



City of Sandy

Agenda

City Council Meeting

Meeting Date: Monday, November 21, 2022

Meeting Time: 7:00 PM

Page

1. CITY COUNCIL EXECUTIVE SESSION - 6:00 PM

The City Council will meet in executive session pursuant to ORS 192.660(2)(d)

2. CITY COUNCIL REGULAR MEETING - 7:00 PM

This meeting will be conducted in a hybrid in-person / online format. The Council 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/82602829337>
Or by phone: (253) 215-8782; Meeting ID: 82602829337

Please also note the public comment signup process below.

3. PLEDGE OF ALLEGIANCE

4. ROLL CALL

5. CHANGES TO THE AGENDA

6. PUBLIC COMMENT

The Council welcomes your comments at this time.

If you are attending the meeting in-person

Please submit your comment signup form to the City Recorder before the regular meeting begins at 7:00 p.m. Forms are available on the table next to the Council Chambers door.

If you are attending the meeting via Zoom

Please complete the [online comment signup webform](#) by 3:00 p.m. on the day of the meeting.

The Mayor will call on each person when it is their turn to speak for up to three minutes.

7. RESPONSE TO PREVIOUS PUBLIC COMMENTS

8. CONSENT AGENDA

- | | | |
|------|--|---------|
| 8.1. | <u>City Council Minutes</u> | 4 - 14 |
| | City Council - 07 Nov 2022 - Minutes - Pdf | |
| 8.2. | <u>Sandy Transit Operations Contract</u> | 15 - 23 |
| | Sandy Transit Operations Contract - Pdf | |

9. ORDINANCES

- | | | |
|------|---|----------|
| 9.1. | <u>PUBLIC HEARING: "Bull Run Terrace" Reconsideration</u> | 24 - 533 |
| | Ordinance 2022-27 | |
| | Bull Run Terrace Reconsideration - Pdf | |
| | Staff Presentation Slides | |
| | Ordinance 2022-27 | |
| | A - Cover Letter from Tracy Brown Planning Consultants, LLC | |
| | B - Project Narrative | |
| | C - Civil Plan Set | |
| | D - Preliminary Storm Drainage Design and Calculations | |
| | E -Traffic Impact Study | |
| | F - Arborist Reports from Teragan and Associates | |
| | G - Geotechnical and Slope Stability Investigation | |
| | H - Wetland Determination Report | |
| | I - Screening Concept Plan | |
| | J - Public Need Analysis from Johnson Economics | |
| | K - Figure 11 from the 2022 Parks and Trails Master Plan | |
| | L - S - Agency Comments | |
| | T - U - Public Comments | |
| | V - Additional Public Comment (11.14.22) | |
| | W - Staff Memo Regarding Condition Edits | |
| | X - Ard Engineering - Response to City Traffic Eng DKS (11.21.22) | |
| | Y - Letter from Attorney Garrett Stephenson (11.21.22) | |
| | Z - Ruehrdanz email (11.21.22) | |

10. REPORT FROM THE CITY MANAGER

11. COMMITTEE /COUNCIL REPORTS

12. STAFF UPDATES

12.1. [Monthly Reports](#)

13. ADJOURN



MINUTES
City Council Meeting
Monday, November 7, 2022 6:00 PM

COUNCIL PRESENT: Stan Pulliam, Mayor; Jeremy Pietzold, Council President; Laurie Smallwood, Councilor; Richard Sheldon, Councilor; Kathleen Walker, Councilor; Carl Exner, Councilor; and Don Hokanson, Councilor

COUNCIL ABSENT: (none)

STAFF PRESENT: Jordan Wheeler, City Manager; Jeff Aprati, City Recorder; Tyler Deems, Deputy City Manager; Shelley Denison, Associate Planner; Kelly O'Neill Jr., Development Services Director; Jenny Coker, Public Works Director; and AJ Thorne, Assistant Public Works Director

MEDIA PRESENT: (none)

1. JOINT COUNCIL / PLANNING COMMISSION WORKSESSION - 6:00 PM

1.1. Envision Sandy 2050: Project Update (6:00 p.m.)

Staff Report - 0625

The City's contractor, 3J Consulting, summarized the staff report and delivered a presentation. Slides were included in the agenda packet.

Council discussion ensued on the following topics:

- Parks and Trails section should specifically reference Sandy River Park
- Natural Hazards section should include earthquakes and should also reference the word 'disasters'
- SandyNet section should include the words 'state of the art'
- Discussion on how the Economic Opportunities Analysis and the Economic Development Strategic Plan relate to this effort
- Discussion on the need to strike a balance between specificity and general/broad statements
- Discussion on the success of the recent Future Fest community engagement event
- Discussion on the process for developing the Vision into tangible goals and policies

1.2. **Transportation System Plan Update** (6:30 p.m.)

Staff Report - 0623

The City's consultant, DKS Associates, summarized the staff report and delivered a presentation. Slides were included in the agenda packet.

Council discussion ensued on the following topics:

General

- Differences between transit, freight, and other categories
- Importance of reliable transit service, including at night
- Clarity on bypass cost escalation figures
- Discussion on financially constrained vs. aspirational project lists
- Benefits of listing aspirational projects with regard to seeking grant funding
- Discussion on projects that involve other agencies and the degree to which they participate in this planning. (ODOT provided budget estimates for funds the City is likely to receive in coming years)
- Clarity that maintenance costs for road infrastructure are accounted for in the planning work
- Details on the Safe Routes to School grant program, including cost sharing requirements and opportunities to cooperate with OTSD
- Discussion on why projects are grouped as they are
- Inflation pressures on construction and the importance of moving quickly
- Traffic study requirements for new developments and concerns about study cost burdens
- Suggestions to narrow the study area to closer to city limits
- Importance of ensuring ODOT shares an equitable proportion of costs
- History and context of the City's working relationship with ODOT, and opportunities to cooperate in the future
- Concern about project management and cost control for ODOT managed projects

Project Feedback

- Concern about costs of project at intersection of Hwy 211 and Gunderson; discussion of the development agreement established in 2020
- Importance of safety improvements at the intersection of Hwy 211 and Dubarko

- Concern that the funds allocated for a study are insufficient considering the seriousness of the problems
- Opportunities for collecting additional funds from development that affects that intersection
- Possibilities for adjusting transportation SDCs in the future, which could affect the total available funds
- Suggestion to add a flashing lights crosswalk at Hwy 211 and Dubarko
- Concerns about unintended impacts of intersection improvements at Hwy 211 and Dubarko, especially pertaining to large trucks on a significant slope in icy conditions
- Importance of not giving pedestrians a false sense of security; emphasis on the need to study the potential effects of possible improvements
- Suggestion to reduce the Hwy 211 speed limit
- Possibilities for reallocating a portion of the funds designated for Hwy 211 and Gunderson to Hwy 211 and Dubarko
- Importance of ensuring all sections of town are included in road improvements
- Support for pursuing a Safe Routes to School grant
- Need to facilitate the ability of trucks to turn left from westbound Hwy 26 to southbound Hwy 211, to alleviate truck traffic elsewhere
- Opportunities for sidewalk improvements on Bluff Rd
- Suggestion to reallocate some pedestrian improvement funding from 362nd Ave to Bluff Rd

2. CITY COUNCIL REGULAR MEETING - 7:30 PM

3. Pledge of Allegiance

4. Roll Call

5. Changes to the Agenda
(none)

6. Public Comment

Janet Davis: pleased to see that wastewater discharge alternatives are being explored; understands that much uncertainty remains but is hopeful for good news. Is pleased with the amount of information available on the Sandy Clean Waters webpage, but is concerned that she has not received any emails after signing up for the subscription list.

Julie Stevens: agrees with the comments of Ms. Davis; is glad the City is studying alternatives

7. Response to Previous Public Comments
(none)

8. Consent Agenda

8.1. **City Council Minutes**

8.2. **School Resource Officer Contract Renewal**

Staff Report - 0626

Moved by Jeremy Pietzold, seconded by Kathleen Walker

Adopt the Consent Agenda

CARRIED. 6-0

Ayes: Stan Pulliam, Jeremy Pietzold, Laurie Smallwood,
Kathleen Walker, Carl Exner, and Don Hokanson

Abstained: Richard Sheldon

9. New Business

9.1. **Wastewater System Facilities Plan Amendment**

Staff Report - 0627

The **Assistant Public Works Director** and consultants from Leeway Engineering summarized the staff report, which was included in the agenda packet.

Council discussion ensued on the following topics:

- Optimism regarding possible discharge alternatives, which are worth exploring
- Importance of continuing work to limit system inflow and infiltration
- Importance of investing in the stormwater system as well

Moved by Carl Exner, seconded by Don Hokanson

Authorize the City Manager to sign an agreement with Kennedy Jenks for professional services to complete a Wastewater System Facilities Plan Amendment in an amount not to exceed \$502,841.

CARRIED. 7-0

Ayes: Stan Pulliam, Jeremy Pietzold, Laurie Smallwood,
Richard Sheldon, Kathleen Walker, Carl Exner, and Don
Hokanson

10. Report from the City Manager

- Very promising initial results regarding the wastewater system's performance in the recent storm event
- Portland has moved to groundwater due to recent turbidity; challenges exist at the Alder Creek facility and investment is greatly needed
- The Police Chief is presenting at a conference on Sandy's successes in recruitment and retention
- Council Members are needed to serve on board and commission interview panels. The following Councilors were designated:
 - Library Advisory Board: Mayor Pulliam, and Councilors Walker and Sheldon
 - Transit Advisory Board: Mayor Pulliam, and Councilors Smallwood and Exner
 - Economic Development Advisory Board: Mayor Pulliam, and Councilors Pietzold and Walker

11. Committee /Council Reports

11.1.

7 - 11

Councilor Hokanson

- Expressed praise for Sandy Fire emergency services
- Proposed adding new regulations regarding outdoor burning. Will send ideas to the Council via email and ask for their input individually

Councilor Exner

- Expressed concern regarding stormwater detention at a subdivision on the south end of town. Staff will look into the matter as soon as possible.
- Provided information regarding housing affordability, population growth, housing supply, and economic trends obtained at a recent conference. (Slides that were referenced are attached to these minutes).

Councilor Walker

- Suggested publicizing the recent successes of the wastewater system
- Provided an update regarding possibilities for the County to assist with rent costs for the Hoodland Library
- Provided a summary of the recent Clackamas Cities Dinner event

Councilor Sheldon

- Urged staff to ensure new camping regulations are being enforced
- Praised the new Community Center Manager

Councilor Smallwood

- Appreciated the recent Trick or Treat Trail event
- Expressed safety concerns regarding the ODOT bumpouts

Council President Pietzold

- Echoed the stormwater concerns referenced by Councilor Exner
- Encouraged holding a chipper event to assist residents with storm debris
- Encouraged sharing information regarding responsibility for street trees
- Stressed the importance of customer service five days per week
- Praised the new Vista Loop sidewalks

Mayor Pulliam

- Encouraged City Hall participation in the Trick or Treat Trail
- Referred to the upcoming Action Center Thanksgiving box program
- Referenced the upcoming Turkey Trot
- Praised the upcoming Meinig Park light displays

[Exner images](#)

12. Staff updates

12.1. [Monthly Reports](#)

13. Adjourn

Mayor, Stan Pulliam

City Recorder, Jeff Aprati

Housing Affordability Headwinds Rising

*HBA of Metropolitan Portland
November 10, 2021*

*Robert Dietz, Ph.D.
NAHB Chief Economist*



Home Builders Association
of Metropolitan Portland



The seal of the State of Oregon is faintly visible in the background of the dark blue section. It features an eagle with wings spread, perched on a shield. Above the eagle are the words "STATE OF OREGON" and "1859". Below the eagle is a banner with the words "THE UNION".

Oregon's Economic and Housing Outlook

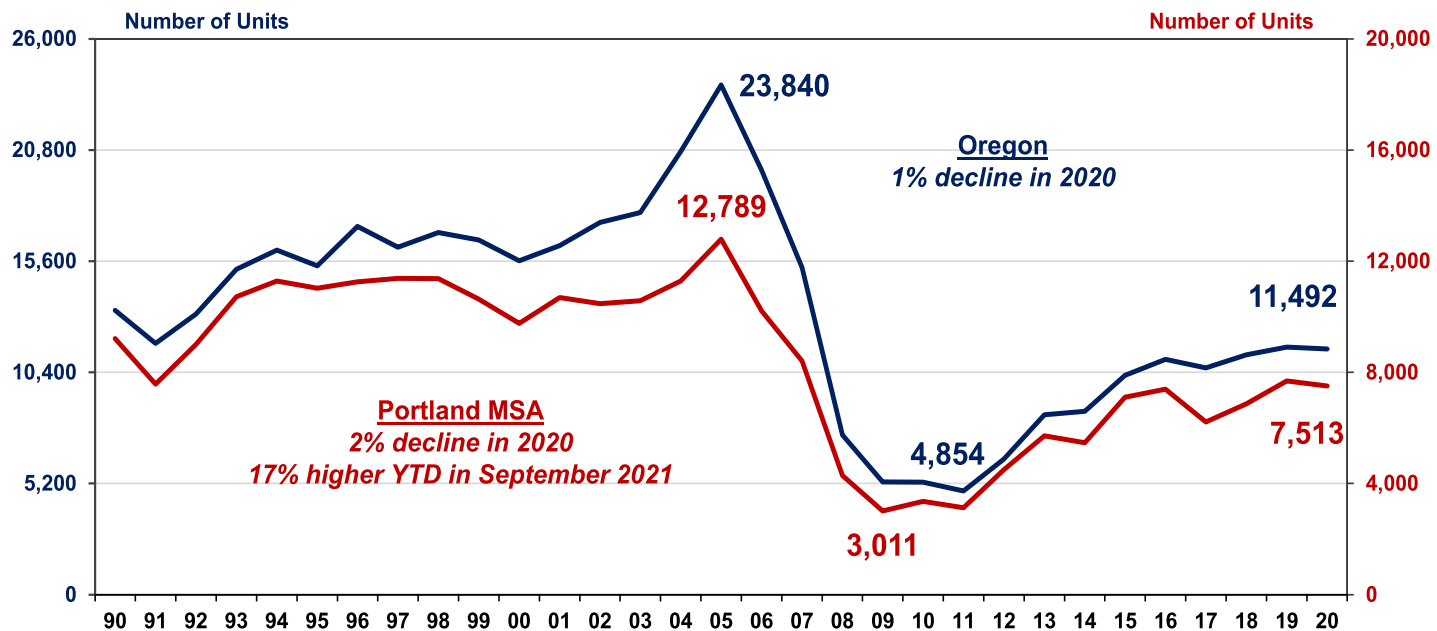
November 10th, 2021

Oregon Office of Economic Analysis

Josh Lehner

Disclaimer: The views expressed here are solely those of the presenter, they do not necessarily represent official State of Oregon policies or positions.

Single-Family Building Permits – Oregon and Portland MSA



Source: Census Bureau.

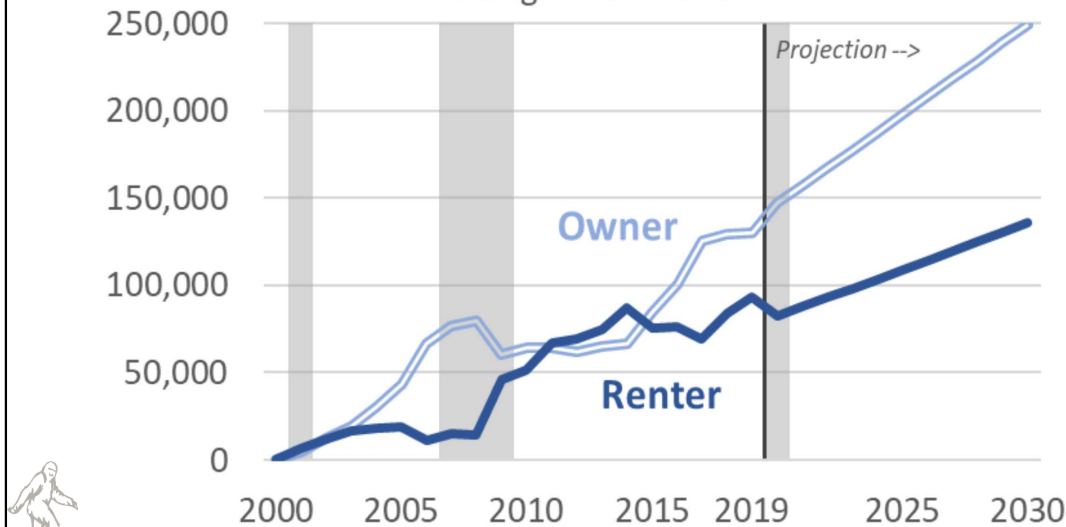




Outlook: This is the demand sweet spot

Portland MSA Households

Change Since 2000

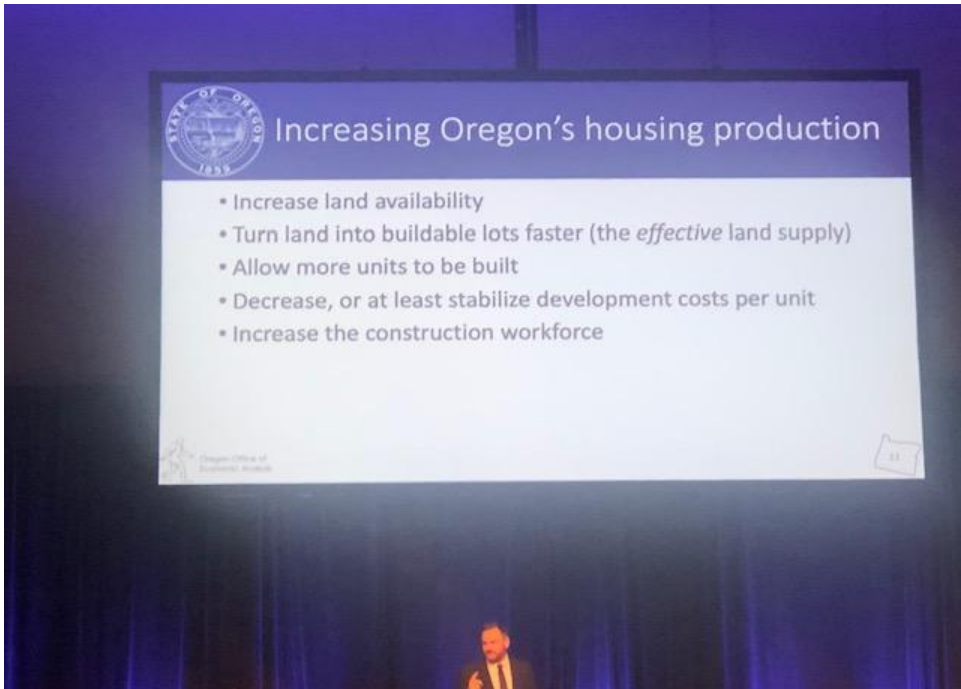


Latest Data: 2019 | Source: Census, Portland State PRC, WA OFM, Oregon Office of Economic Analysis



- Strong demand, especially ownership

- Demographics as Millennials age into their homebuying years
- Low interest rates
- Strong labor income growth





Staff Report

Meeting Date: November 21, 2022
From Andi Howell, Transit Director
SUBJECT: Sandy Transit Operations Contract

DECISION TO BE MADE:

Whether to approve the Transit Operations Contract with MV Transportation Inc.

BACKGROUND / CONTEXT:

Transit contracts operations of the Sandy Area Metro (SAM) transit system. To procure a contractor, SAM conducts a Request for Proposal (RFP) process. Each RFP process is for a possible 5 year contract, with 3 annual negotiations after the first two years. On May 2, 2022, Transit requested a 6 month extension with MV Transportation Services due to an inability to negotiate a full one year extension between the City, County and MV.

The extension was requested to allow the City and County to continue negotiations and/or issue a Request for Proposals (RFP). The current environment of high costs and shrinking available labor force does not suggest that a new RFP process would yield lower rates. Additionally, a new RFP often causes lowered morale and some to leave in search for a more stable work environment. With the current workforce shortages and the burdensome drain of resources during contractor negotiations and contractor transitions, it is pertinent to maintain the current contractor for the remainder of the contracted period.

KEY CONSIDERATIONS / ANALYSIS:

The negotiated rate increase during the 6 month extension was a 23% increase for the City and was primarily driven by higher wage requests. The rate per Revenue Service Hour (RSH) was \$60.47, increased to \$74.85 for fixed route and \$70.10 for out-of-town medical rides. Since the driver wage increase, MV has been more successful in recruiting drivers to the Sandy Transit team.

The new contract would begin December 1, 2022 and a new rate (\$77.15) would be in effect until June 30, 2023. As of July 1, 2023 there would be a new rate (\$79.75) and driver wages would increase another 5%. This would continue to June 30, 2024, at which time the 5 year contract period expires and a new RFP process will be required. In order to conduct a good, thorough RFP and provide a smooth transition in the event a new contractor is chosen, the City will need to begin the process at least one year before the contract terminates. Therefore the City will begin a new RFP this June, 2023.

This contract gives Transit staff and MV employees a stable work environment while the City conducts a new RFP. The new contract also has added language issuing refunds to the City when key positions go unfilled, something that has not been included in past contracts. Additionally, the City's rates closely reflect other similar, local agencies who recently conducted an RFP such as Canby Area Transit (CAT). CAT currently has a rate of \$76.72 that will increase to just over \$80.00 as of July 1, 2023. Although SAM and CAT have similar services with similar revenue hours, the cost sharing structure with Clackamas County keeps City rates slightly lower by adding another 9600 Revenue Hours and a shared labor force.

The County's rates in the new contract are higher than City rates due to higher costs associated with operating a mountain service. County rates are \$85.77 in year 1 and \$88.66 in year 2. Additionally, the County pays \$2.00 per revenue hour as a wage differential for driving the mountain making their total cost \$87.77 and \$90.66 per revenue hour.

The City and the County look forward to working with MV for the remainder of the contract period while also actively seeking future cost saving measures and best practices.

Significant contract changes December - June

- **SAM I** hourly service rate was \$74.85 New rate \$77.15
- **SAM II** hourly service rate was \$74.85 New rate \$77.15
- **Shopper Shuttle** hourly service rate was \$74.85 New rate \$77.15
- **Shopper Shuttle** hourly service rate was \$74.85 New rate \$77.15
- **SAM rides** hourly service rate was \$74.85 New rate \$77.15
- **Elderly and Disabled** hourly service rate was \$70.10 New rate \$72.33

Estimated maximum 7-month cost estimate: \$875,000

Significant contract changes July - June

- **SAM I** hourly service rate was \$77.15 New rate \$79.75
- **SAM II** hourly service rate was \$77.15 New rate \$79.75
- **Shopper Shuttle** hourly service rate was \$77.15 New rate \$79.75
- **Shopper Shuttle** hourly service rate was \$77.15 New rate \$79.75
- **SAM rides** hourly service rate was \$77.15 New rate \$79.75
- **Elderly and Disabled** hourly service rate was \$72.33 New rate \$74.79

Estimated maximum 12-month cost estimate: \$1,550,574

The Rate Proposal Sheet including the estimated budget costs is attached.

- In year 1, driver start wage remains the same with drivers getting 2.7% hire date anniversary raises
- In year 2, driver start wage increases from to \$23.10 w CDL \$19.95 without a CDL
- In both years, dispatch wage will be driver wage based on seniority plus \$1.00 per hour. This corrects a current underpayment of dispatchers which are supervisor positions
- Road Supervisor start wage raised from \$24.00 to 25.20 in year 2
- Maintenance Coordinator wage raised from \$25.00 to \$26.25 in year 2
- Utility worker wage raised from \$18.53 to 19.98 in year 2
- Drivers with seniority who currently receive an additional \$400 monthly bonus will continue to receive this monthly payment

The driver and staff wage chart is attached (drivers' names removed for privacy of MV employees).

RECOMMENDATION:

Approve the MV Contract for Sandy Transit Operations.

BUDGETARY IMPACT:

Cost of operations per contract for 19 months is \$2,425,574. This has no impact on the FY2023 contracting budget. SAM has available revenue to cover the increased costs for the remainder of the contract period.

SUGGESTED MOTION LANGUAGE:

I move to approve the Transit Contract amendment, extending the transit contract with MV Transportation Services as attached.

LIST OF ATTACHMENTS/EXHIBITS:

- Contract amendment
- Driver and staff wage chart

Amendment 2 to Personal Services

Contract

Effective December 1, 2022

This Amendment 2 to Personal Services Contract (“Amendment 2”) is made and entered into as of December 1, 2022 by and between The City of Sandy (“City”) and MV Transportation, Inc. (“Contractor”), in order to amend that certain Personal Services Contract effective as of May 30, 2020, as amended by that certain Amendment 1 Transit Contract, effective as of May 31, 2022 (as may be further amended from time to time, collectively, the “Transit Contract”). Capitalized terms that are used but not defined herein have the meaning set forth in the Transit Contract.

Now, therefore, for other good and valuable consideration the sufficiency of which is hereby acknowledged, the parties agree as follows:

1. Amendment. The Transit Contract is hereby amended as follows:

- a. Article 1, Section 1 is hereby deleted in its entirety and replaced with the following:

“**Effective Date and Duration**. This Contract shall become effective on **May 30, 2020** and upon signature of both parties. Unless earlier terminated or extended, this Contract shall expire on **June 30, 2024**. This Contract may be renewed for up to three (3) additional terms, to be exercised by execution of a written amendment on terms and conditions approved by both parties.”

- b. Article 1, Section 3 is hereby deleted in its entirety and replaced with the following:

“**Consideration**. The City agrees to pay Contractor, from available and authorized funds, (A) a sum not to exceed \$2,432,126 from the effective date of this Contract until November 30, 2022 and (B) a sum not to exceed \$2,445,000 from December 1, 2022 until June 30, 2024, for accomplishing the Work required by this Contract. Consideration rates are on a fixed hourly rate basis in accordance with the rates and costs specified in Exhibits B, B.1, and B.2 (which Exhibit B.1 includes the new staff wage scale, the continuation of the \$400 monthly payment to those MV employees already receiving such payments as outlined in Exhibit A, and a new revenue service hour rate). If any interim payments to Contractor are made, such payments shall be made only in accordance with the schedule and requirements in Exhibit A and Exhibit B. Any change to hours and/or routes shall be made in writing on terms mutually acceptable to the parties. If for any reason any of the General

{00822934; 3 }

Manager, Road Supervisor, Maintenance Coordinator, Dispatcher or Utility Worker positions designated in the Contract are open or not permanently filled by a qualified individual for a period that is longer than 90 consecutive days, the City shall (1) immediately assess a charge equal to the position's monthly salary and benefits as denoted in the Contract and (2) collect such charge through a reduction in the payment owed to the Contractor in the next invoice cycle, or as otherwise agreed to at the City's discretion. The City may continue to collect such fee for each subsequent month in which the open position is left vacant."

- c. Article 1, section 6 is hereby deleted in its entirety and replaced with the following:

"This Contract consists of the following documents, which are listed in descending order of precedence and are attached and incorporated by reference: this Contract (as amended from time to time), **Exhibit A, Exhibit B, Exhibit B.1, Exhibit B.2, and Exhibit C.**"

- d. The following exhibits are hereby added to the Contract:

Exhibit B.1, Wages and Rates as of December 1, 2022

Exhibit B.2, Wages and rates, as passed by the Council for June – November 2022.

2. Electronic Signature. This Amendment 2 may be executed in several counterparts, each of which will be an original, all of which will constitute one and the same instrument. An electronic signature will be considered an original. The individuals signing this Amendment 2 certify that they are authorized to execute this document on behalf of the City and Contractor respectively.
3. Effect of Amendment. Except as specifically amendment by this Amendment 2, the Transit Contract remains in full force and effect. This Amendment 2 shall not constitute or operate as a waiver of, or estoppel with respect to, any provisions of the Transit Contract by any party hereto.

By their signatures below, the parties to this Amendment 2 agree to the terms, conditions, and content expressed herein.

MV Transportation LLC

City of Sandy

Authorized Signature Date

Jordan Wheeler Date

Name / Title (Printed)

Approved as to Form:

Oregon Business Registry #

City Attorney Date

Entity Type / State of Formation

Attachment B
BUDGET FORM

Proposed Budget: Year 1 – 9/01/22 – 6/30/23							
Category	CLACKAMAS			Total Recalc			
	Total	Fixed	Variable	Total	Fixed	Variable	Total
STARTING DRIVER WAGE				<i>\$19 NCDL \$22 CDL</i>			
Driver Wages (REV)	\$ 257,906	\$ -	\$ 257,906	\$ 466,289	\$ -	\$ 466,289	\$ 724,196
Driver Wages (NON_REV)	\$ 16,907	\$ -	\$ 16,907	\$ 30,567	\$ -	\$ 30,567	\$ 47,474
Driver Benefits	\$ 100,606	\$ -	\$ 100,606	\$ 184,433	\$ -	\$ 184,433	\$ 285,039
Dispatch Wages	\$ 48,641	\$ 48,641	\$ -	\$ 89,169	\$ 89,169	\$ -	\$ 137,810
Dispatch Benefits	\$ 10,605	\$ 10,605	\$ -	\$ 19,441	\$ 19,441	\$ -	\$ 30,045
Management Wages	\$ 23,731	\$ 23,731	\$ -	\$ 43,505	\$ 43,505	\$ -	\$ 67,236
Management Fringes	\$ 2,960	\$ 2,960	\$ -	\$ 5,426	\$ 5,426	\$ -	\$ 8,385
Payroll Taxes	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Road Supervisor Wages	\$ 15,123	\$ 15,123	\$ -	\$ 27,725	\$ 27,725	\$ -	\$ 42,848
Road Supervisor Benefits	\$ 3,443	\$ 3,443	\$ -	\$ 6,311	\$ 6,311	\$ -	\$ 9,754
Maintenance Wages	\$ 27,430	\$ 27,430	\$ -	\$ 50,286	\$ 50,286	\$ -	\$ 77,716
Maintenance Benefits	\$ 7,470	\$ 7,470	\$ -	\$ 13,695	\$ 13,695	\$ -	\$ 21,165
Workers Comp	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Liability Insurance	\$ 47,766	\$ 47,766	\$ -	\$ 87,565	\$ 87,565	\$ -	\$ 135,331
Communications	\$ 4,418	\$ 4,418	\$ -	\$ 8,099	\$ 8,099	\$ -	\$ 12,517
Driver Uniforms	\$ 1,235	\$ 1,235	\$ -	\$ 2,265	\$ 2,265	\$ -	\$ 3,500
Driver Physicals & D/A Testing	\$ 9,029	\$ 9,029	\$ -	\$ 16,552	\$ 16,552	\$ -	\$ 25,581
Employee Recruiting/Training	\$ 1,362	\$ 1,362	\$ -	\$ 2,497	\$ 2,497	\$ -	\$ 3,858
Office Supplies	\$ 9,474	\$ 9,474	\$ -	\$ 17,368	\$ 17,368	\$ -	\$ 26,842
Interest	\$ 4,830	\$ 4,830	\$ -	\$ 8,855	\$ 8,855	\$ -	\$ 13,685
Depreciation	\$ 1,696	\$ 1,696	\$ -	\$ 3,109	\$ 3,109	\$ -	\$ 4,805
Business License	\$ 3,194	\$ 3,194	\$ -	\$ 5,856	\$ 5,856	\$ -	\$ 9,050
Drive Cam	\$ 1,902	\$ 1,902	\$ -	\$ 3,488	\$ 3,488	\$ -	\$ 5,390
Total:	\$ 599,728	\$ 224,309	\$ 375,419	\$ 1,092,499	\$ 411,209	\$ 681,290	\$ 1,692,227
Administrative Overhead	\$ 38,427	\$ 14,372	\$ 24,054	\$ 70,000	\$ 26,348	\$ 43,652	\$ 108,426
Administrative Overhead %	5.60%	5.60%	5.60%	5.60%	5.60%	5.60%	5.60%
Profit	\$ 48,033	\$ 17,965	\$ 30,068	\$ 87,500	\$ 32,934	\$ 54,566	\$ 135,533
Profit%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%
Total:	\$ 686,188	\$ 256,647	\$ 429,541	\$ 1,249,999	\$ 470,491	\$ 779,508	\$ 1,936,187
Number of Sandy CDL Vehicle Revenue Hours	-	-	-	14,658	14,658	14,658	14,658
Number of Sandy NCDL Vehicle Revenue Hours	-	-	-	-	-	-	-
Number of Clackamas CDL Vehicle Revenue Hours	8,000	8,000	8,000	1,647	1,647	1,647	8,000
Total Vehicle Revenue Hours	8,000	8,000	8,000	16,304	16,304	16,304	24,304
Fixed Route - Cost per Vehicle Revenue Hour	\$ -	\$ -	\$ -	\$ 77.15	\$ -	\$ -	\$ 77.15
Demand Response - Cost per Vehicle Revenue Hour	\$ -	\$ -	\$ -	\$ 72.33	\$ -	\$ -	\$ 72.33
City Circulator - Cost per Vehicle Revenue Hours	\$ -	\$ -	\$ -	\$ 77.15	\$ -	\$ -	\$ 77.15
Clackamas	\$ 85.77	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 85.77
Total Cost:	\$ 686,188	\$ 256,647	\$ 429,541	\$ 1,249,999	\$ 470,491	\$ 779,508	\$ 1,936,187
Proposed Fixed and Variable Rate							
CDL Variable Rate	\$ 53.69	\$ -	\$ 53.69	\$ 48.30	\$ -	\$ 48.30	\$ 49.75
Non-CDL Variable Rate	\$ -	\$ -	\$ -	\$ 43.48	\$ -	\$ 43.48	\$ -
Fixed Cost per Month	\$ 25,664.65	\$ 25,664.65	\$ -	\$ 47,049.11	\$ 47,049.11	\$ -	\$ 72,713.76
Total Cost:	\$ 686,188	\$ 256,647	\$ 429,541	\$ 1,249,999	\$ 470,491	\$ 779,508	\$ 1,936,187

Attachment B
BUDGET FORM

Proposed Budget: Year 2 - 7/01/23 – 6/30/24							
Category	CLACKAMAS			Total Recalc			
	Total	Fixed	Variable	Total	Fixed	Variable	Total
STARTING DRIVER WAGE				<i>\$19 NCDL \$22 CDL</i>			
Driver Wages (REV)	\$ 318,973	\$ -	\$ 318,973	\$ 576,696	\$ -	\$ 576,696	\$ 895,669
Driver Wages (NON REV)	\$ 21,097	\$ -	\$ 21,097	\$ 38,144	\$ -	\$ 38,144	\$ 59,241
Driver Benefits	\$ 123,746	\$ -	\$ 123,746	\$ 226,855	\$ -	\$ 226,855	\$ 350,601
Dispatch Wages	\$ 61,749	\$ 61,749	\$ -	\$ 113,200	\$ 113,200	\$ -	\$ 174,948
Dispatch Benefits	\$ 13,336	\$ 13,336	\$ -	\$ 24,447	\$ 24,447	\$ -	\$ 37,783
Management Wages	\$ 29,189	\$ 29,189	\$ -	\$ 53,511	\$ 53,511	\$ -	\$ 82,700
Management Fringes	\$ 3,647	\$ 3,647	\$ -	\$ 6,686	\$ 6,686	\$ -	\$ 10,333
Payroll Taxes	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Road Supervisor Wages	\$ 19,055	\$ 19,055	\$ -	\$ 34,933	\$ 34,933	\$ -	\$ 53,988
Road Supervisor Benefits	\$ 4,316	\$ 4,316	\$ -	\$ 7,912	\$ 7,912	\$ -	\$ 12,229
Maintenance Wages	\$ 34,565	\$ 34,565	\$ -	\$ 63,365	\$ 63,365	\$ -	\$ 97,929
Maintenance Benefits	\$ 9,369	\$ 9,369	\$ -	\$ 17,176	\$ 17,176	\$ -	\$ 26,546
Workers Comp	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Liability Insurance	\$ 60,185	\$ 60,185	\$ -	\$ 110,333	\$ 110,333	\$ -	\$ 170,517
Communications	\$ 5,461	\$ 5,461	\$ -	\$ 10,010	\$ 10,010	\$ -	\$ 15,471
Driver Uniforms	\$ 1,527	\$ 1,527	\$ -	\$ 2,799	\$ 2,799	\$ -	\$ 4,326
Driver Physicals & D/A Testing	\$ 11,160	\$ 11,160	\$ -	\$ 20,459	\$ 20,459	\$ -	\$ 31,618
Employee Recruiting/Training	\$ 1,683	\$ 1,683	\$ -	\$ 3,086	\$ 3,086	\$ -	\$ 4,769
Office Supplies	\$ 11,710	\$ 11,710	\$ -	\$ 21,467	\$ 21,467	\$ -	\$ 33,176
Interest	\$ 5,671	\$ 5,671	\$ -	\$ 10,396	\$ 10,396	\$ -	\$ 16,067
Depreciation	\$ 2,035	\$ 2,035	\$ -	\$ 3,731	\$ 3,731	\$ -	\$ 5,766
Business License	\$ 3,948	\$ 3,948	\$ -	\$ 7,237	\$ 7,237	\$ -	\$ 11,185
Drive Cam	\$ 2,351	\$ 2,351	\$ -	\$ 4,311	\$ 4,311	\$ -	\$ 6,662
Total:	\$ 744,774	\$ 280,957	\$ 463,817	\$ 1,356,752	\$ 515,058	\$ 841,695	\$ 2,101,526
Administrative Overhead	\$ 38,303	\$ 14,449	\$ 23,853	\$ 69,776	\$ 26,489	\$ 43,287	\$ 108,078
Administrative Overhead %	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%
Profit	\$ 68,093	\$ 25,687	\$ 42,406	\$ 124,046	\$ 47,091	\$ 76,955	\$ 192,139
Profit%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%
Total:	\$ 851,170	\$ 321,094	\$ 530,076	\$ 1,550,574	\$ 588,637	\$ 961,937	\$ 2,401,743
Number of Sandy CDL Vehicle Revenue Hours	-	-	-	17,589	17,589	17,589	17,589
Number of Sandy NCDL Vehicle Revenue Hours	-	-	-	1,976	1,976	1,976	1,976
Number of Clackamas CDL Vehicle Revenue Hours	9,600	9,600	9,600	-	-	-	9,600
Total Vehicle Revenue Hours	9,600	9,600	9,600	19,565	19,565	19,565	29,165
Fixed Route - Cost per Vehicle Revenue Hour	\$ -	\$ -	\$ -	\$ 79.75	\$ -	\$ -	\$ 79.75
Demand Response - Cost per Vehicle Revenue Hour	\$ -	\$ -	\$ -	\$ 74.79	\$ -	\$ -	\$ 74.79
City Circulator - Cost per Vehicle Revenue Hours	\$ -	\$ -	\$ -	\$ 79.75	\$ -	\$ -	\$ 79.75
Clackamas	\$ 88.66	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 88.66
Total Cost:	\$ 851,170	\$ 321,094	\$ 530,076	\$ 1,550,574	\$ 588,637	\$ 961,937	\$ 2,401,743
Proposed Fixed and Variable Rate							
CDL Variable Rate	\$ 55.22	\$ -	\$ 55.22	\$ 49.67	\$ -	\$ 49.67	\$ 51.16
Non-CDL Variable Rate	\$ -	\$ -	\$ -	\$ 44.70	\$ -	\$ 44.70	\$ -
Fixed Cost per Month	\$ 26,757.80	\$ 26,757.80	\$ -	\$ 49,053.09	\$ 49,053.09	\$ -	\$ 75,810.89
Total Cost:	\$ 851,170	\$ 321,094	\$ 530,076	\$ 1,550,574	\$ 588,637	\$ 961,937	\$ 2,401,743

Sandy, OR Staffing Proposal Summary

	FTE	Average Wage	
		Year 1	Year 2
General Manager	1.0	\$ 38.79	\$ 39.76
Drivers	21.0	\$ 22.65	\$ 23.34
Lead Dispatcher/Weekend Ops MGR	-	\$ -	\$ -
Dispatchers	3.0	\$ 25.73	\$ 27.22
Road Supervisor	1.0	\$ 24.00	\$ 25.20
Fleet Coordinator	1.0	\$ 25.00	\$ 26.25
Utility Worker	1.0	\$ 18.53	\$ 19.46



Staff Report

Meeting Date: November 21, 2022
From Kelly O'Neill Jr., Development Services Director
SUBJECT: Bull Run Terrace Reconsideration

DECISION TO BE MADE:

Hold a Type IV Quasi-Judicial de novo (starting from the beginning) public hearing to hear testimony from the applicant and the public, and either approve or deny the Bull Run Terrace land use application.

PURPOSE / OBJECTIVE:

Approve or deny the Bull Run Terrace subdivision request. Approval will include among other things, a comprehensive plan change, a zone change, establishment of a specific area plan, and extensive tree removal. If the City Council decides to approve this subdivision request it will also necessitate the adoption of Ordinance No. 2022-27.

BACKGROUND / CONTEXT:

On December 29, 2020, the City Council issued a decision denying the [Bull Run Terrace Subdivision](#) application (File No. 19-050 CPA/ZC/SAP/SUB/TREE). The applicant, Roll Tide Properties Corp., appealed the City Council decision to the Oregon Land Use Board of Appeals (LUBA). The LUBA appeal was then placed on stay, meaning 'on hold', until the City could process the alternative proposal, [Deer Meadows Subdivision](#) application which was denied by the Planning Commission and appealed to the City Council. On May 2, 2022, the City Council issued a decision denying the Deer Meadows Subdivision application. The applicant then appealed that City Council decision to LUBA.

In accordance with ORS 197.830(13)(b), the applicant requested the City Council reconsider the Bull Run Terrace Subdivision proposal with certain modifications, including a residential dwelling cap not to exceed 200 dwelling units. The applicant states that the existing zoning could accommodate 226 dwelling units. The applicant also proposed to increase the parkland dedication by 0.325 acres from the original plan to a total of 1.755 acres. The City Council has agreed to reconsider the proposal with the modifications. This document reviews the reconsideration.

The applicant requests a Type IV Zone Map Amendment, Comprehensive Plan Map Amendment, establishment of a Specific Area Plan, approval of a 7-lot subdivision, and tree removal. The subject site is approximately 15.91 acres. The site is located at 40808 and 41010 Highway 26. The development area would total 11.60 acres. Four lots are proposed as R-1 (low-density residential) zoning at 0.59 acres and will each contain a

single-family dwelling or duplex. One lot at 6.50 acres is proposed to have the R-3 (high-density residential) zoning designation, one lot at 1.23 acres is proposed to have the R-2 (medium-density residential) zoning designation, and one lot at 3.28 acres is proposed to have the C-3 (village commercial) zoning designation. The R-3 and R-2 lots would contain multi-family dwellings and the one lot of C-3 would likely contain a mix of commercial and residential development. The applicant also proposes to dedicate 1.755 acres for the eventual construction of Deer Pointe Park and zone this land as Parks and Open Space (POS).

KEY CONSIDERATIONS / ANALYSIS:

The findings throughout the staff report address the varying approval criteria and code requirements that are required to be analyzed with this land use application. Of utmost importance are the approval criteria tied to the comprehensive plan amendment, the zone change amendment, the specific area plan overlay, and the subdivision approval. The evaluation of the criteria is thoroughly evaluated in the staff report, but are more specifically described as follows:

Comprehensive Plan Amendment: Section 17.24.70, criteria A. and B.

Zoning Map Amendment: Section 17.26.40 B., criteria 1. through 4.

Specific Area Plan Overlay: Section 15.54.10 A. through H.

Subdivision Approval: Section 17.100.60 E., criteria 1. through 6.

Four important notes:

1. This application was originally submitted on December 30, 2019. The Sandy Development Code in effect at that time is what this reconsideration is being reviewed under. Therefore, it is important to note that modifications that have since occurred to the Sandy Development Code, particularly to Chapter 17.86, Parkland and Open Space, and Chapter 17.100, Land Division, do not apply to this application. However, because of how state legislation was adopted, House Bill 2001 and Senate Bill 458 are allowed to apply to this site, independent of the land use submission date.
2. Per Section 17.100.60(H) of the Development Code at the time of the original application submittal (December, 2019), the final plat shall be delivered to the Director for approval within one year 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, grant an extension of the tentative plat approval for up to one additional year. While the subdivision approval expires one year from approval, if a final plat is not recorded, the proposed comprehensive plan map and zoning map modifications go into effect 30 days from the date of the ordinance in accordance with Section 17.26.90.
3. This application is not subject to the moratorium on development adopted by Resolution 2022-24 because it was submitted prior to the effective date of the moratorium.
4. An exhaustive density analysis is included on pages 6 through 8 of the staff report in the section titled, 'Proposed Zoning Amendments.'

RECOMMENDATION:

The Development Services Director recommends the City Council approve the Type IV comprehensive plan amendment, zone change, subdivision, and specific area plan overlay with tree removal associated with the proposed development subject to the conditions of approval below. This proposal meets the applicable approval criteria in the Sandy Municipal Code and achieves some major goals consistent with long range planning objectives in the City of Sandy, including but not limited to the following:

1. Extending Dubarko Road to intersect with Highway 26 consistent with the Transportation System Plan that was adopted in 2011;
2. Installing Street B to the south consistent with the Transportation System Plan that was adopted in 2011;
3. Paying a proportional share fee of \$268,345 towards construction of future capacity improvements at the intersection of Highway 211 and Dubarko Road at a cost of \$15,785 per PM peak hour trip;
4. Extending Fawn Street to the east;
5. Expanding the Deer Pointe Park consistent with the goals of the Parks and Trails Advisory Board and Figure 11 of the 2022 Parks and Trails Master Plan;
6. Fulfilling housing needs as defined in the Urbanization Study that was adopted in 2015; and,
7. Providing a mixture of housing types consistent with the goals of the 2040 Plan that was created in 1997.

SUGGESTED MOTION LANGUAGE:

"I move to approve the first reading of Ordinance No. 2022-27; and to hold a vote on approval of the second reading, and on approval of File No. 22-038, on December 5, 2022."

LIST OF ATTACHMENTS/EXHIBITS:

Clarification on Documents: The staff report contains exhibits, whereas the ordinance contains attachments. This was done to decrease the confusion over what documents are being referred to by staff, the hearing body, and the public.

- Council Staff Report
- Ordinance 2022-27 with Attachments A, B, C
- Exhibit A. Cover Letter from Tracy Brown Planning Consultants, LLC
- Exhibit B. Project Narrative
- Exhibit C. Civil Plan Set
- Exhibit D. Preliminary Storm Drainage Design and Calculations
- Exhibit E. Traffic Impact Study
- Exhibit F. Arborist Reports from Teragan and Associates
- Exhibit G. Geotechnical and Slope Stability Investigation
- Exhibit H. Wetland Determination Report
- Exhibit I. Screening Concept Plan

- Exhibit J. Public Needs Analysis from Johnson Economics
- Exhibit K. Figure 11 from the 2022 Parks and Trails Master Plan
- Exhibits L. – S. Agency Comments
- Exhibits T. – U. Public Comments
- Exhibit V. Additional Public Comment
- Exhibit W. Staff Memo on Conditions
- Exhibit X. Ard Engineering Response
- Exhibit Y. Garrett Stevenson Email
- Exhibit Z. Ruehrdanz email (11.21.22)

CITY COUNCIL STAFF REPORT (REVISED 11/17/22)
TYPE IV LAND USE PROPOSAL

This proposal was reviewed concurrently as a Type IV comprehensive plan amendment, zone change, subdivision, and specific area plan overlay with tree removal. The following exhibits, findings of fact, and conditions (bold text) explain the proposal and the proposed conditions of approval.

DATE OF HEARING: November 21, 2022

FILE NO.: 22-038 CPA/ZC/SUB/SAP/TREE

PROJECT NAME: Bull Run Terrace Reconsideration

APPLICANT/OWNER: Roll Tide Properties Corp.

PHYSICAL ADDRESS: 40808 and 41010 Highway 26

TAX MAP/LOTS: T2 R5E Section 18CD, Tax Lots 900 and 1000

EXISTING ZONING DISTRICT DESIGNATIONS: Low-Density Residential (R-1), Medium-Density Residential (R-2), and Village Commercial (C-3)

PROPOSED ZONING DISTRICT DESIGNATIONS: Low-Density Residential (R-1), Medium-Density Residential (R-2), High-Density Residential (R-3), Village Commercial (C-3), and Parks and Open Space (POS)

COMPREHENSIVE PLAN DESIGNATION: Village

PROPOSED COMPREHENSIVE PLAN DESIGNATIONS: Village and Parks and Open Space (POS)

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EXHIBITS

Applicant's Submittals for Reconsideration:

- A. Cover Letter from Tracy Brown Planning Consultants, LLC
- B. Project Narrative
- C. Civil Plan Set
 - Sheet C1 – Cover Sheet, Preliminary Plat Map, and Future Street Plan
 - Sheet C2 – Preliminary Plat Map and Specific Area Plan
 - Sheet C3 – Existing Conditions and Tree Retention Plan
 - Sheet C4 – Tree Tables
 - Sheet C5 – Master Street and Utility Plan
 - Sheet C6 – Street Sections
 - Sheet C7 – Street Tree Plan and Parking Analysis
 - Sheet C8 – Proposed Striping Plan
 - Sheet C9 – Preliminary Grading and Erosion Control Plan
 - Sheet C10 – Slope Analysis
 - Sheet 11 – Concept Plan
 - Sheet 12 – Net Zoning Area Comparison
- D. Preliminary Storm Drainage Design and Calculations
- E. Traffic Impact Study

Additional Documents from First Iteration of Bull Run Terrace:

- F. Arborist Reports from Teragan and Associates
- G. Geotechnical and Slope Stability Investigation
- H. Wetland Determination Report
- I. Screening Concept Plan
- J. Public Needs Analysis from Johnson Economics

Additional Documents Included by Development Services Director:

- K. Figure 11 from the 2022 Parks and Trails Master Plan

Agency Comments:

- L. Parks and Trails Advisory Board (October 27, 2022)
- M. Director of Sandy Area Metro (October 28, 2022)
- N. Sandy Fire Marshal (October 24, 2022)
- O. City Engineer Curran-McLeod (October 27, 2022)
- P. Assistant Public Works Director (October 28, 2022)
- Q. City Transportation Engineer (October 31, 2022)
- R. City Transportation Engineer Proportional Share Memo (October 27, 2022)
- S. ODOT (November 2, 2022)

Public Comments:

- T. Val and Gary Roche (October 21, 2022)
- U. David and Nancy Allan (October 21, 2022)

FINDINGS OF FACT

GENERAL FINDINGS

1. This application was originally submitted on December 30, 2019. The Sandy Development Code in effect at that time is what this reconsideration is being reviewed under. Therefore, it is important to note that modifications that have since occurred to the Sandy Development Code, particularly to Chapter 17.86, Parkland and Open Space, and Chapter 17.100, Land Division, do not apply to this application. However, because of how state legislation was adopted, House Bill 2001 and Senate Bill 458 are allowed to apply to this site, independent of the land use submission date.
2. This application is not subject to the moratorium on development adopted by Resolution 2022-24 because it was submitted prior to the effective date of the moratorium.
3. On December 29, 2020, the City Council issued a decision denying the Bull Run Terrace Subdivision application (File No. 19-050 CPA/ZC/SAP/SUB/TREE). The applicant, Roll Tide Properties Corp., appealed the City Council decision to the Oregon Land Use Board of Appeals (LUBA). The LUBA appeal was then placed on stay by the applicant, meaning ‘on hold’, until the City could process the Deer Meadows Subdivision proposal. On May 2, 2022, the City Council issued a decision denying the Deer Meadows Subdivision application. The applicant then appealed that City Council decision to LUBA. In accordance with ORS 197.830(13)(b), the applicant asked the City Council to reconsider the Bull Run Terrace Subdivision proposal with certain modifications, including a residential dwelling cap not to exceed 200 dwelling units. The applicant states that the existing zoning could accommodate 226 dwelling units. The City Council has agreed to reconsider the proposal with the modifications. This document reviews the reconsideration.
4. The applicant requests a Type IV Zone Map Amendment, Comprehensive Plan Map Amendment, establishment of a Specific Area Plan, approval of a 7-lot subdivision, and tree removal. The subject site is approximately 15.91 acres. The site is located at 40808 and 41010 Highway 26. The development area would total 11.60 acres with the remaining acreage dedicated as right-of-way, two stormwater facilities, and parkland. Four lots totaling 0.59 acres are proposed to be zoned R-1 (low-density residential) and will each contain a single-family dwelling or duplex. One lot at 6.50 acres is proposed to have the R-3 (high-density residential) zoning designation, one lot at 1.23 acres is proposed to have the R-2 (medium-density residential) zoning designation, and one lot at 3.28 acres is proposed to have the C-3 (village commercial) zoning designation. The R-3 and R-2 lots would contain multi-family dwellings and the one lot of C-3 would likely contain a mix of commercial and residential development.
5. The applicant also proposes to dedicate 1.755 acres for the eventual construction of Deer Pointe Park and zone this land as Parks and Open Space (POS). As referenced in Finding 1, above, and per Section 17.32.00 of the Development Code at the time of the original application submittal (December 2019), only publicly owned land can be zoned POS. **The**

applicant shall dedicate the proposed 1.755 acres of parkland to the City through a dedication deed process, separate from the subdivision plat process.

6. Staff has retained all original submittal items on file but did not include items that are no longer germane to the proposal as exhibits to this staff report as staff believes the omission of the original materials will make the proposal easier to understand and discuss.
7. The parcel has a Comprehensive Plan Map designation of Village. The designation of Village is not proposed to change, except for the parkland which is being proposed to be designated as Parks and Open Space (POS) on the Comprehensive Plan Map. The reason for this is that the Village designation does not include POS.
8. The City of Sandy completed the following notices:
 - a. A transmittal was sent to agencies asking for comment on October 13, 2022.
 - b. Notification of the proposed application was mailed to affected property owners within 500 feet of the subject property on October 13, 2022.
 - c. A legal notice was published in the Sandy Post on November 2, 2022.
9. Agency comments were received from the Parks and Trails Advisory Board, Director of Sandy Area Metro, Sandy Fire Marshal, City Engineer Curran-McLeod, the Assistant Public Works Director, City Transportation Engineer, and ODOT.
10. At publication of this staff report, two written public comments were received. The main concerns expressed by residents include the following:
 - a. Concerns about the intersection of Highway 26 and Dubarko Road.
 - b. High density residential and commercial being located too close to single family homes.
11. Staff is sympathetic to all concerns raised by the public but the existing designation of Medium Density Residential (R-2) allows multi-family dwellings. Multi-family is listed as a permitted outright use in the R-2 zoning district in Section 17.38.10(A)(6). Even if the applicant were not proposing a comprehensive plan map and zoning map amendment the applicant would still have property rights to construct multi-family housing on the existing R-2 and C-3 designated lands.

PROPOSED ZONING AMENDMENTS – Chapters 17.24, 17.26, 17.30, 17.32, 17.36, 17.38, 17.40, and 17.46

12. The existing zoning district designations and gross acreage, without dedications for roads, stormwater, or parkland, for the 15.91 acres are as follows:
 - a. Low-Density Residential (R-1): 8.05 acres
 - b. Medium-Density Residential (R-2): 5.01 acres
 - c. Village Commercial (C-3): 2.84 acres

13. The applicant's submitted Plan Set, Sheet 12 (Exhibit C), details the existing net zoning area and the proposed net zoning area for the reconsideration. Staff relied on this sheet as the evidence in the record as it was provided by a licensed surveyor.

14. **Existing Net Acres with Existing Zoning.** After removing 2.23 acres of right-of-way for roads, removing 0.32 acres for stormwater facilities, and removing the area for the 1.755-acre park, the remaining existing zoning district designations and acreage would be as follows:
 - a. Low-Density Residential (R-1): 4.57 acres
 - b. Medium-Density Residential (R-2): 4.43 acres
 - c. Village Commercial (C-3): 2.61 acres
 - d. TOTAL = 11.60 acres

15. **Proposed Net Acres with Modified Zoning for Reconsideration.** After removing 2.23 acres of right-of-way for roads, removing 0.32 acres for stormwater facilities, and removing the area for the 1.755-acre park, the remaining proposed zoning district designations and acreage would be as follows:
 - a. Low-Density Residential (R-1): 0.59 acres
 - b. Medium-Density Residential (R-2): 1.23 acres
 - c. High-Density Residential (R-3): 6.50 acres
 - d. Village Commercial (C-3): 3.28 acres
 - e. TOTAL = 11.60 acres

16. **Maximum Number of Dwelling Units Based on Existing Zoning.** Based on the existing net zoning acreage above and the allowances in House Bill 2001, staff has calculated that the existing zoning designations could potentially accommodate the following number of dwelling units:
 - a. Low-Density Residential (R-1): 74 dwelling units
For the area zoned R-1, a minimum of 5 and a maximum of 8 units per acre are allowed.
The minimum density for 4.57 net acres x 5 units/net acre = 22.85 rounded up to 23 units.
The maximum density for 4.57 net acres x 8 units/net acre = 36.56 rounded up to 37 units. The maximum number of 37 dwelling units could be doubled with the introduction of House Bill 2001, to a maximum of 74 dwelling units.

 - b. Medium-Density Residential (R-2): 124 dwelling units
For the area zoned R-2, a minimum of 8 and a maximum of 14 units per acre are allowed.
The minimum density for 4.43 net acres x 8 units/net acre = 35.44 rounded down to 35

units. The maximum density for 4.43 net acres x 14 units/net acre = 62.02 rounded down to 62 units. The maximum number of 62 dwelling units could be doubled with the introduction of House Bill 2001, to a maximum of 124 dwelling units.

- c. Village Commercial (C-3): unknown number of dwelling units
For the area zoned C-3, the exact number of potential residential units is not known at this time because in accordance with Section 17.46.10 (A)(2), multi-family dwellings above, beside or behind a commercial business is an outright permitted use. This means that the applicant could construct one business and designate the remainder of the 2.61 acres to multifamily development. Within the constraints of the existing zoning the exact number of dwelling units on the 2.61 acres of C-3 land is not possible to determine.
- d. TOTAL = 198 dwelling units, plus an unknown number of dwelling units in the C-3 zoning district. While it is unlikely that all the lots in the 4.57 acres of R-1 zoned land and the 4.43 acres of R-2 zoned land would be doubled through House Bill 2001 allowances, it is potentially possible, especially considering that some of the units could be oriented vertically and because House Bill 2001 required that parking requirements are the same for one single-family dwelling as for a duplex.

17. Maximum Number of Dwelling Units Based on Modified Zoning for Reconsideration.

Based on the proposed net zoning acreage above and the allowances in House Bill 2001, staff has calculated that the modified zoning designations could potentially accommodate the following number of dwelling units:

- a. Low-Density Residential (R-1): 8 dwelling units
Low-Density Residential (R-1) Cap: 8 dwelling units
For the area zoned R-1, a minimum of 5 and a maximum of 8 units per acre are allowed. The minimum density for 0.59 net acres x 5 units/net acre = 2.95 rounded down to 2 units. The maximum density for 0.59 net acres x 8 units/net acre = 4.72 rounded up to 5 units. The maximum number of 5 dwelling units could be doubled with the introduction of House Bill 2001, to a maximum of 10 dwelling units as the proposed subdivision includes individual lots in the R-1 zoning district. However, the applicant is only proposing 4 lots in the R-1 zoning district, so the maximum number of dwelling units is 8 dwelling units. *Note: In accordance with Section 17.30.20 (D) a dwelling unit figure is rounded down to the nearest whole number for all total maximum or minimum figures less than four dwelling units.*
- b. Medium-Density Residential (R-2): 17 dwelling units
Medium-Density Residential (R-2) Cap: 17 dwelling units
For the area zoned R-2, a minimum of 8 and a maximum of 14 units per acre are allowed. The minimum density for 1.23 net acres x 8 units/net acre = 9.84 rounded up to 10 units. The maximum density for 1.23 net acres x 14 units/net acre = 17.22 rounded down to 17 units. The maximum number of 17 dwelling units could be doubled with the introduction of House Bill 2001, to a maximum of 34 dwelling units if the proposal included lots, but the proposed subdivision is for one lot, so House Bill 2001 is not applicable.
- c. High-Density Residential (R-3): 130 dwelling units

High-Density Residential (R-3) Cap: 127 dwelling units

For the area zoned R-3, a minimum of 10 and a maximum of 20 units per acre are allowed. The minimum density for 6.50 net acres x 10 units/net acre = 65 units. The maximum density for 6.50 net acres x 20 units/net acre = 130 units. House Bill 2001 is not applicable to the R-3 zoning district as this zoning district does not permit single-family detached dwellings on new lots of record created with new subdivision plats.

- d. Village Commercial (C-3): unknown number of dwelling units

Village Commercial (C-3) Cap: 48 dwelling units

For the area zoned C-3, the exact number of potential residential units is not known at this time because in accordance with Section 17.46.10 (A)(2), multi-family dwellings above, beside or behind a commercial business is an outright permitted use. This means that the applicant could construct one business and designate the remainder of the 3.28 acres to multifamily development. Within the constraints of the existing zoning the exact number of dwelling units on the 3.28 acres of C-3 land is not possible to determine.

- e. **TOTAL with Cap = 200 dwelling units with the proposed cap.** Without the cap instated it is likely that the number of dwelling units would be greater than 200. For instance, the subdivision known as Vista Loop South that was approved in 2006, but never constructed, had 88 lots on the R-1 and R-2 land, which with the introduction of House Bill 2001 could have potentially allowed up to 176 dwelling units on the R-1 and R-2 land. While it is unlikely that all the lots in the 4.57 acres of R-1 zoned land and the 4.43 acres of R-2 zoned land in Vista Loop South would be doubled through House Bill 2001 allowances, it is potentially possible, especially considering that some of the units could be oriented vertically and because House Bill 2001 required that parking requirements are the same for one single-family dwelling as for a duplex. Also, without the cap on the C-3 zoned land there are no assurances on how many multi-family dwellings would be included on the C-3 land.

18. OAR 660-024 contains regulations related to urban growth boundaries and requires local governments to inventory land inside the UGB to determine whether there is adequate capacity to accommodate 20-years of growth. If the inventory demonstrates that the development capacity of land inside the UGB is inadequate to accommodate the estimated 20-year needs determined under OAR 660-024-0040, the local government must amend the plan to satisfy the need deficiency, either by increasing the development capacity of land already inside the UGB or by expanding the UGB, or both. A city cannot allow the rezoning of land that would bring the land supply for any given zone into a deficit. In accordance with OAR 660-024, the existing zoning designations for land within the UGB have the following 20-year land surplus:

- a. Commercial = surplus of 1.13 acres
- b. Low Density Residential = surplus of 19.20 acres
- c. Medium Density Residential = surplus of 17.10 acres
- d. High Density Residential = surplus of 12.60 acres

19. In accordance with OAR 660-024, the modified zoning designations for land within the UGB would result in the following 20-year land surplus:
 - a. Commercial = surplus of 1.80 acres (increase of 0.67 acres)
 - b. Low Density Residential = surplus of 15.22 acres (reduction of 3.98 acres)
 - c. Medium Density Residential = surplus of 13.90 acres (reduction of 3.20 acres)
 - d. High Density Residential = surplus of 19.10 acres (increase of 6.50 acres)
20. Chapter 17.24, Comprehensive Plan Amendment Procedures, contains review criteria for Comprehensive Plan amendments. The subject property has a comprehensive plan map designation of Village. Parks and Open Space (POS) is not a permitted zoning designation within Village as the Village designation was established in 1997 and the POS designation was only established in March of 2012 with the adoption of Ordinance 2012-01. The comprehensive plan map change is requested to modify 1.755 acres from Village to Parks and Open Space (POS).
21. The previous iteration of the Bull Run Terrace subdivision application also contained a density increase by greater than 20 percent, however, with the adoption of House Bill 2001 and as evident in the above density analysis, this is no longer the case. Therefore, the Comprehensive Plan Amendment with this application is solely for the 1.755 acres of parkland.
22. Section 17.24.70 (A) specifies the change being proposed is the best means of meeting the identified public need. Expanding the Deer Pointe Park is consistent with the goals of the Parks and Trails Advisory Board and the 1997 Parks Master Plan that was applicable at the time of this application. It is worth noting that this proposal is also consistent with the newly adopted 2022 Parks and Trails Master Plan. The concept plan in Figure 11 of the 2022 Parks and Trails Master Plan (Exhibit K) details parkland improvements on the subject property in the location of what is proposed to be dedicated to the City of Sandy and redesignated to POS. Therefore, this comprehensive plan change is the best means of meeting the identified public need as established in the 2022 Parks and Trails Master Plan.
23. Section 17.24.70(B) requires the change to conform to all applicable Statewide Planning Goals. These goals are evaluated concurrently with criteria in Section 17.26.40(B)(4), below.
24. Chapter 17.26, Zoning District Amendments, contains review criteria for zoning map amendments. Section 17.26.40 outlines the procedures for a quasi-judicial zoning map amendment. The proposed zone map change proposes to add High Density Residential (R-3) and Parks and Open Space (POS), increase Village Commercial (C-3), reduce Medium Density Residential (R-2), and reduce Low Density Residential (R-1).
25. Section 17.26.40(B)(1) requires the City Council to determine the effects on City facilities and services. With the proposed development, Dubarko Road will be extended from its current terminus through the subject site to connect with Highway 26. This road is identified as a necessary future minor arterial in the City's 2011 Transportation System Plan. An existing water line is located in the future alignment of Dubarko Road, and the applicant will accommodate this facility during the construction of this road. This application is not subject

to the moratorium on development adopted by Resolution 2022-24 because it was submitted prior to the effective date of the moratorium. Therefore, this proposed reconsideration does not negatively affect any City facilities or services.

26. Section 17.26.40(B)(2) and (3) requires the Council to assure consistency with the purposes of this chapter and with the policies of the Comprehensive Plan, including the following:
- a. Maintain sound, stable, and desirable development within the City
 - b. Permit changes in zoning district boundaries where appropriate
 - c. Ensure zoning changes are consistent with the community's land use policies and goals
 - d. Lessen the influence of private economic interests in the land use decision-making process

Given that the proposed development conforms with the Sandy Municipal Code and Comprehensive Plan goals, and that multiple conditions have been put in place to ensure that the development meets the intent of the Code and goals, staff finds that these criteria have been met.

27. Section 17.26.40(B)(4) requires the Council to assure consistency with the Statewide Planning Goals as may be necessary, and any other applicable policies and standards adopted by the City Council.

Goal 1: Citizen Involvement

A public notice was sent to adjoining property owners on October 13, 2022, a legal notice published in the Sandy Post on November 2, 2022, and a notice of the proposal was sent to the Department of Land Conservation and Development on October 7, 2022. Since this is a reconsideration of File No. 19-050 CPA/ZC/SAP/SUB/TREE the Planning Commission does not hear the proposal during this reconsideration. On November 21, 2022, the City Council will hold a public hearing to likely decide on the request. Because the public will have the opportunity to review and comment on the application, the proposal meets the intent of Goal 1.

Goal 2: Land Use Planning

The City's Comprehensive Plan guides land uses within the City's Urban Growth Boundary. The City's Zoning Ordinance enforces the Comprehensive Plan. Staff has reviewed the application for conformance with the Comprehensive Plan in review of Chapter 17.24, and Zoning Ordinance in review of Chapter 17.26. The City has sent notification of this proposal to both the Department of Land Conservation and Development as well as the Oregon Department of Transportation.

Goal 3: Agricultural Lands

Not Applicable

Goal 4: Forest Lands

Not Applicable

Goal 5: Natural Resources

The applicant, along with a consultant, have shown that the subject site does not contain any wetland area (Exhibit H). The applicant worked with an arborist to inventory trees and develop a tree retention plan as required in Chapter 17.102 (Exhibit F). The Planning Commission provided a code interpretation that retention trees only have to be protected consistent with Chapter 17.102, and not consistent with the distance requirements in Chapter 17.92 for a residential subdivision. That said, staff finds that to adequately protect the retention trees, the protection area shall be consistent with Chapter 17.92 and the recommendations of the arborist. **The applicant shall install tree protection fencing at the critical root zone of 1 foot per 1-inch DBH to protect all of the retention trees in the tree retention conservation easement on Lot 7, for the trees included in the parkland, and for the trees included on Lots 2 and 4 consistent with the arborist reports from Teragan and Associates. 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.** Additional analysis and conditions are contained in the review of Chapter 17.102 in this document.

Goal 6: Air, Water, and Land Quality

The applicant proposes that the application complies with all regulations relative to air, water, and land quality.

Goal 7: Natural Hazards

The site contains minimal steep slopes, and no natural hazards are known to exist on the site.

Goal 8: Recreational Needs

The applicant is dedicating 1.755 acres of parkland to the City of Sandy. This dedication helps expand the existing parkland that will eventually be developed as Deer Pointe Park. Expanding the Deer Pointe Park is consistent with the goals of the Parks and Trails Advisory Board and the 1997 Parks Master Plan that was applicable at the time of this application. It is worth noting that this proposal is also consistent with the newly adopted 2022 Parks and Trails Master Plan. The concept plan in Figure 11 of the 2022 Parks and Trails Master Plan details parkland improvements on the subject property in the location of what is proposed to be dedicated to the City of Sandy. Staff finds that parkland dedication is preferable so long as the development to the east of the park is complementary to the parkland. The Parks and Trail Advisory Board provided a letter (Exhibit L) which contains a recommendation for the City Council to accept the parkland as it meets the objectives as listed in the 2022 Parks and Trails Master Plan by providing a true neighborhood park in an underserved area of the community. Additional analysis and conditions related to parks are contained in the parkland dedication section review of Chapter 17.86 in this document.

Goal 9: Economic Development

Goal 9 requires cities to provide an adequate supply of buildable lands for a variety of commercial and industrial activities and requires plans to be based on an analysis of the comparative advantages of a planning region. With the reconsideration proposal, staff finds that each type of land use in the Comprehensive Plan will continue to be in surplus.

Goal 10: Housing

This proposal to change residential designations on the subject property does not affect compliance with this goal. In fact, the proposed modification to the zoning map increases the potential diversity in housing types by providing additional multi-family housing.

Goal 11: Public Facilities and Services

Not Applicable

Goal 12: Transportation

With development of this project, Dubarko Road will be extended through the property to connect with Highway 26 in accordance with the 2011 Transportation System Plan (TSP). The applicant included a Traffic Impact Study from Ard Engineering with the application (Exhibit E). According to the revised traffic study, the assumptions were based on 8 duplex units, 192 multi-family units, and a 5,000 square foot office building. These three uses would produce 94 peak AM trips, 115 peak PM trips, and 1,418 total daily trips. Since this application involves a zone change, the traffic engineer also had to evaluate traffic volumes as measured under the “reasonable worst case” development scenarios as defined by Oregon’s Transportation Planning Rule (TPR). The reasonable worst case scenario analysis can be found on pages 13, 14, 15, 26, 27, and 28 of Exhibit E. Based on the TPR, Ard Engineering recommends that a trip cap of 340 PM net new peak hour trips be applied to the subject property as a condition of approval for the proposed zone change. The City Transportation Engineer (Exhibit Q) concurs with the importance of applying a trip cap of 340 PM net new peak hour trips. **The subject property shall be subject to a trip cap of 340 PM net new peak hour trips. Each application for development of a lot within the subject property shall include a report from a licensed traffic engineer stating the number of net new PM peak hour trips expected to be generated by the proposed development, and this number of trips will be deducted from the total trip cap of 340 net new PM peak hour trips upon approval of the application. No development application will be approved that would cause the total net new PM peak hour trips to exceed said cap unless the applicant agrees to pay additional proportionate share fees for the intersection of Highway 211 and Dubarko Road, in an amount determined by the City based on the number of trips in excess of the cap.** Additional analysis and conditions on transportation are contained in the transportation section review of Chapter 17.84 and Chapter 17.100 in this document.

Goal 13: Energy Conservation

Not Applicable

Goal 14: Urbanization

This proposal accomplishes the objectives of this Statewide Planning Goal by accommodating additional residential and commercial growth within the existing Urban Growth Boundary (UGB) as planned for in the adopted Urbanization Study completed in 2015. As detailed above, the proposed changes will not result in any deficit in available land use.

Goals 15-19

Not applicable for the City of Sandy as these goals relate to the Willamette River and the Oregon Coast.

28. Section 17.26.90 pertains to the effective date of the proposed zone change and states: “The decision of the City Council made in conjunction with a Zoning Map amendment shall become effective 30 days after passage of the ordinance. No zoning district changes will take effect, however, until and unless the necessary Comprehensive Plan amendment has been implemented by the City Council, if needed.” The comprehensive plan map will need to be amended to reflect the proposed change from Village to POS for the 1.755 acres of parkland. As referenced in Finding 1, above, and per Section 17.32.00 of the Development Code at the time of the original application submittal (December 2019), only publicly owned land can be zoned POS. **The applicant shall dedicate the proposed 1.755 acres of parkland to the City through a dedication deed process, separate from the subdivision plat process.**

17.32 – Parks & Open Space (POS)

29. The applicant proposes dedicating 1.755 acres of parkland to the City of Sandy and zoning the land as Parks and Open Space (POS). Section 17.32.10 contains the permitted uses in the POS zoning district. The applicant proposes a park dedication consistent with parkland in the 1997 Parks Master Plan and the 2022 Parks and Trails Master Plan.

17.36 – Low Density Residential (R-1)

30. The applicant proposes constructing four duplexes on the four proposed lots that are proposed to be zoned R-1, as permitted in this zoning district. While the net acreage for the R-1 zoned land is 0.59, the gross acreage including the two stormwater facilities is 0.91 acres. Section 17.36.30 contains the design standards for this zone. As shown in Exhibit C, Sheet C2, all lots four lots proposed as R-1 contain at least 5,500 square feet, have at least 20 feet of street frontage, and contain an average lot width of at least 50 feet as required. Lot 4 has frontage on Dubarko Road, but access is not permitted from Dubarko Road. Access to this lot will be by means of an access easement on Lot 3. **The dwellings on Lots 1, 2, 3, and 4 shall be designed to meet all of the requirements as specified in Chapter 17.36 and will be assessed with future building permits for those four lots.**
31. Section 17.36.50(B) requires that lots with 40 feet or less of street frontage shall be accessed by a rear alley or shared private driveway. No proposed lots have 40 feet or less of street frontage.

17.38 – Medium Density Residential (R-2)

32. The applicant proposes constructing 17 multi-family dwelling units on the one proposed lot that is proposed to be zoned R-2, as permitted in this zoning district. Exhibit C, Sheet 11 details a conceptual layout for this lot. **Conformity with the remainder of Chapter 17.38 shall be determined in a future design review process.**

17.40 – High Density Residential (R-3)

33. The applicant proposes constructing 127 multi-family dwelling units on the one proposed lot that is proposed to be zoned R-3, as permitted in this zoning district. Exhibit C, Sheet 11 details a conceptual layout for this lot. **Conformity with the remainder of Chapter 17.40 shall be determined in a future design review process.**

17.46 – Village Commercial (C-3)

34. The applicant proposes constructing 48 multi-family dwelling units above, beside, or behind a commercial business on the one proposed lot that is proposed to be zoned C-3, as permitted in this zoning district. Exhibit C, Sheet 11 details a conceptual layout for this lot. **Conformity with the remainder of Chapter 17.46 shall be determined in a future design review process.**

LAND DIVISION CRITERIA – Chapter 17.100

35. This application was originally submitted on December 30, 2019. The Sandy Development Code in effect at that time is what this reconsideration is being reviewed under. Therefore, it is important to note that modifications that have since occurred to the Sandy Development Code, particularly to Chapter 17.86, Parkland and Open Space, and Chapter 17.100, Land Division, do not apply to this application.
36. Submittal of preliminary utility 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.** As referenced in Finding 1, above, and per Section 17.100.60(H) of the Development Code at the time of the original application submittal (December 2019), **the final plat shall be delivered to the Director for approval within one year 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, grant an extension of the tentative plat approval for up to one additional year.** While the subdivision approval expires one year from approval, if a final plat is not recorded, **the proposed comprehensive plan map and zoning map modifications go into effect 30 days from the date of the ordinance in accordance with Section 17.26.90.**
37. 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. Each base zoning district requires that residential development comply with Chapter 17.82. As explained throughout this document, the proposed subdivision meets the standards of the proposed base zoning districts, and adherence to this standard will be verified with future building permits or design reviews, whichever is applicable. Section 17.100.220 includes requirements for lot design. All lots in the proposed subdivision have been designed so that no foreseeable difficulties due to topography or other conditions will exist in securing building permits on these lots as required by Section 17.100.220(A). All lots in the R-1 zone comply with the minimum standards in that zone as required by Section 17.100.220(B). No lots are proposed to contain more than double the minimum lot size. Section 17.100.220 states that all new lots shall have at least 20 feet of street frontage. All lots in the proposed subdivision contain at least 20 feet of frontage along a public street therefore meeting the requirements of Section 17.100.220(C). Lots 6 and 7 both contain frontage on Highway 26 and Dubarko Road. Because no direct access to Highway 26 is allowed the creation of these double frontage lots is unavoidable and is thus allowed as required by Section 17.100.220(D). The proposal meets approval criteria 17.100.60 (E)(1).
38. Section 17.100.60(E)(2) requires subdivisions to be consistent with the design standards set forth in this chapter. In accordance with Section 17.100.70 the design standards in Chapter 17.100 are met as the proposed subdivision follows the 2011 City of Sandy Transportation System Plan by providing the connection of Dubarko Road to Highway 26. In accordance with Section 17.100.100 (A) the proposed subdivision meets the Street Connectivity Principle. Connecting Dubarko Road to Highway 26 provides safe and convenient options

for cars, bikes, and pedestrians; creates a logical, recognizable pattern of circulation; and spreads traffic over many streets so that key streets such as Langensand Road and Highway 211 are not overburdened. The proposal meets approval criteria 17.100.60 (E)(2).

39. 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. The proposed street pattern is consistent with the Comprehensive Plan and the city's standards, including connecting Dubarko Road to Highway 26. The 2011 Sandy Transportation System Plan (TSP) was adopted by Ordinance 2011-12 as an addendum to the Comprehensive Plan. Exhibit A of Ordinance 2011-12 is the TSP. Project M20 in the TSP is the connection of Dubarko Road to Highway 26. Furthermore, the proposal is consistent with OAR 660-012-0045, which requires that local governments implement their TSP. The proposal meets approval criteria 17.100.60 (E)(3).
40. Section 17.100.60(E)(4) requires that adequate public facilities are available or can be provided to serve the proposed subdivision. City water, sanitary sewer, and stormwater are available and will be extended by the applicant to serve the subdivision as detailed in Exhibit C, Sheet C5. The proposal meets approval criteria 17.100.60 (E)(4).
41. Section 17.100.60(E)(5) requires that all proposed improvements meet City standards. Extending Dubarko Road to connect with Highway 26 is consistent with the 2011 TSP and OAR 660-012-0045, which requires that local governments implement their TSP. Pursuant to 17.86.10 of the Development Code, new residential subdivisions "shall be required to provide parkland to serve existing and future residents of those developments." By providing 1.755 acres of parkland, the proposal meets the goals of the 1997 Parks Master Plan that designated Deer Pointe Park as a community park, and the 2022 Parks and Trails Master Plan, specifically Figure 11. By providing street frontage improvements (curbs, sidewalks, street lighting, street trees, storm drainage, etc.) on Highway 26, Dubarko Road, Street B, and Fawn Street, the proposal meets Chapter 17.84 for frontage improvements. The proposal meets approval criteria 17.100.60 (E)(5).
42. Section 17.100.60(E)(6) 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 per their narrative in Exhibit B. That said, the applicant is proposing that the design of the multi-family dwellings and commercial development occurs at a future date. Reviewing multi-family and commercial development through a separate process is typical. The proposal meets approval criteria 17.100.60 (E)(6).

ADDITIONAL SETBACKS AND SPECIAL SETBACKS – Chapters 17.80 and 17.82

43. Chapter 17.80 requires all residential structures to be setback at least 20 feet on collector and arterial streets. Lots 3, 4, 5, 6 and 7 shall adhere to the setback standards in Chapter 17.80 for Highway 26 which is classified as an arterial, Dubarko Road which is classified as a minor arterial, and Street B which is classified as a collector. The revised Preliminary Plat (Exhibit C) details the 20-foot setbacks to Highway 26, Dubarko Road, and Street B.
44. 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 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. **The dwellings on all lots abutting a transit street shall be designed to meet all of the requirements as specified in Chapter 17.82 and will be assessed with future building permits or design reviews, whichever is applicable.**
45. Section 17.82.20(D) requires that 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. **The orientation of the future multi-family units that have frontage on both Highway 26 and Dubarko Road, or Street B and Dubarko Road will be determined in a future design review process.**

SPECIFIC AREA PLAN OVERLAY – Chapter 17.54

46. The purpose of a specific area plan overlay zone is to allow development and approval of specific area plans in the city. The City of Sandy Comprehensive Plan, Goal 2, Land Use Designations, Village states: “shifting of the underlying zoning district boundaries to accommodate development constraints and land divisions for specific development proposals may be allowed through approval of a Specific Area Plan.”
47. The applicant proposes shifting zoning district boundaries as noted in this document and has submitted a Specific Area Plan request according to the standards in the chapter as required. The purpose of a specific area plan overlay zone is to allow development and approval of specific area plans in the city. A specific area plan is a master plan coordinating and directing development in terms of transportation, utilities, open space and land use; however, no phasing or timeline is required. Specific area plans may be located anywhere within the Urban Growth Boundary and are intended to promote coordinated planning concepts and pedestrian-oriented mixed-use development. The City of Sandy Comprehensive Plan, Goal 2, Land Use Designations, Village states: “shifting of the underlying zoning district boundaries to accommodate development constraints and land divisions for specific development proposals may be allowed through approval of a Specific Area Plan.”
48. The applicant proposes shifting of zoning district boundaries and addition of a new zoning designation for the subject properties and therefore submitted a Specific Area Plan request according to the standards in Chapter 17.54. Staff finds that the only other specific area plan in Sandy, the Bornstedt Village Specific Area Overlay, has additional standards related to additional tree retention, green streets, additional design standards for single family homes, etc. Keeping the Bornstedt Village Overlay in mind, staff recommends that additional consideration is given to additional tree protection for the proposed retention trees. The Planning Commission provided a code interpretation that retention trees only have to be protected consistent with Chapter 17.102, and not consistent with the distance requirements in Chapter 17.92 for residential subdivisions. That said, staff finds that to adequately protect the retention trees, the protection area shall be consistent with Chapter 17.92 and the recommendations of the arborist. **The applicant shall install tree protection fencing at the critical root zone of 1 foot per 1-inch DBH to protect all of the retention trees in the tree retention conservation easement on Lot 7, for the trees included in the parkland, and for the trees included on Lots 2 and 4 consistent with the arborist reports from Teragan and Associates. 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.** The applicant is also proposing to retain five conifers (Exhibit C, Sheet C3), and to plant some maples, incense cedars, katsura, and Silver Queen Port Orford cedars along the common property line with Deer Pointe subdivision per the Screening Concept Plan (Exhibit I). Additional tree retention analysis and conditions are contained in the review of Chapter 17.102 in this document.

Consistent with the Bornstedt Village Overlay this development should also consider green streets where practicable. **The applicant shall explore locations for green street swales. If green streets are practicable as determined by the City Engineer in accordance with topography, the plan set shall be modified to detail additional right-of-way or easements to accommodate the swales, if needed.** In addition, the applicant shall be required to adhere to additional design standards for the four duplexes (or single-family homes) similar to the Bornstedt Village Overlay requirements. **Future development on Lots 1-4 shall adhere to the garage standards contained in Section 17.54.110(D).**

49. The process to establish a specific area plan shall be initiated by the City Council. The Planning Commission or interested property owners may submit requests to the City Council to initiate the specific area plan process. If owners request initiation of a specific area plan process, the City Council may require an application fee to cover the cost of creating the plan. The applicant requests initiation of this specific area plan and has paid the applicable fees. The comprehensive plan map change is requested to modify 1.755 acres from Village to Parks and Open Space (POS). The proposed zone map change proposes to add High Density Residential (R-3) and Parks and Open Space (POS), increase Village Commercial (C-3), reduce Medium Density Residential (R-2), and reduce Low Density Residential (R-1).
50. In accordance with Section 17.54.00(D) a specific area plan shall be adopted through a Type IV process and shall be evaluated for compliance with the criteria for zoning district amendments and/or comprehensive plan amendments where applicable. The applicant states that this specific area plan request will be reviewed through a Type IV process and shall comply with the criteria for zoning district and Comprehensive Plan amendments. As stated by the applicant, the criteria in Chapter 17.24, Comprehensive Plan Amendment Procedures and Chapter 17.26, Zoning District Amendments are reviewed in this document and as reviewed in these chapters, the proposal is found to comply with all required criteria if the conditions of approval as recommended by staff are required.
51. In accordance with Section 17.54.00(G) compliance with specific area plan standards and procedures are required. New construction and land divisions shall meet any development, land division, and design standards of the applicable specific area plan. Base zone and land division standards shall apply where no different standard is referenced for the specific plan area. Staff finds that with adequate conditions of approval the proposal will comply with the standards and procedures of a specific area plan.
52. Section 17.54.10 defines eight items that define the specific area plan by providing text and diagrams with the specific area plan application. The eight items relate to the following: plan objectives; site and context; land use diagram; density; facilities analysis; circulation/transportation diagram; market analysis; and, design and development standards. The eight items are reviewed as follows:
 - a. Plan Objectives. A narrative shall set forth the goals and objectives of the plan. The applicant submitted a robust narrative explaining the proposal for the Bull Run Terrace subdivision reconsideration. The applicant's narrative elaborates on the objectives of their proposal and the desire to include 4 duplexes, 192 multi-family dwellings, and

village commercial development. The narrative also elaborates on dedications, including 1.755 acres of parkland.

- b. Site and Context. A map of the site and existing context shall identify the project area. The applicant submitted a 12-sheet plan set that details the project area and proposed improvements.
- c. Land Use Diagram. The land use diagram shall indicate the distribution and location of planned land uses, including open space and parks, within the area covered by the specific area plan. The applicant's plan set clearly identifies all proposed land uses (Exhibit C, Sheet 11). The development of commercial on Lot 7 will need to follow the uses as defined in Chapter 17.46, Village Commercial (C-3). If the applicant or successor-in-interest proposes uses in Section 17.46.20(B), Conditional Uses, the proposal will need to be reviewed by the Planning Commission.
- d. Density. If residential uses are proposed, a narrative shall describe planned residential densities. Density calculations were included by the applicant in their narrative and are included in review of Chapter 17.30, Zoning Districts in this document.
- e. Facilities Analysis. The plan shall include an analysis of the general location and extent of major components of sanitary sewer, water, and other essential facilities proposed to be located within the specific plan area and needed to support the land use and densities described in the plan. A review of existing facilities master plans shall be sufficient if these master plans indicate there is adequate capacity to serve the specific plan area. The applicant included a utility plan within the plan set and a preliminary stormwater report. The Assistant Public Works Director reviewed the applicant's submission and has provided analysis and recommended conditions as explained in this document.
- f. Circulation/Transportation Diagram. The circulation diagram shall indicate the proposed street pattern for the specific area plan area, including pedestrian pathways and bikeways. Design standards and street cross sections shall be included, if different than normal City standards. The applicant included a traffic study from Ard Engineering, a future street plan, a master street plan, and street section details. The City's Transportation Engineer, Assistant Public Works Director, ODOT, Fire Marshal, and the Director of Sandy Area Metro reviewed the applicant's submission and have provided analysis and recommended conditions as explained in this document.
- g. Market Analysis. Specific area plans that include amendments to the zoning map affecting the acreage of Village Commercial (C-3) land within the plan area shall include a market analysis of supportable retail space that verifies demand for the proposed acreage of C-3 land. The analysis should include a market delineation, a regional and local economic review, and a retail market evaluation. The applicant submitted an analysis from Johnson Economics. The revised proposal includes increasing the amount of available commercial lands by 0.67 acres. Johnson Economics explains that the proposal will provide capacity for additional housing options and provide more property that is an active urban use. The analysis states that an increase in multifamily housing

will increase local capacity for residential products that can meet a broad range of price points. The analysis goes on to explain that the Highway 26 infrastructure investment requirements were too great to be offset by the value of the underlying property, but that a zone change to allow more residential units will provide the ability of the site to support necessary infrastructure investments. As Johnson Economics correctly identifies, the extension of Dubarko Road to Highway 26 and the additional land needed for Deer Pointe Park cannot be completed unless the subject site is developed.

- h. Design and Development Standards. If standards differ from normal City standards, design and development standards shall be included in the plan. The applicant states that the proposal is anticipated to comply with all design and development standards. As identified by the applicant, the exact details of site and building review will be primarily addressed with submittal of subsequent land use applications for development on Lot 5, 6 and 7.

TRANSPORTATION – Chapters 17.84 and 17.100

53. 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. Street A and Fawn Street both meet these requirements.
54. As required by Section 17.84.30(A)(2), six-foot sidewalks are proposed to be constructed along Highway 26, portions of Dubarko Road, and on Street B. These frontages will include planter strips as required with at least 5 feet wide of soil area. As required by Section 17.84.30(A)(4), the applicant intends to construct all sidewalk improvements as required by this section with the exception of some five-foot wide sidewalks on Dubarko Road. **The applicant shall revise the street sections and plan set to detail all sidewalks on Dubarko Road at least 6 feet in width.**
55. No exceptions or modifications listed in Section 17.84.30(A)(3) are requested with the application. In relation to Sections 17.84.30(B), 17.84.30(C), 17.84.30(D), and 17.84.30(E), no pedestrian or bicycle facilities other than sidewalks and on-street bicycle lanes have been identified or proposed in the application.
56. Traffic Study. Section 17.84.50 outlines the requirements for providing a traffic study. The applicant included a Traffic Impact Study from Ard Engineering with the application (Exhibit E). According to the revised traffic study, the assumptions were based on 8 duplex units, 192 multi-family units, and a 5,000 square foot office building. These three uses would produce 94 peak AM trips, 115 peak PM trips, and 1,418 total daily trips. Since this application involves a zone change, the traffic engineer also had to evaluate traffic volumes as measured under the “reasonable worst case” development scenarios as defined by Oregon’s Transportation Planning Rule (TPR). The reasonable worst case scenario analysis can be found on pages 13, 14, 15, 26, 27, and 28 of Exhibit F. Based on the TPR, Ard Engineering recommends that a trip cap of 340 PM net new peak hour trips be applied to the subject property as a condition of approval for the proposed zone change. The City Transportation Engineer (Exhibit Q) concurs with the importance of applying a trip cap of 340 PM net new peak hour trips. **The subject property shall be subject to a trip cap of 340 PM net new peak hour trips. Each application for development of a lot within the subject property shall include a report from a licensed traffic engineer stating the number of net new PM peak hour trips expected to be generated by the proposed development, and this number of trips will be deducted from the total trip cap of 340 net new PM peak hour trips upon approval of the application. No development application will be approved that would cause the total net new PM peak hour trips to exceed said cap unless the applicant agrees to pay additional proportionate share fees for the intersection of Highway 211 and Dubarko Road, in an amount determined by the City based on the number of trips in excess of the cap.** With its connection to Highway 26, Dubarko Road will become increasingly important to the transportation system in Sandy. The traffic analysis makes several references to a right-in/right-out intersection at Dubarko Road and Highway 26. These references are in the context of analysis of the performance of other study intersections examined in the traffic study and not a proposal to

construct a right-in/right-out intersection at this location. The adopted Transportation System Plan (TSP) does not contemplate a right-in/right-out intersection at Highway 26 and Dubarko Road. **The intersection of Highway 26 and Dubarko Road shall be constructed as a full-access intersection in compliance with the TSP.**

57. Highway 211 and Dubarko Road Intersection. The intersection improvements at Highway 211 and Dubarko Road are defined as Project M9 in the 2011 Sandy Transportation System Plan. The improvements include eventually constructing a traffic signal, northbound right turn lane, southbound left turn lane, and northbound left turn lane. The proposed development will add 17 PM peak hour trips to this intersection. The City Transportation Engineer (Exhibit Q) states that due to the impacts this proposed development will have on the intersection of Highway 211 and Dubarko Road, as offsite mitigation for that intersection shall be incorporated into the conditions of approval. The City Transportation Engineer created a memorandum (Exhibit R) summarizing the development of a proportionate share funding plan to construct improvements at the Highway 211 and Dubarko Road intersection. This proportionate share funding plan will collect financial contributions from multiple developments and will fund specific capacity improvements needed to mitigate traffic operation deficiency that is triggered by the impact of new trips from growth. Exhibit R explains the cost of the new improvement at over \$10 million, the proportionate share fee formula, and the fee analysis results. **The applicant shall contribute a proportional share fee of \$268,345 towards construction of future capacity improvements at the intersection of Highway 211 and Dubarko Road at a cost of \$15,785 per PM peak hour trip.**
58. Dubarko Road. The proposed street sections (Exhibit C, Sheet C6) depict Dubarko Road between its current eastern terminus and proposed Street A with a 76-foot-wide right-of-way consisting of two 0.5-foot monumentation strips, varying sidewalk widths, two five-foot wide planter strips, two 0.5-foot curbs, two five-foot bike lanes, and two varying travel lane widths and varying median width. **The applicant shall revise the street sections and plan set to detail all sidewalks on Dubarko Road at least 6 feet in width.** The standard section for an arterial street in the TSP consists of 11-foot travel lanes with 5-foot bike lanes. It is unclear to staff as to why some of the proposed travel lanes are so wide. The portion of Dubarko Road between Street A to the west boundary of the development should be used to provide a transition from the proposed three lane section with median to a two lane section with median to match the existing section. The proposed 17-foot wide travel lanes will be confusing to motorists. **The applicant shall submit a revised cross-section for the portion of Dubarko Road between the existing terminus and Street A with construction plans for City Engineer review and approval.** The extension of Dubarko Road is classified as a minor arterial street and shall meet the standards of Section 17.84.50(B) which states that arterial streets should generally be spaced in one-mile intervals and traffic signals should generally not be spaced closer than 1,500 ft for reasonable traffic progression. The proposed alignment of Dubarko Road is consistent with the TSP and is an extension of an existing arterial street, not a new arterial street. The traffic study concluded that based on warrant analysis a traffic signal is not warranted, but a traffic signal at Dubarko Road and Highway 26 will be needed in the future based on future development. Therefore, the Preliminary Plat (Exhibit C, Sheet C2) details a 40-foot by 40-foot traffic signal easement at the northeast

corner of Lot 7. The traffic signal easement could impact the tree retention area. **The applicant shall submit revised plans detailing how the traffic signal easement will impact the tree retention area. If the tree retention area is negatively impacted the applicant shall preserve additional trees.**

59. Street B. Street B (defined as ‘New Road in the TSP) is classified as a collector street and does not need to adhere to the standards in Section 17.84.50(B). Street B is proposed with a 60-foot right-of-way consisting of two 0.5-foot monumentation strips, two six-foot sidewalks, two five-foot wide planter strips, two 0.5-foot curbs, and two 18-foot travel lanes. In accordance with Figure 10 of the 2011 TSP, the travel lanes on a collector street may be as narrow as 11 feet wide. **The applicant shall revise the street sections and striping plan to accommodate two 5-foot-wide bike lanes and two 13-foot-wide travel lanes for Street B.**
60. Street A and Fawn Street. Street A and Fawn Street are both classified as local streets. Both streets are proposed with 50-foot right-of-ways consisting of two 0.5-foot monumentation strips, two five-foot wide sidewalks, two five-foot wide planter strips, two 0.5-foot curbs, two 7-foot-wide parking areas, and a combined 14-foot-wide travel lane. These proposed street sections meet the TSP requirements.
61. Credits for Dubarko Road. The widening of Dubarko Road to accommodate the section recommended in the TSP is eligible for Transportation System Development Charge credits. The difference in cost between the required minor arterial improvements and a standard local street section is eligible for credits. **Estimated costs shall be submitted to City staff and reviewed and approved by the City Engineer. The City and the Applicant shall enter into an agreement defining the eligible improvements and estimated costs prior to plat approval. SDC credits shall be based on final audited costs.**
62. Intersection with Highway 26. The extension of Dubarko Road to Highway 26 is defined as Project M20 in the 2011 Sandy Transportation System Plan. The subject property abuts Highway 26 and notification of the proposal was sent to ODOT as required by Section 17.100.90. ODOT provided comments as contained in Exhibit S. Dubarko Road will contain a dedicated left turn and right turn/through lane, a median with street trees, and a dedicated left turn lane to Street B. Highway 26 improvements will include among other things a dedicated right turn lane to Dubarko Road, sidewalks, street trees, and restriping. **The applicant shall adhere to all standards and requirements that are defined by ODOT, including the Dubarko Road connection to Highway 26 and all required improvements along Highway 26 including stormwater facilities constructed as necessary to be consistent with local, ODOT, and ADA standards.** As stated by the Assistant Public Works Director (Exhibit P), any ODOT required improvements on and adjacent to the Highway 26 frontage of the site are not included in the City’s TSP or capital plans and as such are not eligible for SDC credits or reimbursement.
 - a. ODOT recommends that the site layout and development be consistent with the approved and adopted Transportation System Plan, including: the Dubarko Road extension to Highway 26, aligned with the westerly most SE Vista Loop Drive intersection; accommodation of a Collector road terminating at the southern extents of the subject

property to allow the road to extend south from the westernmost leg of the SE Vista Loop Drive intersection; and curb, sidewalks, cross walk ramp, bikeways and road widening along Highway 26 constructed as necessary to be consistent with local, ODOT, and ADA standards.

- b. According to ODOT, the intersection of Dubarko Road and Highway 26 requires a grant of access from ODOT. **The applicant shall assist the City of Sandy in applying for a grant of access or other necessary approval from ODOT for access to Highway 26 at Dubarko Road.**
- c. The conditions of approval shall require the development to comply with the standards and procedures specified by ODOT. **The ODOT grant of access shall be approved and the improvements completed per the grant of access prior to issuance of certificates of occupancy for any structures on the subject property.**

63. Average Daily Traffic. While this proposal will undoubtedly increase traffic on Dubarko Road the Average Daily Traffic (ADT) concerns that were raised during the Bailey Meadows approval process are not present with this land use application. In the Bailey Meadows case, Melissa Avenue is designated a local street and the concerns raised relative to ADT impacted a local street. In the case of Bull Run Terrace, the majority of the anticipated trips will use Dubarko Road, which is designated as a minor arterial, and Street B, which is designated as a collector. According to Chapter 17.10 of the Development Code, arterial streets are defined as helping interconnect and support the arterial highway system and link major commercial, residential, industrial, and institutional areas. Also, in Chapter 17.10, the definition for collector streets states they are meant to provide both access and circulation within residential neighborhoods and commercial/industrial areas. While staff is sympathetic of existing residents to the west of the proposed Bull Run Terrace subdivision, the extension of Dubarko Road has always been intended to occur and the street has been designed to accommodate high traffic volumes. The only street that ADT concerns are valid for is Fawn Street/Street A. The four proposed duplexes in the R-1 zoning district (Lots 1-4) will not cause any concerns, but the potential of trips generated from the C-3 zoned property (Lot 7) could cause additional traffic on Fawn Street/Street A and negatively impact the Deer Pointe subdivision. **The land use application for Lot 7 shall include proposed driveway designs to discourage commercial patrons existing Lot 7 to Street A from entering the Deer Pointe Subdivision on Street A. The designs shall be reviewed and approved by the City Engineer and Public Works Director.**

64. Tangent Alignment. The alignment of Street B and Dubarko Road does not provide the minimum 100 feet of tangent alignment (as measured from the curb line on Dubarko extended) on Street B as required by Section 17.84.50(H)(5)(a) of the Sandy Municipal Code (SMC). However, this requirement can be waived or modified by the City Engineer. In verbal discussions with the City Engineer, Curran-McLeod, and the Assistant Public Works Director, they find the proposed alignment to be adequate.

65. Future Street Plan. Proposed streets meet the requirements of 17.94.50(H). The future street plan (Exhibit C, Sheet C1) shows that the proposed development will facilitate and not preclude development on adjacent properties. Both Dubarko Road and Street B are identified in the TSP and proposed to be constructed with the development. All proposed streets

comply with the grade standards, centerline radii standards, and TSP-based right-of-way improvement widths. Dubarko Road will be extended by a continuation of the centerline of the existing section. All proposed streets are designed to intersect at right angles with the intersecting street and comply with the requirements of Section 17.94.50.(H)(5). Section 17.100.180(A) requires that intersections are designed with right angles. Both the extension of Fawn Street and Street B are designed to intersect at right angles to Dubarko Road as required. Additionally, Dubarko Road will intersect Highway 26 at a right angle. All streets in the proposed subdivision have a minimum curve radius as required by Section 17.100.180(B). **All streets shall meet the requirements of the Fire District as noted in Exhibit N.**

66. Street Extensions. 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 one temporary dead-end street (Street B) that will be stubbed to the southern property line of the subject property. To accommodate fire apparatus turnaround the temporary dead-end of Street B shall include turnarounds, subject to the approval of the Fire Marshal. **The applicant shall revise the plan set to detail fire turnaround easements on Lots 5 and 6 as approved by the Sandy Fire District Fire Marshal. The applicant shall also ensure that water supply requirements are in compliance with the adopted Oregon Fire Code.**
67. Blocks. All blocks within the proposed subdivision have sufficient width to provide for two tiers of lots as required in 17.100.120(A). The local streets of Fawn Street/Street A meet the maximum block length standards of 400 feet. The block length from Street A to Highway 26 is 437 feet and the block length from Street B to Highway 26 is 434 feet. The block length requirements in Section 17.100.120 are in conflict with the preferred spacing standards on arterial and collector streets. While local streets are required to be spaced 8-10 streets per mile in accordance with Section 17.100.110(E), the spacing standards for arterial and collector streets are required to be spaced at much greater distances. The distance from Highway 26 to Street B is needed to maintain distance between the Highway and the collector street (Street B). Fawn Street/Street A has to be aligned with Street B to create a safe intersection. Furthermore, the City Transportation Engineer did not recommend alternative spacing for the streets proposed in the Bull Run Terrace subdivision. Therefore, all block lengths meet the Sandy development code provisions and staff does not recommend any changes to street spacing. The spacing from Dubarko Road to the east property line of Lot 6 is 431 feet. Staff finds that providing a pedestrian connection along the east side of the Bull Run Terrace subdivision will be vital for providing future connectivity for the subject area and development to the south of Bull Run Terrace. **The applicant shall install an 8-foot-wide concrete walkway with pedestrian scale lighting through Lot 6 from the sidewalk on Highway 26 to the southern property line of Lot 6. This facility shall be contained within a pedestrian access easement or tract recorded prior to any certificate of occupancy on this lot.**
68. Street Naming. The proposed development includes the need to name Street B. **The street name shall follow the deer related theme in the development to the west and shall be an 'avenue' as it runs north/south. Staff recommends the name Velvet Avenue.**

69. Transit. Section 17.84.40(A) requires that the developer construct adequate public transit facilities. The Transit Master Plan (TMP) identifies new roads consistent with the 2011 Transportation System Plan. Pages 35 and 36 of the TMP describes long term future plans, including a circulator route that serves Dubarko Road, Vista Loop, and Proctor Blvd., as well as the importance of transit service that provides options along Highway 26. Development proposals, such as Bull Run Terrace, with high density residential and village development, should provide transit access along Highway 26 to support useful and high ridership transit. **The applicant shall install a pull-out transit stop on Highway 26 to the east of the intersection of Dubarko Road and Highway 26 to serve eastbound transit services along Highway 26 (within or by Lot 6). The applicant shall also install two concrete bus shelter pads and green benches (Fairweather model PL-3, powder coated RAL6028). The required pad size is 7 feet by 9 feet 6 inches and the amenities should be located adjacent to Lot 3 or 1 and Lot 6.** Engineering specifications are available from the Director of Sandy Area Metro.
70. The Sandy Development Code has a list of other considerations in the right-of-way that were evaluated as follows:
- a. Other Access Considerations. No public alleys, flag lots, or public access lanes are proposed in this development. One residential shared private drive is being proposed by using an easement over Lot 3 to access Lot 4. **The applicant shall modify the plat to include a vehicular easement on Lot 4 as necessary to accommodate maneuvering for vehicles on Lot 3.**
 - b. Lighting. 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.
 - c. Planter Strips. Planter strips will be provided along all frontages as required in Section 17.100.290. Street trees in accordance with City standards will be provided in these areas. A Street Tree Plan is included in Exhibit C, Sheet C7.
 - d. Mail Facilities. 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.**

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 four R-1 zoned lots and is included in Exhibit C, Sheet C7.
72. Section 17.98.20(A) requires that each duplex is required to provide at least two off-street parking spaces and that multi-family dwelling units are required to provide 1.5 off-street parking spaces for a studio or one-bedroom unit or provide 2.0 off-street parking spaces for a two-bedroom unit or greater. **Compliance with this requirement will be assessed with future building permits or design reviews, whichever is applicable.**
73. Section 17.98.60 has specifications for parking lot design and size of parking spaces. **Compliance with this requirement will be assessed with future building permits or design reviews, whichever is applicable.**
74. Section 17.98.90 requires that all streets proposed will be improved to city standards.
75. Section 17.98.100 has specifications for driveways. The minimum driveway width for a single-family dwelling is 10 feet. The Public Works driveway approach standard detail specifies a maximum of 24 feet wide for a residential driveway approach. Additionally, all driveways will meet vertical clearance, slope, and vision clearance requirements. **Driveway access locations to Lots 5 -7 shall be determined and approved by the City Public Works Director and City Engineer during design review for these lots.**
76. Section 17.98.110 outlines the requirements for vision clearance. **The requirements of Section 17.98.110 shall be considered in placing landscaping in these areas with construction of homes and will be evaluated with a future design review application for the multi-family units.**
77. 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.**
78. 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 200 feet of each of the 4 lots zoned as R-1 as required. Exhibit C, Sheet C7 shows that 20 on-street parking spaces have been identified in compliance with this standard. No parking courts are proposed by the applicant.

UTILITIES – Chapters 17.84 and 17.100

79. 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.**
80. As required by 17.100.130, eight-foot wide public utility easements will be included along all property lines abutting a public right-of-way. Because access is limited along Dubarko Road, an access easement is also proposed across Lot 3 to provide access to Lot 4. In addition, a 10-foot PUE/sidewalk easement is proposed along the Highway 26 frontage of Lot 7 and the majority of the frontage of Tract A. A conservation easement is also proposed to be platted across the northern portion of Lot 7 to protect retained trees in this area. The revised Preliminary Plat (Exhibit C, Sheet C2) details a 40 foot by 40 foot traffic signal easement.
81. Water. 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. According to the Assistant Public Works Director (Exhibit P), the existing 8-inch diameter water line resides in an easement granted to the City of Sandy recorded as Clackamas County Document No. 2004-110340. **The applicant shall replace the existing waterline with an 8-inch diameter water line at a depth approved by the City Engineer.** There will be no compensation or credits for replacement of the existing water line. This pipe is a standard pressure line and will be used to provide domestic water service to the development. The Assistant Public Works Director also stated that the City's water master plan shows an 18-inch diameter water line in Dubarko Road south of Highway 26. **The applicant shall install an 18-inch water line in Dubarko Road connected to the existing 18-inch water line at the west end of the site and the existing 12-inch line on Highway 26. The applicant shall extend the existing 12-inch water main in Highway 26 east from the proposed intersection of Dubarko Road and Highway 26 to the east boundary of the site.** The applicant will also need to work with the Sandy Fire Marshal (Exhibit M) to verify fire hydrant locations, fire department connections (FDCs), and fire flow. **The applicant shall modify the plan set to detail new fire hydrants ordered in an OSHA safety red finish and having a 4-inch non-threaded metal faced hydrant connection with cap installed on the steamer port (4 ½-inch NST x 4-inch Storz Adaptor).**
82. Sanitary Sewer. This application is not subject to the moratorium on development adopted by Resolution 2022-24 because it was submitted prior to the effective date of the moratorium. The applicant intends to install sanitary sewer lines in compliance with applicable standards in Section 17.100.240. All lots except Lot 7 are designed to gravity drain to the sanitary sewer line in Dubarko Road. Due to grade, Lot 7 is not able to drain to the line in Dubarko Road but is proposed to connect to the existing sanitary sewer line at the north end of the park property. The Assistant Public Works Director stated that sewer connections will be permitted as proposed (Exhibit P).

83. Stormwater. Section 17.100.250(A) details requirements for stormwater detention and treatment. Two public stormwater quality and detention facilities are proposed as Tract B to be located north of Lot 1 and Tract C in the SW corner of the property. However, the preliminary storm drainage and design calculations was done in November of 2019 and did not detail stormwater Tract C. **The applicant shall revise the storm drainage and design calculations with Tract C. 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).**
84. 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.**
85. Section 17.84.60 outlines the requirements of public facility extensions. The applicant submitted a utility plan (Exhibit C, Sheet C5) which shows the location of proposed public water, sanitary sewer, and stormwater drainage facilities. Broadband fiber service will be detailed with construction plans. A private sanitary sewer connection is proposed to serve Lot 7. All other utilities will be public.
86. 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 will install underground conduit for street lighting.
87. Section 17.84.90 outlines requirements for land for public purposes. The majority of public facilities will be located within public rights-of-way including the existing waterline that will be contained within the Dubarko Road right-of-way. Eight-foot wide public utility easements will be provided along all lots adjacent to street rights-of-way for future franchise utility installations. All easements and dedications will be identified on the final plat as required.

PARKLAND DEDICATION – Chapter 17.86

88. The applicant intends to dedicate parkland as outlined in the requirements of Section 17.86. This application was originally submitted on December 30, 2019. The Sandy Development Code in effect at that time is what this reconsideration is being reviewed under. Therefore, it is important to note that modifications that have since occurred to the Sandy Development Code, particularly to Chapter 17.86, Parkland and Open Space, and Chapter 17.100, Land Division, do not apply to this application.
89. 17.86.10(2) contains the calculation requirements for parkland dedication. The formula is acres = proposed units x (persons/unit) x 0.0043 (per person parkland dedication factor).
- For the four duplexes, the acres equal 8 units x 3 persons per unit x 0.0043 = 0.103 acres.
 - For the 192 multifamily units, the acres equal 192 x 2 persons per unit x 0.0043 = 1.651 acres.
 - Combined, this totals 1.754 acres. The applicant proposes to dedicate 1.755 acres of parkland and is thus in compliance with this requirement.
90. Section 17.86.20 has a requirement that all homes must front on the parkland. The applicant is not proposing any houses to the south of the parkland, but instead is proposing a stormwater tract. The applicant is proposing housing to the east of the parkland. are proposing future commercial development. Staff supports the shift of commercial lands from the east side of Dubarko Road to the west side of Dubarko Road if the parkland is accommodated with adequate landscape buffering, pedestrian amenities, and housing facing the parkland. The purpose of having homes front the parkland is to provide eyes on the park and increase safety for park users. Having active storefronts or patios facing the park will provide the same safety measures as homes facing the park. **The applicant shall design Lot 7 to incorporate buildings facing the parkland and usable windows facing the parkland.** An additional consideration should be to connect the sidewalk along Highway 26 to the walkway on the parkland property to accommodate additional pedestrian connectivity. The Revised Master Street and Utility Plan (Exhibit C, Sheet C5) details a meandering walkway in the proposed park. While staff appreciates this preliminary walkway location being identified in the revisions, ultimately the location of the walkway will need to be determined with design of Deer Pointe Park. **The applicant shall install a walkway along the east side of the park or west side of Lot 7 that connects Fawn Street/Street A to the sidewalk on Highway 26 as determined during design of Deer Pointe Park. The design of Lot 7 shall incorporate a landscape buffer that provides visibility between Lot 7 and the parkland but provides a visually attractive separation.**
91. The Parks and Trails Advisory Board provided a letter (Exhibit L) which contains a recommendation for the City Council to accept the parkland as it meets the objectives as listed in the 2022 Parks and Trails Master Plan by providing a true neighborhood park in an underserved area of the community. The Parks and Trails Advisory Board would also like the City to pursue a development agreement with the developer to make initial improvements to the park based on the conceptual plan in the 2022 Parks and Trails Master Plan in-lieu of

paying Systems Development Charges. **The applicant shall work with the City of Sandy to create a mutually agreed upon engineer estimate for the Deer Pointe parkland improvements. The final engineer's estimate shall be used as the basis for an agreement to calculate Park SDC credits for the applicant. If the applicant and City agree to the applicant/developer completing parkland improvements, the park improvements shall be completed with approval from the Parks and Trails Advisory Board and prior to final plat approval or as otherwise established in a development agreement.**

92. Section 17.86.30 lists the requirements of the developer prior to acceptance of required parkland dedications. **The applicant shall clear, grade, and seed the proposed parkland as specified by the City in the construction plans.** The parkland grading could impact proposed tree retention. **The applicant shall submit revised plans detailing how the parkland grading will minimize impacts to tree retention. If tree retention is negatively impacted the applicant shall preserve additional trees.** As referenced in Finding 1, above, and per Section 17.32.00 of the Development Code at the time of the original application submittal (December 2019), only publicly owned land can be zoned POS. **The applicant shall dedicate the proposed 1.755 acres of parkland to the City through a dedication deed process, separate from the subdivision plat process. The applicant shall also provide a Phase I Environmental Assessment prior to dedication. This dedication shall occur within 180 days after approval of Ordinance No. 2022-27.**
93. The applicant proposes including two utility easements within the proposed parkland dedication. However, these easements are unavoidable given the location of existing utilities. **The applicant shall define these utilities on the tentative plat.**

URBAN FORESTRY – 17.102

94. Section 17.102.20 contains information on the applicability of Urban Forestry regulations. Two Arborist Reports were included with the first iteration of Bull Run Terrace (Exhibit F) from Teragan and Associates. The applicant has also included an existing conditions and tree retention plan, and tree tables (Exhibit C, Sheet C3 and C4). The arborist inventoried all trees eleven inches and greater DBH for the portion of the property proposed to satisfy tree retention requirements as required in 17.102.50.
95. The property contains 15.91 acres requiring retention of 48 trees, 11 inches and greater DBH ($15.91 \times 3 = 47.73$). The applicant is proposing to retain 81 trees, however, only 62 of the trees are both 11-inches or greater DBH and in good health according to the Arborist Reports (Exhibit F). The majority of the trees are conifers, with the majority of those being Doug fir. Five of the 81 trees marked for retention have been identified as in poor or very poor condition, but they are located in a grouping of healthy trees which makes removal difficult. The proposed retention is as follows:
- a. Lot 7: 44 trees at 11-inches DBH or greater and in good condition, 4 trees at 11-inches DBH or greater and in fair condition, 5 trees at less than 11-inches DBH and in good or fair condition, 4 trees in poor or very poor condition
 - b. Tract A (parkland): 15 trees at 11-inches DBH or greater and in good condition, 3 trees at 11-inches DBH or greater and in fair condition, 1 tree in poor condition
 - c. Lots 2 and 4: 3 trees at 11-inches DBH or greater and in good condition, 1 tree at 11-inches DBH or greater and in fair condition, 1 tree at less than 11-inches DBH and in good condition
96. The Arborist Reports (Exhibit F) provide recommendations for protection of retained trees including identification of the recommended tree protection zone for these trees. The requirements of 17.102.50(B) will be complied with prior to any grading or tree removal on the site. The Planning Commission provided a code interpretation that retention trees only have to be protected consistent with Chapter 17.102, and not consistent with the distance requirements in Chapter 17.92 for residential subdivisions. That said, staff finds that to adequately protect the retention trees, the protection area shall be consistent with Chapter 17.92 and the recommendations of the arborist. **The applicant shall install tree protection fencing at the critical root zone of 1 foot per 1-inch DBH to protect the 53 retention trees in the conservation easement on Lot 7, the 18 retention trees on the parkland, and the 5 trees included on Lots 2 and 4, consistent with the arborist reports from Teragan and Associates. 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.**

97. **The tree protection fencing shall be 6-foot-tall chain link or no-jump horse fencing and the applicant shall affix a laminated sign (minimum 8.5 inches by 11 inches) every 50 feet to the tree protection fencing indicating that the area behind the fence is a tree retention area and that the fence shall not be removed or relocated. 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. The applicant shall request an inspection of tree protection measures prior to any tree removal, grading, or other construction activity on the site.**
98. The Tree Preservation Plan (Exhibit C, Sheet C3) details a number of trees being removed right next to the trees proposed for retention. **The trees proposed for removal that are adjacent to retention trees shall be removed in a way that does not harm or damage adjacent trees.** The applicant submitted a Tree Removal Plan from Teragan and Associates, Inc. The Tree Removal Plan identifies tree removal options, including directional felling, piece removal, and crane removal. The arborist also identifies options for stumps, including retention or careful surface grinding. **Tree removal and/or snag creation shall be completed without the use of heavy equipment in the tree protection zone; trunks and branches of adjacent trees shall not be contacted during tree removal or snag creation. The applicant shall submit a post-construction report prepared by the project arborist or other TRAQ qualified arborist to ensure none of the retention trees were damaged during construction.**
99. **To ensure protection of the required retention trees, the applicant shall record a tree protection covenant for all 76 trees in good or fair retention as defined in Exhibit F, specifying protection of trees on the subject property and limiting removal without submittal of an Arborist's Report and City approval. The 5 trees in poor or very poor condition shall not be included in the covenant. The plat shall also include a conservation easement on Lot 7.**

LANDSCAPING AND SCREENING – Chapter 17.92

100. 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). Tree protection fencing and tree retention will be discussed in more detail under Chapter 17.102 in this document. **Per Section 17.92.10(L), all landscaping shall be continually maintained, including necessary watering, weeding, pruning, and replacing.**
101. Section 17.92.20 lists the requirements for minimum landscaping improvements. **The details of this section will be considered with submittal of all design review applications for the proposed multi-family units and commercial property.**
102. 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. The current street tree plan (Exhibit C, Sheet C7) details trees at an appropriate spacing per the development code, except there are two trees missing to the east of Lot 7 along Dubarko Road. **The applicant shall revise the street tree plan (Exhibit C, Sheet C7) to detail two additional street trees to the east of Lot 7.** The trees the applicant has identified are American hophornbeam, American linden, Greenspire linden, and Green Vase zelkova. These four street tree species are on the approved street tree list.
103. The applicant is proposing to mass grade the buildable portion of the site. This will remove top soil and heavily compact the soil. In order to maximize the success of the required street trees, **the applicant shall aerate the planter strips to a depth of 3 feet prior to planting street trees. The applicant shall submit documentation from the project landscaper stating that the soil has been amended and aerated prior to planting the street trees at the individual construction phase for each lot. 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. Street trees are required to be a minimum caliper of 1.5-inches measured 6 inches from grade 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).**
104. 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.**

105. 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. The applicant shall submit proposed trees specifics to City staff for review and approval concurrent with construction plan review.**
106. 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.**
107. Section 17.92.90 has details on screening of unsightly views or visual conflicts. While the proposed lots are not unsightly, they are a big difference from the existing view of the natural landscape. This contrast was identified at the Planning Commission hearing on August 24, 2020 and the applicant was asked to look at some additional screening measures to protect existing trees or add additional landscaping. The applicant took the comments seriously and proposed some additional landscaping along the common property line with the Deer Pointe subdivision (Exhibit I). The applicant is proposing to retain five conifers (Exhibit C, Sheet C3), and to plant some maples, incense cedars, katsura, and Silver Queen Port Orford cedars. **The applicant shall retain the additional five trees on Lots 2 and 4 (Tree Nos. 13439, 13440, 13441, 13421, and 13423) and shall plant maples, incense cedars, katsura, Excelsa Western red cedars, and Silver Queen Port Orford cedars or other trees as approved by staff per the Screening Concept Plan (Exhibit I) along Lots 1, 2, 4, and Tracts B and C. Deciduous trees shall be at least 1.5 inches caliper at planting and the cedars shall be at least 6 to 8 feet in height at planting.**
108. 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 install 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 installation 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.**

HILLSIDE DEVELOPMENT, EROSION CONTROL, NUISANCES, AND ACCESSORY DEVELOPMENT – Chapters 17.56, 15.44, 15.30, and 17.74

109. In accordance with the requirements of Chapter 17.56, Hillside Development, and Chapter 15.44, Erosion Control, the applicant submitted a Geotechnical and Slope Stability Investigation (Exhibit G) showing that the subject site contains a small area of slope exceeding 25 percent. **All recommendations in Section 6 of the submitted Geotechnical and Slope Stability Investigation (Exhibit G) shall be conditions for development.** The geotechnical report (2005) submitted with the application is nearly fifteen years old. It does not appear that there have been physical changes to the existing surface of the site in that time span that would impact the findings and recommendations in the geotechnical report but there may have been changes in industry standards or practices since then. As a result, the Applicant shall submit a letter from the original geotechnical engineering firm indicating that the findings and recommendations from the 2005 report remain substantially unchanged or modifying the original findings and recommendations as necessary. **The applicant shall submit a letter from the original geotechnical engineering firm indicating that the findings and recommendations from the 2005 report remain substantially unchanged or modifying the original findings and recommendations as necessary.**
110. **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. The applicant shall submit confirmation from DEQ if a 1200-C Permit will not be required.**
111. 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.** 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.
112. 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, particularly rats, is needed.**
113. Section 17.74.40 specifies, among other things, retaining wall and fence height in front, side and rear yards. Retaining walls 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 side and rear yards abutting a street. The submitted plan set does not define any retaining walls with the exception of a retaining wall for the stormwater facility in Tract B. **If retaining walls**

are proposed, the applicant shall submit additional details/confirmation on the proposed retaining walls, including heights meeting code requirements and an architectural finish, for staff review and approval.

114. Chapter 15.30 contains the City of Sandy's Dark Sky Ordinance. 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 in order to minimize negative impacts on wildlife and human health.**

RECOMMENDATION

The Development Services Director recommends the City Council **approve** the Type IV comprehensive plan amendment, zone change, subdivision, and specific area plan overlay with tree removal associated with the proposed development subject to the conditions of approval below. This proposal meets the applicable approval criteria in the Sandy Municipal Code and achieves some major goals consistent with long range planning objectives in the City of Sandy, including but not limited to the following:

- 1) Extending Dubarko Road to intersect with Highway 26 consistent with the Transportation System Plan that was adopted in 2011;
- 2) Installing Street B to the south consistent with the Transportation System Plan that was adopted in 2011;
- 3) Paying a proportional share fee of \$268,345 towards construction of future capacity improvements at the intersection of Highway 211 and Dubarko Road at a cost of \$15,785 per PM peak hour trip;
- 4) Extending Fawn Street to the east;
- 5) Expanding the Deer Pointe Park consistent with the 1997 Parks Master Plan, goals of the Parks and Trails Advisory Board, and Figure 11 of the 2022 Parks and Trails Master Plan;
- 6) Fulfilling housing needs as defined in the Urbanization Study that was adopted in 2015; and,
- 7) Providing a mixture of housing types consistent with the goals of the 2040 Plan that was created in 1997.

RECOMMENDED CONDITIONS OF APPROVAL

- A. The applicant shall assist the City of Sandy in applying for a grant of access or other necessary approval from ODOT for access to Highway 26 at Dubarko Road.**
- B. The applicant shall dedicate the proposed 1.755 acres of parkland to the City through a dedication deed process, separate from the subdivision plat process. Prior to dedication, the applicant shall provide a Phase I Environmental Assessment for Tract A. This dedication shall occur within 180 days after approval of Ordinance No. 2022-27.**
- C. Prior to earthwork, grading, or excavation, the applicant shall complete the following and receive necessary approvals as described:**
1. Apply for a grading and erosion control permit in conformance with Chapter 15.44. The grading and erosion control plan shall include a re-vegetation plan for all areas disturbed during construction of the subdivision. (*Submit 2 copies to Planning/Building Department.*)
 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. (*Submit to Planning/Building Department.*)
 3. Submit a letter from the original geotechnical engineering firm indicating that the findings and recommendations from the 2005 report remain substantially unchanged or modify the original findings and recommendations as necessary.
 4. Submit proof that a licensed pest control agent evaluated the site to determine if pest eradication, particularly rats, is needed.
 5. Submit revised plans detailing how the traffic signal easement will impact the tree retention area and how the parkland grading will impact tree retention. If tree retention is negatively impacted the applicant shall preserve additional trees.
 6. The applicant shall install tree protection fencing at the critical root zone of 1 foot per 1-inch DBH to protect the 53 retention trees in the conservation easement on Lot 7, the 18 retention trees on the parkland, and the 5 trees included on Lots 2 and 4, consistent with the arborist reports from Teragan and Associates. The following shall be followed:
 - a. 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.

- b. The tree protection fencing shall be 6-foot-tall chain link or no-jump horse fencing and the applicant shall affix a laminated sign (minimum 8.5 inches by 11 inches) every 50 feet to the tree protection fencing indicating that the area behind the fence is a tree retention area and that the fence shall not be removed or relocated.
 - c. 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.
 - d. 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. Tree removal and/or snag creation shall be completed without the use of heavy equipment in the tree protection zone; trunks and branches of adjacent trees shall not be contacted during tree removal or snag creation.
7. Request an inspection of erosion control measures and tree protection measures as specified in Section 17.102.50 C. prior to construction activities or grading.

D. Prior to all construction activities, except grading and/or excavation, the applicant shall submit the following additional information as part of construction plans and complete items during construction as identified below: (*Submit to the Assistant Public Works Director unless otherwise noted*)

- 1. Submit estimated costs of widening Dubarko Road to City staff for review and approval by the City Engineer. The City and the Applicant shall enter into an agreement defining the eligible improvements and estimated costs prior to plat approval. SDC credits shall be based on final audited costs.
- 2. Work with the City of Sandy to create a mutually agreed upon engineer estimate for the Deer Pointe parkland improvements. The final Engineer's estimate shall be used as the basis for an agreement to calculate Park SDC credits for the applicant. If the applicant and City agree to the applicant/developer completing parkland improvements, the park improvements shall be completed with approval from the Parks and Trails Advisory Board.
- 3. Submit written confirmation from the Sandy Fire District regarding the number and location of required fire hydrants. Submit a revised Residential Parking Access Plan if required fire hydrants effect on-street parking spaces.
- 4. Submit revised plans including the following:
 - a. Detail a revised cross-section for the portion of Dubarko Road between the existing terminus and Street A.
 - b. Detail all sidewalks on Dubarko Road at least 6 feet in width.
 - c. Detail two 5-foot-wide bike lanes and two 13-foot-wide travel lanes for Street B.

- d. Detail a pull-out transit stop on Highway 26 to the east of the intersection of Dubarko Road and Highway 26 to serve eastbound transit services along Highway 26 (within or by Lot 6).
 - e. Detail the locations for green street swales as determined by the City Engineer in accordance with topography. If green street swales are incorporated into the design, the plan set shall be modified to detail additional right-of-way or easements to accommodate the swales, if needed.
 - f. Detail a walkway along the east side of the park or west side of Lot 7 that connects Fawn Street/Street A to the sidewalk on Highway 26 as determined during design of Deer Pointe Park. If Deer Pointe Park is not designed prior to construction plan submission the applicant shall revise the construction plans with the walkway modifications once the Deer Pointe Park design is complete.
 - g. Detail fire turnaround easements on Lots 5 and 6 as approved by the Sandy Fire District Fire Marshal.
 - h. Detail new fire hydrants in an OSHA safety red finish and having a 4-inch non-threaded metal faced hydrant connection with cap installed on the steamer port (4 ½-inch NST x 4-inch Storz Adaptor).
 - i. Detail two additional street trees to the east of Lot 7.
 - j. Detail the locations of streetlights on all streets being improved within and adjacent to the subdivision. Streetlights shall be full cut-off, shall not exceed 4,150 Kelvins, and shall conform to the Dark Sky standards of Chapter 15.30.
 - k. Detail proposed retaining walls, including heights meeting code requirements and an architectural finish.
 - l. Detail a revised utility plan to include broadband fiber locations as detailed by the SandyNet Manager.
5. Submit a detailed drainage report meeting the water quality and water quantity criteria as stated in the City of Sandy Development Code (SDC) 13.18 Standards and the most current City of Portland Stormwater Management Manual (SWMM) Standards that were adopted by reference into the Sandy Development Code. The drainage report and design calculations shall include Tract C.
 6. Submit a mail delivery plan, featuring grouped lockable mail facilities, to the City and the USPS for review. Mail delivery facilities shall be provided by the applicant in conformance with 17.84.100 and the standards of the USPS.
 7. Call PGE Service Coordination at 503-323-6700 when the developer is ready to start the project.

E. Prior to Final Plat approval, the applicant shall complete the following tasks or provide assurance for their future completion:

1. Submit two paper copies of a Final Plat and associated fee.

2. Pay a proportional share fee of \$268,345 towards construction of future capacity improvements at the intersection of Highway 211 and Dubarko Road at a cost of \$15,785 per PM peak hour trip.
3. The street name for Street B shall follow the deer related theme in the development to the west and shall be an 'avenue' as it runs north/south. Staff recommends the name Velvet Avenue.
4. Modify the plat to include a vehicular easement on Lot 4 as necessary to accommodate maneuvering for vehicles on Lot 3.
5. Pay plan review, inspection and permit fees as determined by the Public Works Director.
6. Pay addressing fees at the existing rate per the fee schedule.
7. Submit a post-construction report prepared by the project arborist or other TRAQ qualified arborist to ensure none of the retention trees were damaged during construction.
8. Install all public and private improvements consistent with this decision and the ODOT improvements consistent with the grant of access, the approved construction plans, and the Sandy Municipal Code, including, but not limited to the following:
 - a. A walkway along the east side of the park or west side of Lot 7 that connects Fawn Street/Street A to the sidewalk on Highway 26;
 - b. A pull-out transit stop on Highway 26 to the east of the intersection of Dubarko Road and Highway 26 to serve eastbound transit services along Highway 26 (within or by Lot 6);
 - c. Two concrete bus shelter pads and green benches (Fairweather model PL-3, powder coated RAL6028). The required pad size is 7 feet by 9 feet 6 inches and the amenities should be located adjacent to Lot 3 or 1 and Lot 5. Engineering specifications are available from the Director of Sandy Area Metro.
 - d. Replace the existing waterline with an 8-inch diameter water line at a depth approved by the City Engineer.
 - e. Install an 18-inch water line in Dubarko Road connected to the existing 18-inch water line at the west end of the site and the existing 12-inch line in Highway 26.
 - f. Extend the existing 12-inch water main in Highway 26 east from the proposed intersection of Dubarko Road and Highway 26 to the east boundary of the site.
9. Clear, grade, and seed the proposed parkland as specified by the City in the construction plans. If the applicant and City agree to the applicant/developer completing parkland improvements, the park improvements shall be completed prior to final plat approval or as otherwise established in a development agreement.
10. Retain the additional five trees on Lots 2 and 4 (Tree Nos. 13439, 13440, 13441, 13421, and 13423) and plant maples, incense cedars, katsura, Excelsa Western red cedars, and Silver Queen Port Orford cedars or other trees as approved by staff per the Screening

Concept Plan (Exhibit I) along Lots 1, 2, 4, and Tracts B and C. Deciduous trees shall be at least 1.5 inches caliper at planting and the cedars shall be at least 6 to 8 feet in height at planting.

11. Record a tree protection covenant for all 76 trees in good or fair condition as defined in Exhibit F, specifying protection of trees on the subject property and limiting removal without submittal of an Arborist's Report and City approval. The 5 trees in poor or very poor condition shall not be included in the covenant. The plat shall also include a conservation easement on Lot 7.
12. Submit a true and exact reproducible copy (Mylar) of the Final Plat for final review and signature.

F. Conditions related to future development of the lots:

1. Development on Lots 1 through 4 shall meet the standards of the R-1 zoning district and all other development standards in the Sandy Municipal Code. Future development on Lots 1-4 shall adhere to the garage standards contained in Section 17.54.110(D). Development of these four lots will be reviewed by means of a building permit.
2. Development on Lots 5, 6, and 7 shall meet the standards of the underlying zoning district and all other development standards in the Sandy Municipal Code. Development of these three lots will be reviewed by means of a design review.
3. Design review approval for Lot 7 shall incorporate buildings facing the parkland and usable windows facing the parkland. This design review approval for Lot 7 shall also incorporate a landscape buffer that provides visibility between Lot 7 and the parkland but provides a visually attractive separation.
4. Driveway access locations to Lots 5 -7 shall be determined and approved by the City Public Works Director and City Engineer during design review for these lots. The land use application for Lot 7 shall include proposed driveway designs to discourage commercial patrons existing Lot 7 to Street A from entering the Deer Pointe Subdivision on Street A. The designs shall be reviewed and approved by the City Engineer and Public Works Director.
5. The dwellings on all lots abutting a transit street shall be designed to meet all of the requirements as specified in Chapter 17.82 and will be assessed with future building permits or design reviews, whichever is applicable.
6. The orientation of the future multi-family units that have frontage on both Highway 26 and Dubarko Road, or Street B and Dubarko Road will be determined in a future design review process.
7. Aerate the planter strips to a depth of 3 feet prior to planting street trees. The applicant shall submit documentation from the project landscaper stating that the soil has been

amended and aerated prior to planting the street trees at the individual construction phase for each lot.

8. Install an 8-foot-wide concrete walkway with pedestrian scale lighting through Lot 6 from the sidewalk on Highway 26 to the southern property line of Lot 6. This facility shall be contained within a pedestrian access easement or tract recorded prior to any certificate of occupancy on this lot.

G. General Conditions of Approval:

1. The Final Plat shall be recorded as detailed in Section 17.100.60 (I). The final plat shall be delivered to the Director for approval within one year 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, grant an extension of the tentative plat approval for up to one additional year.
2. The comprehensive plan map and zoning map modifications go into effect 30 days from the date of the ordinance in accordance with Section 17.26.90.
3. The subject property is limited to 200 dwelling units, as follows:
 - a. Low-Density Residential (R-1) Cap: 8 dwelling units
 - b. Medium-Density Residential (R-2) Cap: 17 dwelling units
 - c. High-Density Residential (R-3) Cap: 127 dwelling units
 - d. Village Commercial (C-3) Cap: 48 dwelling units
4. The ODOT grant of access shall be approved and the improvements completed per the grant of access prior to issuance of certificates of occupancy for any structures on the subject property. The intersection of Highway 26 and Dubarko Road shall be constructed as a full-access intersection in compliance with the TSP.
5. Public plans are subject to a separate review and approval process. Preliminary Plat approval does not connote approval of public improvement construction plans, which will be reviewed and approved separately upon submittal of public improvement construction plans.
6. All on-site earthwork activities including any retaining wall construction should follow the requirements of the City of Sandy Development Code and the current edition of the Oregon Structural Specialty Code (OSSC).
7. The subject property shall be subject to a trip cap of 340 PM net new peak hour trips. Each application for development of a lot within the subject property shall include a report from a licensed traffic engineer stating the number of net new PM peak hour trips expected to be generated by the proposed development, and this number of trips will be deducted from the total trip cap of 340 net new PM peak hour trips upon approval of the application. No development application will be approved that would cause the total net new PM peak hour trips to exceed said cap unless the applicant agrees to pay additional

proportionate share fees for the intersection of Highway 211 and Dubarko Road, in an amount determined by the City based on the number of trips in excess of the cap.

8. If entry signs are desired, the applicant shall submit a detailed plan showing the location of such signage and a sign permit application.
9. All parking, driveway and maneuvering areas shall be constructed of asphalt, concrete, or other approved material.
10. All work within the public right-of-way and within the paved area shall comply with the American Public Works Association (APWA) and City requirements as amended and should be constructed to the City's structural streets standards.
11. All on-site earthwork activities including any retaining wall construction shall follow the current requirements of the current edition of the Oregon Structural Specialty Code (OSSC).
12. All recommendations in Section 6 of the submitted Geotechnical and Slope Stability Investigation (Exhibit I) shall be conditions for development.
13. All utilities shall be installed underground and in conformance with City standards. The applicant shall install utilities underground with individual service to each lot.
14. The applicant shall be responsible for the installation of all improvements detailed in Section 17.100.310, including fiber facilities. SandyNet requires the developer to work with the City to ensure that broadband infrastructure meets the design standards and adopted procedures as described in Section 17.84.70.
15. All public utility installations shall conform to the City's facilities master plans.
16. As required by Section 17.98.130, all parking, driveway and maneuvering areas shall be constructed of asphalt, concrete, or other approved material.
17. Water line sizes shall be based upon the Water Facilities Master Plan and shall be sized to accommodate domestic fire protection flows on the site.
18. All new public sanitary sewer and waterlines shall be a minimum of 8-inches in diameter.
19. All stormwater drains shall be a minimum of 12-inches in diameter and shall be extended to the plat boundaries where practical to provide future connections to adjoining properties.
20. 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).

21. 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 installation 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.
22. 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. Street trees are required to be a minimum caliper of 1.5-inches measured 6 inches from grade 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).
23. As required by Section 17.92.10(L), all landscaping shall be continually maintained, including necessary watering, weeding, pruning, and replacing. As required by Section 17.92.140, the developer shall 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.
24. 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.
25. Successors-in-interest of the applicant shall comply with site development requirements prior to the issuance of building permits.
26. All improvements listed in Section 17.100.300 shall be provided by the applicant including drainage facilities, monumentation, mail facilities, sanitary sewers, storm sewer, sidewalks, street lights, street signs, street trees, streets, traffic signs, underground communication lines including telephone and cable, underground power lines, water lines and fire hydrants.
27. Comply with all standards required by Section 17.84 of the Sandy Development Code. Public and franchise improvements shall be installed or financially guaranteed in accordance with Chapter 17 of the Sandy Municipal Code prior to temporary or final occupancy of structures. Water lines and fire hydrants shall be installed in accordance with City standards. All sanitary sewer lines shall be installed in accordance with City standards.
28. Comply with all other conditions or regulations imposed by the Sandy Fire District (Exhibit N) 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.



BULL RUN TERRACE RECONSIDERATION

City Council 11/21/2022

VICINITY MAP



HISTORY

December 2020 - the City Council denied the Bull Run Terrace Subdivision application (File No. 19-050). The applicant appealed the City Council decision to the Oregon Land Use Board of Appeals (LUBA). The LUBA appeal was then placed on stay by the applicant, meaning 'on hold', until the City could process the Deer Meadows Subdivision proposal.

May 2022 - the City Council denied the Deer Meadows Subdivision application. The applicant then appealed that City Council decision to LUBA. The LUBA appeal was then placed on stay by the applicant, meaning 'on hold'.

In accordance with ORS 197.830(13)(b), the applicant then asked the City Council to reconsider the Bull Run Terrace Subdivision proposal with certain modifications, including a residential dwelling cap not to exceed 200 dwelling units and additional parkland. The applicant states that the existing zoning could accommodate 226 dwelling units. **The City Council agreed to reconsider the proposal with the modifications.**

REVIEW TYPE

Type IV comprehensive plan amendment, zone change, subdivision, and specific area plan overlay with tree removal.

Quasi-Judicial de novo (starting from the beginning) public hearing to hear testimony from the applicant and the public, and either approve or deny the Bull Run Terrace land use application.

Ordinance No. 2022-27 would have to be adopted to approve the application.

TIME LIMITS

Applicant: 20 minutes for presentation, 10 minutes for rebuttal

Public: 3 minutes per each testimony

APPLICABLE CODE

This application was originally submitted on December 30, 2019. The Sandy Development Code in effect at that time is what this reconsideration is being reviewed under.

Therefore, it is important to note that modifications that have since occurred to the Sandy Development Code, particularly to Chapter 17.86, Parkland and Open Space, and Chapter 17.100, Land Division, do not apply to this application.

However, because of how state legislation was adopted, House Bill 2001 and Senate Bill 458 are allowed to apply to this site, independent of the land use submission date.

MORATORIUM

This application is not subject to the moratorium on development adopted by Resolution 2022-24 because it was submitted prior to the effective date of the moratorium.

If this application is approved, the applicant will still need to work with DEQ to get a sanitary sewer connection and will be potentially limited for building construction by the ERU limitations in effect at that time.

REQUEST

- Approval of a 7-lot subdivision with tree removal.
- The subject site is 15.91 gross acres and 11.60 net acres after dedication of right-of-way, parkland, and stormwater tracts.
- Four lots totaling 0.59 acres are proposed with the R-1 (low-density residential) zoning designation with four duplexes (8 dwelling units).
- One lot at 1.23 acres is proposed with the R-2 (medium-density residential) zoning designation with 17 multifamily dwelling units.
- One lot at 6.50 acres is proposed with the R-3 (high-density residential) zoning designation with 127 multifamily dwelling units.
- One lot at 3.28 acres is proposed with the C-3 (village commercial) zoning designation with a commercial business and 48 multifamily dwelling units.

ZONE MAP CHANGE (NET ACRES)

Zoning District	Existing Acres	Proposed Acres
R-1	4.57	0.59
R-2	4.43	1.23
R-3	0.00	6.50
C-3	2.61	3.28

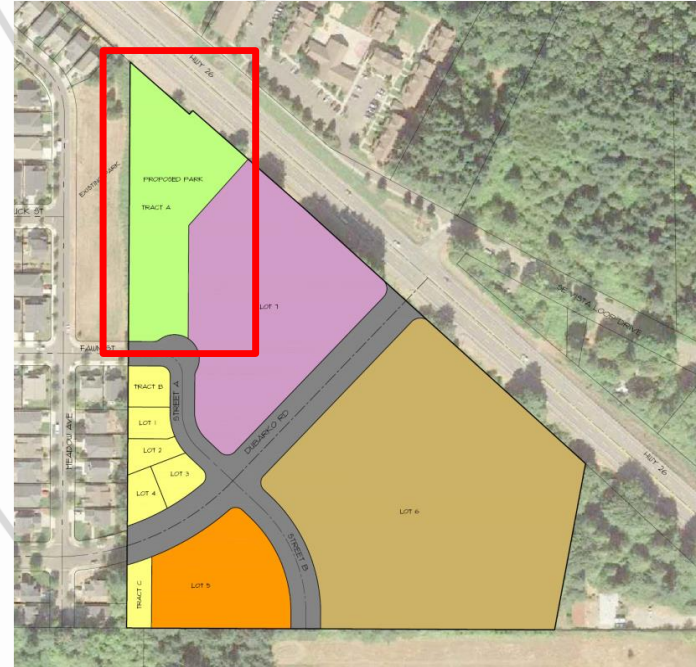
DENSITY

The applicant is proposing a density cap of 200 dwelling units. Without the cap instated it is likely that the number of dwelling units would be greater than 200.

For instance, the subdivision known as Vista Loop South that was approved in 2006, but never constructed, had 88 lots on the R-1 and R-2 land, which with the introduction of House Bill 2001 could have potentially allowed up to 176 dwelling units on the R-1 and R-2 land. While it is unlikely that all the lots in the 4.57 acres of R-1 zoned land and the 4.43 acres of R-2 zoned land in Vista Loop South would be doubled through House Bill 2001 allowances, it is potentially possible, especially considering that some of the units could be oriented vertically and because House Bill 2001 required that parking requirements are the same for one single-family dwelling as for a duplex. Also, without the cap on the C-3 zoned land there are no assurances on how many multi-family dwellings would be included on the C-3 land.

PARKLAND DEDICATION

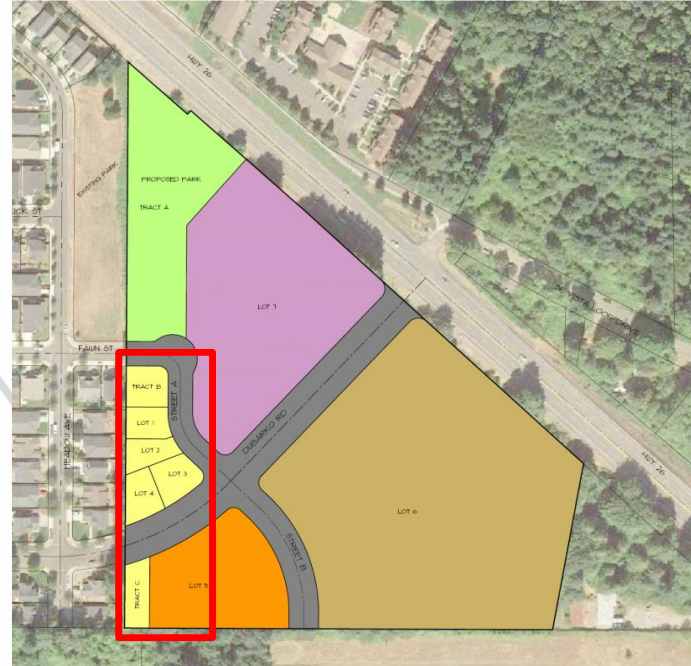
- Dedicate 1.755 acres for the eventual construction of Deer Pointe Park and zone this land as Parks and Open Space (POS).
- Necessitates a comprehensive plan map change from Village to POS.
- 0.33 acres larger than the 2019 proposal with Bull Run Terrace.



LOW DENSITY RESIDENTIAL (R-1)

Lots 1, 2, 3, and 4

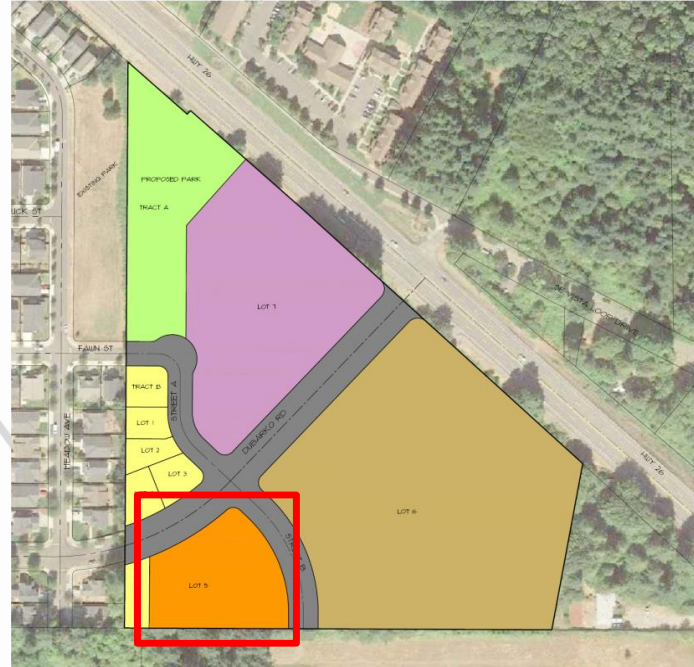
- Maximum density = 8 dwelling units
- Proposed Cap = 8 dwelling units
- Each lot is at least 7,500 sq ft
- Tracts B and C are stormwater facilities but are real property so have a zoning designation.



MEDIUM DENSITY RESIDENTIAL (R-2)

Lot 5

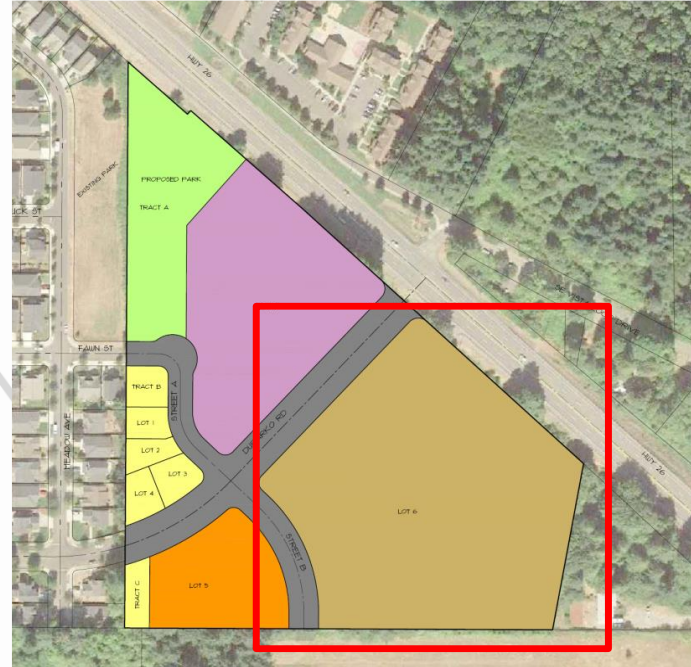
- Maximum density = 17 dwelling units
- Proposed Cap = 17 dwelling units
- The future design review application will include a review of development standards, minimum requirements, and additional requirements.



HIGH DENSITY RESIDENTIAL (R-3)

Lot 6

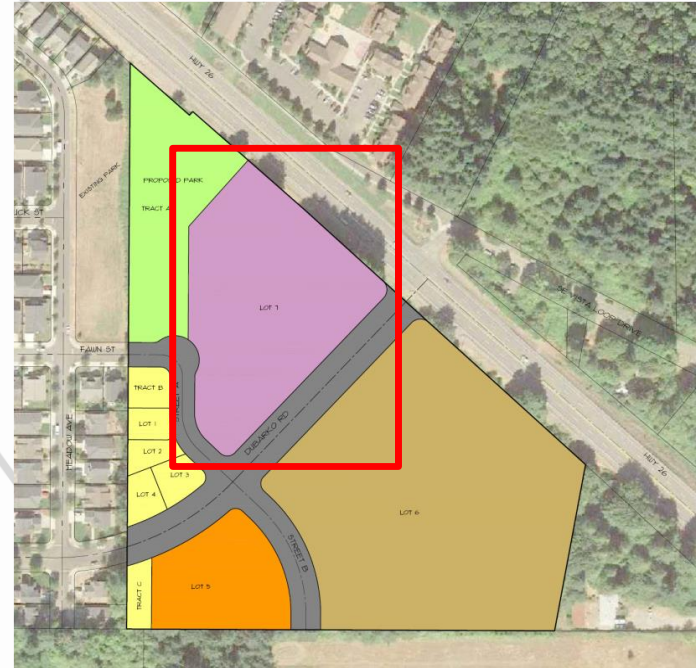
- Maximum density = 130 dwelling units
- Proposed Cap = 127 dwelling units
- The future design review application will include a review of development standards, minimum requirements, and additional requirements.



VILLAGE COMMERCIAL (C-3)

Lot 7

- Allows for mix of commercial and residential uses.
- Maximum density = unknown
- Proposed Cap = 48 dwelling units
- The future design review application will include a review of development standards, minimum requirements, and additional requirements.



SPECIFIC AREA PLAN OVERLAY

The City of Sandy Comprehensive Plan, Goal 2, Land Use Designations, Village states: **“development within village areas is governed by a specific area plan approved by the city as a Type IV land use decision”** and, **“shifting of the underlying zoning district boundaries to accommodate development constraints and land divisions for specific development proposals may be allowed through approval of a Specific Area Plan.”**

Therefore, the City required submission of a Specific Area Plan (SAP) Overlay request.

The only other specific area plan in Sandy, the Bornstedt Village Specific Area Overlay, has additional standards related to additional tree retention, green streets, additional design standards for single family homes, etc.

SPECIFIC AREA PLAN OVERLAY

With the Bornstedt Village Overlay in mind, staff recommends the additional provisions:

- Additional trees retained and additional retention requirements. **Additional requirements from the first Bull Run Terrace iteration.**
- Additional plantings along the common property line with Deer Pointe subdivision per the Screening Concept Plan (Exhibit I).
- The requirement to install green street swales anywhere that topography will allow.
- More restrictive garage design standards on Lots 1, 2, 3, and 4. **Additional requirements from the first Bull Run Terrace iteration.**

APPROVAL CRITERIA

Staff finds that this proposed application meets the applicable approval criteria in the Sandy Development Code. These approval criteria are more specially listed as:

- Comprehensive Plan Amendment: Section 17.24.70, criteria A. and B.
- Zoning Map Amendment: Section 17.26.40 B., criteria 1. through 4.
- Specific Area Plan Overlay: Section 15.54.10 A. through H.
- Subdivision Approval: Section 17.100.60 E., criteria 1. through 6.

MAIN POTENTIAL PUBLIC BENEFITS

- Extending Dubarko Road to intersect with Highway 26 consistent with the Transportation System Plan that was adopted in 2011.
 - Installs a much-needed transportation connection that is more suitable for turning movements than Langensand Road
- Paying a proportional share fee of \$268,345 towards construction of future capacity improvements at the intersection of Highway 211 and Dubarko Road at a cost of \$15,785 per PM peak hour trip.
 - The developer helps pay for intersection improvements at a location that is in need of modifications

MAIN POTENTIAL PUBLIC BENEFITS

- Expanding the Deer Pointe Park by 1.755 acres, consistent with the goals of the Parks and Trails Advisory Board and Figure 11 of the 2022 Parks and Trails Master Plan.
 - 0.33 acres larger than the 2019 proposal with Bull Run Terrace
 - Parkland dedication would occur prior to plat recording with a separate deed process
 - Potential to partner with the developer to help develop the park property

OTHER POTENTIAL PUBLIC BENEFITS

- Installing Street B to the south consistent with the Transportation System Plan that was adopted in 2011
- Extending Fawn Street to the east
- Fulfilling housing needs as defined in the Urbanization Study that was adopted in 2015
- Providing a mixture of housing types consistent with the goals of the 2040 Plan that was created in 1997

RECOMMENDATION

- Approve the Bull Run Terrace subdivision per the findings and conditions in the staff report for File No. 22-038.
- Adopt Ordinance No. 2022-27.



NO. 2022-27

AN ORDINANCE AMENDING THE CITY OF SANDY COMPREHENSIVE PLAN MAP BY CHANGING THE COMPREHENSIVE PLAN MAP DESIGNATION FOR 1.755 ACRES AND CHANGING THE ZONING MAP DESIGNATION FOR 15.91 ACRES (13.68 NET ACRES), AND ADOPTING THE BULL RUN TERRACE SPECIFIC AREA PLAN

Whereas, on December 29, 2020, the City Council issued a decision denying the Bull Run Terrace Subdivision application (File No. 19-050 CPA/ZC/SAP/SUB/TREE). The applicant, Roll Tide Properties Corp., appealed the City Council decision to the Oregon Land Use Board of Appeals (LUBA). The LUBA appeal was then placed on stay until the City could process the Deer Meadows Subdivision proposal for the same subject properties. On May 2, 2022, the City Council issued a decision denying the Deer Meadows Subdivision application. The applicant then appealed that City Council decision to LUBA;

Whereas, in accordance with ORS 197.830(13)(b), the applicant asked the City Council to reconsider the Bull Run Terrace Subdivision proposal with certain modifications, including a residential dwelling cap not to exceed 200 dwelling units. The applicant stated that the existing zoning could accommodate 226 dwelling units. The City Council agreed to reconsider the proposal with the modifications;

Whereas, the applicant submitted, as part of the Bull Run Terrace subdivision application on reconsideration, a request to change the Comprehensive Plan Map and Zoning Map designation for a property identified as T2S R5E Section 18CD Tax Lots 900 and 1000, and to adopt a Specific Area Plan for the affected properties;

Whereas, more specifically, the applicant requested to change the Comprehensive Plan Map designation for 1.755 acres of land from Village to Parks and Open Space (POS), and to change the Zoning Map designation for the identified properties from 6.64 acres of Low Density Residential (R-1), 4.43 acres of Medium Density Residential (R-2), and 2.61 acres of Village Commercial (C-3) (totaling 13.68 net acres) to 0.91 acres of Low-Density Residential (R-1), 1.23 acres of Medium-Density Residential (R-2), 6.50 acres of High-Density Residential (R-3), 3.28 acres of Village Commercial (C-3), and 1.755 acres of Parks and Open Space (POS) (totaling 13.68 net acres), with the establishment of a Specific Area Plan;

Whereas, on October 7, 2022, the City provided notice of the proposed map amendments and Specific Area Plan to DLCD in conformance with ORS 197.610;

Whereas, the City Council held a public hearing to review the proposal on November 21, 2022.

#2022-27

NOW, THEREFORE, THE CITY OF SANDY ORDAINS AS FOLLOWS,

Section 1: The Council approves the Comprehensive Map and Zoning Map amendments for a property identified as T2S R5E Section 18CD Tax Lots 900 and 1000. The Comprehensive Plan Map designation for 1.755 acres of land will be changed from Village to Parks and Open Space (POS) as identified in Attachment A, and the Zoning Map designation for the identified property will be changed from 6.64 acres of Low Density Residential (R-1), 4.43 acres of Medium Density Residential (R-2), and 2.61 acres of Village Commercial (C-3) (totaling 13.68 net acres) to 0.91 acres of Low-Density Residential (R-1), 1.23 acres of Medium-Density Residential (R-2), 6.50 acres of High-Density Residential (R-3), 3.28 acres of Village Commercial (C-3), and 1.755 acres of Parks and Open Space (POS) (totaling 11.6 net acres), with the establishment of a Specific Area Plan, as identified in Attachment B. The Council further approves the adoption of the Bull Run Terrace Specific Area Plan as described in Attachment C.

Section 2: The Comprehensive Plan Map and Zoning Map amendments and adoption of the Bull Run Terrace Specific Area Plan are supported by the Findings and Conditions contained in the staff report published on November 14, 2022, attached as Attachment C and incorporated into this Ordinance. Attachment C contains findings supporting the above changes, and those changes are subject to the conditions contained in Attachment C.

This ordinance is adopted by the Common Council of the City of Sandy and approved by the Mayor this 21 day of November 2022

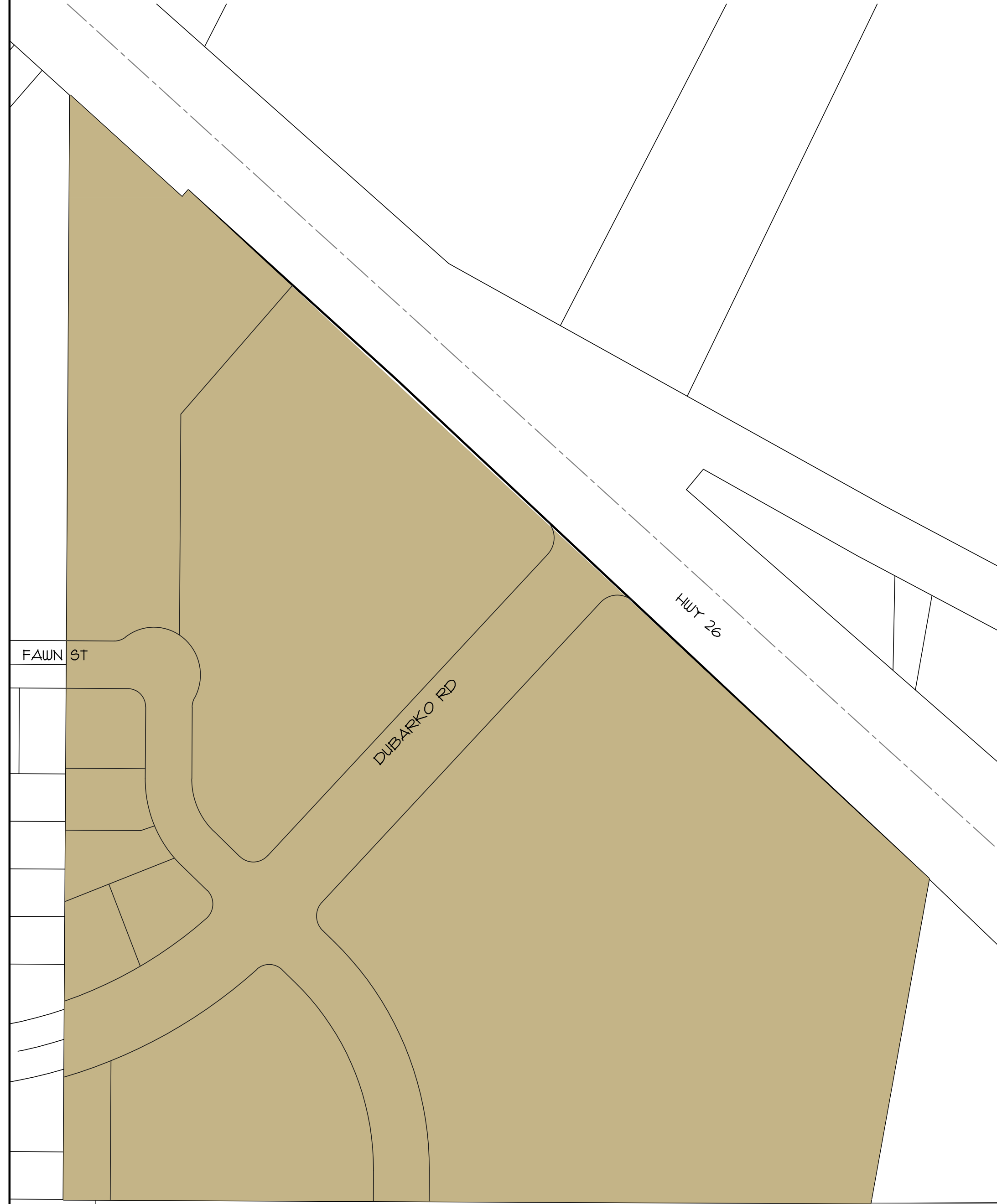
Stan Pulliam, Mayor

ATTEST:

Jeff Aprati, City Recorder

#2022-27

ATTACHMENT A

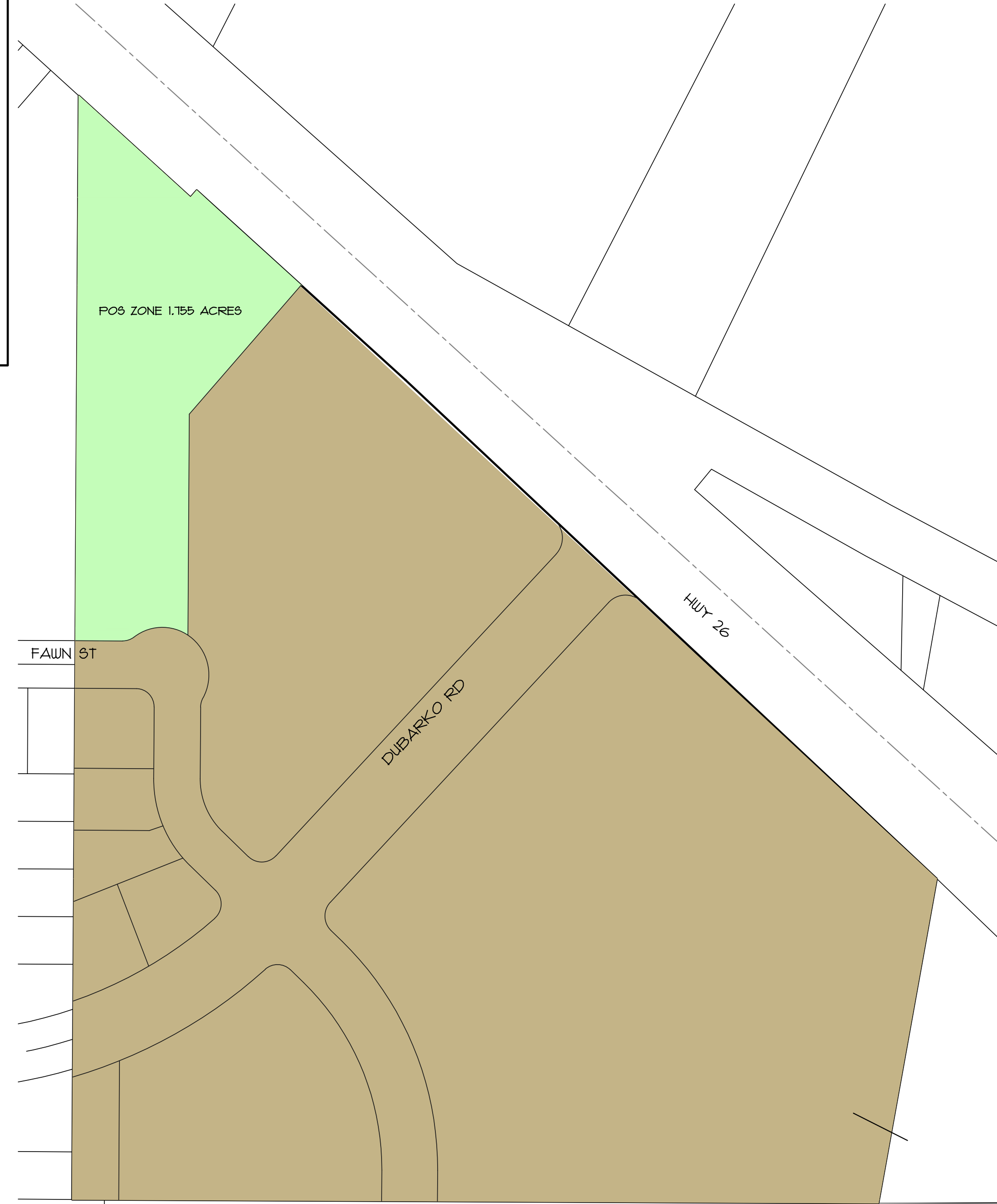


EXISTING COMPREHENSIVE PLAN



LEGEND

- POB ZONE
- VILLAGE



PROPOSED COMPREHENSIVE PLAN

CLIENT:
 ROLL TIDE
 PROPERTIES CORPORATION
 CORNELIUS, OR 97113

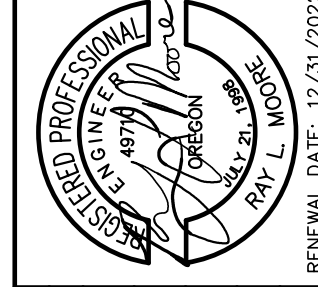
Surveyors & Planners, Inc.
 Surveying, Planning and
 Civil Engineering and
 P.L.L.C.
 P.O. Box 855 Sandy, OR 97055
 Phone: (503) 668-4730
 Fax: (503) 668-4730
 DATE OF PLOT: 11-1-22

PROJECT: **BULL RUN TERRACE SUBDIVISION**
COMPREHENSIVE PLAN MAP CHANGE

LOCATION: **40808 & 41010 HWY 26, SANDY, OR 97055**

SCALE: N/A
 HORIZ: 1" = 80'
 DATE: 11-1-22
 FILE: 19-038-CITY-SKETCH.dwg

LEGAL: 1B 25 5E
 SECTION: 1B 25 5E
 TWP: 25
 RANGE: 5E



DATE	NO.	REVISION	BY
DESIGNED: CTH	CHECKED: RLM	APPROVED: RLM	SHEET
DRAWN: CTH			SK1
			OF
			1

RENEWAL DATE: 12/31/2022

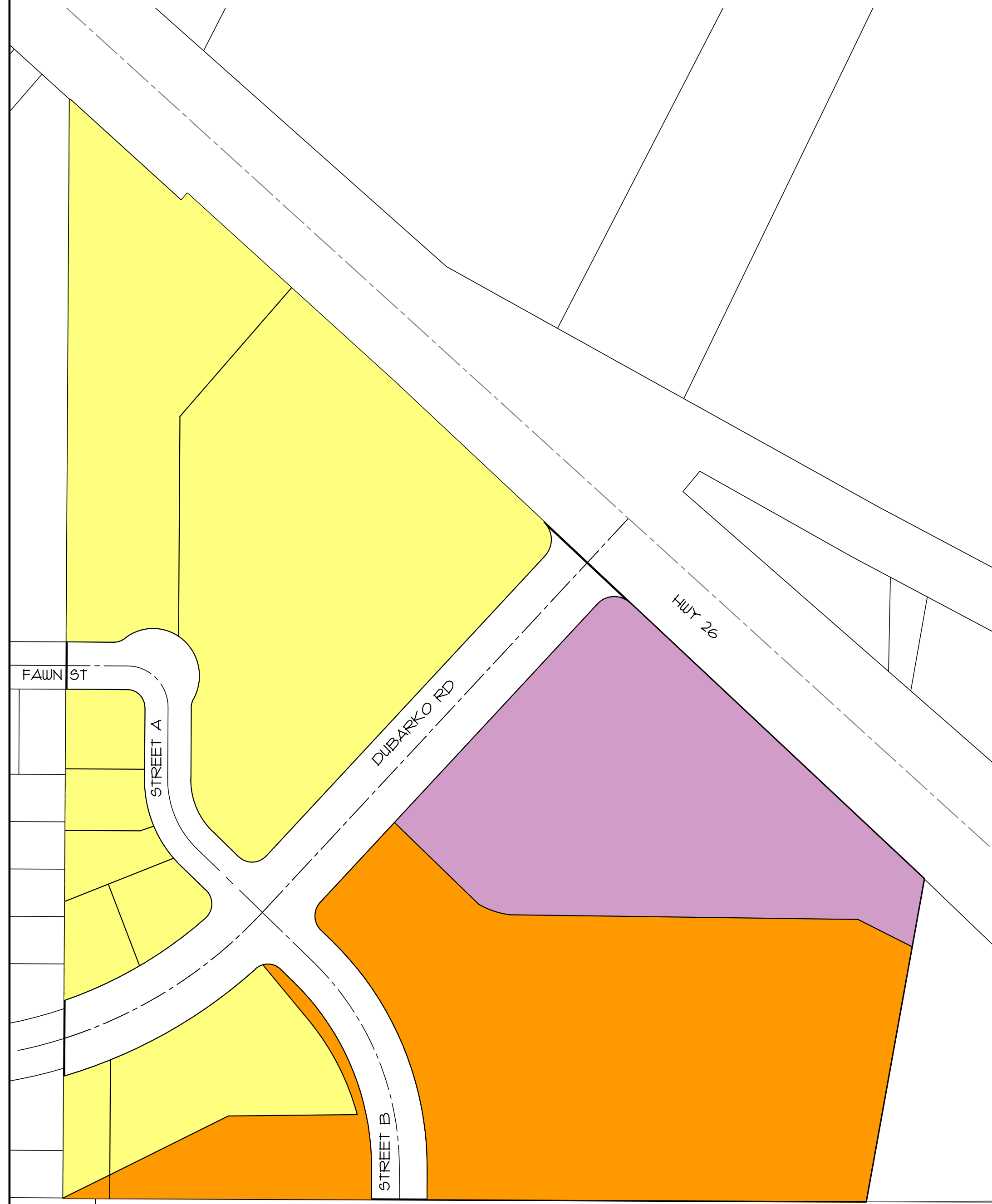
ATTACHMENT B

EXISTING NET ZONING AREA	
TOTAL SITE AREA	= 693,051 SF = 15.910 ACRES
R-1 SINGLE FAMILY	= 289,350 SF = 6.643 ACRES
R-2 MULTI-FAMILY	= 192,168 SF = 4.425 ACRES
C-3 COMMERCIAL	= 113,133 SF = 2.611 ACRES
PUBLIC ROW	= 91,205 SF = 2.232 ACRES

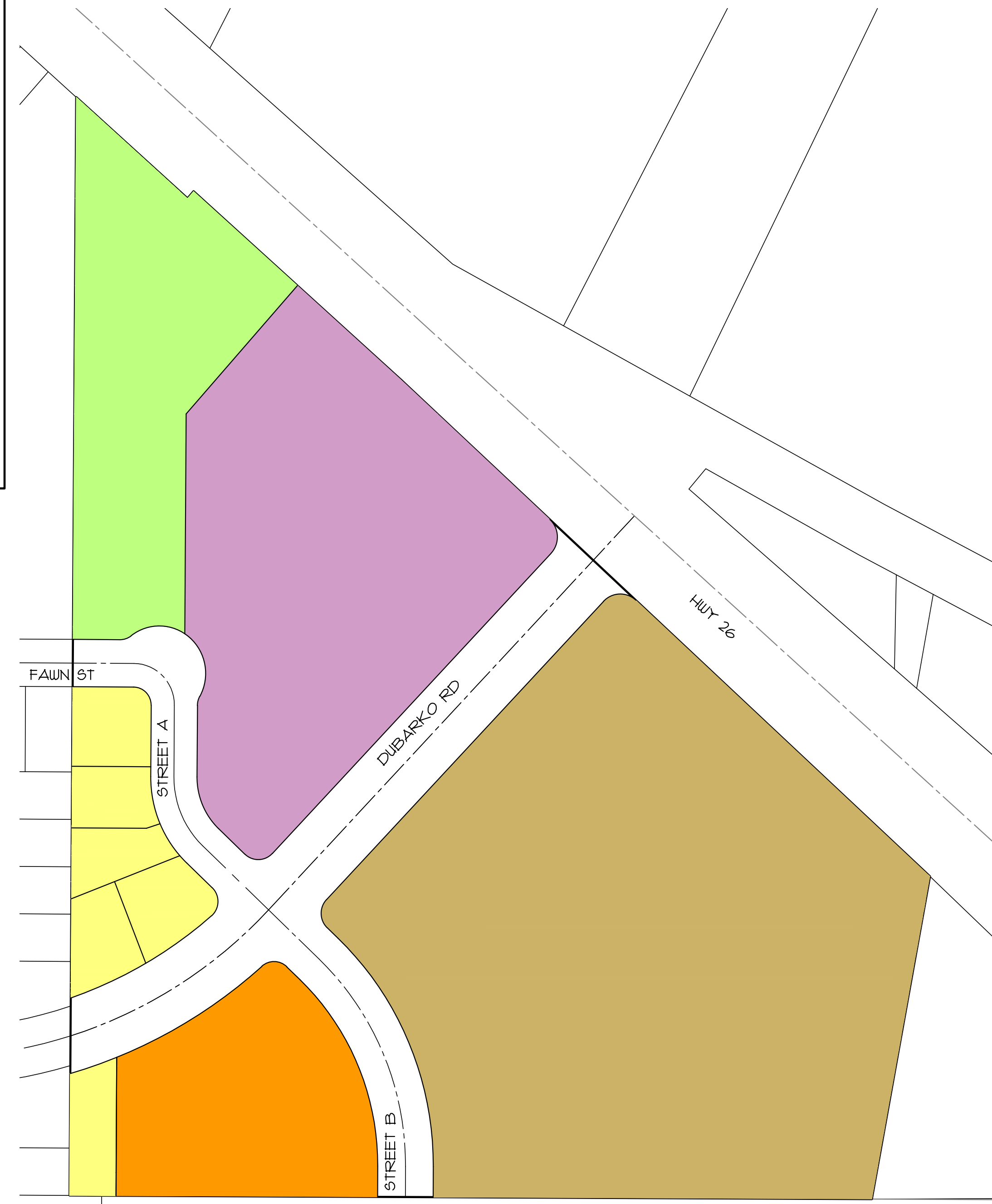


LEGEND	
	PARKS AND OPEN SPACE ZONE
	R-1 ZONE
	R-2 ZONE
	R-3 ZONE
	C-3 ZONE

PROPOSED NET ZONING AREA	
TOTAL SITE AREA	= 693,051 SF = 15.910 ACRES
PARKS AND OPEN SPACE	= 16,440 SF = 1.155 ACRES
R-1 SINGLE FAMILY	= 39,466 SF = 0.906 ACRES
R-2 MULTI-FAMILY	= 53,128 SF = 1.233 ACRES
R-3 MULTI-FAMILY	= 283,334 SF = 6.504 ACRES
C-3 COMMERCIAL	= 142,884 SF = 3.280 ACRES
PUBLIC ROW	= 91,205 SF = 2.232 ACRES

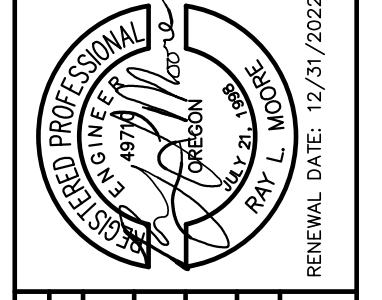


EXISTING ZONING



PROPOSED ZONING

BY		SHEET	
REVISION		SK2	
NO.		OF	2
DATE		DESIGNED: CTH	
		DRAWN: CTH	
		CHECKED: RLM	
		APPROVED: RLM	



SCALE	N/A	VERT.	
HORIZ.	1" = 80'	DATE	11-1-22
FILE	19-038-CITY-SKETCH.dwg	LEGAL	
SECTION	TWP. 25	RANGE	5E
	18		

BULL RUN TERRACE SUBDIVISION
NET ZONING AREA COMPARISON
 40808 & 41010 HWY 26, SANDY, OR 97055

Surveyors & Planners, Inc.
 Surveying, Planning and
 Civil Engineering and
 P.O. Box 855 Sandy, OR 97055
 Phone: (503) 668-4730
 Fax: (503) 668-4730
 DATE OF PLOT: 11-1-22

CLIENT:
 ROLL TIDE
 PROPERTIES CORPORATION
 CORNELIUS, OR 97113

ATTACHMENT C



39250 Pioneer Blvd
Sandy, OR 97055
503-668-5533

**CITY COUNCIL STAFF REPORT (REVISED 11/17/22)
TYPE IV LAND USE PROPOSAL**

This proposal was reviewed concurrently as a Type IV comprehensive plan amendment, zone change, subdivision, and specific area plan overlay with tree removal. The following exhibits, findings of fact, and conditions (bold text) explain the proposal and the proposed conditions of approval.

DATE OF HEARING: November 21, 2022

FILE NO.: 22-038 CPA/ZC/SUB/SAP/TREE

PROJECT NAME: Bull Run Terrace Reconsideration

APPLICANT/OWNER: Roll Tide Properties Corp.

PHYSICAL ADDRESS: 40808 and 41010 Highway 26

TAX MAP/LOTS: T2 R5E Section 18CD, Tax Lots 900 and 1000

EXISTING ZONING DISTRICT DESIGNATIONS: Low-Density Residential (R-1), Medium-Density Residential (R-2), and Village Commercial (C-3)

PROPOSED ZONING DISTRICT DESIGNATIONS: Low-Density Residential (R-1), Medium-Density Residential (R-2), High-Density Residential (R-3), Village Commercial (C-3), and Parks and Open Space (POS)

COMPREHENSIVE PLAN DESIGNATION: Village

PROPOSED COMPREHENSIVE PLAN DESIGNATIONS: Village and Parks and Open Space (POS)

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EXHIBITS

Applicant's Submittals for Reconsideration:

- A. Cover Letter from Tracy Brown Planning Consultants, LLC
- B. Project Narrative
- C. Civil Plan Set
 - Sheet C1 – Cover Sheet, Preliminary Plat Map, and Future Street Plan
 - Sheet C2 – Preliminary Plat Map and Specific Area Plan
 - Sheet C3 – Existing Conditions and Tree Retention Plan
 - Sheet C4 – Tree Tables
 - Sheet C5 – Master Street and Utility Plan
 - Sheet C6 – Street Sections
 - Sheet C7 – Street Tree Plan and Parking Analysis
 - Sheet C8 – Proposed Striping Plan
 - Sheet C9 – Preliminary Grading and Erosion Control Plan
 - Sheet C10 – Slope Analysis
 - Sheet 11 – Concept Plan
 - Sheet 12 – Net Zoning Area Comparison
- D. Preliminary Storm Drainage Design and Calculations
- E. Traffic Impact Study

Additional Documents from First Iteration of Bull Run Terrace:

- F. Arborist Reports from Teragan and Associates
- G. Geotechnical and Slope Stability Investigation
- H. Wetland Determination Report
- I. Screening Concept Plan
- J. Public Needs Analysis from Johnson Economics

Additional Documents Included by Development Services Director:

- K. Figure 11 from the 2022 Parks and Trails Master Plan

Agency Comments:

- L. Parks and Trails Advisory Board (October 27, 2022)
- M. Director of Sandy Area Metro (October 28, 2022)
- N. Sandy Fire Marshal (October 24, 2022)
- O. City Engineer Curran-McLeod (October 27, 2022)
- P. Assistant Public Works Director (October 28, 2022)
- Q. City Transportation Engineer (October 31, 2022)
- R. City Transportation Engineer Proportional Share Memo (October 27, 2022)
- S. ODOT (November 2, 2022)

Public Comments:

- T. Val and Gary Roche (October 21, 2022)
- U. David and Nancy Allan (October 21, 2022)

FINDINGS OF FACT

GENERAL FINDINGS

1. This application was originally submitted on December 30, 2019. The Sandy Development Code in effect at that time is what this reconsideration is being reviewed under. Therefore, it is important to note that modifications that have since occurred to the Sandy Development Code, particularly to Chapter 17.86, Parkland and Open Space, and Chapter 17.100, Land Division, do not apply to this application. However, because of how state legislation was adopted, House Bill 2001 and Senate Bill 458 are allowed to apply to this site, independent of the land use submission date.
2. This application is not subject to the moratorium on development adopted by Resolution 2022-24 because it was submitted prior to the effective date of the moratorium.
3. On December 29, 2020, the City Council issued a decision denying the Bull Run Terrace Subdivision application (File No. 19-050 CPA/ZC/SAP/SUB/TREE). The applicant, Roll Tide Properties Corp., appealed the City Council decision to the Oregon Land Use Board of Appeals (LUBA). The LUBA appeal was then placed on stay by the applicant, meaning ‘on hold’, until the City could process the Deer Meadows Subdivision proposal. On May 2, 2022, the City Council issued a decision denying the Deer Meadows Subdivision application. The applicant then appealed that City Council decision to LUBA. In accordance with ORS 197.830(13)(b), the applicant asked the City Council to reconsider the Bull Run Terrace Subdivision proposal with certain modifications, including a residential dwelling cap not to exceed 200 dwelling units. The applicant states that the existing zoning could accommodate 226 dwelling units. The City Council has agreed to reconsider the proposal with the modifications. This document reviews the reconsideration.
4. The applicant requests a Type IV Zone Map Amendment, Comprehensive Plan Map Amendment, establishment of a Specific Area Plan, approval of a 7-lot subdivision, and tree removal. The subject site is approximately 15.91 acres. The site is located at 40808 and 41010 Highway 26. The development area would total 11.60 acres with the remaining acreage dedicated as right-of-way, two stormwater facilities, and parkland. Four lots totaling 0.59 acres are proposed to be zoned R-1 (low-density residential) and will each contain a single-family dwelling or duplex. One lot at 6.50 acres is proposed to have the R-3 (high-density residential) zoning designation, one lot at 1.23 acres is proposed to have the R-2 (medium-density residential) zoning designation, and one lot at 3.28 acres is proposed to have the C-3 (village commercial) zoning designation. The R-3 and R-2 lots would contain multi-family dwellings and the one lot of C-3 would likely contain a mix of commercial and residential development.
5. The applicant also proposes to dedicate 1.755 acres for the eventual construction of Deer Pointe Park and zone this land as Parks and Open Space (POS). As referenced in Finding 1, above, and per Section 17.32.00 of the Development Code at the time of the original application submittal (December 2019), only publicly owned land can be zoned POS. **The**

applicant shall dedicate the proposed 1.755 acres of parkland to the City through a dedication deed process, separate from the subdivision plat process.

6. Staff has retained all original submittal items on file but did not include items that are no longer germane to the proposal as exhibits to this staff report as staff believes the omission of the original materials will make the proposal easier to understand and discuss.
7. The parcel has a Comprehensive Plan Map designation of Village. The designation of Village is not proposed to change, except for the parkland which is being proposed to be designated as Parks and Open Space (POS) on the Comprehensive Plan Map. The reason for this is that the Village designation does not include POS.
8. The City of Sandy completed the following notices:
 - a. A transmittal was sent to agencies asking for comment on October 13, 2022.
 - b. Notification of the proposed application was mailed to affected property owners within 500 feet of the subject property on October 13, 2022.
 - c. A legal notice was published in the Sandy Post on November 2, 2022.
9. Agency comments were received from the Parks and Trails Advisory Board, Director of Sandy Area Metro, Sandy Fire Marshal, City Engineer Curran-McLeod, the Assistant Public Works Director, City Transportation Engineer, and ODOT.
10. At publication of this staff report, two written public comments were received. The main concerns expressed by residents include the following:
 - a. Concerns about the intersection of Highway 26 and Dubarko Road.
 - b. High density residential and commercial being located too close to single family homes.
11. Staff is sympathetic to all concerns raised by the public but the existing designation of Medium Density Residential (R-2) allows multi-family dwellings. Multi-family is listed as a permitted outright use in the R-2 zoning district in Section 17.38.10(A)(6). Even if the applicant were not proposing a comprehensive plan map and zoning map amendment the applicant would still have property rights to construct multi-family housing on the existing R-2 and C-3 designated lands.

PROPOSED ZONING AMENDMENTS – Chapters 17.24, 17.26, 17.30, 17.32, 17.36, 17.38, 17.40, and 17.46

12. The existing zoning district designations and gross acreage, without dedications for roads, stormwater, or parkland, for the 15.91 acres are as follows:
 - a. Low-Density Residential (R-1): 8.05 acres
 - b. Medium-Density Residential (R-2): 5.01 acres
 - c. Village Commercial (C-3): 2.84 acres

13. The applicant's submitted Plan Set, Sheet 12 (Exhibit C), details the existing net zoning area and the proposed net zoning area for the reconsideration. Staff relied on this sheet as the evidence in the record as it was provided by a licensed surveyor.

14. **Existing Net Acres with Existing Zoning.** After removing 2.23 acres of right-of-way for roads, removing 0.32 acres for stormwater facilities, and removing the area for the 1.755-acre park, the remaining existing zoning district designations and acreage would be as follows:
 - a. Low-Density Residential (R-1): 4.57 acres
 - b. Medium-Density Residential (R-2): 4.43 acres
 - c. Village Commercial (C-3): 2.61 acres
 - d. TOTAL = 11.60 acres

15. **Proposed Net Acres with Modified Zoning for Reconsideration.** After removing 2.23 acres of right-of-way for roads, removing 0.32 acres for stormwater facilities, and removing the area for the 1.755-acre park, the remaining proposed zoning district designations and acreage would be as follows:
 - a. Low-Density Residential (R-1): 0.59 acres
 - b. Medium-Density Residential (R-2): 1.23 acres
 - c. High-Density Residential (R-3): 6.50 acres
 - d. Village Commercial (C-3): 3.28 acres
 - e. TOTAL = 11.60 acres

16. **Maximum Number of Dwelling Units Based on Existing Zoning.** Based on the existing net zoning acreage above and the allowances in House Bill 2001, staff has calculated that the existing zoning designations could potentially accommodate the following number of dwelling units:
 - a. Low-Density Residential (R-1): 74 dwelling units
For the area zoned R-1, a minimum of 5 and a maximum of 8 units per acre are allowed.
The minimum density for 4.57 net acres x 5 units/net acre = 22.85 rounded up to 23 units.
The maximum density for 4.57 net acres x 8 units/net acre = 36.56 rounded up to 37 units. The maximum number of 37 dwelling units could be doubled with the introduction of House Bill 2001, to a maximum of 74 dwelling units.

 - b. Medium-Density Residential (R-2): 124 dwelling units
For the area zoned R-2, a minimum of 8 and a maximum of 14 units per acre are allowed.
The minimum density for 4.43 net acres x 8 units/net acre = 35.44 rounded down to 35

units. The maximum density for 4.43 net acres x 14 units/net acre = 62.02 rounded down to 62 units. The maximum number of 62 dwelling units could be doubled with the introduction of House Bill 2001, to a maximum of 124 dwelling units.

- c. Village Commercial (C-3): unknown number of dwelling units
For the area zoned C-3, the exact number of potential residential units is not known at this time because in accordance with Section 17.46.10 (A)(2), multi-family dwellings above, beside or behind a commercial business is an outright permitted use. This means that the applicant could construct one business and designate the remainder of the 2.61 acres to multifamily development. Within the constraints of the existing zoning the exact number of dwelling units on the 2.61 acres of C-3 land is not possible to determine.
- d. TOTAL = 198 dwelling units, plus an unknown number of dwelling units in the C-3 zoning district. While it is unlikely that all the lots in the 4.57 acres of R-1 zoned land and the 4.43 acres of R-2 zoned land would be doubled through House Bill 2001 allowances, it is potentially possible, especially considering that some of the units could be oriented vertically and because House Bill 2001 required that parking requirements are the same for one single-family dwelling as for a duplex.

17. Maximum Number of Dwelling Units Based on Modified Zoning for Reconsideration.

Based on the proposed net zoning acreage above and the allowances in House Bill 2001, staff has calculated that the modified zoning designations could potentially accommodate the following number of dwelling units:

- a. Low-Density Residential (R-1): 8 dwelling units
Low-Density Residential (R-1) Cap: 8 dwelling units
For the area zoned R-1, a minimum of 5 and a maximum of 8 units per acre are allowed. The minimum density for 0.59 net acres x 5 units/net acre = 2.95 rounded down to 2 units. The maximum density for 0.59 net acres x 8 units/net acre = 4.72 rounded up to 5 units. The maximum number of 5 dwelling units could be doubled with the introduction of House Bill 2001, to a maximum of 10 dwelling units as the proposed subdivision includes individual lots in the R-1 zoning district. However, the applicant is only proposing 4 lots in the R-1 zoning district, so the maximum number of dwelling units is 8 dwelling units. *Note: In accordance with Section 17.30.20 (D) a dwelling unit figure is rounded down to the nearest whole number for all total maximum or minimum figures less than four dwelling units.*
- b. Medium-Density Residential (R-2): 17 dwelling units
Medium-Density Residential (R-2) Cap: 17 dwelling units
For the area zoned R-2, a minimum of 8 and a maximum of 14 units per acre are allowed. The minimum density for 1.23 net acres x 8 units/net acre = 9.84 rounded up to 10 units. The maximum density for 1.23 net acres x 14 units/net acre = 17.22 rounded down to 17 units. The maximum number of 17 dwelling units could be doubled with the introduction of House Bill 2001, to a maximum of 34 dwelling units if the proposal included lots, but the proposed subdivision is for one lot, so House Bill 2001 is not applicable.
- c. High-Density Residential (R-3): 130 dwelling units

High-Density Residential (R-3) Cap: 127 dwelling units

For the area zoned R-3, a minimum of 10 and a maximum of 20 units per acre are allowed. The minimum density for 6.50 net acres x 10 units/net acre = 65 units. The maximum density for 6.50 net acres x 20 units/net acre = 130 units. House Bill 2001 is not applicable to the R-3 zoning district as this zoning district does not permit single-family detached dwellings on new lots of record created with new subdivision plats.

- d. Village Commercial (C-3): unknown number of dwelling units

Village Commercial (C-3) Cap: 48 dwelling units

For the area zoned C-3, the exact number of potential residential units is not known at this time because in accordance with Section 17.46.10 (A)(2), multi-family dwellings above, beside or behind a commercial business is an outright permitted use. This means that the applicant could construct one business and designate the remainder of the 3.28 acres to multifamily development. Within the constraints of the existing zoning the exact number of dwelling units on the 3.28 acres of C-3 land is not possible to determine.

- e. **TOTAL with Cap = 200 dwelling units with the proposed cap.** Without the cap instated it is likely that the number of dwelling units would be greater than 200. For instance, the subdivision known as Vista Loop South that was approved in 2006, but never constructed, had 88 lots on the R-1 and R-2 land, which with the introduction of House Bill 2001 could have potentially allowed up to 176 dwelling units on the R-1 and R-2 land. While it is unlikely that all the lots in the 4.57 acres of R-1 zoned land and the 4.43 acres of R-2 zoned land in Vista Loop South would be doubled through House Bill 2001 allowances, it is potentially possible, especially considering that some of the units could be oriented vertically and because House Bill 2001 required that parking requirements are the same for one single-family dwelling as for a duplex. Also, without the cap on the C-3 zoned land there are no assurances on how many multi-family dwellings would be included on the C-3 land.

18. OAR 660-024 contains regulations related to urban growth boundaries and requires local governments to inventory land inside the UGB to determine whether there is adequate capacity to accommodate 20-years of growth. If the inventory demonstrates that the development capacity of land inside the UGB is inadequate to accommodate the estimated 20-year needs determined under OAR 660-024-0040, the local government must amend the plan to satisfy the need deficiency, either by increasing the development capacity of land already inside the UGB or by expanding the UGB, or both. A city cannot allow the rezoning of land that would bring the land supply for any given zone into a deficit. In accordance with OAR 660-024, the existing zoning designations for land within the UGB have the following 20-year land surplus:

- a. Commercial = surplus of 1.13 acres
- b. Low Density Residential = surplus of 19.20 acres
- c. Medium Density Residential = surplus of 17.10 acres
- d. High Density Residential = surplus of 12.60 acres

19. In accordance with OAR 660-024, the modified zoning designations for land within the UGB would result in the following 20-year land surplus:
 - a. Commercial = surplus of 1.80 acres (increase of 0.67 acres)
 - b. Low Density Residential = surplus of 15.22 acres (reduction of 3.98 acres)
 - c. Medium Density Residential = surplus of 13.90 acres (reduction of 3.20 acres)
 - d. High Density Residential = surplus of 19.10 acres (increase of 6.50 acres)
20. Chapter 17.24, Comprehensive Plan Amendment Procedures, contains review criteria for Comprehensive Plan amendments. The subject property has a comprehensive plan map designation of Village. Parks and Open Space (POS) is not a permitted zoning designation within Village as the Village designation was established in 1997 and the POS designation was only established in March of 2012 with the adoption of Ordinance 2012-01. The comprehensive plan map change is requested to modify 1.755 acres from Village to Parks and Open Space (POS).
21. The previous iteration of the Bull Run Terrace subdivision application also contained a density increase by greater than 20 percent, however, with the adoption of House Bill 2001 and as evident in the above density analysis, this is no longer the case. Therefore, the Comprehensive Plan Amendment with this application is solely for the 1.755 acres of parkland.
22. Section 17.24.70 (A) specifies the change being proposed is the best means of meeting the identified public need. Expanding the Deer Pointe Park is consistent with the goals of the Parks and Trails Advisory Board and the 1997 Parks Master Plan that was applicable at the time of this application. It is worth noting that this proposal is also consistent with the newly adopted 2022 Parks and Trails Master Plan. The concept plan in Figure 11 of the 2022 Parks and Trails Master Plan (Exhibit K) details parkland improvements on the subject property in the location of what is proposed to be dedicated to the City of Sandy and redesignated to POS. Therefore, this comprehensive plan change is the best means of meeting the identified public need as established in the 2022 Parks and Trails Master Plan.
23. Section 17.24.70(B) requires the change to conform to all applicable Statewide Planning Goals. These goals are evaluated concurrently with criteria in Section 17.26.40(B)(4), below.
24. Chapter 17.26, Zoning District Amendments, contains review criteria for zoning map amendments. Section 17.26.40 outlines the procedures for a quasi-judicial zoning map amendment. The proposed zone map change proposes to add High Density Residential (R-3) and Parks and Open Space (POS), increase Village Commercial (C-3), reduce Medium Density Residential (R-2), and reduce Low Density Residential (R-1).
25. Section 17.26.40(B)(1) requires the City Council to determine the effects on City facilities and services. With the proposed development, Dubarko Road will be extended from its current terminus through the subject site to connect with Highway 26. This road is identified as a necessary future minor arterial in the City's 2011 Transportation System Plan. An existing water line is located in the future alignment of Dubarko Road, and the applicant will accommodate this facility during the construction of this road. This application is not subject

to the moratorium on development adopted by Resolution 2022-24 because it was submitted prior to the effective date of the moratorium. Therefore, this proposed reconsideration does not negatively affect any City facilities or services.

26. Section 17.26.40(B)(2) and (3) requires the Council to assure consistency with the purposes of this chapter and with the policies of the Comprehensive Plan, including the following:
- a. Maintain sound, stable, and desirable development within the City
 - b. Permit changes in zoning district boundaries where appropriate
 - c. Ensure zoning changes are consistent with the community's land use policies and goals
 - d. Lessen the influence of private economic interests in the land use decision-making process

Given that the proposed development conforms with the Sandy Municipal Code and Comprehensive Plan goals, and that multiple conditions have been put in place to ensure that the development meets the intent of the Code and goals, staff finds that these criteria have been met.

27. Section 17.26.40(B)(4) requires the Council to assure consistency with the Statewide Planning Goals as may be necessary, and any other applicable policies and standards adopted by the City Council.

Goal 1: Citizen Involvement

A public notice was sent to adjoining property owners on October 13, 2022, a legal notice published in the Sandy Post on November 2, 2022, and a notice of the proposal was sent to the Department of Land Conservation and Development on October 7, 2022. Since this is a reconsideration of File No. 19-050 CPA/ZC/SAP/SUB/TREE the Planning Commission does not hear the proposal during this reconsideration. On November 21, 2022, the City Council will hold a public hearing to likely decide on the request. Because the public will have the opportunity to review and comment on the application, the proposal meets the intent of Goal 1.

Goal 2: Land Use Planning

The City's Comprehensive Plan guides land uses within the City's Urban Growth Boundary. The City's Zoning Ordinance enforces the Comprehensive Plan. Staff has reviewed the application for conformance with the Comprehensive Plan in review of Chapter 17.24, and Zoning Ordinance in review of Chapter 17.26. The City has sent notification of this proposal to both the Department of Land Conservation and Development as well as the Oregon Department of Transportation.

Goal 3: Agricultural Lands

Not Applicable

Goal 4: Forest Lands

Not Applicable

Goal 5: Natural Resources

The applicant, along with a consultant, have shown that the subject site does not contain any wetland area (Exhibit H). The applicant worked with an arborist to inventory trees and develop a tree retention plan as required in Chapter 17.102 (Exhibit F). The Planning Commission provided a code interpretation that retention trees only have to be protected consistent with Chapter 17.102, and not consistent with the distance requirements in Chapter 17.92 for a residential subdivision. That said, staff finds that to adequately protect the retention trees, the protection area shall be consistent with Chapter 17.92 and the recommendations of the arborist. **The applicant shall install tree protection fencing at the critical root zone of 1 foot per 1-inch DBH to protect all of the retention trees in the tree retention conservation easement on Lot 7, for the trees included in the parkland, and for the trees included on Lots 2 and 4 consistent with the arborist reports from Teragan and Associates. 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.** Additional analysis and conditions are contained in the review of Chapter 17.102 in this document.

Goal 6: Air, Water, and Land Quality

The applicant proposes that the application complies with all regulations relative to air, water, and land quality.

Goal 7: Natural Hazards

The site contains minimal steep slopes, and no natural hazards are known to exist on the site.

Goal 8: Recreational Needs

The applicant is dedicating 1.755 acres of parkland to the City of Sandy. This dedication helps expand the existing parkland that will eventually be developed as Deer Pointe Park. Expanding the Deer Pointe Park is consistent with the goals of the Parks and Trails Advisory Board and the 1997 Parks Master Plan that was applicable at the time of this application. It is worth noting that this proposal is also consistent with the newly adopted 2022 Parks and Trails Master Plan. The concept plan in Figure 11 of the 2022 Parks and Trails Master Plan details parkland improvements on the subject property in the location of what is proposed to be dedicated to the City of Sandy. Staff finds that parkland dedication is preferable so long as the development to the east of the park is complementary to the parkland. The Parks and Trail Advisory Board provided a letter (Exhibit L) which contains a recommendation for the City Council to accept the parkland as it meets the objectives as listed in the 2022 Parks and Trails Master Plan by providing a true neighborhood park in an underserved area of the community. Additional analysis and conditions related to parks are contained in the parkland dedication section review of Chapter 17.86 in this document.

Goal 9: Economic Development

Goal 9 requires cities to provide an adequate supply of buildable lands for a variety of commercial and industrial activities and requires plans to be based on an analysis of the comparative advantages of a planning region. With the reconsideration proposal, staff finds that each type of land use in the Comprehensive Plan will continue to be in surplus.

Goal 10: Housing

This proposal to change residential designations on the subject property does not affect compliance with this goal. In fact, the proposed modification to the zoning map increases the potential diversity in housing types by providing additional multi-family housing.

Goal 11: Public Facilities and Services

Not Applicable

Goal 12: Transportation

With development of this project, Dubarko Road will be extended through the property to connect with Highway 26 in accordance with the 2011 Transportation System Plan (TSP). The applicant included a Traffic Impact Study from Ard Engineering with the application (Exhibit E). According to the revised traffic study, the assumptions were based on 8 duplex units, 192 multi-family units, and a 5,000 square foot office building. These three uses would produce 94 peak AM trips, 115 peak PM trips, and 1,418 total daily trips. Since this application involves a zone change, the traffic engineer also had to evaluate traffic volumes as measured under the “reasonable worst case” development scenarios as defined by Oregon’s Transportation Planning Rule (TPR). The reasonable worst case scenario analysis can be found on pages 13, 14, 15, 26, 27, and 28 of Exhibit E. Based on the TPR, Ard Engineering recommends that a trip cap of 340 PM net new peak hour trips be applied to the subject property as a condition of approval for the proposed zone change. The City Transportation Engineer (Exhibit Q) concurs with the importance of applying a trip cap of 340 PM net new peak hour trips. **The subject property shall be subject to a trip cap of 340 PM net new peak hour trips. Each application for development of a lot within the subject property shall include a report from a licensed traffic engineer stating the number of net new PM peak hour trips expected to be generated by the proposed development, and this number of trips will be deducted from the total trip cap of 340 net new PM peak hour trips upon approval of the application. No development application will be approved that would cause the total net new PM peak hour trips to exceed said cap unless the applicant agrees to pay additional proportionate share fees for the intersection of Highway 211 and Dubarko Road, in an amount determined by the City based on the number of trips in excess of the cap.** Additional analysis and conditions on transportation are contained in the transportation section review of Chapter 17.84 and Chapter 17.100 in this document.

Goal 13: Energy Conservation

Not Applicable

Goal 14: Urbanization

This proposal accomplishes the objectives of this Statewide Planning Goal by accommodating additional residential and commercial growth within the existing Urban Growth Boundary (UGB) as planned for in the adopted Urbanization Study completed in 2015. As detailed above, the proposed changes will not result in any deficit in available land use.

Goals 15-19

Not applicable for the City of Sandy as these goals relate to the Willamette River and the Oregon Coast.

28. Section 17.26.90 pertains to the effective date of the proposed zone change and states: “The decision of the City Council made in conjunction with a Zoning Map amendment shall become effective 30 days after passage of the ordinance. No zoning district changes will take effect, however, until and unless the necessary Comprehensive Plan amendment has been implemented by the City Council, if needed.” The comprehensive plan map will need to be amended to reflect the proposed change from Village to POS for the 1.755 acres of parkland. As referenced in Finding 1, above, and per Section 17.32.00 of the Development Code at the time of the original application submittal (December 2019), only publicly owned land can be zoned POS. **The applicant shall dedicate the proposed 1.755 acres of parkland to the City through a dedication deed process, separate from the subdivision plat process.**

17.32 – Parks & Open Space (POS)

29. The applicant proposes dedicating 1.755 acres of parkland to the City of Sandy and zoning the land as Parks and Open Space (POS). Section 17.32.10 contains the permitted uses in the POS zoning district. The applicant proposes a park dedication consistent with parkland in the 1997 Parks Master Plan and the 2022 Parks and Trails Master Plan.

17.36 – Low Density Residential (R-1)

30. The applicant proposes constructing four duplexes on the four proposed lots that are proposed to be zoned R-1, as permitted in this zoning district. While the net acreage for the R-1 zoned land is 0.59, the gross acreage including the two stormwater facilities is 0.91 acres. Section 17.36.30 contains the design standards for this zone. As shown in Exhibit C, Sheet C2, all lots four lots proposed as R-1 contain at least 5,500 square feet, have at least 20 feet of street frontage, and contain an average lot width of at least 50 feet as required. Lot 4 has frontage on Dubarko Road, but access is not permitted from Dubarko Road. Access to this lot will be by means of an access easement on Lot 3. **The dwellings on Lots 1, 2, 3, and 4 shall be designed to meet all of the requirements as specified in Chapter 17.36 and will be assessed with future building permits for those four lots.**
31. Section 17.36.50(B) requires that lots with 40 feet or less of street frontage shall be accessed by a rear alley or shared private driveway. No proposed lots have 40 feet or less of street frontage.

17.38 – Medium Density Residential (R-2)

32. The applicant proposes constructing 17 multi-family dwelling units on the one proposed lot that is proposed to be zoned R-2, as permitted in this zoning district. Exhibit C, Sheet 11 details a conceptual layout for this lot. **Conformity with the remainder of Chapter 17.38 shall be determined in a future design review process.**

17.40 – High Density Residential (R-3)

33. The applicant proposes constructing 127 multi-family dwelling units on the one proposed lot that is proposed to be zoned R-3, as permitted in this zoning district. Exhibit C, Sheet 11 details a conceptual layout for this lot. **Conformity with the remainder of Chapter 17.40 shall be determined in a future design review process.**

17.46 – Village Commercial (C-3)

34. The applicant proposes constructing 48 multi-family dwelling units above, beside, or behind a commercial business on the one proposed lot that is proposed to be zoned C-3, as permitted in this zoning district. Exhibit C, Sheet 11 details a conceptual layout for this lot. **Conformity with the remainder of Chapter 17.46 shall be determined in a future design review process.**

LAND DIVISION CRITERIA – Chapter 17.100

35. This application was originally submitted on December 30, 2019. The Sandy Development Code in effect at that time is what this reconsideration is being reviewed under. Therefore, it is important to note that modifications that have since occurred to the Sandy Development Code, particularly to Chapter 17.86, Parkland and Open Space, and Chapter 17.100, Land Division, do not apply to this application.
36. Submittal of preliminary utility 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.** As referenced in Finding 1, above, and per Section 17.100.60(H) of the Development Code at the time of the original application submittal (December 2019), **the final plat shall be delivered to the Director for approval within one year 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, grant an extension of the tentative plat approval for up to one additional year.** While the subdivision approval expires one year from approval, if a final plat is not recorded, **the proposed comprehensive plan map and zoning map modifications go into effect 30 days from the date of the ordinance in accordance with Section 17.26.90.**
37. 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. Each base zoning district requires that residential development comply with Chapter 17.82. As explained throughout this document, the proposed subdivision meets the standards of the proposed base zoning districts, and adherence to this standard will be verified with future building permits or design reviews, whichever is applicable. Section 17.100.220 includes requirements for lot design. All lots in the proposed subdivision have been designed so that no foreseeable difficulties due to topography or other conditions will exist in securing building permits on these lots as required by Section 17.100.220(A). All lots in the R-1 zone comply with the minimum standards in that zone as required by Section 17.100.220(B). No lots are proposed to contain more than double the minimum lot size. Section 17.100.220 states that all new lots shall have at least 20 feet of street frontage. All lots in the proposed subdivision contain at least 20 feet of frontage along a public street therefore meeting the requirements of Section 17.100.220(C). Lots 6 and 7 both contain frontage on Highway 26 and Dubarko Road. Because no direct access to Highway 26 is allowed the creation of these double frontage lots is unavoidable and is thus allowed as required by Section 17.100.220(D). The proposal meets approval criteria 17.100.60 (E)(1).
38. Section 17.100.60(E)(2) requires subdivisions to be consistent with the design standards set forth in this chapter. In accordance with Section 17.100.70 the design standards in Chapter 17.100 are met as the proposed subdivision follows the 2011 City of Sandy Transportation System Plan by providing the connection of Dubarko Road to Highway 26. In accordance with Section 17.100.100 (A) the proposed subdivision meets the Street Connectivity Principle. Connecting Dubarko Road to Highway 26 provides safe and convenient options

for cars, bikes, and pedestrians; creates a logical, recognizable pattern of circulation; and spreads traffic over many streets so that key streets such as Langensand Road and Highway 211 are not overburdened. The proposal meets approval criteria 17.100.60 (E)(2).

39. 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. The proposed street pattern is consistent with the Comprehensive Plan and the city's standards, including connecting Dubarko Road to Highway 26. The 2011 Sandy Transportation System Plan (TSP) was adopted by Ordinance 2011-12 as an addendum to the Comprehensive Plan. Exhibit A of Ordinance 2011-12 is the TSP. Project M20 in the TSP is the connection of Dubarko Road to Highway 26. Furthermore, the proposal is consistent with OAR 660-012-0045, which requires that local governments implement their TSP. The proposal meets approval criteria 17.100.60 (E)(3).
40. Section 17.100.60(E)(4) requires that adequate public facilities are available or can be provided to serve the proposed subdivision. City water, sanitary sewer, and stormwater are available and will be extended by the applicant to serve the subdivision as detailed in Exhibit C, Sheet C5. The proposal meets approval criteria 17.100.60 (E)(4).
41. Section 17.100.60(E)(5) requires that all proposed improvements meet City standards. Extending Dubarko Road to connect with Highway 26 is consistent with the 2011 TSP and OAR 660-012-0045, which requires that local governments implement their TSP. Pursuant to 17.86.10 of the Development Code, new residential subdivisions "shall be required to provide parkland to serve existing and future residents of those developments." By providing 1.755 acres of parkland, the proposal meets the goals of the 1997 Parks Master Plan that designated Deer Pointe Park as a community park, and the 2022 Parks and Trails Master Plan, specifically Figure 11. By providing street frontage improvements (curbs, sidewalks, street lighting, street trees, storm drainage, etc.) on Highway 26, Dubarko Road, Street B, and Fawn Street, the proposal meets Chapter 17.84 for frontage improvements. The proposal meets approval criteria 17.100.60 (E)(5).
42. Section 17.100.60(E)(6) 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 per their narrative in Exhibit B. That said, the applicant is proposing that the design of the multi-family dwellings and commercial development occurs at a future date. Reviewing multi-family and commercial development through a separate process is typical. The proposal meets approval criteria 17.100.60 (E)(6).

ADDITIONAL SETBACKS AND SPECIAL SETBACKS – Chapters 17.80 and 17.82

43. Chapter 17.80 requires all residential structures to be setback at least 20 feet on collector and arterial streets. Lots 3, 4, 5, 6 and 7 shall adhere to the setback standards in Chapter 17.80 for Highway 26 which is classified as an arterial, Dubarko Road which is classified as a minor arterial, and Street B which is classified as a collector. The revised Preliminary Plat (Exhibit C) details the 20-foot setbacks to Highway 26, Dubarko Road, and Street B.
44. 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 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. **The dwellings on all lots abutting a transit street shall be designed to meet all of the requirements as specified in Chapter 17.82 and will be assessed with future building permits or design reviews, whichever is applicable.**
45. Section 17.82.20(D) requires that 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. **The orientation of the future multi-family units that have frontage on both Highway 26 and Dubarko Road, or Street B and Dubarko Road will be determined in a future design review process.**

SPECIFIC AREA PLAN OVERLAY – Chapter 17.54

46. The purpose of a specific area plan overlay zone is to allow development and approval of specific area plans in the city. The City of Sandy Comprehensive Plan, Goal 2, Land Use Designations, Village states: “shifting of the underlying zoning district boundaries to accommodate development constraints and land divisions for specific development proposals may be allowed through approval of a Specific Area Plan.”
47. The applicant proposes shifting zoning district boundaries as noted in this document and has submitted a Specific Area Plan request according to the standards in the chapter as required. The purpose of a specific area plan overlay zone is to allow development and approval of specific area plans in the city. A specific area plan is a master plan coordinating and directing development in terms of transportation, utilities, open space and land use; however, no phasing or timeline is required. Specific area plans may be located anywhere within the Urban Growth Boundary and are intended to promote coordinated planning concepts and pedestrian-oriented mixed-use development. The City of Sandy Comprehensive Plan, Goal 2, Land Use Designations, Village states: “shifting of the underlying zoning district boundaries to accommodate development constraints and land divisions for specific development proposals may be allowed through approval of a Specific Area Plan.”
48. The applicant proposes shifting of zoning district boundaries and addition of a new zoning designation for the subject properties and therefore submitted a Specific Area Plan request according to the standards in Chapter 17.54. Staff finds that the only other specific area plan in Sandy, the Bornstedt Village Specific Area Overlay, has additional standards related to additional tree retention, green streets, additional design standards for single family homes, etc. Keeping the Bornstedt Village Overlay in mind, staff recommends that additional consideration is given to additional tree protection for the proposed retention trees. The Planning Commission provided a code interpretation that retention trees only have to be protected consistent with Chapter 17.102, and not consistent with the distance requirements in Chapter 17.92 for residential subdivisions. That said, staff finds that to adequately protect the retention trees, the protection area shall be consistent with Chapter 17.92 and the recommendations of the arborist. **The applicant shall install tree protection fencing at the critical root zone of 1 foot per 1-inch DBH to protect all of the retention trees in the tree retention conservation easement on Lot 7, for the trees included in the parkland, and for the trees included on Lots 2 and 4 consistent with the arborist reports from Teragan and Associates. 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.** The applicant is also proposing to retain five conifers (Exhibit C, Sheet C3), and to plant some maples, incense cedars, katsura, and Silver Queen Port Orford cedars along the common property line with Deer Pointe subdivision per the Screening Concept Plan (Exhibit I). Additional tree retention analysis and conditions are contained in the review of Chapter 17.102 in this document.

Consistent with the Bornstedt Village Overlay this development should also consider green streets where practicable. **The applicant shall explore locations for green street swales. If green streets are practicable as determined by the City Engineer in accordance with topography, the plan set shall be modified to detail additional right-of-way or easements to accommodate the swales, if needed.** In addition, the applicant shall be required to adhere to additional design standards for the four duplexes (or single-family homes) similar to the Bornstedt Village Overlay requirements. **Future development on Lots 1-4 shall adhere to the garage standards contained in Section 17.54.110(D).**

49. The process to establish a specific area plan shall be initiated by the City Council. The Planning Commission or interested property owners may submit requests to the City Council to initiate the specific area plan process. If owners request initiation of a specific area plan process, the City Council may require an application fee to cover the cost of creating the plan. The applicant requests initiation of this specific area plan and has paid the applicable fees. The comprehensive plan map change is requested to modify 1.755 acres from Village to Parks and Open Space (POS). The proposed zone map change proposes to add High Density Residential (R-3) and Parks and Open Space (POS), increase Village Commercial (C-3), reduce Medium Density Residential (R-2), and reduce Low Density Residential (R-1).
50. In accordance with Section 17.54.00(D) a specific area plan shall be adopted through a Type IV process and shall be evaluated for compliance with the criteria for zoning district amendments and/or comprehensive plan amendments where applicable. The applicant states that this specific area plan request will be reviewed through a Type IV process and shall comply with the criteria for zoning district and Comprehensive Plan amendments. As stated by the applicant, the criteria in Chapter 17.24, Comprehensive Plan Amendment Procedures and Chapter 17.26, Zoning District Amendments are reviewed in this document and as reviewed in these chapters, the proposal is found to comply with all required criteria if the conditions of approval as recommended by staff are required.
51. In accordance with Section 17.54.00(G) compliance with specific area plan standards and procedures are required. New construction and land divisions shall meet any development, land division, and design standards of the applicable specific area plan. Base zone and land division standards shall apply where no different standard is referenced for the specific plan area. Staff finds that with adequate conditions of approval the proposal will comply with the standards and procedures of a specific area plan.
52. Section 17.54.10 defines eight items that define the specific area plan by providing text and diagrams with the specific area plan application. The eight items relate to the following: plan objectives; site and context; land use diagram; density; facilities analysis; circulation/ transportation diagram; market analysis; and, design and development standards. The eight items are reviewed as follows:
 - a. Plan Objectives. A narrative shall set forth the goals and objectives of the plan. The applicant submitted a robust narrative explaining the proposal for the Bull Run Terrace subdivision reconsideration. The applicant's narrative elaborates on the objectives of their proposal and the desire to include 4 duplexes, 192 multi-family dwellings, and

village commercial development. The narrative also elaborates on dedications, including 1.755 acres of parkland.

- b. Site and Context. A map of the site and existing context shall identify the project area. The applicant submitted a 12-sheet plan set that details the project area and proposed improvements.
- c. Land Use Diagram. The land use diagram shall indicate the distribution and location of planned land uses, including open space and parks, within the area covered by the specific area plan. The applicant's plan set clearly identifies all proposed land uses (Exhibit C, Sheet 11). The development of commercial on Lot 7 will need to follow the uses as defined in Chapter 17.46, Village Commercial (C-3). If the applicant or successor-in-interest proposes uses in Section 17.46.20(B), Conditional Uses, the proposal will need to be reviewed by the Planning Commission.
- d. Density. If residential uses are proposed, a narrative shall describe planned residential densities. Density calculations were included by the applicant in their narrative and are included in review of Chapter 17.30, Zoning Districts in this document.
- e. Facilities Analysis. The plan shall include an analysis of the general location and extent of major components of sanitary sewer, water, and other essential facilities proposed to be located within the specific plan area and needed to support the land use and densities described in the plan. A review of existing facilities master plans shall be sufficient if these master plans indicate there is adequate capacity to serve the specific plan area. The applicant included a utility plan within the plan set and a preliminary stormwater report. The Assistant Public Works Director reviewed the applicant's submission and has provided analysis and recommended conditions as explained in this document.
- f. Circulation/Transportation Diagram. The circulation diagram shall indicate the proposed street pattern for the specific area plan area, including pedestrian pathways and bikeways. Design standards and street cross sections shall be included, if different than normal City standards. The applicant included a traffic study from Ard Engineering, a future street plan, a master street plan, and street section details. The City's Transportation Engineer, Assistant Public Works Director, ODOT, Fire Marshal, and the Director of Sandy Area Metro reviewed the applicant's submission and have provided analysis and recommended conditions as explained in this document.
- g. Market Analysis. Specific area plans that include amendments to the zoning map affecting the acreage of Village Commercial (C-3) land within the plan area shall include a market analysis of supportable retail space that verifies demand for the proposed acreage of C-3 land. The analysis should include a market delineation, a regional and local economic review, and a retail market evaluation. The applicant submitted an analysis from Johnson Economics. The revised proposal includes increasing the amount of available commercial lands by 0.67 acres. Johnson Economics explains that the proposal will provide capacity for additional housing options and provide more property that is an active urban use. The analysis states that an increase in multifamily housing

will increase local capacity for residential products that can meet a broad range of price points. The analysis goes on to explain that the Highway 26 infrastructure investment requirements were too great to be offset by the value of the underlying property, but that a zone change to allow more residential units will provide the ability of the site to support necessary infrastructure investments. As Johnson Economics correctly identifies, the extension of Dubarko Road to Highway 26 and the additional land needed for Deer Pointe Park cannot be completed unless the subject site is developed.

- h. Design and Development Standards. If standards differ from normal City standards, design and development standards shall be included in the plan. The applicant states that the proposal is anticipated to comply with all design and development standards. As identified by the applicant, the exact details of site and building review will be primarily addressed with submittal of subsequent land use applications for development on Lot 5, 6 and 7.

TRANSPORTATION – Chapters 17.84 and 17.100

53. 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. Street A and Fawn Street both meet these requirements.
54. As required by Section 17.84.30(A)(2), six-foot sidewalks are proposed to be constructed along Highway 26, portions of Dubarko Road, and on Street B. These frontages will include planter strips as required with at least 5 feet wide of soil area. As required by Section 17.84.30(A)(4), the applicant intends to construct all sidewalk improvements as required by this section with the exception of some five-foot wide sidewalks on Dubarko Road. **The applicant shall revise the street sections and plan set to detail all sidewalks on Dubarko Road at least 6 feet in width.**
55. No exceptions or modifications listed in Section 17.84.30(A)(3) are requested with the application. In relation to Sections 17.84.30(B), 17.84.30(C), 17.84.30(D), and 17.84.30(E), no pedestrian or bicycle facilities other than sidewalks and on-street bicycle lanes have been identified or proposed in the application.
56. Traffic Study. Section 17.84.50 outlines the requirements for providing a traffic study. The applicant included a Traffic Impact Study from Ard Engineering with the application (Exhibit E). According to the revised traffic study, the assumptions were based on 8 duplex units, 192 multi-family units, and a 5,000 square foot office building. These three uses would produce 94 peak AM trips, 115 peak PM trips, and 1,418 total daily trips. Since this application involves a zone change, the traffic engineer also had to evaluate traffic volumes as measured under the “reasonable worst case” development scenarios as defined by Oregon’s Transportation Planning Rule (TPR). The reasonable worst case scenario analysis can be found on pages 13, 14, 15, 26, 27, and 28 of Exhibit F. Based on the TPR, Ard Engineering recommends that a trip cap of 340 PM net new peak hour trips be applied to the subject property as a condition of approval for the proposed zone change. The City Transportation Engineer (Exhibit Q) concurs with the importance of applying a trip cap of 340 PM net new peak hour trips. **The subject property shall be subject to a trip cap of 340 PM net new peak hour trips. Each application for development of a lot within the subject property shall include a report from a licensed traffic engineer stating the number of net new PM peak hour trips expected to be generated by the proposed development, and this number of trips will be deducted from the total trip cap of 340 net new PM peak hour trips upon approval of the application. No development application will be approved that would cause the total net new PM peak hour trips to exceed said cap unless the applicant agrees to pay additional proportionate share fees for the intersection of Highway 211 and Dubarko Road, in an amount determined by the City based on the number of trips in excess of the cap.** With its connection to Highway 26, Dubarko Road will become increasingly important to the transportation system in Sandy. The traffic analysis makes several references to a right-in/right-out intersection at Dubarko Road and Highway 26. These references are in the context of analysis of the performance of other study intersections examined in the traffic study and not a proposal to

construct a right-in/right-out intersection at this location. The adopted Transportation System Plan (TSP) does not contemplate a right-in/right-out intersection at Highway 26 and Dubarko Road. **The intersection of Highway 26 and Dubarko Road shall be constructed as a full-access intersection in compliance with the TSP.**

57. Highway 211 and Dubarko Road Intersection. The intersection improvements at Highway 211 and Dubarko Road are defined as Project M9 in the 2011 Sandy Transportation System Plan. The improvements include eventually constructing a traffic signal, northbound right turn lane, southbound left turn lane, and northbound left turn lane. The proposed development will add 17 PM peak hour trips to this intersection. The City Transportation Engineer (Exhibit Q) states that due to the impacts this proposed development will have on the intersection of Highway 211 and Dubarko Road, as offsite mitigation for that intersection shall be incorporated into the conditions of approval. The City Transportation Engineer created a memorandum (Exhibit R) summarizing the development of a proportionate share funding plan to construct improvements at the Highway 211 and Dubarko Road intersection. This proportionate share funding plan will collect financial contributions from multiple developments and will fund specific capacity improvements needed to mitigate traffic operation deficiency that is triggered by the impact of new trips from growth. Exhibit R explains the cost of the new improvement at over \$10 million, the proportionate share fee formula, and the fee analysis results. **The applicant shall contribute a proportional share fee of \$268,345 towards construction of future capacity improvements at the intersection of Highway 211 and Dubarko Road at a cost of \$15,785 per PM peak hour trip.**
58. Dubarko Road. The proposed street sections (Exhibit C, Sheet C6) depict Dubarko Road between its current eastern terminus and proposed Street A with a 76-foot-wide right-of-way consisting of two 0.5-foot monumentation strips, varying sidewalk widths, two five-foot wide planter strips, two 0.5-foot curbs, two five-foot bike lanes, and two varying travel lane widths and varying median width. **The applicant shall revise the street sections and plan set to detail all sidewalks on Dubarko Road at least 6 feet in width.** The standard section for an arterial street in the TSP consists of 11-foot travel lanes with 5-foot bike lanes. It is unclear to staff as to why some of the proposed travel lanes are so wide. The portion of Dubarko Road between Street A to the west boundary of the development should be used to provide a transition from the proposed three lane section with median to a two lane section with median to match the existing section. The proposed 17-foot wide travel lanes will be confusing to motorists. **The applicant shall submit a revised cross-section for the portion of Dubarko Road between the existing terminus and Street A with construction plans for City Engineer review and approval.** The extension of Dubarko Road is classified as a minor arterial street and shall meet the standards of Section 17.84.50(B) which states that arterial streets should generally be spaced in one-mile intervals and traffic signals should generally not be spaced closer than 1,500 ft for reasonable traffic progression. The proposed alignment of Dubarko Road is consistent with the TSP and is an extension of an existing arterial street, not a new arterial street. The traffic study concluded that based on warrant analysis a traffic signal is not warranted, but a traffic signal at Dubarko Road and Highway 26 will be needed in the future based on future development. Therefore, the Preliminary Plat (Exhibit C, Sheet C2) details a 40-foot by 40-foot traffic signal easement at the northeast

corner of Lot 7. The traffic signal easement could impact the tree retention area. **The applicant shall submit revised plans detailing how the traffic signal easement will impact the tree retention area. If the tree retention area is negatively impacted the applicant shall preserve additional trees.**

59. Street B. Street B (defined as ‘New Road in the TSP) is classified as a collector street and does not need to adhere to the standards in Section 17.84.50(B). Street B is proposed with a 60-foot right-of-way consisting of two 0.5-foot monumentation strips, two six-foot sidewalks, two five-foot wide planter strips, two 0.5-foot curbs, and two 18-foot travel lanes. In accordance with Figure 10 of the 2011 TSP, the travel lanes on a collector street may be as narrow as 11 feet wide. **The applicant shall revise the street sections and striping plan to accommodate two 5-foot-wide bike lanes and two 13-foot-wide travel lanes for Street B.**
60. Street A and Fawn Street. Street A and Fawn Street are both classified as local streets. Both streets are proposed with 50-foot right-of-ways consisting of two 0.5-foot monumentation strips, two five-foot wide sidewalks, two five-foot wide planter strips, two 0.5-foot curbs, two 7-foot-wide parking areas, and a combined 14-foot-wide travel lane. These proposed street sections meet the TSP requirements.
61. Credits for Dubarko Road. The widening of Dubarko Road to accommodate the section recommended in the TSP is eligible for Transportation System Development Charge credits. The difference in cost between the required minor arterial improvements and a standard local street section is eligible for credits. **Estimated costs shall be submitted to City staff and reviewed and approved by the City Engineer. The City and the Applicant shall enter into an agreement defining the eligible improvements and estimated costs prior to plat approval. SDC credits shall be based on final audited costs.**
62. Intersection with Highway 26. The extension of Dubarko Road to Highway 26 is defined as Project M20 in the 2011 Sandy Transportation System Plan. The subject property abuts Highway 26 and notification of the proposal was sent to ODOT as required by Section 17.100.90. ODOT provided comments as contained in Exhibit S. Dubarko Road will contain a dedicated left turn and right turn/through lane, a median with street trees, and a dedicated left turn lane to Street B. Highway 26 improvements will include among other things a dedicated right turn lane to Dubarko Road, sidewalks, street trees, and restriping. **The applicant shall adhere to all standards and requirements that are defined by ODOT, including the Dubarko Road connection to Highway 26 and all required improvements along Highway 26 including stormwater facilities constructed as necessary to be consistent with local, ODOT, and ADA standards.** As stated by the Assistant Public Works Director (Exhibit P), any ODOT required improvements on and adjacent to the Highway 26 frontage of the site are not included in the City’s TSP or capital plans and as such are not eligible for SDC credits or reimbursement.
 - a. ODOT recommends that the site layout and development be consistent with the approved and adopted Transportation System Plan, including: the Dubarko Road extension to Highway 26, aligned with the westerly most SE Vista Loop Drive intersection; accommodation of a Collector road terminating at the southern extents of the subject

property to allow the road to extend south from the westernmost leg of the SE Vista Loop Drive intersection; and curb, sidewalks, cross walk ramp, bikeways and road widening along Highway 26 constructed as necessary to be consistent with local, ODOT, and ADA standards.

- b. According to ODOT, the intersection of Dubarko Road and Highway 26 requires a grant of access from ODOT. **The applicant shall assist the City of Sandy in applying for a grant of access or other necessary approval from ODOT for access to Highway 26 at Dubarko Road.**
- c. The conditions of approval shall require the development to comply with the standards and procedures specified by ODOT. **The ODOT grant of access shall be approved and the improvements completed per the grant of access prior to issuance of certificates of occupancy for any structures on the subject property.**

63. Average Daily Traffic. While this proposal will undoubtedly increase traffic on Dubarko Road the Average Daily Traffic (ADT) concerns that were raised during the Bailey Meadows approval process are not present with this land use application. In the Bailey Meadows case, Melissa Avenue is designated a local street and the concerns raised relative to ADT impacted a local street. In the case of Bull Run Terrace, the majority of the anticipated trips will use Dubarko Road, which is designated as a minor arterial, and Street B, which is designated as a collector. According to Chapter 17.10 of the Development Code, arterial streets are defined as helping interconnect and support the arterial highway system and link major commercial, residential, industrial, and institutional areas. Also, in Chapter 17.10, the definition for collector streets states they are meant to provide both access and circulation within residential neighborhoods and commercial/industrial areas. While staff is sympathetic of existing residents to the west of the proposed Bull Run Terrace subdivision, the extension of Dubarko Road has always been intended to occur and the street has been designed to accommodate high traffic volumes. The only street that ADT concerns are valid for is Fawn Street/Street A. The four proposed duplexes in the R-1 zoning district (Lots 1-4) will not cause any concerns, but the potential of trips generated from the C-3 zoned property (Lot 7) could cause additional traffic on Fawn Street/Street A and negatively impact the Deer Pointe subdivision. **The land use application for Lot 7 shall include proposed driveway designs to discourage commercial patrons existing Lot 7 to Street A from entering the Deer Pointe Subdivision on Street A. The designs shall be reviewed and approved by the City Engineer and Public Works Director.**

64. Tangent Alignment. The alignment of Street B and Dubarko Road does not provide the minimum 100 feet of tangent alignment (as measured from the curb line on Dubarko extended) on Street B as required by Section 17.84.50(H)(5)(a) of the Sandy Municipal Code (SMC). However, this requirement can be waived or modified by the City Engineer. In verbal discussions with the City Engineer, Curran-McLeod, and the Assistant Public Works Director, they find the proposed alignment to be adequate.

65. Future Street Plan. Proposed streets meet the requirements of 17.94.50(H). The future street plan (Exhibit C, Sheet C1) shows that the proposed development will facilitate and not preclude development on adjacent properties. Both Dubarko Road and Street B are identified in the TSP and proposed to be constructed with the development. All proposed streets

comply with the grade standards, centerline radii standards, and TSP-based right-of-way improvement widths. Dubarko Road will be extended by a continuation of the centerline of the existing section. All proposed streets are designed to intersect at right angles with the intersecting street and comply with the requirements of Section 17.94.50.(H)(5). Section 17.100.180(A) requires that intersections are designed with right angles. Both the extension of Fawn Street and Street B are designed to intersect at right angles to Dubarko Road as required. Additionally, Dubarko Road will intersect Highway 26 at a right angle. All streets in the proposed subdivision have a minimum curve radius as required by Section 17.100.180(B). **All streets shall meet the requirements of the Fire District as noted in Exhibit N.**

66. Street Extensions. 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 one temporary dead-end street (Street B) that will be stubbed to the southern property line of the subject property. To accommodate fire apparatus turnaround the temporary dead-end of Street B shall include turnarounds, subject to the approval of the Fire Marshal. **The applicant shall revise the plan set to detail fire turnaround easements on Lots 5 and 6 as approved by the Sandy Fire District Fire Marshal. The applicant shall also ensure that water supply requirements are in compliance with the adopted Oregon Fire Code.**
67. Blocks. All blocks within the proposed subdivision have sufficient width to provide for two tiers of lots as required in 17.100.120(A). The local streets of Fawn Street/Street A meet the maximum block length standards of 400 feet. The block length from Street A to Highway 26 is 437 feet and the block length from Street B to Highway 26 is 434 feet. The block length requirements in Section 17.100.120 are in conflict with the preferred spacing standards on arterial and collector streets. While local streets are required to be spaced 8-10 streets per mile in accordance with Section 17.100.110(E), the spacing standards for arterial and collector streets are required to be spaced at much greater distances. The distance from Highway 26 to Street B is needed to maintain distance between the Highway and the collector street (Street B). Fawn Street/Street A has to be aligned with Street B to create a safe intersection. Furthermore, the City Transportation Engineer did not recommend alternative spacing for the streets proposed in the Bull Run Terrace subdivision. Therefore, all block lengths meet the Sandy development code provisions and staff does not recommend any changes to street spacing. The spacing from Dubarko Road to the east property line of Lot 6 is 431 feet. Staff finds that providing a pedestrian connection along the east side of the Bull Run Terrace subdivision will be vital for providing future connectivity for the subject area and development to the south of Bull Run Terrace. **The applicant shall install an 8-foot-wide concrete walkway with pedestrian scale lighting through Lot 6 from the sidewalk on Highway 26 to the southern property line of Lot 6. This facility shall be contained within a pedestrian access easement or tract recorded prior to any certificate of occupancy on this lot.**
68. Street Naming. The proposed development includes the need to name Street B. **The street name shall follow the deer related theme in the development to the west and shall be an 'avenue' as it runs north/south. Staff recommends the name Velvet Avenue.**

69. Transit. Section 17.84.40(A) requires that the developer construct adequate public transit facilities. The Transit Master Plan (TMP) identifies new roads consistent with the 2011 Transportation System Plan. Pages 35 and 36 of the TMP describes long term future plans, including a circulator route that serves Dubarko Road, Vista Loop, and Proctor Blvd., as well as the importance of transit service that provides options along Highway 26. Development proposals, such as Bull Run Terrace, with high density residential and village development, should provide transit access along Highway 26 to support useful and high ridership transit. **The applicant shall install a pull-out transit stop on Highway 26 to the east of the intersection of Dubarko Road and Highway 26 to serve eastbound transit services along Highway 26 (within or by Lot 6). The applicant shall also install two concrete bus shelter pads and green benches (Fairweather model PL-3, powder coated RAL6028). The required pad size is 7 feet by 9 feet 6 inches and the amenities should be located adjacent to Lot 3 or 1 and Lot 6.** Engineering specifications are available from the Director of Sandy Area Metro.
70. The Sandy Development Code has a list of other considerations in the right-of-way that were evaluated as follows:
- a. Other Access Considerations. No public alleys, flag lots, or public access lanes are proposed in this development. One residential shared private drive is being proposed by using an easement over Lot 3 to access Lot 4. **The applicant shall modify the plat to include a vehicular easement on Lot 4 as necessary to accommodate maneuvering for vehicles on Lot 3.**
 - b. Lighting. 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.
 - c. Planter Strips. Planter strips will be provided along all frontages as required in Section 17.100.290. Street trees in accordance with City standards will be provided in these areas. A Street Tree Plan is included in Exhibit C, Sheet C7.
 - d. Mail Facilities. 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.**

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 four R-1 zoned lots and is included in Exhibit C, Sheet C7.
72. Section 17.98.20(A) requires that each duplex is required to provide at least two off-street parking spaces and that multi-family dwelling units are required to provide 1.5 off-street parking spaces for a studio or one-bedroom unit or provide 2.0 off-street parking spaces for a two-bedroom unit or greater. **Compliance with this requirement will be assessed with future building permits or design reviews, whichever is applicable.**
73. Section 17.98.60 has specifications for parking lot design and size of parking spaces. **Compliance with this requirement will be assessed with future building permits or design reviews, whichever is applicable.**
74. Section 17.98.90 requires that all streets proposed will be improved to city standards.
75. Section 17.98.100 has specifications for driveways. The minimum driveway width for a single-family dwelling is 10 feet. The Public Works driveway approach standard detail specifies a maximum of 24 feet wide for a residential driveway approach. Additionally, all driveways will meet vertical clearance, slope, and vision clearance requirements. **Driveway access locations to Lots 5 -7 shall be determined and approved by the City Public Works Director and City Engineer during design review for these lots.**
76. Section 17.98.110 outlines the requirements for vision clearance. **The requirements of Section 17.98.110 shall be considered in placing landscaping in these areas with construction of homes and will be evaluated with a future design review application for the multi-family units.**
77. 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.**
78. 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 200 feet of each of the 4 lots zoned as R-1 as required. Exhibit C, Sheet C7 shows that 20 on-street parking spaces have been identified in compliance with this standard. No parking courts are proposed by the applicant.

UTILITIES – Chapters 17.84 and 17.100

79. 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.**
80. As required by 17.100.130, eight-foot wide public utility easements will be included along all property lines abutting a public right-of-way. Because access is limited along Dubarko Road, an access easement is also proposed across Lot 3 to provide access to Lot 4. In addition, a 10-foot PUE/sidewalk easement is proposed along the Highway 26 frontage of Lot 7 and the majority of the frontage of Tract A. A conservation easement is also proposed to be platted across the northern portion of Lot 7 to protect retained trees in this area. The revised Preliminary Plat (Exhibit C, Sheet C2) details a 40 foot by 40 foot traffic signal easement.
81. Water. 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. According to the Assistant Public Works Director (Exhibit P), the existing 8-inch diameter water line resides in an easement granted to the City of Sandy recorded as Clackamas County Document No. 2004-110340. **The applicant shall replace the existing waterline with an 8-inch diameter water line at a depth approved by the City Engineer.** There will be no compensation or credits for replacement of the existing water line. This pipe is a standard pressure line and will be used to provide domestic water service to the development. The Assistant Public Works Director also stated that the City's water master plan shows an 18-inch diameter water line in Dubarko Road south of Highway 26. **The applicant shall install an 18-inch water line in Dubarko Road connected to the existing 18-inch water line at the west end of the site and the existing 12-inch line on Highway 26. The applicant shall extend the existing 12-inch water main in Highway 26 east from the proposed intersection of Dubarko Road and Highway 26 to the east boundary of the site.** The applicant will also need to work with the Sandy Fire Marshal (Exhibit M) to verify fire hydrant locations, fire department connections (FDCs), and fire flow. **The applicant shall modify the plan set to detail new fire hydrants ordered in an OSHA safety red finish and having a 4-inch non-threaded metal faced hydrant connection with cap installed on the steamer port (4 ½-inch NST x 4-inch Storz Adaptor).**
82. Sanitary Sewer. This application is not subject to the moratorium on development adopted by Resolution 2022-24 because it was submitted prior to the effective date of the moratorium. The applicant intends to install sanitary sewer lines in compliance with applicable standards in Section 17.100.240. All lots except Lot 7 are designed to gravity drain to the sanitary sewer line in Dubarko Road. Due to grade, Lot 7 is not able to drain to the line in Dubarko Road but is proposed to connect to the existing sanitary sewer line at the north end of the park property. The Assistant Public Works Director stated that sewer connections will be permitted as proposed (Exhibit P).

83. Stormwater. Section 17.100.250(A) details requirements for stormwater detention and treatment. Two public stormwater quality and detention facilities are proposed as Tract B to be located north of Lot 1 and Tract C in the SW corner of the property. However, the preliminary storm drainage and design calculations was done in November of 2019 and did not detail stormwater Tract C. **The applicant shall revise the storm drainage and design calculations with Tract C. 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).**
84. 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.**
85. Section 17.84.60 outlines the requirements of public facility extensions. The applicant submitted a utility plan (Exhibit C, Sheet C5) which shows the location of proposed public water, sanitary sewer, and stormwater drainage facilities. Broadband fiber service will be detailed with construction plans. A private sanitary sewer connection is proposed to serve Lot 7. All other utilities will be public.
86. 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 will install underground conduit for street lighting.
87. Section 17.84.90 outlines requirements for land for public purposes. The majority of public facilities will be located within public rights-of-way including the existing waterline that will be contained within the Dubarko Road right-of-way. Eight-foot wide public utility easements will be provided along all lots adjacent to street rights-of-way for future franchise utility installations. All easements and dedications will be identified on the final plat as required.

PARKLAND DEDICATION – Chapter 17.86

88. The applicant intends to dedicate parkland as outlined in the requirements of Section 17.86. This application was originally submitted on December 30, 2019. The Sandy Development Code in effect at that time is what this reconsideration is being reviewed under. Therefore, it is important to note that modifications that have since occurred to the Sandy Development Code, particularly to Chapter 17.86, Parkland and Open Space, and Chapter 17.100, Land Division, do not apply to this application.
89. 17.86.10(2) contains the calculation requirements for parkland dedication. The formula is acres = proposed units x (persons/unit) x 0.0043 (per person parkland dedication factor).
- For the four duplexes, the acres equal 8 units x 3 persons per unit x 0.0043 = 0.103 acres.
 - For the 192 multifamily units, the acres equal 192 x 2 persons per unit x 0.0043 = 1.651 acres.
 - Combined, this totals 1.754 acres. The applicant proposes to dedicate 1.755 acres of parkland and is thus in compliance with this requirement.
90. Section 17.86.20 has a requirement that all homes must front on the parkland. The applicant is not proposing any houses to the south of the parkland, but instead is proposing a stormwater tract. The applicant is proposing housing to the east of the parkland. are proposing future commercial development. Staff supports the shift of commercial lands from the east side of Dubarko Road to the west side of Dubarko Road if the parkland is accommodated with adequate landscape buffering, pedestrian amenities, and housing facing the parkland. The purpose of having homes front the parkland is to provide eyes on the park and increase safety for park users. Having active storefronts or patios facing the park will provide the same safety measures as homes facing the park. **The applicant shall design Lot 7 to incorporate buildings facing the parkland and usable windows facing the parkland.** An additional consideration should be to connect the sidewalk along Highway 26 to the walkway on the parkland property to accommodate additional pedestrian connectivity. The Revised Master Street and Utility Plan (Exhibit C, Sheet C5) details a meandering walkway in the proposed park. While staff appreciates this preliminary walkway location being identified in the revisions, ultimately the location of the walkway will need to be determined with design of Deer Pointe Park. **The applicant shall install a walkway along the east side of the park or west side of Lot 7 that connects Fawn Street/Street A to the sidewalk on Highway 26 as determined during design of Deer Pointe Park. The design of Lot 7 shall incorporate a landscape buffer that provides visibility between Lot 7 and the parkland but provides a visually attractive separation.**
91. The Parks and Trails Advisory Board provided a letter (Exhibit L) which contains a recommendation for the City Council to accept the parkland as it meets the objectives as listed in the 2022 Parks and Trails Master Plan by providing a true neighborhood park in an underserved area of the community. The Parks and Trails Advisory Board would also like the City to pursue a development agreement with the developer to make initial improvements to the park based on the conceptual plan in the 2022 Parks and Trails Master Plan in-lieu of

paying Systems Development Charges. **The applicant shall work with the City of Sandy to create a mutually agreed upon engineer estimate for the Deer Pointe parkland improvements. The final engineer's estimate shall be used as the basis for an agreement to calculate Park SDC credits for the applicant. If the applicant and City agree to the applicant/developer completing parkland improvements, the park improvements shall be completed with approval from the Parks and Trails Advisory Board and prior to final plat approval or as otherwise established in a development agreement.**

92. Section 17.86.30 lists the requirements of the developer prior to acceptance of required parkland dedications. **The applicant shall clear, grade, and seed the proposed parkland as specified by the City in the construction plans.** The parkland grading could impact proposed tree retention. **The applicant shall submit revised plans detailing how the parkland grading will minimize impacts to tree retention. If tree retention is negatively impacted the applicant shall preserve additional trees.** As referenced in Finding 1, above, and per Section 17.32.00 of the Development Code at the time of the original application submittal (December 2019), only publicly owned land can be zoned POS. **The applicant shall dedicate the proposed 1.755 acres of parkland to the City through a dedication deed process, separate from the subdivision plat process. The applicant shall also provide a Phase I Environmental Assessment prior to dedication. This dedication shall occur within 180 days after approval of Ordinance No. 2022-27.**
93. The applicant proposes including two utility easements within the proposed parkland dedication. However, these easements are unavoidable given the location of existing utilities. **The applicant shall define these utilities on the tentative plat.**

URBAN FORESTRY – 17.102

94. Section 17.102.20 contains information on the applicability of Urban Forestry regulations. Two Arborist Reports were included with the first iteration of Bull Run Terrace (Exhibit F) from Teragan and Associates. The applicant has also included an existing conditions and tree retention plan, and tree tables (Exhibit C, Sheet C3 and C4). The arborist inventoried all trees eleven inches and greater DBH for the portion of the property proposed to satisfy tree retention requirements as required in 17.102.50.
95. The property contains 15.91 acres requiring retention of 48 trees, 11 inches and greater DBH ($15.91 \times 3 = 47.73$). The applicant is proposing to retain 81 trees, however, only 62 of the trees are both 11-inches or greater DBH and in good health according to the Arborist Reports (Exhibit F). The majority of the trees are conifers, with the majority of those being Doug fir. Five of the 81 trees marked for retention have been identified as in poor or very poor condition, but they are located in a grouping of healthy trees which makes removal difficult. The proposed retention is as follows:
- a. Lot 7: 44 trees at 11-inches DBH or greater and in good condition, 4 trees at 11-inches DBH or greater and in fair condition, 5 trees at less than 11-inches DBH and in good or fair condition, 4 trees in poor or very poor condition
 - b. Tract A (parkland): 15 trees at 11-inches DBH or greater and in good condition, 3 trees at 11-inches DBH or greater and in fair condition, 1 tree in poor condition
 - c. Lots 2 and 4: 3 trees at 11-inches DBH or greater and in good condition, 1 tree at 11-inches DBH or greater and in fair condition, 1 tree at less than 11-inches DBH and in good condition
96. The Arborist Reports (Exhibit F) provide recommendations for protection of retained trees including identification of the recommended tree protection zone for these trees. The requirements of 17.102.50(B) will be complied with prior to any grading or tree removal on the site. The Planning Commission provided a code interpretation that retention trees only have to be protected consistent with Chapter 17.102, and not consistent with the distance requirements in Chapter 17.92 for residential subdivisions. That said, staff finds that to adequately protect the retention trees, the protection area shall be consistent with Chapter 17.92 and the recommendations of the arborist. **The applicant shall install tree protection fencing at the critical root zone of 1 foot per 1-inch DBH to protect the 53 retention trees in the conservation easement on Lot 7, the 18 retention trees on the parkland, and the 5 trees included on Lots 2 and 4, consistent with the arborist reports from Teragan and Associates. 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.**

97. **The tree protection fencing shall be 6-foot-tall chain link or no-jump horse fencing and the applicant shall affix a laminated sign (minimum 8.5 inches by 11 inches) every 50 feet to the tree protection fencing indicating that the area behind the fence is a tree retention area and that the fence shall not be removed or relocated. 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. The applicant shall request an inspection of tree protection measures prior to any tree removal, grading, or other construction activity on the site.**
98. The Tree Preservation Plan (Exhibit C, Sheet C3) details a number of trees being removed right next to the trees proposed for retention. **The trees proposed for removal that are adjacent to retention trees shall be removed in a way that does not harm or damage adjacent trees.** The applicant submitted a Tree Removal Plan from Teragan and Associates, Inc. The Tree Removal Plan identifies tree removal options, including directional felling, piece removal, and crane removal. The arborist also identifies options for stumps, including retention or careful surface grinding. **Tree removal and/or snag creation shall be completed without the use of heavy equipment in the tree protection zone; trunks and branches of adjacent trees shall not be contacted during tree removal or snag creation. The applicant shall submit a post-construction report prepared by the project arborist or other TRAQ qualified arborist to ensure none of the retention trees were damaged during construction.**
99. **To ensure protection of the required retention trees, the applicant shall record a tree protection covenant for all 76 trees in good or fair retention as defined in Exhibit F, specifying protection of trees on the subject property and limiting removal without submittal of an Arborist's Report and City approval. The 5 trees in poor or very poor condition shall not be included in the covenant. The plat shall also include a conservation easement on Lot 7.**

LANDSCAPING AND SCREENING – Chapter 17.92

100. 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). Tree protection fencing and tree retention will be discussed in more detail under Chapter 17.102 in this document. **Per Section 17.92.10(L), all landscaping shall be continually maintained, including necessary watering, weeding, pruning, and replacing.**
101. Section 17.92.20 lists the requirements for minimum landscaping improvements. **The details of this section will be considered with submittal of all design review applications for the proposed multi-family units and commercial property.**
102. 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. The current street tree plan (Exhibit C, Sheet C7) details trees at an appropriate spacing per the development code, except there are two trees missing to the east of Lot 7 along Dubarko Road. **The applicant shall revise the street tree plan (Exhibit C, Sheet C7) to detail two additional street trees to the east of Lot 7.** The trees the applicant has identified are American hophornbeam, American linden, Greenspire linden, and Green Vase zelkova. These four street tree species are on the approved street tree list.
103. The applicant is proposing to mass grade the buildable portion of the site. This will remove top soil and heavily compact the soil. In order to maximize the success of the required street trees, **the applicant shall aerate the planter strips to a depth of 3 feet prior to planting street trees. The applicant shall submit documentation from the project landscaper stating that the soil has been amended and aerated prior to planting the street trees at the individual construction phase for each lot. 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. Street trees are required to be a minimum caliper of 1.5-inches measured 6 inches from grade 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).**
104. 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.**

105. 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. The applicant shall submit proposed trees specifics to City staff for review and approval concurrent with construction plan review.**
106. 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.**
107. Section 17.92.90 has details on screening of unsightly views or visual conflicts. While the proposed lots are not unsightly, they are a big difference from the existing view of the natural landscape. This contrast was identified at the Planning Commission hearing on August 24, 2020 and the applicant was asked to look at some additional screening measures to protect existing trees or add additional landscaping. The applicant took the comments seriously and proposed some additional landscaping along the common property line with the Deer Pointe subdivision (Exhibit I). The applicant is proposing to retain five conifers (Exhibit C, Sheet C3), and to plant some maples, incense cedars, katsura, and Silver Queen Port Orford cedars. **The applicant shall retain the additional five trees on Lots 2 and 4 (Tree Nos. 13439, 13440, 13441, 13421, and 13423) and shall plant maples, incense cedars, katsura, Excelsa Western red cedars, and Silver Queen Port Orford cedars or other trees as approved by staff per the Screening Concept Plan (Exhibit I) along Lots 1, 2, 4, and Tracts B and C. Deciduous trees shall be at least 1.5 inches caliper at planting and the cedars shall be at least 6 to 8 feet in height at planting.**
108. 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 install 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 installation 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.**

HILLSIDE DEVELOPMENT, EROSION CONTROL, NUISANCES, AND ACCESSORY DEVELOPMENT – Chapters 17.56, 15.44, 15.30, and 17.74

109. In accordance with the requirements of Chapter 17.56, Hillside Development, and Chapter 15.44, Erosion Control, the applicant submitted a Geotechnical and Slope Stability Investigation (Exhibit G) showing that the subject site contains a small area of slope exceeding 25 percent. **All recommendations in Section 6 of the submitted Geotechnical and Slope Stability Investigation (Exhibit G) shall be conditions for development.** The geotechnical report (2005) submitted with the application is nearly fifteen years old. It does not appear that there have been physical changes to the existing surface of the site in that time span that would impact the findings and recommendations in the geotechnical report but there may have been changes in industry standards or practices since then. As a result, the Applicant shall submit a letter from the original geotechnical engineering firm indicating that the findings and recommendations from the 2005 report remain substantially unchanged or modifying the original findings and recommendations as necessary. **The applicant shall submit a letter from the original geotechnical engineering firm indicating that the findings and recommendations from the 2005 report remain substantially unchanged or modifying the original findings and recommendations as necessary.**
110. **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. The applicant shall submit confirmation from DEQ if a 1200-C Permit will not be required.**
111. 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.** 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.
112. 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, particularly rats, is needed.**
113. Section 17.74.40 specifies, among other things, retaining wall and fence height in front, side and rear yards. Retaining walls 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 side and rear yards abutting a street. The submitted plan set does not define any retaining walls with the exception of a retaining wall for the stormwater facility in Tract B. **If retaining walls**

are proposed, the applicant shall submit additional details/confirmation on the proposed retaining walls, including heights meeting code requirements and an architectural finish, for staff review and approval.

114. Chapter 15.30 contains the City of Sandy's Dark Sky Ordinance. 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 in order to minimize negative impacts on wildlife and human health.**

RECOMMENDATION

The Development Services Director recommends the City Council **approve** the Type IV comprehensive plan amendment, zone change, subdivision, and specific area plan overlay with tree removal associated with the proposed development subject to the conditions of approval below. This proposal meets the applicable approval criteria in the Sandy Municipal Code and achieves some major goals consistent with long range planning objectives in the City of Sandy, including but not limited to the following:

- 1) Extending Dubarko Road to intersect with Highway 26 consistent with the Transportation System Plan that was adopted in 2011;
- 2) Installing Street B to the south consistent with the Transportation System Plan that was adopted in 2011;
- 3) Paying a proportional share fee of \$268,345 towards construction of future capacity improvements at the intersection of Highway 211 and Dubarko Road at a cost of \$15,785 per PM peak hour trip;
- 4) Extending Fawn Street to the east;
- 5) Expanding the Deer Pointe Park consistent with the 1997 Parks Master Plan, goals of the Parks and Trails Advisory Board, and Figure 11 of the 2022 Parks and Trails Master Plan;
- 6) Fulfilling housing needs as defined in the Urbanization Study that was adopted in 2015; and,
- 7) Providing a mixture of housing types consistent with the goals of the 2040 Plan that was created in 1997.

RECOMMENDED CONDITIONS OF APPROVAL

- A. The applicant shall assist the City of Sandy in applying for a grant of access or other necessary approval from ODOT for access to Highway 26 at Dubarko Road.**
- B. The applicant shall dedicate the proposed 1.755 acres of parkland to the City through a dedication deed process, separate from the subdivision plat process. Prior to dedication, the applicant shall provide a Phase I Environmental Assessment for Tract A. This dedication shall occur within 180 days after approval of Ordinance No. 2022-27.**
- C. Prior to earthwork, grading, or excavation, the applicant shall complete the following and receive necessary approvals as described:**
1. Apply for a grading and erosion control permit in conformance with Chapter 15.44. The grading and erosion control plan shall include a re-vegetation plan for all areas disturbed during construction of the subdivision. (*Submit 2 copies to Planning/Building Department.*)
 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. (*Submit to Planning/Building Department.*)
 3. Submit a letter from the original geotechnical engineering firm indicating that the findings and recommendations from the 2005 report remain substantially unchanged or modify the original findings and recommendations as necessary.
 4. Submit proof that a licensed pest control agent evaluated the site to determine if pest eradication, particularly rats, is needed.
 5. Submit revised plans detailing how the traffic signal easement will impact the tree retention area and how the parkland grading will impact tree retention. If tree retention is negatively impacted the applicant shall preserve additional trees.
 6. The applicant shall install tree protection fencing at the critical root zone of 1 foot per 1-inch DBH to protect the 53 retention trees in the conservation easement on Lot 7, the 18 retention trees on the parkland, and the 5 trees included on Lots 2 and 4, consistent with the arborist reports from Teragan and Associates. The following shall be followed:
 - a. 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.

- b. The tree protection fencing shall be 6-foot-tall chain link or no-jump horse fencing and the applicant shall affix a laminated sign (minimum 8.5 inches by 11 inches) every 50 feet to the tree protection fencing indicating that the area behind the fence is a tree retention area and that the fence shall not be removed or relocated.
 - c. 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.
 - d. 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. Tree removal and/or snag creation shall be completed without the use of heavy equipment in the tree protection zone; trunks and branches of adjacent trees shall not be contacted during tree removal or snag creation.
7. Request an inspection of erosion control measures and tree protection measures as specified in Section 17.102.50 C. prior to construction activities or grading.

D. Prior to all construction activities, except grading and/or excavation, the applicant shall submit the following additional information as part of construction plans and complete items during construction as identified below: (*Submit to the Assistant Public Works Director unless otherwise noted*)

1. Submit estimated costs of widening Dubarko Road to City staff for review and approval by the City Engineer. The City and the Applicant shall enter into an agreement defining the eligible improvements and estimated costs prior to plat approval. SDC credits shall be based on final audited costs.
2. Work with the City of Sandy to create a mutually agreed upon engineer estimate for the Deer Pointe parkland improvements. The final Engineer's estimate shall be used as the basis for an agreement to calculate Park SDC credits for the applicant. If the applicant and City agree to the applicant/developer completing parkland improvements, the park improvements shall be completed with approval from the Parks and Trails Advisory Board.
3. Submit written confirmation from the Sandy Fire District regarding the number and location of required fire hydrants. Submit a revised Residential Parking Access Plan if required fire hydrants effect on-street parking spaces.
4. Submit revised plans including the following:
 - a. Detail a revised cross-section for the portion of Dubarko Road between the existing terminus and Street A.
 - b. Detail all sidewalks on Dubarko Road at least 6 feet in width.
 - c. Detail two 5-foot-wide bike lanes and two 13-foot-wide travel lanes for Street B.

- d. Detail a pull-out transit stop on Highway 26 to the east of the intersection of Dubarko Road and Highway 26 to serve eastbound transit services along Highway 26 (within or by Lot 6).
 - e. Detail the locations for green street swales as determined by the City Engineer in accordance with topography. If green street swales are incorporated into the design, the plan set shall be modified to detail additional right-of-way or easements to accommodate the swales, if needed.
 - f. Detail a walkway along the east side of the park or west side of Lot 7 that connects Fawn Street/Street A to the sidewalk on Highway 26 as determined during design of Deer Pointe Park. If Deer Pointe Park is not designed prior to construction plan submission the applicant shall revise the construction plans with the walkway modifications once the Deer Pointe Park design is complete.
 - g. Detail fire turnaround easements on Lots 5 and 6 as approved by the Sandy Fire District Fire Marshal.
 - h. Detail new fire hydrants in an OSHA safety red finish and having a 4-inch non-threaded metal faced hydrant connection with cap installed on the steamer port (4 ½-inch NST x 4-inch Storz Adaptor).
 - i. Detail two additional street trees to the east of Lot 7.
 - j. Detail the locations of streetlights on all streets being improved within and adjacent to the subdivision. Streetlights shall be full cut-off, shall not exceed 4,150 Kelvins, and shall conform to the Dark Sky standards of Chapter 15.30.
 - k. Detail proposed retaining walls, including heights meeting code requirements and an architectural finish.
 - l. Detail a revised utility plan to include broadband fiber locations as detailed by the SandyNet Manager.
5. Submit a detailed drainage report meeting the water quality and water quantity criteria as stated in the City of Sandy Development Code (SDC) 13.18 Standards and the most current City of Portland Stormwater Management Manual (SWMM) Standards that were adopted by reference into the Sandy Development Code. The drainage report and design calculations shall include Tract C.
 6. Submit a mail delivery plan, featuring grouped lockable mail facilities, to the City and the USPS for review. Mail delivery facilities shall be provided by the applicant in conformance with 17.84.100 and the standards of the USPS.
 7. Call PGE Service Coordination at 503-323-6700 when the developer is ready to start the project.

E. Prior to Final Plat approval, the applicant shall complete the following tasks or provide assurance for their future completion:

1. Submit two paper copies of a Final Plat and associated fee.

2. Pay a proportional share fee of \$268,345 towards construction of future capacity improvements at the intersection of Highway 211 and Dubarko Road at a cost of \$15,785 per PM peak hour trip.
3. The street name for Street B shall follow the deer related theme in the development to the west and shall be an 'avenue' as it runs north/south. Staff recommends the name Velvet Avenue.
4. Modify the plat to include a vehicular easement on Lot 4 as necessary to accommodate maneuvering for vehicles on Lot 3.
5. Pay plan review, inspection and permit fees as determined by the Public Works Director.
6. Pay addressing fees at the existing rate per the fee schedule.
7. Submit a post-construction report prepared by the project arborist or other TRAQ qualified arborist to ensure none of the retention trees were damaged during construction.
8. Install all public and private improvements consistent with this decision and the ODOT improvements consistent with the grant of access, the approved construction plans, and the Sandy Municipal Code, including, but not limited to the following:
 - a. A walkway along the east side of the park or west side of Lot 7 that connects Fawn Street/Street A to the sidewalk on Highway 26;
 - b. A pull-out transit stop on Highway 26 to the east of the intersection of Dubarko Road and Highway 26 to serve eastbound transit services along Highway 26 (within or by Lot 6);
 - c. Two concrete bus shelter pads and green benches (Fairweather model PL-3, powder coated RAL6028). The required pad size is 7 feet by 9 feet 6 inches and the amenities should be located adjacent to Lot 3 or 1 and Lot 5. Engineering specifications are available from the Director of Sandy Area Metro.
 - d. Replace the existing waterline with an 8-inch diameter water line at a depth approved by the City Engineer.
 - e. Install an 18-inch water line in Dubarko Road connected to the existing 18-inch water line at the west end of the site and the existing 12-inch line in Highway 26.
 - f. Extend the existing 12-inch water main in Highway 26 east from the proposed intersection of Dubarko Road and Highway 26 to the east boundary of the site.
9. Clear, grade, and seed the proposed parkland as specified by the City in the construction plans. If the applicant and City agree to the applicant/developer completing parkland improvements, the park improvements shall be completed prior to final plat approval or as otherwise established in a development agreement.
10. Retain the additional five trees on Lots 2 and 4 (Tree Nos. 13439, 13440, 13441, 13421, and 13423) and plant maples, incense cedars, katsura, Excelsa Western red cedars, and Silver Queen Port Orford cedars or other trees as approved by staff per the Screening

Concept Plan (Exhibit I) along Lots 1, 2, 4, and Tracts B and C. Deciduous trees shall be at least 1.5 inches caliper at planting and the cedars shall be at least 6 to 8 feet in height at planting.

11. Record a tree protection covenant for all 76 trees in good or fair condition as defined in Exhibit F, specifying protection of trees on the subject property and limiting removal without submittal of an Arborist's Report and City approval. The 5 trees in poor or very poor condition shall not be included in the covenant. The plat shall also include a conservation easement on Lot 7.
12. Submit a true and exact reproducible copy (Mylar) of the Final Plat for final review and signature.

F. Conditions related to future development of the lots:

1. Development on Lots 1 through 4 shall meet the standards of the R-1 zoning district and all other development standards in the Sandy Municipal Code. Future development on Lots 1-4 shall adhere to the garage standards contained in Section 17.54.110(D). Development of these four lots will be reviewed by means of a building permit.
2. Development on Lots 5, 6, and 7 shall meet the standards of the underlying zoning district and all other development standards in the Sandy Municipal Code. Development of these three lots will be reviewed by means of a design review.
3. Design review approval for Lot 7 shall incorporate buildings facing the parkland and usable windows facing the parkland. This design review approval for Lot 7 shall also incorporate a landscape buffer that provides visibility between Lot 7 and the parkland but provides a visually attractive separation.
4. Driveway access locations to Lots 5 -7 shall be determined and approved by the City Public Works Director and City Engineer during design review for these lots. The land use application for Lot 7 shall include proposed driveway designs to discourage commercial patrons existing Lot 7 to Street A from entering the Deer Pointe Subdivision on Street A. The designs shall be reviewed and approved by the City Engineer and Public Works Director.
5. The dwellings on all lots abutting a transit street shall be designed to meet all of the requirements as specified in Chapter 17.82 and will be assessed with future building permits or design reviews, whichever is applicable.
6. The orientation of the future multi-family units that have frontage on both Highway 26 and Dubarko Road, or Street B and Dubarko Road will be determined in a future design review process.
7. Aerate the planter strips to a depth of 3 feet prior to planting street trees. The applicant shall submit documentation from the project landscaper stating that the soil has been

amended and aerated prior to planting the street trees at the individual construction phase for each lot.

8. Install an 8-foot-wide concrete walkway with pedestrian scale lighting through Lot 6 from the sidewalk on Highway 26 to the southern property line of Lot 6. This facility shall be contained within a pedestrian access easement or tract recorded prior to any certificate of occupancy on this lot.

G. General Conditions of Approval:

1. The Final Plat shall be recorded as detailed in Section 17.100.60 (I). The final plat shall be delivered to the Director for approval within one year 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, grant an extension of the tentative plat approval for up to one additional year.
2. The comprehensive plan map and zoning map modifications go into effect 30 days from the date of the ordinance in accordance with Section 17.26.90.
3. The subject property is limited to 200 dwelling units, as follows:
 - a. Low-Density Residential (R-1) Cap: 8 dwelling units
 - b. Medium-Density Residential (R-2) Cap: 17 dwelling units
 - c. High-Density Residential (R-3) Cap: 127 dwelling units
 - d. Village Commercial (C-3) Cap: 48 dwelling units
4. The ODOT grant of access shall be approved and the improvements completed per the grant of access prior to issuance of certificates of occupancy for any structures on the subject property. The intersection of Highway 26 and Dubarko Road shall be constructed as a full-access intersection in compliance with the TSP.
5. Public plans are subject to a separate review and approval process. Preliminary Plat approval does not connote approval of public improvement construction plans, which will be reviewed and approved separately upon submittal of public improvement construction plans.
6. All on-site earthwork activities including any retaining wall construction should follow the requirements of the City of Sandy Development Code and the current edition of the Oregon Structural Specialty Code (OSSC).
7. The subject property shall be subject to a trip cap of 340 PM net new peak hour trips. Each application for development of a lot within the subject property shall include a report from a licensed traffic engineer stating the number of net new PM peak hour trips expected to be generated by the proposed development, and this number of trips will be deducted from the total trip cap of 340 net new PM peak hour trips upon approval of the application. No development application will be approved that would cause the total net new PM peak hour trips to exceed said cap unless the applicant agrees to pay additional

proportionate share fees for the intersection of Highway 211 and Dubarko Road, in an amount determined by the City based on the number of trips in excess of the cap.

8. If entry signs are desired, the applicant shall submit a detailed plan showing the location of such signage and a sign permit application.
9. All parking, driveway and maneuvering areas shall be constructed of asphalt, concrete, or other approved material.
10. All work within the public right-of-way and within the paved area shall comply with the American Public Works Association (APWA) and City requirements as amended and should be constructed to the City's structural streets standards.
11. All on-site earthwork activities including any retaining wall construction shall follow the current requirements of the current edition of the Oregon Structural Specialty Code (OSSC).
12. All recommendations in Section 6 of the submitted Geotechnical and Slope Stability Investigation (Exhibit I) shall be conditions for development.
13. All utilities shall be installed underground and in conformance with City standards. The applicant shall install utilities underground with individual service to each lot.
14. The applicant shall be responsible for the installation of all improvements detailed in Section 17.100.310, including fiber facilities. SandyNet requires the developer to work with the City to ensure that broadband infrastructure meets the design standards and adopted procedures as described in Section 17.84.70.
15. All public utility installations shall conform to the City's facilities master plans.
16. As required by Section 17.98.130, all parking, driveway and maneuvering areas shall be constructed of asphalt, concrete, or other approved material.
17. Water line sizes shall be based upon the Water Facilities Master Plan and shall be sized to accommodate domestic fire protection flows on the site.
18. All new public sanitary sewer and waterlines shall be a minimum of 8-inches in diameter.
19. All stormwater drains shall be a minimum of 12-inches in diameter and shall be extended to the plat boundaries where practical to provide future connections to adjoining properties.
20. 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).

21. 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 installation 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.
22. 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. Street trees are required to be a minimum caliper of 1.5-inches measured 6 inches from grade 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).
23. As required by Section 17.92.10(L), all landscaping shall be continually maintained, including necessary watering, weeding, pruning, and replacing. As required by Section 17.92.140, the developer shall 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.
24. 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.
25. Successors-in-interest of the applicant shall comply with site development requirements prior to the issuance of building permits.
26. All improvements listed in Section 17.100.300 shall be provided by the applicant including drainage facilities, monumentation, mail facilities, sanitary sewers, storm sewer, sidewalks, street lights, street signs, street trees, streets, traffic signs, underground communication lines including telephone and cable, underground power lines, water lines and fire hydrants.
27. Comply with all standards required by Section 17.84 of the Sandy Development Code. Public and franchise improvements shall be installed or financially guaranteed in accordance with Chapter 17 of the Sandy Municipal Code prior to temporary or final occupancy of structures. Water lines and fire hydrants shall be installed in accordance with City standards. All sanitary sewer lines shall be installed in accordance with City standards.
28. Comply with all other conditions or regulations imposed by the Sandy Fire District (Exhibit N) 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.

EXHIBIT A

September 29, 2022

Mayor Pulliam and City Council
City of Sandy
39250 Pioneer Blvd.
Sandy, OR. 97055

Dear Mayor and Councilors,

On behalf of Roll Tide Properties Corp., I would like to thank the Council for reconsidering the revised Bull Run Terrace Subdivision application. As you review the new plan, we believe you will find it far superior to the previously presented plans and warrants your approval. As detailed in the application submittal package, the revised plan differs from the previous Bull Run plan in that the area devoted to parkland dedication has been increased in size by 0.325 acres to 1.755 acres. In this plan the applicant is also proposing to cap the number dwelling units for the entire subdivision at 200 units. In addition to these changes, the applicant also proposes constructing Dubarko Road through the property and completing Highway 26 frontage improvements.

As you are aware City Planning staff supported the original Bull Run Terrace application and the application was recommended for approval by unanimous vote of the Planning Commission in October 2020. The City Council then reviewed the application and adopted the first reading of an Ordinance approving the application. It was during the Council's consideration of the second reading of this Ordinance that confusion over the proposed unit count on the site resulted in Councilors changing their vote and the application was then denied. The current plan is the same as the original plan except a unit cap and a larger parkland dedication have been proposed.

It is our understanding during your discussion to reconsider the revised plan, the Council requested the applicant provide additional information regarding the validity of the existing zoning unit count calculations and to also prepare a conceptual plan showing how the property could be developed. Both items are discussed below.

Existing Zoning

My August 31, 2022, memo prepared for your reconsideration discussion compared the maximum dwelling unit count for the Revised Bull Run Terrace plan, to the Original Bull Run Terrace plan, and the Deer Meadows plan. In addition, the maximum unit count under the existing zoning designation was included. The calculation used for the existing zoning scenario followed the typical methodology used when conducting buildable lands inventories. In this scenario the net area of each zoning designation was derived after deducting assumed factors for roads, tree protection and parkland dedication. Based on these calculations, 226 dwelling units is the maximum unit count expected under existing zoning.

To provide additional certainty regarding the validity of these numbers, I reviewed the Vista Loop South Subdivision approved in 2006 on this site. This approval expired in 2008 but was later reinstated in 2013. Although the development never received final plat approval and was never built due to the high cost of improvements, all the zoning designations on the property as they exist today are the result of this approval.

The table to the right compares the maximum unit count calculated for existing zoning to the lot and unit count approved with the Vista Loop South subdivision application. As shown on this table, the maximum unit count under existing zoning, after factoring in the middle housing provisions of HB 2001, results in just two fewer units than the number of units approved with the Vista Loop Subdivision (226 to 228 units). I hope this additional information provides the Council with the information you were looking for regarding the accuracy of these calculations.

Zoning	Existing Zoning with Assumptions		Vista Loop as Approved	
	Density Units	Max Units	Approved Lots	Max Units
R-1	28	56	36	72
R-2	59	118	52	104
R-3	0	0	0	0
C-3	52	52	1	52
Total Dwelling Units	139	226	89	228

1. The C-3 zone unit count is based on 20 units/net acre maximum. The actual number of units on this lot will be determined with a future design review application.

Conceptual Plan

As you requested, a Conceptual Plan is included with the revised application package. This plan is intended to show an initial layout for developing the property with the proposed lot changes. The R-1 zoned lots (Lots 1 - 4) on this plan are likely to be constructed with duplexes, the R-2 and R-3 lots with multi-family dwellings, and the C-3 zoned lot with a combination of multi-family dwellings and commercial development or commercial development only. The table below shows the proposed conceptual unit count for each zoning designation. As is proposed with the unit cap, the maximum unit count totals 200 dwellings. It is important to note that the layout shown on this sheet is only conceptual at this time and is likely to change following completion of a detailed grading analysis and submittal of a design review application at a future date.

Zoning District	Capped Units	Proposed Uses
R-1	8	4 Duplexes
R-2	17	Multi-family
R-3	127	Multi-family
C-3	48	Combination res./com. or commercial only
Total Dwelling Units	200	

On behalf of Roll Tide Properties Corp., I would like to thank the Council again for reconsidering the revised Bull Run Terrace plan. I hope the information in this letter and the Conceptual Plan have addressed your questions and concerns. We look forward to reviewing the application with you in more detail in the near future. Please do not hesitate to let us know if you have any further questions or need additional information.

Best Regards,

Tracy A. Brown

Tracy Brown
Tracy Brown Planning Consultants, LLC

EXHIBIT B

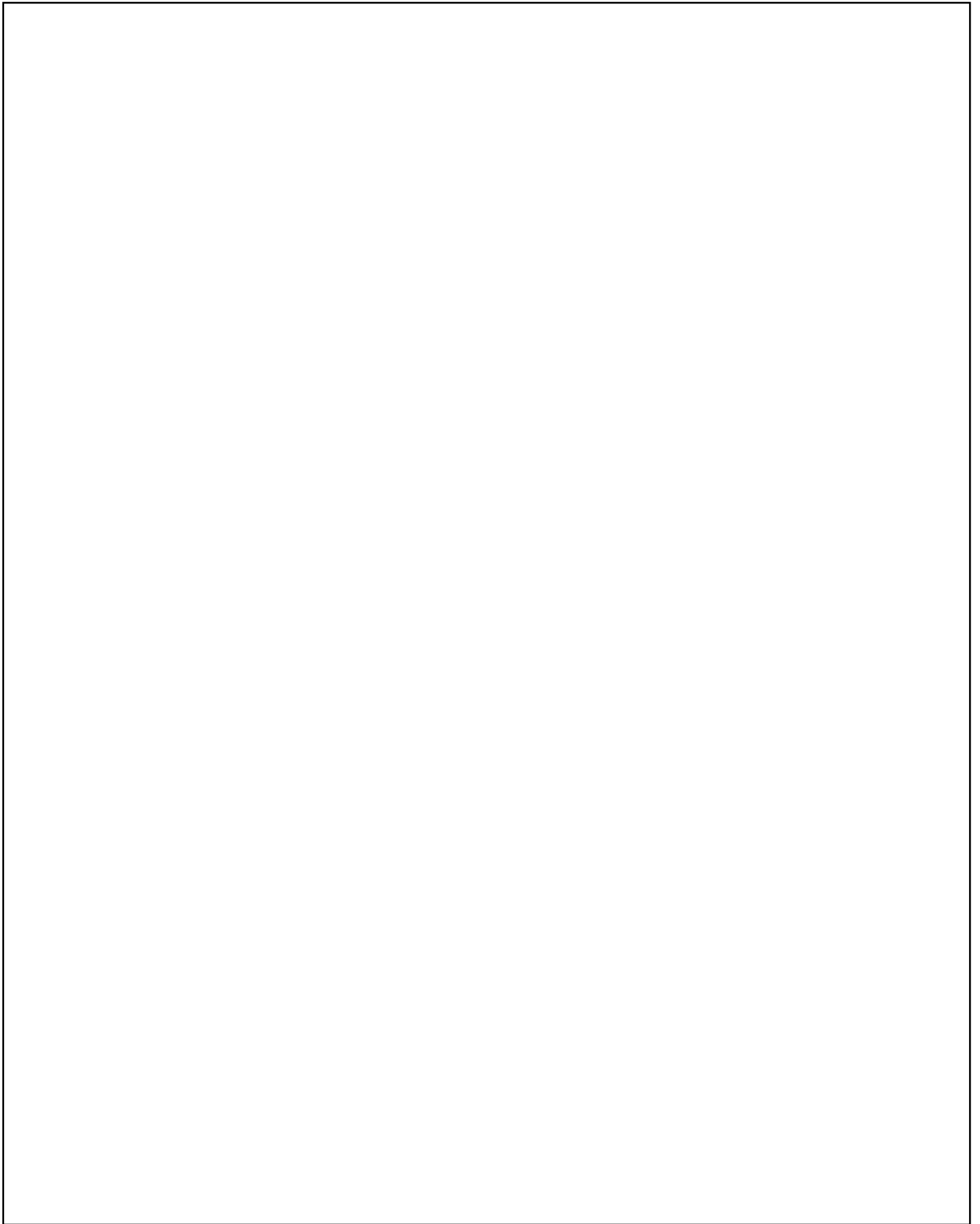
Revised

Project Narrative for Bull Run Terrace Subdivision

40808 and 41010 Highway 26, Sandy, Oregon
(25E 18CD, tax lots 900 and 1000)



Revised
September 2022



Note: This revised project narrative is intended to replace all previously submitted narratives for this project.

Project Details

Project Location: 40808 and 41010 Highway 26, south side of Highway 26; directly south across Highway 26 from Vista Loop Drive and east of Meadow Ave.

Legal Description: Map 25E 18CD, Tax Lots 900 and 1000

Existing Comprehensive Plan - V, Village

Proposed Comprehensive Plan - V, Village and POS, Parks and Open Space

Existing Zoning - R-1, Low Density Residential, R-2, Medium Density Residential and C-3, Village Commercial

Proposed Zoning - R-1, Low Density Residential, R-2, Medium Density Residential, R-3, High Density Residential, C-3, Village Commercial, and POS, Parks and Open Space

Site Size: 15.91 ac. (693,058 sf)

I. Project Description

The subject property consists of two tax lots totaling 15.91 acres. The requested seven-lot subdivision includes four lots to be platted with R-1 zoning (Lots 1 - 4), one lot (Lot 5) zoned R-2, one lot (Lot 6) zoned R-3, and one lot (Lot 7) zoned C-3. Development on Lots 5 - 7 is only conceptual at this time and will to be reviewed with a subsequent design review application submitted following approval of the initial request.

In addition to platting seven lots, the applicant proposes dedicating all public streets and conveying 1.755 acres (76,440 square feet) of parkland (Tract A), a 0.16 acre (7,062 square feet) stormwater tract (Tract B) and a (6,845 square foot) stormwater tract (Tract C) to the City. With the proposed plan, Dubarko Road will be extended through the site to connect with Highway 26 and highway frontage improvements completed.

In addition to these improvements, the applicant is also proposing to cap the number of dwelling units constructed on the site at 200 units. This number was chosen after reviewing the maximum unit count allowed units under existing zoning (226 units) and the maximum unit count with the proposed zoning (213 units). The applicant feels the proposed 200 unit cap represents a reasonable number given previously heard public and Council comments and his goals for developing the site.

II. Approval Requests

The following approvals are requested with this application:

- Type IV, Comprehensive Plan map amendment to designate 1.755 of land Parks and Open Space (POS);
- Type IV, Zoning Map amendment to change the current zoning designations on the property from a mix of C-3 (Village Commercial), R-2 (Medium Density Residential), and R-1 (Low Density Residential) to a mix of C-3 (Village Commercial), R-3 (High Density Residential), R-2 (Medium Density Residential), R-1 (Low Density Residential), and Parks and Open Space (POS);
- Type IV, Specific Area Plan to shift the zoning designations on the site;
- Type II, seven-lot subdivision;
- Type II, tree removal.

III. Items Submitted With This Revised Application

- Notification List and Mailing Labels (*Updated September, 2022*)
- Exhibit A - Project Narrative (*Revised September, 2022*)
- Exhibit B - Civil Plans (*Revised September, 2022*)
 - Sheet C1 - Cover Sheet and Future Street Plan
 - Sheet C2 - Preliminary Plat Map
 - Sheet C3 - Existing Conditions and Tree Retention Plan
 - Sheet C4 - Tree Tables
 - Sheet C5 - Master Street and Utility Plan
 - Sheet C6 - Street Sections
 - Sheet C7 - Preliminary Street Tree and Parking Plan
 - Sheet C8 - Proposed Striping Plan
 - Sheet C9 - Preliminary Grading and Erosion Control Plan
 - Sheet C10 - Slope Analysis
 - Sheet C11 - Concept Plan
 - Sheet C12 - Net Zoning Area Comparison
- Exhibit C - Preliminary Stormwater Report
- Exhibit E - Traffic Impact Study (*Revised September, 2022*)

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*. Criteria related to the proposed Comprehensive Plan Map Amendment and Zoning Map Amendment are reviewed first followed by a review of the Specific Area Plan request and finally all relevant criteria for the proposed residential subdivision are reviewed last. The following code chapters are reviewed in this narrative:

<u>Chapter</u>	<u>Title</u>
17.24	Comprehensive Plan Amendment Procedures
17.26	Zoning District Amendments
17.54	Specific Area Plan Overlay

Subdivision Review

17.30	Zoning Districts
17.36	Low Density Residential (R-1)
17.38	Medium Density Residential (R-2)
17.40	High Density Residential (R-3)
17.46	Village Commercial (C-3)
17.56	Hillside Development
17.80	Additional Setbacks on Collector and Arterial Streets
17.82	Special Setbacks on Transit Streets
17.84	Improvements Required with Development
17.86	Parkland and Open Space
17.92	Landscaping and Screening
17.98	Parking, Loading, and Access Requirements
17.100	Land Division
17.102	Urban Forestry
15.30	Dark Sky Ordinance

CHAPTER 17.24 - COMPREHENSIVE PLAN AMENDMENT PROCEDURES

RESPONSE: *The subject property is designated Village in the City's Comprehensive Plan. Because the Village Plan designation as described in the Comprehensive Plan does not expressly allow Parks and Open Space zoning and the city is requiring the applicant to dedicate parkland, the city is also requiring the applicant to apply for a Comprehensive Plan Map amendment to designate the proposed 1.755 acre parkland dedication Parks and Open Space (POS). In the previously submitted Bull Run Terrace application the application also requested a Comprehensive Plan amendment to increase the maximum density on the property by more than 20 percent. With that application the applicant proposed increasing the density on the property by 61 percent. With the passage of HB 2001 allowing any lot permitting a single family dwelling is also required to permit construction of a duplex. With the passage of this legislations and incorporation of these regulations into City code, the maximum density allowed on the site with the current zoning designations increased from 139 units to 226 units. As noted above, the applicant is proposing to voluntarily impose a dwelling unit cap of 200 units on the property with the current application. With this cap, the proposal will now contain approximately 12 percent fewer units than the maximum allowed under existing zoning. For this reason, a Comprehensive Plan amendment for this item is no longer needed.*

17.24.10 INTENT

This chapter sets forth review criteria and procedural requirements in order to:

- A. Respond to changing conditions and community attitudes;
- B. Ensure flexibility while at the same time maintain the integrity of the Comprehensive Plan; and
- C. Establish procedures by which the Plan text and map may be amended.

RESPONSE: *As noted above, the applicant requests a Comprehensive Plan Map amendment to designate parkland required by the city, Parks and Open Space (POS).*

17.24.20 INITIATION

Comprehensive Plan amendments may be initiated by one of the following:

- A. An application submitted by a property's owners or their authorized agents for a specific property; or
- B. A majority vote of the City Council.

RESPONSE: *This request has been initiated by the property owner as allowed by Subsection (A).*

17.24.70 REVIEW CRITERIA

Comprehensive Plan amendments shall be reviewed to assure consistency with the purposes of this chapter, policies of the Comprehensive Plan, and any other applicable policies and standards adopted by the City Council. Amendments shall be approved only when the following findings are made:

- A. The change being proposed is the best means of meeting the identified public need; and,

RESPONSE: *The proposed Plan Amendment will address several public needs with approval of this request and the eventual development of the property. First, construction of the proposed development will extend Dubarko Road through the property to connect with Highway 26. This road is classified as a Minor Arterial in the City's Transportation System Plan (TSP) and has been included in this plan for a number of years. Identified as "Project M20" in this plan, this project is intended to provide an alternative transportation road generally paralleling Highway 26. With improvement of this final unbuilt section, this road will now be complete from 362nd Avenue on the West to Highway 26 on the East. Development of the property and the extension of Dubarko Road will also trigger extensive improvements along Highway 26. The cost of constructing Dubarko Road and improvements to the highway are likely the reasons the project did not move forward in 2006 and 2013.*

A second public need realized is the proposal to dedicate 1.755 acres of public parkland to the City of Sandy located directly east of the 1.4 acres of previously dedicated parkland as part of the Deer Pointe 2 Subdivision in 2006. The proposed parkland dedication will ensure completion of park improvements in a timely manner.

Approval of this request also will facilitate this currently undeveloped commercial property to develop thereby creating additional employment opportunities and goods and services in this area of the community.

Another public need the proposal addresses is the need for additional rental housing options. Development of the property with multi-family housing units following approval of the current request strives to fill this market need.

The applicant believes the proposed Comprehensive Plan amendment to designate land for Parks and Open Space is the best means to meet the public needs described above. In addition, development of the property as proposed will provide additional tax revenues to the city to provide needed services.

- B. The change conforms with all applicable Statewide Planning Goals.

RESPONSE: As reviewed below, the proposed Comprehensive Plan Map amendment conforms to all applicable Statewide Planning Goals.

Goal 1 - Citizen Involvement The City will provide notification of the proposal to all property owners within 500 feet of the subject property and will place a legal notice in the Sandy Post newspaper. The City will also hold legally noticed and conducted public hearings before the Sandy City Council. Goal 1 is satisfied.

Goal 2 - Land Use Planning Goal 2 requires the City's decision on this application to be coordinated with other governmental agencies and to be supported by an adequate factual base. The City will send notification of the proposal to both the Department of Land Conservation and Development and the Oregon Department of Transportation. The City will consider comments from these agencies in evaluating the proposal. Goal 2 is satisfied.

Goal 3 - Agricultural Lands Goal 3 is not applicable to this proposal.

Goal 4 - Forest Lands Goal 4 is not applicable to this proposal.

Goal 5 - Natural Resources No resources identified on the City's Flood and Slope Hazard map are located on the subject property. An intermittent stream is shown on the City's wetland inventory as "TCL". The applicant contracted with a wetlands consultant to evaluate the status of this resource and to determine if wetlands exist on the site. The conclusion of this report is that the mapping of an intermittent stream is not accurate and the site does not contain any stream or wetland resources. The applicant then sent an Offsite Determination Request to the Department of State Lands who responded that there are unlikely to be jurisdictional wetlands or waterways located on the site. The site contains a number of conifer and deciduous trees. The applicant hired an Arborist to evaluate the size, species, and condition of these trees provided with this application. The applicant then reviewed the tree retention requirements in Chapter 17.102, Urban Forestry Ordinance to develop a tree retention plan that is consistent with these regulations. As reviewed in detail below, the applicant's tree retention plan exceeds the minimum required by City Code. Goal 5 is satisfied.

Goal 6 - Air, Water, and Land Quality - The proposal complies with all regulations relative to air, water, and land quality. Goal 6 is satisfied to the extent it is applicable to the proposal.

Goal 7 - Natural Hazards - The proposal to change the Comprehensive Plan designation for the subject property does not affect compliance with this goal. The site contains minimal steep slopes and no natural hazards are known to exist on the site. Goal 7 is satisfied to the extent it is applicable to the proposal.

Goal 8 - Recreational Needs - No resorts are proposed with this application. The proposal includes dedication of 1.755 acres of parkland as requested by the City of Sandy. This land is proposed to be conveyed to the City as identified on the

preliminary subdivision plat. Goal 8 is satisfied to the extent it is applicable to the decision.

Goal 9 - Economy - Goal 9 requires the city to maintain a 20 year supply of buildable employment land within the UGB. In 2015 the City completed an Economic Opportunities Analysis (EOA) in accordance with the methodology required by OAR 660-009-0015. This study included an analysis and update of the City's Comprehensive Plan with respect to Goal 9 and concluded that the Urban Growth Boundary did not contain sufficient employment land to meet projected employment needs. Based on the results of this study, the City then completed an Urban Growth Boundary Expansion Analysis to resolve this issue and the City Council adopted this study and it was acknowledged by DLCD in February 2017. As shown on Table 3.10 from this study below, the city added approximately 38 acres of commercial land and four acres of industrial land to the UGB. In addition, approximately 18 acres of other properties were changed to commercial zoning. With expansion of the UGB and designation of lands as contained in the study, a surplus of land in all land use categories is projected through the year 2034.

Table 3.10: Area of Land Surplus (deficit) of the Preferred UGB Expansion Alternative

Land Use Type	Existing Land Needs	Efficiency Measures	Expansion Alternative	Adjusted UGB
LDR	(276.8)	(21.55)	317.50	19.2
MDR	(4.5)	21.55		17.1
HDR	13.9	(1.34)		12.6
Commercial	(51.8)	17.74	37.66	3.6
Industrial	45.0	(16.40)	4.18	32.8

The table below shows data from Table 3.10 of the UGB Expansion Analysis reduced by 2.47 acres (Commercial to HDR) as a result of a previously approved Plan Amendment and the adjusted area based on the applicant's proposal. As shown on this table, a surplus in all employment land use categories will be maintained over the 20 year planning horizon and Goal 9 is satisfied.

Adjusted UGB Area

Land Use Type	Adjusted UGB area (Table 3.10)	Adjusted area previous approval 2.47 acres Commercial to HDR	Proposed area changes (reductions)	Adjusted UGB with proposal
LDR	19.2		(7.46)	11.74
MDR	17.1		(3.77)	13.33
HDR	12.6	15.07	6.50	21.57
Commercial	3.6	1.13	2.61	3.74
Industrial	32.8		0.00	32.8

Goal 10 - Housing - The 2015 Urbanization Report 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. To meet this need, the City expanded the Urban Growth Boundary by adding approximately 318 acres of low density residential land and changed the zoning on approximately 22 acres of land zoned another designation to medium density residential. As shown on the Adjusted UGB Area table above, the proposal to reduce the area of LDR and MDR designated land, and add HDR designated land will not adversely affect the city's 20 year buildable lands supply of residential lands. Goal 10 is satisfied.

Goal 11 - Public Facilities - The proposal to change zoning designations on the subject property does not affect the ability of the City to comply with Goal 11. Public facilities are guided by City master plans and the Development Code and the proposal does not affect the assumptions or conclusions in these documents. Goal 11 is satisfied to the extent it is applicable to the proposal.

Goal 12 - Transportation - In order to evaluate compliance with this goal, the applicant contracted with a Traffic Engineer to prepare a Traffic Impact Study. The scope of this study was coordinated with both the City of Sandy and the Oregon Department of Transportation. With development of the project, Dubarko Road will be extended through the property to connect with Highway 26. The subject property currently contains a mix of R-1, R-2, and C-3 zoning. The proposal changes zoning to a combination of R-1, R-2, R-3, C-3, and POS (Parks and Open Space). As detailed in the traffic study, the proposed zone change results in a modest increase in vehicle trips compared to uses under existing zoning. The prior transportation impact study prepared as part of the initial application demonstrated the proposed zone change could comply with the requirements of Goal 12 and the Transportation Planning Rule with implementation of a trip cap of no greater than 340 PM peak hour trips on the subject property. This prior study was scoped and reviewed by City of Sandy and ODOT staff. The revised traffic study prepared for consideration of the revised application which the change in Oregon law which allows duplex development within the R-1 zone (HB 2001) and refreshes the report to include more recent crash data at area intersections and expected development within the C-3 zone. The results of the analysis were substantially similar to the original report, and a trip cap of 340 PM peak hour trips in association with the proposed zone change is recommended. As demonstrated in this study all intersections will operate acceptably upon project completion. As such, the proposed zone change is not expected to degrade the performance of any existing or planned transportation facilities and no mitigation is necessary or recommended. As reviewed in this study, the Transportation Planning Rule and Goal 12 are satisfied.

Goal 13 - Energy Conservation - The City's Development Code contains various criteria to implement Goal 13. The proposal to increase the area designated R-3 and convey parkland to the City ensures Goal 13 is satisfied.

Goal 14 - Urbanization - The Urbanization Report adopted in 2015 and the Urban Growth Boundary Expansion Analysis adopted in 2017 have both been acknowledged and are part of the City's Comprehensive Plan. As reviewed in Goals 9, Economy and Goal 10, Housing above, the applicant's proposal to change Comprehensive Plan and Zoning designations on the subject property will not affect compliance with these studies. Goal 14 is satisfied.

Goals 15 - 19 - Sandy is not subject to these Goals and they are not applicable.

CHAPTER 17.26 - ZONING DISTRICT AMENDMENTS

17.26.00 INTENT

This chapter sets forth review criteria and procedural requirements for quasi-judicial and legislative zoning map amendments to accomplish the following:

- A. Maintain sound, stable, and desirable development within the City;
- B. Permit changes in zoning district boundaries where appropriate;
- C. Ensure zoning changes are consistent with the community's land use policies and goals; and
- D. Lessen the influence of private economic interests in the land use decision-making process.

***RESPONSE:** The applicant requests approval of a quasi-judicial zoning map amendment to modify the zoning district boundaries for the site. As contained in this submittal, the applicant believes the proposed zone changes are critical to the economic viability of the project.*

17.26.40 QUASI-JUDICIAL AMENDMENT PROCEDURES

- A. Initiation-Quasi-Judicial. Initiation of a zoning district change that is quasi-judicial in nature may be accomplished by one of the following ways:
 1. Filing of an application by the owner(s) of the subject property(ies); or
 2. A majority vote of the City Council or Planning Commission following the same procedures used for legislative amendments discussed above.

***RESPONSE:** The property owner filed this application for a quasi-judicial zone change as provided by this section.*

- B. Review Criteria. Quasi-judicial zoning district changes shall be reviewed to:

1. Determine the effects on City facilities and services;

***RESPONSE:** The proposed zone change is necessary to facilitate development of the property. With this development, Dubarko Road will be extended from its current terminus through the site to connect with Highway 26. This road is identified as a necessary future minor arterial in the City's Transportation System Plan. Due to the cost of these improvements, the applicant has determined it is unlikely this road will ever be built without development of the property. A revised Traffic Impact Study completed by a Traffic Engineer evaluated the impacts of the proposed development and the connection of Dubarko Road with Highway 26. The conclusion of this study is the proposed zone change is not expected to degrade the performance of any existing or planned transportation facilities and no mitigation is necessary or recommended. An existing water line is located in the future alignment of Dubarko Road and this facility will be*

accommodated as this road is constructed. All public facilities will be extended to the farthest extent of the subject property as required. With these facts in mind, the proposal will have a positive effect on City facilities and services in compliance with this criteria.

2. To assure consistency with the purposes of this chapter;
RESPONSE: Chapter 17.26 contains relevant criteria and procedural requirements for quasi-judicial and legislative zoning map amendments. The intent of these standards as stated in Section 17.26.00 include the following statements:
 - A. Maintain sound, stable, and desirable development within the City;
 - B. Permit changes in zoning district boundaries where appropriate;
 - C. Ensure zoning changes are consistent with the community's land use policies and goals; and
 - D. Lessen the influence of private economic interests in the land use decision-making process.

The proposal to change zoning on the property represents an appropriate zoning boundary modification and the development represents a sound, stable, and desirable development proposal as detailed in the submitted Economic Analysis submitted with this application. As discussed in this review, the proposed zoning designations are consistent with the Comprehensive Plan and Statewide Planning Goals.

3. To assure consistency with the policies of the Comprehensive Plan;
RESPONSE: The applicant requests Comprehensive Plan Map approval to designate 1.755 acres of the property as Parks and Open Space as required by the city and to shift the current zoning designations. A review of all applicable goals and policies of the City of Sandy Comprehensive Plan is included below.

CITY OF SANDY COMPREHENSIVE PLAN

Goal 2 - Land Use Planning

Specific Area Plans

3. The City may use Specific Area Plans to refine the Comprehensive Plan and/or the zoning ordinance in order to further implement the Comprehensive Plan policies. A Specific Area Plan designates specific land uses and transportation elements through broad local participation. Specific Area Plans may be developed in a single linear process, including neighborhood workshops, Planning Commission hearing(s), and City Council adoption hearing(s).

RESPONSE: The applicant has applied for Specific Area Plan approval concurrently with this application.

4. Specific Area Plans may be used as a tool for coordinating development in a specific area plan, such as a village area. Specific Area Plans should implement coordinated residential and commercial development while integrating surrounding uses and transportation linkages.

RESPONSE: The subject property is located within a designated Village as identified on the Comprehensive Plan Map and the applicant has applied for a

Specific Area Plan concurrently with this request. The proposal includes a seven lot subdivision including the extension of Dubarko Drive through the site.

5. A Specific Area Plan is developed through an extensive public process that relies upon the contributions of citizens and stakeholders. The creation of a Specific Area Plan Overlay District in the zoning ordinance shall further implement the policies of the Comprehensive Plan.

RESPONSE: *The City of Sandy will send notices to affected property owners and agencies as required by SDC Chapter 17.22. In addition, the city will hold a public hearing as required by SDC Chapter 17.20.*

Land Use Regulations

6. The uses, area, and household number projected for each of the villages may be modified by a Specific Area Plan.

RESPONSE: *The subject property is located in an area designated as Village on the City's Comprehensive Plan map. The applicant is proposing to dedicate 1.755 acres of parkland and designating this area POS as required by the city. The applicant also proposes shifting zoning district boundaries and has applied for Specific Area Plan approval concurrently with this application.*

7. Land development proposals shall be consistent with the Sandy Development Code, Municipal Code, and all adopted standards and enforcement codes of the City of Sandy. The burden of proof with regard to consistency with the applicable standards and codes lies with the prospective developer.

RESPONSE: *The applicant proposes constructing a seven-lot subdivision to include four lots (Lots 1 - 4) zoned R-1, Low Density Residential, one lot (Lot 5) zoned R-2, Medium Density Residential, one lot (Lot 6) zoned R-3, High Density Residential, and one lot (Lot 7) zoned C-3. In addition, the proposal includes dedication of 1.755 acres of parkland (Tract A) and two public stormwater facilities (Tracts B and C). The details of the development of Lots 5 - 7 will be evaluated with a design review application at a later date. As discussed in this application, the proposal is consistent with the Sandy Development Code, Municipal Code, and all relevant standards and codes in compliance with this policy.*

11. Where a development offers greater improvement to the community infrastructure than is normally required, or extraordinarily serves to fulfill the objectives of the Sandy Comprehensive Plan, the City of Sandy may provide relief from city standards or requirements in consideration thereof. Relief from standards or requirements can be considered only where there is no infringement to PUBLIC health or safety.

RESPONSE: *The proposed subdivision includes the construction of Dubarko Road and a new collector street stubbed to the southern property line. Both of these roads are included in the city's Transportation System and are sized larger than is necessary to provide access to the proposed development. The city has indicated that system development charge credits will be provided to the applicant for constructing these facilities.*

12. It is important that land divisions do not preclude the development of the property or nearby property to planned urban densities. For that reason, land partitioning and subdivision will be controlled to the extent that there are options remaining for the future extension of public facilities and services.

RESPONSE: *The submitted subdivision design requires Dubarko Road to be extended through the site to connect to Highway 26. In addition, the City's Transportation System Plan identifies a future collector street intersecting Dubarko Road, extended to the South. Both of these roads will be dedicated with the proposed subdivision. All public facilities will be constructed on the subject property as required to facilitate their extension to adjacent properties as necessary.*

Interpretation of Comprehensive Plan Map

14. Proposed plan elements such as parks, roadways, schools, etc., are intended to be conceptual. Actual locations and quantities should be determined through the development process.

RESPONSE: *As specified in this policy, the neighborhood park "N" shown on the Comprehensive Plan map is intended to be conceptual.*

Land Use Designations

Parks and Open Space (POS)

This designation is intended to recognize those publicly-owned lands designated or proposed for parks and open spaces. Parks include publicly developed parks and undeveloped park land where typical uses include active and passive outdoor recreation activities, trails, open space, cultural activities, park buildings and structures, concessions, general park operations and maintenance, and storm drainage facilities. Open space includes publicly developed and undeveloped lands and sensitive areas such as wetlands, steep slopes, forested areas, and stream corridors.

RESPONSE: *The proposal includes dedication of 1.755 acres of parkland (Tract A) as shown on the Preliminary Plat submitted with this application. The proposed parkland will expand the existing 1.4 acre parkland dedication provided in 2006 with development of the Deer Pointe 2 Subdivision located directly west of the subject property. The proposed 1.755 acre parkland dedication will increase the total parkland in this neighborhood of the city to 3.155 acres.*

Low Density Residential (LDR)

The Low Density Residential (R-1) district is intended for 5 to 8 dwelling units per net acre. Intended uses are single family detached and attached units. Duplexes, subject to siting standards, are also allowed in these areas. Low Density Residential districts are located outside village boundaries and on the periphery of the villages.

RESPONSE: *The subject property does not contain any restricted development areas. The area proposed for R-1 zoning contains 0.59 net acres after removing the proposed public stormwater tract (Tract B). The minimum density for this area is 2 units ($0.59 \times 5 = 2.95$, rounded down to 2 units) and the maximum density is 5 units ($0.59 \times 8 = 4.72$, rounded up to 5 units). Four lots are proposed in compliance with*

the density range. As permitted in this zoning district, the applicant intends to construct either single family detached dwellings or duplexes on these lots as permitted.

Medium Density Residential (MDR)

The Medium Density Residential (R-2) district is intended to implement the Medium Density Residential Comprehensive Plan designation by providing for medium density single-family and multi-family uses in suitable locations, where public sewer, water, and other services are readily accessible. All development shall also provide access to the surrounding neighborhood with excellent linkage between residential areas, schools, and parks. Density shall not be less than eight or more than 14 units per net acre.

RESPONSE: *The area proposed for R-2 zoning (Lot 5) contains 1.233 net acres requiring a minimum density of 10 units ($1.233 \times 8 = 9.86$) and allowing a maximum density of 17 units ($1.233 \times 14 = 17.26$). The applicant intends to construct multi-family dwellings, an allowed housing type on this lot. The exact number of dwelling units proposed will be determined with submittal of a separate design review application following approval of the current application.*

High Density Residential (HDR)

The High Density Residential (R-3) district is intended for high density residential development at 10 to 20 dwelling units per net acre. Intended uses are apartments, row houses, and townhouses, duplexes, single-family planned developments, and manufactured home parks including existing developed areas and areas suitable for development at this density.

RESPONSE: *The area proposed for R-3 zoning (Lot 6) contains 6.504 net acres requiring a minimum density of 65 units ($6.504 \times 10 = 65.04$) and allowing a maximum density of 130 units ($6.504 \times 20 = 130.08$). The applicant intends to construct multi-family dwellings, an allowed housing type on this lot. The exact number of dwelling units proposed on this lot will be determined with submittal of a separate design review application following approval of the current application.*

Village

The Village (V) designation provides for a mixture of commercial and residential uses within the context of a village. The village designation is intended to provide flexibility in developing specific area plans. Permitted zoning in a village includes single family residential (when identified as part of a specific area plan), low density residential, medium density residential, high density residential, and village commercial.

A shifting of the underlying zoning district boundaries to accommodate development constraints and land divisions for specific development proposals may be allowed through approval of a Specific Area Plan. Area and density increases may be increased or decreased up to 20%. Changes greater than 20% will require a Plan Map amendment.

RESPONSE: *As described in this section, the Village (V) designation is intended to provide a mix of commercial and residential uses within the context of a village. Proposed zoning includes low density residential, medium density residential, high*

density residential, village commercial, and parks and open space. The applicant requests approval of a Comprehensive Plan amendment to include parks and open space in this village as required by the city. Also as specified in this section, the applicant has requested approval to shift underlying zoning district boundaries through a Specific Area Plan.

The applicant proposes increasing the area devoted to C-3 zoning from 2.611 net acres to 2.790 net acres, decreasing the area of R-1 zoning and R-2 zoning, and adding R-3 and POS zoning. With the adoption of HB 2001, any lot permitted to contain a single family dwelling also allows construction of a duplex. The addition of property zoned R-3 as proposed will have a marginal affect on the residential density allowed on the property. Under existing zoning it is estimated that 226 dwelling units could be constructed on the site. With the current proposal it is estimated 213 dwelling units could be constructed. As noted above, the applicant is proposing to impose a dwelling unit cap of 200 units, 26 units less than allowed under current zoning. The submitted application includes both a Specific Area Plan and a Plan Map amendment request as required.

Commercial

The Village Commercial (C-3) district is primarily oriented to serve residents of the village and the immediately surrounding residential area. The Village Commercial area is intended to help form the core of the villages. Allowing a mixture of residential uses beside and/or above commercial uses will help create a mixed use environment which integrates uses harmoniously and increases the intensity of activity in the area. The orientation of the uses should integrate pedestrian access and provide linkages to adjacent residential areas, plazas and/or parks, and amenities.

RESPONSE: The proposal includes a single lot (Lot 7) zoned C-3 containing 2.790 acres. The location of the area zoned C-3 is located next to the proposed parkland and contains frontage on both Highway 26 and Dubarko Drive. This lot is also located across the street from a lot zoned for high density residential development and four lots zoned for low density residential. Lot 7 is well positioned to serve as a central component of this village. The use proposed on this lot is not known at this time and will be determined with a subsequent land use application following approval of the current application.

Goal 6 - Air, Water, and Land Resources

This goal is to establish policies to maintain and improve the quality of the air, water, and land resources of the state.

1. Maintain environmental quality by guiding future development and land use activities. Allow activities that will not significantly deteriorate the existing high quality of air, water and land resources.

RESPONSE: As noted above, the subject property does not contain any known protected natural resources. The applicant will dedicate 1.755 acres of parkland with this application in addition to retaining and protecting a significant number of trees on the site.

4. Reduce congestion and delay on major streets to lessen localized pollution impacts of automobile travel through methods such as signal timing, access management, intersection improvements, etc.

RESPONSE: *As noted in the Traffic Impact Study submitted with this application, the proposal will not have a significant effect on the operation of area roadways and intersections at the planning horizon as defined by the Oregon Transportation Planning Rule.*

Goal 8 - Parks and Recreation

1. Ensure that new residential development contributes equitably to park land acquisition, development, and maintenance.

RESPONSE: *The applicant proposes dedicating 1.755 acres for park use. This area has been sized based on the proposed 200 dwelling unit cap for the property in conformance with the parkland calculation formula specified in Chapter 17.86.*

10. The conceptual location of community and neighborhood parks and areas of open space have been indicated on the City of Sandy Land Use Map. Actual park locations may be determined based on more site-specific information

RESPONSE: *As noted above, the Comprehensive Plan map and Parks Master Plan show a future park in the vicinity of the subject property. The applicant proposes dedicating 1.755 acres of parkland with this proposal.*

Goal 9 - Economic Development

Commercial

1. The City of Sandy shall ensure, at each periodic review, an adequate supply of land to meet the forecast 20-year commerce and service needs of the city's residents and trade area.

RESPONSE: *As shown on the table below and discussed in the review of Goal 9 for the Comprehensive Plan amendment, with approval of the proposal the city will continue to have an adequate supply of employment lands to meet the forecasted 20-year buildable lands supply. Goal 9 is satisfied with the proposal.*

Adjusted UGB Area

Land Use Type	Adjusted UGB area (Table 3.10)	Adjusted area previous approval 2.47 acres Commercial to HDR	Proposed area changes (reductions)	Adjusted UGB with proposal
LDR	19.2		(7.46)	11.74
MDR	17.1		(3.77)	13.33
HDR	12.6	15.07	6.50	21.57
Commercial	3.6	1.13	2.61	3.74
Industrial	32.8		0.00	32.8

Village Commercial Policies

28. One of the central themes in the Comprehensive Plan is the use of Village areas. These are compact neighborhoods (160-200 acres) which are designed to

encourage travel on foot, and reduce reliance on the car. The center of each village includes housing, retail shops, public uses, a village green or park, and, potentially, a transit stop. The street pattern is connected and designed to provide direct and convenient access to the village center.

RESPONSE: *The subject property is located in a designated village as shown on the Comprehensive Plan map. The applicant's proposal to increase the area zoned C-3, add an area zoned R-3, dedicate a 1.755 park, and adjust zoning district boundaries will positively ensure compliance with this policy.*

Goal 10 - Housing - This goal is to establish policies to provide for housing needs of the state.

1. Assure an adequate supply of developable land for low, medium, and high density housing to meet the 20-year population projections.

RESPONSE: *As reviewed in Goal 10 above and shown on the Adjusted UGB Area table, approval of the proposal will result in a surplus of all residential land categories to meet the city's 20-year population projections.*

Residential Districts

7. Provide for distinct mixed use villages separate from the central core of the city. Villages are to be developed around a commercial center or other focal point.

RESPONSE: *The proposal will increase the area of property zoned C-3, Village Commercial by 0.179 acres. The applicant intends developing this property following approval of a subsequent land use application.*

9. Assure that residential densities are appropriately related to site conditions, including slopes, potential hazards, and natural features.

RESPONSE: *The proposed project has been designed in consideration of the site conditions as stated in this policy. No excessively steep slopes, potential hazards, or significant natural features exist on the site. The details of the design of structures on the R-2, R-3 and C-3 lots will be determined following submittal of a subsequent land use application.*

10. Link housing density and location to reduce automobile travel by locating higher density housing near village centers, schools, and potential transit routes.

RESPONSE: *Lot 5 to contain R-2, zoning and Lot 6 R-3, zoning are located directly across Dubarko Road from Lot 7 zoned C-3, Village Commercial, the proposed village center. Dubarko Road will be constructed through the property and will serve as a transit route. The City's Transit Manager is requiring construction of two bus shelter pads and the installation of two benches on these pads in locations accessible to all residents. The subject property is well suited for residential development.*

Goal 11 - Public Facilities and Services

9. Require developers to install and extend all public utilities to, and through, the property to serve the needs of the development and surrounding properties in a logical manner.

RESPONSE: The applicant is aware that public facilities will need to be installed to and through the site. Following construction, these facilities will be available to be extended to adjacent properties as appropriate.

Goal 12 - Transportation

Neighborhood Street System

1. Support a pattern of connected streets, sidewalks, and bicycle routes 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 local streets so that collector and arterial streets are not overburdened.

RESPONSE: The proposed design includes the extension of Dubarko Road through the site and a new collector street stubbed to the southern property line. All proposed streets will contain sidewalks and bike lanes will be included on streets as required.

Major Roadway Circulation

22. Submit notice of development proposals impacting Highways 26 and 211 to ODOT for review and comment.

RESPONSE: The scope of the submitted Transportation Impact Study was coordinated with the Oregon Department of Transportation and the City's Traffic Consultant. ODOT attended the pre-application conference for the proposal and the City will send notification of the proposal to ODOT as part of the required notification process.

Goal 14 - Land Use and Urbanization

Urbanization Policies

1. Maintain an urban growth boundary with sufficient residential, commercial, industrial, and public use lands necessary to support forecast population and employment for a 20-year horizon. The City will evaluate and update the 20-year land supply at each periodic review plan update.

RESPONSE: As reviewed in Goal 9 and 10 and shown on the Adjusted UGB Area table above, the proposal will not adversely impact the City's adopted Buildable Lands Inventory and the findings of the UGB Expansion Analysis. With approval of the proposal, an adequate supply of all land use categories to meet the city's 20-year population projections will remain.

4. To assure consistency with the Statewide Planning Goals as may be necessary, and any other applicable policies and standards adopted by the City Council.

RESPONSE: A review of all applicable Statewide Planning Goals is included as part of the review of the Comprehensive Plan amendment request in Chapter 17.24 above. As discussed in this review, the proposal is consistent with all applicable Statewide Planning Goals and this policy is satisfied.

CHAPTER 17.54 - SPECIFIC AREA PLAN OVERLAY

17.54.00 - SPECIFIC AREA PLAN DEVELOPMENT AND APPROVAL PROCESS

- A. Purpose. The purpose of a specific area plan overlay zone is to allow development and approval of specific area plans in the city. A specific area plan is a master plan

coordinating and directing development in terms of transportation, utilities, open space and land use, however, no phasing or timeline is required. Specific area plans may be located anywhere within the Urban Growth Boundary and are intended to promote coordinated planning concepts and pedestrian-oriented mixed-use development.

Response: *The City of Sandy Comprehensive Plan, Goal 2, Land Use Designations, Village states: “shifting of the underlying zoning district boundaries to accommodate development constraints and land divisions for specific development proposals may be allowed through approval of a Specific Area Plan”. The applicant proposes shifting zoning district boundaries as noted above and has submitted a Specific Area Plan request according to the standards in this chapter as required.*

- B. Initiation. The process to establish a specific area plan shall be initiated by the City Council. The Planning Commission or interested property owners may submit requests to the City Council to initiate the specific area plan process. If owners request initiation of a specific area plan process, the City Council may require an application fee to cover the cost of creating the plan.

Response: *The proposed Specific Area Plan application requests approval to shift zoning district boundaries currently existing on the property, to add areas zoned R-3 and POS, and to adjust the location of the R-1, R-2, and C-3 properties. As a result of these changes, with the adoption of HB 2001 and the proposed unit cap, the projected residential density for the property is expected to decrease by 12 percent as discussed in Chapter 17.24 above. The Village (V) land use designation as described in the Comprehensive Plan allows a mix of residential and commercial uses including low density residential, medium density residential, high density residential, and village commercial. The applicant’s proposal includes a mix of Low Density Residential, Medium Density Residential, High Density Residential, and Village Commercial. In addition, the applicant proposes dedicating 1.755 acres of parkland to be zoned Parks and Open Space.*

- D. Adoption. A specific area plan shall be adopted through a Type IV process, and shall be evaluated for compliance with the criteria for zoning district amendments and/or comprehensive plan amendments where applicable.

Response: *This Specific Area Plan request will be reviewed through a Type IV process and shall comply with the criteria for zoning district and Comprehensive Plan amendments. The criteria in Chapter 17.24, Comprehensive Plan Amendment Procedures and Chapter 17.26, Zoning District Amendments are reviewed above and as reviewed in these chapters, the proposal is found to comply with all required criteria.*

- F. Comprehensive Plan Amendment. A specific area plan is similar to a master plan and does not automatically require a comprehensive plan amendment. A comprehensive plan amendment shall only be required if a need for such an amendment is identified during development of the specific area plan.

Response: *The applicant has applied for a Comprehensive Plan Amendment concurrently with this request.*

G. Compliance with Specific Area Plan Standards and Procedures. New construction and land divisions shall meet any development, land division and design standards of the applicable specific area plan. Base zone and land division standards shall apply where no different standard is referenced for the specific plan area.

Response: *As reviewed below, the proposal complies with all relevant standards and criteria found in applicable code chapters.*

H. Specific Area Plan Standards. Specific standards for adopted specific area plans are defined below.

Response: *Each of these standards are reviewed below.*

17.54.10 - SPECIFIC AREA PLAN CONTENT

At a minimum, a specific area plan shall include the following text and diagrams:

A. Plan Objectives. A narrative shall set forth the goals and objectives of the plan.

Response: *The details of the goals and objectives of this proposal are articulated throughout the project narrative. In general, the proposal strives to create a mixed-use development to include detached single family dwellings or duplexes, multi-family dwellings, and village commercial development. In addition, the applicant proposes dedicating 1.755 acres to the city for a future park. With this plan Dubarko Road will be extended through the site to complete this TSP identified road segment.*

B. Site and Context. A map of the site and existing context shall identify the project area.

Response: *A map showing the site and context are included with this application.*

C. Land Use Diagram. The land use diagram shall indicate the distribution and location of planned land uses, including open space and parks, within the area covered by the specific area plan.

Response: *The submitted plan set clearly identifies the distribution of all proposed land uses.*

D. Density. If residential uses are proposed, a narrative shall describe planned residential densities.

Response: *Density calculations are included in Chapter 17.30, Zoning Districts above.*

E. Facilities Analysis. The plan shall include an analysis of the general location and extent of major components of sanitary sewer, water, and other essential facilities proposed to be located within the specific plan area and needed to support the land uses and densities described in the plan. A review of existing facilities master plans shall be sufficient if these master plans indicate there is adequate capacity to serve the specific plan area.

Response: *A Utility Plan is included with the plan set showing the location of all public facilities proposed to serve the development.*

- F. Circulation/Transportation Diagram. The circulation diagram shall indicate the proposed street pattern for the specific area plan area, including pedestrian pathways and bikeways. Design standards and street cross sections shall be included, if different than normal City standards.

Response: *The submitted plan set shows the location and dimensions of all proposed roads and cross-section drawings of these streets are also included.*

- G. Market Analysis. Specific area plans that include amendments to the zoning map affecting the acreage of Village Commercial (C-3) land within the plan area shall include a market analysis of supportable retail space that verifies demand for the proposed acreage of C-3 land. The analysis should include a market delineation, a regional and local economic review, and a retail market evaluation.

Response: *An Economic Analysis is included as part of the application package.*

- H. Design and Development Standards. If standards differ from normal City standards, design and development standards shall be included in the plan.

Response: *The proposal is anticipated to comply with all design and development standards. The details of this review will be addressed with submittal of subsequent land use applications for development on Lot 5 - 7.*

SUBDIVISION REVIEW

The applicant requests approval to construct a seven-lot subdivision with this application. Four lots (Lots 1 - 4) will be zoned R-1, Low Density Residential constructed with either single-family residential dwellings or duplexes, one lot (Lot 5) zoned R-2, Medium Density Residential and one lot (Lot 6) zoned R-3, High Density Residential to contain multi-family units, and one lot (Lot 7) zoned C-3, Village Commercial and constructed with buildings in compliance with this zone. In addition, the applicant proposes dedicating 1.755 acres of parkland (Tract A) and constructing and dedicating two public stormwater facilities (Tracts B and C).

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. No areas within the FSH Overlay are located on the subject property.

Response: *The applicant proposes a seven-lot subdivision with three tracts to be dedicated to the city. The subject property contains a gross site area of 15.91 acres. The net area identified to be zoned R-1 contains 0.59 net acres. This zone allows a minimum of 5 and allows a maximum of 8 units per net acre. The minimum density is (0.59 acres x 5 units/net acres = 2.95 units round down to 2 units) and the maximum density is (0.59 acres x 8 units/net acre = 4.72, rounded up to 5 units). As a result of these calculations the density range for this part of the property is a minimum of two units and a maximum of five units. As permitted by HB 2001, duplexes are permitted on any lot where a single family dwelling is permitted. For this reason, a maximum of 10*

units are allowed. The applicant proposes platting four R-1 zoned lots to be constructed with either single family dwellings or duplexes on these lots as permitted. The net area identified to be zoned R-2 (Lot 5) contains 1.233 acres. The R-2 zone requires a minimum of 8 and allows a maximum of 14 units per net acre. The minimum density is (1,233 acres x 8 units/acre = 10 units) and the maximum density is (1.233 acres x 14 units/acre = 17 units). The applicant proposes constructing multi-family dwellings on this lot.

The area identified to be zoned R-3 (Lot 6) contains a net area of 6.504 acres. The R-3 zone allows a minimum of 10 and a maximum of 20 units per net acre. The minimum density is (6.504 acres x 10 units/acre = 65 units) and the maximum density is (6.504 acres x 20 units/acre = 130 units). The applicant proposes constructing multi-family dwellings on this lot.

As a result of these calculations the density range for the residential portion of the subject property is a minimum of 80 units and a maximum of 157 units and with the C-3 portion of the property included the maximum density is 213 units. At this time the applicant does not know the exact number of units that will be constructed on Lots 5 and 6, however, the applicant is proposing a cap of 200 units be imposed for the entire site. The number of units constructed is likely to be less than the maximum allowed and will be determined with design review applications submitted at a later date.

CHAPTER 17.32 - PARKS & OPEN SPACE (POS)

17.32.00 - INTENT

This district is intended to recognize those publicly-owned lands designated or proposed for parks and open spaces. Parks include publicly developed parks and undeveloped park land where typical uses include active and passive outdoor recreation activities, trails, open space, cultural activities, park buildings and structures, concessions, general park operations and maintenance, and storm drainage facilities. Open space includes publicly developed and undeveloped lands and sensitive areas such as wetlands, steep slopes, forested areas, and stream corridors.

Response: The applicant proposes dedicating 1.755 acres (Tract A) to be designated and used as public parkland. The land proposed for parkland abuts the existing 1.4 acres of parkland dedicated in 2007 with the Deer Pointe 2 Subdivision approval along its entire western line. The subject property is generally level and suitable for parkland.

17.32.10 - PERMITTED USES

A. Primary Uses Permitted Outright:

1. Park improvements identified in the Parks Master Plan or Park Specific Master Plans adopted by the City Council.

Response: The City has prepared a master plan for the Deer Pointe Park. With dedication of the additional land with the current proposal, the city now have the area to develop a new 3.155 acre neighborhood park.

17.32.40 - DEVELOPMENT STANDARDS

A. Parks & Open Space

Lot Area - No minimum

Lot Dimension - No minimum

Setbacks - No minimum or maximum
 Lot Coverage - No maximum
 Structure Height - 35 ft. maximum
 Off-Street Parking - See Chapter 17.98
 Design Review Standards - See Section 17.90.120

Response: *The proposal complies with all applicable development standards. The city will need to determine compliance as the master plan for this new park is prepared and as part of the approval process.*

17.32.50 - ADDITIONAL REQUIREMENTS

- A. Where applicable, park improvements shall comply with city design standards.
- B. Provisions for pedestrian and vehicular off-street access to adjoining properties shall be included in park master plans

Response: *These items are required to be addressed with preparation of the master plan for this park.*

CHAPTER 17.36 - LOW DENSITY RESIDENTIAL (R-1)

17.36.00 - INTENT

This district is intended to implement the Low Density Residential Comprehensive Plan designation by providing for an urban level of low-density residential development. It is to be used as a transition between the Single Family Residential zone and the higher densities of a village. The uses are to be fully serviced by public facilities. This zone is intended to provide walkable neighborhoods with excellent linkage between residential areas, schools, parks, and village commercial. This zone is one of four zones included in a village area and is designed as a mixed-use neighborhood with a range of housing types and accessible commercial areas. Density shall not be less than 5 or more than 8 units per net acre.

Response: *As detailed in Chapter 17.30 above, the four lots (Lots 1 - 4) proposed to contain R-1 zoning fall within the density range (2 - 5 units) for this area. As noted below, either a single family dwelling or duplex are permitted on this lots.*

17.36.10 - PERMITTED USES

A. Primary Uses Permitted Outright:

- 1. Single detached dwelling subject to design standards in Chapter 17.90;

Response: *The applicant proposes constructing either single-family detached dwellings or duplexes on this lots as permitted.*

17.36.30 - DEVELOPMENT STANDARDS

Type	Standard	Proposed
A. Minimum Lot Area - Single detached dwelling - Other permitted uses	5,500 square ft. Minimum No minimum	Lot 1 - 5,708 s.f. Lot 2 - 5,791 s.f. Lot 3 - 7,389 s.f. Lot 4 - 6,671 s.f.
B. Minimum Average Lot Width - Single detached dwelling - Other permitted uses (no min.)	50 ft	Complies

C. Minimum Lot Frontage	20 ft. except as allowed by Section 17.100.160	<i>Complies.</i>
D. Minimum Average Lot Depth	No minimum	<i>Complies</i>
E. Setbacks (Main Building) Front yard Rear yard Side yard (interior) Corner Lot Garage	10 ft. minimum 15 ft. minimum 5 ft. minimum 10 ft. minimum on side abutting the street 22 ft. minimum for front vehicle access 15 ft. minimum if entrance is perpendicular to the street (subject to Section 17.90.220)	<i>All lots are capable of complying with setbacks. Setbacks will be confirmed with submittal of building permits.</i>
F. Projections into Required Setbacks	See Chapter 17.74	<i>No projections are proposed at this time.</i>
G. Accessory Structures in Required Setbacks	See Chapter 17.74	<i>No accessory structures are proposed at this time.</i>
H. Structure Height	35 ft. maximum	<i>To be determined.</i>
I. Building Site Coverage	No minimum	<i>Complies</i>
J. Off-Street Parking	See Chapter 17.98	<i>See Chapter 17.98.</i>

Response: As shown on the plan set, all lots in the proposed subdivision contain at least 5,500 square feet, have at least 20 feet of street frontage, and contain an average lot width of at least 50 feet as required. Lot 4 fronts Dubarko Road and will be accessed from Street A across an easement on Lot 3. All lots are capable of complying with applicable setbacks in the zone. All development standards will be reviewed with submittal of building permits. Compliance with required off-street parking has been shown and is reviewed in Chapter 17.98 below.

17.36.40 - MINIMUM REQUIREMENTS

A. Must connect to municipal water.

Response: The applicant proposes extending water service to serve all dwellings in the new subdivision.

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: All proposed units will be connected to sanitary sewer service.

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: *All lots contain frontage on a public street and all lots will gain access directly from a public street with the exception of Lot 4 which fronts Dubarko Road but will gain access across an easement on Lot 3 fronting Fawn Street (Street A).*

17.36.50 - ADDITIONAL REQUIREMENTS

A. Design review as specified in Chapter 17.90 is required for all uses.

Response: *Only Section 17.90.150, Residential Design Standards of Chapter 17.90 is applicable to residential developments. This section is reviewed below.*

B. Lots with 40 feet or less of street frontage shall be accessed by a rear alley or a shared private driveway.

Response: *All lots contain at least 40 feet of street frontage.*

CHAPTER 17.38 - MEDIUM DENSITY RESIDENTIAL (R-2)

17.38.00 - INTENT

This district is intended to implement the Medium Density Residential Comprehensive Plan designation by providing for medium density single-family and multi-family uses in suitable locations, where public sewer, water, and other services are readily accessible. All development shall also provide access to the surrounding neighborhood with excellent linkage between residential areas, schools, and parks. Density shall not be less than eight or more than 14 units per net acre.

Response: *As detailed in Section 17.30 above, the applicant proposes one lot (Lot 5) to be zoned R-2 allowing a maximum of 17 dwelling units. The exact number of units will be determined with a future design review application.*

17.38.10 - PERMITTED USES

A. Primary Uses Permitted Outright:

6. Multi-family dwellings

Response: *The applicant proposes constructing multi-family dwellings on this lot as permitted in this zoning district.*

17.38.30 - DEVELOPMENT STANDARDS

Response: *The details of this section will be addressed with a design review application for the proposed multi-family dwelling project.*

17.38.40 - MINIMUM REQUIREMENTS

A. Must connect to municipal water.

Response: *The applicant proposes extending water service to serve all dwellings.*

B. Must connect to municipal sewer.

Response: *The applicant proposes extending water service to serve all dwellings.*

- 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 lot will be served by construction of a new public street. Units constructed on the lots will be served by a private driveway and parking lot.*

17.38.50 - ADDITIONAL REQUIREMENTS

- A. Design review as specified in Chapter 17.90 is required for all uses.

Response: *The requirements of Section 17.90.160, Additional Requirements - Multi-family Development Standards will be addressed as part of a future design review application.*

- B. Lots with 40 feet or less of street frontage shall be accessed by a rear alley or a shared private driveway.

Response: *No lots contain less than 40 feet of street frontage.*

- C. Zero Lot Line Dwellings: Prior to building permit approval, the applicant shall submit a recorded easement between the subject property and the abutting lot next to the yard having the zero setback. This easement shall be sufficient to guarantee rights for maintenance purposes of structures and yard, but in no case shall it be less than 5 feet in width.

Response: *No zero lot dwellings are proposed.*

CHAPTER 17.40 - HIGH DENSITY RESIDENTIAL (R-3)

17.40.00 - INTENT

This district is intended to implement the High Density Residential Comprehensive Plan designation by providing for housing in close proximity to retail, public amenities; major transportation routes and transit services where public sewer, water and other services are readily accessible. R-3 uses are designed to be a transition area between commercial and industrial uses and low density single family uses. Pedestrian connections are required to ensure a direct walking route to retail shops. All development shall also provide access to the surrounding neighborhood with excellent linkage between residential areas, schools, parks, and commercial. Density shall not be less than 10 or more than 20 units per net acre.

Response: *As detailed in Section 17.30 above, the applicant proposes one lot (Lot 6) zoned R-3 allowing a maximum of 30 dwelling units. The exact number of units will be determined with a future design review application.*

17.40.10 - PERMITTED USES

- A. Primary Uses Permitted Outright:

6. Multi-family dwellings

Response: *The applicant proposes constructing multi-family dwellings as permitted in this zoning district.*

17.40.30 - DEVELOPMENT STANDARDS

Response: The details of this section will be addressed with a design review application for the proposed multi-family dwelling project.

17.40.40 - MINIMUM REQUIREMENTS

A. Must connect to municipal water.

Response: The applicant proposes extending water service to serve all dwellings.

B. Must connect to municipal sewer.

Response: The applicant proposes extending water service to serve all dwellings.

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 lot will be served by construction of a new public street. Units constructed on the lots will be served by a private driveway and parking lot.

17.40.50 - ADDITIONAL REQUIREMENTS

A. Design review as specified in Chapter 17.90 is required for all uses.

Response: The requirements of Section 17.90.160, Additional Requirements - Multi-family Development Standards will be addressed as part of a future design review application.

B. Lots with 40 feet or less of street frontage shall be accessed by a rear alley or a shared private driveway.

Response: No lots contain less than 40 feet of street frontage.

C. Zero Lot Line Dwellings: Prior to building permit approval, the applicant shall submit a recorded easement between the subject property and the abutting lot next to the yard having the zero setback. This easement shall be sufficient to guarantee rights for maintenance purposes of structures and yard, but in no case shall it be less than 5 feet in width.

Response: No zero lot dwellings are proposed.

CHAPTER 17.46 - VILLAGE COMMERCIAL (C-3)

17.46.00 - INTENT

The intent of the village commercial district is primarily oriented to serve residents of the village and the immediately surrounding residential area. The Village Commercial area is intended to help form the core of the villages. Allowing a mixture of residential uses beside and/or above commercial uses will help create a mixed-use environment, which integrates uses harmoniously and increases the intensity of activity in the area. The orientation of the uses should integrate pedestrian access and provide linkages to adjacent residential areas, plazas and/or parks, and amenities.

Response: As shown on submitted plan one lot (Lot 7) is proposed to be zoned C-3.

17.46.10 - PERMITTED USES

A. Primary Uses Permitted Outright—Residential

2. Multi-family dwellings above, beside or behind a commercial business.

Response: The applicant intends to construct a combination of multi-family dwellings and a commercial business or commercial only as allowed by this section. The exact unit count and the proposed commercial use will be determined at a later date.

17.46.30 - DEVELOPMENT STANDARDS

Response: The details of this section will be addressed with a subsequent design review application .

CHAPTER 17.56 - HILLSIDE DEVELOPMENT

17.56.10 APPLICABILITY

These regulations shall apply to any parcel with slopes greater than twenty-five percent (25%) as shown on the Hillside Development Overlay District Map or with slope hazards mapped by the Department of Geology and Mineral Industries (DOGAMI). This chapter shall apply only to activities and uses that require a building, grading, tree removal and/or land use permit.

Response: As shown on the slope analysis submitted with the plan set, the site contains a small area of slopes exceeding 25 percent. A Geotechnical and Slope Stability Investigation is included with the submittal.

CHAPTER 17.80 - ADDITIONAL SETBACKS ON COLLECTOR AND ARTERIAL STREETS

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: The City's Transportation System Plan identifies Dubarko Road through the subject property as a "Minor Arterial" street, Highway 26 a "Major Arterial", and Street B ("New" street) terminating to tax lot 900 a "Collector Street". The Preliminary Plat shows a 20 foot setback for all lots adjacent to Dubarko Road and Street B. The requirements of this section will be confirmed with submittal of a design review application to construct the proposed dwellings and building permits on these lots.

CHAPTER 17.82 - SPECIAL SETBACKS ON TRANSIT STREETS

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: Lots 3 - 7 of the proposed subdivision are located adjacent to Dubarko Road, a transit street. Lots 3 and 4 will be zoned R-1, Lot 5 will be zoned R2, Lot 6 will be zoned R-3, and Lot 7 will be zoned C-3. The requirements of this chapter will be addressed with the design review application for the dwellings on Lots 5 - 7 as applicable.

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: Lot 4 will be accessed by an easement across Lot 3 and will be designed in accordance with this standard. Lot 3 will be located at the corner of Dubarko Drive and a new local street. The dwelling on this lot can be designed in compliance with this standard as required.

- 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 dwellings on Lots 3 and 4 will be designed in accordance with this standard. The future dwellings on Lots 5 - 6 and future development on Lot 7 will address this requirement as part of the design review application for these lots.

- C. Primary dwelling entrances shall be architecturally emphasized and visible from the street and shall include a covered porch at least 5 feet in depth.

Response: The dwellings on Lots 3 and 4 will be designed in accordance with this standard. The multi-family dwellings on Lots 5 - 6 and future development on Lot 7 will address this requirement during design review.

- 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: It is unclear if Highway 26 is identified as a transit street adjacent to the site. If Highway 26 is considered a transit street, Lots 6 will contain frontage on both Dubarko Road and Highway 26 and Lot 7 will contain frontage on Highway 26, Dubarko Road, and Street B ("New Street"). The details of this design will be determined with the future design review application for these lots.

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 subdivision are required to install public and franchise utility improvements 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 applicant does not propose constructing the subdivision in phases.*

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 proposed sidewalks on local streets will be five feet wide as required and separated from curbs by a tree planting area.*

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, six-foot sidewalks are proposed to be constructed along Highway 26, Dubarko Road north of Street B and on Street B. These frontages will include a planter strip as required.*

3. Sidewalk improvements shall be made according to city standards, unless the city determines that the public benefit in the particular case does not warrant imposing a severe adverse impact to a natural or other significant feature such as requiring removal of a mature tree, requiring undue grading, or requiring modification to an existing building. Any exceptions to the standards shall generally be in the following order.

- a) Narrow landscape strips
- b) Narrow sidewalk or portion of sidewalk to no less than 4 feet in width
- c) Eliminate landscape strips
- d) Narrow on-street improvements by eliminating on-street parking
- e) Eliminate sidewalks

Response: *As shown on submitted plans, the applicant proposes constructing the sidewalk along Dubarko Road from Street B to Highway 26 five feet rather than six feet due to the increased median width along this section.*

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 sidewalks along Highway 26, Dubarko Road and Street B will be constructed prior to final plat approval, or at the time of home construction whichever the city prefers. Sidewalks along Street A 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: *No pedestrian or bicycle facilities other than sidewalks and on-street bicycle lanes have been identified or are proposed.*

- 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: *As noted above, no facilities are proposed.*

- 3. 12 feet wide pathways shall be provided in areas with high bicycle volumes or multiple use by bicyclists, pedestrians, and joggers.

Response: *No facilities of this type are proposed with the subdivision.*

- 4. Pathways and sidewalks shall be encouraged in new developments by clustering buildings or constructing convenient pedestrian ways. Pedestrian walkways shall be provided in accordance with the following standards:

- a) The pedestrian circulation system shall be at least five feet in width and shall connect the sidewalk on each abutting street to the main entrance of the primary structure on the site to minimize out of direction pedestrian travel.
- b) Walkways at least five feet in width shall be provided to connect the pedestrian circulation system with existing or planned pedestrian facilities which abut the site but are not adjacent to the streets abutting the site.
- c) Walkways shall be as direct as possible and avoid unnecessary meandering.

Response: *No pedestrian pathways are proposed, only sidewalks adjacent to public streets.*

- 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: *The requirements of these sections are not applicable to the proposed subdivision.*

- C. Where a development site is traversed by or adjacent to a future trail linkage identified within the Transportation System Plan, improvement of the trail linkage shall occur concurrent with development. Dedication of the trail to the City shall be provided in accordance with 17.84.80.

Response: *No trails are identified in the City's Transportation System Plan or Parks Master Plan on the subject property and none are proposed.*

- 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: *No pedestrian facilities, except sidewalks are proposed.*

- 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 subject property is located along Dubarko Road, a future transit street. During the pre-application conference for the project the city Transit*

Manager identified two required transit amenities. These facilities are shown on the plan set.

- 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 subdivision complies with the requirements of this section.*

17.84.50 - STREET REQUIREMENTS

- A. Traffic evaluations may be required of all development proposals in accordance with the following:
 - 1. A proposal establishing the scope of the traffic evaluation shall be submitted for review to the City Engineer. The evaluation requirements shall reflect the magnitude of the project in accordance with accepted traffic engineering practices. Large projects should assess all nearby key intersections. Once the scope of the traffic evaluation has been approved, the applicant shall present the results with and an overall site development proposal. If required by the City Engineer, such evaluations shall be signed by a Licensed Professional Civil Engineer or Licensed Professional Traffic Engineer licensed in the State of Oregon.
 - 2. If the traffic evaluation identifies level-of-service conditions less than the minimum standard established in the Transportation System Plan, improvements and funding strategies mitigating the problem shall be considered concurrent with a development proposal.

Response: *A Traffic Impact Study is included with this application as requested by the City and ODOT. This study does not identify any required mitigation.*

- B. Location of new arterial streets shall conform to the Transportation System Plan in accordance with the following:
 - 1. Arterial streets should generally be spaced in one-mile intervals.
 - 2. Traffic signals should generally not be spaced closer than 1500 ft. for reasonable traffic progression.

Response: *The extension of Dubarko Road is classified as a minor arterial street. This street has been designed in accordance with this standard as applicable. The applicant understands improvement of this street is eligible for SDC credits.*

- C. Local streets shall be designed to discourage through traffic. NOTE: for the purposes of this section, “through traffic” means the traffic traveling through an area that does not have a local origination or destination. To discourage through traffic and excessive vehicle speeds the following street design characteristics shall be considered, as well as other designs intended to discourage traffic:

1. Straight segments of local streets should be kept to less than a quarter mile in length. As practical, local streets should include traffic calming features, and design features such as curves and “T” intersections while maintaining pedestrian connectivity.
2. Local streets should typically intersect in “T” configurations rather than 4-way intersections to minimize conflicts and discourage through traffic. Adjacent “T” intersections shall maintain a minimum of 150 ft. between the nearest edges of the 2 rights-of-way.

Response: *The proposed subdivision does not include any long straight street segments. All streets have been designed in accordance with the requirements of these sections.*

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-sac streets are proposed.*

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

1. Where a development site abuts an existing public street not improved to City standards, the abutting street shall be improved to City standards along the full frontage of the property concurrent with development.

Response: *All single-family homes will gain direct access from a public street improved to city standards with the exception of Lot 4 which will be accessed across an easement on Lot 3.*

2. Half-street improvements are considered the minimum required improvement. Three quarter-street or full-street improvements shall be required where traffic volumes generated by the development are such that a half-street improvement would cause safety and/or capacity problems. Such a determination shall be made by the City Engineer.

Response: *All new streets are proposed as full street improvements with the exception of improvements along Highway 26.*

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: *All streets are proposed as full streets. 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: *The applicant intends to complete frontage improvements along the Highway 26 frontage as required. No 1/2 streets are proposed.*

E. As necessary to provide for orderly development of adjacent properties, public streets installed concurrent with development of a site shall be extended through the site to the edge of the adjacent property(ies) in accordance with the following:

1. Temporary dead-ends created by this requirement to extend street improvements to the edge of adjacent properties may be installed without turn-arounds, subject to the approval of the Fire Marshal.

2. In order to assure the eventual continuation or completion of the street, reserve strips may be required.

Response: *The proposed street layout results in one temporary dead-end street (Street B. "New Street") that will be stubbed to the southern property line of the subject property. The applicant is aware the Fire Marshal will need to review the proposal. In addition, the applicant is aware that reserve strips will likely be required at the end of this street.*

F. Where required by the Planning Commission or Director, public street improvements may be required through a development site to provide for the logical extension of an existing street network or to connect a site with a nearby neighborhood activity center, such as a school or park. Where this creates a land division incidental to the development, a land partition shall be completed concurrent with the development.

Response: *The applicant does not anticipate any public street improvements will be required to be extended beyond the site boundaries. No such improvements were identified at the pre-application conference.*

G. Except for extensions of existing streets, no street names shall be used that will duplicate or be confused with names of existing streets. Street names and numbers shall conform to the established pattern in the surrounding area and be subject to approval of the Director.

Response: *The proposal contains only three street segments: Dubarko Road, an extension of Fawn Street to intersect with Dubarko Road, and Street B ("New Street") from Dubarko Road to the southern property line of the subject property. The City will need to determine if Street A will be named Fawn Street or a different name and the name for Street B.*

H. Location, grades, alignment, and widths for all public streets shall be considered in relation to existing and planned streets, topographical conditions, public convenience and safety, and proposed land use. Where topographical conditions present special circumstances, exceptions to these standards may be granted by the City Engineer

provided the safety and capacity of the street network is not adversely affected. The following standards shall apply:

1. Location of streets in a development shall not preclude development of adjacent properties. Streets shall conform to planned street extensions identified in the Transportation Plan and/or provide for continuation of the existing street network in the surrounding area.

Response: *A future street plan is included with this application as part of the plan set. This plan demonstrates that the proposal does not preclude development on adjacent properties. Both Dubarko Road and Street B (“New Street”) are identified on the TSP and proposed to be constructed with this development.*

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

Response: *Dubarko, a minor arterial is designed to have a grade of 2% to 6%, Street B (“New Street”) a grade of 2% to 10%, and the extension of Fawn Street, a local street will have a grade of 1% to 7%. All streets comply with the standards in this section.*

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: *Dubarko Road, a minor arterial, will be extended by a continuation of the centerline of this existing street. Street B (“New Road”) is not an extension of an existing street except that it will align with the extension of Fawn Street (Street A).*

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: *Dubarko Road, a minor arterial is designed with a centerline radii of 500 feet, Street B, a collector with 300 feet, and the extension of Fawn Street will have a centerline radii of 100 feet in compliance with this standard.*

5. Streets shall be designed to intersect at angles as near as practicable to right angles and shall comply with the following:

- a) The intersection of an arterial or collector street with another arterial or collector street shall have a minimum of 100 ft. of straight (tangent) alignment perpendicular to the intersection.

Response: *The proposed tangent length from the projected curb line is proposed to be 75 feet on Street B. The applicant requests approval of this design.*

- b) The intersection of a local street with another street shall have a minimum of 50 ft. of straight (tangent) alignment perpendicular to the intersection.

- c) Where right angle intersections are not possible, exceptions can be granted by the City Engineer provided that intersections not at right angles have a minimum corner radius of 20 ft. along the right-of-way lines of the acute angle.
- d) Intersections with arterial streets shall have a minimum curb corner radius of 20 ft. All other intersections shall have a minimum curb corner radius of 10 ft.
Response: *All proposed streets are designed to intersect at right angles with the intersecting street and comply with the requirements of this section.*

- 6. Right-of-way and improvement widths shall be as specified by the Transportation System Plan. Exceptions to those specifications may be approved by the City Engineer to deal with specific unique physical constraints of the site.
Response: *The proposed right-of-way width of Dubarko Road is 76 feet, Street B ("New Street") is 60 feet, and the extension of Fawn Street is proposed at 50 feet in compliance this standard.*

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

17.84.60 - PUBLIC FACILITY EXTENSIONS

- A. All development sites shall be provided with public water, sanitary sewer, broadband (fiber), and storm drainage.
Response: *The submitted Utility Plan shows the location of proposed public water, sanitary sewer, and stormwater drainage facilities. Broadband fiber service will be detailed 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 Master Street and 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: A private sanitary sewer and stormwater drainage connection is proposed to serve Lot 7. All other utilities 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 subdivision 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 will determine if the installation of cable television service is 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, as such this section is not applicable. With the future review of the proposed multi-family units, this section will be applicable.

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

- F. The developer shall be responsible for making necessary arrangements with franchise utility providers for provision of plans, timing of installation, and payment for services installed. Plans for franchise utility installations shall be submitted concurrent with plan submittal for public improvements to facilitate review by the City Engineer.
Response: *The developer will make all 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 majority of public facilities will be located within public rights-of-way including the existing waterline that will be contained within the Dubarko Road right-of-way.*

- B. Public utility easements with a minimum width of 5 feet shall be provided adjacent to all street rights-of-way for franchise utility installations.

Response: *Despite the language in this section, eight foot wide public utility easements will be provided along all lots adjacent to street rights-of-way for future franchise utility installations.*

- C. Where a development site is traversed by a drainageway or water course, a drainage way dedication shall be provided to the City.

Response: *The site is not traversed by a drainage way or water course and this section is not applicable.*

- 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 trail is identified in the TSP on subject property and none are proposed.*

- E. Where existing rights-of-way and/or easements within or adjacent to development sites are nonexistent or of insufficient width, dedications may be required. The need for and widths of those dedications shall be determined by the City Engineer.

Response: *The only existing right-of-way adjacent to the development is Highway 26. No additional right-of-way dedication along this street has 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 easements and dedications will be identified on the plat as required.*

17.84.100 - MAIL DELIVERY FACILITIES

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

CHAPTER 17.86 - PARKLAND and OPEN SPACE

17.86.00 - INTENT

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

Response: *The city's Parks Master Plan and Comprehensive Plan map show a neighborhood park located on the subject property. The applicant proposes dedicating 1.755 acres parkland with this application.*

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: *A subdivision to contain single family detached or duplexes and multi-family dwellings is proposed. The applicant proposes dedicating 1.755 acres of parkland with this application.*

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 seven-lot subdivision includes four lots for single-family dwellings or duplexes and the two lots for multi-family dwellings. An additional lot is proposed to be zoned C-3. As noted above, the applicant is proposing a cap of 200 dwelling units for the property to include a maximum of 8 duplex units and 192 multi-family units.*

As such, the proposal results in the following formulas: 1) Lots 1 - 4: 8 (duplex units) x 3 (persons/unit) x 0.0043 (per person park land dedication factor) = 0.1032 acres rounded to 0.10 acres, and 2) 3 lots (Lots 5 - 7) to contain 192 multi-family units: 192 (proposed multi-family units) x 2 (persons/unit) x 0.0043 (per person park land dedication factor) = 1.6512 acres rounded to 1.65 acres. 3) The combined total required parkland dedication is 1.75 acres (0.10 + 1.65). As shown on submitted plans, the applicant proposes dedicating 1.755 acres of parkland, exceeding the minimum parkland dedication required by this section by 0.005 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:

1. Homes must front on the parkland as shown in the example below:

Response: *The diagram in this section shows the preferred relationship of parkland to single family residential dwellings with homes fronting the park. The proposed parkland dedication with this application expands parkland dedicated previously*

dedicated with the Deer Pointe 2 Subdivision. With this configuration the entire park after dedication with the current application will be bordered on its western border by Meadow Avenue with homes across the street, on the South by an extension of Fawn Street, on the North by Highway 26, and on the East by Lot 7 zoned C-3, Village Commercial. The details of the development of Lot 7 are only conceptual at this time and will be determined following a pre-application conference and approval of a design review application at a later date.

2. The required dedication shall be contained as a contiguous unit and not separated into pieces or divided by roadways.

Response: *The proposed 1.755 acre parkland dedication will be contiguous to 1.4 acres of parkland previously dedicated as part of the Deer Point 2 Subdivision.*

3. The parkland must be able to accommodate play structures, play fields, picnic areas, or other active park use facilities. The average slope of the active use parkland shall not exceed 15%.

Response: *The majority of the proposed parkland contains slopes less than 15 percent as required. As shown on submitted plans, a small area of the proposed park currently exists exceeding this grade and could either be regraded or left in a natural condition in order to provide visual interest or an additional amenity. The subject property is able to accommodate a variety of amenities including those listed in this section. The city's Master Plan for this park will determine appropriate amenities for this park.*

4. Any retaining wall constructed at the perimeter of the park adjacent to a public right-of-way or private street shall not exceed 4 feet in height.

Response: *No retaining walls are proposed.*

5. Once dedicated, the City will assume maintenance responsibility for the neighborhood or mini parkland.

Response: *The applicant understands the City will assume maintenance responsibility once the land is dedicated.*

17.86.30 DEDICATION PROCEDURES

Prior to approval of the final plat, the developer shall dedicate the land as previously determined by the City in conjunction with approval of the tentative plat. Dedication of land in conjunction with multi-family development shall be required prior to issuance of permits and commencement of construction.

A. 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,

Response: *The applicant understands he will be required to clear, grade, and seed the proposed parkland as desired by the City.*

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.

Response: The applicant understands submittal of a Phase I Environmental Assessment will be required prior to the City accepting the parkland dedication.

B. Additional Requirements

1. In addition to a formal dedication on the plat to be recorded, the subdivider shall convey the required lands to the city by general warranty deed. The developer of a multi-family development or manufactured home park shall deed the lands required to be dedicated by a general warranty deed. In any of the above situations, the land so dedicated and deeded shall not be subject to any reservations of record, encumbrances of any kind or easements which, in the opinion of the Director, will interfere with the use of the land for park, open space or recreational purposes.

The subdivider or developer shall be required to present to the City a title insurance policy on the subject property ensuring the marketable state of the title.

Response: The applicant understands this requirement.

2. Where any reservations, encumbrances or easements exist, the City may require payment in lieu of the dedication of lands unless it chooses to accept the land subject to encumbrances.

Response: The applicant proposes including two utility easements within the proposed parkland dedication. These easements are unavoidable given the location of existing utilities.

17.86.40 - CASH IN LIEU OF DEDICATION

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

Response: The applicant proposes dedicating 1.755 acres of parkland with this application rather than paying a fee in lieu. This area exceeds the required dedication calculated in Section 17.86.10(2) above by 0.005 acres.

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: The requirements of this section do not apply to residential subdivisions per the Planning Commission's Code Interpretation as part of the Jacoby Heights Subdivision (File No. 18-025 SUB/VAR/FSH/TREE/INT). Tree retention requirements are contained in Chapter 17.102, Urban Forestry and are reviewed below. The proposed tree plan proposes to retain more than the minimum required by this chapter.

17.92.20 - MINIMUM IMPROVEMENTS - LANDSCAPING AND SCREENING

Response: The Single Family Residential zone is not listed in this section requiring minimum landscaping. The details of this section will be considered with submittal of a design review application for the proposed multi-family units to be zoned R-2, Medium Density Residential, R-3, High Density Residential, and C-3 portions of the property.

CHAPTER 17.98 - PARKING, LOADING, AND ACCESS REQUIREMENTS

17.98.10 - GENERAL PROVISIONS

- M. Residential Parking Analysis Plan. A Residential Parking Analysis Plan shall be required for all new residential planned developments, subdivisions, and partitions to include a site plan depicting all of the following:
 - a. Location and dimension of required parking spaces as specified in Section 17.98.200.
 - b. Location of areas where parking is not permitted as specified in Sections 17.98.200(A)(3) and (5).
 - c. Location and design of parking courts (if applicable).

Response: A Residential Parking Analysis Plan identifying the location of parking for the four R-1 lots as required by this section is included with the plan set. The details of this analysis is discussed in Section 17.98.200 below.

17.98.20 - OFF-STREET PARKING REQUIREMENTS

- A. Off Street Parking Requirements. Off street parking shall conform to the following standards:
1. All square footage measurements are gross square feet of total floor area.
 2. 18 lineal inches of bench shall be considered 1 seat.
 3. Except as otherwise specified, parking for employees shall be provided based on 1 space per 2 employees for the largest shift in addition to required parking specified in Sections A6-A9 below.
 4. Where less than 5 parking spaces are required, then only one bicycle space shall be required except as otherwise modified in Sections 5-9 below.
 5. In addition to requirements for residential off street parking, new dwellings shall meet the on-street parking requirements in Section 17.98.200.

Response: Each single-family dwelling or duplex are required to provide at least two off-street parking spaces. All lots are designed to ensure compliance with this standard and will be evaluated during building plan review. Parking for the proposed multi-family units will be evaluated as part of a future design review application.

17.98.60 - DESIGN, SIZE AND ACCESS

All off-street parking facilities, vehicular maneuvering areas, driveways, loading facilities, accessways, and private streets shall conform to the standards set forth in this section.

Response: The details of this section will be evaluated with submittal of the design review application for the multi-family units.

17.98.80 - ACCESS TO ARTERIAL AND COLLECTOR STREETS

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

17.98.90 - ACCESS TO UNIMPROVED STREETS

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

17.98.100 - DRIVEWAYS

- A. A driveway to an off-street parking area shall be improved from the public roadway to the parking area a minimum width of 20 feet for a two-way drive or 12 feet for a one-way drive but in either case not less than the full width of the standard approach for the first 20 feet of the driveway.

Response: Lots 5 and 6 to contain multi-family units will be accessed by a 26 foot wide curb cut and driveway approach.

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

Response: All single family lots will have a 12-foot wide curb cut and driveway approach. This reduction from the typical standard width is proposed to accommodate additional on-street parking.

- 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: *None of the lots will be developed with two-family dwellings and this section is not applicable.*

- D. Driveways, aisles, turnaround areas and ramps shall have a minimum vertical clearance of twelve feet for their entire length and width but such clearance may be reduced in parking structures.

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

- E. No driveway shall traverse a slope in excess of 15 percent at any point along the driveway length.

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

- F. The location and design of the driveway shall provide for unobstructed sight per the vision clearance requirements. Requests for exceptions to these requirements will be evaluated by the City Engineer considering the physical limitations of the lot and safety impacts to vehicular, bicycle, and pedestrian traffic.

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

17.98.110 - VISION CLEARANCE

- A. Except within the Central Business District, vision clearance areas shall be provided at intersections of all streets and at intersections of driveways and alleys with streets to promote pedestrian, bicycle, and vehicular safety. The extent of vision clearance to be provided shall be determined from standards in Chapter 17.74 and taking into account functional classification of the streets involved, type of traffic control present at the intersection, and designated speed for the streets.

Response: *The subject property will contain R-1, R-2, R-3, and C-3 zoning requiring compliance with this section. The requirements of this section will be considered in placing landscaping in these areas with construction of homes and will be evaluated with future design review applications.*

- 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: *This section is only applicable to the portion of the property zoned R-1. A Residential On-Street Parking Analysis designed in compliance with the requirements of this section is included with the application package. One on-street parking space at least 22 feet in length has been identified within 200 feet of each of the 4 lots as required. This analysis shows 20 on-street parking spaces in compliance 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 proposed subdivision preliminary plat complies with all applicable code requirements to be processed as a Type II application. However, because the application also includes Type IV applications for a Specific Area Plan, Comprehensive Plan Map Amendment, and Zoning Map amendment, the entire application will be processed under the Type IV quasi-judicial procedure.*

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: *As defined by this section the seven-lot land division is considered a 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: *Pre-application conferences were held with the City on January 10, 2018, June 12, 2018, and October 10, 2018.*

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

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

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

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

Response: *As reviewed in the narrative above, the proposed subdivision is consistent with the density, setback, and dimensional standards in the R-1, R-2, R-3, and C-3 zoning districts. The details of the development on Lots 5 - 7 will be addressed with future design review applications.*

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

Response: *As detailed in this narrative, the proposal complies with the design standards of this chapter.*

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

Response: *As illustrated on the submitted Future Street Plan, the proposed street system is consistent with the City's Transportation System Plan and Comprehensive Plan.*

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

Response: *The City has previously indicated that all public facilities have capacity to serve the proposed subdivision.*

5. All proposed improvements meet City standards.

Response: *As reviewed in this narrative, all improvements in the proposed development are designed in compliance with City standards.*

6. The phasing plan, if requested, can be carried out in a manner that meets the objectives of the above criteria and provides necessary public improvements for each phase as it develops.

Response: *The applicant proposes developing the subdivision in a single phase. The applicant intends to submit design review applications for development proposed on Lots 5 - 7 at a later date.*

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: As reviewed in this narrative, the subject property is suitable for development as proposed. The site does not contain any physical constraints or utility concerns that would make it unsuitable for the proposed subdivision. The proposal is not expected to degrade the performance of any existing or planned transportation facilities and no mitigation is necessary or recommended.

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 abuts Highway 26 and notification of the proposal will be sent to ODOT. The applicant's traffic consultant coordinated with ODOT and the City's traffic consultant prior to the preparation of the traffic impact study submitted with this application. The proposal does not include direct access to Highway 26 with the exception of the Dubarko Road intersection, a planned public road.

17.100.100 - STREETS GENERALLY

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

1. A proposal established with the scope of the transportation impact study shall be coordinated with, and agreed to, by the city engineer. The study requirements shall reflect the magnitude of the project in accordance with accepted transportation planning and engineering practices. A professional civil or traffic engineer registered in the State of Oregon shall prepare such studies.
2. If the study identifies level-of-service conditions less than the minimum standards established in the Sandy Transportation System Plan, improvements and funding strategies mitigating the problem shall be considered as part of the land use decision for the proposal.

Response: A traffic impact study prepared in compliance with city standards is included with the application package. With the exception of a revised striping plan and frontage improvements along the Highway 26 frontage, this study does not identify any issues requiring mitigation by the applicant.

- B. Topography and Arrangement. All streets shall be properly related to special traffic generators such as industries, business districts, schools, and shopping centers and to the pattern of existing and proposed land uses.

Response: None of the special traffic generators listed in this section are located near the subject property. All existing and proposed residential uses have been considered in development of the proposed street pattern. A future street plan is submitted with this application showing how streets can be extended beyond the subject property in the future.

- C. Street Spacing. Street layout shall generally use a rectangular grid pattern with modifications as appropriate to adapt to topography or natural conditions.

Response: The proposed street layout is predominately controlled by the alignment of Dubarko Road that will be extended through the site from the current terminus to connect with Highway 26 and the location of Street B (“New Street”). Both of these streets are identified in the city’s Transportation System Plan as future streets. The only other street in the subdivision is the extension of Fawn Street (Street “A”) on the property. The proposed street layout represents a logical street pattern.

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

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

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

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

Proposed streets or street extensions shall be located to provide direct access to existing or planned transit stops, and existing or planned neighborhood activity centers, such as schools, shopping areas and parks.

Response: The proposal includes a limited number of streets because of the alignment of Dubarko Road, Street B (“New Street”), and the location of Fawn Street extended into the property. Because the proposed subdivision includes two large lot multi-family development sites proposed on Lots 5 and 6 and future Village

Commercial development on Lot 7, the street network is further limited. Given these facts, the proposed street layout represents a logical design.

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: All blocks within the proposed subdivision have sufficient width to provide for two tiers of lots.

- 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: No blocks exceed 400 feet in length.

- 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: None of the blocks within the proposed subdivision 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: The preliminary plat includes eight foot wide public utility easements along all property lines abutting a public right-of-way. Because access is limited along Dubarko Drive, a shared private drive and access easement is also proposed across Lot 3 to provide access to Lot 4. In addition, a 10-foot PUE/Sidewalk easement is proposed along the Highway 26 frontage of Lot 7 and the majority of the frontage of Tract A. A Conservation Easement is proposed to be platted across the northern portion of Lot 7 to protect retained trees in this area.

17.100.140 - PUBLIC ALLEYS

Response: No alleys are proposed with this development.

17.100.150 RESIDENTIAL SHARED PRIVATE DRIVES

Response: No residential shared private drives as defined by this section are proposed. The proposal does include an access easement to provide access to both Lots 3 and 4. This drive serves only two lots as allowed and will be designed in accordance with this

section. A shared maintenance agreement will be recorded with the plat to ensure maintenance for this facility into the future.

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: No flag lots are proposed.

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: Both the extension of Fawn Street (Street A) and Street B (“New Street”) are designed to intersect at right angles to the Dubarko Road as required. In addition, Dubarko Road will intersect Highway 26 at a right angle.

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

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

17.100.190 - STREET SIGNS

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

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

17.100.200 - STREET SURFACING

Public streets, including alleys, within the development shall be improved in accordance with the requirements of the City or the standards of the Oregon State Highway

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

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

17.100.210 - STREET LIGHTING

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

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

17.100.220 - LOT DESIGN

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

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

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: *All lots in the R-1 zone comply with the minimum standards in that zone and no lots are proposed to contain more than double the minimum lot size. The R-2 and R-3 zoning districts do not contain a minimum or maximum lot size standard.*

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. As noted above, no flag lots are proposed.*

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: Lots 6 and 7 both contain frontage on Highway 26 and Dubarko Road. In addition, Lot 7 also contains frontage on Street A (Fawn Street). Because no direct access to Highway 26 is allowed, the creation of a double frontage lot 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: Lots 6 and 7 are proposed to be provided full access to Dubarko Road, a minor arterial. Lot 6 will also have access on Street B (“New Street”), a collector street, but because of the size of this lot and the number of units proposed for this lot, the applicant is proposing two access points. Lot 7 will have access on Street A, a local street and the applicant may request a full access to Dubarko Road in the future.

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 installing 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 installing sanitary sewer lines in compliance with applicable standards. All lots except Lot 7 are designed to gravity drain to the sanitary sewer line in Dubarko Road. Because Lot 7 is lower in elevation than this line, it will be served by connecting to the existing sanitary sewer line at the North end of Tract A.

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 public stormwater water quality and detention facility is proposed as Tract B to be located north of Lot 1 and south of the Fawn Street extension and Tract C, west of Lot 5. These facilities have been sized and located to accommodate the water quality and stormwater detention needs of all streets in addition to those of Lots 1 - 4. The water quality and detention needs of Lots 5 - 7 will be accommodated on each of these lots. Stormwater from Lots 5 and 6 will also be routed to flow through the facility in Tract B. After onsite detention and water quality treatment, Stormwater from Lot 7 will be piped and connected to the existing storm line in Tract A. A stormwater report is included with this application.

- B. In addition to normal drainage design and construction, provisions shall be taken to handle any drainage from preexisting subsurface drain tile. It shall be the design engineer's duty to investigate the location of drain tile and its relation to public improvements and building construction.

Response: No subsurface drain tiles are known to exist on the site.

- C. The roof and site drainage from each lot shall be discharged to either curb face outlets (if minor quantity), to a public storm drain or to a natural acceptable drainage way if adjacent to the lot.

Response: All roof and site drainage will be discharged to curb face outlets or another approved system as required.

17.100.260 - UNDERGROUND UTILITIES

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

Response: The applicant intends installing all utilities underground as required.

17.100.270 - SIDEWALKS

Sidewalks shall be installed on both sides of a public street and in any special pedestrian way within the subdivision.

Response: Sidewalks will be installed on both sides of all streets with the exception of Highway 26 which will only be improved on the frontage adjacent to the subject property.

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 existing, planned, or proposed bicycle routes are proposed with the exception of stripped bike lanes on Dubarko Road. A cross-section showing this improvement is included.

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. A Street Tree Plan is included with the submittal package.

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 preliminary Grading and Erosion Control plan provides additional details to address erosion control concerns. A separate Grading and Erosion Control Permit will be required prior to any site grading.

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 of the improvements specified in this section are required to 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 15.91 acres and the standards of this chapter are applicable to the proposed subdivision. The applicant intends removing the majority of the trees on the property to accommodate development of this subdivision. The proposed tree removal and protection plan have been designed in accordance with the standards of this chapter. As noted in a review of Chapter 17.92, Landscaping above, the Planning Commission has determined only the requirements of Chapter 17.102 are applicable to residential subdivisions.

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: An Arborist Report completed by a professional Arborist is included with the submittal package. The Arborist inventoried all trees eleven-inches and greater DBH for the portion of the property proposed to satisfy tree retention requirements (northern portion of Lot 7 and Tract A parkland) as required. This inventory and the proposed retention trees are included in the plan set. The subject property contains 15.91 acres requiring retention of 48 trees, 11 inches and greater DBH ($15.91 \times 3 = 47.73$ rounded up to 48 trees) and in good condition. Only those trees on the portion of the site proposed to be retained were inventoried because most of the trees on the site except those in the proposed tree retention areas will need to be removed to facilitate development of the project. The plans list all trees in the inventory area by number, species, condition, and whether it is proposed to be retained or removed.

The submitted plan identifies 63 trees that will be retained. All of the trees proposed for retention are at least 11-inches DBH, and in "good" condition as

identified by the Arborist. The applicant proposes protecting a majority of these trees within a Tree Protection Easement. The proposal complies with the requirements of this section.

- 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: The Arborist Report provides recommendations for protection of retained trees including identification of the recommended tree protection zone for these trees. As noted above, the applicant proposes protecting the retained trees with a Tree Protection Easement. The requirements of this section will be complied with prior to any grading or tree removal on the site.

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: No trees are proposed to be replanted at this time.

17.102.70 - VARIANCES

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

CHAPTER 15.30 - DARK SKY ORDINANCE

15.30.000 - PURPOSE

The purpose of the Sandy Dark Sky Ordinance is to regulate outdoor lighting in order to reduce or prevent light pollution. This means to the extent reasonably possible the

reduction or prevention of glare and light trespass, the conservation of energy, and promotion of safety and security. (Ord. 2002-11)

15.30.030 - EXEMPTIONS AND EXCEPTIONS

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

15.30.060 - GENERAL STANDARDS

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

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

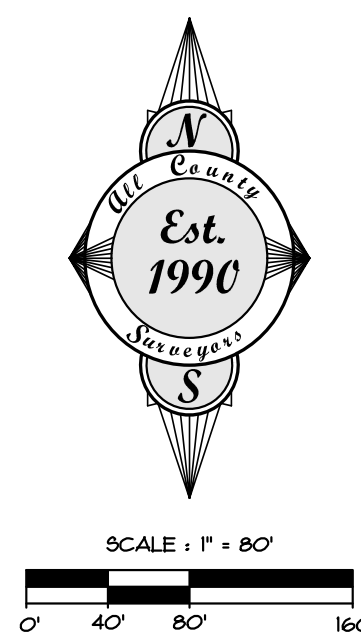
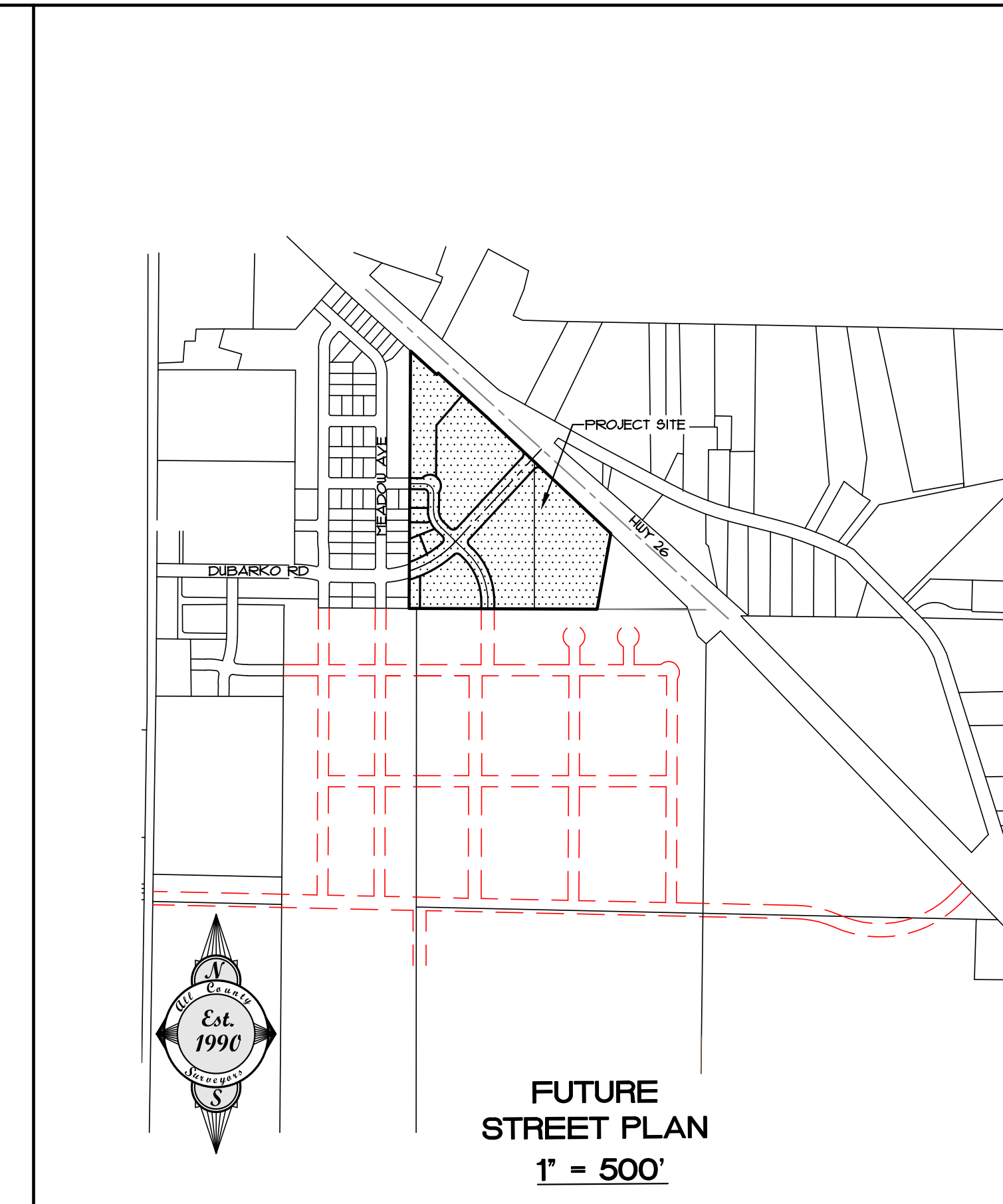
VI. Conclusion

As reviewed in the submitted narrative, the applicant requests Specific Area Plan approval to shift the zoning district boundaries for the property and a Comprehensive Plan and Map amendment to designate Tract A, a proposed park, as Parks and Open Space (POS). The proposal also includes a Zoning Map amendment to change the zoning designations on the property from a mix of C-3 (Village Commercial), R-2 (Medium Density Residential), and R-1 (Low Density Residential) to a mix of C-3 (Village Commercial), R-3 (High Density Residential), R-2, (Medium Density Residential), R-1 (Low Density Residential), and Parks and Open Space (POS).

The four R-1 zoned lots (Lots 1 - 4) are proposed to contain single-family detached dwellings or duplexes and the two R-2 and R-3 zoned lots (Lots 5 and 6) will contain multi-family dwellings. Lot 7 zoned C-3 will be developed according to the standards of that zone with either a combination of commercial and multi-family dwellings or commercial only. With this application, the applicant proposes dedicating 1.755 acres to the city to be used as a public park and imposing a dwelling cap of 200 units for the entire site. As discussed in this narrative, the proposal complies with all relevant approval criteria, code standards, policies, and goals, and the applicant respectfully requests the application be approved as submitted.

EXHIBIT C BULL RUN TERRACE

7-LOT SUBDIVISION



CLIENT
 ROLL TIDE PROPERTIES CORPORATION
 PO BOX 103
 CORNELIUS, OR 97113

SURVEYOR/ENGINEER
 ALL COUNTY SURVEYORS & PLANNERS, INC.
 PO BOX 955
 SANDY, OR 97055

PLANNER
 TRACY BROWN PLANNING CONSULTANTS, LLC
 17075 FIR DR.
 SANDY, OR 97055

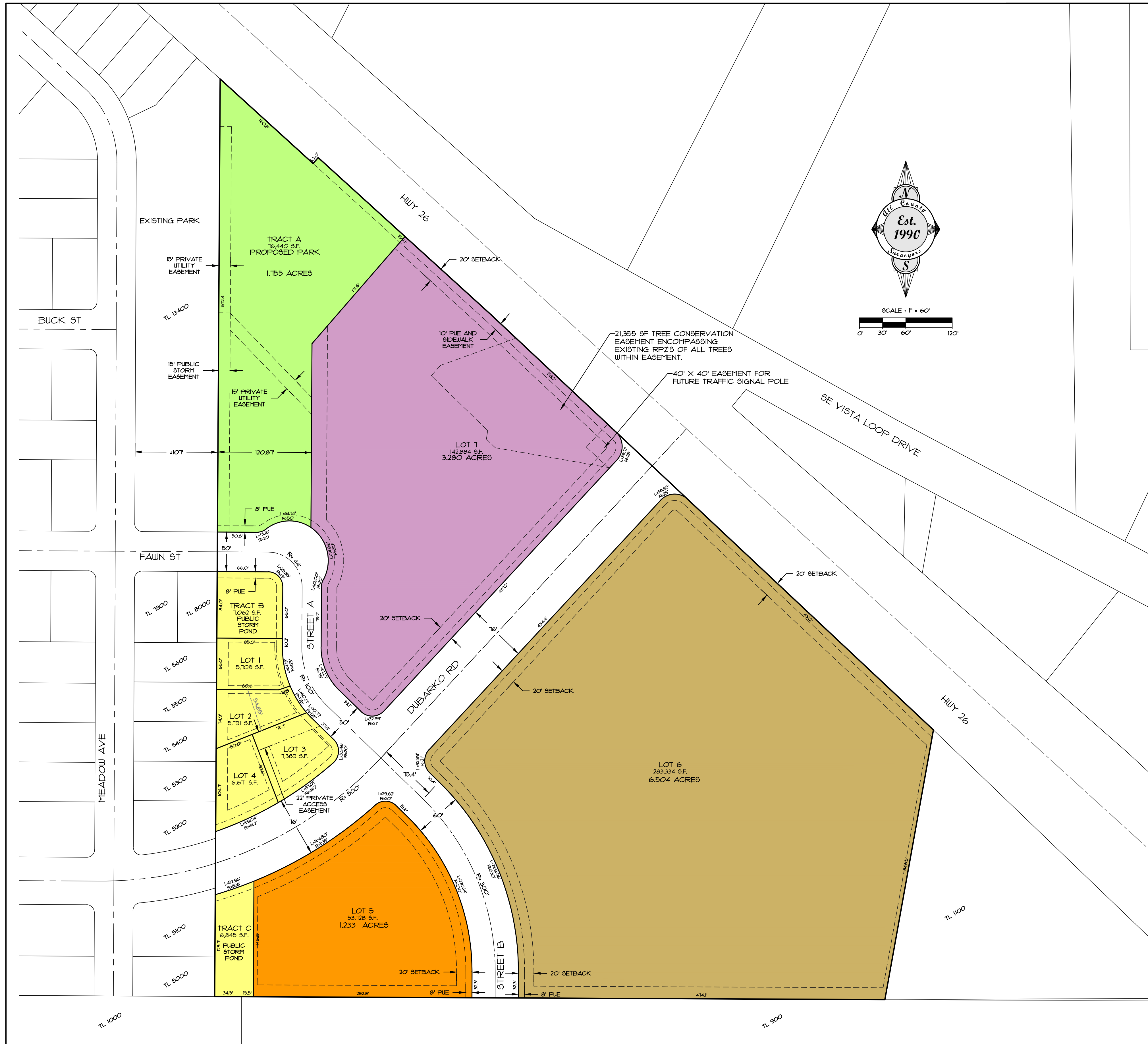
LEGEND (PROPOSED ZONING)

	PARKS AND OPEN SPACE ZONE
	R-3 ZONE
	R-1 ZONE
	C-3 ZONE

SHEET INDEX

- COVER SHEET & FUTURE STREET PLAN
- PRELIMINARY PLAT MAP AND SPECIFIC AREA PLAN
- EXISTING CONDITIONS AND TREE RETENTION PLAN
- TREE TABLES
- MASTER STREET & UTILITY PLAN
- STREET SECTIONS
- PRELIMINARY STREET TREE & PARKING PLAN
- PROPOSED STRIPING PLAN
- PRELIMINARY GRADING & EROSION CONTROL PLAN
- SLOPE ANALYSIS
- CONCEPT PLAN
- NET ZONING AREA COMPARISON

	DATE: _____	NO. _____	REVISION _____	BY _____	SHEET _____
	DESIGNED: CTH	DRAWN: CTH	CHECKED: RLM	APPROVED: RLM	OF 12
VERT: N/A HORIZ: 1"=500' DATE: 07/26/2018 FILE: 19-038-Planning-LDE-Land	LEGAL SECTION: 1B TWP: 2S RANGE: 5E	PROJECT: BULL RUN TERRACE SUBDIVISION COVER SHEET, PRELIMINARY PLAT MAP, AND FUTURE STREET PLAN LOCATION: 40808 & 41010 HWY 26, SANDY, OR 97055			
CLIENT: ROLL TIDE PROPERTIES CORPORATION CORNELIUS, OR 97113		CLIENT: Surveyors & Planners, Inc. Surveying, Planning and Civil Engineering and Construction P.O. Box 955 Sandy, OR 97055 Phone: (503) 668-4730 Fax: (503) 668-4730 DATE OF PLOT: 9-27-22			



AREA TOTALS

TOTAL SITE AREA	= 693,051 SF	= 15.910 ACRES
TRACT A (PARK)	= 16,440 SF	= 1.155 ACRES
TRACT B (POND)	= 1,062 SF	= 0.024 ACRES
TRACT C (POND)	= 6,845 SF	= 0.151 ACRES
R-1 SINGLE FAMILY	= 25,559 SF	= 0.581 ACRES
R-2 MULTI-FAMILY	= 53,728 SF	= 1.233 ACRES
R-3 MULTI-FAMILY	= 283,334 SF	= 6.504 ACRES
C-3 COMMERCIAL	= 142,884 SF	= 3.280 ACRES
PUBLIC ROW	= 91,205 SF	= 2.123 ACRES

DENSITY CALCULATIONS

R-1 SINGLE FAMILY MIN DENSITY	0.59 AC*(5 UNITS/AC) = 2 UNITS
R-1 SINGLE FAMILY MAX DENSITY	0.59 AC*(8 UNITS/AC) = 5 UNITS
R-1 SINGLE FAMILY PROPOSED DENSITY	4 UNITS
R-2 MULTI-FAMILY MIN DENSITY	1.23 AC*(8 UNITS/AC) = 9.8 = 10 UNITS
R-2 MULTI-FAMILY MAX DENSITY	1.23 AC*(14 UNITS/AC) = 17.2 = 17 UNITS
R-3 MULTI-FAMILY MIN DENSITY	6.50 AC*(10 UNITS/AC) = 65 UNITS
R-3 MULTI-FAMILY MAX DENSITY	6.50 AC*(20 UNITS/AC) = 130 UNITS

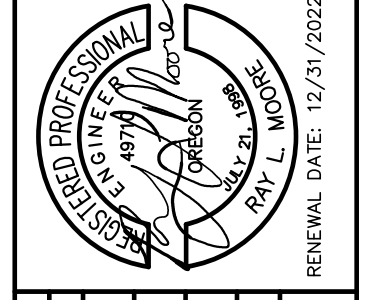
LEGEND

	PARKS AND OPEN SPACE ZONE
	R-1 ZONE
	R-2 ZONE
	R-3 ZONE
	C-3 ZONE

NOTES

1. THIS IS NOT A BOUNDARY SURVEY. NO LIABILITY IS ASSUMED BY ALL COUNTY SURVEYORS AND PLANNERS FOR THE EXISTENCE OF ANY EASEMENTS, ENCUMBRANCES AND DISCREPANCIES IN BOUNDARY OR TITLE DEFECTS.

BY	REVISION	SHEET
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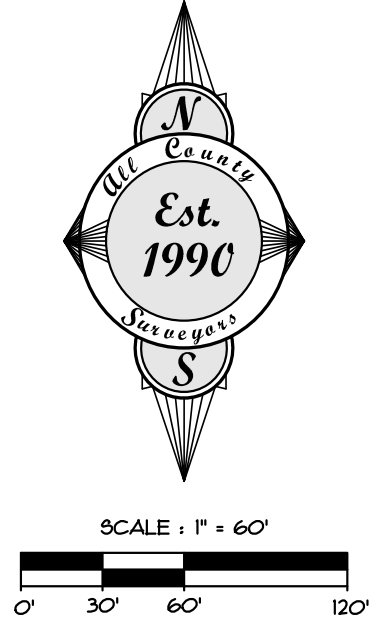
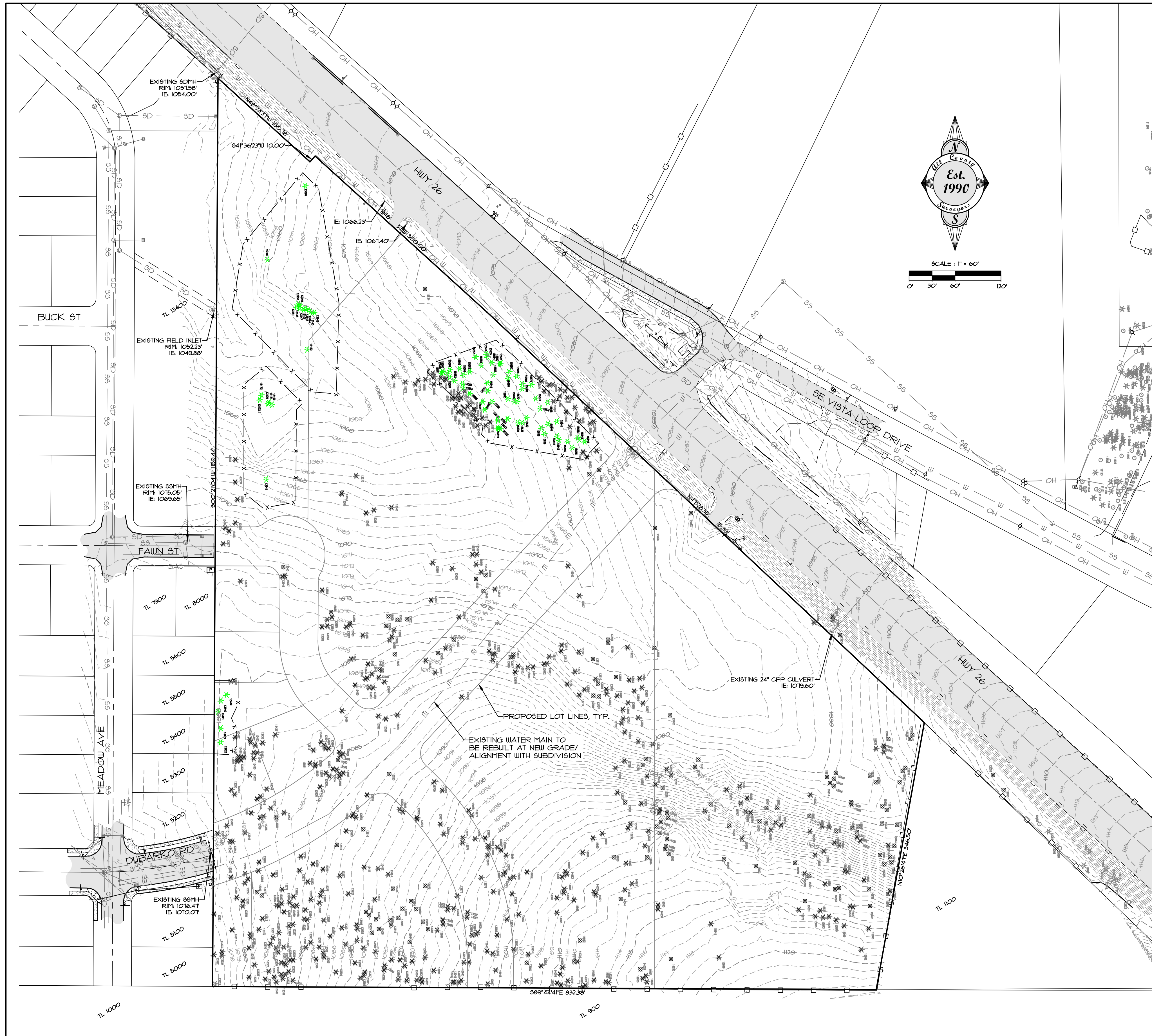


SCALE	VERT. N/A	HORIZ. 1"=60'
DATE	07/26/2018	
FILE	19-038-Planning-LDE-L418	
SECTION	TWP. 18	RANGE 25
	SECTION 5E	

BULL RUN TERRACE SUBDIVISION
PRELIMINARY PLAT MAP AND SPECIFIC AREA PLAN
40808 & 41010 HWY 26, SANDY, OR 97055

Surveyors & Planners, Inc.
 Surveying, Planning and Civil Engineering
 P.O. Box 955 Sandy, OR 97055
 Phone: (503) 668-4730
 Fax: (503) 668-4730
 DATE OF PLOT: 9-27-22

CLIENT:
 ROLL TIDE PROPERTIES CORPORATION
 CORNELIUS, OR 97113



LEGEND	
---	PROPERTY LINE
---	LOT LINE
▨	EXISTING BUILDING
▨	EXISTING EDGE OF PAVEMENT
▨	EXISTING SIDEWALK/CONCRETE
---	EXISTING CURB
W	EXISTING WATER LINE
SD	EXISTING STORM LINE
SS	EXISTING SANITARY LINE
GA	EXISTING GAS LINE
T	EXISTING TELEPHONE LINE
P	EXISTING UNDERGROUND POWER
⊕	EXISTING STORM MANHOLE
⊕	EXISTING CATCH BASIN
⊕	EXISTING SANITARY MANHOLE
⊕	EXISTING UTILITY POLE
⊕	EXISTING WATER METER
⊕	EXISTING WATER VALVE
⊕	EXISTING FIRE HYDRANT
⊕	EXISTING SIGN
---	EXISTING GROUND CONTOUR
---	EXISTING LIGHT POLE
*	EXISTING DECIDUOUS TREE
*	EXISTING CONIFEROUS TREE
---	NEW LOT LINE
---	NEW EASEMENT LINE
---	NEW CURB
▨	NEW SIDEWALK/CONCRETE
---	NEW AC
W	NEW WATER LINE
SS	NEW SANITARY LINE
SD	NEW STORM LINE
---	SAUCUT LINE
---	NEW FINISH GRADE CONTOUR
⊕	NEW WATER METER
⊕	NEW STORM MANHOLE
⊕	NEW CATCH BASIN
⊕	NEW SANITARY MANHOLE
⊕	NEW CLEANOUT
⊕	NEW FIRE HYDRANT
⊕	NEW WATER VALVE
⊕	NEW STREET LIGHT
⊕	NEW SIGN
⊕	NEW MAILBOX UNIT

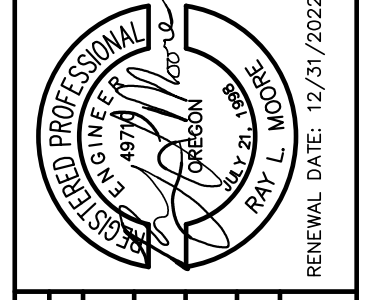
LEGEND	
○	EXISTING DECIDUOUS TREE TO BE PRESERVED
*	EXISTING CONIFEROUS TREE TO BE PRESERVED
×	EXISTING DECIDUOUS TREE TO BE REMOVED
*	EXISTING CONIFEROUS TREE TO BE REMOVED

INSTALL PROTECTIVE BARRIER FENCING TO PROTECT TREES DURING EXCAVATION FOR THE UTILITIES. REQUEST AN INSPECTION OF EROSION CONTROL MEASURES AND TREE PROTECTION MEASURES AS SPECIFIED IN SECTION 11.02.5(C) PRIOR TO CONSTRUCTION ACTIVITIES OR GRADING. REFER TO ARBORIST REPORT FOR DETAIL ON FENCING LOCATION.

TREE RETENTION NOTES
 TREES REQUIRED TO BE RETAINED:
 3 TREES/ACRE X 15.91 ACRES = **48 TREES**
 NUMBER OF TREES PROPOSED FOR RETENTION:
63 TREES

- NOTES**
- THIS IS NOT A BOUNDARY SURVEY. NO LIABILITY IS ASSUMED BY ALL COUNTY SURVEYORS AND PLANNERS FOR THE EXISTENCE OF ANY EASEMENTS, ENCUMBRANCES AND DISCREPANCIES IN BOUNDARY OR TITLE DEFECTS.
 - UNDERGROUND UTILITIES SHOWN ON THIS SURVEY ARE LIMITED TO THOSE ITEMS VISIBLE BY SURFACE INSPECTION AND LOCATED PAINTED ON THE GROUND AS OF THE DATE OF THIS SURVEY. SUBSURFACE STRUCTURES, IF ANY, ARE NOT SHOWN.
 - UNDERGROUND UTILITY LOCATIONS MUST BE POTHOLED AND VERIFIED PRIOR TO CONSTRUCTION.
 - THE ELEVATION DATUM IS BASED ON THE CITY OF SANDY BENCHMARK #33. THE BENCHMARK IS LOCATED AT THE INTERSECTION OF MCCORMICK AND LANGENBEND. THE PUBLISHED ELEVATION IS 10215.1'

BY	REVISION	SHEET
		C3
		OF 12
DATE	DESIGNED: CTH	
	DRAWN: CTH	
	CHECKED: RLM	
	APPROVED: RLM	



SCALE	VERT. N/A	HORIZ. 1"=60'
DATE	07/26/2018	
FILE	19-038-Planning-LDE-443	
SECTION	TWP. 18	RANGE 5E
LEGAL	19-038-Planning-LDE-443	

BULL RUN TERRACE SUBDIVISION
EXISTING CONDITIONS AND TREE RETENTION PLAN
 40808 & 41010 HWY 26, SANDY, OR 97055

Surveyors & Planners, Inc.
 Surveying, Planning and
 Civil Engineering and
 P.L.L.C.
 P.O. Box 855 Sandy, OR 97055
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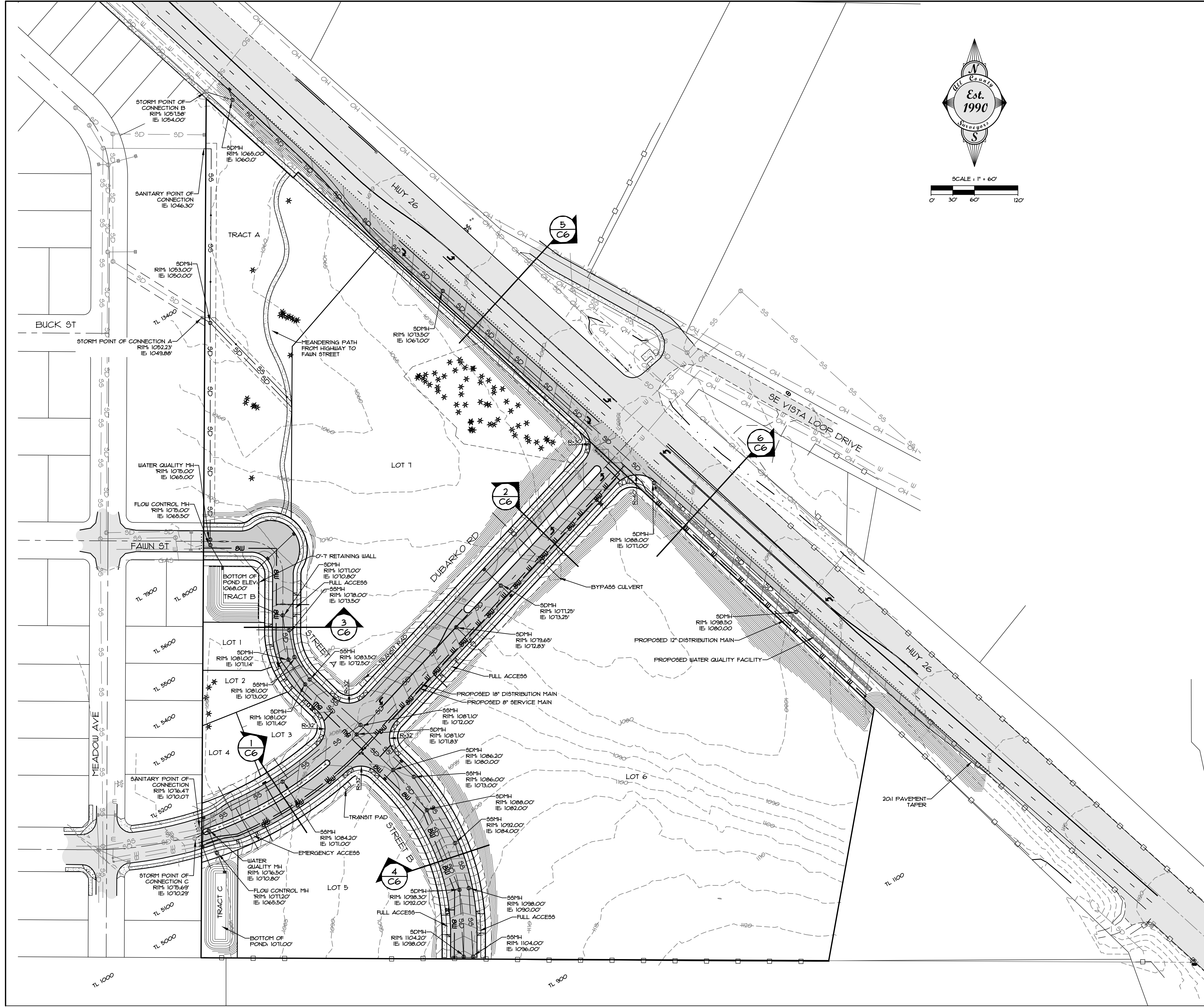
TREE PRESERVATION INVENTORY					
TREE NO.	SPECIES (COMMON NAME)	DBH (INCHES)	CONDITION	COMMENTS	TREATMENT
13096	DOUGLAS-FIR	11	GOOD		RETAIN
13134	BIGLEAF MAPLE	55	GOOD	OPEN GROWTH, MULTIPLE LEADERS AT 10', CABLE CONSTRICTING LOWER TRUNK	REMOVE
13142	DOUGLAS-FIR	32	FAIR	ONE SIDED, CODOMINANT AT 5' WITH INCLUDED BARK, 10% GIRDLED AT LOWER TRUNK	RETAIN
13143	DOUGLAS-FIR	13	FAIR	OVERTOPPED BY ADJACENT TREES, POOR TRUNK TAPER	RETAIN
13144	DOUGLAS-FIR	34	GOOD	MULTIPLE LEADERS AT 5' WITH INCLUDED BARK, ONE SIDED, WEST 10' LEADER DEAD	RETAIN
13145	DOUGLAS-FIR	14	FAIR	OVERTOPPED BY ADJACENT TREES, POOR TRUNK TAPER	RETAIN
13146	DOUGLAS-FIR	26	GOOD	ONE SIDED	RETAIN
13141	DOUGLAS-FIR	15	GOOD	ONE SIDED, MARGINAL TRUNK TAPER	RETAIN
13148	DOUGLAS-FIR	25	GOOD	ONE SIDED	RETAIN
13149	DOUGLAS-FIR	11	POOR	OVERTOPPED BY ADJACENT TREES, ONE SIDED, SUPPRESSED	RETAIN
13150	DOUGLAS-FIR	22	GOOD	ONE SIDED	RETAIN
13151	DOUGLAS-FIR	24,12	GOOD	ONE SIDED, CODOMINANT AT GROUND LEVEL	RETAIN
13152	DOUGLAS-FIR	31	GOOD	OPEN GROWTH, MULTIPLE LEADERS AT 25'	RETAIN
13169	DOUGLAS-FIR	24	GOOD	ONE SIDED	RETAIN
13170	DOUGLAS-FIR	19	GOOD	ONE SIDED	RETAIN
13171	WESTERN REDCEDAR	28	GOOD	MODERATELY ONE SIDED	RETAIN
13172	WESTERN REDCEDAR	30	GOOD	ONE SIDED, PRESSED AGAINST TREE 13172.1	RETAIN
13172.1	DOUGLAS-FIR	25	GOOD	ONE SIDED, PRESSED AGAINST TREE 13172	RETAIN
13421	DOUGLAS-FIR	34	GOOD	SWELLING AT LOWER TRUNK, PREVIOUSLY LOST TOP WITH NEW TOP AT 15'	RETAIN
13423	DOUGLAS-FIR	42	GOOD	MODERATELY ONE SIDED	RETAIN
13438	DOUGLAS-FIR	46	GOOD	MODERATELY ONE SIDED	REMOVE
13439	DOUGLAS-FIR	10	GOOD	OVERTOPPED BY ADJACENT TREES, ONE SIDED	RETAIN
13440	DOUGLAS-FIR	38	GOOD	MODERATELY ONE SIDED	RETAIN
13441	DOUGLAS-FIR	15	FAIR	OVERTOPPED BY ADJACENT TREES, MARGINAL TRUNK TAPER, SMALL PORODADALEA CONKS AT LOWER TRUNK	RETAIN
13538	WESTERN REDCEDAR	39	GOOD	CODOMINANT AT 6' WITH INCLUDED BARK	REMOVE
13539	DOUGLAS-FIR	32	GOOD	MODERATELY ONE SIDED	REMOVE
13540	WESTERN REDCEDAR	31,33	GOOD	CODOMINANT AT 3' WITH INCLUDED BARK	REMOVE
13541	WESTERN REDCEDAR	29	GOOD		RETAIN
13653	DOUGLAS-FIR	11	FAIR	THIN CROWN, LARGE WOUND AT LOWER TRUNK	RETAIN
15446	DOUGLAS-FIR	15	GOOD	25% LIVE CROWN RATIO, POOR TRUNK TAPER	RETAIN
15500	DOUGLAS-FIR	34	GOOD		RETAIN
15550	DOUGLAS-FIR	6	VERY POOR	DEAD	RETAIN
15551	DOUGLAS-FIR	30	GOOD	CODOMINANT AT 1', WEST STEM HAS 33% LIVE CROWN RATIO	RETAIN
15552	N/A	N/A	N/A	SAME AS TREE 15551	N/A
15553	DOUGLAS-FIR	13	GOOD	25% LIVE CROWN RATIO, POOR TRUNK TAPER	RETAIN
15554	DOUGLAS-FIR	11	FAIR	POOR TRUNK TAPER, SUPPRESSED	RETAIN
15555	DOUGLAS-FIR	30	GOOD	MODERATELY ONE SIDED	RETAIN
15556	DOUGLAS-FIR	12	POOR	OVERTOPPED BY ADJACENT TREES, SUPPRESSED	RETAIN
15557	GRAND FIR	22	GOOD	ONE SIDED, CODOMINANT AT 30' WITH INCLUDED BARK	RETAIN
15558	DOUGLAS-FIR	12	GOOD	33% LIVE CROWN RATIO, POOR TRUNK TAPER	RETAIN
15562	DOUGLAS-FIR	20	GOOD	40% LIVE CROWN RATIO, MARGINAL TRUNK TAPER	RETAIN
15564	DOUGLAS-FIR	14	GOOD	MARGINAL TRUNK TAPER, 33% LIVE CROWN RATIO	RETAIN
15565	DOUGLAS-FIR	11	FAIR	ONE SIDED, MARGINAL TRUNK TAPER, 33% LIVE CROWN RATIO	RETAIN
15566	DOUGLAS-FIR	23	GOOD	ONE SIDED	RETAIN
15567	DOUGLAS-FIR	17	GOOD	MARGINAL TRUNK TAPER, 40% LIVE CROWN RATIO	RETAIN
15568	DOUGLAS-FIR	7	VERY POOR	DEAD	RETAIN
15569	DOUGLAS-FIR	11	FAIR	POOR TRUNK TAPER	RETAIN
15570	DOUGLAS-FIR	14	FAIR	ONE SIDED, OVERTOPPED BY ADJACENT TREES	RETAIN
15571	DOUGLAS-FIR	9	FAIR	POOR TRUNK TAPER, SUPPRESSED	RETAIN
15582	DOUGLAS-FIR	10	FAIR	POOR TRUNK TAPER, SUPPRESSED	RETAIN
15583	DOUGLAS-FIR	13	GOOD	POOR TRUNK TAPER, 25% LIVE CROWN RATIO	RETAIN
15584	DOUGLAS-FIR	14	GOOD	MARGINAL TRUNK TAPER, 40% LIVE CROWN RATIO	RETAIN
15584.1	DOUGLAS-FIR	8	VERY POOR	DEAD	REMOVE
15585	DOUGLAS-FIR	15	GOOD	35% LIVE CROWN RATIO, POOR TRUNK TAPER	RETAIN
15589	DOUGLAS-FIR	18	GOOD	33% LIVE CROWN RATIO, MARGINAL TRUNK TAPER	RETAIN
15590	DOUGLAS-FIR	13	GOOD	35% LIVE CROWN RATIO, POOR TRUNK TAPER	RETAIN
15612	DOUGLAS-FIR	9	VERY POOR	DEAD	RETAIN
15614	DOUGLAS-FIR	9	FAIR	25% LIVE CROWN RATIO, POOR TRUNK TAPER	RETAIN
15615	DOUGLAS-FIR	14	GOOD	25% LIVE CROWN RATIO, POOR TRUNK TAPER	RETAIN
15619	DOUGLAS-FIR	20, 16	GOOD	CODOMINANT AT GROUND LEVEL WITH INCLUDED BARK, MARGINAL TRUNK TAPER	RETAIN
15620	N/A	N/A	N/A	SAME AS TREE 15619	N/A
15621	N/A	N/A	N/A	DUPLICATE TREE POINT	N/A
15622	DOUGLAS-FIR	19	GOOD	ONE SIDED, BOWED TRUNK, MARGINAL TRUNK TAPER	RETAIN
15623	DOUGLAS-FIR	8	GOOD	ONE SIDED, POOR TRUNK TAPER	RETAIN
15624	DOUGLAS-FIR	9	VERY POOR	DEAD	RETAIN

TREE PRESERVATION INVENTORY					
TREE NO.	SPECIES (COMMON NAME)	DBH (INCHES)	CONDITION	COMMENTS	TREATMENT
15630	DOUGLAS-FIR	18	GOOD	ONE SIDED	RETAIN
15631	DOUGLAS-FIR	24	GOOD	ONE SIDED	RETAIN
15632	DOUGLAS-FIR	13	GOOD	40% LIVE CROWN RATIO, POOR TRUNK TAPER	RETAIN
15638	DOUGLAS-FIR	21	GOOD	ONE SIDED	RETAIN
15639	DOUGLAS-FIR	14	GOOD	ONE SIDED, MARGINAL TRUNK TAPER, BOWED TRUNK	RETAIN
15640	DOUGLAS-FIR	15	GOOD	ONE SIDED, 10% LIVE CROWN RATIO, MARGINAL TRUNK TAPER	RETAIN
15641	DOUGLAS-FIR	19	GOOD	40% LIVE CROWN RATIO, MARGINAL TRUNK TAPER	RETAIN
15642	DOUGLAS-FIR	19	GOOD	MODERATELY ONE SIDED, MARGINAL TRUNK TAPER, 50% LIVE CROWN RATIO	RETAIN
15643	DOUGLAS-FIR	16	GOOD	ONE SIDED	RETAIN
15644	DOUGLAS-FIR	17	GOOD	33% LIVE CROWN RATIO, MARGINAL TRUNK TAPER	REMOVE
15645	DOUGLAS-FIR	24	GOOD	ONE SIDED	RETAIN
15646	DOUGLAS-FIR	16	GOOD	ONE SIDED	RETAIN
15648	DOUGLAS-FIR	17	GOOD	ONE SIDED, 60% LIVE CROWN RATIO, MARGINAL TRUNK TAPER	RETAIN
15649	DOUGLAS-FIR	16	GOOD	ONE SIDED, MARGINAL TRUNK TAPER	RETAIN
15649.1	DOUGLAS-FIR	17	GOOD	MODERATELY ONE SIDED, MARGINAL TRUNK TAPER	RETAIN
15650	DOUGLAS-FIR	23, 16	GOOD	CODOMINANT AT GROUND LEVEL, NORTH STEM HAS POOR TRUNK TAPER	REMOVE
15651	N/A	N/A	N/A	SAME AS TREE 15650	N/A
15654	DOUGLAS-FIR	21	GOOD	ONE SIDED, CODOMINANT AT 12' WITH INCLUDED BARK	REMOVE
15655	DOUGLAS-FIR	24	GOOD	ONE SIDED	REMOVE
15656	DOUGLAS-FIR	16	GOOD	MARGINAL TRUNK TAPER, 40% LIVE CROWN RATIO	REMOVE
15659	DOUGLAS-FIR	21	GOOD	MODERATELY ONE SIDED, 6' DEAD CODOMINANT STEM AT BASE OF TRUNK	REMOVE
15660	DOUGLAS-FIR	19	GOOD	35% LIVE CROWN RATIO, MARGINAL TRUNK TAPER, DEAD 8' CODOMINANT STEM AT 15'	REMOVE
15662	DOUGLAS-FIR	8	VERY POOR	DEAD	REMOVE
15666	DOUGLAS-FIR	13	GOOD	MARGINAL TRUNK TAPER, 35% LIVE CROWN RATIO	REMOVE
15667	DOUGLAS-FIR	16	GOOD	40% LIVE CROWN RATIO, MARGINAL TRUNK TAPER	REMOVE
15668	DOUGLAS-FIR	14	GOOD	40% LIVE CROWN RATIO, MARGINAL TRUNK TAPER	RETAIN
15669	DOUGLAS-FIR	15	GOOD	ONE SIDED, OVERTOPPED BY ADJACENT TREES	REMOVE
15670	DOUGLAS-FIR	23	GOOD	MODERATELY ONE SIDED	REMOVE
15671	DOUGLAS-FIR	10	GOOD	ONE SIDED, POOR TRUNK TAPER	REMOVE
15672	DOUGLAS-FIR	15	GOOD	33% LIVE CROWN RATIO, MARGINAL TRUNK TAPER	REMOVE
15673	DOUGLAS-FIR	15	GOOD	35% LIVE CROWN RATIO, MARGINAL TRUNK TAPER	RETAIN
15674	DOUGLAS-FIR	13	GOOD	25% LIVE CROWN RATIO, POOR TRUNK TAPER	RETAIN
15677	DOUGLAS-FIR	13	GOOD	25% LIVE CROWN RATIO, POOR TRUNK TAPER	RETAIN
15678	DOUGLAS-FIR	14	GOOD	33% LIVE CROWN RATIO, POOR TRUNK TAPER	RETAIN
15679	DOUGLAS-FIR	16,12	GOOD	CODOMINANT AT GROUND LEVEL WITH INCLUDED BARK, SOUTH STEM HAS MARGINAL TRUNK TAPER WITH 25% LIVE CROWN RATIO	RETAIN
15680	DOUGLAS-FIR	11	GOOD	25% LIVE CROWN RATIO, POOR TRUNK TAPER	RETAIN
15681	DOUGLAS-FIR	14	GOOD	POOR TRUNK TAPER, 20% LIVE CROWN RATIO	RETAIN
15682	DOUGLAS-FIR	26	GOOD	ONE SIDED	REMOVE
15685	DOUGLAS-FIR	22	GOOD	MODERATELY ONE SIDED	RETAIN
15686	DOUGLAS-FIR	25	GOOD	ONE SIDED	RETAIN
15688	DOUGLAS-FIR	20	GOOD	MARGINAL TRUNK TAPER, 50% LIVE CROWN RATIO	RETAIN
15690	DOUGLAS-FIR	16	GOOD	33% LIVE CROWN RATIO, POOR TRUNK TAPER	RETAIN

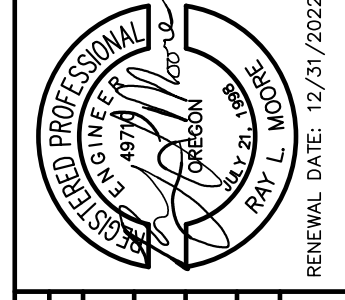
NOTE: INDICATES TREES 1" DBH AND GREATER DEEMED TO BE VIABLE BY ARBORIST INSPECTION.

TOTAL NUMBER OF VIABLE, 1" DBH TREES TO BE PRESERVED: 63

BY		SHEET	C4	OF	12
REVISION		DESIGNED: CTH	DRAWN: CTH	CHECKED: RLM	APPROVED: RLM
DATE		REVISION DATE: 12/21/2022			
SCALE	VERT. N/A	DATE: 07/26/2018	SECTION	RANGE	5E
FILE: 19-038-Planning-LDE-dwg					
PROJECT: BULL RUN TERRACE SUBDIVISION					
TREE TABLES					
LOCATION: 40808 & 41010 HWY 26, SANDY, OR 97055					
DATE OF PLOT: 9-27-22					
CLIENT: ROLL TIDE PROPERTIES CORPORATION 10000 SW 3113 CORNELIUS, OR 97113					



DATE	NO.	REVISION	BY
DESIGNED:	CTH	CHECKED:	RLM
DRAWN:	CTH	APPROVED:	RLM



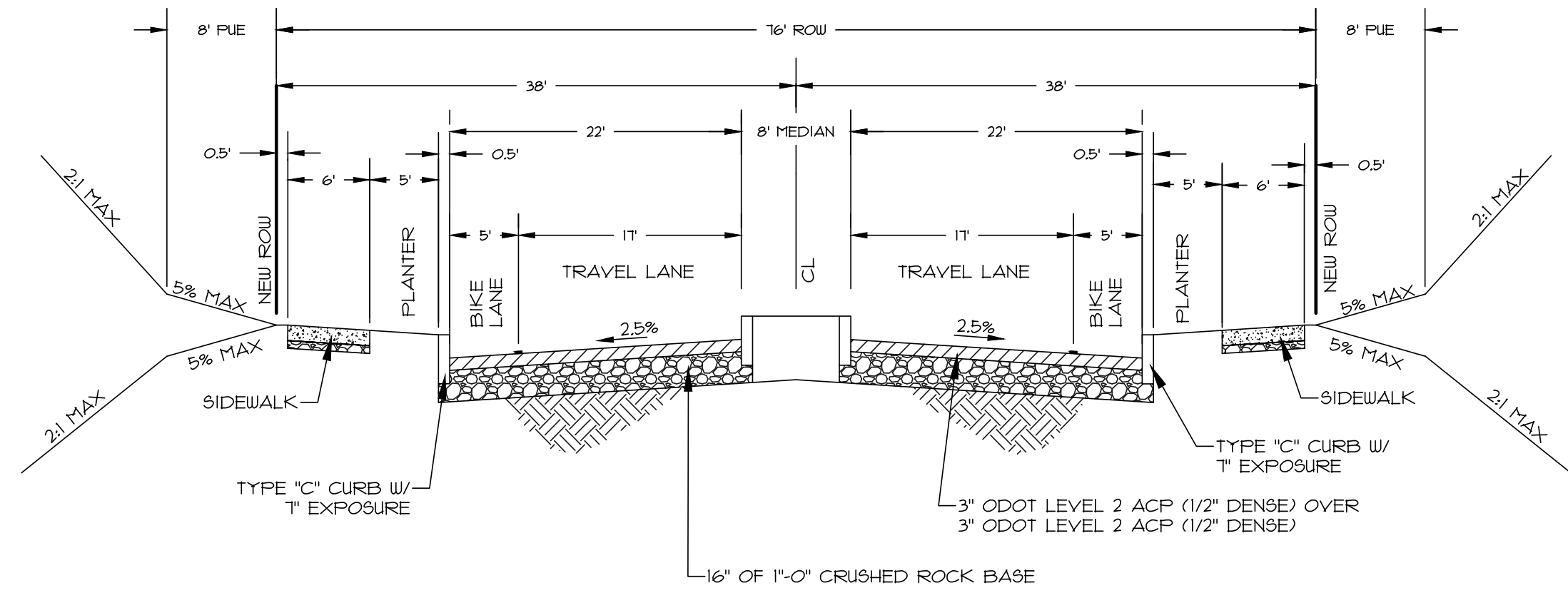
SCALE:	N/A
VERT.:	1"=60'
HORIZ.:	1"=60'
DATE:	07/26/2018
FILE:	19-038-Planning-LDE-448
SECTION:	1B
TWP.:	2S
RANGE:	5E
REVISION DATE:	12/21/2022

BULL RUN TERRACE SUBDIVISION
MASTER STREET AND UTILITY PLAN
 40808 & 41010 HWY 26, SANDY, OR 97055

Surveyors & Planners, Inc.
 Surveying, Planning and
 Civil Engineering
 P.O. Box 955 Sandy, OR 97055
 Phone: (503) 668-4730
 Fax: (503) 668-4730
 DATE OF PLOT: 9-21-22

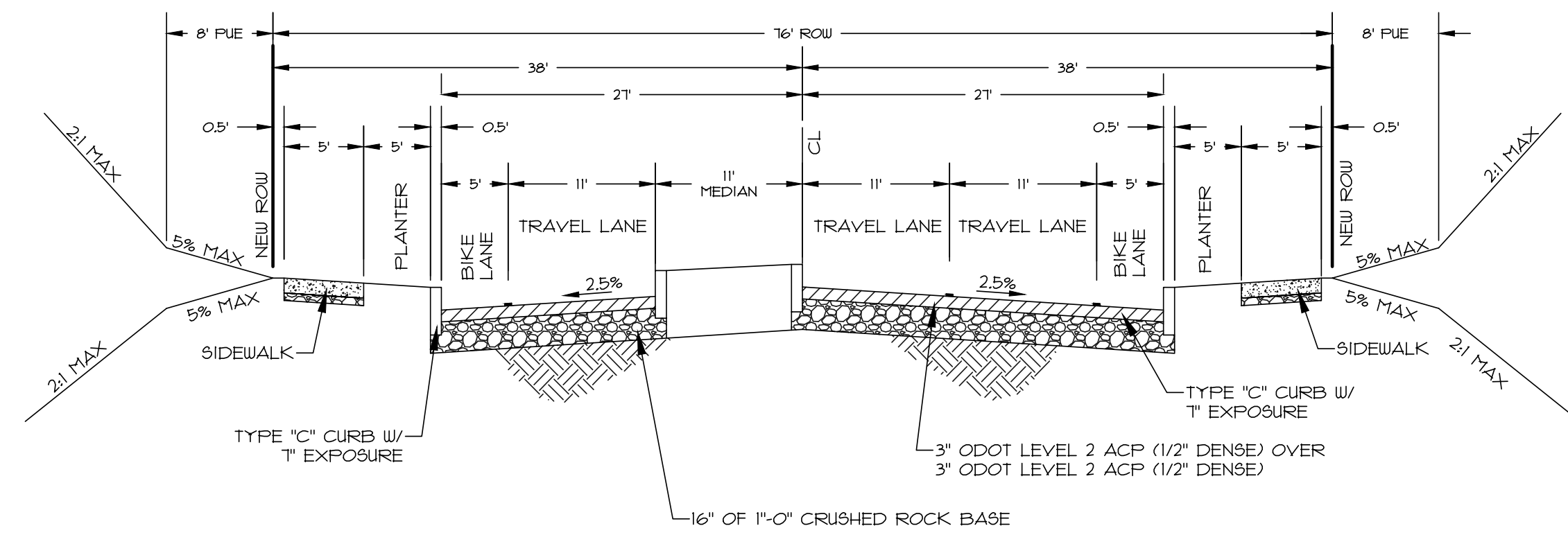
CLIENT:
 ROLL TIDE
 PROPERTIES CORPORATION
 CORNELIUS, OR 97113

SHEET
C5
 OF
12



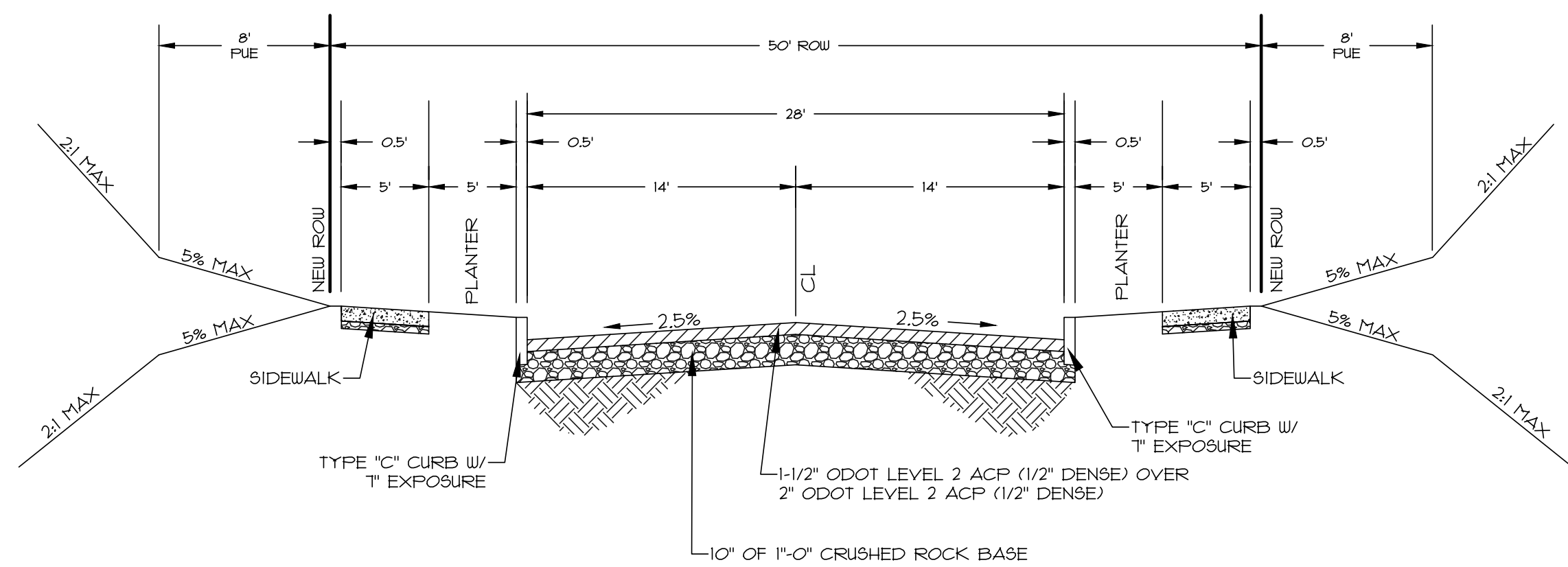
SECTION ① (76' ROW - FULL STREET IMPROVEMENTS)

DUBARKO ROAD - ARTERIAL STREET
NTS



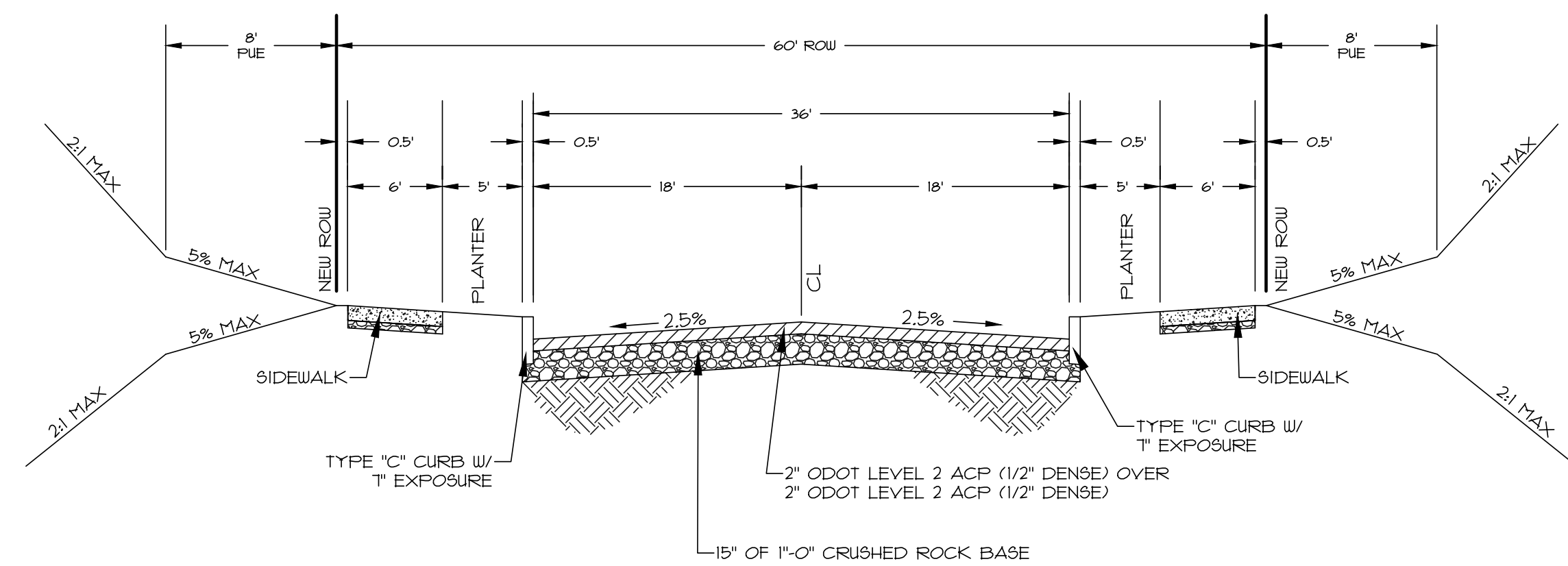
SECTION ② (76' ROW - FULL STREET IMPROVEMENTS)

DUBARKO ROAD - ARTERIAL STREET
NTS



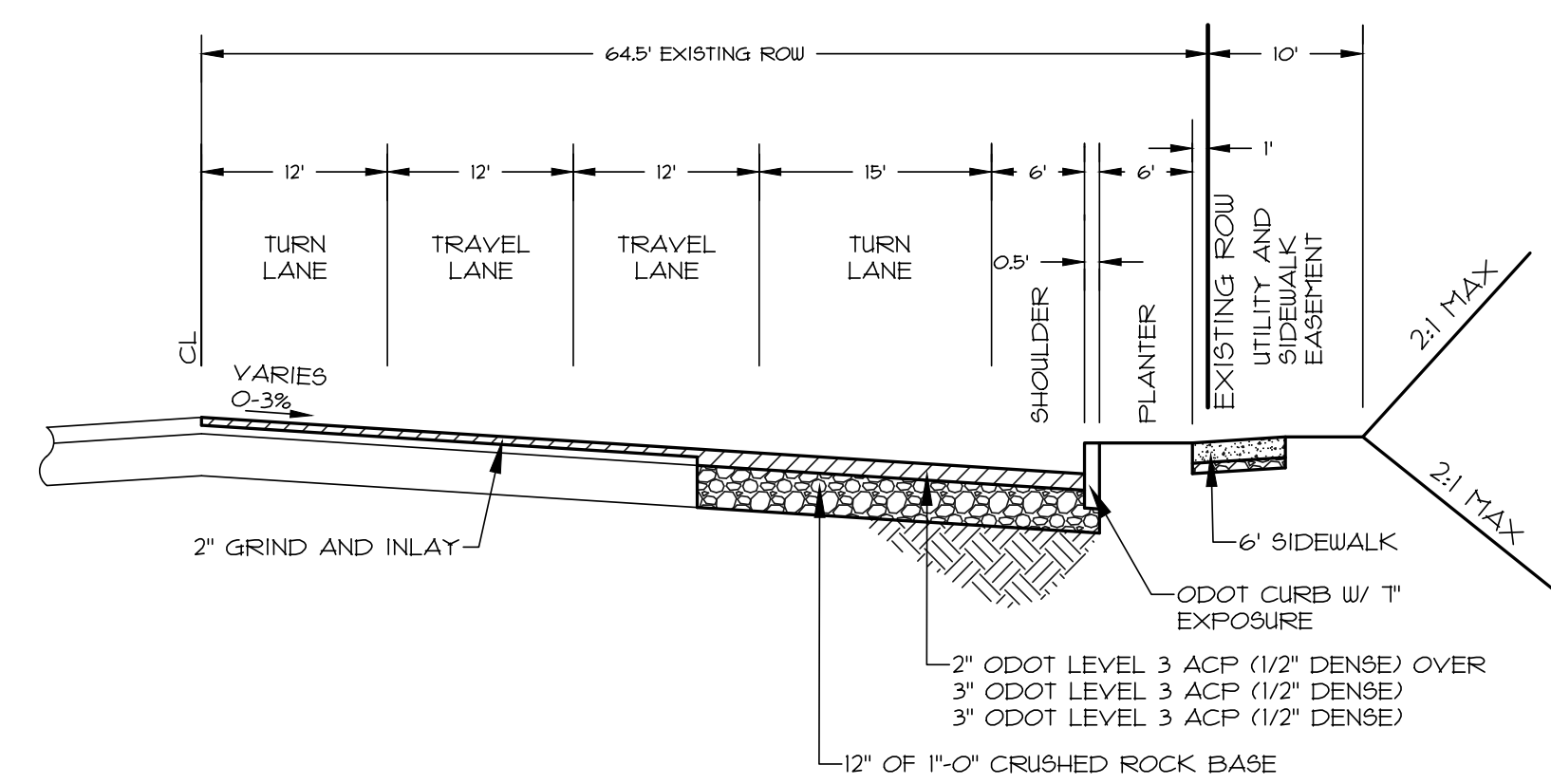
SECTION ③ (50' ROW - FULL STREET IMPROVEMENTS)

STREET A - LOCAL STREET
NTS



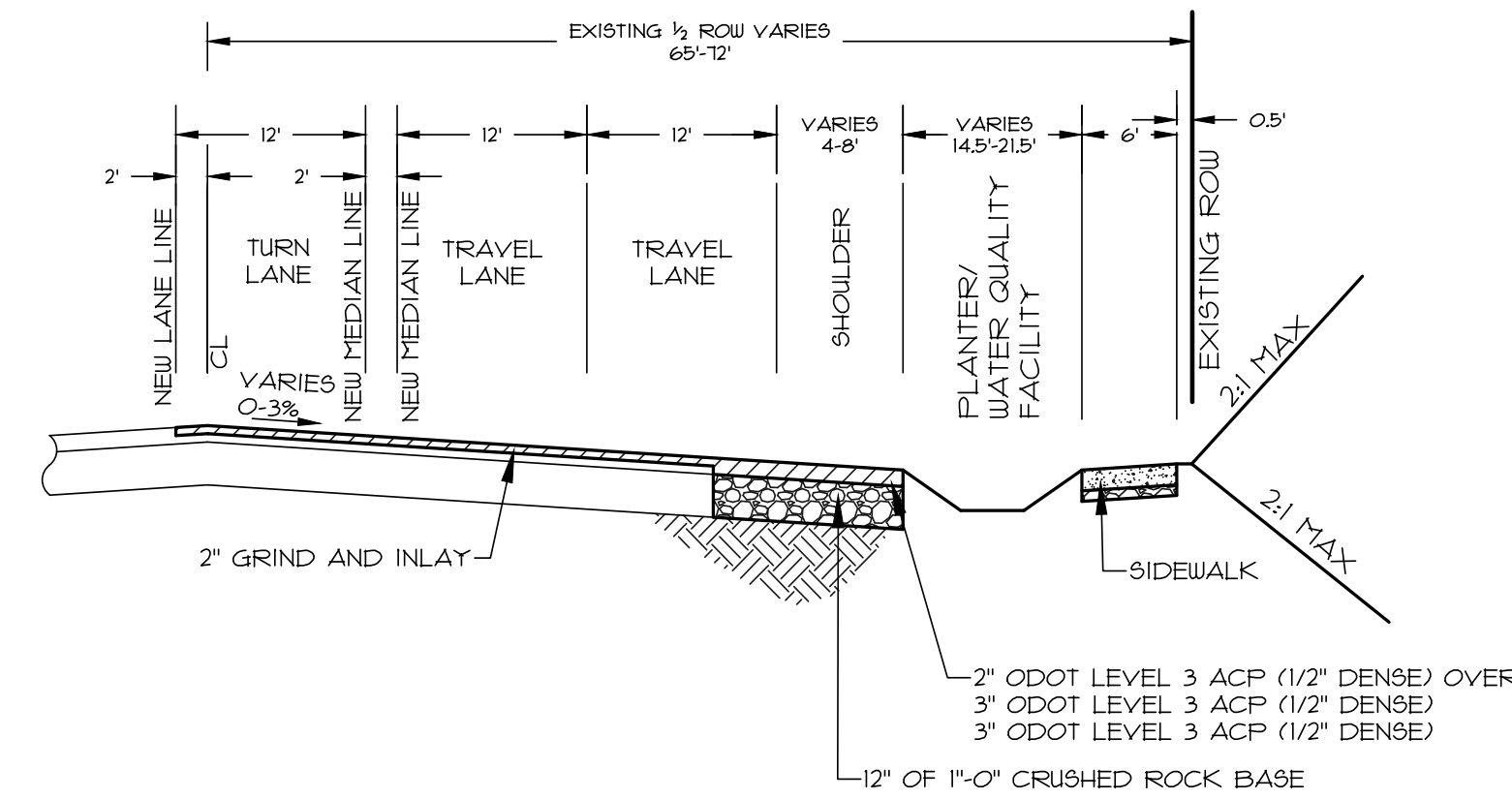
SECTION ④ (60' ROW - FULL STREET IMPROVEMENTS)

STREET B - COLLECTOR STREET
NTS



SECTION ⑤ (ODOT - HALF STREET IMPROVEMENTS)

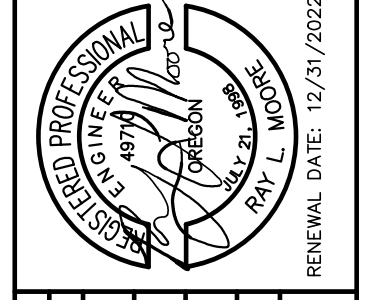
HIGHWAY 26 - HIGHWAY
NTS



SECTION ⑥ (ODOT - HALF STREET IMPROVEMENTS)

HIGHWAY 26 - HIGHWAY
NTS

BY	REVISION	SHEET
DATE	NO.	C6
		OF 12
DESIGNED: CTH	DRAWN: CTH	CHECKED: RLM
APPROVED: RLM		

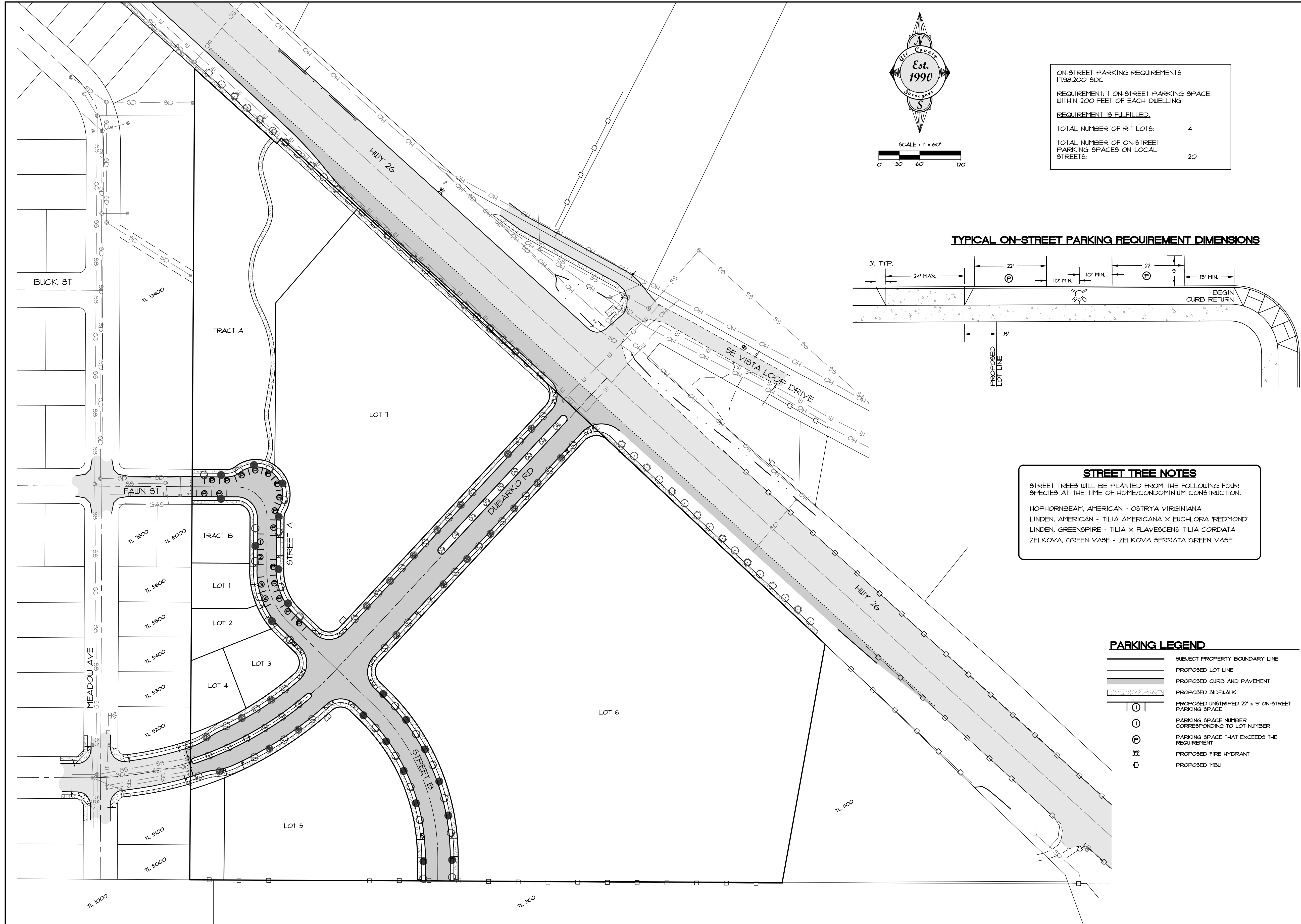


SCALE	DATE	SECTION
N/A	07/26/2018	1B
HORIZ: 1"=60'	FILE: 18-038-Planning-LDE-438	
VERT: 1"=5'	LEGAL	
	TWP. RANGE	5E
	SECTION	25

BULL RUN TERRACE SUBDIVISION
STREET SECTIONS
PROJECT: 40808 & 41010 HWY 26, SANDY, OR 97055
LOCATION:

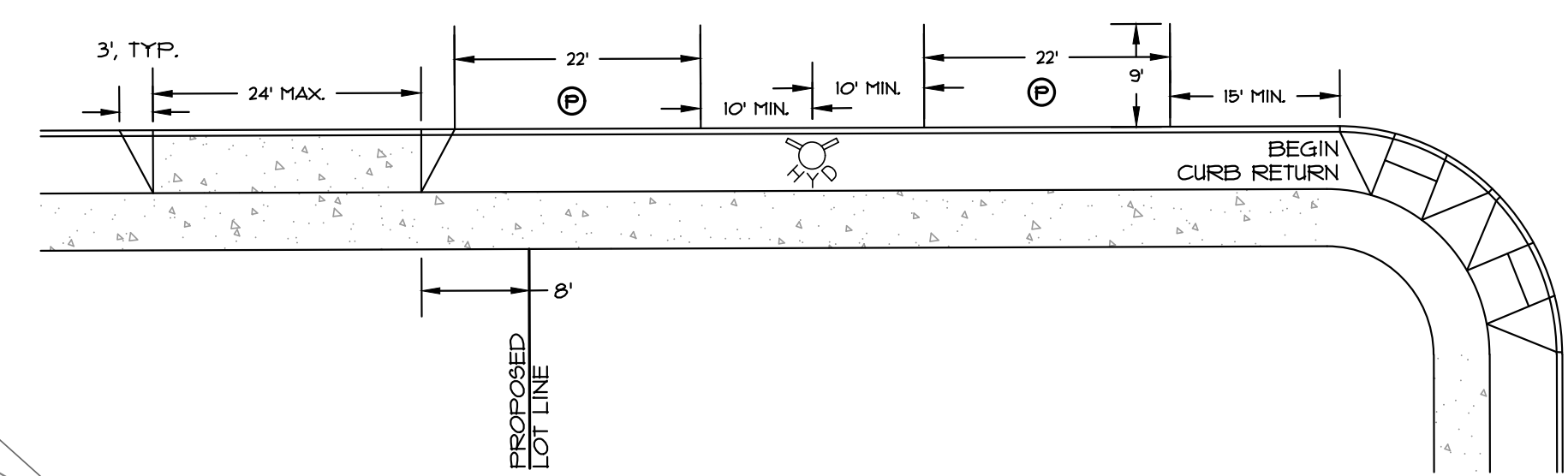
Surveyors & Planners, Inc.
Surveying, Planning and
Civil Engineering and
Architecture
P.O. Box 855 Sandy, OR 97055
Phone: (503) 668-4730
Fax: (503) 668-4730
DATE OF PLOT: 9-27-22

CLIENT:
ROLL TIDE
PROPERTIES CORPORATION
CORVALLIS, OR 97331



ON-STREET PARKING REQUIREMENTS
 11.98.200 SDC
 REQUIREMENT: 1 ON-STREET PARKING SPACE
 WITHIN 200 FEET OF EACH DWELLING
 REQUIREMENT IS FULFILLED.
 TOTAL NUMBER OF R-1 LOTS: 4
 TOTAL NUMBER OF ON-STREET
 PARKING SPACES ON LOCAL
 STREETS: 20

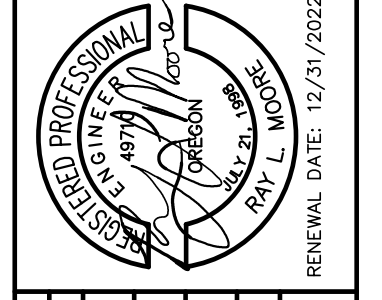
TYPICAL ON-STREET PARKING REQUIREMENT DIMENSIONS



STREET TREE NOTES
 STREET TREES WILL BE PLANTED FROM THE FOLLOWING FOUR SPECIES AT THE TIME OF HOME/CONDOMINIUM CONSTRUCTION.
 HOPHORNBEAM, AMERICAN - OSTRYA VIRGINIANA
 LINDEN, AMERICAN - TILIA AMERICANA X EUCHLORA 'REDMOND'
 LINDEN, GREENSPIRE - TILIA X FLAVESCENS TILIA CORDATA
 ZELKOVA, GREEN VASE - ZELKOVA SERRATA 'GREEN VASE'

- PARKING LEGEND**
- SUBJECT PROPERTY BOUNDARY LINE
 - PROPOSED LOT LINE
 - PROPOSED CURB AND PAVEMENT
 - PROPOSED SIDEWALK
 - PROPOSED UNSTRIPED 22' x 9' ON-STREET PARKING SPACE
 - ① PARKING SPACE NUMBER CORRESPONDING TO LOT NUMBER
 - ⊕ PARKING SPACE THAT EXCEEDS THE REQUIREMENT
 - ⚡ PROPOSED FIRE HYDRANT
 - PROPOSED MANHOLE

BY	REVISION	NO.	DATE
SHEET			C7
OF			12
DESIGNED:	CTH	CHECKED:	RLM
DRAWN:	CTH	APPROVED:	RLM

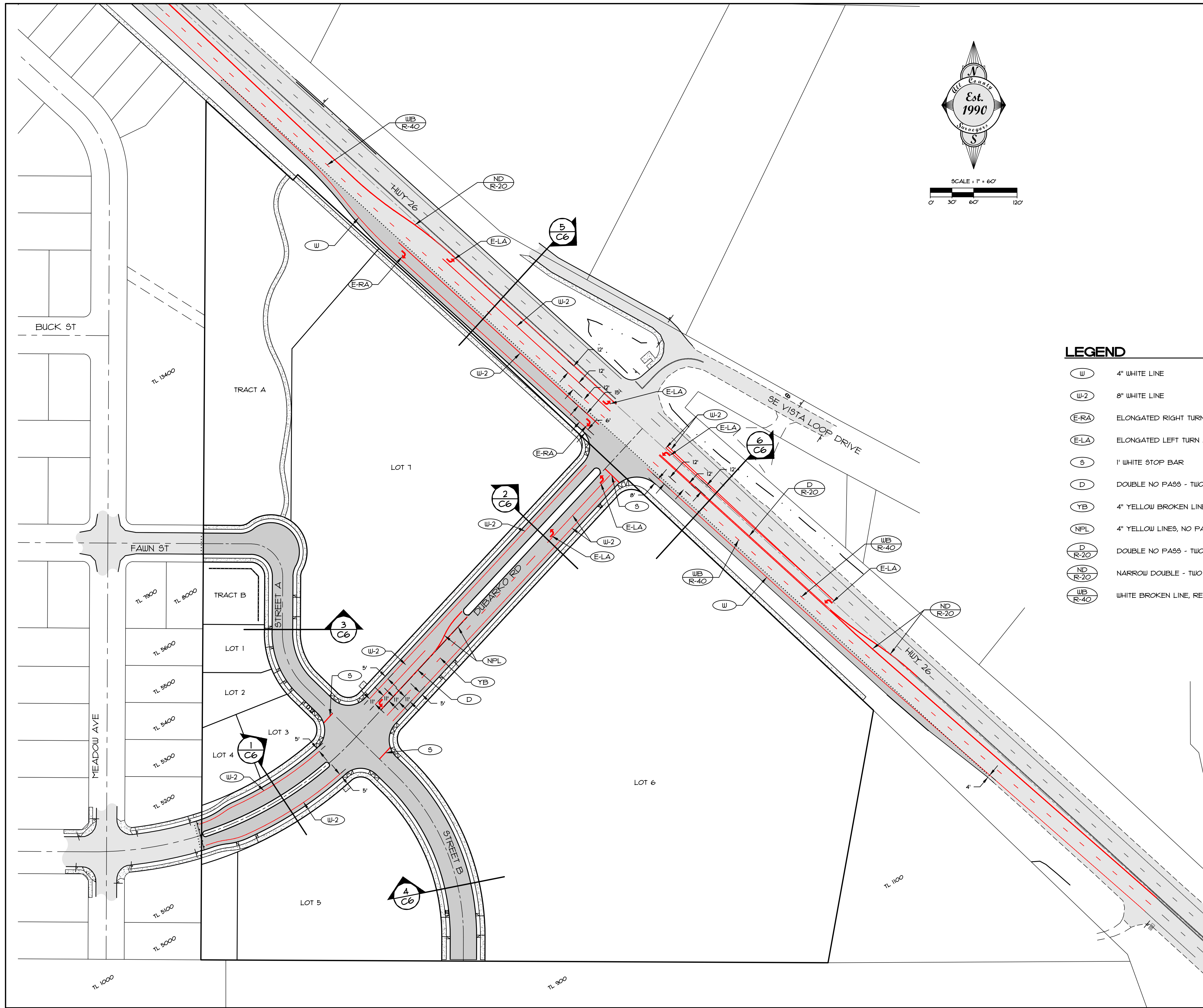


SCALE	N/A	VERT.	1"=60'
DATE	07/26/2018	FILE	18-038-Planning-LDE-448
SECTION	1B	RANGE	5E

PROJECT: **BULL RUN TERRACE SUBDIVISION**
STREET TREE PLAN & PARKING ANALYSIS
 LOCATION: **40808 & 41010 HWY 26, SANDY, OR 97055**

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: 9-21-22

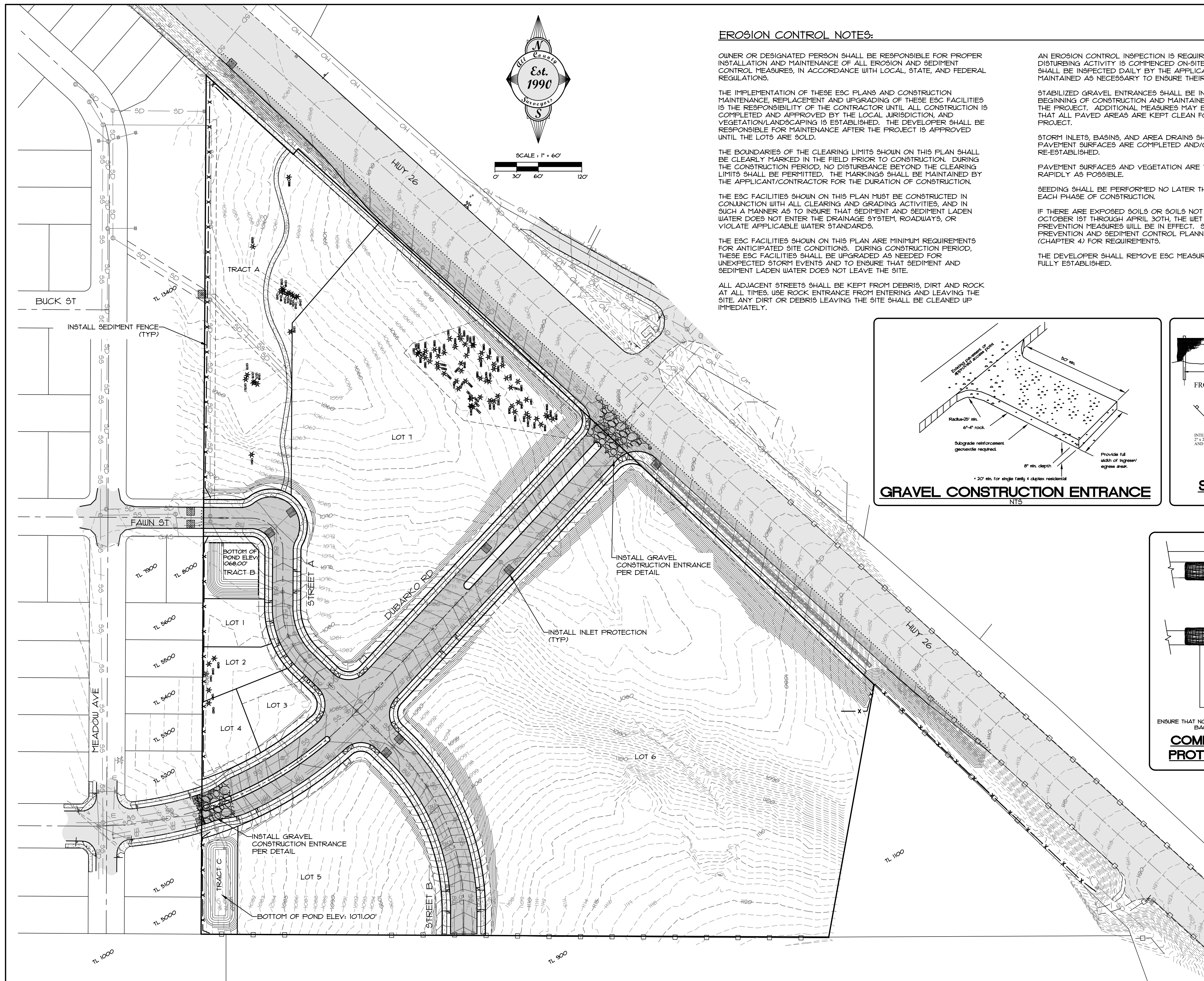
CLIENT:
 ROLL TIDE
 PROPERTIES CORPORATION
 CORVALLIS, OR 97331



LEGEND

- (W) 4" WHITE LINE
- (W-2) 8" WHITE LINE
- (E-RA) ELONGATED RIGHT TURN ARROW
- (E-LA) ELONGATED LEFT TURN ARROW
- (S) 1' WHITE STOP BAR
- (D) DOUBLE NO PASS - TWO (2), 4" YELLOW LINES
- (YB) 4" YELLOW BROKEN LINE
- (NFL) 4" YELLOW LINES, NO PASS LEFT
- (D-R-20) DOUBLE NO PASS - TWO (2), 4" YELLOW LINES, REFLECTORS EVERY 20'
- (ND-R-20) NARROW DOUBLE - TWO (2), 4" YELLOW LINES, REFLECTORS EVERY 20'
- (WB-R-40) WHITE BROKEN LINE, REFLECTORS EVERY 40'

CLIENT: ROLL TIDE PROPERTIES CORPORATION CORNELIUS, OR 97113		PROJECT: BULL RUN TERRACE SUBDIVISION PROPOSED STRIPING PLAN		LOCATION: 40808 & 41010 HWY 26, SANDY, OR 97055	
		SCALE: N/A HORIZ: 1"=60' DATE: 07/26/2018 FILE: 19-038-Planning-LDE-1483	LEGAL SECTION: 1B TWP: 2S RANGE: 5E	REVISION NO. _____ DATE _____	DESIGNED: CTH DRAWN: CTH CHECKED: RLM APPROVED: RLM
SURVEYORS & PLANNERS, INC. Surveying, Planning and Civil Engineering and P.O. Box 855 Sandy, OR 97055 Phone: (503) 666-4730 Fax: (503) 666-4730 DATE OF PLOT: 9-21-22					



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.

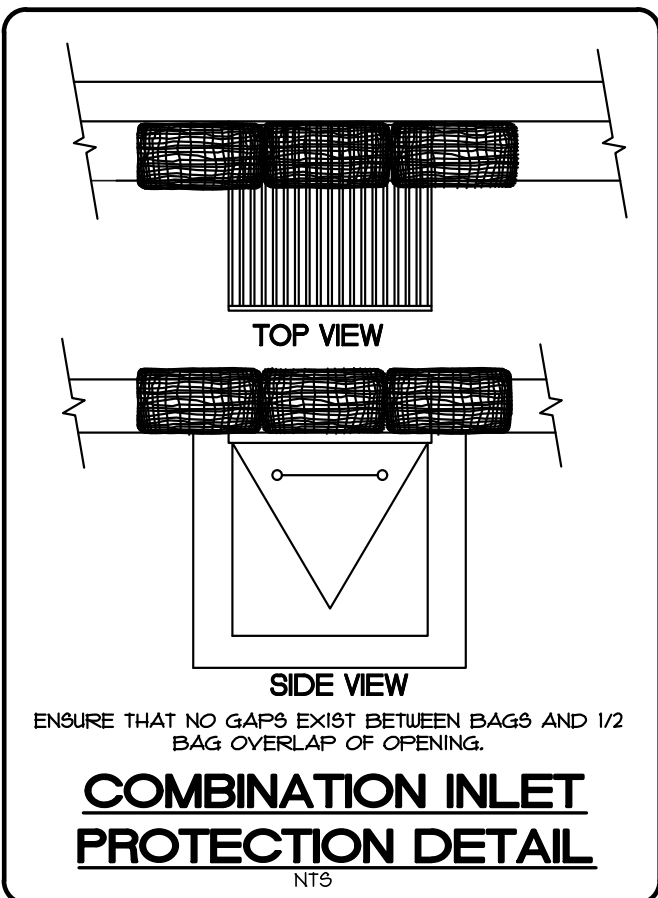
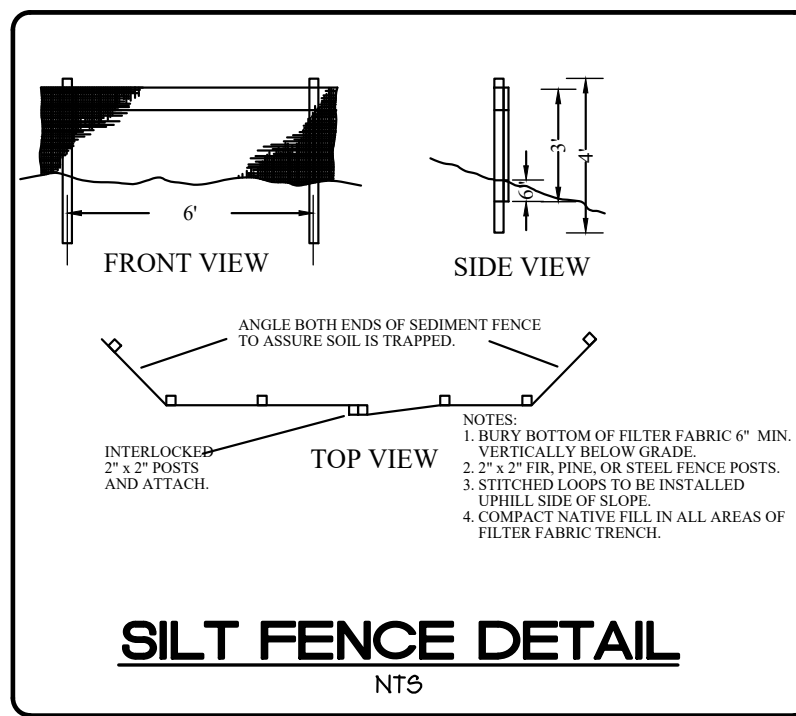
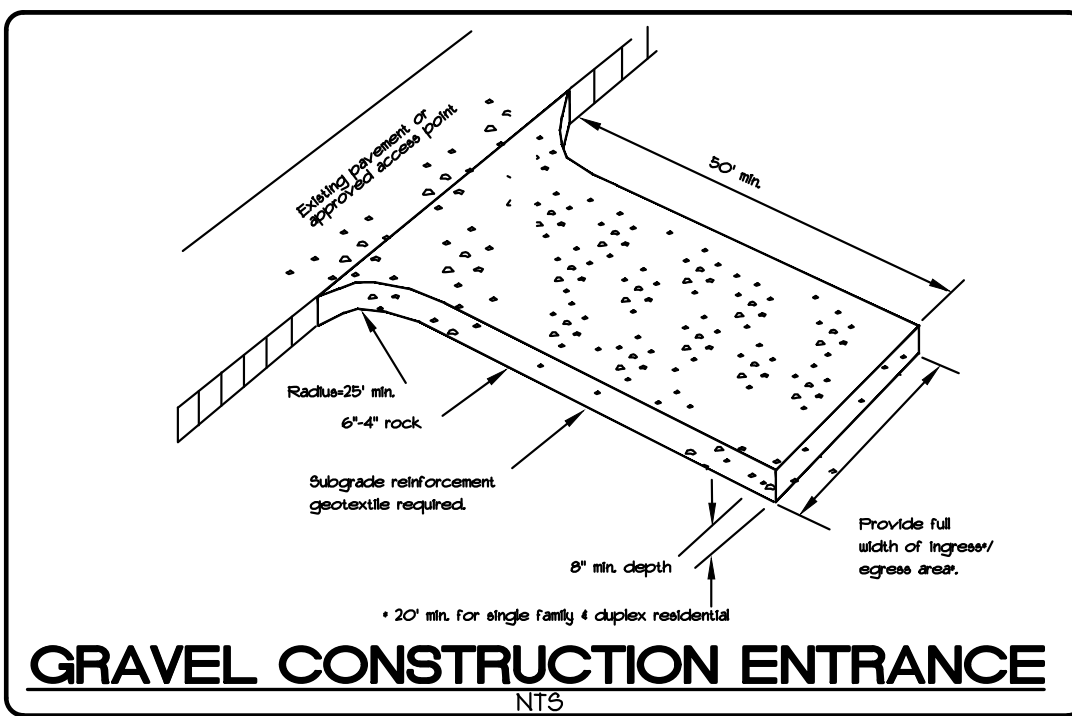
STORM INLETS, BASINS, AND AREA DRAINS SHALL BE PROTECTED UNTIL PAVEMENT SURFACES ARE COMPLETED AND/OR VEGETATION IS RE-ESTABLISHED.

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

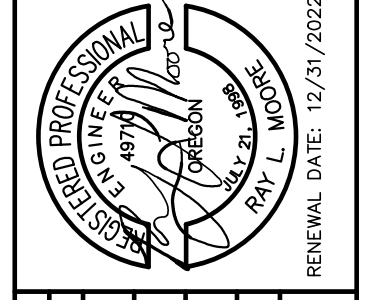
SEEDING SHALL BE PERFORMED NO LATER THAN SEPTEMBER 1 FOR EACH PHASE OF CONSTRUCTION.

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	SHEET
		C9
		OF 12
DATE	DESIGNED: CTH	CHECKED: RLM
	DRAWN: CTH	APPROVED: RLM

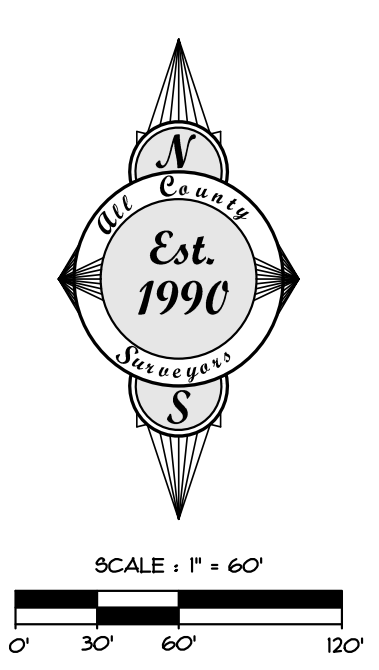
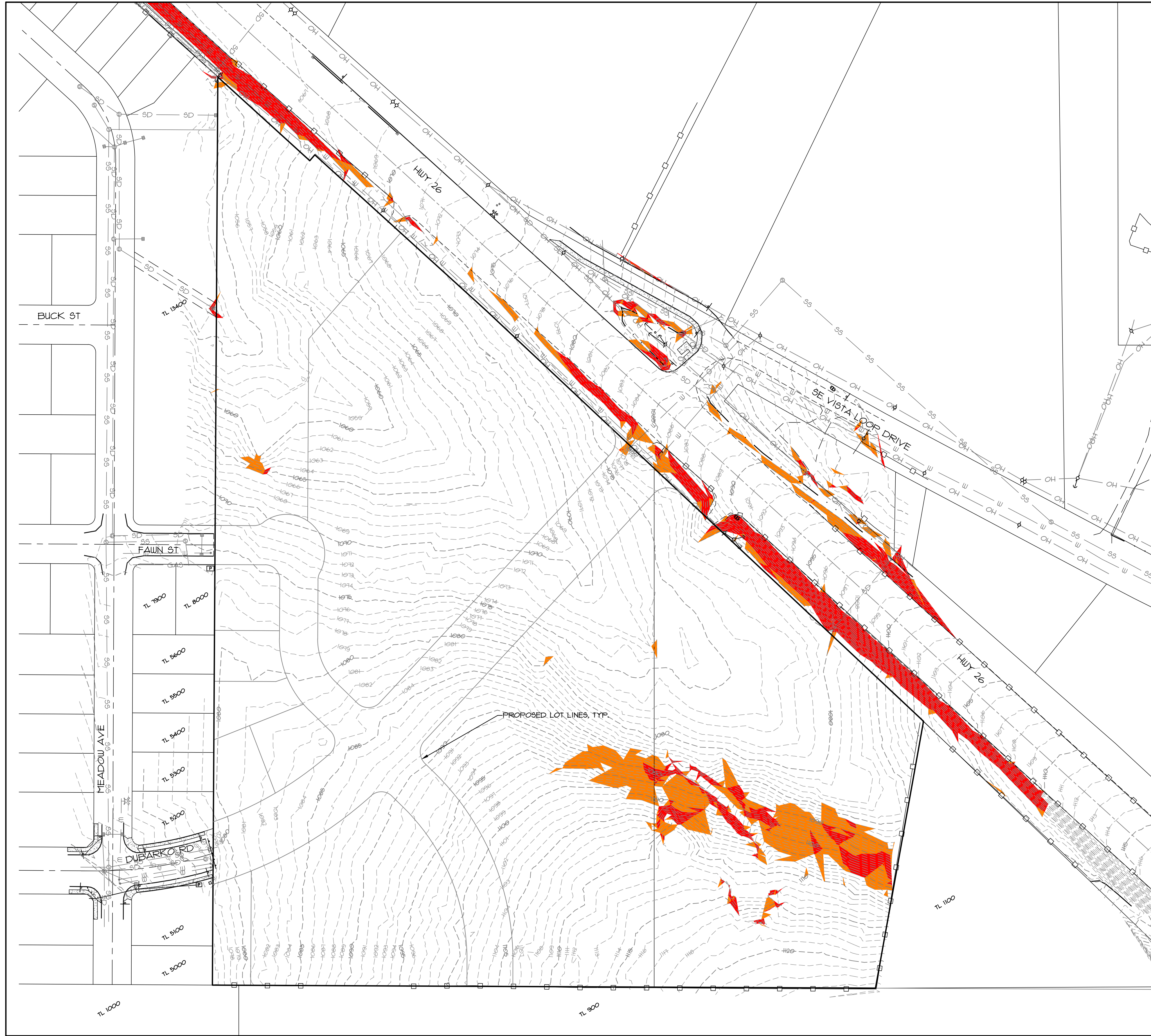


SCALE	VERT. HORIZ.	N/A	5E
DATE	FILE	07/26/2018	18
SECTION	RANGE		25

BULL RUN TERRACE SUBDIVISION
PRELIMINARY GRADING AND EROSION CONTROL PLAN
40808 & 41010 HWY 26, SANDY, OR 97055

Surveyors & Planners, Inc.
Surveying, Planning and
Civil Engineering
P.O. Box 955 Sandy, OR 97055
Phone: (503) 668-4730
Fax: (503) 668-4730
DATE OF PLOT: 9-21-22

CLIENT:
ROLL TIDE
PROPERTIES CORPORATION
CORNELIUS, OR 97113

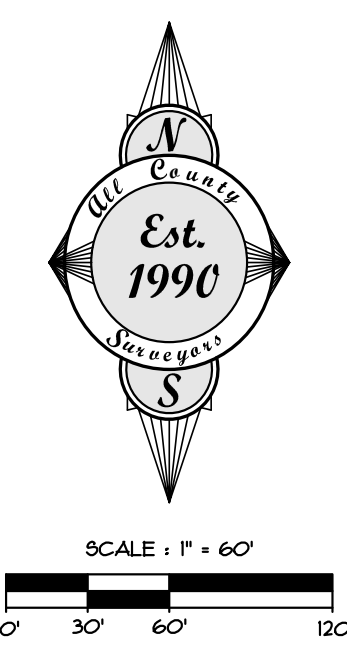
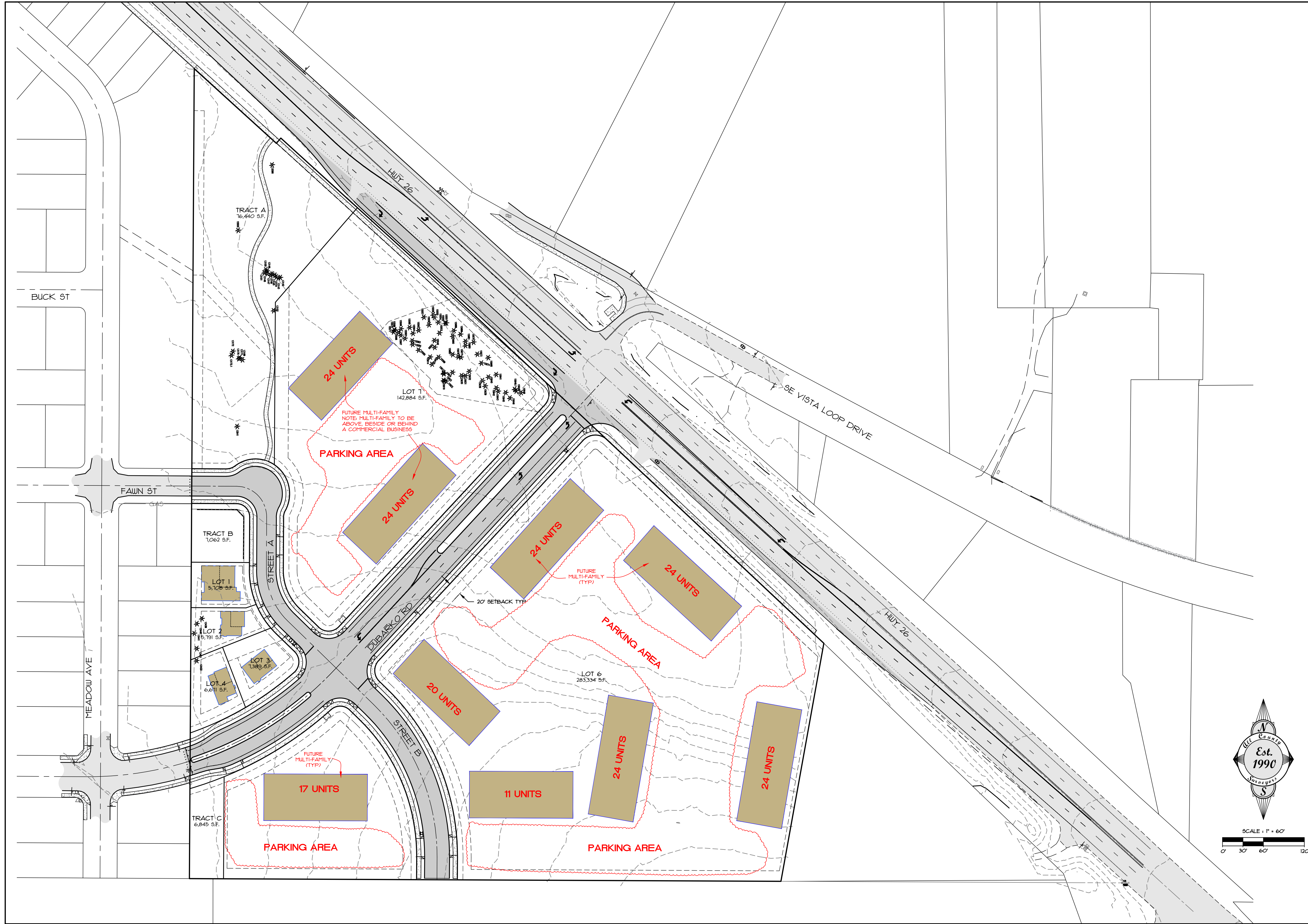


LEGEND

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

<p>CLIENT:</p> <p>ROLL TIDE PROPERTIES CORPORATION CORNELIUS, OR 97113</p>	<p>PROJECT:</p> <p>BULL RUN TERRACE SUBDIVISION SLOPE ANALYSIS</p>	<p>SCALE: N/A</p> <p>DATE: 07/26/2018</p> <p>FILE: 19-038-Planning-LDE-1443</p>	<p>VERT: N/A</p> <p>HORIZ: TYP</p>	<p>SECTION: 1B</p> <p>TWP: 2S</p> <p>RANGE: 5E</p>	<p>REVISION</p> <p>NO.</p> <p>DATE</p>	<p>BY</p>	<p>SHEET</p> <p>C10</p>

RENEWAL DATE: 12/31/2022



DATE	NO.	REVISION	BY
DESIGNED:	CTH		
DRAWN:	CTH		
CHECKED:	RLM		
APPROVED:	RLM		



SCALE	N/A
VERT.:	1"=60'
HORIZ.:	1"=60'
DATE:	07/26/2018
FILE:	18-0305-Planning-DE-1.dwg
SECTION	TWP. RANGE
18	25 5E

PROJECT: **BULL RUN TERRACE SUBDIVISION**

CONCEPT PLAN

LOCATION: **40808 & 41010 HWY 26, SANDY, OR 97055**

Surveyors & Planners, Inc.
 Surveying, Planning and
 Civil Engineering and
 P.L.L.C.
 P.O. Box 855 Sandy, OR 97055
 Phone: (503) 668-4730
 Fax: (503) 668-4730
 DATE OF PLOT: 9-21-22

CLIENT: **ROLL-TIDE PROPERTIES LLC**
 PO BOX 103
 CORNELIUS, OR 97113
 PHONE: 453-5599
 (503) 453-5599

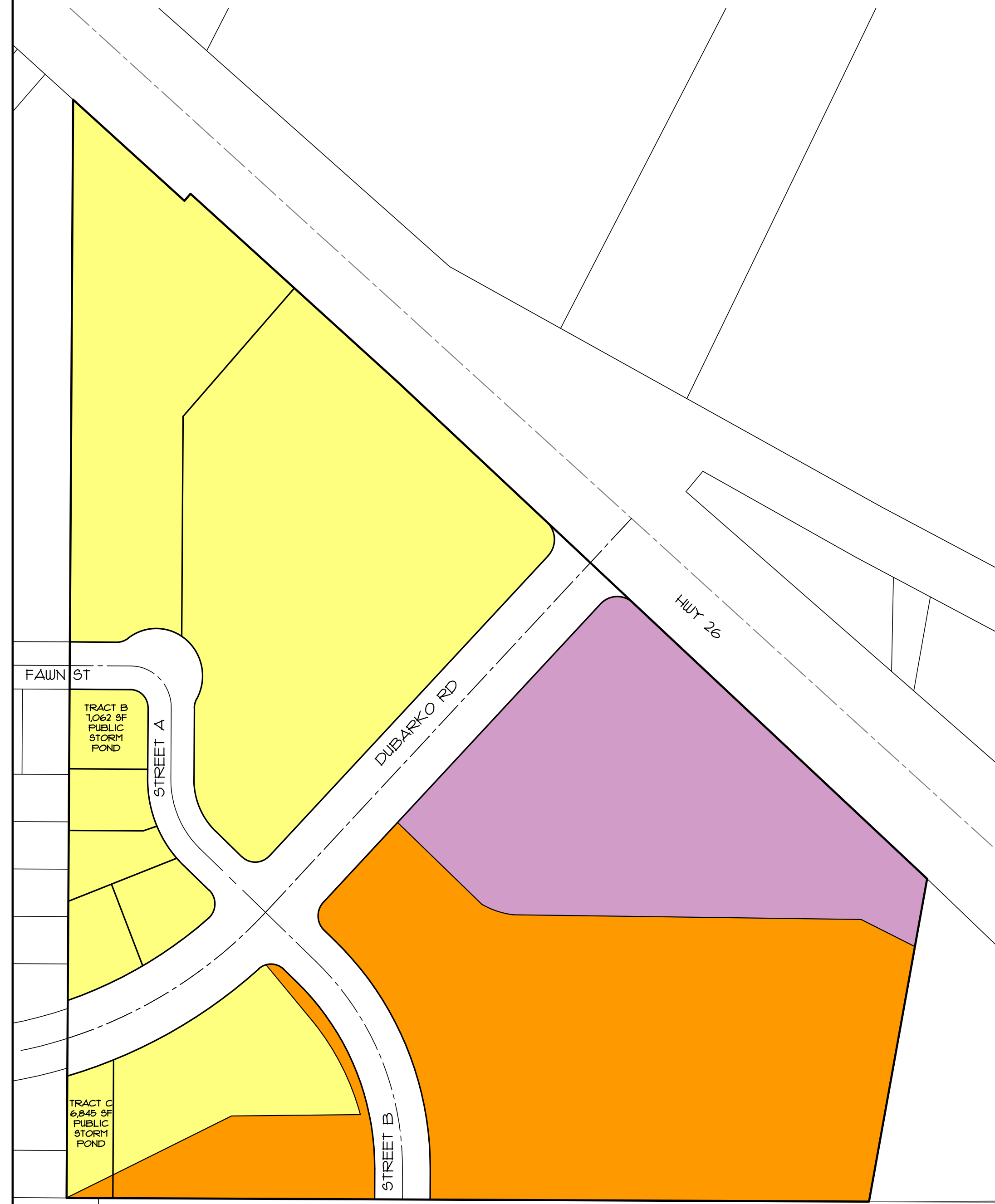
SHEET	11
OF	12

EXISTING NET ZONING AREA	
TOTAL SITE AREA	= 693,051 SF = 15.910 ACRES
R-1 SINGLE FAMILY	= 275,443 SF = 6.323 ACRES
R-2 MULTI-FAMILY	= 192,768 SF = 4.425 ACRES
C-3 COMMERCIAL	= 113,133 SF = 2.611 ACRES
PUBLIC ROW & STORM PONDS	= 111,112 SF = 2.551 ACRES

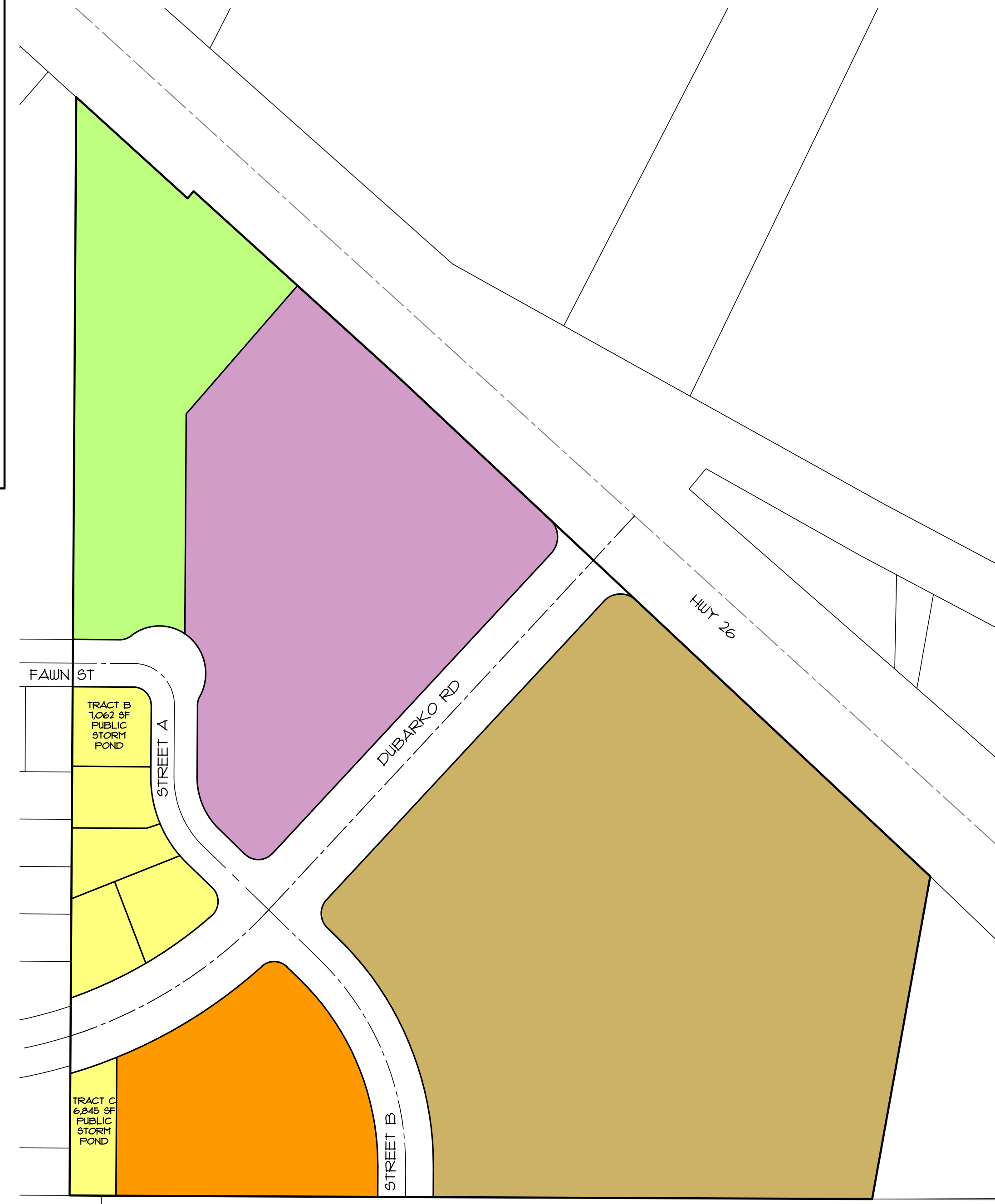


LEGEND	
	PARKS AND OPEN SPACE ZONE
	R-1 ZONE
	R-2 ZONE
	R-3 ZONE
	C-3 ZONE

PROPOSED NET ZONING AREA	
TOTAL SITE AREA	= 693,051 SF = 15.910 ACRES
PARKS AND OPEN SPACE	= 76,440 SF = 1.755 ACRES
R-1 SINGLE FAMILY	= 25,559 SF = 0.581 ACRES
R-2 MULTI-FAMILY	= 53,728 SF = 1.233 ACRES
R-3 MULTI-FAMILY	= 283,334 SF = 6.504 ACRES
C-3 COMMERCIAL	= 142,884 SF = 3.280 ACRES
PUBLIC ROW & STORM PONDS	= 111,112 SF = 2.551 ACRES



EXISTING ZONING



PROPOSED ZONING

CLIENT: ROLL TIDE PROPERTIES CORPORATION CORNELIUS, OR 97113	PROJECT: BULL RUN TERRACE SUBDIVISION NET ZONING AREA COMPARISON	LOCATION: 40808 & 41010 HWY 26, SANDY, OR 97055	DATE OF PLOT: 9-27-22		SCALE: N/A	VERT. DATE: 07/26/2018	REVISION: 1	BY: [Signature]
					FILE: 19-038-Planning-LDE-1.dwg	LEGAL: [Signature]	DESIGNED: CTH	DESIGNED: CTH
					SECTION: 1B	RANGE: 25	DATE: [Blank]	DATE: [Blank]
							CHECKED: RLM	CHECKED: RLM
							APPROVED: [Signature]	APPROVED: [Signature]
								SHEET 12 OF 12

EXHIBIT D

**Preliminary Storm Drainage Design and
Calculations
For the Bull Run Terrace Subdivision**

November 20, 2019

Prepared By:

All County Surveyors and Planners, Inc.
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Job #19-035

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RENEWAL DATE: 12/31/2020

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Appendix A

- Vicinity Map
- Site Layout
- Pre-Developed Areas
- Developed Areas

Appendix B

- Standard Formulas
- Coefficients
- SCS Runoff Curve Numbers (CN)
- Hydrograph Analysis Summary
- Detention System Summary
- Stage Storage Summary
- Rectangular, Sharp Crested Weir Calculations
- Contech CDS2015-4-C Detail

PURPOSE:

The purpose of this analysis is to:

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

PROJECT LOCATION AND DESCRIPTION:

The project site is located on the south side of the Mount Hood Highway in Sandy, Oregon. The site includes tax lots 900 and 1000. The +/- 15.9-acre site consists of grassy fields, and plentiful tree cover. The land is generally sloped to the north and west with an average slope of about 8%. A Vicinity Map and Site Layout (with proposed storm sewer layout) can be found in Appendix A.

PROPOSED IMPROVEMENTS

The proposed 7-lot Bull Run Terrace Subdivision project will consist of four single-family residential lots ranging from 5,748 SF to 7,444 SF. The project will also include three multi-family lots ranging in size from 52,667 SF to 292,076 SF. The site improvements will include streets, curbs, sidewalks, utilities, etc.

New storm sewer pipes, manholes, and catch basins will be installed to convey storm water to a public detention pond located in Tract B. A new water quality manhole will be installed downstream of the detention pond (See Site Layout – Appendix A).

The pond will be sized to detain the new public streets and the new homes to be built on lots 1 through 4. Lots 5, 6, and 7 will provide lot-level detention and water quality systems at the time of building construction. Lots 5 and 6 will drain through the detention pond, and the pond will be sized to accommodate these anticipated flows. The future detention system on lot 7 will bypass the pond and flow directly to the public storm system in the park west of the development.

The fill required to bring Dubarko Road up to grade with Highway 26 will impede the flows of an existing drainage way that flows through the site. To remedy this, a new culvert will be installed under Dubarko Road. In the future, when lots 6 and 7 develop, a new bypass system will be designed to intercept the off-site flows draining to the project site and reroute them to the existing storm system to the west.

In addition to the on-site storm, improvements to the storm system in the ODOT right of way will occur as well. A new water quality facility will be constructed along Highway 26. This facility will conform to the requirements of the newest ODOT stormwater management manual at the time of design and construction. An existing 24" culvert which currently drains to the site will be intercepted, and the flows routed through an existing storm system in the ODOT right of way.

Upstream and downstream analyses will be performed as needed at the time of final engineering.

HYDROGRAPH PARAMETERS:

Rainfall

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

2 year, 24 hr. rainfall = 3.5"
5 year, 24 hr. rainfall = 4.5"
10 year, 24 hr. rainfall = 4.8"
25 year, 24 hr. rainfall = 5.5"

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, Cazadero silty clay loam. Hydrologic Group "C"
15C, Cazadero silty clay loam. Hydrologic Group "C"
24B, Cottrell silty clay loam. Hydrologic Group "C"

(See Appendix B for Runoff Curve Numbers)

Areas and Curve Numbers

Drainage basin areas were determined using a topographic map drafted in AutoCAD. See the Pre-Developed Area and Developed Area in Appendix A.

The impervious area for these post-developed basins includes the proposed roofs from lots 1 through 4, streets, sidewalks, driveways, and curbs. See the following tables for a specific breakdown of these areas.

Pre-Development		
Areas	CN	Land Use Description
Pervious (10.88 acres)*	83	Meadow & Young Second Growth Forest Land
Impervious (0.00 acres)	98	N/A
Post-Development		
Areas	CN	Land Use Description
Pervious (8.77 acres)**	83	Lawns "Good Condition", Meadow & Young Second Growth Forest
Impervious (2.11 acres)***	98	Buildings, AC, Sidewalks, etc.

*Pre-Developed Pervious CN: Weighted CN
 Meadow or Pasture 5.19 AC: CN = 85
 Wood or Forest Land "Young Second Growth" 5.68 AC: CN = 81
 $[(5.19AC \times 85) + (5.68AC \times 81)] / (5.19+5.68) = 82.91 = \mathbf{83.0}$

Pre-Developed Impervious CN: See Runoff Curve Numbers Appendix B

**Post-Developed Pervious CN: Weighted CN
 Meadow or Pasture 2.75 AC: CN = 85
 Wood or Forest Land "Young Second Growth" 5.16 AC: CN = 81
 Lawns "Good Condition" 0.85 AC: CN = 86
 $[(2.75AC \times 85) + (5.16AC \times 81) + (0.85AC \times 86)] / (2.75+5.16+0.85) = 82.74 = \mathbf{83.0}$

***Refer to Water Quality Design Section for detailed area breakdown.

Post-Developed Impervious CN: See Runoff Curve Numbers Appendix B

Time of Concentration

The times of concentrations (T_c), were assumed as follows.

Pre-development T_c= 30.0 minutes
 Post-development T_c= 5.0 minutes

Hydrograph Modeling Results

Hydrographs for the site 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.

DETENTION SIZING RESULTS:

The Post-Development flows were routed through a proposed 4-foot deep detention pond. The 4-foot deep detention pond has been designed so that the Post-Developed release rates for the entire site do not exceed the Pre-Developed rates for the 2-year, 5-year, 10-year, and 25-year storm events per the City of Sandy public Works Design Standards. See the Detention System Summary in Appendix B.

Hydrology Table			
Recurrence Interval (years)	Pre-developed Flows (cfs)	Developed Flows (cfs)	Proposed Release Rates (cfs)
2	3.42	6.14	3.23
5	5.30	8.99	4.77
10	5.88	9.87	5.71
25	7.26	11.94	7.07

The required storage volume is 12,323-cubic feet. This can be contained in a 4-foot deep pond with a bottom area of 2,443 square feet.

Flow Control:

The flow control orifices were designed to release the Post-development Peak-Q's at or below the Pre-developed Peak-Q's.
(See the Detention System Summary - Appendix B)

Orifice Table		
Orifice	Dia. (inches)	Height (feet)
Bottom	7.68	-2.50
Top	10.03	2.80

WATER QUALITY DESIGN:

CDS Storm Water Treatment Device

A CDS manhole by Contech Stormwater Solutions was designed for water quality for the site - see detail in Appendix B. The impervious area for the site includes AC pavement, sidewalks, and roofs. The impervious area is 2.11-acres.

Proposed asphalt, walks, etc.:	1.88 acres
Roof, Patio, Driveway*:	0.23 acres
Total Impervious Area:	2.11 acres

*40'x50' Building footprint:	2000SF
20'x20' Driveway:	400SF
10'x10' Patio:	100SF
Total:	2,500SF X 4 lots = 10,000SF

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

Where Q = flow (cfs)

C = runoff coefficient = 0.90 pavement and Roofs

I = Intensity = 0.2 inches per hour (Water Quality Design Storm)

A = Impervious Area = 2.11 Acres

$$Q = 0.90 \times 0.2 \times 2.11$$

$$Q = 0.38 \text{ cfs}$$

The Contech Storm Water Treatment Device Model: CDS2015-4-C has a treatment capacity of 0.7 cfs which exceeds the required 0.38 cfs.

A Storm Water Treatment Device CDS Model CDS2015-4-C can be used to adequately treat the water for the site

CONCLUSIONS:

- The conveyance system for the proposed Bull Run Terrace Subdivision site has been sized to handle the peak 25-year, 24-hour storm.
- On-site detention has been designed to maintain existing downstream storm water runoff characteristics in accordance with the City of Sandy requirements.
- A CDS Storm Water Treatment Device will be used for water quality.

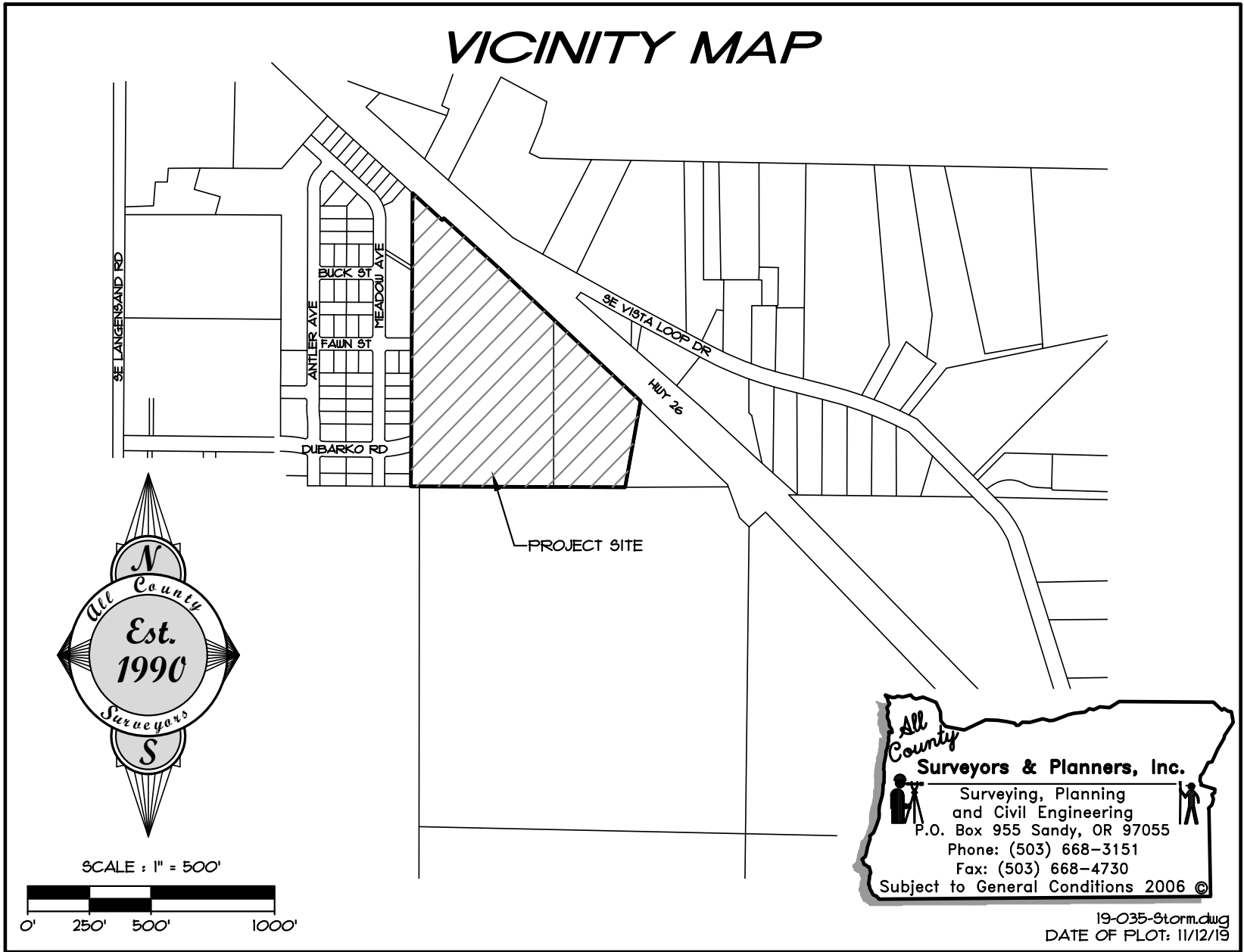
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Appendix A

- Vicinity Map
- Site Layout
- Pre-Developed Areas
- Developed Areas

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VICINITY MAP



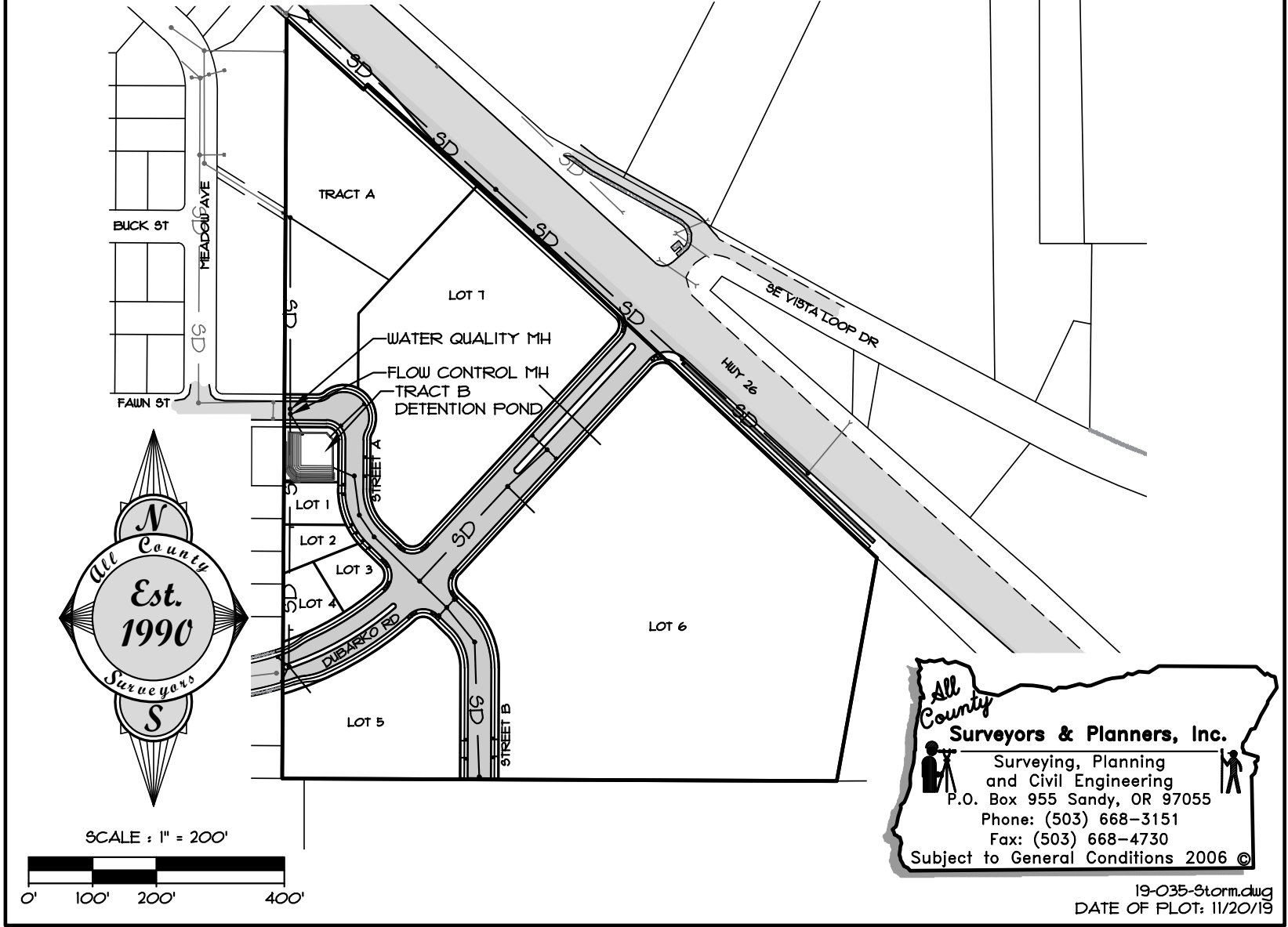
SCALE : 1" = 500'



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DATE OF PLOT: 11/12/19

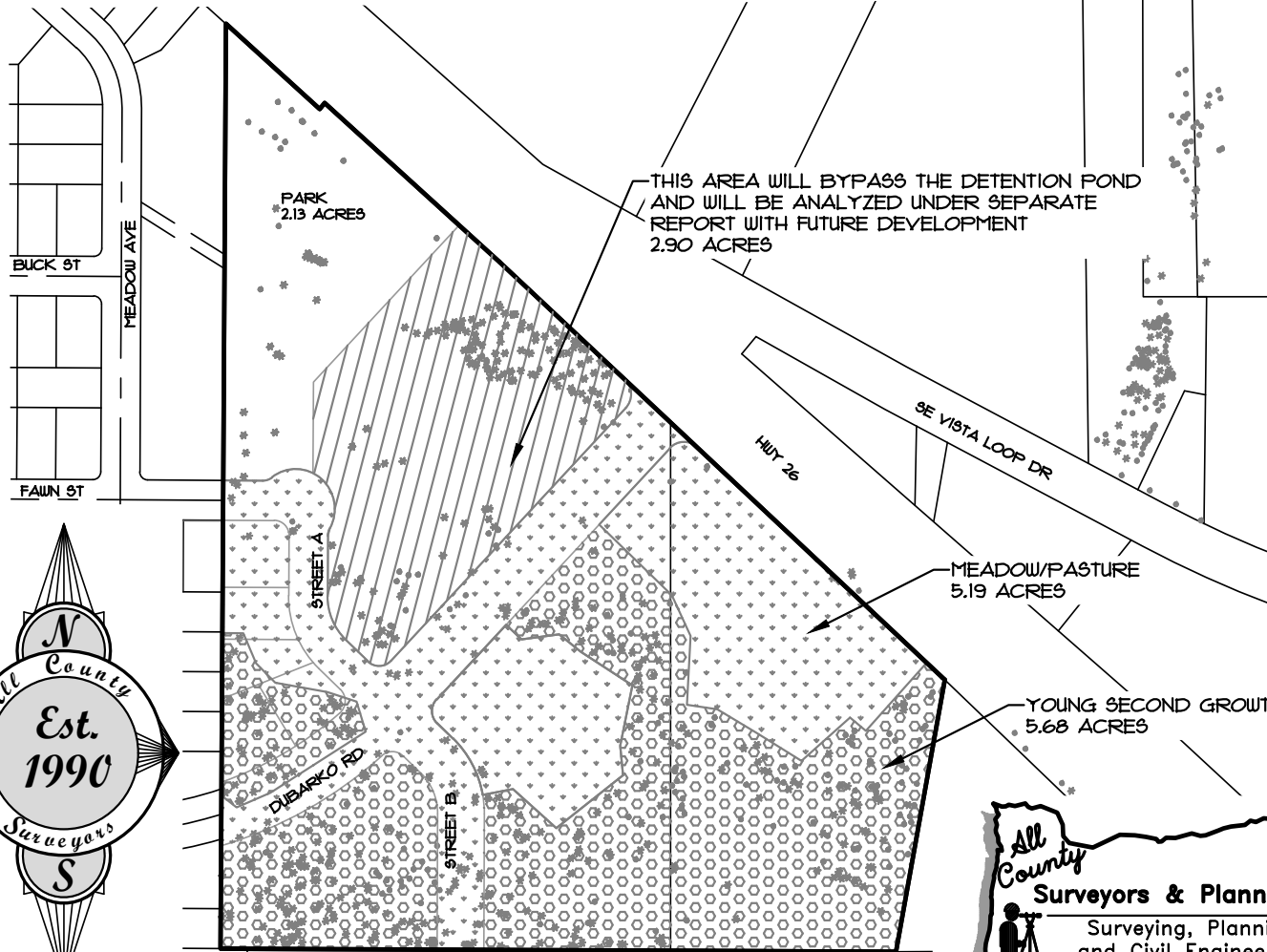
SITE LAYOUT



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19-035-Storm.dwg
 DATE OF PLOT: 11/20/19

PRE-DEVELOPED AREAS



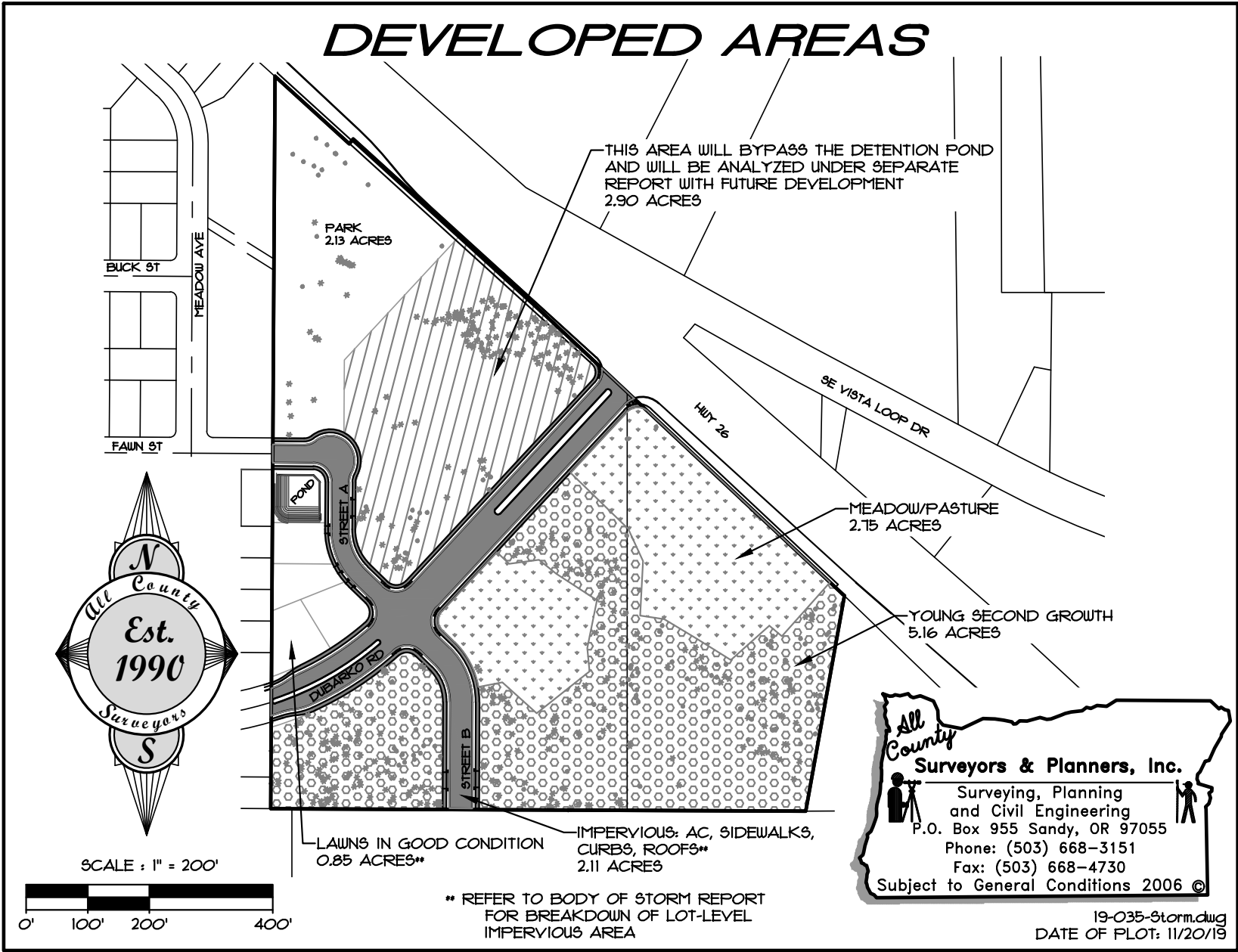
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 DATE OF PLOT: 11/20/19

DEVELOPED AREAS



Appendix B

- Standard Formulas
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Standard formulas used for the Time of Concentration Calculations

Overland Flow (max 300' total)

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

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

Shallow Concentrated Flow (after initial 300')

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

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

Flow in Swales

$$Q = (1.486/n) \times A \times R^{2/3} \times S^{1/2} \text{ (Manning's Equation)}$$

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

Flow in gutters

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

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

Flow in pipes

Mannings Equation

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

COEFFICIENTS

Ns = = Manning's coefficient (sheet flow)
n values are for sheet flow only

Design Value

- 0.011 Concrete or asphalt
- 0.010 Bare soil
- 0.020 Graveled surface
- 0.020 Bare clay - loam (eroded)
- 0.150 Grass (short prairie)
- 0.240 Grass (dense lawn)
- 0.410 Grass (bermuda)
- 0.400 Woods (light underbrush)
- 0.800 Woods (dense underbrush)

k = = time of concentration velocity factor (ft/s)

Design Value

- 3 Forest with heavy ground cover and meadows (n=0.10)
- 5 Brushy ground with some trees (n=0.060)
- 8 Fallow or cultivation (n=0.040)
- 9 High grass (n=0.035)
- 11 Short grass, pasture or lawns (n=0.030)
- 13 Nearly bare ground (n=0.025)
- 27 Paved and gravel areas (n=0.012)

n = = Manning's coefficient (channel)

Design Value

CONSTRUCTED CHANNELS

A. Earth, straight and uniform

- 0.018 Earth (straight and uniform)
- 0.025 Gravel (straight and uniform)
- 0.027 Grass (with weeds)

B. Earth, winding and sluggish

- 0.025 Earth (no vegetation)
- 0.030 Grass (some weeds)
- 0.035 Dense weeds (deep channel)
- 0.030 Earth (rubble bottom and sides)
- 0.035 Stony bottom and weedy banks
- 0.040 Cobble bottom with clean sides

C. Rock lined

- 0.035 Smooth and uniform
- 0.040 Jagged and irregular

D. Channels not maintained (weeds and brush uncut)

- 0.050 Dense weeds (high as flow depth)
- 0.050 Clean bottom (brush on sides)
- 0.100 Dense brush (high stage)
- 0.200 Water quality swales (mowed regulary)

NATURAL STREAMS

- 0.029 Clean (straight no pools)
- 0.035 Clean (straight no pools with weeds and stones)
- 0.039 Clean (winding pools)
- 0.042 Clean (winding pools weeds and stones)
- 0.052 Clean (winding pools weeds and large stones)
- 0.065 Weedy (sluggish with deep pools)
- 0.112 Very weedy (sluggish with deep pools)

SCS RUNOFF CURVE NUMBERS (CN)

For Selected Land Uses

LAND USE DESCRIPTION		RUNOFF CURVE NUMBERS (CN) BY HYDROLOGIC SOIL GROUP			
		A	B	C	D
Cultivated land (1):	winter condition	86	91	94	95
Mountain open areas:	low growing brush and grasslands	74	82	89	92
Meadow or pasture:		65	78	85	89
Wood or forest land:	undisturbed or older second growth	42	64	76	81
Wood or forest land:	young second growth or brush	55	72	81	86
Orchard:	with cover crop	81	88	92	94
Open spaces, lawns, parks, golf courses, cemeteries, landscaping					
Good condition:	grass cover on 75% or more of the area	68	80	86	90
Fair condition:	grass cover on 50% to 75% of the area	77	85	90	92
Gravel roads and parking lots		76	85	89	91
Dirt Roads and parking lots		72	82	87	89
Impervious surfaces:	pavement, roof, etc.	98	98	98	98
Open water bodies:	lakes, wetlands, ponds, etc.	100	100	100	100
Single Family Residential (2)		Select separate curve numbers for the pervious and impervious portion of the site or basin.			
Dwelling Unit/Gross Acre (DU/GA)	% Impervious (3)				
1.0	15				
2.0	25				
3.0	34				
4.0	42				
5.0	48				
6.0	52				
7.0	56				
Planned unit developments, condominiums, apartments, commercial businesses and industrial areas.	Use actual impervious area.				
(1) Detailed information relating to specific agricultural land uses is available in the National Engineering Engineering Handbook, Section 4, Hydrology, chapter 9, August 1972. (2) Assume site drains to storm system. (3) For this land use, the remaining pervious areas are assumed to be lawn in good condition.					

Project Name: Bull Run Terrace
Hydrograph Analysis Summary

Job # 019-035
 Date: 11/20/2019

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

Pre-Developed	
Pervious	
Area =	10.88 acres
CN =	83 na
Impervious	
Area =	0 acres
CN =	98 na
Tc =	30 min
Total A =	10.88 acres

Developed	
Pervious	
Area =	8.77 acres
CN =	83 na
Impervious	
Area =	2.11 acres
CN =	98 na
Tc =	5 min
Total A =	10.88 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.

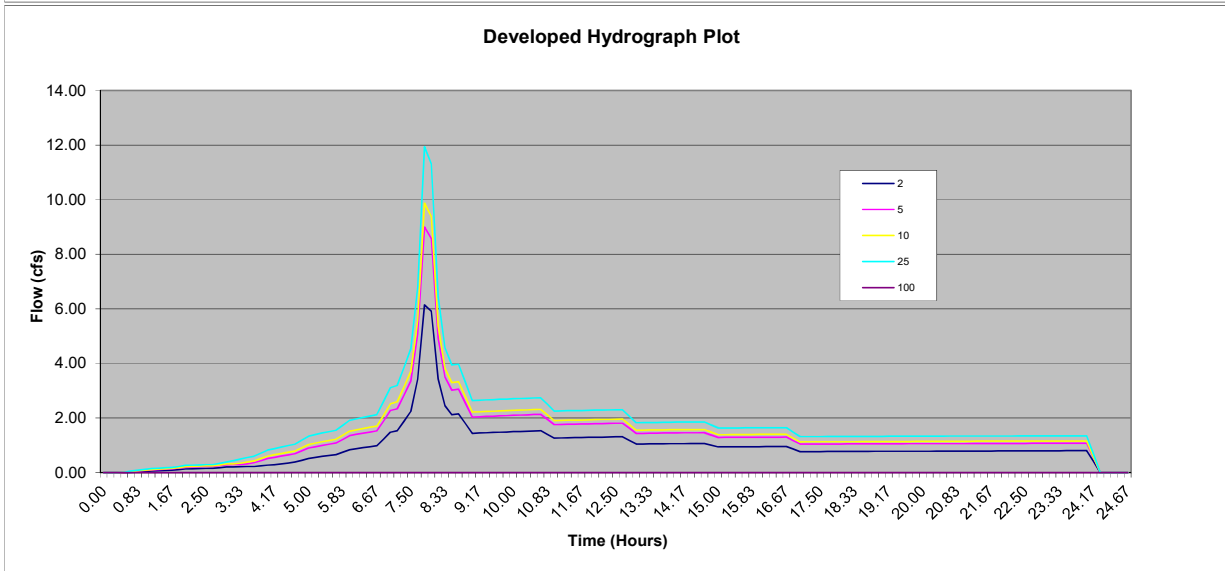
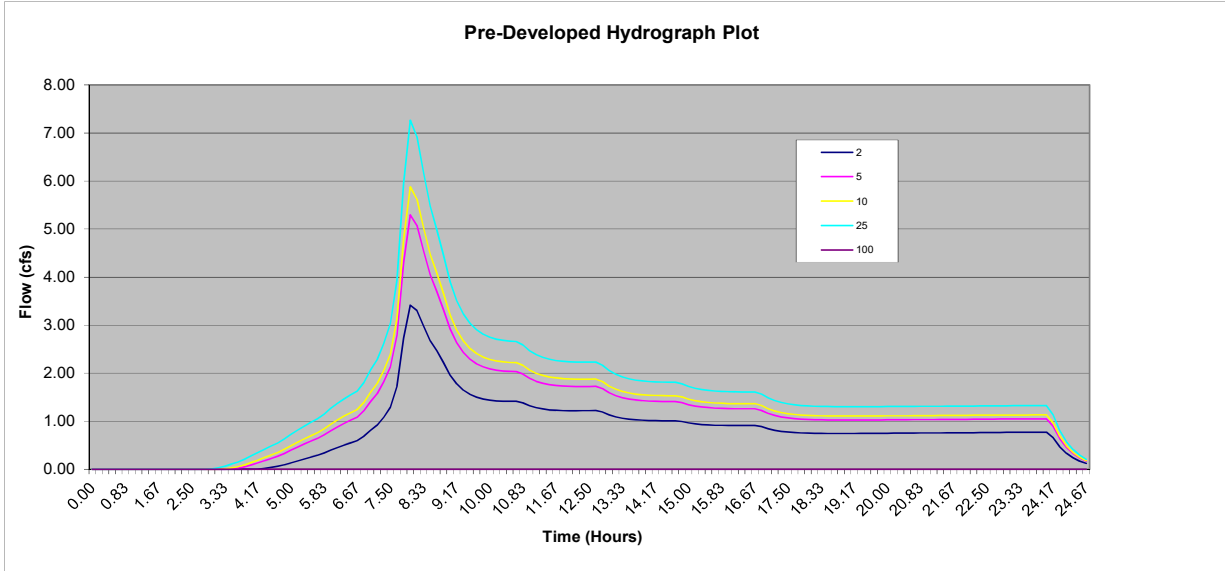
Pre-Developed Hydrographs							Developed Hydrographs					
Year	=====	2	5	10	25	100	2	5	10	25	100	
Qpeak	cfs =>	3.42	5.30	5.88	7.26	0.00	6.14	8.99	9.87	11.94	0.00	
Volume	cf =>	73,183	107,346	117,913	142,981	-	84,150	119,380	130,207	155,802	-	
Tpeak	min =>	480	480	480	480	10	470	470	470	470	10	
Tpeak	hr =>	8.00	8.00	8.00	8.00	0.17	7.83	7.83	7.83	7.83	0.17	
Hydrograph Name=>		2	5	10	25	100	2	5	10	25	100	
Time	Time	Hyd	Hyd	Hyd	Hyd	Hyd	Hyd	Hyd	Hyd	Hyd	Hyd	
(min)	(hr)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
10	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
20	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
30	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.00	
40	0.67	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.03	0.06	0.00	
50	0.83	0.00	0.00	0.00	0.00	0.00	0.02	0.06	0.07	0.09	0.00	
60	1.00	0.00	0.00	0.00	0.00	0.00	0.04	0.08	0.09	0.12	0.00	
70	1.17	0.00	0.00	0.00	0.00	0.00	0.06	0.10	0.11	0.15	0.00	
80	1.33	0.00	0.00	0.00	0.00	0.00	0.07	0.11	0.13	0.16	0.00	
90	1.50	0.00	0.00	0.00	0.00	0.00	0.08	0.13	0.14	0.18	0.00	
100	1.67	0.00	0.00	0.00	0.00	0.00	0.09	0.14	0.15	0.19	0.00	
110	1.83	0.00	0.00	0.00	0.00	0.00	0.11	0.17	0.19	0.23	0.00	
120	2.00	0.00	0.00	0.00	0.00	0.00	0.13	0.20	0.22	0.26	0.00	
130	2.17	0.00	0.00	0.00	0.00	0.00	0.14	0.21	0.23	0.27	0.00	
140	2.33	0.00	0.00	0.00	0.00	0.00	0.15	0.22	0.24	0.28	0.00	
150	2.50	0.00	0.00	0.00	0.00	0.00	0.16	0.22	0.24	0.29	0.00	
160	2.67	0.00	0.00	0.00	0.00	0.00	0.16	0.23	0.25	0.30	0.00	
170	2.83	0.00	0.00	0.00	0.00	0.00	0.18	0.26	0.28	0.33	0.00	
180	3.00	0.00	0.00	0.00	0.01	0.00	0.21	0.29	0.31	0.39	0.00	
190	3.17	0.00	0.00	0.00	0.03	0.00	0.21	0.29	0.32	0.44	0.00	
200	3.33	0.00	0.00	0.01	0.06	0.00	0.22	0.30	0.34	0.50	0.00	
210	3.50	0.00	0.01	0.03	0.11	0.00	0.22	0.32	0.39	0.55	0.00	
220	3.67	0.00	0.03	0.05	0.15	0.00	0.23	0.36	0.43	0.60	0.00	
230	3.83	0.00	0.05	0.09	0.21	0.00	0.25	0.44	0.51	0.71	0.00	
240	4.00	0.00	0.09	0.14	0.28	0.00	0.27	0.51	0.60	0.82	0.00	
250	4.17	0.01	0.13	0.19	0.35	0.00	0.29	0.56	0.65	0.88	0.00	
260	4.33	0.02	0.18	0.24	0.42	0.00	0.32	0.61	0.70	0.94	0.00	
270	4.50	0.04	0.23	0.30	0.48	0.00	0.35	0.65	0.75	0.99	0.00	
280	4.67	0.06	0.27	0.35	0.55	0.00	0.38	0.69	0.79	1.04	0.00	
290	4.83	0.10	0.33	0.42	0.63	0.00	0.45	0.79	0.91	1.19	0.00	
300	5.00	0.13	0.40	0.49	0.73	0.00	0.52	0.90	1.03	1.34	0.00	
310	5.17	0.17	0.46	0.56	0.82	0.00	0.56	0.95	1.08	1.39	0.00	
320	5.33	0.21	0.53	0.63	0.90	0.00	0.59	1.00	1.13	1.45	0.00	
330	5.50	0.25	0.59	0.70	0.98	0.00	0.63	1.04	1.18	1.50	0.00	
340	5.67	0.29	0.64	0.76	1.05	0.00	0.66	1.08	1.22	1.55	0.00	
350	5.83	0.34	0.72	0.84	1.15	0.00	0.75	1.22	1.37	1.73	0.00	
360	6.00	0.40	0.80	0.94	1.27	0.00	0.84	1.35	1.52	1.91	0.00	
370	6.17	0.45	0.88	1.03	1.37	0.00	0.88	1.40	1.57	1.97	0.00	
380	6.33	0.50	0.96	1.10	1.47	0.00	0.91	1.45	1.62	2.02	0.00	
390	6.50	0.55	1.02	1.18	1.55	0.00	0.95	1.49	1.66	2.07	0.00	
400	6.67	0.60	1.09	1.24	1.63	0.00	0.98	1.53	1.71	2.12	0.00	
410	6.83	0.69	1.22	1.39	1.81	0.00	1.22	1.89	2.11	2.61	0.00	
420	7.00	0.81	1.41	1.60	2.07	0.00	1.48	2.27	2.52	3.12	0.00	
430	7.17	0.92	1.57	1.78	2.28	0.00	1.54	2.34	2.59	3.19	0.00	
440	7.33	1.08	1.82	2.05	2.61	0.00	1.88	2.84	3.14	3.86	0.00	
450	7.50	1.29	2.13	2.40	3.04	0.00	2.24	3.37	3.71	4.54	0.00	
460	7.67	1.73	2.80	3.13	3.93	0.00	3.42	5.07	5.58	6.79	0.00	
470	7.83	2.73	4.30	4.79	5.96	0.00	6.14	8.99	9.87	11.94	0.00	
480	8.00	3.42	5.30	5.88	7.26	0.00	5.91	8.57	9.39	11.31	0.00	
490	8.17	3.31	5.08	5.62	6.92	0.00	3.44	4.93	5.39	6.46	0.00	
500	8.33	2.98	4.55	5.03	6.18	0.00	2.45	3.50	3.82	4.57	0.00	
510	8.50	2.68	4.05	4.48	5.48	0.00	2.12	3.02	3.30	3.94	0.00	
520	8.67	2.46	3.71	4.09	4.99	0.00	2.15	3.05	3.33	3.97	0.00	

Pre-Developed Hydrographs							Developed Hydrographs				
Year	=====	2	5	10	25	100	2	5	10	25	100
Qpeak	cfs =>	3.42	5.30	5.88	7.26	0.00	6.14	8.99	9.87	11.94	0.00
Volume	cf =>	73,183	107,346	117,913	142,981	-	84,150	119,380	130,207	155,802	-
Tpeak	min =>	480	480	480	480	10	470	470	470	470	10
Tpeak	hr =>	8.00	8.00	8.00	8.00	0.17	7.83	7.83	7.83	7.83	0.17
Hydrograph Name=>		2	5	10	25	100	2	5	10	25	100
Time	Time	Hyd	Hyd	Hyd	Hyd	Hyd	Hyd	Hyd	Hyd	Hyd	Hyd
(min)	(hr)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
530	8.83	2.22	3.33	3.66	4.46	0.00	1.80	2.55	2.78	3.31	0.00
540	9.00	1.96	2.92	3.21	3.91	0.00	1.44	2.04	2.22	2.64	0.00
550	9.17	1.78	2.63	2.90	3.51	0.00	1.45	2.05	2.23	2.65	0.00
560	9.33	1.65	2.43	2.67	3.23	0.00	1.46	2.06	2.24	2.66	0.00
570	9.50	1.56	2.29	2.52	3.04	0.00	1.47	2.07	2.25	2.67	0.00
580	9.67	1.50	2.20	2.41	2.90	0.00	1.48	2.08	2.26	2.68	0.00
590	9.83	1.46	2.13	2.34	2.81	0.00	1.49	2.09	2.27	2.70	0.00
600	10.00	1.44	2.09	2.29	2.75	0.00	1.50	2.10	2.28	2.71	0.00
610	10.17	1.42	2.06	2.25	2.71	0.00	1.51	2.11	2.29	2.71	0.00
620	10.33	1.42	2.04	2.24	2.68	0.00	1.52	2.12	2.30	2.72	0.00
630	10.50	1.41	2.04	2.22	2.67	0.00	1.53	2.13	2.31	2.73	0.00
640	10.67	1.42	2.03	2.22	2.66	0.00	1.53	2.14	2.32	2.74	0.00
650	10.83	1.38	1.98	2.16	2.59	0.00	1.40	1.95	2.11	2.50	0.00
660	11.00	1.32	1.89	2.07	2.47	0.00	1.27	1.76	1.91	2.26	0.00
670	11.17	1.28	1.83	2.00	2.39	0.00	1.27	1.77	1.91	2.26	0.00
680	11.33	1.26	1.79	1.95	2.33	0.00	1.28	1.77	1.92	2.27	0.00
690	11.50	1.24	1.76	1.92	2.29	0.00	1.28	1.78	1.92	2.27	0.00
700	11.67	1.23	1.74	1.90	2.26	0.00	1.29	1.78	1.93	2.28	0.00
710	11.83	1.22	1.73	1.89	2.25	0.00	1.29	1.79	1.93	2.28	0.00
720	12.00	1.22	1.73	1.88	2.24	0.00	1.30	1.79	1.94	2.29	0.00
730	12.17	1.22	1.72	1.88	2.23	0.00	1.30	1.80	1.94	2.29	0.00
740	12.33	1.22	1.72	1.88	2.23	0.00	1.31	1.80	1.95	2.30	0.00
750	12.50	1.22	1.72	1.88	2.23	0.00	1.31	1.80	1.95	2.30	0.00
760	12.67	1.23	1.73	1.88	2.23	0.00	1.31	1.81	1.96	2.31	0.00
770	12.83	1.19	1.68	1.83	2.17	0.00	1.18	1.62	1.76	2.07	0.00
780	13.00	1.13	1.59	1.73	2.06	0.00	1.05	1.44	1.56	1.83	0.00
790	13.17	1.09	1.53	1.67	1.98	0.00	1.05	1.44	1.56	1.83	0.00
800	13.33	1.06	1.49	1.62	1.92	0.00	1.05	1.44	1.56	1.84	0.00
810	13.50	1.04	1.46	1.59	1.88	0.00	1.05	1.45	1.56	1.84	0.00
820	13.67	1.03	1.44	1.57	1.86	0.00	1.06	1.45	1.57	1.84	0.00
830	13.83	1.02	1.43	1.55	1.84	0.00	1.06	1.45	1.57	1.84	0.00
840	14.00	1.02	1.42	1.54	1.83	0.00	1.06	1.45	1.57	1.85	0.00
850	14.17	1.01	1.42	1.54	1.82	0.00	1.06	1.46	1.57	1.85	0.00
860	14.33	1.01	1.41	1.53	1.81	0.00	1.07	1.46	1.58	1.85	0.00
870	14.50	1.01	1.41	1.53	1.81	0.00	1.07	1.46	1.58	1.85	0.00
880	14.67	1.01	1.41	1.53	1.81	0.00	1.07	1.46	1.58	1.86	0.00
890	14.83	1.00	1.39	1.50	1.78	0.00	1.01	1.38	1.49	1.74	0.00
900	15.00	0.97	1.35	1.46	1.72	0.00	0.94	1.29	1.39	1.63	0.00
910	15.17	0.95	1.32	1.43	1.69	0.00	0.94	1.29	1.39	1.63	0.00
920	15.33	0.93	1.30	1.41	1.66	0.00	0.95	1.29	1.39	1.63	0.00
930	15.50	0.92	1.28	1.39	1.64	0.00	0.95	1.29	1.40	1.64	0.00
940	15.67	0.92	1.27	1.38	1.63	0.00	0.95	1.29	1.40	1.64	0.00
950	15.83	0.91	1.27	1.37	1.62	0.00	0.95	1.30	1.40	1.64	0.00
960	16.00	0.91	1.26	1.37	1.62	0.00	0.95	1.30	1.40	1.64	0.00
970	16.17	0.91	1.26	1.37	1.61	0.00	0.95	1.30	1.40	1.64	0.00
980	16.33	0.91	1.26	1.37	1.61	0.00	0.96	1.30	1.40	1.64	0.00
990	16.50	0.91	1.26	1.37	1.61	0.00	0.96	1.30	1.41	1.65	0.00
1000	16.67	0.91	1.26	1.37	1.61	0.00	0.96	1.30	1.41	1.65	0.00
1010	16.83	0.89	1.23	1.33	1.56	0.00	0.86	1.17	1.27	1.48	0.00
1020	17.00	0.84	1.16	1.26	1.49	0.00	0.77	1.04	1.13	1.32	0.00
1030	17.17	0.81	1.12	1.21	1.43	0.00	0.77	1.05	1.13	1.32	0.00
1040	17.33	0.79	1.09	1.18	1.39	0.00	0.77	1.05	1.13	1.32	0.00
1050	17.50	0.78	1.07	1.16	1.36	0.00	0.77	1.05	1.13	1.32	0.00
1060	17.67	0.76	1.05	1.14	1.34	0.00	0.77	1.05	1.13	1.32	0.00
1070	17.83	0.76	1.04	1.13	1.33	0.00	0.77	1.05	1.13	1.32	0.00
1080	18.00	0.75	1.04	1.12	1.32	0.00	0.77	1.05	1.13	1.33	0.00
1090	18.17	0.75	1.03	1.12	1.31	0.00	0.78	1.05	1.13	1.33	0.00
1100	18.33	0.75	1.03	1.11	1.31	0.00	0.78	1.05	1.13	1.33	0.00
1110	18.50	0.75	1.03	1.11	1.31	0.00	0.78	1.05	1.14	1.33	0.00
1120	18.67	0.75	1.03	1.11	1.30	0.00	0.78	1.05	1.14	1.33	0.00
1130	18.83	0.75	1.03	1.11	1.30	0.00	0.78	1.05	1.14	1.33	0.00
1140	19.00	0.75	1.03	1.11	1.30	0.00	0.78	1.06	1.14	1.33	0.00
1150	19.17	0.75	1.03	1.11	1.30	0.00	0.78	1.06	1.14	1.33	0.00
1160	19.33	0.75	1.03	1.11	1.30	0.00	0.78	1.06	1.14	1.33	0.00
1170	19.50	0.75	1.03	1.11	1.30	0.00	0.78	1.06	1.14	1.33	0.00
1180	19.67	0.75	1.03	1.11	1.30	0.00	0.78	1.06	1.14	1.33	0.00
1190	19.83	0.75	1.03	1.11	1.31	0.00	0.78	1.06	1.14	1.33	0.00
1200	20.00	0.75	1.03	1.11	1.31	0.00	0.78	1.06	1.14	1.33	0.00
1210	20.17	0.75	1.03	1.11	1.31	0.00	0.79	1.06	1.14	1.34	0.00
1220	20.33	0.75	1.03	1.11	1.31	0.00	0.79	1.06	1.14	1.34	0.00
1230	20.50	0.75	1.03	1.12	1.31	0.00	0.79	1.06	1.15	1.34	0.00

Pre-Developed Hydrographs							Developed Hydrographs					
Year	=====	2	5	10	25	100	2	5	10	25	100	
Qpeak	cfs =>	3.42	5.30	5.88	7.26	0.00	6.14	8.99	9.87	11.94	0.00	
Volume	cf =>	73,183	107,346	117,913	142,981	-	84,150	119,380	130,207	155,802	-	
Tpeak	min =>	480	480	480	480	10	470	470	470	470	10	
Tpeak	hr =>	8.00	8.00	8.00	8.00	0.17	7.83	7.83	7.83	7.83	0.17	
Hydrograph Name=>		2	5	10	25	100	2	5	10	25	100	
Time	Time	Hyd	Hyd	Hyd	Hyd	Hyd	Hyd	Hyd	Hyd	Hyd	Hyd	
(min)	(hr)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	
1240	20.67	0.75	1.03	1.12	1.31	0.00	0.79	1.06	1.15	1.34	0.00	
1250	20.83	0.76	1.03	1.12	1.31	0.00	0.79	1.06	1.15	1.34	0.00	
1260	21.00	0.76	1.03	1.12	1.31	0.00	0.79	1.07	1.15	1.34	0.00	
1270	21.17	0.76	1.04	1.12	1.31	0.00	0.79	1.07	1.15	1.34	0.00	
1280	21.33	0.76	1.04	1.12	1.31	0.00	0.79	1.07	1.15	1.34	0.00	
1290	21.50	0.76	1.04	1.12	1.31	0.00	0.79	1.07	1.15	1.34	0.00	
1300	21.67	0.76	1.04	1.12	1.31	0.00	0.79	1.07	1.15	1.34	0.00	
1310	21.83	0.76	1.04	1.12	1.32	0.00	0.79	1.07	1.15	1.34	0.00	
1320	22.00	0.76	1.04	1.12	1.32	0.00	0.79	1.07	1.15	1.34	0.00	
1330	22.17	0.76	1.04	1.12	1.32	0.00	0.79	1.07	1.15	1.34	0.00	
1340	22.33	0.76	1.04	1.12	1.32	0.00	0.80	1.07	1.15	1.34	0.00	
1350	22.50	0.76	1.04	1.13	1.32	0.00	0.80	1.07	1.15	1.35	0.00	
1360	22.67	0.77	1.04	1.13	1.32	0.00	0.80	1.07	1.15	1.35	0.00	
1370	22.83	0.77	1.04	1.13	1.32	0.00	0.80	1.07	1.16	1.35	0.00	
1380	23.00	0.77	1.05	1.13	1.32	0.00	0.80	1.07	1.16	1.35	0.00	
1390	23.17	0.77	1.05	1.13	1.32	0.00	0.80	1.07	1.16	1.35	0.00	
1400	23.33	0.77	1.05	1.13	1.32	0.00	0.80	1.07	1.16	1.35	0.00	
1410	23.50	0.77	1.05	1.13	1.32	0.00	0.80	1.08	1.16	1.35	0.00	
1420	23.67	0.77	1.05	1.13	1.32	0.00	0.80	1.08	1.16	1.35	0.00	
1430	23.83	0.77	1.05	1.13	1.33	0.00	0.80	1.08	1.16	1.35	0.00	
1440	24.00	0.77	1.05	1.13	1.33	0.00	0.80	1.08	1.16	1.35	0.00	
1450	24.17	0.66	0.90	0.97	1.14	0.00	0.40	0.54	0.58	0.68	0.00	
1460	24.33	0.47	0.64	0.69	0.81	0.00	0.00	0.00	0.00	0.00	0.00	
1470	24.50	0.34	0.46	0.50	0.58	0.00	0.00	0.00	0.00	0.00	0.00	
1480	24.67	0.24	0.33	0.35	0.41	0.00	0.00	0.00	0.00	0.00	0.00	
1490	24.67	0.17	0.23	0.25	0.30	0.00	0.00	0.00	0.00	0.00	0.00	
1500	24.67	0.12	0.17	0.18	0.21	0.00	0.00	0.00	0.00	0.00	0.00	

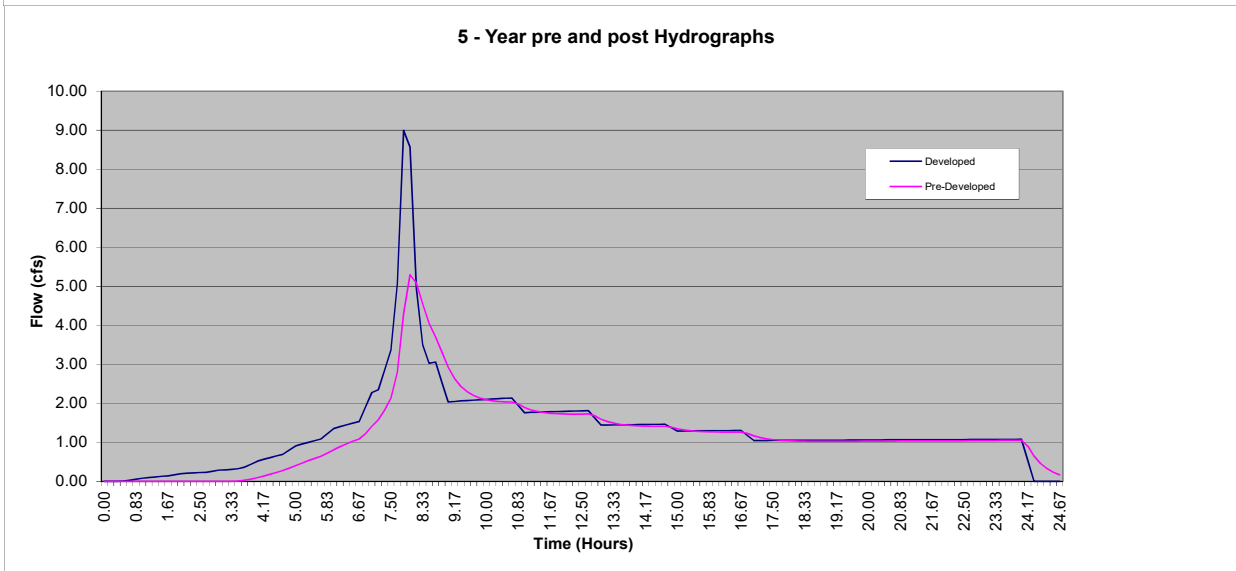
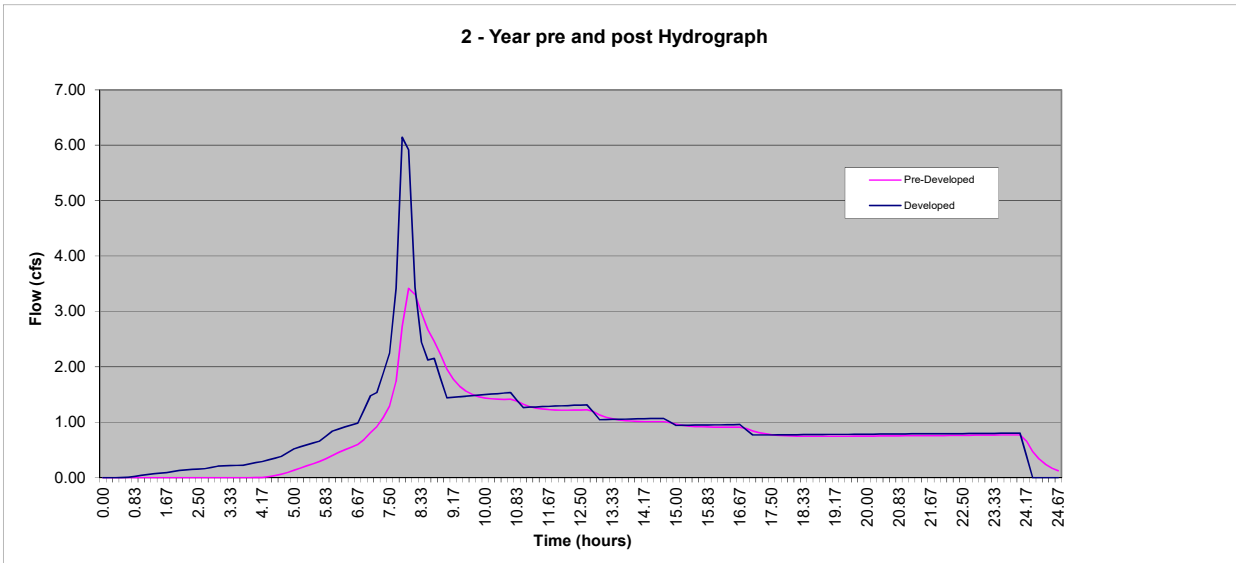
Pre-Developed Hydrographs						
Year	=====	2	5	10	25	100
Qpeak	cfs =>	3.42	5.30	5.88	7.26	0.00
Volume	cf =>	73,183	107,346	117,913	142,981	-
Tpeak	min =>	480	480	480	480	10
Tpeak	hr =>	8.00	8.00	8.00	8.00	0.17
Hydrograph Name=>		2	5	10	25	100
Time	Time	Hyd	Hyd	Hyd	Hyd	Hyd
(min)	(hr)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)

Developed Hydrographs					
	2	5	10	25	100
Qpeak	6.14	8.99	9.87	11.94	0.00
Volume	84,150	119,380	130,207	155,802	-
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)



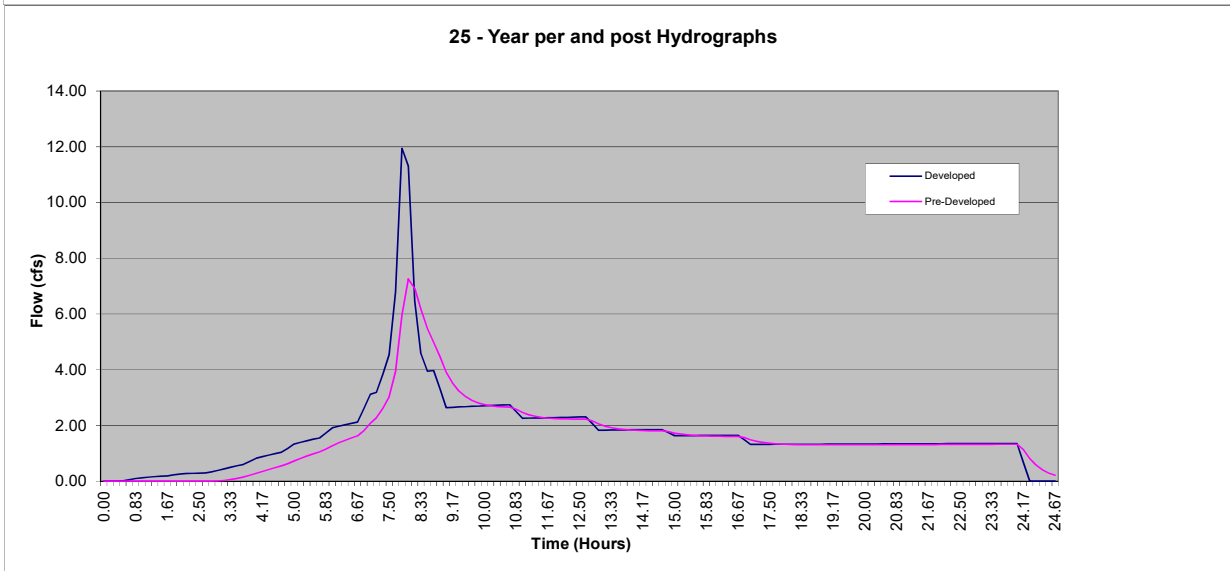
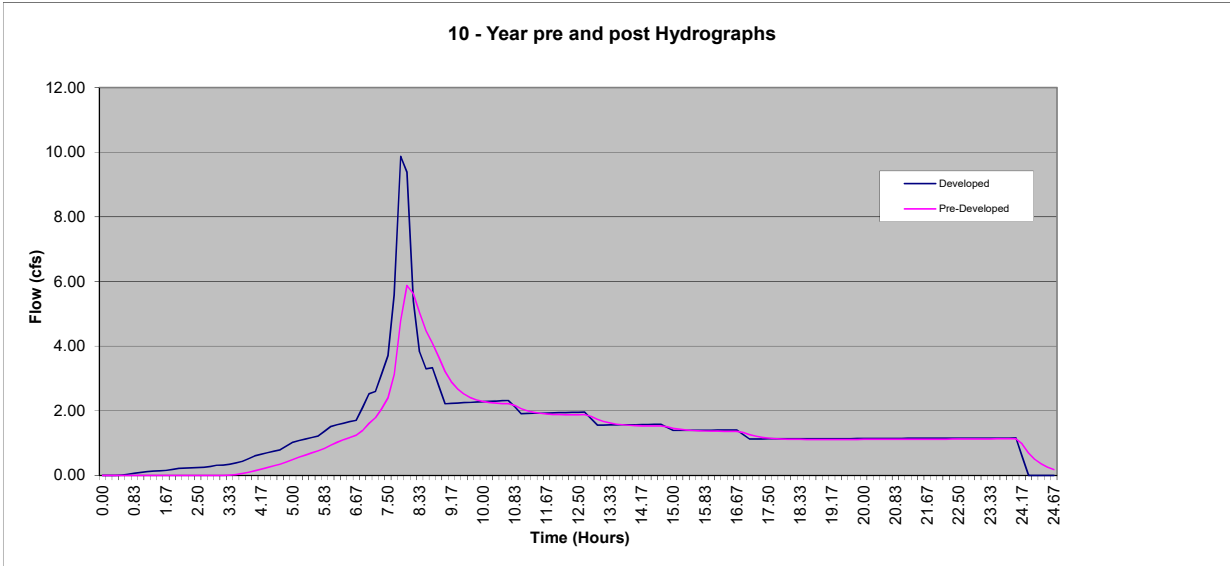
Pre-Developed Hydrographs						
Year	=====	2	5	10	25	100
Qpeak	cfs =>	3.42	5.30	5.88	7.26	0.00
Volume	cf =>	73,183	107,346	117,913	142,981	-
Tpeak	min =>	480	480	480	480	10
Tpeak	hr =>	8.00	8.00	8.00	8.00	0.17
Hydrograph Name=>		2	5	10	25	100
Time	Time	Hyd	Hyd	Hyd	Hyd	Hyd
(min)	(hr)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)

Developed Hydrographs					
	2	5	10	25	100
Qpeak	6.14	8.99	9.87	11.94	0.00
Volume	84,150	119,380	130,207	155,802	-
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)



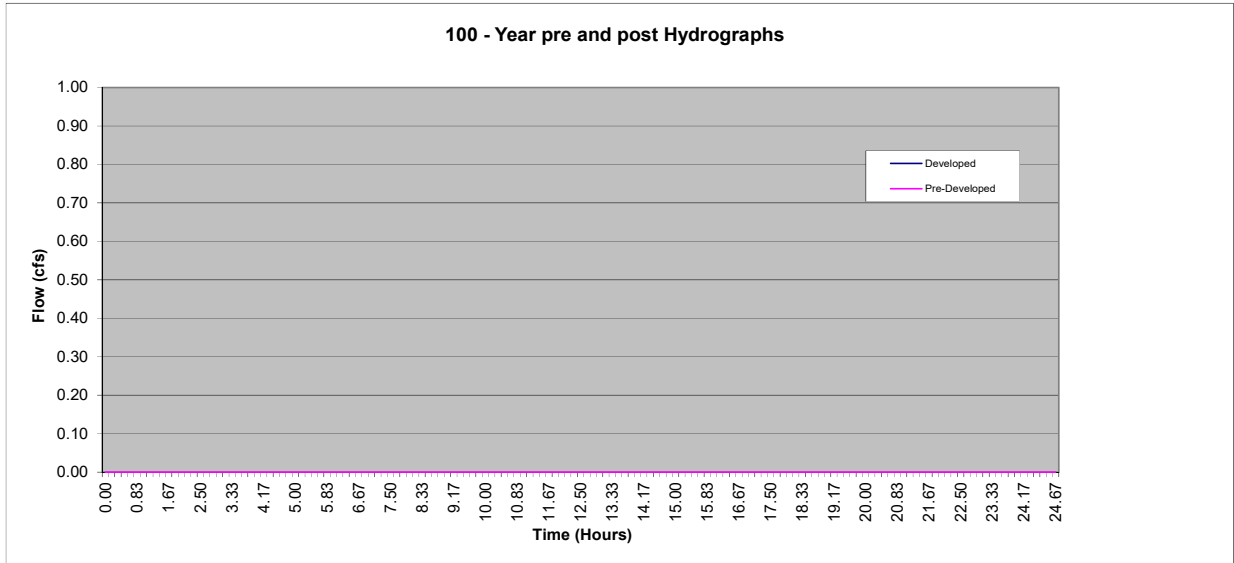
Pre-Developed Hydrographs						
Year	=====	2	5	10	25	100
Qpeak	cfs =>	3.42	5.30	5.88	7.26	0.00
Volume	cf =>	73,183	107,346	117,913	142,981	-
Tpeak	min =>	480	480	480	480	10
Tpeak	hr =>	8.00	8.00	8.00	8.00	0.17
Hydrograph Name=>		2	5	10	25	100
Time	Time	Hyd	Hyd	Hyd	Hyd	Hyd
(min)	(hr)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)

Developed Hydrographs					
	2	5	10	25	100
Qpeak	6.14	8.99	9.87	11.94	0.00
Volume	84,150	119,380	130,207	155,802	-
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 =>	3.42	5.30	5.88	7.26	0.00
Volume	cf =>	73,183	107,346	117,913	142,981	-
Tpeak	min =>	480	480	480	480	10
Tpeak	hr =>	8.00	8.00	8.00	8.00	0.17
Hydrograph Name=>		2	5	10	25	100
Time	Time	Hyd	Hyd	Hyd	Hyd	Hyd
(min)	(hr)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)

Developed Hydrographs					
	2	5	10	25	100
Qpeak	6.14	8.99	9.87	11.94	0.00
Volume	84,150	119,380	130,207	155,802	-
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: Bull Run Terrace
Detention System Summary

Job # 019-035
 Date: 11/20/2019

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

1) Detention Facility Design Input:

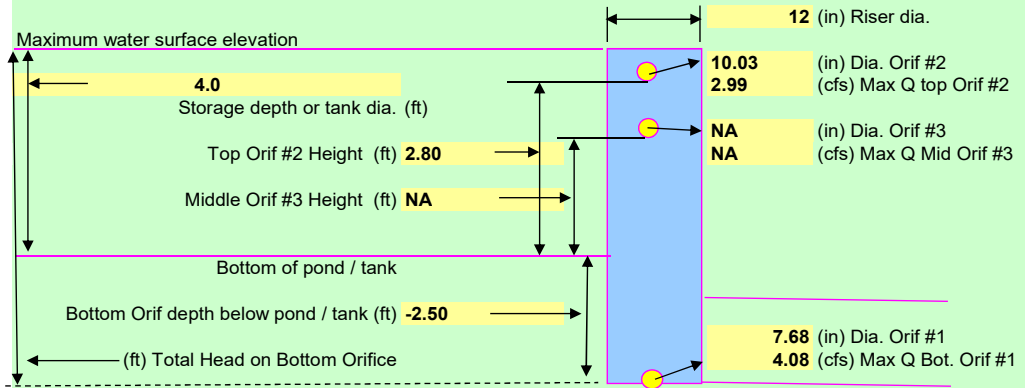
2) Type of facility:	USER	
3) Pond side slopes:	3 NA in USER mode	
4) Pond storage depth:	4 ft (from bottom of pond to overflow)	
5) Vertical permeability:	0 min/in	
6) Number of orifices:	2	
7) Riser dia. =>	12 in	
8) Orifice coefficient:	0.62 (typically 0.62)	
9) IE - bottom orifice:	-2.5 ft (distance below bottom of pond - Negative #)	
10) Max Q Bottom Orif. #1	4.08 cfs	
11) Top Orif #2 Height =	2.8 ft	
12) Max Q Mid Orif. #3	0.00 cfs	Orifice not being used
13) Mid Orif #3 Height =	0.90 ft	Orifice not being used

Detention Facility Design Results:

Performance year	Developed Inflow cfs	Pre-Developed Outflow cfs	Actual Outflow cfs	Peak Stage ft	Storage cf
100	0	0	0	0	-
25	11.94	7.26	7.07	4.00	12,323
10	9.87	5.88	5.71	3.27	9,696
5	8.99	5.30	4.77	2.94	8,562
2	6.14	3.42	3.23	1.57	4,252
Required Storage =====					12,323

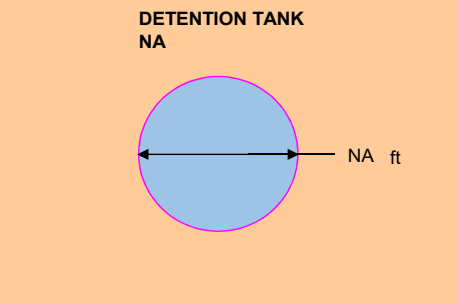
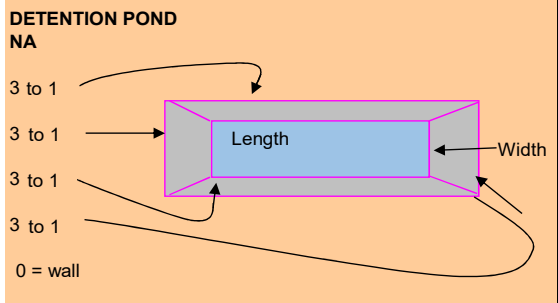
Total Q =	Bottom Orif. 4.08	Middle Orif. 0.00	Top Orif. 2.99	Optional Weir Design (for top orifice)
Head (ft) =	6.50	0.00	1.20	1.16 La (ft)
Dist. from bottom of pond (ft) =	-2.50	NA	2.80	132.65 < deg.
Orif. Dia. (in) =	7.68	0.00	10.03	Weir is an option

FLOW CONTROL STRUCTURE SCHEMATIC



Project Name: Bull Run Terrace
 Detention Facility Type
 Job # 019-035
 Date: 11/20/2019

Detention Facility Type:
USER
 L = NA ft
 W = 40.0 ft
 D = 4.0 ft
 Pond Area = NA sf

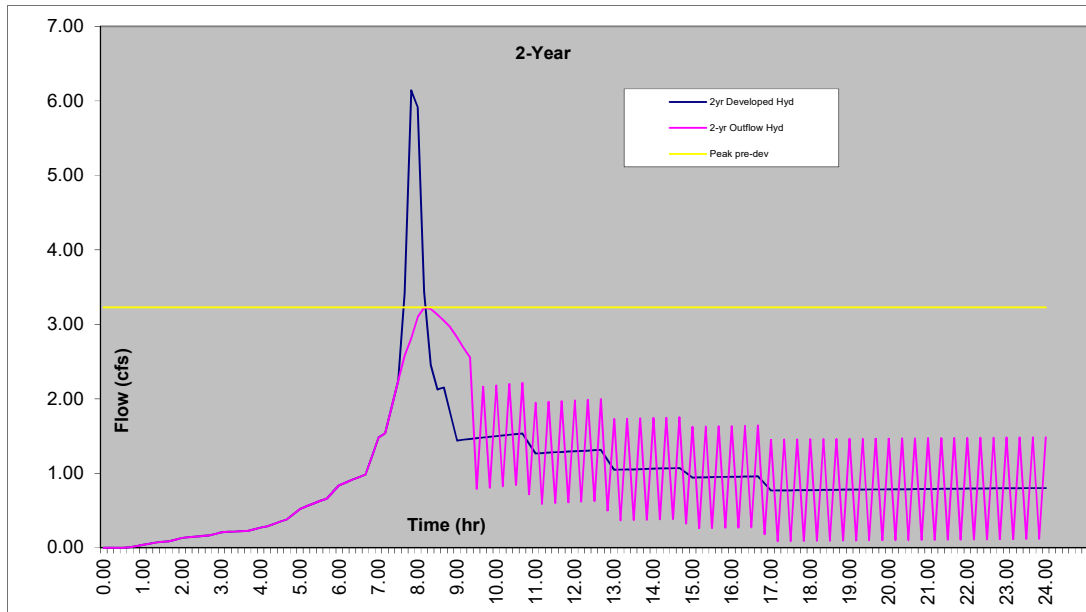
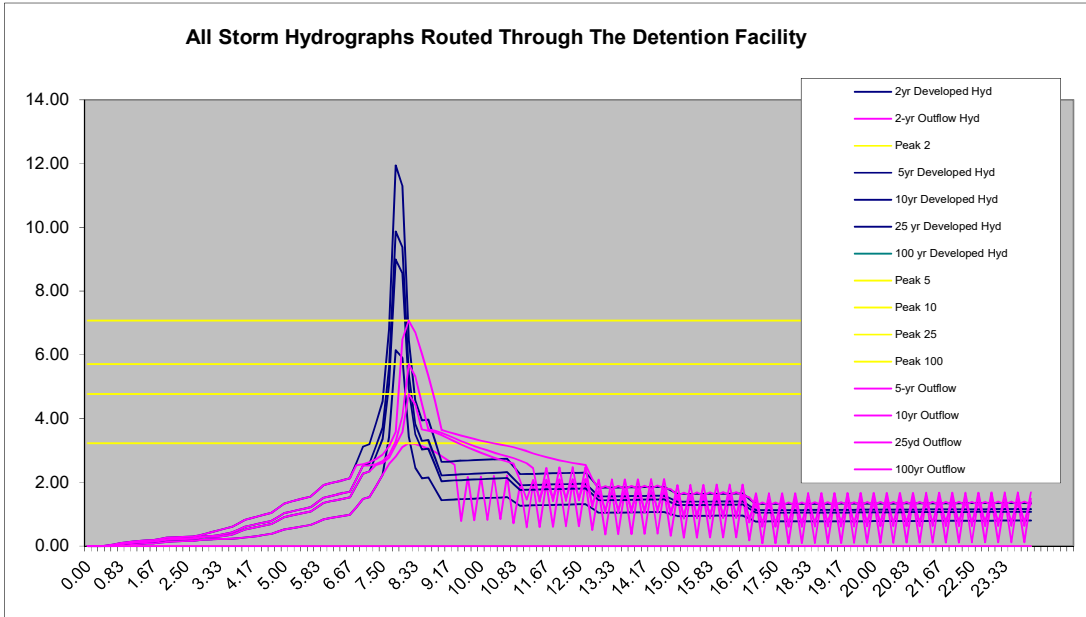


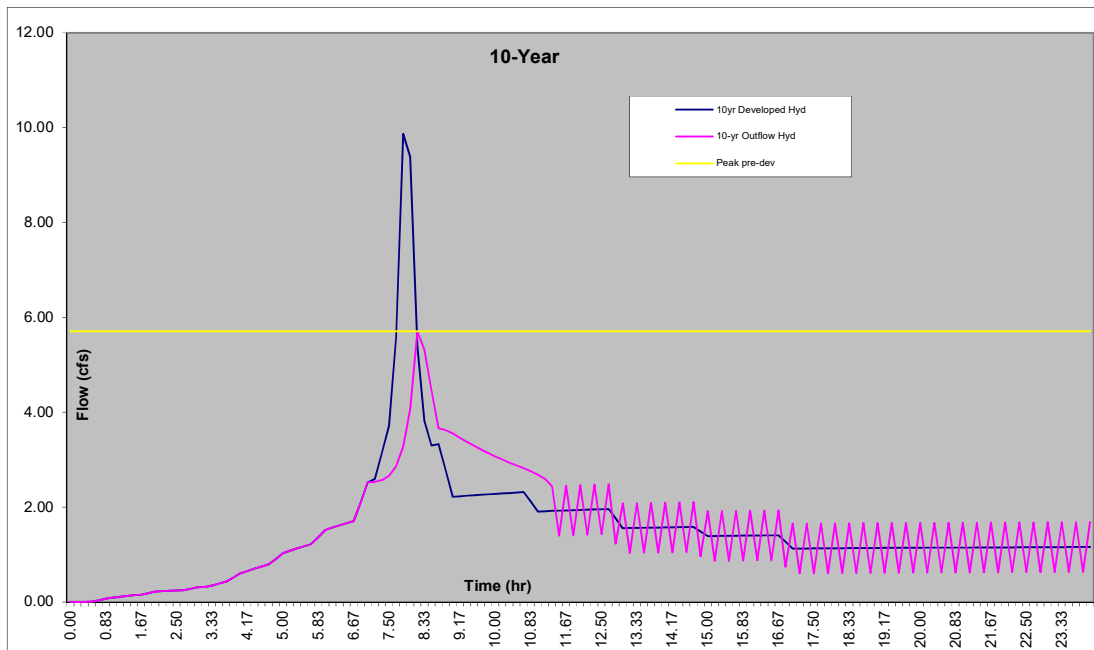
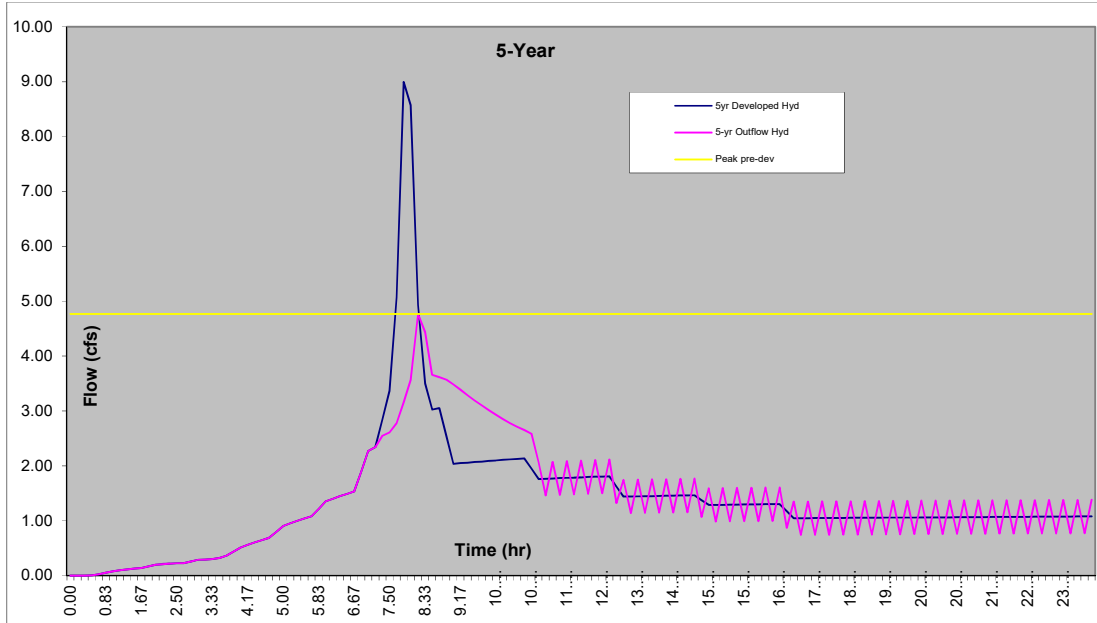
USER DEFINED POND

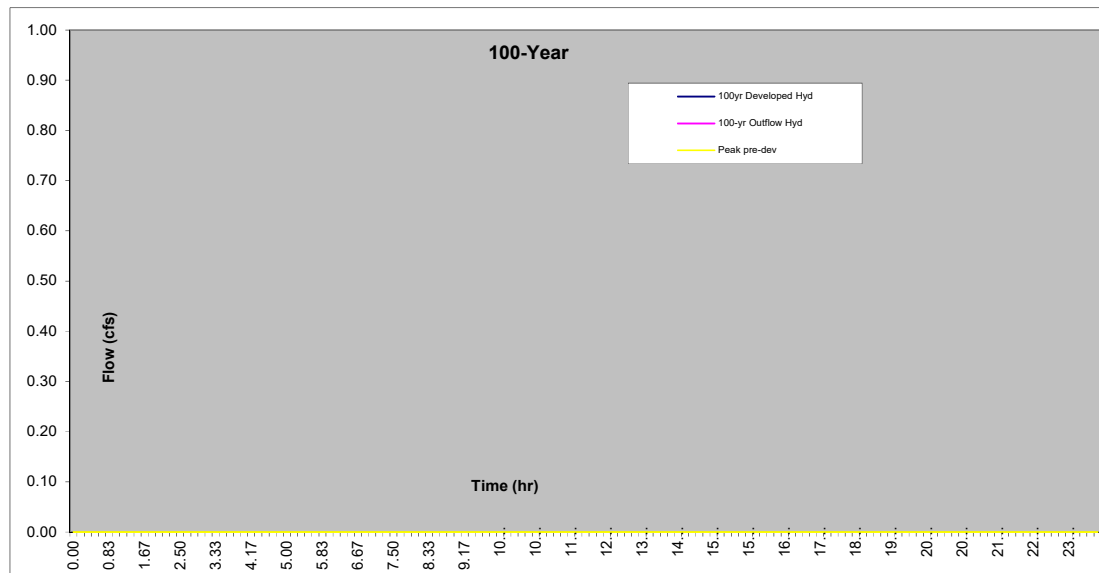
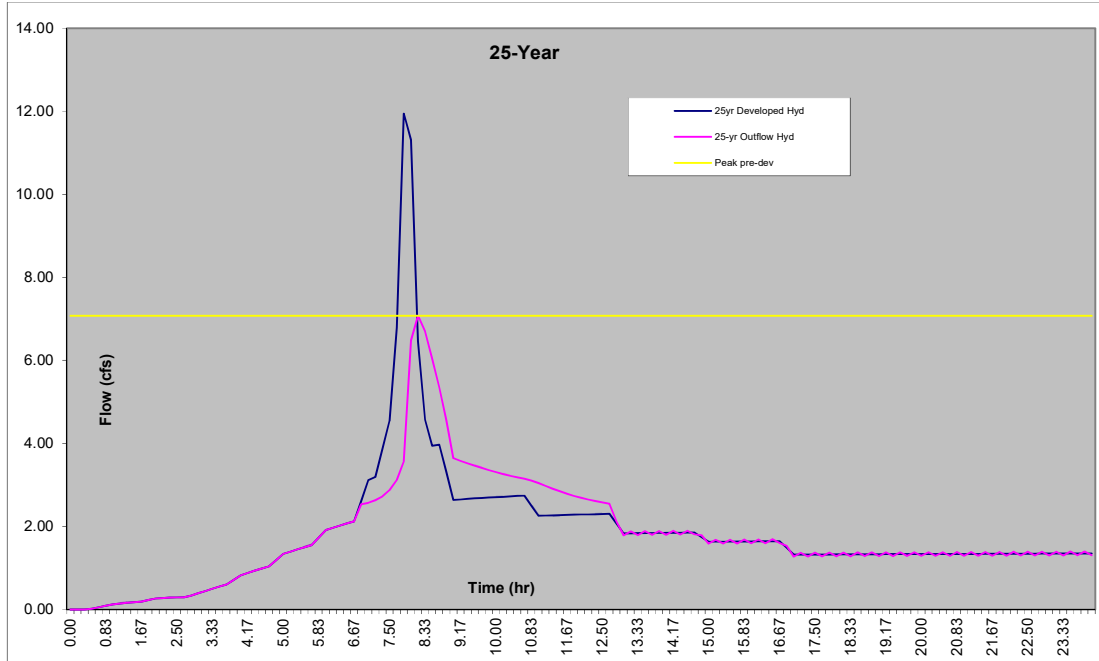
Pond Geometry

Stage (ft)	Area (sf)
0	2,443
1	2,750
2	3,070
3	3,405
4	3,754
5	4,000
6	4,500
7	5,000
8	5,500
9	6,000
10	6,500
11	7,000
12	7,500
13	8,000
14	8,500
15	9,000

Stage 1
 Stage 0



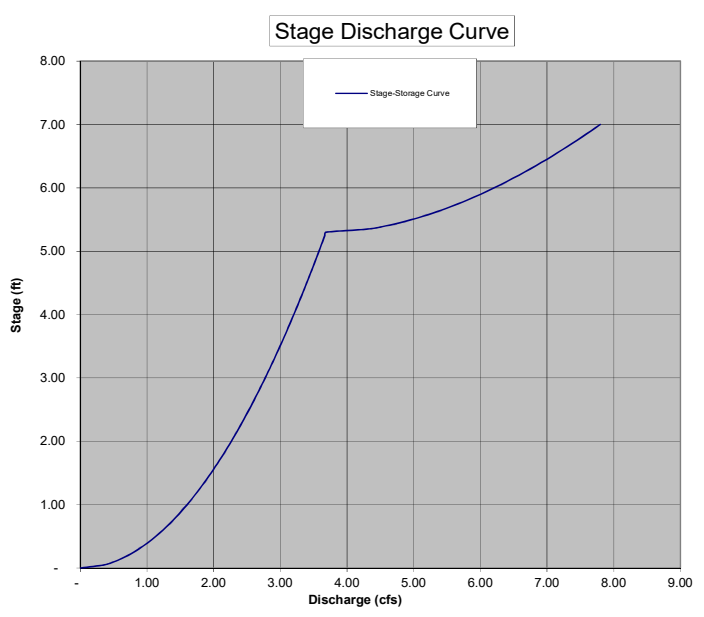
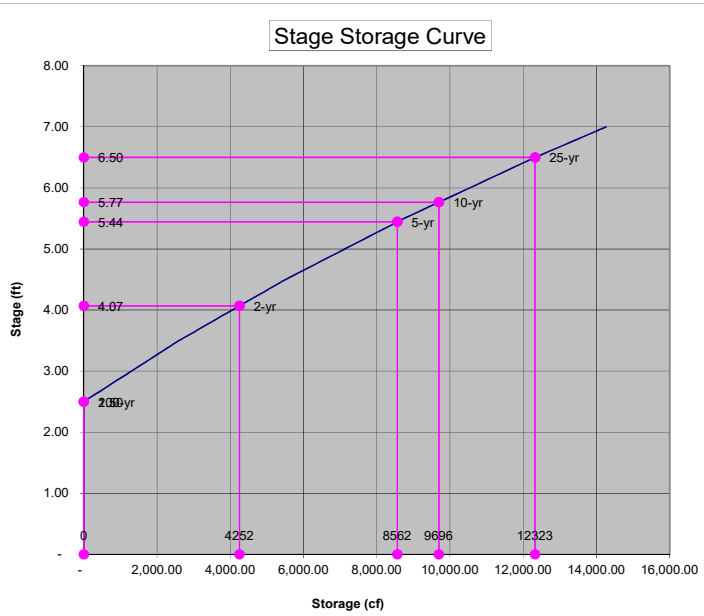




Project Name: Bull Run Terrace
Stage Storage Summary

Job # 019-035
 Date: 11/20/2019

Stage ft	Storage cf	Discharge cfs
-	-	-
0.05	-	0.36
0.10	-	0.51
0.15	-	0.62
0.20	-	0.72
0.25	-	0.80
0.30	-	0.88
0.35	-	0.95
0.40	-	1.01
0.45	-	1.07
0.50	-	1.13
0.55	-	1.19
0.60	-	1.24
0.65	-	1.29
0.70	-	1.34
0.75	-	1.39
0.80	-	1.43
0.85	-	1.48
0.90	-	1.52
0.95	-	1.56
1.00	-	1.60
1.05	-	1.64
1.10	-	1.68
1.15	-	1.72
1.20	-	1.75
1.25	-	1.79
1.30	-	1.82
1.35	-	1.86
1.40	-	1.89
1.45	-	1.93
1.50	-	1.96
1.55	-	1.99
1.60	-	2.02
1.65	-	2.06
1.70	-	2.09
1.75	-	2.12
1.80	-	2.15
1.85	-	2.18
1.90	-	2.21
1.95	-	2.23
2.00	-	2.26
2.05	-	2.29
2.10	-	2.32
2.15	-	2.35
2.20	-	2.37
2.25	-	2.40
2.30	-	2.43
2.35	-	2.45
2.40	-	2.48
2.45	-	2.50
2.50	-	2.53
2.55	129.83	2.56
2.60	259.65	2.58
2.65	389.48	2.61
2.70	519.30	2.63
2.75	649.13	2.65
2.80	778.95	2.68
2.85	908.78	2.70
2.90	1,038.60	2.73
2.95	1,168.43	2.75
3.00	1,298.25	2.77
3.05	1,428.08	2.79
3.10	1,557.90	2.82
3.15	1,687.73	2.84
3.20	1,817.55	2.86
3.25	1,947.38	2.88



Stage ft	Storage cf	Discharge cfs
3.30	2,077.20	2.91
3.35	2,207.03	2.93
3.40	2,336.85	2.95
3.45	2,466.68	2.97
3.50	2,596.50	2.99
3.55	2,742.00	3.02
3.60	2,887.50	3.04
3.65	3,033.00	3.06
3.70	3,178.50	3.08
3.75	3,324.00	3.10
3.80	3,469.50	3.12
3.85	3,615.00	3.14
3.90	3,760.50	3.16
3.95	3,906.00	3.18
4.00	4,051.50	3.20
4.05	4,197.00	3.22
4.10	4,342.50	3.24
4.15	4,488.00	3.26
4.20	4,633.50	3.28
4.25	4,779.00	3.30
4.30	4,924.50	3.32
4.35	5,070.00	3.34
4.40	5,215.50	3.36
4.45	5,361.00	3.38
4.50	5,506.50	3.39
4.55	5,668.38	3.41
4.60	5,830.25	3.43
4.65	5,992.13	3.45
4.70	6,154.00	3.47
4.75	6,315.88	3.49
4.80	6,477.75	3.51
4.85	6,639.63	3.52
4.90	6,801.50	3.54
4.95	6,963.38	3.56
5.00	7,125.25	3.58
5.05	7,287.13	3.60
5.10	7,449.00	3.61
5.15	7,610.88	3.63
5.20	7,772.75	3.65
5.25	7,934.63	3.67
5.30	8,096.50	3.68
5.35	8,258.38	4.31
5.40	8,420.25	4.58
5.45	8,582.13	4.79
5.50	8,744.00	4.97
5.55	8,922.98	5.14
5.60	9,101.95	5.28
5.65	9,280.93	5.42
5.70	9,459.90	5.55
5.75	9,638.88	5.67
5.80	9,817.85	5.79
5.85	9,996.83	5.90
5.90	10,175.80	6.00
5.95	10,354.78	6.11
6.00	10,533.75	6.21
6.05	10,712.73	6.30
6.10	10,891.70	6.40
6.15	11,070.68	6.49
6.20	11,249.65	6.58
6.25	11,428.63	6.66
6.30	11,607.60	6.75
6.35	11,786.58	6.83
6.40	11,965.55	6.91
6.45	12,144.53	6.99
6.50	12,323.50	7.07
6.55	12,517.35	7.15
6.60	12,711.20	7.23
6.65	12,905.05	7.30
6.70	13,098.90	7.38
6.75	13,292.75	7.45
6.80	13,486.60	7.52
6.85	13,680.45	7.59

Stage ft	Storage cf	Discharge cfs
6.90	13,874.30	7.66
6.95	14,068.15	7.73
7.00	14,262.00	7.80

Project Name: Bull Run Terrace
Rectangular, Sharp Crested Weir Calculations

Job # 019-035
 Date: 11/20/2019

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

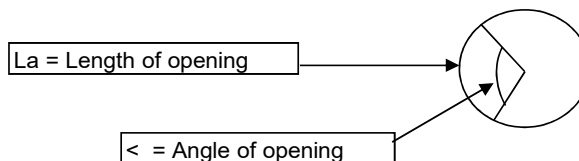
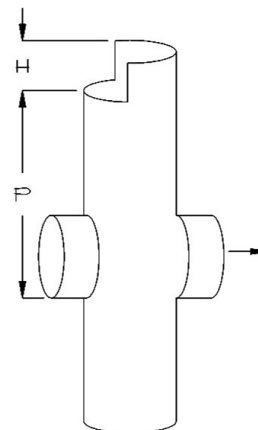
- Q = Flow over weir (cfs)
- C = $3.27 + 0.40 H/P$ (ft)
- L = Adjusted length of weir ($L_a - 0.1H \times 2$) this is to account for side constraints
- L_a = Actual length of weir along pipes interior circumference (ft)
- H = Distance from bottom of weir to maximum head (ft)
- P = Distance from bottom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

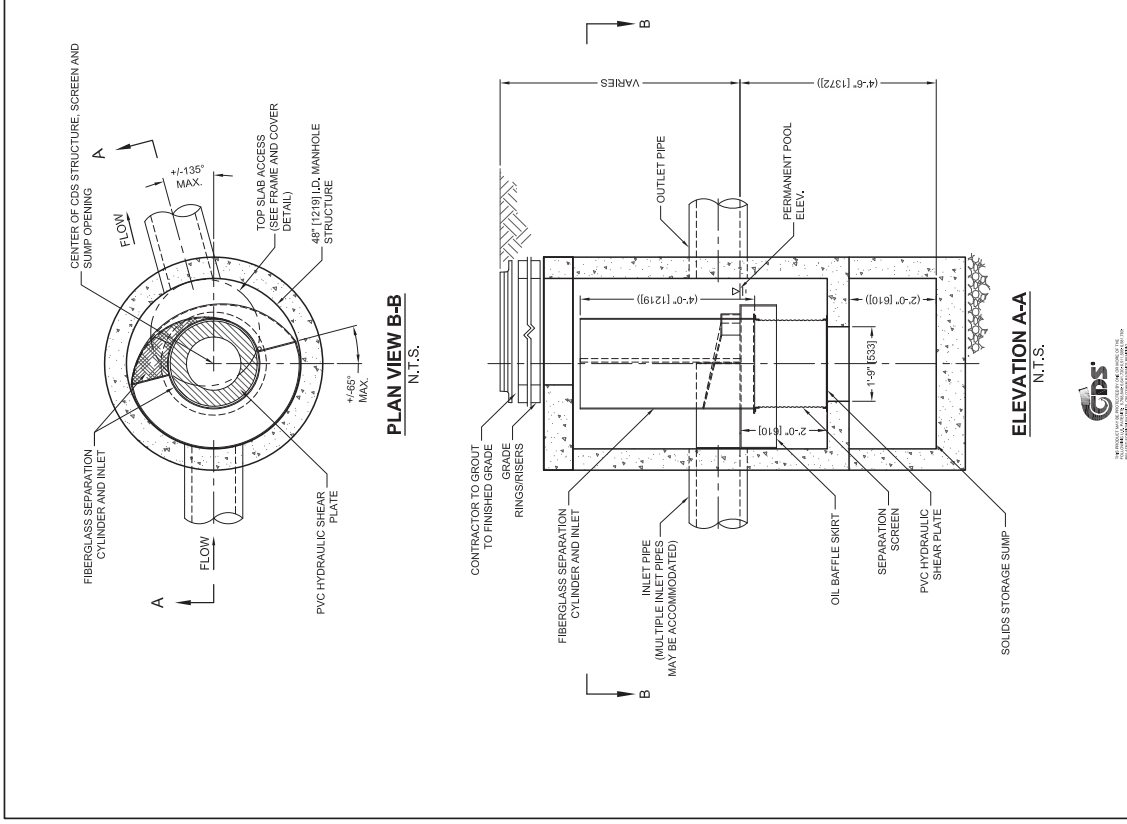
Given:

Q	2.99	cfs
H	1.20	ft
P	5.30	ft
D	12	in

Find:

C	3.36	ft
L	0.92	ft
L_a	1.16	ft
\angle	133	degrees



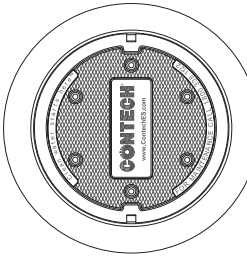


CDS2015-4-C DESIGN NOTES

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

THE 87 IN. (2214 MM) CDS2015-4-C CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

CONFIGURATION DESCRIPTION
GRATED INLET ONLY (NO INLET PIPE)
GRATED INLET WITH INLET PIPE OR PIPES
CURB INLET ONLY (NO INLET PIPE)
CURB INLET WITH INLET PIPE OR PIPES
SEPARATE OIL BAFFLE (SINGLE INLET PIPE REQUIRED FOR THIS CONFIGURATION)
SEDIMENT WEIR FOR NIDEP/ INICAT 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**
- PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
 - DIMENSIONS MARKED WITH (1) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
 - FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.conteches.com
 - CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING, INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
 - CONTRACTOR TO PROVIDE WATER ELEVATION AT OR BELOW THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION.
 - PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.
- INSTALLATION NOTES**
- ANY SUB-BASE BACKFILL DEPTH AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
 - CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE (LIFTING CLUTCHES PROVIDED).
 - CONTRACTOR TO PROVIDE ANTI-FLOTATION BALLAST BETWEEN ALL STRUCTURE SECTIONS, AND ASSEMBLE STRUCTURE.
 - CONTRACTOR TO PROVIDE INSTALL AND GROUT PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.
 - 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 45389
800-338-1122 513-645-7000 513-645-7993 FAX

CDS2015-4-C
INLINE CDS
STANDARD DETAIL





**BULL RUN TERRACE SUBDIVISION
TRAFFIC IMPACT STUDY
(SEPTEMBER 2022 UPDATE)**

SANDY, OREGON



RENEWS: 12/31/2023

PREPARED FOR:
Alex Reverman

PREPARED BY:
Michael Ard, PE
Ard Engineering

DATE:
September 29, 2022

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



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EXECUTIVE SUMMARY

1. A property located on the south side of US Highway 26 opposite SE Vista Loop Drive in Sandy, Oregon is proposed for a subdivision which will support up to 192 apartment units and 8 duplex dwelling units, along with future commercial uses. The site will take access via an extension of Dubarko Road through the property, connecting the existing stub to Highway 26 opposite SE Vista Loop Drive.
2. Upon completion of residential development within the R-1, R-2, R-3 and C-3 zones, the subject property is projected to generate 94 new site trips during the morning peak hour, 115 trips during the evening peak hour, and 1,418 new daily site trips.
3. Based on the operational analysis, the study intersections currently operate acceptably and are projected to continue to operate acceptably under year 2024 background conditions without residential development of the subject property or connection of Dubarko Road to Highway 26.
4. All study intersections are projected to operate within capacity under year 2024 traffic conditions either with or without the addition of site trips from the proposed development. However, upon completion of the residential development within the proposed subdivision and the connection of Dubarko Road to Highway 26, it is projected that the intersection of Highway 26 at Dubarko Road will operate with very high delays for the northeast-bound Dubarko Road approach. Since vehicles exiting the site to the west can also travel west on Dubarko Road to Langensand Road prior to turning west on Highway 26, it is expected that some vehicles will divert and the actual delays will be lower than those reported.
5. 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 ODOT safety improvements have not significantly reduced. It is recommended that the intersection be converted to all-way stop control. This improvement will also restore operation of the intersection to level of service D or better during the peak hours. No other safety improvements are recommended for the study area intersections at this time.
6. Based on the warrant analysis, a northwest-bound left-turn lane and a southeast-bound right-turn lane are projected to be warranted at the intersection of Highway 26 at Dubarko Road with completion of the Dubarko Road extension. No other turn lanes or traffic signals are recommended in conjunction with the proposed subdivision.
7. Intersection sight distance was evaluated for the new intersection of Highway 26 at Dubarko Road. The proposed intersection was found to have adequate sight distance in both directions.
8. Based on the transportation planning rule analysis for the proposed zone change, it is recommended that a trip cap of 340 PM net new peak hour trips be applied to the subject property as a condition of approval for the proposed zone change. No other mitigations are necessary or recommended in conjunction with the proposed zone change.



PROJECT DESCRIPTION & LOCATION

INTRODUCTION

A property located on the south side of US Highway 26 opposite SE Vista Loop Drive is proposed for development with up to 192 apartment units and 8 duplex dwelling units. The site will take access via an extension of Dubarko Road which will connect the existing stub (east of Meadow Avenue) to Highway 26 opposite SE Vista Loop Drive.

This report addresses the impacts of the proposed development on the surrounding street system. Based on discussions with the City of Sandy and ODOT staff, an operational and safety analysis was conducted for the proposed site access as well as the intersections of:

- Highway 26 at SE Ten Eyck Road;
- Highway 26 at SE Langensand Road;
- Highway 26 at SE Vista Loop Drive;
- Highway 211 at Dubarko Road; and
- Dubarko Road at SE Langensand Road.

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 16 acres, which is currently undeveloped. The property is surrounded by a mixture of residential development, agricultural uses and undeveloped forested land.

The proposed development will include an extension of Dubarko Road from its existing eastern terminus through the subject property to Highway 26 opposite SE Vista Loop Drive. The proposed development will take access via this newly extended segment of Dubarko Road.

US Highway 26 (Mt. Hood Highway) is classified by the Oregon Department of Transportation as a Statewide Highway and a Freight Route. It has two through lanes in each direction and added turn lanes at intersections. Between SE Langensand Road and SE Vista Loop Drive it has a center two-way left-turn lane. It has a posted speed limit of 25 mph at SE Ten Eyck Road, 40 mph at SE Langensand Road, and 55 mph at SE Vista Loop Drive. West of SE Ten Eyck Road the highway divides into a couplet, with westbound traffic traveling on Proctor Boulevard and eastbound traffic traveling on Pioneer Boulevard.

SE Ten Eyck Road has one through lane in each direction and is striped to prohibit passing in the site vicinity. It has a basic rule speed limit of 55 mph and is classified by the City of Sandy as a Minor Arterial.



SE Langensand Road is also classified by the City of Sandy as a Minor Arterial. It has a two-lane cross-section with one through lane in each direction and a posted speed limit of 25 mph. Partial sidewalks are in place on both sides of the roadway, and on-street parking is available where sufficient paved width is provided.

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

Oregon Highway 211 (Eagle Creek Sandy Highway) is classified by the Oregon Department of Transportation as a District Highway. It has a two-lane cross-section with one through lane in each direction and added turn lanes at major intersections. It has a posted speed limit of 45 mph in the vicinity of Dubarko Road.

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.



EXISTING CONDITIONS

The intersection of US Highway 26 at SE Ten Eyck Road/Wolf Drive is controlled by a traffic signal. The northbound and southbound approaches each have a single, shared lane for all turning movements. The westbound approach has a left-turn lane, two through lanes, and a short right-turn pocket. The eastbound approach has a left-turn lane, a dedicated through lane and a shared through/right lane. The northbound and southbound approaches operate with concurrent signal phasing. Protected phasing is provided for the eastbound and westbound left-turn movements. Bike lanes are provided along Highway 26 to the right of the through lanes.

The intersection of US Highway 26 at SE Langensand Road is a T- intersection controlled by a stop sign on the northbound Langensand Road approach. Through traffic traveling along Highway 26 does not stop. The northbound approach has a left-turn lane and a right-turn lane. The eastbound approach has two through lanes and a right-turn lane. The westbound approach has a left-turn lane and two through lanes. Bike lanes are provided along Highway 26 to the right of the through lanes.

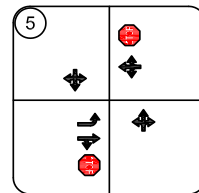
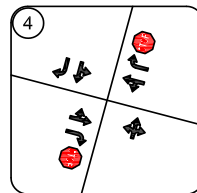
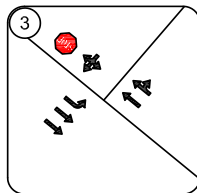
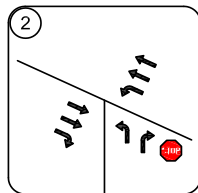
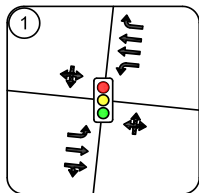
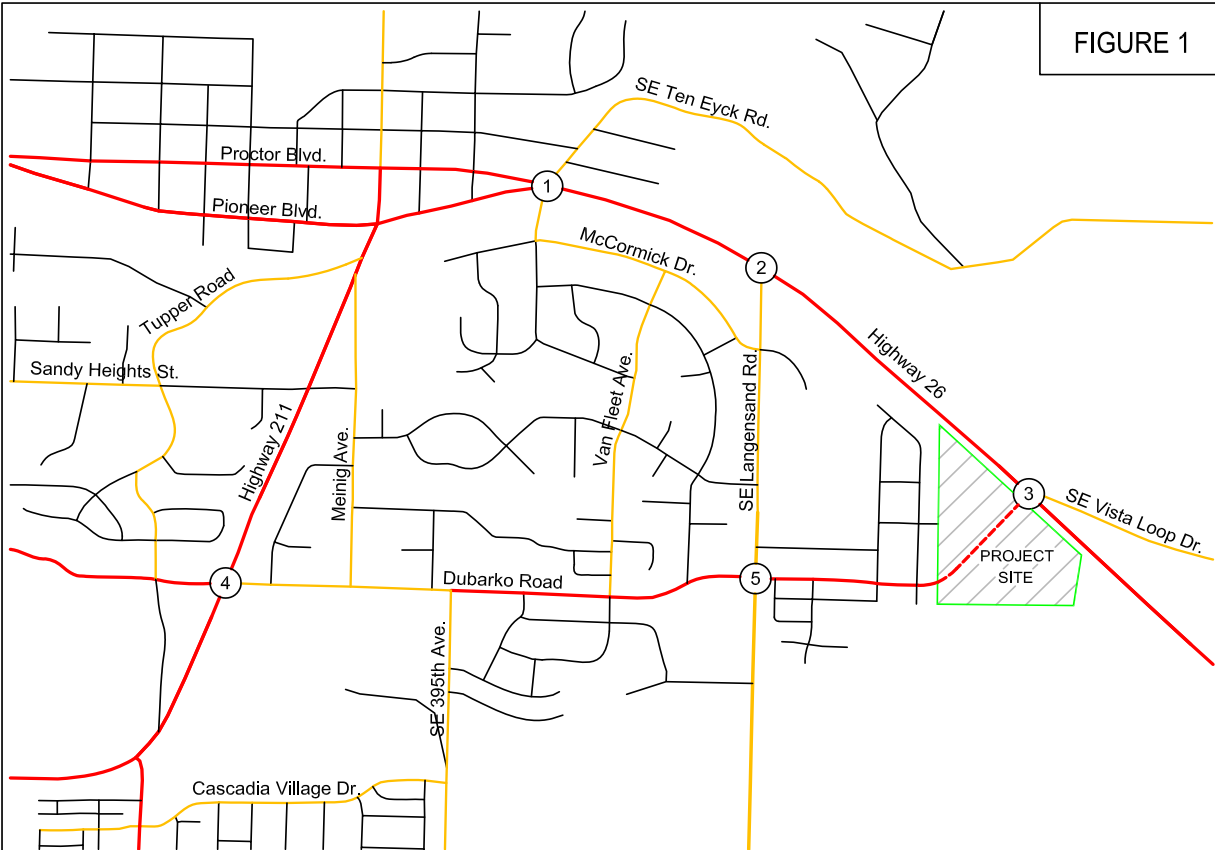
The intersection of US Highway 26 at SE Vista Loop Drive is currently a T- intersection controlled by a stop sign on the southwest-bound Vista Loop Drive approach. Through traffic traveling along Highway 26 does not stop. The southwest-bound approach has a single, shared lane for all turning movements.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

The intersection of Oregon 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 Dubarko Road at SE Langensand Road is a four-way intersection currently controlled by stop signs on the eastbound and westbound Dubarko Road approaches. Through traffic traveling along SE Langensand Road does not stop. The northbound and southbound approaches each have a single, shared lane for all turning movements. The westbound approach has a single, shared lane for all motor vehicle turning movements and a bike lane. The eastbound approach has a left-turn lane, a shared through/right lane and a bike lane.

A vicinity map displaying the project site, vicinity streets, and the study intersections including lane configurations is provided in Figure 1 on page 7.

FIGURE 1



LEGEND

- Study Intersection
- Traffic Signal
- Stop Sign



VICINITY MAP
 Study Intersections
 Lane Configurations and Traffic Control

PAGE
 7



TRAFFIC COUNT DATA

Traffic counts were conducted at the study intersections on Tuesday March 19th, 2019 from 4:00 to 6:00 PM and on Wednesday March 20th, 2019 from 7:00 to 9:00 AM. Data was used from the highest-volume hour during each analysis period.

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 in order 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.

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

Based on the data, 6,763 vehicles per day (approximately 676 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 March. This volume represents 45.3 percent of the through traffic volumes measured on Highway 26 east of SE Vista Loop Drive. Accordingly, it is expected that no more than 45.3 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 54.7 percent of through traffic volumes on the Highway 26 at the study intersections never reach Mt. Hood, it was assumed that these traffic volumes represent more typical commuter and local trips.

The ODOT data also showed that 11,738 vehicles were measured per day (approximately 1174 per hour during the peak hour) during the peak-season month of August at the ATR station near Rhododendron. This indicates that the seasonal recreational traffic volumes along the Highway 26 corridor increased by no more than 4,975 vehicles per day (11,738 vehicles per day in August - 6,763 vehicles per day in March). This equates to roughly 498 additional vehicles per hour during the peak hour of the peak recreational season. It is expected that the increased recreational traffic flows will be somewhat directional, with approximately 55% traveling westbound during the evening peak hour.

In order to seasonally adjust the local and commuter traffic volumes, the through traffic volumes were reduced by the amount of the assumed seasonal traffic (676 vehicles per hour during the evening peak hour, and a seasonal adjustment of 1.08 was applied to the remaining local and commuter traffic



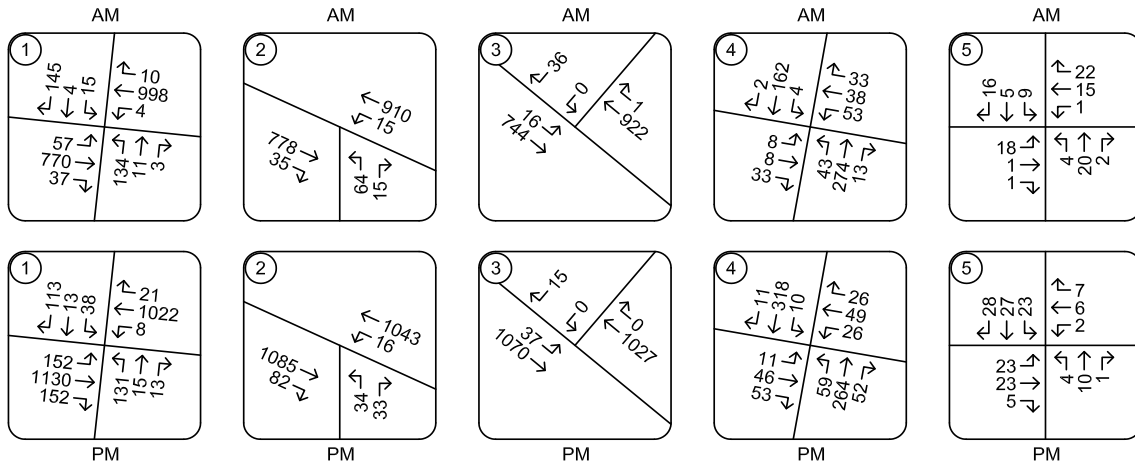
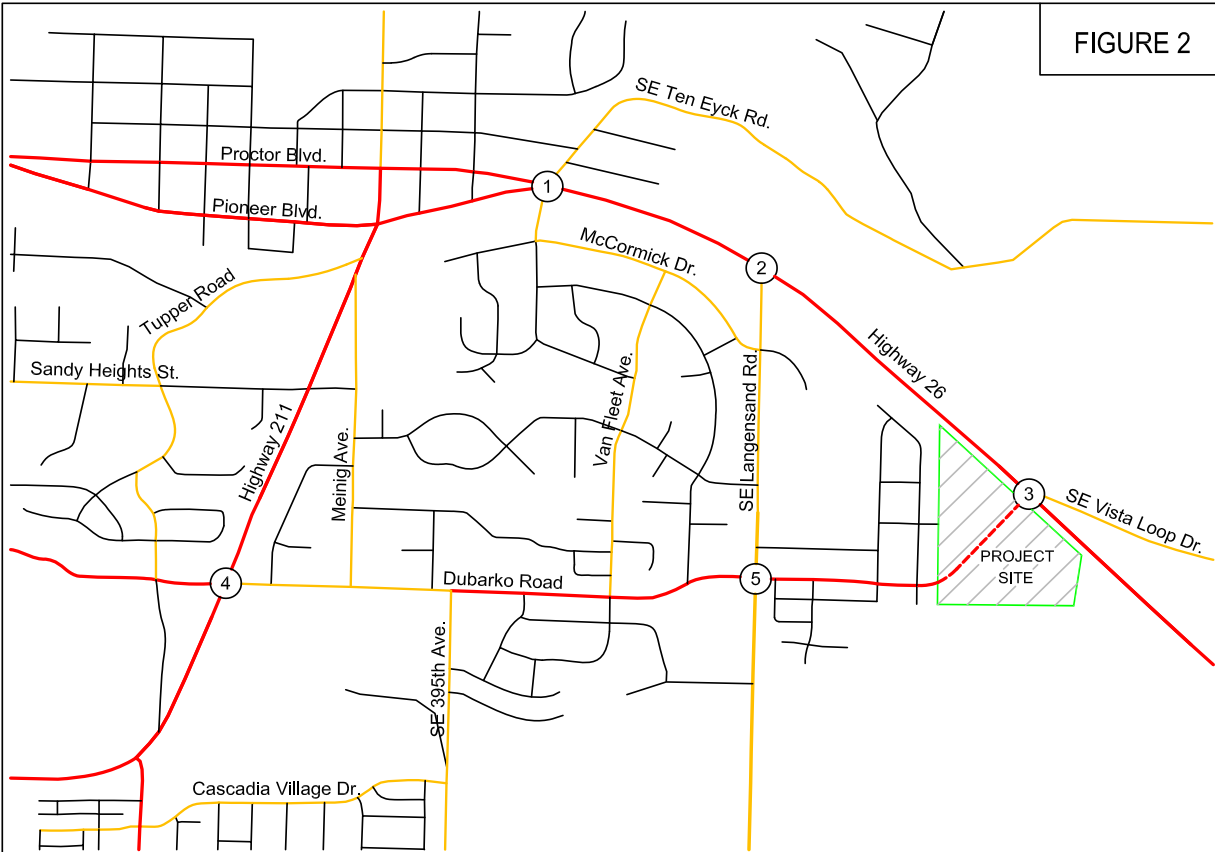
volumes. Following this adjustment, the 676 March recreational trips and the 498 peak-season through trips were added to determine the total peak-season traffic volumes. These calculated through traffic volumes represent the anticipated traffic levels for the intersections along Highway 26 during the 30th-highest hour in August. The morning peak hour traffic volumes along the highway were then increased by the same overall percentage as the evening peak hour volumes.

The observed traffic volumes along Highway 211 also had a seasonal adjustment of 1.08 applied to represent peak-season traffic volumes.

Following application of the seasonal adjustments, one year of growth was added to the year 2019 traffic count data in order to represent the expected year 2020 seasonal peak traffic conditions absent the impacts of the current COVID-19 pandemic. Based on data from ODOT's Future Volume Tables, the growth rate for traffic volumes on Highway 26 in the site vicinity was calculated to be 1.93 percent per year. The growth rate for traffic volumes on Highway 211 was calculated to be 3.16 percent per year. These growth rates were applied to the through traffic volumes on the highways. All other turning movements had a growth factor of 2 percent per year applied. The respective growth rates were applied over a period of one year to generate the year 2020 seasonal peak traffic volumes.

Figure 2 on page 10 shows the existing year 2020 30th-highest hour traffic volumes for the morning and evening peak hours at the study intersections.

FIGURE 2





OPERATIONAL ANALYSIS

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

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

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

The Oregon Department of Transportation requires that the signalized intersection of Highway 26 at SE Ten Eyck Road operate with a v/c ratio of 0.85 or less during the peak hours. The intersections of Highway 26 at SE Langensand Road and Highway 26 at SE Vista Loop Drive are required to operate with a v/c ratio of 0.80 or less on the major-street approaches and a v/c ratio of 0.90 or less on the minor-street approaches.

Intersections operating under the jurisdiction of the City of Sandy are required to operate at level of service D or better. This operational standard applies to the intersection of Dubarko Road at Langensand Road.

A summary of the existing conditions operational analysis is provided in Table 1 on the following page. For the unsignalized intersections the reported delays and levels-of-service represent the approach lane which experiences the highest delays. The reported v/c ratios represent the highest ratio for the major-street and minor-street movements. For the signalized intersection of Highway 26 at SE Ten Eyck Road, the reported delays, levels-of-service and v/c ratios represent the operation of the overall intersection.

Based on the analysis, the study intersections are currently operating acceptably per the respective ODOT and City of Sandy standards. Detailed capacity analysis worksheets are provided in the technical appendix.



Table 1 - Operational Analysis Summary: Year 2020 30th-Highest Hour Conditions

Intersection	AM Peak Hour			PM Peak Hour		
	Delay	LOS	v/c*	Delay	LOS	v/c*
Highway 26 at Ten Eyck Road	23.4	C	0.62	26.2	C	0.70
Highway 26 at Langensand Road	54.8	F	0.28 / 0.50	88.9	F	0.35 / 0.47
Highway 26 at Vista Loop Drive	12.7	B	0.28 / 0.08	13.0	B	0.32 / 0.06
Highway 211 at Dubarko Road	18.3	C	0.22 / 0.27	25.7	D	0.24 / 0.32
Dubarko Road at Langensand Road	9.3	A	0.05	9.8	A	0.04

*(major street v/c) / (minor-street v/c) is shown for unsignalized ODOT intersections.



SITE TRIPS

Proposed Development

The proposed subdivision will support development of up to 200 dwelling units, including 8 duplex units and 192 multi-family dwellings. Some commercial development is also expected to occur within the C-3 zoned portion of the property prior to completion of development within the subject area. The exact nature of any future commercial use is unknown, but to assess potential impacts associated with some level of commercial activity and ensure that the analysis contains a realistic development scenario, a 5,000 square foot general office building was assumed to be included within the C-3 zone. To estimate the number of trips that will be generated by residential development within the proposed subdivision, trip rates from the *TRIP GENERATION MANUAL, 11th EDITION* were used. Data from land-use code 215, *Single-Family Attached Housing*, 220, *Multi-Family Housing*, and 565, *Day Care Center* were used. The trip estimates are based on the number of dwelling units.

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

Table 2 - Proposed Development Trip Generation Summary

	AM Peak Hour			PM Peak Hour			Daily Total
	In	Out	Total	In	Out	Total	
192 Apartment Units	20	62	82	65	38	103	1306
8 Duplex Units	1	3	4	3	2	5	58
5,000 sf General Office Building	7	1	8	1	6	7	54
Total Site Trips	28	66	94	69	46	115	1,418

Zone Change

In addition to evaluation of the increase in site trips expected upon completion of anticipated development within the proposed subdivision, trip generation calculations were prepared to examine the potential change in site trips based on the “reasonable worst-case development scenario” for the existing and proposed zoning. This second analysis was conducted to determine whether the proposed zone change would significantly affect any transportation facilities as defined by Oregon’s Transportation Planning Rule.

After accounting for anticipated dedication of 2.232 acres of public right-of-way, the subject property is currently zoned with a mix of 6.628 acres of R-1, 4.439 acres of R-2 and 2.611 acres of C-3 zoning. Under the proposed subdivision plan, again 2.232 acres will be dedicated as public right-of-way, 0.906 acres will be zoned R-1, 1.233 acres will be zoned R-2, 6.504 acres will be zoned R-3, 3.280 acres will be zoned C-3, and 1.755 acres will be zoned POS (Parks & Open Space).

Trip generation for the R-1 zone was calculated assuming duplex residential development with 80 percent lot coverage and a minimum lot size of 5,000 square feet. For the R-2 zoning, trip generation was calculated assuming single-family residential development with 14 dwelling units per acre and 80



percent lot coverage. For the R-3 zoning, trip generation was calculated based on low-rise multi-family residential development with 20 dwelling units per acre and 100 percent lot coverage.

Under the C-3 (Village Commercial) zoning, the Sandy development code allows development with auto sales and repair facilities, convenience stores, restaurants (excluding drive-through facilities), grocery stores, athletic clubs, day care facilities, schools, banks (excluding drive-through facilities), medical clinics, offices, hotels, residential facilities, and manufacturing facilities that do not produce significant levels of noise or odor beyond the boundaries of the site. Since the highest trip generators have limited floor areas, and no more than one convenience store, one day care center and two fast food restaurants can reasonably be expected within a commercial site with a gross land area of less than five acres, the “reasonable worst case” development scenario includes a mix of these uses with the remainder of the site consisting of general retail uses (evaluated as a shopping center).

A summary of the trip generation calculations for the reasonable worst-case development scenarios based on allowable development levels under the existing and proposed City of Sandy zoning is provided in Table 3 below. Detailed trip generation calculations are also included in the technical appendix.

Table 3 - Zone Change Trip Generation Summary

	AM Peak Hour			PM Peak Hour			Daily Total
	In	Out	Total	In	Out	Total	
Existing R1, R2 and C3 Zoning							
6.628 Acres R-1 (92 Duplex Units)	13	29	42	29	22	51	650
4.439 Acres R-2 (50 Homes)	9	28	37	32	18	50	472
2.611 Acres C-3 (28,433 sf)							
Fast Food w/o Drive Thru (5,000 sf)	64	62	126	74	68	142	1732
-Pass-by Trips (43%)	-27	-27	-54	-31	-31	-62	-744
Day Care Center (5,000 sf)	30	25	55	27	29	56	238
Supermarket (18,433 sf)	41	29	70	85	85	170	1968
-Pass-by Trips (36%)	-13	-13	-26	-31	-31	-62	-708
Net Trips (Existing Zoning)	117	133	250	185	160	345	3608
Proposed Zoning							
0.906 Acres R-1 (12 Duplex Units)	2	4	6	4	3	7	86
1.233 Acres R-2 (14 Homes)	3	7	10	9	5	14	132
6.504 Acres R-3 (130 Apartments)	14	46	60	46	27	73	952
3.609 Acres C-3 (35,720 sf Retail)							
Fast Food w/o Drive Thru (5,000 sf)	64	62	126	74	68	142	1732
-Pass-by Trips (43%)	-27	-27	-54	-31	-31	-62	-744
Day Care Center (5,000 sf)	30	25	55	27	29	56	238
Supermarket (25,720 sf)	44	30	74	129	128	257	2838
-Pass-by Trips (36%)	-13	-13	-26	-46	-46	-92	-1022
1.755 Acres POS (Public Park)	0	0	0	0	0	0	2
Net Trips (Proposed Zoning)	117	134	251	212	183	395	4214
Net Change In Site Trips	0	1	1	27	23	50	606



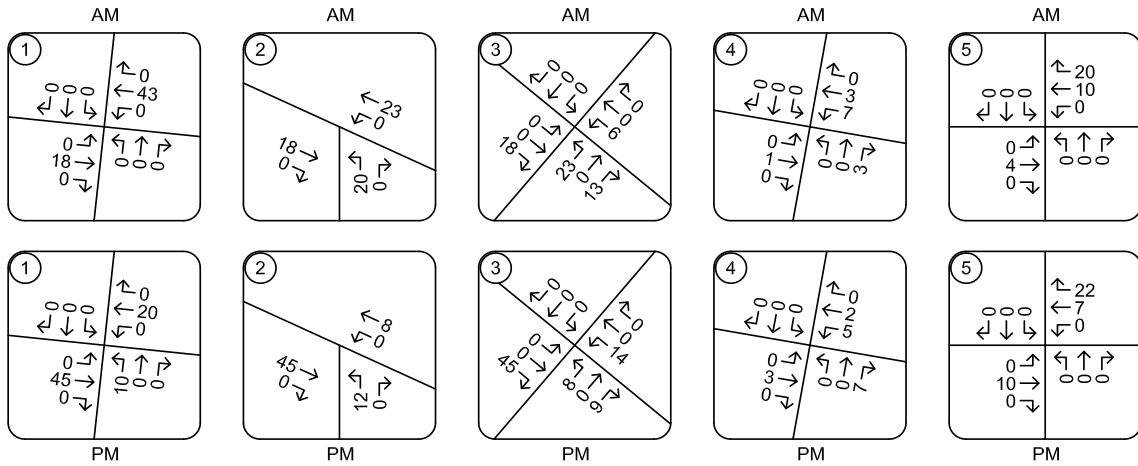
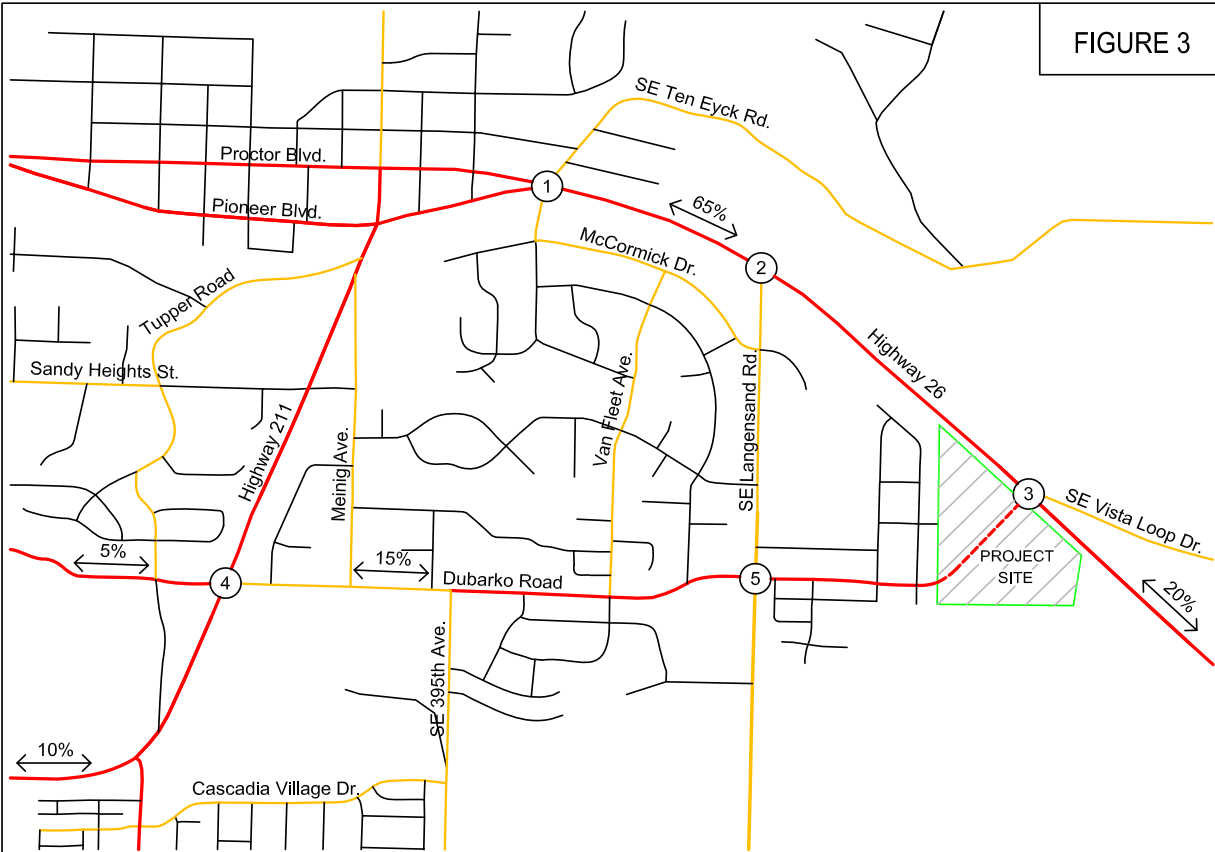
Based on the zone change analysis, the proposed zone change could result in a net increase of 1 site trip during the morning peak hour, a net increase of 50 trips during the evening peak hour, and a net increase of 606 daily trips. The zone change may therefore result in a significant increase in site traffic as measured at the planning horizon under the “reasonable worst case” development scenario. Accordingly, some form of mitigation is necessary to meet the requirements of Oregon’s Transportation Planning Rule. A detailed analysis based on the requirements of Oregon’s Transportation Planning Rule including a recommended condition of approval which is sufficient to ensure that the zone change does not result in a significant effect is provided in the “Transportation Planning Rule Analysis” section found on page 26 of this report.

TRIP DISTRIBUTION

The directional distribution of site trips to and from the project site was estimated based on the existing travel patterns in the site vicinity, as well as the locations of likely trip destinations and major transportation routes. Overall, 65 percent of the anticipated site trips are projected to travel to and from the northwest on Highway 26, 20 percent are projected to travel to and from the southeast on Highway 26, and the remaining 15 percent of site trips are projected to travel to and from the west on Dubarko Road.

The trip distribution percentages and trip assignment for residential development within the proposed subdivision are shown in Figure 3 on page 16.

FIGURE 3



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



FUTURE CONDITIONS ANALYSIS

BACKGROUND VOLUMES

In order to determine the expected impact of site trips on the study area intersections, it is necessary to compare traffic conditions both with and without the addition of the projected traffic from the proposed development. This comparison is made for future traffic conditions at the time of project completion. It is anticipated that the proposed use will be completed and occupied within four years. 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. Based on data from ODOT's Future Volume Tables, the growth rate for traffic volumes on Highway 26 in the site vicinity was calculated to be 1.93 percent per year (linear). The growth rate for traffic volumes on Highway 211 was calculated to be 3.16 percent per year (linear). These growth rates were applied to the through traffic volumes on the highways. All other turning movements had a growth factor of 2 percent per year (exponential) applied.

In addition to the background growth, anticipated site trips from the "The Views" residential development were added to the background traffic volumes. The projected site trips for this residential development are shown in Figure 8 in the attached technical appendix.

Figure 4 on page 18 shows the projected year 2024 background traffic volumes at the study intersections during the morning and evening peak hours.

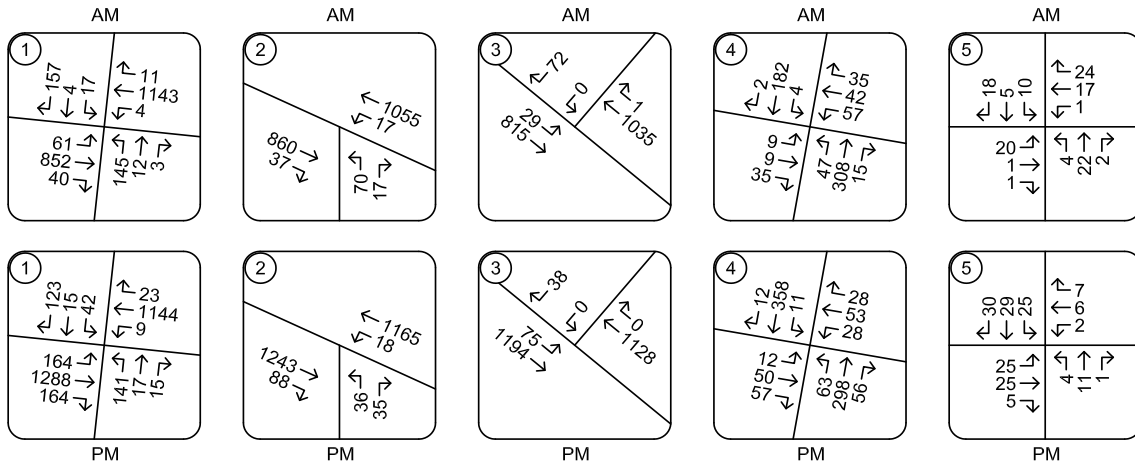
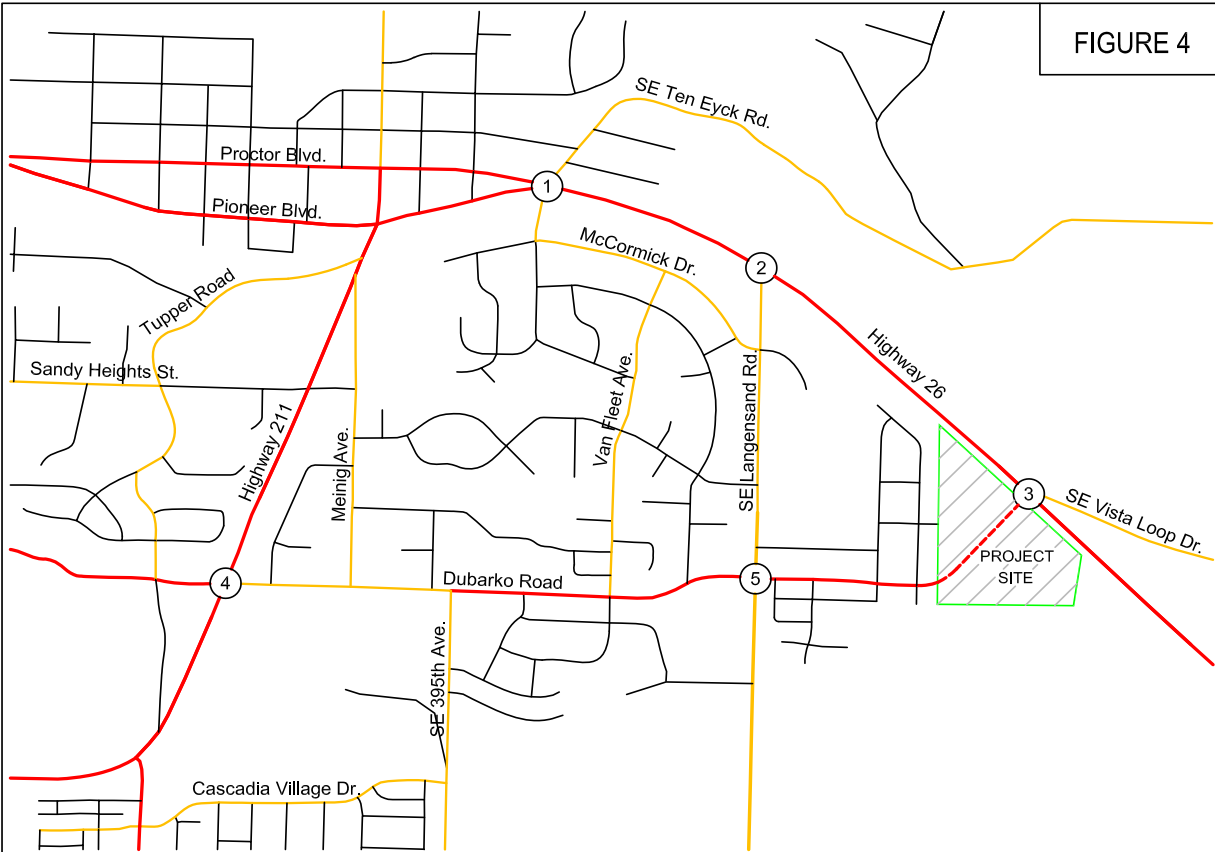
BACKGROUND VOLUMES PLUS SITE TRIPS

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 residential development.

In addition to the addition of anticipated site trips, some existing traffic is expected to divert upon completion of the Dubarko Road connection to Highway 26. Drivers traveling between locations east of the city on Highway 26 and locations south of the city on Highway 211 will have an alternative travel route available that will serve as a shorter travel route and bypass some congestion within the City of Sandy. The new road connection will also serve as an alternative travel route for residents living in areas to the west of the subject property traveling to and from destinations to the east on Highway 26. A diagram showing the projected trip diversions associated with completion of the Dubarko Road connection to Highway 26 is provided as Figure 7 in the attached technical appendix.

Figure 5 on page 19 shows the projected year 2024 peak hour volumes including background growth, site trips from the proposed development, and diverted trips associated with the proposed connection of Dubarko Road to Highway 26 for the morning and evening peak hours.

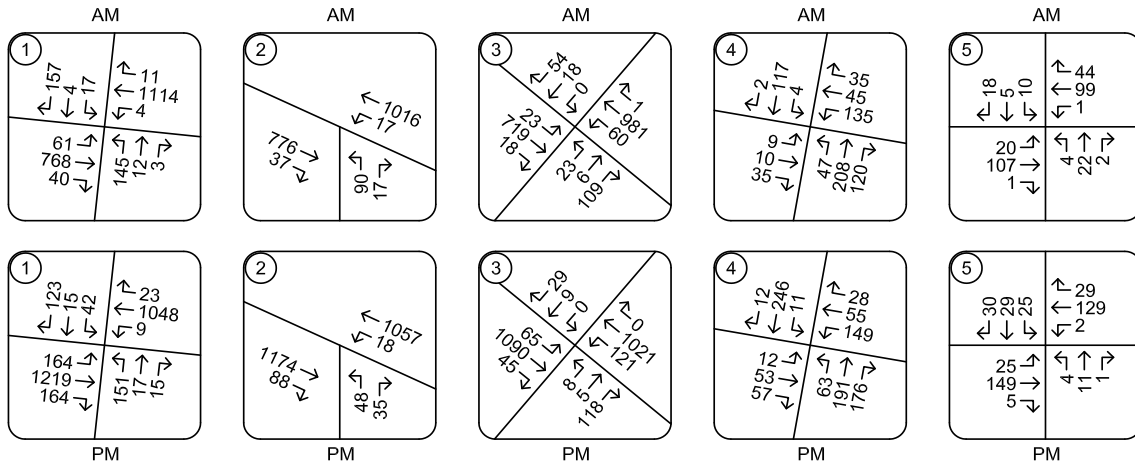
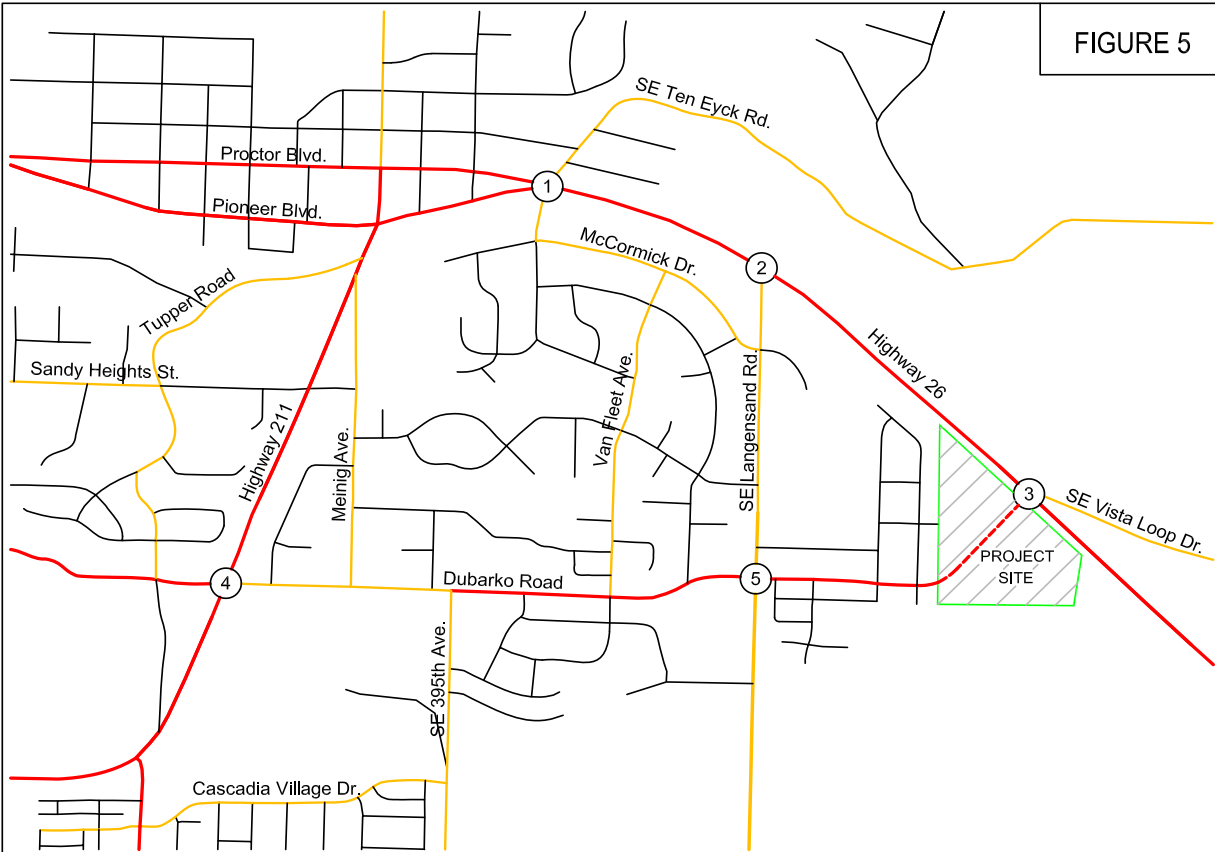
FIGURE 4



TRAFFIC VOLUMES
 2024 Background Conditions
 Morning and Evening Peak Hours

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 18

FIGURE 5



TRAFFIC VOLUMES
 2024 Background Plus Site Trips
 Morning and Evening Peak Hours



OPERATIONAL ANALYSIS

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

The results of the operational analysis are summarized in Table 4 below. Detailed analysis worksheets are also included in the technical appendix.

Table 4 - Operational Analysis Summary: Year 2024 Future Conditions

Intersection	AM Peak Hour			PM Peak Hour		
	Delay	LOS	v/c*	Delay	LOS	v/c*
Highway 26 at Ten Eyck Road						
2024 Background Conditions	25.1	C	0.70	29.4	C	0.78
2024 Background plus Site	24.7	C	0.69	29.5	C	0.76
Highway 26 at Langensand Road						
2024 Background Conditions	95.4	F	0.33 / 0.70	169.9	F	0.41 / 0.72
2024 Background plus Site	93.8	F	0.32 / 0.77	168.0	F	0.39 / 0.80
Highway 26 at Vista Loop Drive						
2024 Background Conditions	14.4	B	0.33 / 0.17	14.3	B	0.38 / 0.09
2024 Background plus Site	140.9	F	0.31 / 0.58	533.0	F	0.34 / 0.89
Highway 211 at Dubarko Road						
2024 Background Conditions	21.2	C	0.33	32.9	D	0.41
2024 Background plus Site	23.3	C	0.51	74.7	F	0.89
2024 Background plus Site (AWSC)	18.0	C	0.64	29.9	D	0.79
Dubarko Road at Langensand Road						
2024 Background Conditions	9.4	A	0.05	9.9	A	0.04
2024 Background plus Site	10.5	B	0.20	11.3	B	0.23

*(major street v/c) / (minor-street v/c) is shown for unsignalized ODOT intersections.

Based on the results of the operational analysis, most study intersections are projected to operate acceptably through year 2024 either with or without the addition of site trips from the proposed development and the diversion of through trips between Highway 26 and Highway 211 onto Dubarko Road. The intersection of Highway 211 at Dubarko Road is projected to operate at level of service F during the evening peak hour; however, with conversion to all-way stop control the intersection is projected to operate at level of service D (meeting the city standard). Warrants for this treatment are discussed in more detail in the Safety analysis section of this report.

It should be noted that the intersections of Highway 26 at Ten Eyck Road and Highway 26 at Langensand Road operate slightly better with project completion than under background conditions. This is an expected result of the diversion of traffic onto Dubarko Road, which results in decreased through traffic volumes along Highway 26.



Although the intersection of Highway 26 at SE Vista Loop Drive is shown to operate acceptably during the morning and evening peak hours, the average delays for the northeast-bound left/through lane are projected to be 182 seconds during the morning peak hour and 533 seconds during the evening peak hour. These long delays indicate that the northeast-bound left/through lane is unlikely to accommodate any meaningful traffic volumes as vehicles are likely to divert to alternative (lower-delay) travel routes.

QUEUING ANALYSIS

In addition to the operational analysis, a queuing analysis was conducted to determine an appropriate storage length for a northwest-bound left-turn lane on Highway 26 at Dubarko Road.

The storage length provided for the northwest-bound left-turn lane on Highway 26 should be sufficient to accommodate the 95th percentile queue length for this movement. The 95th percentile queue is the length which is exceeded during five percent or less of the peak hour. Queue lengths in excess of the 95th percentile occur do not occur with sufficient frequency to allow for cost-effective design.

The queuing analysis was conducted for year 2024 background plus site trips conditions during the morning and evening peak hours. Based on the analysis, the projected 95th percentile queue lengths were 45 feet during the morning peak hour and 127 feet during the evening peak hour. Accordingly, it is recommended that if a new northwest-bound left turn lane is provided it should have a storage length of at least 130 feet.

SITE CIRCULATION CONSIDERATIONS

The proposed subdivision includes a new four-leg intersection on Dubarko Road. “Street A” will connect to Fawn Street to the north, providing for local-street connectivity within the development and extending connectivity for the existing residential homes west of the site. “Street B” will extend south from Dubarko Road stubbing at the property line to provide future connectivity to the south in conformance with the city’s Transportation System Plan.

It is anticipated that there may also be private access driveways on Dubarko Road within the subject property. Future access driveways should be located outside the standing queue for the intersection of Highway 26 at Dubarko Road or be restricted to right-in, right-out access only in order to ensure that they can operate safely and efficiently.



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 2016 through December 2020) 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 in order to identify any locations with crash rates in excess of the 90th percentile.

The intersection of Highway 26 at SE Ten Eyck Road had nine reported collisions during the five-year analysis period. These included five rear-end collisions, three turning-movement collisions, and one angle collision. The crashes resulted in no serious injuries or fatalities and six reports of a “possible injury/complaint of pain”. The crash rate for the intersection was calculated to be 0.18 crashes per million entering vehicles. This is well below the 90th percentile crash rate of 0.86 crashes per million entering vehicles for signalized, four-way urban intersections in Oregon.

The intersection of Highway 26 at SE Langensand Road had six reported collisions during the five-year analysis period. These included four turning-movement collisions, one backing collision and one pedestrian collision. The pedestrian collision occurred when a pedestrian walking along the south side of Highway 26 crossing Langensand Road was struck by a driver making an eastbound right turn from the highway onto Langensand Road. The collision resulted in a report of a “possible injury/complaint of pain” by the pedestrian. Overall, the crashes resulted in one non-incapacitating injury and four reports of a “possible injury/complaint of pain”. The crash rate for the intersection was calculated to be 0.20 crashes per million entering vehicles. This is well below the 90th percentile crash rate of 0.29 crashes per million entering vehicles for stop-controlled, three-way urban intersections in Oregon.

The intersection of Highway 26 at SE Vista Loop Drive had two reported crashes during the five-year analysis period. Both were turning movement collisions that resulted in property damage only. The crash rate for the intersection was calculated to be 0.051 crashes per million entering vehicles. This is well below the 90th percentile crash rate of 0.475 crashes per million entering vehicles for stop-controlled, three-way rural intersections in Oregon.

The intersection of Highway 211 at Dubarko Road had 27 reported crashes during the five-year analysis period. These included 17 angle collisions, 3 turning-movement collisions, 3 rear-end collisions, 1 backing collision, 1 sideswipe-overtaking collision, 1 fixed-object collision, and 1 pedestrian collision. The crashes resulted in one incapacitating injury. There were 11 “non-incapacitating” injuries reported and 18 reports of a “possible injury/complaint of pain”. The crash rate for the intersection was calculated to be 1.72 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 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 along the major-street to increase driver awareness of speed. However, the crash data for subsequent years showed 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 and is projected to meet all-way stop control warrants based on vehicular volume under year 2024 conditions with completion of the Dubarko Road connection to Highway 26. Accordingly, it is recommended that the intersection be converted to all-way stop control. No other safety mitigations are recommended at this time.

The intersection of Dubarko Road at SE Langensand Road had one reported collision during the five-year analysis period. It was an angle collision that resulted in property damage only. The crash rate for the intersection was calculated to be 0.35 crashes per million entering vehicles. This is well below the 90th percentile crash rate of 0.408 crashes per million entering vehicles for stop-controlled, four-way urban intersections in Oregon.

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 all-way stop control be considered for installation at this intersection. No other safety improvements are recommended for the study area intersections at this time.

TRAFFIC SIGNAL WARRANT ANALYSIS

Traffic signal warrants were examined for the unsignalized study intersections.

Based on the projected traffic volumes, traffic signal warrants are projected to be marginally met at for the intersection of Highway 211 at Dubarko Road under year 2024 30th-highest hour conditions with completion of the proposed development, the nearby “The Views” development, and completion of a full-movement connection between Highway 26 and Dubarko Road. Traffic signal warrants are not projected to be met for any of the other unsignalized study intersections for any of the analysis scenarios, and are not likely to be met under average traffic conditions.

An examination of the future turning movement volumes at the intersection of Highway 211 and Dubarko Road reveals that the proposed development will add 10 PM peak hour trips to the westbound side-street approach. This represents 5 percent of the future westbound traffic volume on Dubarko Road. In contrast, the connection of Dubarko Road as contemplated in the city’s Transportation System Plan adds 116 PM peak hour trips to the westbound approach. This comparison demonstrates that the triggering event that causes signal warrants to be met under 30th-highest-hour conditions at this intersection upon project completion is not the Bull Run Terrace Development. Rather, it is the completion of the city’s planned connection of Dubarko Road to Highway 26. Accordingly, a request to construct a traffic signal at this intersection would be disproportionate to the actual impacts of the proposed development. Since an alternative treatment is available which would not be disproportionate to the impact of the proposed development, installation of a traffic signal is not recommended at this time.



Since traffic volumes for Highway 211 at Dubarko Road are only projected to marginally meet signal warrants for 30th-highest hour conditions, all-way stop-control warrants were also examined for the intersection. Based on the analysis, all-way stop control warrants are currently met for Criterion B (crash history) and are projected to be met upon completion of the proposed development for Criterion C (minimum volumes). Accordingly, all-way stop control can be installed at this intersection. Upon installation of all-way stop control, the intersection would be projected to operate at level of service C during the morning peak hour, and level of service D during the evening peak hour. The maximum projected v/c ratio was determined to be 0.79 with implementation of all-way stop control.

Alternatively, consideration was given to installing a roundabout at the intersection of Highway 211 and Dubarko Road. Based on the operational analysis, installation of a roundabout would result in operation well within capacity and at level of service A. However, according to *Roundabouts: An Informational Guide*, published by the Federal Highway Administration, "It is generally not desirable to locate roundabouts in locations where grades through the intersection are greater than four percent. The installation of roundabouts on roadways with grades lower than three percent is generally not problematic." In this instance, Highway 211 has a constant grade of approximately 6 percent through its intersection with Dubarko Road. Accordingly, installation of a roundabout would not be recommended absent significant re-grading of the approach roadways. The potential for snow and ice at the intersection compound this concern.

TURN LANE WARRANT ANALYSIS

Turn lane warrants were also examined for the major-street approaches to the unsignalized study intersections. Left-turn lane warrants are intended to evaluate whether a meaningful safety benefit may be expected if the turning vehicles are provided with turn lane within the street, allowing left-turning drivers to move out of the through travel lane so that following vehicles may pass without conflicts.

The intersection of Highway 26 at Langensand Road already has left and right turn lanes in place.

The intersection of Highway 26 at Dubarko Road is projected to meet warrants for a northwest-bound left-turn lane and a southeast-bound right turn lane upon completion of the proposed development.

The intersection of Highway 211 at Dubarko Road currently meets warrants for a northbound left-turn lane and a northbound right-turn lane. However, the need for these turn lanes is not related to the proposed development. Further, the turn lane warrants would not be applicable and added lanes would not be needed if all-way stop control is installed at the intersection as recommended based on the safety analysis. Accordingly, no new turn lanes are recommended in conjunction with the proposed development.

The intersection of Dubarko Road at Langensand Road is not projected to meet turn lane warrants under any analysis scenarios. However, it was noted that the existing two-way stop control is currently oriented in a way that favors through traffic on Langensand Road. Upon completion of the Dubarko Road connection to Highway 26 the major street is projected to be Dubarko Road. Accordingly, consideration should be given to revising the traffic control at this intersection to remove the stop signs on the eastbound and westbound Dubarko Road approaches and install stop signs on the northbound and southbound Langensand Road approaches.



INTERSECTION SIGHT DISTANCE ANALYSIS

Intersection sight distance was evaluated for the proposed new Dubarko Road approach to Highway 26. The posted speed limit along Highway 26 is 55 mph. Using a design speed of 65 mph and designing for combination trucks, the minimum required intersection sight distance was calculated to be 1,195 feet in each direction.

The available intersection sight distances were measured from a position 14.5 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.

From the location of the proposed Dubarko Road approach to Highway 26, the available intersection sight distance was measured to be in excess of 1,200 feet in each direction. Since the available intersection sight distance is in excess of the minimum required, intersection sight distance was determined to be acceptable at this intersection. No sight distance mitigations are necessary or recommended.



TRANSPORTATION PLANNING RULE ANALYSIS

In order to allow the proposed zone change on the subject property, 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 comprehensive plan amendment 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;

(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 zone change would result in no significant change in trips during the morning peak hour, a net increase of 50 trips during the evening peak hour, and an increase of 606 daily trips. This represents an increase of 14.5 percent during the evening peak hour and 16.8 percent in daily trips. It is anticipated that these increases may result in a significant effect as measured at the planning horizon. Accordingly, some form of mitigation is required in order to approve the zone change application. Acceptable mitigation measures are described in OAR 660-012-0060(2).

(2) If a local government determines that there would be a significant effect, then the local government must ensure that allowed land uses are consistent with the identified function, capacity, and performance standards of the facility measured at the end of the planning period identified in the adopted TSP through one or a combination of the remedies listed in (a) through (e) below, unless the amendment meets the balancing test in subsection (2)(e) of this section or qualifies for partial mitigation in section (11) of this rule. A local government using subsection (2)(e), section (3), section (10) or section (11) to approve an amendment recognizes that additional motor vehicle traffic congestion may result and that other facility providers would not be expected to provide additional capacity for motor vehicles in response to this congestion.

It is anticipated that the increases in trip generation resulting from the proposed zone change may result in a significant effect as measured at the planning horizon. Accordingly, some form of mitigation as described in OAR 660-012-0060(2) is required. In this instance, mitigation would be provided pursuant to sub-section (d), which reads:

(d) Providing other measures as a condition of development or through a development agreement or similar funding method, including, but not limited to, transportation system management measures or minor transportation improvements. Local governments shall, as part of the amendment, specify when measures or improvements provided pursuant to this subsection will be provided.

One mechanism to ensure that future development under the proposed zoning does not result in a significant impact on surrounding transportation facilities is to apply a trip cap to the subject property.

Under the existing zoning, the reasonable worst case development scenario was calculated to result in 250 net new morning peak hour trips, 345 net evening peak hour trips, and 3,608 net new daily trips. Since the operational analysis demonstrated that the evening peak hour was the critical design hour for all intersections, an appropriate trip cap can be created by limiting the number of net new PM peak hour trips to a level no greater than that allowed under the existing zoning. Accordingly, a trip cap of 345 net new PM peak hour site trips is sufficient to address the potential transportation impacts of the proposed zone change.



It should be noted that in the prior Bull Run Terrace Traffic Impact Study dated September 28, 2020, the trip generation numbers varied somewhat from the current analysis. This is primarily due to the fact that duplex development is now permitted within low-density residential zones (but was not permitted at the time of the prior report). In the prior study, a slightly lower trip cap of 340 PM peak hour trips was proposed. To maintain consistency with that report and the numerous materials in the record, it is recommended that the trip cap be maintained at 340 PM peak hour trips.

Based on the transportation planning rule analysis for the proposed zone change, it is recommended that a trip cap of 340 PM net new peak hour trips be applied to the subject property as a condition of approval for the proposed zone change. No other mitigations are necessary or recommended in conjunction with the proposed zone change.



CONCLUSIONS

All study intersections are projected to operate within capacity under year 2024 traffic conditions either with or without the addition of site trips from the proposed development. However, upon completion of development within the proposed subdivision and the connection of Dubarko Road to Highway 26, it is projected that the intersection of Highway 26 at Dubarko Road will operate with very high delays for the northeast-bound Dubarko Road approach. Since vehicles exiting the site to the west can also travel west on Dubarko Road to Langensand Road prior to turning west on Highway 26, it is expected that some vehicles will divert and the actual delays will be lower than those reported.

The intersection of Highway 211 at Dubarko Road is projected to operate at level of service F during the evening peak hour if it continues to operate under two-way stop control upon completion of the proposed development. Based on the crash and warrant analysis, it is recommended that the intersection be converted to all-way stop control. With this safety mitigation in place, the intersection is projected to operate within capacity and at level of service D or better during the peak hours, meeting the standards of the City of Sandy.

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. Based on the analysis it was recommended that the intersection be converted to all-way stop control. No other safety improvements are recommended for the study area intersections at this time.

Based on the warrant analysis, a northwest-bound left-turn lane and a southeast-bound right-turn lane are projected to be warranted at the intersection of Highway 26 at Dubarko Road with completion of the Dubarko Road extension. No other turn lanes or traffic signals are recommended in conjunction with the proposed subdivision.

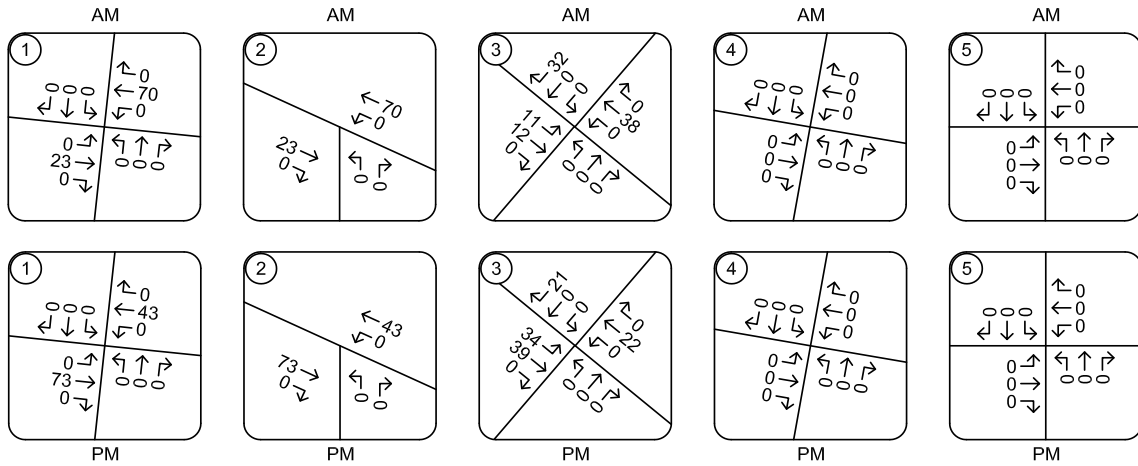
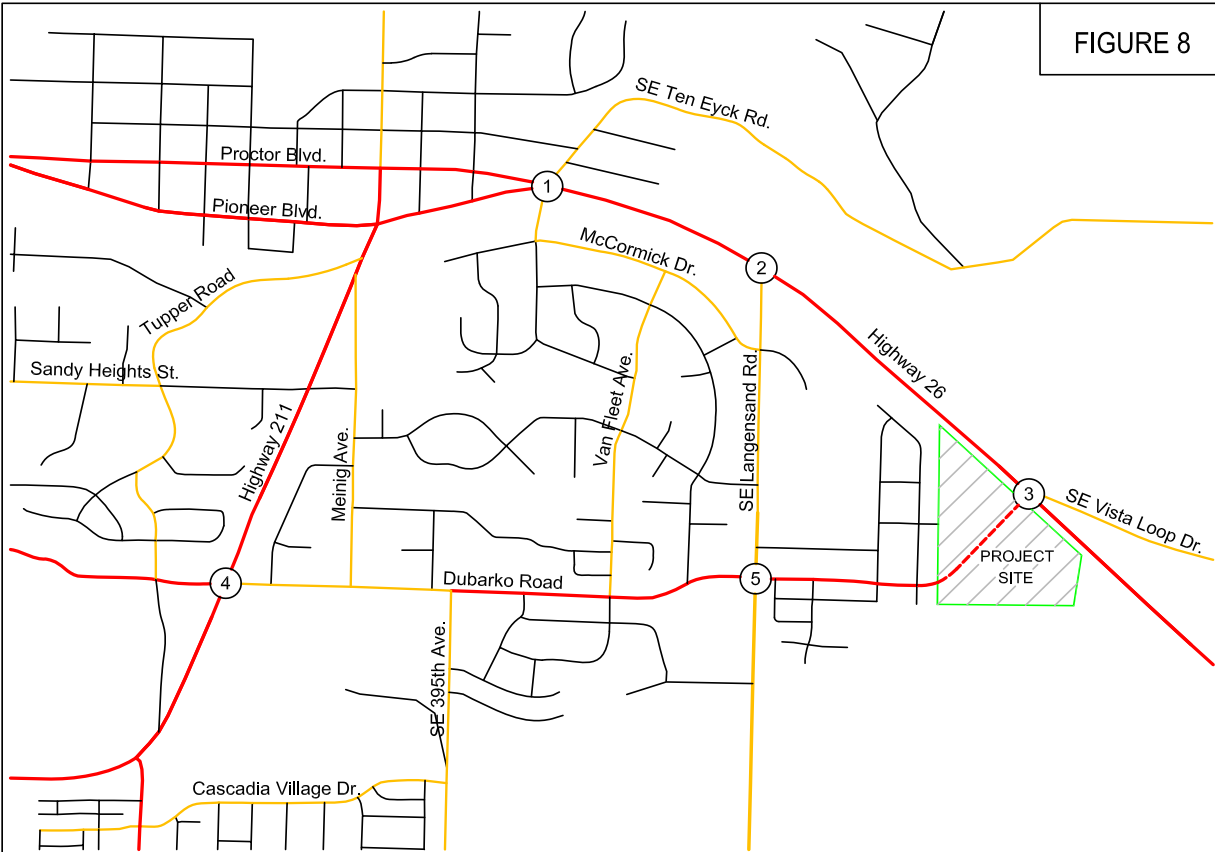
Intersection sight distance was evaluated for the new intersection of Highway 26 at Dubarko Road. The proposed intersection was found to have adequate sight distance in both directions.

A zone change is proposed for the subject property from the existing mix of R-1, R-2 and C-3 zoning to R-1, R-2, R-3, C-3 and POS zoning. It is recommended that the proposed zone change be approved with a condition of approval limiting the site to no more than 340 PM peak hour trips. With this condition of approval, the proposed zone change will not result in a significant effect on the transportation system and will meet the requirements of Oregon's Transportation Planning Rule.



APPENDIX

FIGURE 8



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

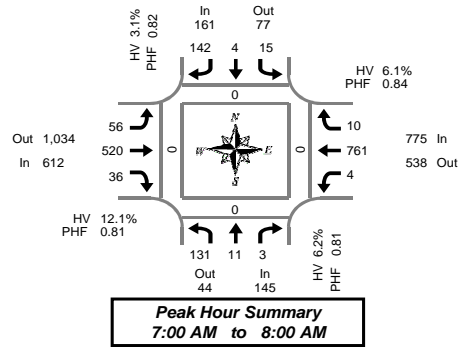
Total Vehicle Summary



Clay Carney
(603) 833-2740

SE Ten Eyck Rd & Hwy 26

Wednesday, March 20, 2019
7:00 AM to 9:00 AM



5-Minute Interval Summary 7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	16	0	0	0	0	0	17	0	5	26	2	0	0	74	0	0	140	0	0	0	0
7:05 AM	10	0	1	0	1	0	10	0	2	18	3	0	1	65	2	0	113	0	0	0	0
7:10 AM	17	1	0	0	2	0	11	0	7	36	2	0	2	74	1	0	153	0	0	0	0
7:15 AM	12	0	0	0	1	2	9	0	9	40	2	0	1	84	1	0	161	0	0	0	0
7:20 AM	15	0	0	0	3	0	11	0	3	40	1	0	0	68	0	0	141	0	0	0	0
7:25 AM	14	1	0	0	1	1	16	0	2	40	4	0	0	70	1	0	150	0	0	0	0
7:30 AM	7	1	1	0	0	0	16	0	8	43	2	0	0	67	0	0	145	0	0	0	0
7:35 AM	12	2	0	0	3	0	12	0	0	56	5	0	0	57	1	0	148	0	0	0	0
7:40 AM	8	2	0	0	0	0	11	0	4	59	3	0	0	53	0	0	140	0	0	0	0
7:45 AM	12	1	1	0	2	0	11	0	4	53	3	0	0	45	2	0	134	0	0	0	0
7:50 AM	4	2	0	0	1	0	10	0	9	47	4	0	0	62	0	0	139	0	0	0	0
7:55 AM	4	1	0	0	1	1	8	0	3	62	5	0	0	42	2	0	129	0	0	0	0
8:00 AM	5	0	1	0	2	1	13	0	2	46	2	0	0	41	0	0	113	0	0	0	0
8:05 AM	6	0	0	0	1	1	5	0	8	50	2	0	0	42	2	0	117	0	0	0	0
8:10 AM	3	0	0	0	2	1	10	0	5	45	4	0	0	53	1	0	124	0	0	0	1
8:15 AM	12	0	0	0	2	0	7	0	3	38	1	0	0	34	1	0	98	0	0	0	0
8:20 AM	6	2	0	0	2	0	9	0	5	38	1	0	1	49	0	0	113	0	0	0	0
8:25 AM	8	0	0	0	1	0	11	0	4	44	3	0	0	39	2	0	112	0	0	0	1
8:30 AM	5	0	0	0	2	1	10	0	4	66	2	0	0	47	0	0	137	1	0	0	0
8:35 AM	10	0	0	0	3	0	13	0	6	59	5	0	0	45	1	0	142	0	0	0	0
8:40 AM	7	0	0	0	5	1	15	0	10	62	3	0	1	43	1	0	148	0	0	0	0
8:45 AM	5	0	0	0	1	0	12	0	5	69	5	0	0	63	0	0	160	0	0	0	0
8:50 AM	9	2	0	0	3	0	12	0	7	56	8	0	1	46	1	0	145	0	0	0	0
8:55 AM	8	1	0	0	2	0	13	0	6	51	8	0	2	44	1	0	136	0	0	0	0
Total Survey	215	16	4	0	41	9	272	0	121	1,144	80	0	9	1,307	20	0	3,238	1	0	0	2

15-Minute Interval Summary 7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	43	1	1	0	3	0	38	0	14	80	7	0	3	213	3	0	406	0	0	0	0
7:15 AM	41	1	0	0	5	3	36	0	14	120	7	0	1	222	2	0	452	0	0	0	0
7:30 AM	27	5	1	0	3	0	39	0	12	158	10	0	0	177	1	0	433	0	0	0	0
7:45 AM	20	4	1	0	4	1	29	0	16	162	12	0	0	149	4	0	402	0	0	0	0
8:00 AM	14	0	1	0	5	3	28	0	15	141	8	0	0	136	3	0	354	0	0	0	1
8:15 AM	26	2	0	0	5	0	27	0	12	120	5	0	1	122	3	0	323	0	0	0	1
8:30 AM	22	0	0	0	10	2	38	0	20	187	10	0	1	135	2	0	427	1	0	0	0
8:45 AM	22	3	0	0	6	0	37	0	18	176	21	0	3	153	2	0	441	0	0	0	0
Total Survey	215	16	4	0	41	9	272	0	121	1,144	80	0	9	1,307	20	0	3,238	1	0	0	2

Peak Hour Summary 7:00 AM to 8:00 AM

By Approach	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	145	44	189	0	161	77	238	0	612	1,034	1,646	0	775	538	1,313	0	1,693	0	0	0	0
%HV	6.2%				3.1%				12.1%				6.1%				8.0%				
PHF	0.81				0.82				0.81				0.84				0.93				

By Movement	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	131	11	3	145	15	4	142	161	56	520	36	612	4	761	10	775	1,693
%HV	6.9%	0.0%	0.0%	6.2%	13.3%	25.0%	1.4%	3.1%	8.9%	12.7%	8.3%	12.1%	75.0%	5.5%	20.0%	6.1%	8.0%
PHF	0.74	0.55	0.75	0.81	0.63	0.33	0.81	0.82	0.74	0.77	0.75	0.81	0.25	0.84	0.63	0.84	0.93

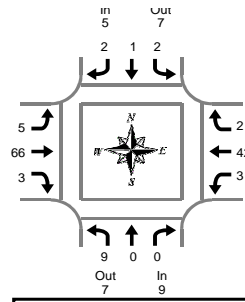
Rolling Hour Summary 7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	131	11	3	0	15	4	142	161	56	520	36	0	4	761	10	0	1,693	0	0	0	0
7:15 AM	102	10	3	0	17	7	132	0	57	581	37	0	1	684	10	0	1,641	0	0	0	1
7:30 AM	87	11	3	0	17	4	123	0	55	581	35	0	1	584	11	0	1,512	0	0	0	2
7:45 AM	82	6	2	0	24	6	122	0	63	610	35	0	2	542	12	0	1,506	1	0	0	2
8:00 AM	84	5	1	0	26	5	130	0	65	624	44	0	5	546	10	0	1,545	1	0	0	2

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



Peak Hour Summary
7:00 AM to 8:00 AM

SE Ten Eyck Rd & Hwy 26

Wednesday, March 20, 2019
7:00 AM to 9:00 AM

Heavy Vehicle 5-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	1	0	0	1	0	0	0	0	1	6	1	8	0	6	0	6	15
7:05 AM	0	0	0	0	0	0	0	0	0	5	0	5	0	5	0	5	10
7:10 AM	3	0	0	3	0	0	0	0	0	3	0	3	2	2	1	5	11
7:15 AM	1	0	0	1	0	1	0	1	2	6	0	8	1	1	0	2	12
7:20 AM	2	0	0	2	1	0	0	1	0	5	0	5	0	1	0	1	9
7:25 AM	0	0	0	0	0	0	0	0	0	6	1	7	0	1	0	1	8
7:30 AM	0	0	0	0	0	0	0	0	0	7	0	7	0	7	0	7	14
7:35 AM	0	0	0	0	1	0	0	1	0	7	0	7	0	6	0	6	14
7:40 AM	0	0	0	0	0	0	0	0	1	8	0	9	0	1	0	1	10
7:45 AM	0	0	0	0	0	0	1	1	0	6	0	6	0	4	0	4	11
7:50 AM	0	0	0	0	0	0	1	1	0	3	0	3	0	7	0	7	11
7:55 AM	2	0	0	2	0	0	0	0	1	4	1	6	0	1	1	2	10
8:00 AM	1	0	0	1	0	0	1	1	0	10	1	11	0	2	0	2	15
8:05 AM	0	0	0	0	1	0	1	2	0	9	0	9	0	7	1	8	19
8:10 AM	0	0	0	0	0	0	0	0	0	2	0	2	0	6	0	6	8
8:15 AM	0	0	0	0	0	0	0	0	0	4	0	4	0	3	0	3	7
8:20 AM	0	0	0	0	0	0	1	1	0	5	0	5	1	2	0	3	9
8:25 AM	0	0	0	0	0	0	0	0	0	6	1	7	0	3	0	3	10
8:30 AM	0	0	0	0	1	0	0	1	2	6	0	8	0	3	0	3	12
8:35 AM	0	0	0	0	0	0	0	0	1	5	0	6	0	8	0	8	14
8:40 AM	0	0	0	0	0	0	1	1	0	5	0	5	0	1	0	1	7
8:45 AM	0	0	0	0	0	0	0	0	0	9	0	9	0	3	0	3	12
8:50 AM	0	0	0	0	0	0	0	0	1	4	0	5	1	8	0	9	14
8:55 AM	0	0	0	0	0	0	3	3	0	0	2	2	0	3	0	3	8
Total Survey	10	0	0	10	4	1	9	14	9	131	7	147	5	91	3	99	270

Heavy Vehicle 15-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	4	0	0	4	0	0	0	0	1	14	1	16	2	13	1	16	36
7:15 AM	3	0	0	3	1	1	0	2	2	17	1	20	1	3	0	4	29
7:30 AM	0	0	0	0	1	0	0	1	1	22	0	23	0	14	0	14	38
7:45 AM	2	0	0	2	0	0	2	2	1	13	1	15	0	12	1	13	32
8:00 AM	1	0	0	1	1	0	2	3	0	21	1	22	0	15	1	16	42
8:15 AM	0	0	0	0	0	0	1	1	0	15	1	16	1	8	0	9	26
8:30 AM	0	0	0	0	1	0	1	2	3	16	0	19	0	12	0	12	33
8:45 AM	0	0	0	0	0	0	3	3	1	13	2	16	1	14	0	15	34
Total Survey	10	0	0	10	4	1	9	14	9	131	7	147	5	91	3	99	270

Heavy Vehicle Peak Hour Summary

7:00 AM to 8:00 AM

By Approach	Northbound SE Ten Eyck Rd			Southbound SE Ten Eyck Rd			Eastbound Hwy 26			Westbound Hwy 26			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	9	7	16	5	7	12	74	53	127	47	68	115	135
PHF	0.38			0.63			0.80			0.73			0.89

By Movement	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	9	0	0	9	2	1	2	5	5	66	3	74	3	42	2	47	135
PHF	0.38	0.00	0.00	0.38	0.50	0.25	0.25	0.63	0.63	0.75	0.75	0.80	0.25	0.75	0.50	0.73	0.89

Heavy Vehicle Rolling Hour Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	9	0	0	9	2	1	2	5	5	66	3	74	3	42	2	47	135
7:15 AM	6	0	0	6	3	1	4	8	4	73	3	80	1	44	2	47	141
7:30 AM	3	0	0	3	2	0	5	7	2	71	3	76	1	49	2	52	138
7:45 AM	3	0	0	3	2	0	6	8	4	65	3	72	1	47	2	50	133
8:00 AM	1	0	0	1	2	0	7	9	4	65	4	73	2	49	1	52	135

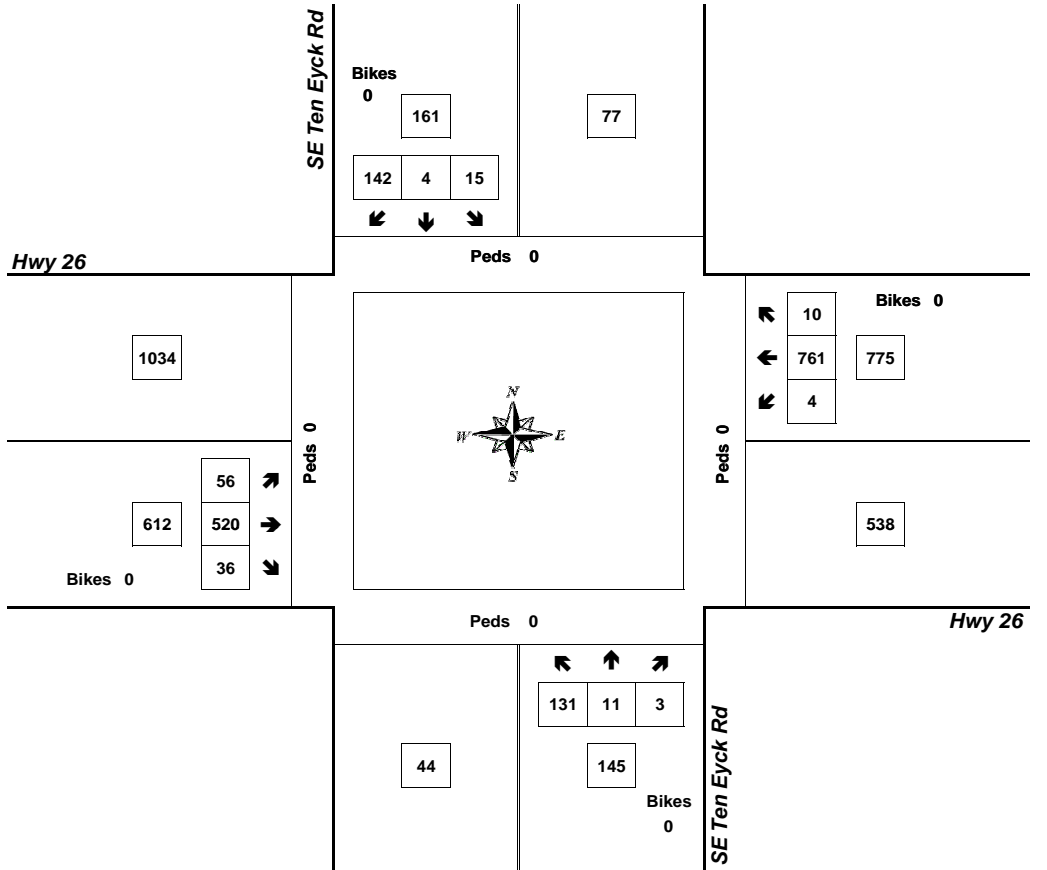
Peak Hour Summary



Clay Carney
(503) 833-2740

SE Ten Eyck Rd & Hwy 26

7:00 AM to 8:00 AM
Wednesday, March 20, 2019



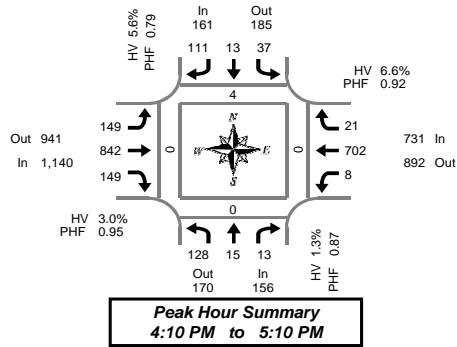
Approach	PHF	HV%	Volume
EB	0.81	12.1%	612
WB	0.84	6.1%	775
NB	0.81	6.2%	145
SB	0.82	3.1%	161
Intersection	0.93	8.0%	1,693

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary



Clay Carney
(603) 833-2740



SE Ten Eyck Rd & Hwy 26

Tuesday, March 19, 2019
4:00 PM to 6:00 PM

5-Minute Interval Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	4	0	2	0	4	3	11	0	8	58	12	0	1	49	2	0	154	0	1	0	0
4:05 PM	10	1	0	0	7	1	5	0	12	63	8	0	1	53	3	0	164	0	0	0	0
4:10 PM	7	2	3	0	1	0	17	0	12	76	11	0	0	65	1	0	195	0	0	0	0
4:15 PM	14	0	1	0	7	1	9	0	18	71	15	0	0	62	1	0	199	0	0	0	0
4:20 PM	9	0	1	0	4	1	11	0	9	75	10	0	0	62	7	0	189	0	0	0	0
4:25 PM	12	2	0	0	5	0	10	0	12	61	14	0	0	52	0	0	168	0	0	0	0
4:30 PM	11	1	4	0	3	2	12	0	17	87	16	1	1	58	1	0	213	0	0	0	0
4:35 PM	15	0	0	0	2	2	6	0	6	59	14	0	0	65	3	0	172	0	0	0	0
4:40 PM	7	1	1	0	3	0	7	0	7	54	9	0	1	57	0	0	147	1	0	0	0
4:45 PM	8	1	0	0	4	1	3	0	13	71	15	1	3	51	3	0	173	0	0	0	0
4:50 PM	13	2	1	0	1	1	6	0	19	74	8	0	0	56	0	0	181	0	0	0	0
4:55 PM	7	1	0	0	1	0	12	0	10	67	14	0	3	57	1	0	173	1	0	0	0
5:00 PM	13	3	1	0	2	2	14	0	12	81	12	0	0	49	1	0	190	2	0	0	0
5:05 PM	12	2	1	0	4	3	4	0	14	86	11	0	0	68	3	1	188	0	0	0	0
5:10 PM	8	0	0	0	6	2	10	0	13	60	12	0	0	68	2	0	181	2	0	0	0
5:15 PM	8	2	1	0	6	2	8	0	9	70	11	0	0	57	1	0	175	0	0	0	0
5:20 PM	8	1	1	1	1	4	10	0	15	73	10	0	0	43	1	0	167	0	1	0	0
5:25 PM	9	1	0	0	4	2	8	0	14	74	11	0	0	43	0	0	166	0	0	0	0
5:30 PM	5	0	1	0	4	0	5	0	15	64	10	0	0	44	0	0	148	1	0	0	0
5:35 PM	5	1	0	0	7	0	9	0	17	50	4	1	0	39	0	0	132	0	0	0	0
5:40 PM	4	0	0	0	2	1	5	0	11	56	7	0	0	30	1	0	117	2	0	0	2
5:45 PM	4	1	0	0	3	2	8	0	14	76	6	0	3	41	1	0	159	0	0	0	0
5:50 PM	7	1	0	0	0	1	6	0	14	69	8	0	0	42	0	0	148	0	0	0	0
5:55 PM	10	1	0	0	2	3	0	16	65	10	0	0	0	51	1	0	159	0	0	0	0
Total Survey	210	24	18	1	81	33	199	0	307	1,620	258	3	13	1,262	33	1	4,058	9	2	0	2

15-Minute Interval Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	21	3	5	0	12	4	33	0	32	197	31	0	2	167	6	0	513	0	1	0	0
4:15 PM	35	2	2	0	16	2	30	0	39	207	39	0	0	176	8	0	556	0	0	0	0
4:30 PM	33	2	5	0	8	4	25	0	30	200	39	1	2	180	4	0	532	1	0	0	0
4:45 PM	28	4	1	0	6	2	21	0	42	212	37	1	6	164	4	0	527	1	0	0	0
5:00 PM	33	5	2	0	12	7	28	0	39	207	35	0	0	185	6	1	559	4	0	0	0
5:15 PM	25	4	2	1	11	8	26	0	38	217	32	0	0	143	2	0	508	0	1	0	0
5:30 PM	14	1	1	0	13	1	19	0	43	170	21	1	0	113	1	0	397	3	0	0	2
5:45 PM	21	3	0	0	3	5	17	0	44	210	24	0	3	134	2	0	466	0	0	0	0
Total Survey	210	24	18	1	81	33	199	0	307	1,620	258	3	13	1,262	33	1	4,058	9	2	0	2

Peak Hour Summary 4:10 PM to 5:10 PM

By Approach	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	156	170	326	0	161	185	346	0	1,140	941	2,081	2	731	892	1,623	1	2,188	4	0	0	0
%HV	1.3%				5.6%				3.0%				6.6%				4.3%				
PHF	0.87				0.79				0.95				0.92				0.94				

By Movement	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	128	15	13	156	37	13	111	161	149	842	149	1,140	8	702	21	731	2,188
%HV	1.6%	0.0%	0.0%	1.3%	0.0%	0.0%	8.1%	5.6%	4.0%	3.0%	2.0%	3.0%	0.0%	6.7%	4.8%	6.6%	4.3%
PHF	0.84	0.63	0.65	0.87	0.58	0.65	0.75	0.79	0.89	0.94	0.85	0.95	0.33	0.93	0.58	0.92	0.94

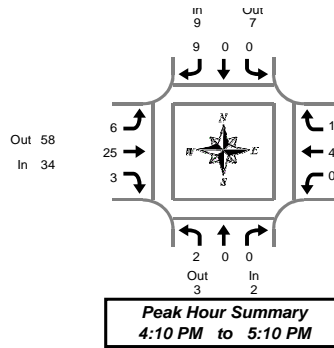
Rolling Hour Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	117	11	13	0	42	12	109	0	143	816	146	2	10	687	22	0	2,128	2	1	0	0
4:15 PM	129	13	10	0	42	15	104	0	150	826	150	2	8	705	22	1	2,174	6	0	0	0
4:30 PM	119	15	10	1	37	21	100	0	149	836	143	2	8	672	16	1	2,126	6	1	0	0
4:45 PM	100	14	6	1	42	18	94	0	162	806	125	2	6	605	13	1	1,991	8	1	0	2
5:00 PM	93	13	5	1	39	21	90	0	164	804	112	1	3	575	11	1	1,930	7	1	0	2

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



SE Ten Eyck Rd & Hwy 26

Tuesday, March 19, 2019
4:00 PM to 6:00 PM

Peak Hour Summary
4:10 PM to 5:10 PM

Heavy Vehicle 5-Minute Interval Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total		
4:00 PM	0	0	0	0	0	0	0	0	0	4	0	0	4	0	10	1	11	15
4:05 PM	0	0	0	0	1	0	0	1	0	6	0	0	6	0	3	1	4	11
4:10 PM	0	0	0	0	0	0	0	0	0	2	0	0	2	0	8	0	8	10
4:15 PM	2	0	0	2	0	0	2	2	2	3	0	5	0	3	0	3	12	12
4:20 PM	0	0	0	0	0	0	2	2	1	3	0	4	0	5	1	6	12	12
4:25 PM	0	0	0	0	0	0	1	1	0	5	1	6	0	4	0	4	11	11
4:30 PM	0	0	0	0	0	0	2	2	1	0	0	1	0	3	0	3	6	6
4:35 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	5	5	5
4:40 PM	0	0	0	0	0	0	1	1	0	3	0	3	0	2	0	2	6	6
4:45 PM	0	0	0	0	0	0	0	0	1	1	0	2	0	4	0	4	6	6
4:50 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	7	7	7
4:55 PM	0	0	0	0	0	0	1	1	1	2	1	4	0	0	0	0	5	5
5:00 PM	0	0	0	0	0	0	0	0	0	4	1	5	0	1	0	1	6	6
5:05 PM	0	0	0	0	0	0	0	0	0	2	0	2	0	5	0	5	7	7
5:10 PM	0	0	0	0	0	0	0	0	1	3	0	4	0	4	0	4	8	8
5:15 PM	0	0	0	0	0	0	0	0	1	1	0	2	0	2	0	2	4	4
5:20 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	5	0	5	6	6
5:25 PM	0	0	0	0	0	0	0	0	0	2	0	2	0	1	0	1	3	3
5:30 PM	0	0	0	0	0	0	0	0	0	3	1	4	0	3	0	3	7	7
5:35 PM	0	0	0	0	0	0	0	0	1	1	0	2	0	4	0	4	6	6
5:40 PM	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	2	2
5:45 PM	1	0	0	1	0	0	0	0	0	2	0	2	0	3	0	3	6	6
5:50 PM	1	0	0	1	0	0	0	0	0	1	1	2	0	4	0	4	7	7
5:55 PM	0	0	0	0	0	0	0	0	1	2	0	3	0	5	0	5	8	8
Total Survey	4	0	0	4	1	0	9	10	10	53	5	68	0	91	3	94	176	176

Heavy Vehicle 15-Minute Interval Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total		
4:00 PM	0	0	0	0	1	0	0	1	0	12	0	12	0	21	2	23	36	36
4:15 PM	2	0	0	2	0	0	5	5	3	11	1	15	0	12	1	13	35	35
4:30 PM	0	0	0	0	0	0	3	3	1	3	0	4	0	10	0	10	17	17
4:45 PM	0	0	0	0	0	0	1	1	2	3	1	6	0	11	0	11	18	18
5:00 PM	0	0	0	0	0	0	0	0	1	9	1	11	0	10	0	10	21	21
5:15 PM	0	0	0	0	0	0	0	0	1	4	0	5	0	8	0	8	13	13
5:30 PM	0	0	0	0	0	0	0	0	1	6	1	8	0	7	0	7	15	15
5:45 PM	2	0	0	2	0	0	0	0	1	5	1	7	0	12	0	12	21	21
Total Survey	4	0	0	4	1	0	9	10	10	53	5	68	0	91	3	94	176	176

Heavy Vehicle Peak Hour Summary 4:10 PM to 5:10 PM

By Approach	Northbound SE Ten Eyck Rd			Southbound SE Ten Eyck Rd			Eastbound Hwy 26			Westbound Hwy 26			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	2	3	5	9	7	16	34	58	92	48	25	73	93
PHF	0.25			0.45			0.57			0.71			0.66

By Movement	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	2	0	0	2	0	0	9	9	6	25	3	34	0	47	1	48	93
PHF	0.25	0.00	0.00	0.25	0.00	0.00	0.45	0.45	0.50	0.57	0.38	0.57	0.00	0.73	0.25	0.71	0.66

Heavy Vehicle Rolling Hour Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total		
4:00 PM	2	0	0	2	1	0	9	10	6	29	2	37	0	54	3	57	106	106
4:15 PM	2	0	0	2	0	0	9	9	7	26	3	36	0	43	1	44	91	91
4:30 PM	0	0	0	0	0	0	4	4	5	19	2	26	0	39	0	39	69	69
4:45 PM	0	0	0	0	0	0	1	1	5	22	3	30	0	36	0	36	67	67
5:00 PM	2	0	0	2	0	0	0	0	4	24	3	31	0	37	0	37	70	70

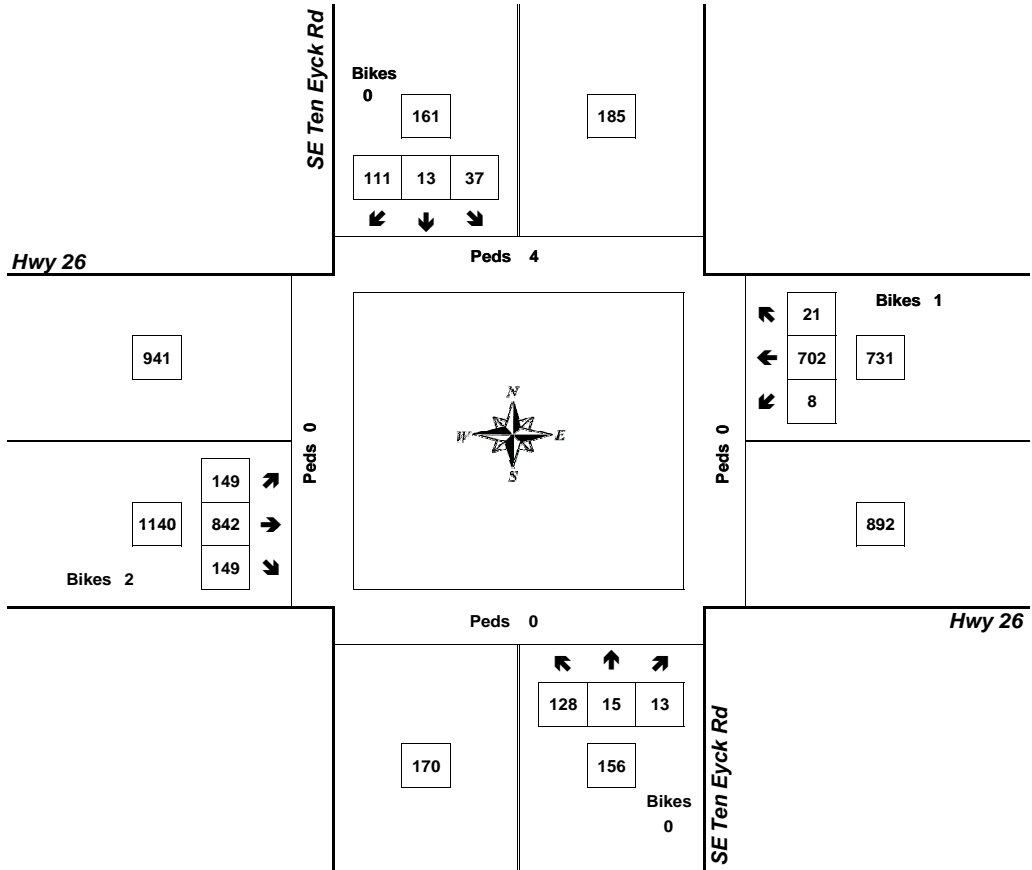
Peak Hour Summary



Clay Carney
(503) 833-2740

SE Ten Eyck Rd & Hwy 26

4:10 PM to 5:10 PM
Tuesday, March 19, 2019



Approach	PHF	HV%	Volume
EB	0.95	3.0%	1,140
WB	0.92	6.6%	731
NB	0.87	1.3%	156
SB	0.79	5.6%	161
Intersection	0.94	4.3%	2,188

Count Period: 4:00 PM to 6:00 PM

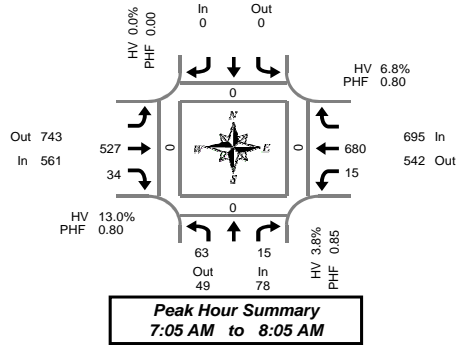
Total Vehicle Summary



Clay Carney
(603) 833-2740

SE Langensand Rd & Hwy 26

Wednesday, March 20, 2019
7:00 AM to 9:00 AM



Peak Hour Summary
7:05 AM to 8:05 AM

5-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Langensand Rd			Southbound SE Langensand Rd			Eastbound Hwy 26			Westbound Hwy 26			Interval Total	Pedestrians Crosswalk			
	L	R	Bikes			Bikes	T	R	Bikes	L	T	Bikes		North	South	East	West
7:00 AM	4	0	0			0	25	1	0	2	62	0	94	0	0	0	0
7:05 AM	9	0	0			0	24	2	0	2	65	0	102	0	0	0	0
7:10 AM	3	0	0			0	22	2	0	0	74	0	101	0	0	0	0
7:15 AM	4	2	0			0	33	3	0	1	71	0	114	0	0	0	0
7:20 AM	9	2	0			0	52	1	0	0	71	0	135	0	0	0	0
7:25 AM	4	1	0			0	31	3	0	4	67	0	110	0	0	0	0
7:30 AM	5	2	0			0	39	5	0	0	60	0	111	0	0	0	0
7:35 AM	4	1	0			0	52	1	0	2	54	0	114	0	0	0	0
7:40 AM	8	0	0			0	56	3	0	2	41	0	110	0	0	0	0
7:45 AM	1	2	0			0	49	8	0	3	42	0	105	0	0	0	0
7:50 AM	4	2	0			0	56	2	0	1	52	0	117	0	0	0	0
7:55 AM	7	1	0			0	59	2	0	0	45	0	114	0	0	0	0
8:00 AM	5	2	0			0	54	2	0	0	38	0	101	0	0	0	0
8:05 AM	2	2	0			0	44	3	0	1	41	0	93	0	0	0	0
8:10 AM	2	2	0			0	41	1	0	0	49	0	95	0	0	0	0
8:15 AM	4	1	0			0	46	0	0	2	34	0	87	0	0	0	0
8:20 AM	2	1	0			0	40	3	0	0	42	0	88	0	0	0	0
8:25 AM	4	2	0			0	39	2	0	1	43	0	91	0	0	0	0
8:30 AM	5	4	0			0	53	1	0	2	37	0	102	0	0	0	0
8:35 AM	2	3	0			0	56	1	0	0	53	0	115	0	0	0	0
8:40 AM	1	2	0			0	53	8	0	1	47	0	112	0	0	0	0
8:45 AM	6	2	0			0	77	5	0	0	53	0	143	0	0	0	0
8:50 AM	4	4	0			0	52	2	0	5	60	0	127	0	0	0	0
8:55 AM	5	0	0			0	60	0	0	1	42	0	108	0	0	0	0
Total Survey	104	38	0			0	1,113	61	0	30	1,243	0	2,589	0	0	0	0

15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Langensand Rd			Southbound SE Langensand Rd			Eastbound Hwy 26			Westbound Hwy 26			Interval Total	Pedestrians Crosswalk			
	L	R	Bikes			Bikes	T	R	Bikes	L	T	Bikes		North	South	East	West
7:00 AM	16	0	0			0	71	5	0	4	201	0	297	0	0	0	0
7:15 AM	17	5	0			0	116	7	0	5	209	0	359	0	0	0	0
7:30 AM	17	3	0			0	147	9	0	4	155	0	335	0	0	0	0
7:45 AM	12	5	0			0	164	12	0	4	139	0	336	0	0	0	0
8:00 AM	9	6	0			0	139	6	0	1	128	0	289	0	0	0	0
8:15 AM	10	4	0			0	125	5	0	3	119	0	266	0	0	0	0
8:30 AM	8	9	0			0	162	10	0	3	137	0	329	0	0	0	0
8:45 AM	15	6	0			0	189	7	0	6	155	0	378	0	0	0	0
Total Survey	104	38	0			0	1,113	61	0	30	1,243	0	2,589	0	0	0	0

Peak Hour Summary
7:05 AM to 8:05 AM

By Approach	Northbound SE Langensand Rd				Southbound SE Langensand Rd				Eastbound Hwy 26				Westbound Hwy 26				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	78	49	127	0	0	0	0	0	561	743	1,304	0	695	542	1,237	0	1,334	0	0	0	0
%HV	3.8%				0.0%				13.0%				6.8%				9.2%				
PHF	0.85				0.00				0.80				0.80				0.93				

By Movement	Northbound SE Langensand Rd				Southbound SE Langensand Rd				Eastbound Hwy 26				Westbound Hwy 26				Total
	L	R	Total	Bikes			Total	Bikes	T	R	Total	Bikes	L	T	Total	Bikes	
Volume	63	15	78	0			0	0	527	34	561	0	15	680	695	0	1,334
%HV	3.2%	NA	6.7%	3.8%	NA	NA	0.0%	NA	13.1%	11.8%	13.0%	20.0%	6.5%	NA	6.8%	9.2%	
PHF	0.88		0.75	0.85			0.00		0.78	0.65	0.80		0.54	0.79	0.80	0.93	

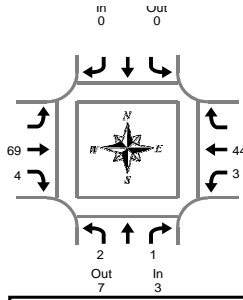
Rolling Hour Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Langensand Rd			Southbound SE Langensand Rd			Eastbound Hwy 26			Westbound Hwy 26			Interval Total	Pedestrians Crosswalk			
	L	R	Bikes			Bikes	T	R	Bikes	L	T	Bikes		North	South	East	West
7:00 AM	62	13	0			0	498	33	0	17	704	0	1,327	0	0	0	0
7:15 AM	55	19	0			0	566	34	0	14	631	0	1,319	0	0	0	0
7:30 AM	48	18	0			0	575	32	0	12	541	0	1,226	0	0	0	0
7:45 AM	39	24	0			0	590	33	0	11	523	0	1,220	0	0	0	0
8:00 AM	42	25	0			0	615	28	0	13	539	0	1,262	0	0	0	0

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



SE Langensand Rd & Hwy 26

Wednesday, March 20, 2019
7:00 AM to 9:00 AM

Heavy Vehicle 5-Minute Interval Summary 7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Langensand Rd			Southbound SE Langensand Rd			Eastbound Hwy 26			Westbound Hwy 26			Interval Total
	L	R	Total			Total	T	R	Total	L	T	Total	
7:00 AM	0	0	0			0	6	1	7	0	6	6	13
7:05 AM	0	0	0			0	4	1	5	0	6	6	11
7:10 AM	0	0	0			0	2	0	2	0	3	3	5
7:15 AM	0	0	0			0	6	0	6	0	3	3	9
7:20 AM	0	0	0			0	7	0	7	0	0	0	7
7:25 AM	0	0	0			0	5	1	6	1	2	3	9
7:30 AM	0	0	0			0	6	0	6	0	6	6	12
7:35 AM	0	0	0			0	5	0	5	1	7	8	13
7:40 AM	1	0	1			0	7	0	7	0	2	2	10
7:45 AM	0	0	0			0	11	1	12	1	3	4	16
7:50 AM	0	1	1			0	4	1	5	0	5	5	11
7:55 AM	1	0	1			0	3	0	3	0	5	5	9
8:00 AM	0	0	0			0	9	0	9	0	2	2	11
8:05 AM	1	0	1			0	11	1	12	0	7	7	20
8:10 AM	0	0	0			0	2	0	2	0	5	5	7
8:15 AM	0	0	0			0	3	0	3	0	4	4	7
8:20 AM	0	0	0			0	4	1	5	0	2	2	7
8:25 AM	0	1	1			0	4	1	5	0	3	3	9
8:30 AM	0	2	2			0	9	0	9	1	3	4	15
8:35 AM	1	1	2			0	5	0	5	0	6	6	13
8:40 AM	0	0	0			0	5	0	5	0	3	3	8
8:45 AM	0	0	0			0	7	0	7	0	1	1	8
8:50 AM	0	0	0			0	3	0	3	0	9	9	12
8:55 AM	0	0	0			0	4	0	4	0	4	4	8
Total Survey	4	5	9			0	132	8	140	4	97	101	250

Heavy Vehicle 15-Minute Interval Summary 7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Langensand Rd			Southbound SE Langensand Rd			Eastbound Hwy 26			Westbound Hwy 26			Interval Total
	L	R	Total			Total	T	R	Total	L	T	Total	
7:00 AM	0	0	0			0	12	2	14	0	15	15	29
7:15 AM	0	0	0			0	18	1	19	1	5	6	25
7:30 AM	1	0	1			0	18	0	18	1	15	16	35
7:45 AM	1	1	2			0	18	2	20	1	13	14	36
8:00 AM	1	0	1			0	22	1	23	0	14	14	38
8:15 AM	0	1	1			0	11	2	13	0	9	9	23
8:30 AM	1	3	4			0	19	0	19	1	12	13	36
8:45 AM	0	0	0			0	14	0	14	0	14	14	28
Total Survey	4	5	9			0	132	8	140	4	97	101	250

Heavy Vehicle Peak Hour Summary 7:05 AM to 8:05 AM

By Approach	Northbound SE Langensand Rd			Southbound SE Langensand Rd			Eastbound Hwy 26			Westbound Hwy 26			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	3	7	10	0	0	0	73	46	119	47	70	117	123
PHF	0.38			0.00			0.76			0.69			0.79

By Movement	Northbound SE Langensand Rd			Southbound SE Langensand Rd			Eastbound Hwy 26			Westbound Hwy 26			Total
	L	R	Total			Total	T	R	Total	L	T	Total	
Volume	2	1	3			0	69	4	73	3	44	47	123
PHF	0.50	0.25	0.38			0.00	0.75	0.50	0.76	0.38	0.73	0.69	0.79

Heavy Vehicle Rolling Hour Summary 7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Langensand Rd			Southbound SE Langensand Rd			Eastbound Hwy 26			Westbound Hwy 26			Interval Total
	L	R	Total			Total	T	R	Total	L	T	Total	
7:00 AM	2	1	3			0	66	5	71	3	48	51	125
7:15 AM	3	1	4			0	76	4	80	3	47	50	134
7:30 AM	3	2	5			0	69	5	74	2	51	53	132
7:45 AM	3	5	8			0	70	5	75	2	48	50	133
8:00 AM	2	4	6			0	66	3	69	1	49	50	125

Peak Hour Summary



Clay Carney
(503) 833-2740

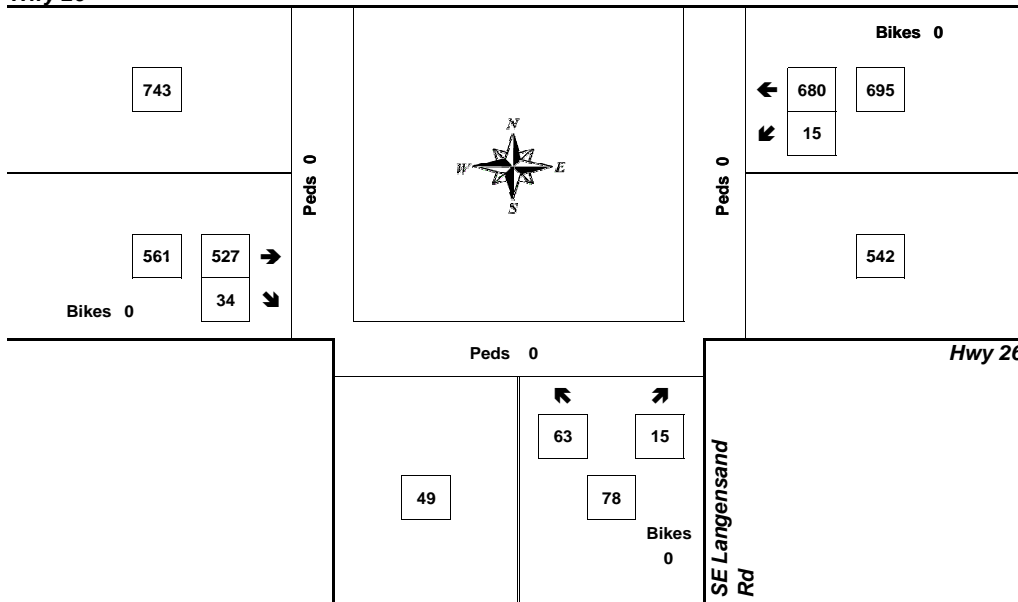
SE Langensand Rd & Hwy 26

7:05 AM to 8:05 AM
Wednesday, March 20, 2019

Bikes
0

Hwy 26

Peds 0



Approach	PHF	HV%	Volume
EB	0.80	13.0%	561
WB	0.80	6.8%	695
NB	0.85	3.8%	78
SB	0.00	0.0%	0
Intersection	0.93	9.2%	1,334

Count Period: 7:00 AM to 9:00 AM

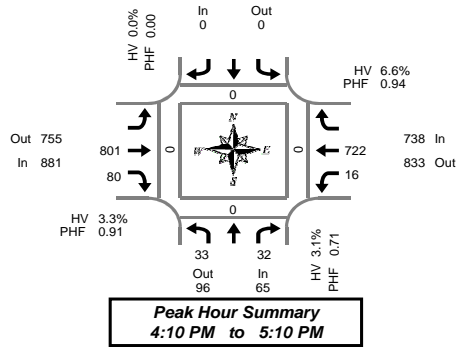
Total Vehicle Summary



Clay Carney
(503) 833-2740

SE Langensand Rd & Hwy 26

Tuesday, March 19, 2019
4:00 PM to 6:00 PM



5-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Langensand Rd			Southbound SE Langensand Rd			Eastbound Hwy 26			Westbound Hwy 26			Interval Total	Pedestrians Crosswalk			
	L	R	Bikes			Bikes	T	R	Bikes	L	T	Bikes		North	South	East	West
4:00 PM	2	4	0			0	62	9	0	5	50	0	132	0	0	0	0
4:05 PM	1	2	0			0	69	6	0	3	52	0	133	0	0	0	0
4:10 PM	1	3	0			0	61	3	0	1	74	0	143	0	0	0	0
4:15 PM	6	1	0			0	76	5	0	1	50	0	139	0	0	0	0
4:20 PM	5	5	0			0	79	9	0	1	70	0	169	0	0	0	0
4:25 PM	6	0	1			0	58	8	0	1	49	0	122	0	0	0	0
4:30 PM	0	3	0			0	75	12	0	1	56	0	147	0	0	0	0
4:35 PM	2	5	0			0	61	7	0	1	64	0	140	0	0	0	0
4:40 PM	0	1	0			0	59	1	0	1	55	0	117	0	0	0	0
4:45 PM	1	1	0			0	64	3	0	2	63	0	134	0	0	0	0
4:50 PM	6	5	0			0	62	6	0	0	54	0	133	0	0	0	0
4:55 PM	3	0	0			0	72	5	0	2	56	0	138	0	0	0	0
5:00 PM	1	5	0			0	62	10	0	1	55	0	134	0	0	0	0
5:05 PM	2	3	0			0	72	11	0	4	76	0	168	0	0	0	0
5:10 PM	2	3	0			0	58	14	0	1	65	0	143	0	0	0	0
5:15 PM	1	2	0			0	51	8	0	2	59	0	123	0	0	0	0
5:20 PM	2	4	0			0	78	7	0	2	43	0	136	0	0	0	0
5:25 PM	3	1	0			0	71	5	0	1	42	0	123	0	0	0	0
5:30 PM	2	2	0			0	67	7	0	3	38	0	119	0	0	0	0
5:35 PM	1	1	0			0	60	5	0	1	38	0	106	0	0	0	0
5:40 PM	0	4	0			0	49	7	0	0	34	0	94	0	0	0	0
5:45 PM	2	1	0			0	69	7	0	1	45	0	125	0	0	0	0
5:50 PM	0	3	0			0	60	4	0	0	43	0	110	0	0	0	0
5:55 PM	4	1	0			0	65	8	0	3	52	0	133	0	0	0	0
Total Survey	53	60	1			0	1,560	167	0	38	1,283	0	3,161	0	0	0	0

15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Langensand Rd			Southbound SE Langensand Rd			Eastbound Hwy 26			Westbound Hwy 26			Interval Total	Pedestrians Crosswalk			
	L	R	Bikes			Bikes	T	R	Bikes	L	T	Bikes		North	South	East	West
4:00 PM	4	9	0			0	192	18	0	9	176	0	408	0	0	0	0
4:15 PM	17	6	1			0	213	22	0	3	169	0	430	0	0	0	0
4:30 PM	2	9	0			0	195	20	0	3	175	0	404	0	0	0	0
4:45 PM	10	6	0			0	198	14	0	4	173	0	405	0	0	0	0
5:00 PM	5	11	0			0	192	35	0	6	196	0	445	0	0	0	0
5:15 PM	6	7	0			0	200	20	0	5	144	0	382	0	0	0	0
5:30 PM	3	7	0			0	176	19	0	4	110	0	319	0	0	0	0
5:45 PM	6	5	0			0	194	19	0	4	140	0	368	0	0	0	0
Total Survey	53	60	1			0	1,560	167	0	38	1,283	0	3,161	0	0	0	0

Peak Hour Summary

4:10 PM to 5:10 PM

By Approach	Northbound SE Langensand Rd				Southbound SE Langensand Rd				Eastbound Hwy 26				Westbound Hwy 26				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	65	96	161	1	0	0	0	0	881	755	1,636	0	738	833	1,571	0	1,684	0	0	0	0
%HV	3.1%				0.0%				3.3%				6.6%				4.8%				
PHF	0.71				0.00				0.91				0.94				0.93				

By Movement	Northbound SE Langensand Rd				Southbound SE Langensand Rd				Eastbound Hwy 26				Westbound Hwy 26				Total
	L	R	Total	Bikes			Total	Bikes	T	R	Total	Bikes	L	T	Total	Bikes	
Volume	33	30	65	1			0	0	801	80	881	0	16	722	738	0	1,684
%HV	3.0%	NA	3.1%	3.1%	NA	NA	NA	0.0%	NA	3.4%	2.5%	3.3%	0.0%	6.8%	NA	6.6%	4.8%
PHF	0.49		0.80	0.71			0.00		0.93	0.69	0.91		0.57	0.93	0.94	0.93	0.93

Rolling Hour Summary

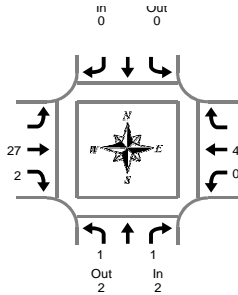
4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Langensand Rd			Southbound SE Langensand Rd			Eastbound Hwy 26			Westbound Hwy 26			Interval Total	Pedestrians Crosswalk			
	L	R	Bikes			Bikes	T	R	Bikes	L	T	Bikes		North	South	East	West
4:00 PM	33	30	1			0	798	74	0	19	693	0	1,647	0	0	0	0
4:15 PM	34	32	1			0	798	91	0	16	713	0	1,684	0	0	0	0
4:30 PM	23	33	0			0	785	89	0	18	688	0	1,636	0	0	0	0
4:45 PM	24	31	0			0	766	88	0	19	623	0	1,551	0	0	0	0
5:00 PM	20	30	0			0	762	93	0	19	590	0	1,514	0	0	0	0

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



Peak Hour Summary
4:10 PM to 5:10 PM

SE Langensand Rd & Hwy 26

Tuesday, March 19, 2019
4:00 PM to 6:00 PM

Heavy Vehicle 5-Minute Interval Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Langensand Rd			Southbound SE Langensand Rd			Eastbound Hwy 26			Westbound Hwy 26			Interval Total
	L	R	Total			Total	T	R	Total	L	T	Total	
4:00 PM	0	0	0			0	3	0	3	0	11	11	14
4:05 PM	0	0	0			0	8	0	8	0	5	5	13
4:10 PM	0	0	0			0	2	0	2	0	7	7	9
4:15 PM	0	0	0			0	5	0	5	0	4	4	9
4:20 PM	1	0	1			0	4	1	5	0	4	4	10
4:25 PM	0	0	0			0	3	0	3	0	5	5	8
4:30 PM	0	1	1			0	1	1	2	0	3	3	6
4:35 PM	0	0	0			0	1	0	1	0	4	4	5
4:40 PM	0	0	0			0	2	0	2	0	3	3	5
4:45 PM	0	0	0			0	1	0	1	0	4	4	5
4:50 PM	0	0	0			0	2	0	2	0	6	6	8
4:55 PM	0	0	0			0	1	0	1	0	2	2	3
5:00 PM	0	0	0			0	3	0	3	0	1	1	4
5:05 PM	0	0	0			0	2	0	2	0	6	6	8
5:10 PM	0	0	0			0	0	1	1	0	4	4	5
5:15 PM	0	0	0			0	2	0	2	0	3	3	5
5:20 PM	0	0	0			0	0	0	0	0	5	5	5
5:25 PM	0	0	0			0	1	0	1	0	1	1	2
5:30 PM	0	0	0			0	4	0	4	0	2	2	6
5:35 PM	0	0	0			0	0	0	0	1	2	3	3
5:40 PM	0	0	0			0	1	0	1	0	3	3	4
5:45 PM	0	0	0			0	4	0	4	0	3	3	7
5:50 PM	0	0	0			0	1	0	1	0	2	2	3
5:55 PM	0	0	0			0	2	0	2	0	7	7	9
Total Survey	1	1	2			0	53	3	56	1	97	98	156

Heavy Vehicle 15-Minute Interval Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Langensand Rd			Southbound SE Langensand Rd			Eastbound Hwy 26			Westbound Hwy 26			Interval Total
	L	R	Total			Total	T	R	Total	L	T	Total	
4:00 PM	0	0	0			0	13	0	13	0	23	23	36
4:15 PM	1	0	1			0	12	1	13	0	13	13	27
4:30 PM	0	1	1			0	4	1	5	0	10	10	16
4:45 PM	0	0	0			0	4	0	4	0	12	12	16
5:00 PM	0	0	0			0	5	1	6	0	11	11	17
5:15 PM	0	0	0			0	3	0	3	0	9	9	12
5:30 PM	0	0	0			0	5	0	5	1	7	8	13
5:45 PM	0	0	0			0	7	0	7	0	12	12	19
Total Survey	1	1	2			0	53	3	56	1	97	98	156

Heavy Vehicle Peak Hour Summary 4:10 PM to 5:10 PM

By Approach	Northbound SE Langensand Rd			Southbound SE Langensand Rd			Eastbound Hwy 26			Westbound Hwy 26			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	2	2	4	0	0	0	29	50	79	49	28	77	80
PHF	0.25			0.00			0.56			0.82			0.71

By Movement	Northbound SE Langensand Rd			Southbound SE Langensand Rd			Eastbound Hwy 26			Westbound Hwy 26			Total
	L	R	Total			Total	T	R	Total	L	T	Total	
Volume	1		1	2		2	27	2	29	0	49	49	80
PHF	0.25		0.25	0.25		0.00	0.56	0.25	0.56	0.00	0.82	0.82	0.71

Heavy Vehicle Rolling Hour Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Langensand Rd			Southbound SE Langensand Rd			Eastbound Hwy 26			Westbound Hwy 26			Interval Total
	L	R	Total			Total	T	R	Total	L	T	Total	
4:00 PM	1		1	2		2	33	2	35	0	58	58	95
4:15 PM	1		1	2		0	25	3	28	0	46	46	76
4:30 PM	0		1	1		0	16	2	18	0	42	42	61
4:45 PM	0		0	0		0	17	1	18	1	39	40	58
5:00 PM	0		0	0		0	20	1	21	1	39	40	61

Peak Hour Summary



Clay Carney
(503) 833-2740

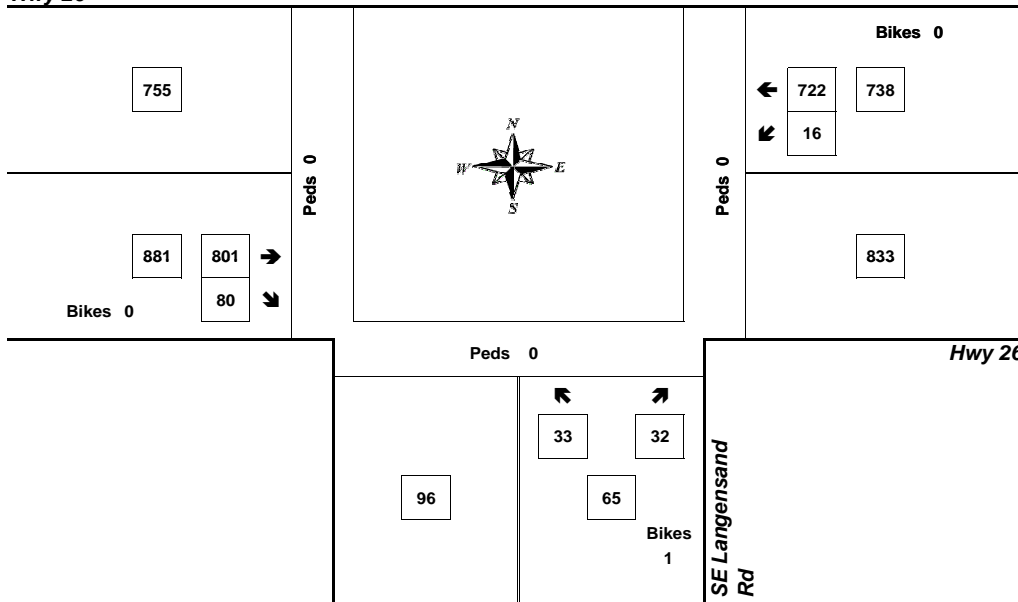
SE Langensand Rd & Hwy 26

4:10 PM to 5:10 PM
Tuesday, March 19, 2019

Bikes
0

Hwy 26

Peds 0



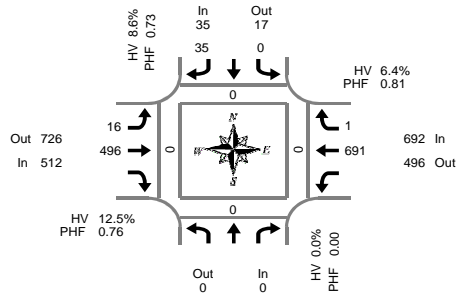
Approach	PHF	HV%	Volume
EB	0.91	3.3%	881
WB	0.94	6.6%	738
NB	0.71	3.1%	65
SB	0.00	0.0%	0
Intersection	0.93	4.8%	1,684

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary



Clay Carney
(603) 833-2740



SE Vista Loop Dr & Hwy 26

Wednesday, March 20, 2019
7:00 AM to 9:00 AM

Peak Hour Summary
7:00 AM to 8:00 AM

5-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
	Bikes	L	R	Bikes	L	R	Bikes	L	T	Bikes	T	R	Bikes	North	South	East		West			
7:00 AM	0	0	6	0	1	25	0	68	0	0	100	0	0	0	0	0	0	0			
7:05 AM	0	0	2	0	0	25	0	54	0	0	81	0	0	0	0	0	0	0			
7:10 AM	0	0	4	0	1	24	0	80	0	0	109	0	0	0	0	0	0	0			
7:15 AM	0	0	2	0	2	32	0	71	0	0	107	0	0	0	0	0	0	0			
7:20 AM	0	0	2	0	2	51	0	63	0	0	118	0	0	0	0	0	0	0			
7:25 AM	0	0	4	0	1	31	0	62	0	0	98	0	0	0	0	0	0	0			
7:30 AM	0	0	1	0	2	46	0	62	1	0	112	0	0	0	0	0	0	0			
7:35 AM	0	0	4	0	0	43	0	49	0	0	96	0	0	0	0	0	0	0			
7:40 AM	0	0	4	0	3	54	0	45	0	0	106	0	0	0	0	0	0	0			
7:45 AM	0	0	4	0	0	54	0	44	0	0	102	0	0	0	0	0	0	0			
7:50 AM	0	0	0	0	2	53	0	57	0	0	112	0	0	0	0	0	0	0			
7:55 AM	0	0	2	0	2	58	0	36	0	0	98	0	0	0	0	0	0	0			
8:00 AM	0	0	3	0	1	52	0	31	0	0	87	0	0	0	0	0	0	0			
8:05 AM	0	0	2	0	3	44	0	40	0	0	89	0	0	0	0	0	0	0			
8:10 AM	0	1	1	0	0	42	0	50	0	0	94	0	0	0	0	0	0	0			
8:15 AM	0	0	0	0	1	46	0	32	0	0	79	0	0	0	0	0	0	0			
8:20 AM	0	0	1	0	2	38	0	46	0	0	87	0	0	0	0	0	0	0			
8:25 AM	0	0	0	0	3	39	0	42	0	0	84	0	0	0	0	0	0	0			
8:30 AM	0	0	2	0	0	61	0	42	0	0	105	0	0	0	0	0	0	0			
8:35 AM	0	0	0	0	0	56	0	44	0	0	100	0	0	0	0	0	0	0			
8:40 AM	0	1	2	0	0	64	0	52	0	0	119	0	0	0	0	0	0	0			
8:45 AM	0	0	1	0	0	66	0	56	0	0	123	0	0	0	0	0	0	0			
8:50 AM	0	0	0	0	2	56	0	49	0	0	107	0	0	0	0	0	0	0			
8:55 AM	0	0	2	0	2	61	0	42	0	0	107	0	0	0	0	0	0	0			
Total Survey	0	2	49	0	30	1,121	0	1,217	1	0	2,420	0	0	0	0	0	0	0			

15-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
	Bikes	L	R	Bikes	L	T	Bikes	L	T	Bikes	T	R	Bikes	North	South	East		West			
7:00 AM	0	0	12	0	2	74	0	202	0	0	290	0	0	0	0	0	0	0			
7:15 AM	0	0	8	0	5	114	0	196	0	0	323	0	0	0	0	0	0	0			
7:30 AM	0	0	9	0	5	143	0	156	1	0	314	0	0	0	0	0	0	0			
7:45 AM	0	0	6	0	4	165	0	137	0	0	312	0	0	0	0	0	0	0			
8:00 AM	0	1	6	0	4	138	0	121	0	0	270	0	0	0	0	0	0	0			
8:15 AM	0	0	1	0	6	123	0	120	0	0	250	0	0	0	0	0	0	0			
8:30 AM	0	1	4	0	0	181	0	138	0	0	324	0	0	0	0	0	0	0			
8:45 AM	0	0	3	0	4	183	0	147	0	0	337	0	0	0	0	0	0	0			
Total Survey	0	2	49	0	30	1,121	0	1,217	1	0	2,420	0	0	0	0	0	0	0			

Peak Hour Summary

7:00 AM to 8:00 AM

By Approach	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	0	0	0	0	35	17	52	0	512	726	1,238	0	692	496	1,188	0	1,239	0	0	0	0
%HV	0.0%				8.6%				12.5%				6.4%				9.0%				
PHF	0.00				0.73				0.76				0.81				0.93				

By Movement	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Total			
	Total	L	R	Total	L	T	Total	L	T	Total	T	R	Total							
Volume	0	0	35	35	16	496	512	691	1	692	1,239	0	0	0						
%HV	NA	NA	NA	0.0%	0.0%	NA	8.6%	8.6%	6.3%	12.7%	NA	12.5%	NA	6.4%	0.0%	6.4%	9.0%			
PHF	0.00	0.00	0.73	0.73	0.80	0.75	0.76	0.81	0.25	0.81	0.93	0.00	0.00	0.00						

Rolling Hour Summary

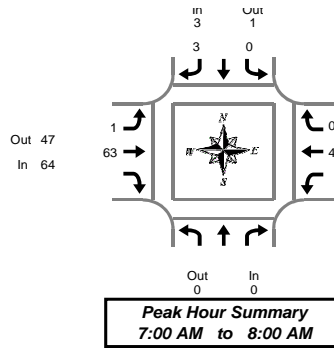
7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
	Bikes	L	R	Bikes	L	T	Bikes	L	T	Bikes	T	R	Bikes	North	South	East		West			
7:00 AM	0	0	35	0	16	496	0	691	1	0	1,239	0	0	0	0	0	0	0			
7:15 AM	0	1	29	0	18	560	0	610	1	0	1,219	0	0	0	0	0	0	0			
7:30 AM	0	1	22	0	19	569	0	534	1	0	1,146	0	0	0	0	0	0	0			
7:45 AM	0	2	17	0	14	607	0	516	0	0	1,156	0	0	0	0	0	0	0			
8:00 AM	0	2	14	0	14	625	0	526	0	0	1,181	0	0	0	0	0	0	0			

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



SE Vista Loop Dr & Hwy 26

Wednesday, March 20, 2019
7:00 AM to 9:00 AM

Heavy Vehicle 5-Minute Interval Summary 7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Vista Loop Dr			Southbound SE Vista Loop Dr			Eastbound Hwy 26			Westbound Hwy 26			Interval Total
	In	Out	Total	L	R	Total	L	T	Total	T	R	Total	
7:00 AM	0	0	0	0	0	0	0	6	6	4	0	4	10
7:05 AM	0	0	0	0	0	0	0	4	4	5	0	5	9
7:10 AM	0	0	0	1	1	0	2	2	2	3	0	3	6
7:15 AM	0	0	0	0	0	0	3	3	3	2	0	2	5
7:20 AM	0	0	0	0	0	0	7	7	7	1	0	1	8
7:25 AM	0	0	0	0	0	0	5	5	5	3	0	3	8
7:30 AM	0	0	0	0	0	0	8	8	8	6	0	6	14
7:35 AM	0	0	0	1	1	0	4	4	4	5	0	5	10
7:40 AM	0	0	0	1	1	1	9	10	10	3	0	3	14
7:45 AM	0	0	0	0	0	0	7	7	7	3	0	3	10
7:50 AM	0	0	0	0	0	0	5	5	5	8	0	8	13
7:55 AM	0	0	0	0	0	0	3	3	3	1	0	1	4
8:00 AM	0	0	0	0	0	1	8	9	9	3	0	3	12
8:05 AM	0	0	0	1	1	1	10	11	11	5	0	5	17
8:10 AM	0	0	0	1	1	0	3	3	3	6	0	6	10
8:15 AM	0	0	0	0	0	0	4	4	4	3	0	3	7
8:20 AM	0	0	0	0	0	1	4	5	5	2	0	2	7
8:25 AM	0	0	0	0	0	1	5	6	6	3	0	3	9
8:30 AM	0	0	0	0	0	0	11	11	11	4	0	4	15
8:35 AM	0	0	0	0	0	0	5	5	5	8	0	8	13
8:40 AM	0	1	0	0	1	0	7	7	7	3	0	3	11
8:45 AM	0	0	0	0	0	0	8	8	8	4	0	4	12
8:50 AM	0	0	0	0	0	1	5	6	6	6	0	6	12
8:55 AM	0	0	0	0	0	0	1	1	1	3	0	3	4
Total Survey	0	1	0	5	6	6	134	140	140	94	0	94	240

Heavy Vehicle 15-Minute Interval Summary 7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Vista Loop Dr			Southbound SE Vista Loop Dr			Eastbound Hwy 26			Westbound Hwy 26			Interval Total
	In	Out	Total	L	R	Total	L	T	Total	T	R	Total	
7:00 AM	0	0	0	1	1	0	12	12	12	12	0	12	25
7:15 AM	0	0	0	0	0	0	15	15	15	6	0	6	21
7:30 AM	0	0	0	2	2	1	21	22	22	14	0	14	38
7:45 AM	0	0	0	0	0	0	15	15	15	12	0	12	27
8:00 AM	0	0	0	2	2	2	21	23	23	14	0	14	39
8:15 AM	0	0	0	0	0	2	13	15	15	8	0	8	23
8:30 AM	0	1	0	0	1	0	23	23	23	15	0	15	39
8:45 AM	0	0	0	0	0	1	14	15	15	13	0	13	28
Total Survey	0	1	0	5	6	6	134	140	140	94	0	94	240

Heavy Vehicle Peak Hour Summary 7:00 AM to 8:00 AM

By Approach	Northbound SE Vista Loop Dr			Southbound SE Vista Loop Dr			Eastbound Hwy 26			Westbound Hwy 26			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	0	0	0	3	1	4	64	47	111	44	63	107	111
PHF	0.00			0.38			0.73			0.79			0.73

By Movement	Northbound SE Vista Loop Dr			Southbound SE Vista Loop Dr			Eastbound Hwy 26			Westbound Hwy 26			Total
	In	Out	Total	L	R	Total	L	T	Total	T	R	Total	
Volume	0	0	0	3	3	1	63	64	64	44	0	44	111
PHF	0.00	0.00		0.38	0.38	0.25	0.75	0.73		0.79	0.00	0.79	0.73

Heavy Vehicle Rolling Hour Summary 7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Vista Loop Dr			Southbound SE Vista Loop Dr			Eastbound Hwy 26			Westbound Hwy 26			Interval Total
	In	Out	Total	L	R	Total	L	T	Total	T	R	Total	
7:00 AM	0	0	0	3	3	1	63	64	64	44	0	44	111
7:15 AM	0	0	0	4	4	3	72	75	75	46	0	46	125
7:30 AM	0	0	0	4	4	5	70	75	75	48	0	48	127
7:45 AM	0	1	0	2	3	4	72	76	76	49	0	49	128
8:00 AM	0	1	0	2	3	5	71	76	76	50	0	50	129

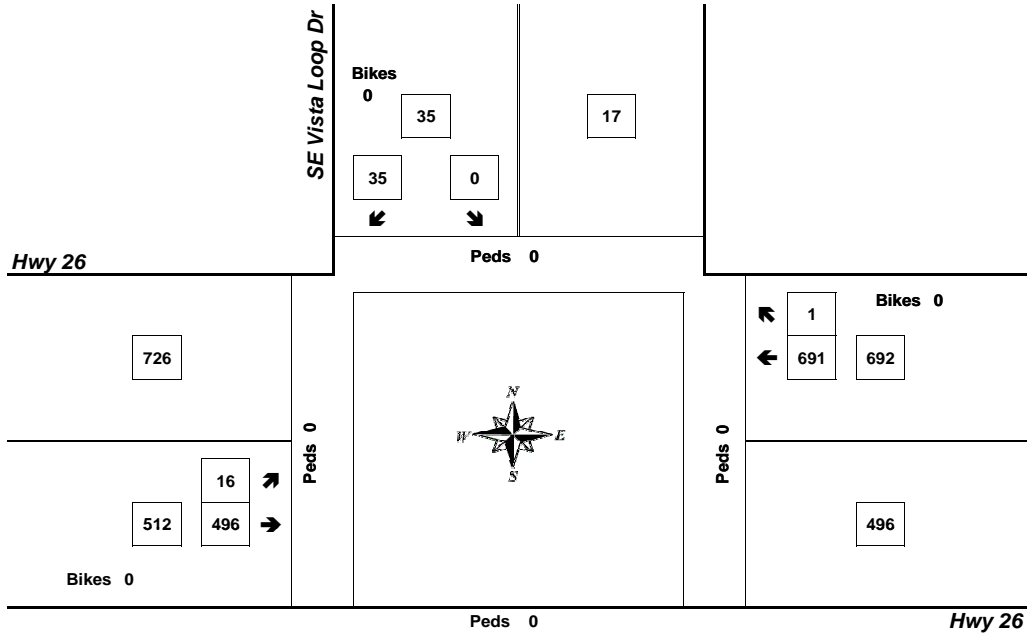
Peak Hour Summary



Clay Carney
(503) 833-2740

SE Vista Loop Dr & Hwy 26

7:00 AM to 8:00 AM
Wednesday, March 20, 2019



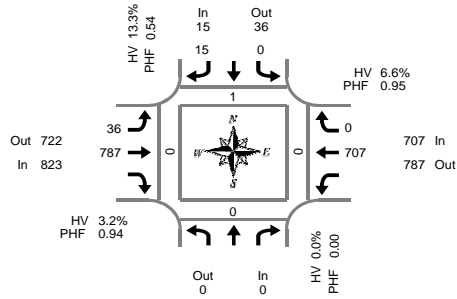
Approach	PHF	HV%	Volume
EB	0.76	12.5%	512
WB	0.81	6.4%	692
NB	0.00	0.0%	0
SB	0.73	8.6%	35
Intersection	0.93	9.0%	1,239

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary



Clay Carney
(603) 833-2740



SE Vista Loop Dr & Hwy 26

Tuesday, March 19, 2019
4:00 PM to 6:00 PM

Peak Hour Summary
4:15 PM to 5:15 PM

5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
	Bikes	L	R	Total	Bikes	L	R	Total	L	T	Bikes	T	R	Bikes	Total	North		South	East	West	
4:00 PM	0	0	2	0	1	53	0	0	55	0	0	0	0	0	0	0	0	0	0	111	
4:05 PM	0	1	0	0	2	65	0	0	60	0	0	0	0	0	0	0	0	0	0	128	
4:10 PM	0	0	3	0	5	61	0	0	62	0	0	0	0	0	0	0	0	0	0	131	
4:15 PM	0	0	1	0	7	68	0	0	53	0	0	0	0	0	0	0	0	0	0	129	
4:20 PM	0	0	3	0	2	86	0	0	68	0	0	0	0	0	0	0	0	0	0	159	
4:25 PM	0	0	2	0	1	50	0	0	44	0	0	0	0	0	0	0	0	0	0	97	
4:30 PM	0	0	2	0	3	76	1	0	63	0	0	0	0	0	0	0	0	0	0	144	
4:35 PM	0	0	1	0	4	69	0	0	54	0	0	0	0	0	0	0	0	0	0	128	
4:40 PM	0	0	0	0	2	51	1	0	68	0	0	0	0	0	0	0	0	0	0	121	
4:45 PM	0	0	1	1	1	59	0	0	59	0	0	0	0	0	0	0	0	0	0	120	
4:50 PM	0	0	0	0	2	70	0	0	59	0	0	0	0	0	0	0	0	0	0	131	
4:55 PM	0	0	1	0	4	64	0	0	58	0	0	0	0	0	0	0	0	0	0	127	
5:00 PM	0	0	2	0	3	69	0	0	54	0	0	0	0	0	0	0	0	0	0	128	
5:05 PM	0	0	1	0	3	64	0	0	58	0	0	0	0	0	0	0	0	0	0	126	
5:10 PM	0	0	1	0	4	61	0	0	69	0	0	0	0	0	0	0	0	0	0	135	
5:15 PM	0	0	0	0	0	57	0	0	44	0	0	0	0	0	0	0	0	0	0	101	
5:20 PM	0	0	0	0	1	73	0	0	39	0	0	0	0	0	0	0	0	0	0	113	
5:25 PM	0	0	4	0	2	61	0	0	41	0	0	0	0	0	0	0	0	0	0	108	
5:30 PM	0	0	2	0	4	76	0	0	39	0	0	0	0	0	0	0	0	0	0	121	
5:35 PM	0	0	0	0	1	56	0	0	39	0	0	0	0	0	0	0	0	0	0	96	
5:40 PM	0	0	3	0	0	62	0	0	29	0	0	0	0	0	0	0	0	0	0	94	
5:45 PM	0	0	1	0	0	79	0	0	46	0	0	0	0	0	0	0	0	0	0	126	
5:50 PM	0	0	0	0	1	60	0	0	45	0	0	0	0	0	0	0	0	0	0	106	
5:55 PM	0	0	2	0	3	70	0	0	42	0	0	0	0	0	0	0	0	0	0	117	
Total Survey	0	1	32	1	56	1,560	2	0	1,248	0	0	0	0	0	0	0	0	0	0	2,897	

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
	Bikes	L	R	Total	Bikes	L	R	Total	L	T	Bikes	T	R	Bikes	Total	North		South	East	West	
4:00 PM	0	1	5	0	8	179	0	0	177	0	0	0	0	0	0	0	0	0	0	370	
4:15 PM	0	0	6	0	10	204	0	0	165	0	0	0	0	0	0	0	0	0	0	385	
4:30 PM	0	0	3	0	9	196	2	0	185	0	0	0	0	0	0	0	0	0	0	393	
4:45 PM	0	0	2	1	7	193	0	0	176	0	0	0	0	0	0	0	0	0	0	378	
5:00 PM	0	0	4	0	10	194	0	0	181	0	0	0	0	0	0	0	0	0	0	389	
5:15 PM	0	0	4	0	3	191	0	0	124	0	0	0	0	0	0	0	0	0	0	322	
5:30 PM	0	0	5	0	5	194	0	0	107	0	0	0	0	0	0	0	0	0	0	311	
5:45 PM	0	0	3	0	4	209	0	0	133	0	0	0	0	0	0	0	0	0	0	349	
Total Survey	0	1	32	1	56	1,560	2	0	1,248	0	0	0	0	0	0	0	0	0	0	2,897	

Peak Hour Summary
4:15 PM to 5:15 PM

By Approach	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	0	0	0	0	15	36	51	1	823	722	1,545	2	707	787	1,494	0	1,545	1	0	0	0
%HV						13.3%				3.2%				6.6%			4.9%				
PHF						0.54				0.94				0.95			0.97				

By Movement	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Total
	Total	L	R	Total	L	T	Total	L	T	Total	T	R	Total				
Volume	0	0	15	15	36	787	823	707	0	707	1,545	2	707	0	707	1,545	
%HV	NA	NA	NA	0.0%	0.0%	NA	13.3%	13.3%	0.0%	3.3%	NA	3.2%	NA	6.6%	0.0%	6.6%	4.9%
PHF				0.00	0.00	0.54	0.54	0.90	0.93	0.94			0.95	0.00	0.95	0.97	

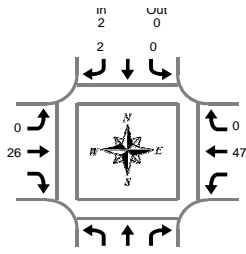
Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
	Bikes	L	R	Total	Bikes	L	T	Total	L	T	Bikes	T	R	Bikes	Total	North		South	East	West	
4:00 PM	0	1	16	1	34	772	2	0	703	0	0	0	0	0	0	1,526	1	0	0	0	
4:15 PM	0	0	15	1	36	787	2	0	707	0	0	0	0	0	0	1,545	1	0	0	0	
4:30 PM	0	0	13	1	29	774	2	0	666	0	0	0	0	0	0	1,482	1	0	0	0	
4:45 PM	0	0	15	1	25	772	0	0	588	0	0	0	0	0	0	1,400	0	0	0	0	
5:00 PM	0	0	16	0	22	788	0	0	545	0	0	0	0	0	0	1,371	0	0	0	0	

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



Out 49
In 26

Peak Hour Summary
4:15 PM to 5:15 PM

SE Vista Loop Dr & Hwy 26

Tuesday, March 19, 2019
4:00 PM to 6:00 PM

Heavy Vehicle 5-Minute Interval Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Vista Loop Dr			Southbound SE Vista Loop Dr			Eastbound Hwy 26			Westbound Hwy 26			Interval Total
	SE Vista Loop Dr	Total	L	R	Total	L	T	Total	T	R	Total		
4:00 PM	0	0	0	1	1	0	2	2	10	0	10	13	
4:05 PM	0	1	0	1	1	1	6	7	2	0	2	10	
4:10 PM	0	0	1	1	1	2	3	3	7	0	7	11	
4:15 PM	0	0	0	0	0	3	3	3	3	0	3	6	
4:20 PM	0	0	1	1	0	6	6	6	4	0	4	11	
4:25 PM	0	0	1	1	0	3	3	3	3	0	3	7	
4:30 PM	0	0	0	0	0	1	1	1	1	0	1	2	
4:35 PM	0	0	0	0	0	0	0	0	5	0	5	5	
4:40 PM	0	0	0	0	0	3	3	3	3	0	3	6	
4:45 PM	0	0	0	0	0	1	1	1	3	0	3	4	
4:50 PM	0	0	0	0	0	2	2	2	8	0	8	10	
4:55 PM	0	0	0	0	0	1	1	1	1	0	1	2	
5:00 PM	0	0	0	0	0	4	4	4	4	0	4	8	
5:05 PM	0	0	0	0	0	1	1	1	8	0	8	9	
5:10 PM	0	0	0	0	0	1	1	1	4	0	4	5	
5:15 PM	0	0	0	0	0	2	2	2	1	0	1	3	
5:20 PM	0	0	0	0	0	0	0	0	5	0	5	5	
5:25 PM	0	0	0	0	0	0	0	0	1	0	1	1	
5:30 PM	0	0	0	0	0	2	2	2	2	0	2	4	
5:35 PM	0	0	0	0	0	0	0	0	4	0	4	4	
5:40 PM	0	0	0	0	0	2	2	2	2	0	2	4	
5:45 PM	0	0	0	0	0	2	2	2	1	0	1	3	
5:50 PM	0	0	0	0	0	0	0	0	2	0	2	2	
5:55 PM	0	0	0	0	0	2	2	2	3	0	3	5	
Total Survey	0	1	4	5	2	46	48	87	0	87	140		

Heavy Vehicle 15-Minute Interval Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Vista Loop Dr			Southbound SE Vista Loop Dr			Eastbound Hwy 26			Westbound Hwy 26			Interval Total
	SE Vista Loop Dr	Total	L	R	Total	L	T	Total	T	R	Total		
4:00 PM	0	1	2	3	2	10	12	19	0	19	34		
4:15 PM	0	0	2	2	0	12	12	10	0	10	24		
4:30 PM	0	0	0	0	0	4	4	9	0	9	13		
4:45 PM	0	0	0	0	0	4	4	12	0	12	16		
5:00 PM	0	0	0	0	0	6	6	16	0	16	22		
5:15 PM	0	0	0	0	0	2	2	7	0	7	9		
5:30 PM	0	0	0	0	0	4	4	8	0	8	12		
5:45 PM	0	0	0	0	0	4	4	6	0	6	10		
Total Survey	0	1	4	5	2	46	48	87	0	87	140		

Heavy Vehicle Peak Hour Summary 4:15 PM to 5:15 PM

By Approach	Northbound SE Vista Loop Dr			Southbound SE Vista Loop Dr			Eastbound Hwy 26			Westbound Hwy 26			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	0	0	0	2	0	2	26	49	75	47	26	73	75
PHF	0.00			0.25			0.54			0.73			0.78

By Movement	Northbound SE Vista Loop Dr			Southbound SE Vista Loop Dr			Eastbound Hwy 26			Westbound Hwy 26			Total
	Total	L	R	Total	L	T	Total	T	R	Total			
Volume	0	0	2	2	0	26	26	47	0	47	75		
PHF	0.00	0.00	0.25	0.25	0.00	0.54	0.54	0.73	0.00	0.73	0.78		

Heavy Vehicle Rolling Hour Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Vista Loop Dr			Southbound SE Vista Loop Dr			Eastbound Hwy 26			Westbound Hwy 26			Interval Total
	SE Vista Loop Dr	Total	L	R	Total	L	T	Total	T	R	Total		
4:00 PM	0	1	4	5	2	30	32	50	0	50	87		
4:15 PM	0	0	2	2	0	26	26	47	0	47	75		
4:30 PM	0	0	0	0	0	16	16	44	0	44	60		
4:45 PM	0	0	0	0	0	16	16	43	0	43	59		
5:00 PM	0	0	0	0	0	16	16	37	0	37	53		

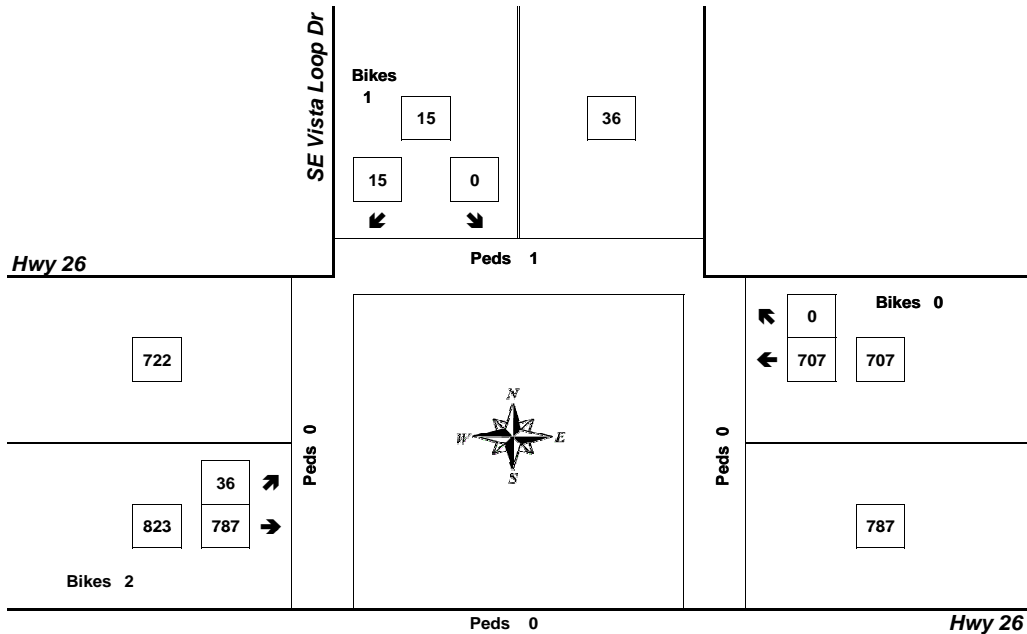
Peak Hour Summary



Clay Carney
(503) 833-2740

SE Vista Loop Dr & Hwy 26

4:15 PM to 5:15 PM
Tuesday, March 19, 2019



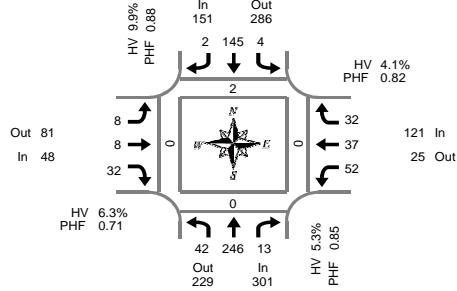
Approach	PHF	HV%	Volume
EB	0.94	3.2%	823
WB	0.95	6.6%	707
NB	0.00	0.0%	0
SB	0.54	13.3%	15
Intersection	0.97	4.9%	1,545

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary



Clay Carney
(603) 833-2740



Peak Hour Summary
7:05 AM to 8:05 AM

Hwy 211 & Dubarko Rd

Wednesday, March 20, 2019
7:00 AM to 9:00 AM

5-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	2	18	1	0	0	8	0	0	0	0	0	0	4	5	0	0	38	0	1	0	0
7:05 AM	3	20	1	0	0	12	0	0	0	0	0	0	3	1	5	0	45	0	0	0	0
7:10 AM	5	23	0	0	0	12	0	0	2	2	4	0	4	3	9	0	64	0	0	0	0
7:15 AM	5	32	0	0	0	9	0	0	1	0	2	0	4	2	2	0	57	1	0	0	0
7:20 AM	8	13	0	0	2	13	1	0	0	0	2	0	5	3	5	0	52	0	0	0	0
7:25 AM	1	23	2	0	0	13	0	0	1	1	5	0	4	3	3	0	56	0	0	0	0
7:30 AM	3	17	0	0	1	12	0	0	0	0	3	0	4	9	1	0	50	1	0	0	0
7:35 AM	2	23	0	0	0	17	0	0	0	0	7	0	6	5	1	0	61	0	0	0	0
7:40 AM	2	23	1	0	0	6	1	0	1	2	4	0	6	4	1	0	51	0	0	0	0
7:45 AM	4	20	3	0	0	14	0	0	0	1	0	0	3	1	0	0	46	0	0	0	0
7:50 AM	5	15	3	0	0	10	0	0	1	1	1	0	5	4	2	0	47	0	0	0	0
7:55 AM	1	21	2	0	1	15	0	0	1	0	3	0	3	1	1	0	49	0	0	0	0
8:00 AM	3	16	1	0	0	12	0	0	1	1	1	0	5	1	2	0	43	0	0	0	0
8:05 AM	2	15	0	0	0	7	0	0	1	1	2	0	4	0	3	0	35	1	0	0	0
8:10 AM	2	19	1	0	1	8	0	0	3	1	2	0	3	4	1	0	45	1	0	0	0
8:15 AM	3	27	1	0	0	8	0	0	0	0	1	0	1	3	2	0	46	0	0	0	0
8:20 AM	0	19	0	0	0	10	0	0	0	1	0	0	1	3	0	0	34	0	0	0	0
8:25 AM	6	8	1	0	0	8	0	0	0	1	1	0	1	1	2	0	29	0	0	0	0
8:30 AM	3	27	2	0	0	10	0	0	0	1	1	0	2	2	5	0	53	0	0	0	0
8:35 AM	1	14	0	0	0	16	0	0	0	1	0	0	2	2	0	0	36	0	0	0	0
8:40 AM	0	19	1	0	0	15	0	0	0	1	1	0	1	3	1	0	42	0	0	0	0
8:45 AM	1	21	1	0	0	15	1	0	0	2	3	0	1	2	4	0	51	0	0	0	0
8:50 AM	0	21	0	0	0	9	0	0	0	2	0	0	3	3	2	0	40	0	0	0	0
8:55 AM	4	20	1	0	1	10	0	0	1	3	2	0	3	3	3	0	51	0	0	0	0
Total Survey	66	474	22	0	6	269	3	0	13	22	45	0	78	68	55	0	1,121	3	1	0	0

15-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	10	61	2	0	0	32	0	0	2	2	4	0	11	9	14	0	147	0	1	0	0
7:15 AM	14	68	2	0	2	35	1	0	2	1	9	0	13	8	10	0	165	1	0	0	0
7:30 AM	7	63	1	0	1	35	1	0	1	2	14	0	16	18	3	0	162	1	0	0	0
7:45 AM	10	56	8	0	1	39	0	0	2	2	4	0	11	6	3	0	142	0	0	0	0
8:00 AM	7	50	2	0	1	27	0	0	5	3	5	0	12	5	6	0	123	1	0	0	0
8:15 AM	9	54	2	0	0	26	0	0	0	2	2	0	3	7	4	0	109	0	0	0	0
8:30 AM	4	60	3	0	0	41	0	0	0	3	2	0	5	7	6	0	131	0	0	0	0
8:45 AM	5	62	2	0	1	34	1	0	1	7	5	0	7	8	9	0	142	0	0	0	0
Total Survey	66	474	22	0	6	269	3	0	13	22	45	0	78	68	55	0	1,121	3	1	0	0

Peak Hour Summary

7:05 AM to 8:05 AM

By Approach	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	301	229	530	0	151	286	437	0	48	81	129	0	121	25	146	0	621	2	0	0	0
%HV	5.3%				9.9%				6.3%				4.1%				6.3%				
PHF	0.85				0.88				0.71				0.82				0.90				

By Movement	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	42	246	13	301	4	145	2	151	8	8	32	48	52	37	32	121	621
%HV	2.4%	5.7%	7.7%	5.3%	25.0%	9.7%	0.0%	9.9%	12.5%	0.0%	6.3%	6.3%	1.9%	0.0%	12.5%	4.1%	6.3%
PHF	0.58	0.82	0.41	0.85	0.33	0.86	0.50	0.88	0.67	0.50	0.53	0.71	0.81	0.51	0.50	0.82	0.90

Rolling Hour Summary

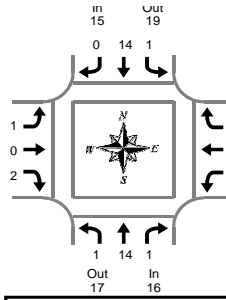
7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	41	248	13	0	4	141	2	0	7	7	31	0	51	41	30	0	616	2	1	0	0
7:15 AM	38	237	13	0	5	136	2	0	10	8	32	0	52	37	22	0	592	3	0	0	0
7:30 AM	33	223	13	0	3	127	1	0	8	9	25	0	42	36	16	0	536	2	0	0	0
7:45 AM	30	220	15	0	2	133	0	0	7	10	13	0	31	25	19	0	505	1	0	0	0
8:00 AM	25	226	9	0	2	128	1	0	6	15	14	0	27	27	25	0	505	1	0	0	0

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



Out 1
In 3

Hwy 211 & Dubarko Rd

Wednesday, March 20, 2019
7:00 AM to 9:00 AM

Peak Hour Summary
7:05 AM to 8:05 AM

Heavy Vehicle 5-Minute Interval Summary 7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total	
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total		
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2
7:05 AM	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0
7:10 AM	0	1	0	1	0	0	0	0	0	0	1	1	0	0	1	1	1	3
7:15 AM	0	1	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0	2
7:20 AM	0	0	0	0	1	1	0	2	0	0	0	0	1	0	0	1	3	3
7:25 AM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	2	2	3	3
7:30 AM	0	1	0	1	0	2	0	2	0	0	0	0	0	0	0	0	0	3
7:35 AM	0	1	0	1	0	2	0	2	0	0	0	0	0	0	0	0	0	3
7:40 AM	0	3	1	4	0	0	0	0	0	0	0	0	0	0	1	1	5	5
7:45 AM	0	0	0	0	0	3	0	3	0	0	0	0	0	0	0	0	3	3
7:50 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:55 AM	1	0	0	1	0	3	0	3	0	0	0	0	0	0	0	0	0	4
8:00 AM	0	6	0	6	0	2	0	2	0	0	0	0	0	0	0	0	0	8
8:05 AM	0	0	0	0	0	3	0	3	0	0	0	0	1	0	0	1	4	4
8:10 AM	0	2	0	2	0	0	0	0	0	0	0	0	1	1	0	2	4	4
8:15 AM	1	2	0	3	0	1	0	1	0	0	0	0	0	0	0	0	4	4
8:20 AM	0	2	0	2	0	2	0	2	0	1	0	1	0	0	0	0	5	5
8:25 AM	0	2	0	2	0	1	0	1	0	0	0	0	0	0	0	0	3	3
8:30 AM	0	3	0	3	0	2	0	2	0	0	0	0	0	0	0	0	5	5
8:35 AM	0	3	0	3	0	4	0	4	0	0	0	0	0	0	0	0	7	7
8:40 AM	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	2	2
8:45 AM	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2	2
8:50 AM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	1
8:55 AM	0	0	0	0	0	2	0	2	0	0	0	0	0	1	0	1	3	3
Total Survey	2	31	1	34	1	31	0	32	1	1	2	4	3	3	4	10	80	80

Heavy Vehicle 15-Minute Interval Summary 7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total	
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total		
7:00 AM	0	2	0	2	0	1	0	1	0	0	1	1	0	1	1	2	6	6
7:15 AM	0	1	0	1	1	1	0	2	1	0	1	2	1	0	2	3	8	8
7:30 AM	0	5	1	6	0	4	0	4	0	0	0	0	0	1	1	1	11	11
7:45 AM	1	0	0	1	0	6	0	6	0	0	0	0	0	0	0	0	7	7
8:00 AM	0	8	0	8	0	5	0	5	0	0	0	0	2	1	0	3	16	16
8:15 AM	1	6	0	7	0	4	0	4	0	1	0	1	0	0	0	0	12	12
8:30 AM	0	7	0	7	0	7	0	7	0	0	0	0	0	0	0	0	14	14
8:45 AM	0	2	0	2	0	3	0	3	0	0	0	0	0	1	0	1	6	6
Total Survey	2	31	1	34	1	31	0	32	1	1	2	4	3	3	4	10	80	80

Heavy Vehicle Peak Hour Summary 7:05 AM to 8:05 AM

By Approach	Northbound Hwy 211			Southbound Hwy 211			Eastbound Dubarko Rd			Westbound Dubarko Rd			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	16	17	33	15	19	34	3	1	4	5	2	7	39
PHF	0.57			0.63			0.38			0.42			0.81

By Movement	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	1	14	1	16	1	14	0	15	1	0	2	3	1	0	4	5	39
PHF	0.25	0.58	0.25	0.57	0.25	0.58	0.00	0.63	0.25	0.00	0.25	0.38	0.25	0.00	0.50	0.42	0.81

Heavy Vehicle Rolling Hour Summary 7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	1	8	1	10	1	12	0	13	1	0	2	3	1	1	4	6	32
7:15 AM	1	14	1	16	1	16	0	17	1	0	1	2	3	1	3	7	42
7:30 AM	2	19	1	22	0	19	0	19	0	1	0	1	2	1	1	4	46
7:45 AM	2	21	0	23	0	22	0	22	0	1	0	1	2	1	0	3	49
8:00 AM	1	23	0	24	0	19	0	19	0	1	0	1	2	2	0	4	48

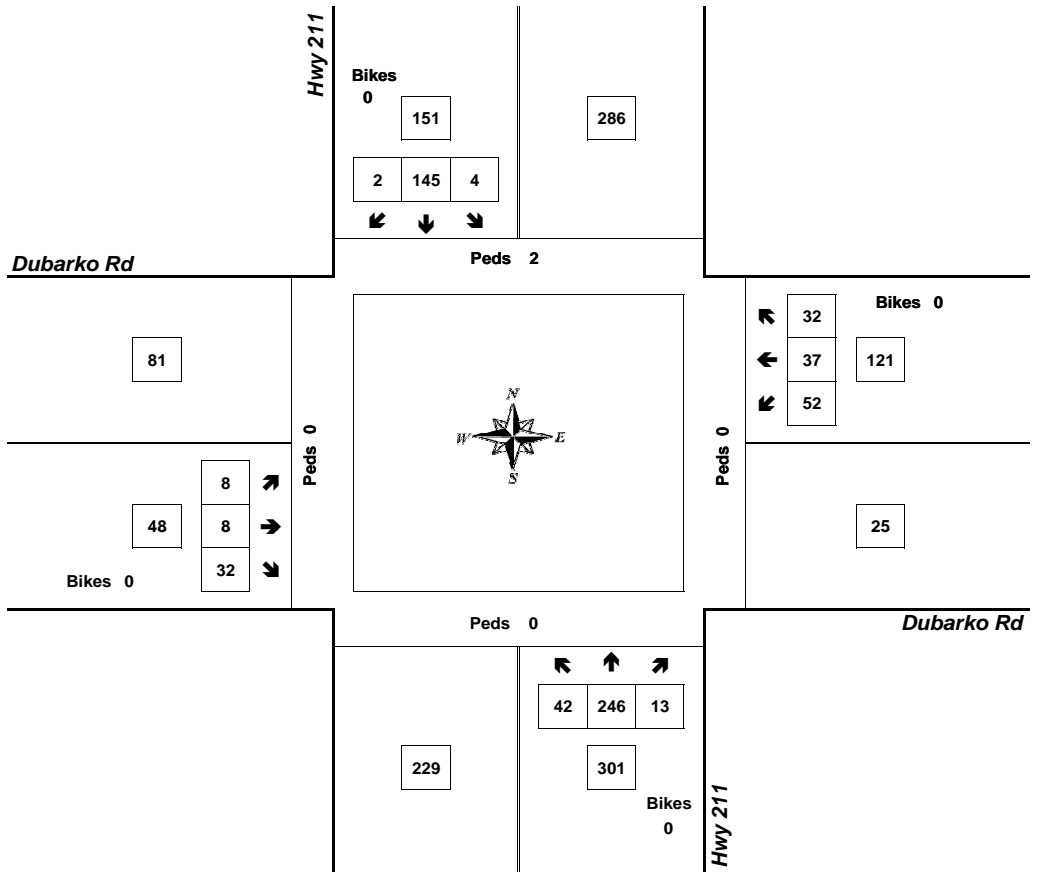
Peak Hour Summary



Clay Carney
(503) 833-2740

Hwy 211 & Dubarko Rd

7:05 AM to 8:05 AM
Wednesday, March 20, 2019



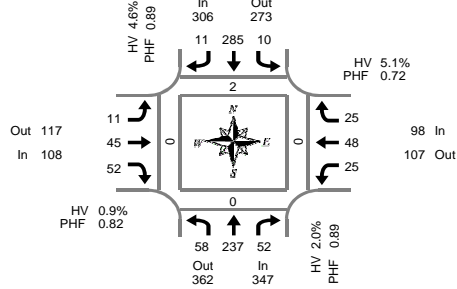
Approach	PHF	HV%	Volume
EB	0.71	6.3%	48
WB	0.82	4.1%	121
NB	0.85	5.3%	301
SB	0.88	9.9%	151
Intersection	0.90	6.3%	621

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary



Clay Carney
(603) 833-2740



Hwy 211 & Dubarko Rd

Tuesday, March 19, 2019
4:00 PM to 6:00 PM

Peak Hour Summary 4:05 PM to 5:05 PM

5-Minute Interval Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total	Pedestrians Crosswalk								
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West					
4:00 PM	4	14	0	0	2	25	1	0	0	3	3	0	2	3	3	0	2	3	3	0	60	0	0	1	0	
4:05 PM	4	28	3	0	1	31	0	0	1	7	6	0	2	6	2	0	91	0	0	0	0	91	0	0	0	0
4:10 PM	10	17	2	0	1	19	0	0	0	4	3	0	3	4	3	0	66	0	0	0	0	66	0	0	0	0
4:15 PM	4	20	6	0	2	20	1	0	2	7	3	1	1	5	1	0	72	0	0	0	0	72	0	0	0	0
4:20 PM	6	12	1	0	1	14	1	0	2	3	4	0	5	7	4	0	60	1	0	0	0	60	1	0	0	0
4:25 PM	5	16	4	0	1	21	1	0	3	3	4	0	2	4	1	0	65	0	0	0	0	65	0	0	0	0
4:30 PM	4	22	3	0	0	19	3	0	1	2	2	0	5	5	1	0	67	1	0	0	0	67	1	0	0	0
4:35 PM	2	23	7	0	0	29	1	0	1	2	1	0	0	1	3	0	70	0	0	0	0	70	0	0	0	0
4:40 PM	2	17	4	0	0	22	0	0	0	2	1	0	1	3	3	0	55	0	0	0	0	55	0	0	0	0
4:45 PM	10	23	7	0	2	29	1	0	0	6	8	0	3	2	0	0	91	0	0	0	0	91	0	0	0	0
4:50 PM	3	22	6	0	1	19	1	0	1	0	4	0	1	1	2	0	61	0	0	0	0	61	0	0	0	0
4:55 PM	4	20	3	0	0	20	2	0	0	6	2	0	1	6	1	0	65	0	0	0	0	65	0	0	0	0
5:00 PM	4	17	6	0	1	42	0	0	0	3	14	0	1	4	4	0	96	0	0	0	0	96	0	0	0	0
5:05 PM	2	24	5	0	0	20	0	0	0	4	5	0	1	2	3	0	66	0	0	0	0	66	0	0	0	0
5:10 PM	8	24	4	0	1	13	1	0	1	8	2	0	2	1	3	0	68	0	0	0	0	68	0	0	0	0
5:15 PM	4	13	4	0	1	19	1	0	0	4	3	0	5	3	0	0	57	0	0	0	0	57	0	0	0	0
5:20 PM	1	19	6	0	1	29	1	0	1	2	2	0	1	4	0	0	67	0	0	0	0	67	0	0	0	0
5:25 PM	5	14	6	0	0	17	1	0	1	3	9	0	2	4	3	0	65	0	0	0	0	65	0	0	0	0
5:30 PM	5	19	6	0	0	19	1	0	1	5	5	0	0	2	3	0	66	0	0	0	0	66	0	0	0	0
5:35 PM	5	15	1	0	2	24	0	0	1	5	6	0	1	2	1	0	63	0	0	0	0	63	0	0	0	0
5:40 PM	5	19	7	0	0	29	1	0	0	8	3	0	1	2	0	1	75	0	0	0	0	75	0	0	0	0
5:45 PM	4	15	8	0	0	16	1	0	0	7	3	0	3	0	0	0	57	0	0	0	0	57	0	0	0	0
5:50 PM	4	13	2	0	0	20	3	0	2	5	3	0	0	5	3	0	60	0	0	0	0	60	0	0	0	0
5:55 PM	5	13	2	0	1	18	0	0	0	2	3	0	2	1	1	0	48	0	0	0	0	48	0	0	0	0
Total Survey	110	439	103	0	18	534	22	0	18	101	99	1	45	77	45	1	1,611	2	0	1	0	1,611	2	0	1	0

15-Minute Interval Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total	Pedestrians Crosswalk								
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West					
4:00 PM	18	59	5	0	4	75	1	0	1	14	12	0	7	13	8	0	217	0	0	1	0	217	0	0	1	0
4:15 PM	15	48	11	0	4	55	3	0	7	13	11	1	8	16	6	0	197	1	0	0	0	197	1	0	0	0
4:30 PM	8	62	14	0	0	70	4	0	2	6	4	0	6	9	7	0	192	1	0	0	0	192	1	0	0	0
4:45 PM	17	65	16	0	3	68	4	0	1	12	14	0	5	9	3	0	217	0	0	0	0	217	0	0	0	0
5:00 PM	14	65	15	0	2	75	1	0	1	15	21	0	4	7	10	0	230	0	0	0	0	230	0	0	0	0
5:15 PM	10	46	16	0	2	65	3	0	2	9	14	0	8	11	3	0	189	0	0	0	0	189	0	0	0	0
5:30 PM	15	53	14	0	2	72	2	0	2	18	14	0	2	6	4	1	204	0	0	0	0	204	0	0	0	0
5:45 PM	13	41	12	0	1	54	4	0	2	14	9	0	5	6	4	0	165	0	0	0	0	165	0	0	0	0
Total Survey	110	439	103	0	18	534	22	0	18	101	99	1	45	77	45	1	1,611	2	0	1	0	1,611	2	0	1	0

Peak Hour Summary 4:05 PM to 5:05 PM

By Approach	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Total	Pedestrians Crosswalk								
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West					
Volume	347	362	709	0	306	273	579	0	108	117	225	1	98	107	205	0	859	2	0	0	0	859	2	0	0	0
%HV	2.0%				4.6%				0.9%				5.1%				3.1%									
PHF	0.89				0.89				0.82				0.72				0.94									

By Movement	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	58	237	52	347	10	285	11	306	11	45	52	108	25	48	25	98	859
%HV	3.4%	1.7%	1.9%	2.0%	0.0%	4.9%	0.0%	4.6%	0.0%	0.0%	1.9%	0.9%	4.0%	2.1%	12.0%	5.1%	3.1%
PHF	0.73	0.91	0.72	0.89	0.63	0.88	0.55	0.89	0.39	0.63	0.65	0.82	0.52	0.75	0.78	0.72	0.94

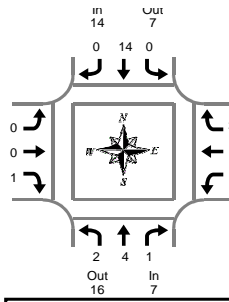
Rolling Hour Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total	Pedestrians Crosswalk								
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West					
4:00 PM	58	234	46	0	11	288	12	0	11	45	41	1	26	47	24	0	823	2	0	1	0	823	2	0	1	0
4:15 PM	54	240	56	0	9	288	12	0	11	46	50	1	23	41	26	0	836	2	0	0	0	836	2	0	0	0
4:30 PM	49	238	61	0	7	278	12	0	6	42	53	0	23	36	23	0	828	1	0	0	0	828	1	0	0	0
4:45 PM	56	229	61	0	9	280	10	0	6	54	63	0	19	33	20	1	840	0	0	0	0	840	0	0	0	0
5:00 PM	52	205	57	0	7	266	10	0	7	56	58	0	19	30	21	1	788	0	0	0	0	788	0	0	0	0

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



Hwy 211 & Dubarko Rd

Tuesday, March 19, 2019
4:00 PM to 6:00 PM

Peak Hour Summary
4:05 PM to 5:05 PM

Heavy Vehicle 5-Minute Interval Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	1	0	1	0	4	0	4	0	0	1	1	0	0	0	1	7
4:05 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
4:10 PM	2	0	0	2	0	0	0	0	0	0	0	0	0	0	1	1	3
4:15 PM	0	1	0	1	0	4	0	4	0	0	0	0	0	0	0	0	5
4:20 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2	2
4:25 PM	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	2
4:30 PM	0	0	0	0	0	2	0	2	0	0	0	0	0	0	1	1	3
4:35 PM	0	1	0	1	0	1	0	1	0	0	0	0	0	0	1	1	3
4:40 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
4:45 PM	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1
4:50 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
4:55 PM	0	0	1	1	0	1	0	1	0	0	0	0	0	0	0	0	2
5:00 PM	0	1	0	1	0	2	0	2	0	0	0	0	0	0	0	0	3
5:05 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
5:10 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
5:15 PM	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
5:20 PM	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1
5:25 PM	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:35 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
5:40 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:50 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
5:55 PM	0	0	0	0	0	2	0	2	0	0	1	1	1	0	0	1	4
Total Survey	3	9	2	14	0	23	0	23	0	0	3	3	3	1	3	7	47

Heavy Vehicle 15-Minute Interval Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	2	1	0	3	0	5	0	5	0	0	1	1	1	0	1	2	11
4:15 PM	0	1	0	1	0	6	0	6	0	0	0	0	1	1	0	2	9
4:30 PM	0	1	0	1	0	4	0	4	0	0	0	0	0	0	2	2	7
4:45 PM	0	1	1	2	0	1	0	1	0	0	1	1	0	0	0	0	4
5:00 PM	0	2	0	2	0	3	0	3	0	0	0	0	0	0	0	0	5
5:15 PM	1	2	1	4	0	0	0	0	0	0	0	0	0	0	0	0	4
5:30 PM	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	2
5:45 PM	0	0	0	0	0	3	0	3	0	0	1	1	1	0	0	1	5
Total Survey	3	9	2	14	0	23	0	23	0	0	3	3	3	1	3	7	47

Heavy Vehicle Peak Hour Summary 4:05 PM to 5:05 PM

By Approach	Northbound Hwy 211			Southbound Hwy 211			Eastbound Dubarko Rd			Westbound Dubarko Rd			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	7	16	23	14	7	21	1	3	4	5	1	6	27
PHF	0.58			0.58			0.25			0.42			0.68

By Movement	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	2	4	1	7	0	14	0	14	0	0	1	1	1	1	3	5	27
PHF	0.25	0.50	0.25	0.58	0.00	0.58	0.00	0.58	0.00	0.00	0.25	0.25	0.25	0.25	0.38	0.42	0.68

Heavy Vehicle Rolling Hour Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	2	4	1	7	0	16	0	16	0	0	2	2	2	1	3	6	31
4:15 PM	0	5	1	6	0	14	0	14	0	0	1	1	1	1	2	4	25
4:30 PM	1	6	2	9	0	8	0	8	0	0	1	1	0	0	2	2	20
4:45 PM	1	6	2	9	0	5	0	5	0	0	1	1	0	0	0	0	15
5:00 PM	1	5	1	7	0	7	0	7	0	0	1	1	1	0	0	1	16

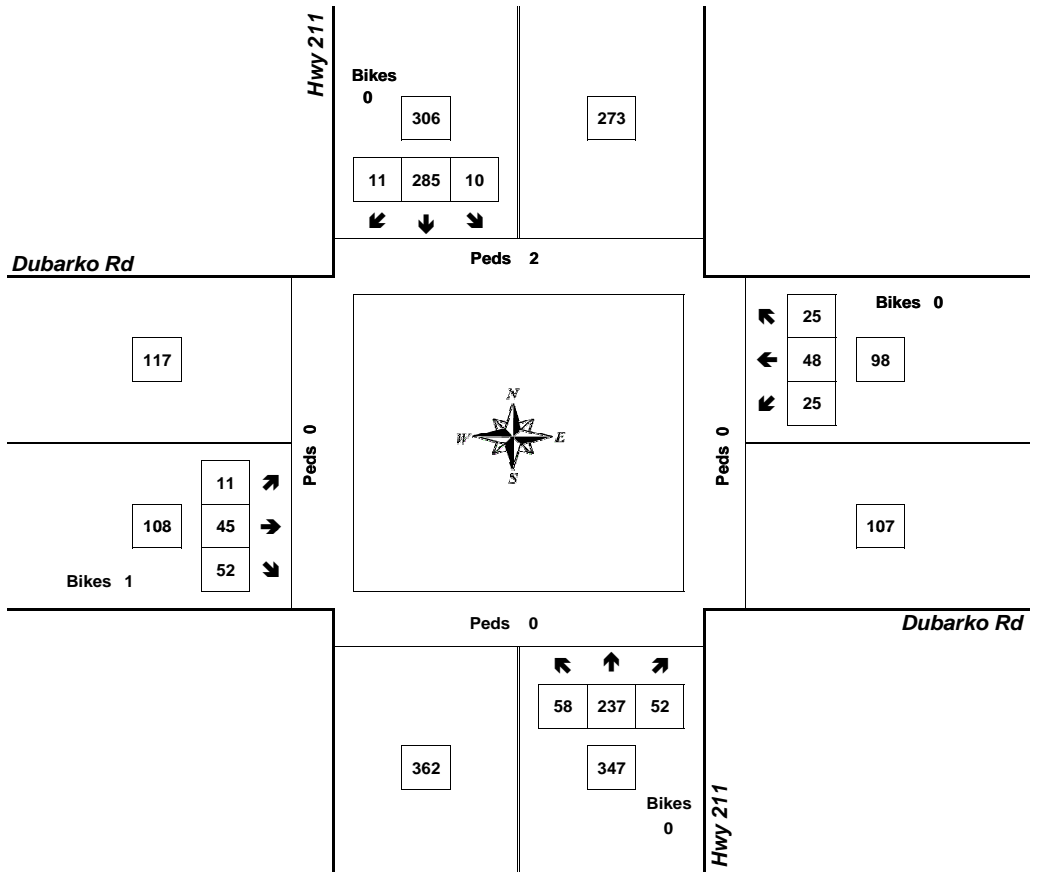
Peak Hour Summary



Clay Carney
(503) 833-2740

Hwy 211 & Dubarko Rd

4:05 PM to 5:05 PM
Tuesday, March 19, 2019



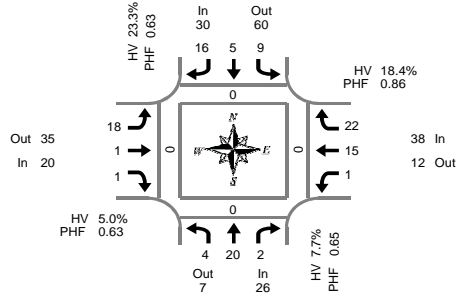
Approach	PHF	HV%	Volume
EB	0.82	0.9%	108
WB	0.72	5.1%	98
NB	0.89	2.0%	347
SB	0.89	4.6%	306
Intersection	0.94	3.1%	859

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary



Clay Carney
(503) 833-2740



**Peak Hour Summary
7:05 AM to 8:05 AM**

SE Langensand Rd & Dubarko Rd

Wednesday, March 20, 2019
7:00 AM to 9:00 AM

**5-Minute Interval Summary
7:00 AM to 9:00 AM**

Interval Start Time	Northbound SE Langensand Rd				Southbound SE Langensand Rd				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total	Pedestrians Crosswalk				
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West	
7:00 AM	1	1	0	0	0	1	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
7:05 AM	2	1	0	0	1	0	3	0	1	1	0	0	0	2	3	0	0	0	0	0	0	0
7:10 AM	0	0	0	0	1	0	0	0	1	0	0	0	0	1	2	0	0	0	0	0	0	0
7:15 AM	0	2	1	0	0	1	1	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0
7:20 AM	0	0	0	0	0	0	0	0	3	0	0	0	1	3	2	0	0	0	0	0	0	0
7:25 AM	0	0	0	0	2	2	3	0	1	0	0	0	0	1	2	0	0	0	0	0	0	0
7:30 AM	0	6	0	0	0	0	3	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0
7:35 AM	1	2	0	0	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0	0	0	0
7:40 AM	0	0	1	0	2	1	3	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0
7:45 AM	0	1	0	0	2	0	1	0	2	0	0	0	0	0	3	0	0	0	0	0	0	0
7:50 AM	1	1	0	0	1	0	2	0	3	0	0	0	0	1	3	0	0	0	0	0	0	0
7:55 AM	0	4	0	0	0	0	0	0	3	0	0	0	0	0	2	0	0	0	0	0	0	0
8:00 AM	0	3	0	0	0	1	0	0	2	0	0	0	0	2	1	0	0	0	0	0	0	0
8:05 AM	0	1	0	0	0	1	1	0	3	0	0	0	0	3	1	0	0	0	0	0	0	0
8:10 AM	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	2	0	0	0	0	1	0	3	0	0	0	0	1	1	0	0	0	0	0	0	0
8:20 AM	1	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
8:25 AM	1	0	0	0	0	1	1	0	3	0	1	0	0	0	1	0	0	0	0	0	1	0
8:30 AM	0	0	0	0	0	0	0	0	2	2	0	0	1	2	1	0	0	0	0	0	0	0
8:35 AM	1	0	0	0	1	0	0	0	1	1	1	0	1	2	0	0	0	0	0	0	0	0
8:40 AM	1	1	0	0	0	3	2	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0
8:45 AM	1	3	0	0	0	1	2	0	3	0	2	0	1	2	1	0	0	0	0	0	0	0
8:50 AM	1	4	1	0	0	1	2	0	2	0	0	0	0	1	3	0	0	0	0	0	0	0
8:55 AM	1	2	1	0	0	0	1	0	1	0	0	0	0	2	1	0	0	0	0	0	0	0
Total Survey	12	35	4	0	11	14	29	0	38	5	5	0	4	31	31	0	0	1	0	1	0	0

**15-Minute Interval Summary
7:00 AM to 9:00 AM**

Interval Start Time	Northbound SE Langensand Rd				Southbound SE Langensand Rd				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total	Pedestrians Crosswalk				
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West	
7:00 AM	3	2	0	0	2	1	4	0	2	1	0	0	0	5	5	0	0	0	0	0	0	0
7:15 AM	0	2	1	0	2	3	4	0	6	0	0	0	1	4	5	0	0	0	0	0	0	0
7:30 AM	1	8	1	0	2	1	6	0	0	0	1	0	0	5	3	0	0	0	0	0	0	0
7:45 AM	1	6	0	0	3	0	3	0	8	0	0	0	0	1	8	0	0	0	0	0	0	0
8:00 AM	0	5	0	0	1	2	2	0	5	0	0	0	0	5	2	0	0	0	0	0	0	0
8:15 AM	2	2	0	0	0	2	3	0	7	1	1	0	0	1	2	0	0	0	0	1	0	0
8:30 AM	2	1	0	0	1	3	2	0	4	3	1	0	2	5	1	0	0	0	0	0	0	0
8:45 AM	3	9	2	0	0	2	5	0	6	0	2	0	1	5	5	0	0	0	0	0	0	0
Total Survey	12	35	4	0	11	14	29	0	38	5	5	0	4	31	31	0	0	1	0	1	0	0

**Peak Hour Summary
7:05 AM to 8:05 AM**

By Approach	Northbound SE Langensand Rd				Southbound SE Langensand Rd				Eastbound Dubarko Rd				Westbound Dubarko Rd				Total	Pedestrians Crosswalk				
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West	
Volume	26	7	33	0	30	60	90	0	20	35	55	0	38	12	50	0	0	0	0	0	0	0
%HV	7.7%				23.3%				5.0%				18.4%				14.9%					
PHF	0.65				0.63				0.63				0.86				0.89					

By Movement	Northbound SE Langensand Rd				Southbound SE Langensand Rd				Eastbound Dubarko Rd				Westbound Dubarko Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	4	20	2	26	9	5	16	30	18	1	1	20	1	15	22	38	114
%HV	25.0%	0.0%	50.0%	7.7%	22.2%	20.0%	25.0%	23.3%	5.6%	0.0%	0.0%	5.0%	0.0%	26.7%	13.6%	18.4%	14.9%
PHF	0.50	0.63	0.50	0.65	0.45	0.42	0.67	0.63	0.56	0.25	0.25	0.63	0.25	0.75	0.69	0.86	0.89

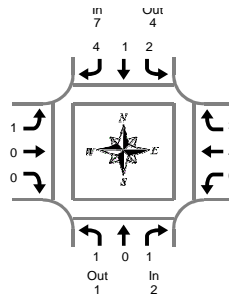
**Rolling Hour Summary
7:00 AM to 9:00 AM**

Interval Start Time	Northbound SE Langensand Rd				Southbound SE Langensand Rd				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total	Pedestrians Crosswalk				
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West	
7:00 AM	5	18	2	0	9	5	17	0	16	1	1	0	1	15	21	0	0	0	0	0	0	0
7:15 AM	2	21	2	0	8	6	15	0	19	0	1	0	1	15	18	0	0	0	0	0	0	0
7:30 AM	4	21	1	0	6	5	14	0	20	1	2	0	0	12	15	0	0	0	0	0	0	0
7:45 AM	5	14	0	0	5	7	10	0	24	4	2	0	2	12	13	0	0	0	0	0	0	0
8:00 AM	7	17	2	0	2	9	12	0	22	4	4	0	3	16	10	0	0	0	0	0	0	0

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



Out 9
In 1

SE Langensand Rd & Dubarko Rd

Wednesday, March 20, 2019
7:00 AM to 9:00 AM

Peak Hour Summary
7:05 AM to 8:05 AM

Heavy Vehicle 5-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Langensand Rd				Southbound SE Langensand Rd				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:05 AM	1	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	2
7:10 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
7:15 AM	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1
7:20 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2
7:25 AM	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	1	2
7:30 AM	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1
7:35 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:40 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	1	0	1	2	0	0	0	0	0	0	0	0	2
7:50 AM	0	0	0	0	1	0	0	1	1	0	0	1	0	1	1	2	4
7:55 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	1	2
8:05 AM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
8:10 AM	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:20 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:25 AM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
8:35 AM	1	0	0	1	0	0	0	0	1	0	0	1	1	0	0	1	3
8:40 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:50 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:55 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	2	1	1	4	2	1	5	8	3	0	0	3	2	4	3	9	24

Heavy Vehicle 15-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Langensand Rd				Southbound SE Langensand Rd				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	1	0	0	1	0	0	1	1	0	0	0	0	0	0	1	1	3
7:15 AM	0	0	1	1	0	0	1	1	0	0	0	0	0	3	0	3	5
7:30 AM	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1
7:45 AM	0	0	0	0	2	0	1	3	1	0	0	1	0	1	1	2	6
8:00 AM	0	1	0	1	0	1	1	2	0	0	0	0	0	0	1	1	4
8:15 AM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1
8:30 AM	1	0	0	1	0	0	0	0	1	0	0	1	2	0	0	2	4
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	2	1	1	4	2	1	5	8	3	0	0	3	2	4	3	9	24

Heavy Vehicle Peak Hour Summary

7:05 AM to 8:05 AM

By Approach	Northbound SE Langensand Rd			Southbound SE Langensand Rd			Eastbound Dubarko Rd			Westbound Dubarko Rd			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	2	1	3	7	4	11	1	9	10	7	3	10	17
PHF	0.25			0.58			0.25			0.58			0.71

By Movement	Northbound SE Langensand Rd				Southbound SE Langensand Rd				Eastbound Dubarko Rd				Westbound Dubarko Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	1	0	1	2	2	1	4	7	1	0	0	1	0	4	3	7	17
PHF	0.25	0.00	0.25	0.25	0.25	0.25	0.50	0.58	0.25	0.00	0.00	0.25	0.00	0.33	0.38	0.58	0.71

Heavy Vehicle Rolling Hour Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Langensand Rd				Southbound SE Langensand Rd				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	1	0	1	2	2	0	4	6	1	0	0	1	0	4	2	6	15
7:15 AM	0	1	1	2	2	1	4	7	1	0	0	1	0	4	2	6	16
7:30 AM	0	1	0	1	2	1	3	6	2	0	0	2	0	1	2	3	12
7:45 AM	1	1	0	2	2	1	2	5	3	0	0	3	2	1	2	5	15
8:00 AM	1	1	0	2	0	1	1	2	2	0	0	2	2	0	1	3	9

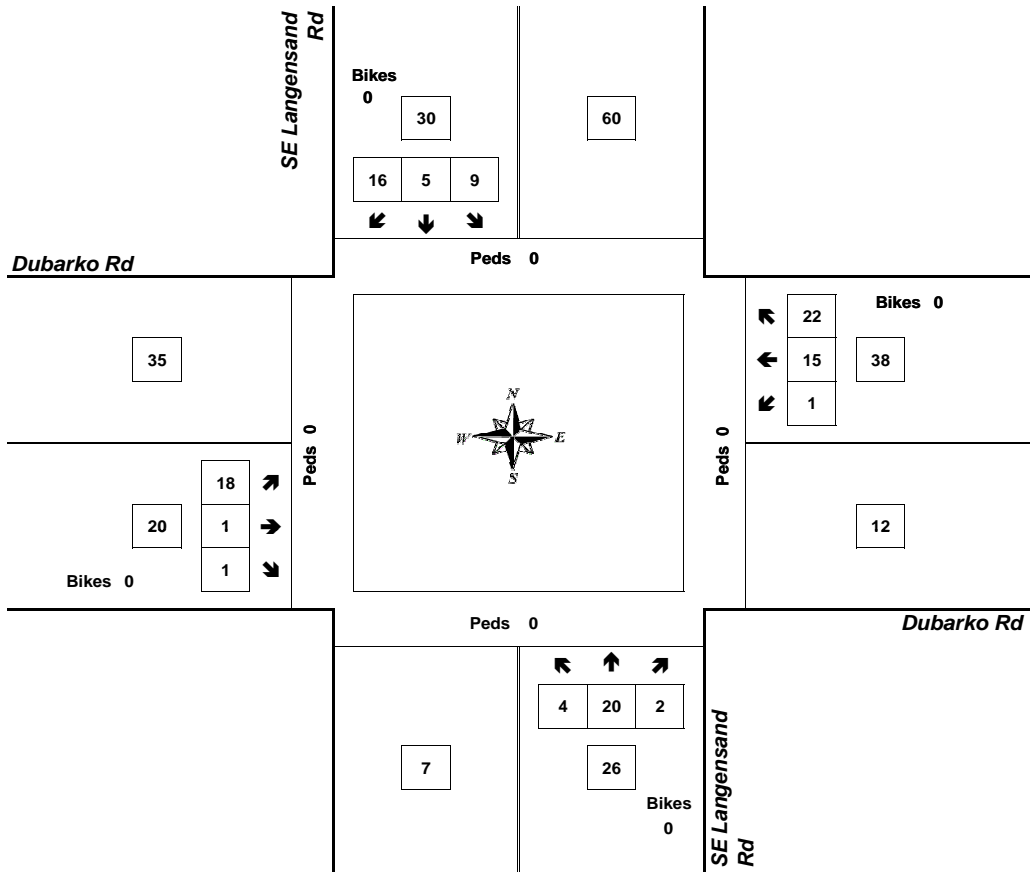
Peak Hour Summary



Clay Carney
(503) 833-2740

SE Langensand Rd & Dubarko Rd

7:05 AM to 8:05 AM
Wednesday, March 20, 2019



Approach	PHF	HV%	Volume
EB	0.63	5.0%	20
WB	0.86	18.4%	38
NB	0.65	7.7%	26
SB	0.63	23.3%	30
Intersection	0.89	14.9%	114

Count Period: 7:00 AM to 9:00 AM

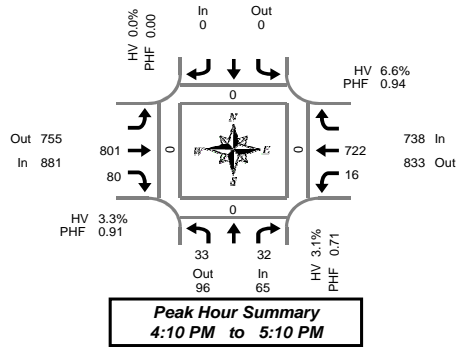
Total Vehicle Summary



Clay Carney
(603) 833-2740

SE Langensand Rd & Hwy 26

Tuesday, March 19, 2019
4:00 PM to 6:00 PM



5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Langensand Rd			Southbound SE Langensand Rd			Eastbound Hwy 26			Westbound Hwy 26			Interval Total	Pedestrians Crosswalk			
	L	R	Bikes			Bikes	T	R	Bikes	L	T	Bikes		North	South	East	West
4:00 PM	2	4	0			0	62	9	0	5	50	0	132	0	0	0	0
4:05 PM	1	2	0			0	69	6	0	3	52	0	133	0	0	0	0
4:10 PM	1	3	0			0	61	3	0	1	74	0	143	0	0	0	0
4:15 PM	6	1	0			0	76	5	0	1	50	0	139	0	0	0	0
4:20 PM	5	5	0			0	79	9	0	1	70	0	169	0	0	0	0
4:25 PM	6	0	1			0	58	8	0	1	49	0	122	0	0	0	0
4:30 PM	0	3	0			0	75	12	0	1	56	0	147	0	0	0	0
4:35 PM	2	5	0			0	61	7	0	1	64	0	140	0	0	0	0
4:40 PM	0	1	0			0	59	1	0	1	55	0	117	0	0	0	0
4:45 PM	1	1	0			0	64	3	0	2	63	0	134	0	0	0	0
4:50 PM	6	5	0			0	62	6	0	0	54	0	133	0	0	0	0
4:55 PM	3	0	0			0	72	5	0	2	56	0	138	0	0	0	0
5:00 PM	1	5	0			0	62	10	0	1	55	0	134	0	0	0	0
5:05 PM	2	3	0			0	72	11	0	4	76	0	168	0	0	0	0
5:10 PM	2	3	0			0	58	14	0	1	65	0	143	0	0	0	0
5:15 PM	1	2	0			0	51	8	0	2	59	0	123	0	0	0	0
5:20 PM	2	4	0			0	78	7	0	2	43	0	136	0	0	0	0
5:25 PM	3	1	0			0	71	5	0	1	42	0	123	0	0	0	0
5:30 PM	2	2	0			0	67	7	0	3	38	0	119	0	0	0	0
5:35 PM	1	1	0			0	60	5	0	1	38	0	106	0	0	0	0
5:40 PM	0	4	0			0	49	7	0	0	34	0	94	0	0	0	0
5:45 PM	2	1	0			0	69	7	0	1	45	0	125	0	0	0	0
5:50 PM	0	3	0			0	60	4	0	0	43	0	110	0	0	0	0
5:55 PM	4	1	0			0	65	8	0	3	52	0	133	0	0	0	0
Total Survey	53	60	1			0	1,560	167	0	38	1,283	0	3,161	0	0	0	0

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Langensand Rd			Southbound SE Langensand Rd			Eastbound Hwy 26			Westbound Hwy 26			Interval Total	Pedestrians Crosswalk			
	L	R	Bikes			Bikes	T	R	Bikes	L	T	Bikes		North	South	East	West
4:00 PM	4	9	0			0	192	18	0	9	176	0	408	0	0	0	0
4:15 PM	17	6	1			0	213	22	0	3	169	0	430	0	0	0	0
4:30 PM	2	9	0			0	195	20	0	3	175	0	404	0	0	0	0
4:45 PM	10	6	0			0	198	14	0	4	173	0	405	0	0	0	0
5:00 PM	5	11	0			0	192	35	0	6	196	0	445	0	0	0	0
5:15 PM	6	7	0			0	200	20	0	5	144	0	382	0	0	0	0
5:30 PM	3	7	0			0	176	19	0	4	110	0	319	0	0	0	0
5:45 PM	6	5	0			0	194	19	0	4	140	0	368	0	0	0	0
Total Survey	53	60	1			0	1,560	167	0	38	1,283	0	3,161	0	0	0	0

Peak Hour Summary
4:10 PM to 5:10 PM

By Approach	Northbound SE Langensand Rd				Southbound SE Langensand Rd				Eastbound Hwy 26				Westbound Hwy 26				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	65	96	161	1	0	0	0	0	881	755	1,636	0	738	833	1,571	0	1,684	0	0	0	0
%HV	3.1%				0.0%				3.3%				6.6%				4.8%				
PHF	0.71				0.00				0.91				0.94				0.93				

By Movement	Northbound SE Langensand Rd				Southbound SE Langensand Rd				Eastbound Hwy 26				Westbound Hwy 26				Total
	L	R	Total	Bikes			Total	Bikes	T	R	Total	Bikes	L	T	Total	Bikes	
Volume	33	32	65	0	NA	NA	NA	0.0%	801	80	881	0	16	722	738	1,684	
%HV	3.0%	NA	3.1%	3.1%	NA	NA	NA	0.0%	NA	3.4%	2.5%	3.3%	0.0%	6.8%	NA	6.6%	4.8%
PHF	0.49	0.80	0.71	0.00			0.00		0.93	0.69	0.91	0.57	0.57	0.93	0.94	0.93	

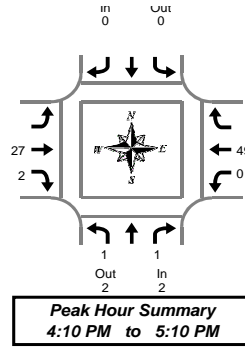
Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Langensand Rd			Southbound SE Langensand Rd			Eastbound Hwy 26			Westbound Hwy 26			Interval Total	Pedestrians Crosswalk			
	L	R	Bikes			Bikes	T	R	Bikes	L	T	Bikes		North	South	East	West
4:00 PM	33	32	1			0	798	74	0	19	693	0	1,647	0	0	0	0
4:15 PM	34	32	1			0	798	91	0	16	713	0	1,684	0	0	0	0
4:30 PM	23	33	0			0	785	89	0	18	688	0	1,636	0	0	0	0
4:45 PM	24	31	0			0	766	88	0	19	623	0	1,551	0	0	0	0
5:00 PM	20	30	0			0	762	93	0	19	590	0	1,514	0	0	0	0

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



SE Langensand Rd & Hwy 26

Tuesday, March 19, 2019
4:00 PM to 6:00 PM

Heavy Vehicle 5-Minute Interval Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Langensand Rd			Southbound SE Langensand Rd			Eastbound Hwy 26			Westbound Hwy 26			Interval Total
	L	R	Total			Total	T	R	Total	L	T	Total	
4:00 PM	0	0	0			0	3	0	3	0	11	11	14
4:05 PM	0	0	0			0	8	0	8	0	5	5	13
4:10 PM	0	0	0			0	2	0	2	0	7	7	9
4:15 PM	0	0	0			0	5	0	5	0	4	4	9
4:20 PM	1	0	1			0	4	1	5	0	4	4	10
4:25 PM	0	0	0			0	3	0	3	0	5	5	8
4:30 PM	0	1	1			0	1	1	2	0	3	3	6
4:35 PM	0	0	0			0	1	0	1	0	4	4	5
4:40 PM	0	0	0			0	2	0	2	0	3	3	5
4:45 PM	0	0	0			0	1	0	1	0	4	4	5
4:50 PM	0	0	0			0	2	0	2	0	6	6	8
4:55 PM	0	0	0			0	1	0	1	0	2	2	3
5:00 PM	0	0	0			0	3	0	3	0	1	1	4
5:05 PM	0	0	0			0	2	0	2	0	6	6	8
5:10 PM	0	0	0			0	0	1	1	0	4	4	5
5:15 PM	0	0	0			0	2	0	2	0	3	3	5
5:20 PM	0	0	0			0	0	0	0	0	5	5	5
5:25 PM	0	0	0			0	1	0	1	0	1	1	2
5:30 PM	0	0	0			0	4	0	4	0	2	2	6
5:35 PM	0	0	0			0	0	0	0	1	2	3	3
5:40 PM	0	0	0			0	1	0	1	0	3	3	4
5:45 PM	0	0	0			0	4	0	4	0	3	3	7
5:50 PM	0	0	0			0	1	0	1	0	2	2	3
5:55 PM	0	0	0			0	2	0	2	0	7	7	9
Total Survey	1	1	2			0	53	3	56	1	97	98	156

Heavy Vehicle 15-Minute Interval Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Langensand Rd			Southbound SE Langensand Rd			Eastbound Hwy 26			Westbound Hwy 26			Interval Total
	L	R	Total			Total	T	R	Total	L	T	Total	
4:00 PM	0	0	0			0	13	0	13	0	23	23	36
4:15 PM	1	0	1			0	12	1	13	0	13	13	27
4:30 PM	0	1	1			0	4	1	5	0	10	10	16
4:45 PM	0	0	0			0	4	0	4	0	12	12	16
5:00 PM	0	0	0			0	5	1	6	0	11	11	17
5:15 PM	0	0	0			0	3	0	3	0	9	9	12
5:30 PM	0	0	0			0	5	0	5	1	7	8	13
5:45 PM	0	0	0			0	7	0	7	0	12	12	19
Total Survey	1	1	2			0	53	3	56	1	97	98	156

Heavy Vehicle Peak Hour Summary 4:10 PM to 5:10 PM

By Approach	Northbound SE Langensand Rd			Southbound SE Langensand Rd			Eastbound Hwy 26			Westbound Hwy 26			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	2	2	4	0	0	0	29	50	79	49	28	77	80
PHF	0.25			0.00			0.56			0.82			0.71

By Movement	Northbound SE Langensand Rd			Southbound SE Langensand Rd			Eastbound Hwy 26			Westbound Hwy 26			Total
	L	R	Total			Total	T	R	Total	L	T	Total	
Volume	1		1	2		2	27	2	29	0	49	49	80
PHF	0.25		0.25	0.25		0.00	0.56	0.25	0.56	0.00	0.82	0.82	0.71

Heavy Vehicle Rolling Hour Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Langensand Rd			Southbound SE Langensand Rd			Eastbound Hwy 26			Westbound Hwy 26			Interval Total
	L	R	Total			Total	T	R	Total	L	T	Total	
4:00 PM	1		1	2		2	33	2	35	0	58	58	95
4:15 PM	1		1	2		2	25	3	28	0	46	46	76
4:30 PM	0		0	0		0	16	2	18	0	42	42	61
4:45 PM	0		0	0		0	17	1	18	1	39	40	58
5:00 PM	0		0	0		0	20	1	21	1	39	40	61

Peak Hour Summary

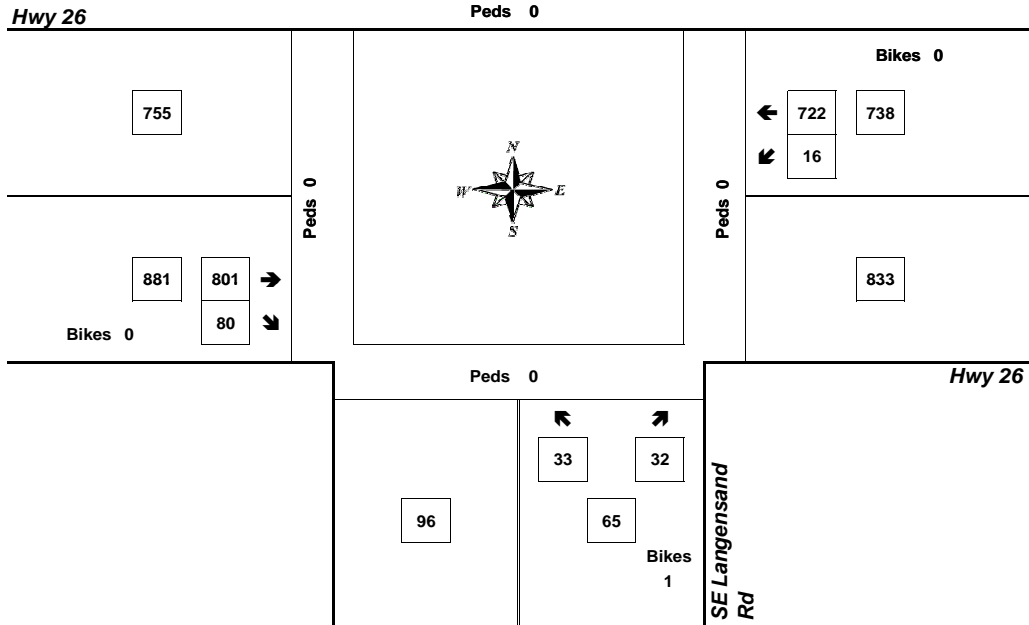


Clay Carney
(503) 833-2740

SE Langensand Rd & Hwy 26

4:10 PM to 5:10 PM
Tuesday, March 19, 2019

Bikes
0



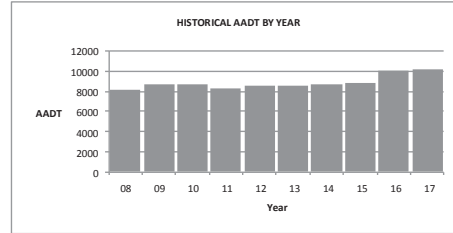
Approach	PHF	HV%	Volume
EB	0.91	3.3%	881
WB	0.94	6.6%	738
NB	0.71	3.1%	65
SB	0.00	0.0%	0
Intersection	0.93	4.8%	1,684

Count Period: 4:00 PM to 6:00 PM

Location:	US26; MP 46.38; MT. HOOD HIGHWAY NO. 26; 0.30 mile east of Camp Creek Rd	Site Name:	Rhododendron (03-006)
	(USFS 28)		Installed:

HISTORICAL TRAFFIC DATA

Year	AADT	Percent of AADT				
		Max Day	Max Hour	10TH Hour	20TH Hour	30TH Hour
2008	8162	233	22.9	20.1	19.1	18.2
2009	8737	197	22.3	19.6	18.4	17.8
2010	8714	207	21.6	19.8	18.9	18.5
2011	8330	214	24.7	20.0	18.6	18.1
2012	8480	227	24.0	21.0	20.2	19.4
2013	8527	213	23.4	21.1	20.3	19.1
2014	8652	216	23.2	21.1	20.3	19.2
2015	8861	242	21.4	20.3	19.4	18.7
2016	10071	208	22.9	19.6	18.8	17.9
2017	10223	200	19.9	19.1	18.1	17.5



2017 TRAFFIC DATA

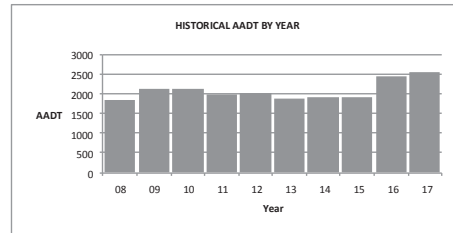
	Average Weekday Traffic	Percent of AADT	Average Daily Traffic	Percent of AADT
January	6744	66	9080	89
February	6533	64	9496	93
March	6763	66	9337	91
April	6166	60	8675	85
May	7675	75	9598	94
June	8568	84	10695	105
July	11291	110	13874	136
August	11738	115	13623	133
September	11300	111	12734	125
October	6589	64	8087	79
November	5493	54	7313	72
December	8753	86	10161	99

For Vehicle Classification data near your project, please go to the following web page:
https://www.oregon.gov/ODOT/Data/Documents/TVT_2017.xlsx

Location:	OR35; MP 57.79; MT. HOOD HIGHWAY NO. 26; 0.02 mile east of Warm Springs Highway No. 53 (US26)	Site Name:	Mt. Hood Meadows (03-007)
			Installed:

HISTORICAL TRAFFIC DATA

Year	AADT	Percent of AADT				
		Max Day	Max Hour	10TH Hour	20TH Hour	30TH Hour
2008	1854	398	56.8	44.2	39.9	36.1
2009	2130	***	***	***	***	***
2010	2145	374	49.2	39.5	34.8	33.2
2011	1976	476	79.2	49.1	45.0	39.1
2012	2023	452	65.4	43.4	40.3	37.7
2013	1868	427	68.1	48.7	42.0	37.1
2014	1908	400	60.0	41.9	37.4	33.6
2015	1931	393	50.4	38.6	34.4	32.6
2016	2455	366	55.9	38.3	33.1	31.2
2017	2565	340	52.1	37.7	32.5	31.3



2017 TRAFFIC DATA

	Average Weekday Traffic	Percent of AADT	Average Daily Traffic	Percent of AADT
January	2449	95	3616	141
February	1978	77	3362	131
March	1781	69	2833	110
April	1116	44	2050	80
May	1202	47	1609	63
June	1794	70	2070	81
July	2405	94	2837	111
August	2302	90	2614	102
September	3956	154	3993	156
October	1387	54	1614	63
November	768	30	1156	45
December	2499	97	2966	116

For Vehicle Classification data near your project, please go to the following web page:
https://www.oregon.gov/ODOT/Data/Documents/TVT_2017.xlsx

HWY	MP	DIR	HS	Location	2014	2015	2016	2036	RSQ
026	22.72	1		0.02 mile northwest of S.E. 362nd Drive, west city limits of Sandy		29500		41400	MODEL
026	23.85	1		0.02 mile west of Bluff Road		30100		42600	MODEL
026	23.89	1		0.02 mile east of Bluff Road		15100		21600	MODEL
026	24.02	1		0.02 mile west of Beers Avenue		15100		21600	MODEL
026	24.35	1		0.05 mile west of Eagle Creek-Sandy Highway (OR211)		14800		21600	MODEL
026	24.42	1		0.02 mile east of Eagle Creek-Sandy Highway (OR211)		12000		17100	MODEL
026	24.59	1		0.02 mile west of Ten Eyck Road		11200		16000	MODEL
026	23.89	2	W	0.02 mile east of Bluff Road		15200		21300	MODEL
026	24.04	2	W	0.02 mile west of Beers Avenue		15200		21300	MODEL
026	24.36	2	W	0.05 mile west of Eagle Creek-Sandy Highway (OR211)		14500		20700	MODEL
026	24.40	2	W	0.02 mile east of Eagle Creek-Sandy Highway (OR211)		12100		16900	MODEL
026	24.61	2	W	0.02 mile west of Ten Eyck Road		11700		16400	MODEL
026	25.10	1		0.02 mile west of Langensand Road		18000		25400	MODEL
026	25.66	1		0.10 mile east of Vista Loop Drive		19700		27600	MODEL

HWY	MP	DIR	HS	Location	2014	2015	2016	2036	RSQ
172	-0.13	1		0.10 mile east of Clackamas Highway (OR224)			5600	8800	MODEL
172	1.45	1		0.10 mile southwest of Judd Road			5800	9100	MODEL
172	1.65	1		0.10 mile northeast of Judd Road			6200	9600	MODEL
172	3.65	1		0.05 mile west of 362nd Drive			7600	11600	MODEL
172	3.75	1		0.05 mile east of 362nd Drive			5300	7900	MODEL
172	5.07	1		0.10 mile west of Bornstedt Road			4200	6900	MODEL
172	5.29	1		0.10 mile south of Dubarko Road			6500	10700	MODEL
172	5.50	1		0.11 mile north of Dubarko Road			5700	9200	MODEL
172	5.83	1		0.05 mile south of Mt. Hood Highway (US26-Eastbound)			5700	9200	MODEL
172	5.92	1		0.02 mile south of Mt. Hood Highway (US26-Westbound)			5000	8100	MODEL

HCM Signalized Intersection Capacity Analysis
 1: Wolf Drive/Ten Eyck Road & Highway 26

07/08/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	57	770	37	4	998	10	134	11	3	15	4	145	
Future Volume (vph)	57	770	37	4	998	10	134	11	3	15	4	145	
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5		4.5			4.5		
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00			1.00		
Fr _t	1.00	0.99		1.00	1.00	0.85		1.00			0.88		
Fl _t Protected	0.95	1.00		0.95	1.00	1.00		0.96			1.00		
Satd. Flow (prot)	1484	2949		1568	3137	1403		1575			1489		
Fl _t Permitted	0.95	1.00		0.95	1.00	1.00		0.55			0.97		
Satd. Flow (perm)	1484	2949		1568	3137	1403		911			1450		
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	
Adj. Flow (vph)	61	819	39	4	1062	11	143	12	3	16	4	154	
RTOR Reduction (vph)	0	3	0	0	0	5	0	1	0	0	107	0	
Lane Group Flow (vph)	61	855	0	4	1062	6	0	157	0	0	67	0	
Heavy Vehicles (%)	12%	12%	12%	6%	6%	6%	6%	6%	6%	3%	3%	3%	
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA		Perm	NA		
Protected Phases	5	2		1	6			4			8		
Permitted Phases						6	4			8			
Actuated Green, G (s)	8.4	68.9		1.1	61.6	61.6		36.5			36.5		
Effective Green, g (s)	8.4	68.9		1.1	61.6	61.6		36.5			36.5		
Actuated g/C Ratio	0.07	0.57		0.01	0.51	0.51		0.30			0.30		
Clearance Time (s)	4.5	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			3.0		
Lane Grp Cap (vph)	103	1693		14	1610	720		277			441		
v/s Ratio Prot	c0.04	0.29		0.00	c0.34								
v/s Ratio Perm						0.00		c0.17			0.05		
v/c Ratio	0.59	0.51		0.29	0.66	0.01		0.57			0.15		
Uniform Delay, d1	54.1	15.3		59.1	21.5	14.3		35.1			30.5		
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00		
Incremental Delay, d2	8.8	1.1		10.9	2.1	0.0		8.2			0.2		
Delay (s)	63.0	16.4		70.0	23.6	14.3		43.3			30.6		
Level of Service	E	B		E	C	B		D			C		
Approach Delay (s)		19.5			23.7			43.3			30.6		
Approach LOS		B			C			D			C		
Intersection Summary													
HCM 2000 Control Delay			23.9									HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.62										
Actuated Cycle Length (s)			120.0									Sum of lost time (s)	13.5
Intersection Capacity Utilization			68.9%									ICU Level of Service	C
Analysis Period (min)			15										
c Critical Lane Group													

HCM 6th Signalized Intersection Summary
 1: Wolf Drive/Ten Eyck Road & Highway 26

07/08/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	57	770	37	4	998	10	134	11	3	15	4	145
Future Volume (veh/h)	57	770	37	4	998	10	134	11	3	15	4	145
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	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	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1586	1586	1586	1668	1668	1668	1668	1668	1668	1709	1709	1709
Adj Flow Rate, veh/h	61	819	39	4	1062	11	143	12	3	16	4	154
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	12	12	12	6	6	6	6	6	6	3	3	3
Cap, veh/h	75	1693	81	8	1692	755	326	25	6	55	29	396
Arrive On Green	0.05	0.58	0.58	0.01	0.53	0.53	0.30	0.30	0.30	0.30	0.30	0.30
Sat Flow, veh/h	1511	2929	139	1589	3169	1414	884	84	19	75	95	1303
Grp Volume(v), veh/h	61	421	437	4	1062	11	158	0	0	174	0	0
Grp Sat Flow(s),veh/h/ln	1511	1507	1561	1589	1585	1414	986	0	0	1472	0	0
Q Serve(g_s), s	4.8	19.7	19.7	0.3	28.2	0.4	7.8	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	4.8	19.7	19.7	0.3	28.2	0.4	19.0	0.0	0.0	11.2	0.0	0.0
Prop In Lane	1.00		0.09	1.00		1.00	0.91		0.02	0.09		0.89
Lane Grp Cap(c), veh/h	75	871	903	8	1692	755	357	0	0	480	0	0
V/C Ratio(X)	0.82	0.48	0.48	0.48	0.63	0.01	0.44	0.00	0.00	0.36	0.00	0.00
Avail Cap(c_a), veh/h	146	871	903	73	1692	755	357	0	0	480	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	56.5	14.8	14.8	59.5	19.6	13.1	36.7	0.0	0.0	32.9	0.0	0.0
Incr Delay (d2), s/veh	18.7	1.9	1.9	38.0	1.8	0.0	3.9	0.0	0.0	0.5	0.0	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	7.1	7.4	0.2	10.7	0.2	4.4	0.0	0.0	4.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	75.2	16.7	16.7	97.5	21.4	13.2	40.6	0.0	0.0	33.4	0.0	0.0
LnGrp LOS	E	B	B	F	C	B	D	A	A	C	A	A
Approach Vol, veh/h		919			1077			158				174
Approach Delay, s/veh		20.6			21.6			40.6				33.4
Approach LOS		C			C			D				C
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.1	73.9		41.0	10.4	68.6		41.0				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.5	64.5		36.5	11.6	58.4		36.5				
Max Q Clear Time (g_c+I1), s	2.3	21.7		21.0	6.8	30.2		13.2				
Green Ext Time (p_c), s	0.0	7.1		0.8	0.0	9.6		1.1				
Intersection Summary												
HCM 6th Ctrl Delay			23.4									
HCM 6th LOS			C									

HCM 6th TWSC
2: Langensand Road & Highway 26

07/08/2020

Intersection						
Int Delay, s/veh	2.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↓	↑↑	↓	↑
Traffic Vol, veh/h	778	35	15	910	64	15
Future Vol, veh/h	778	35	15	910	64	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	160	215	-	120	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	13	13	7	7	4	4
Mvmt Flow	828	37	16	968	68	16
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	865	0	1344	414
Stage 1	-	-	-	-	828	-
Stage 2	-	-	-	-	516	-
Critical Hdwy	-	-	4.24	-	6.88	6.98
Critical Hdwy Stg 1	-	-	-	-	5.88	-
Critical Hdwy Stg 2	-	-	-	-	5.88	-
Follow-up Hdwy	-	-	2.27	-	3.54	3.34
Pot Cap-1 Maneuver	-	-	743	-	140	582
Stage 1	-	-	-	-	384	-
Stage 2	-	-	-	-	558	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	743	-	137	582
Mov Cap-2 Maneuver	-	-	-	-	137	-
Stage 1	-	-	-	-	384	-
Stage 2	-	-	-	-	546	-
Approach	EB	WB	NB			
HCM Control Delay, s	0	0.2	46.6			
HCM LOS			E			
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	137	582	-	-	743	-
HCM Lane V/C Ratio	0.497	0.027	-	-	0.021	-
HCM Control Delay (s)	54.8	11.4	-	-	10	-
HCM Lane LOS	F	B	-	-	A	-
HCM 95th %tile Q(veh)	2.3	0.1	-	-	0.1	-

HCM 6th TWSC
3: Highway 26 & Vista Loop Drive

07/08/2020

Intersection						
Int Delay, s/veh	0.4					
Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations	↘	↑↑	↑↑		↘	
Traffic Vol, veh/h	16	744	922	1	0	36
Future Vol, veh/h	16	744	922	1	0	36
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	220	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	13	13	6	6	9	9
Mvmt Flow	17	791	981	1	0	38
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	982	0	-	0	1412	491
Stage 1	-	-	-	-	982	-
Stage 2	-	-	-	-	430	-
Critical Hdwy	4.36	-	-	-	6.98	7.08
Critical Hdwy Stg 1	-	-	-	-	5.98	-
Critical Hdwy Stg 2	-	-	-	-	5.98	-
Follow-up Hdwy	2.33	-	-	-	3.59	3.39
Pot Cap-1 Maneuver	636	-	-	-	121	505
Stage 1	-	-	-	-	308	-
Stage 2	-	-	-	-	604	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	636	-	-	-	118	505
Mov Cap-2 Maneuver	-	-	-	-	118	-
Stage 1	-	-	-	-	300	-
Stage 2	-	-	-	-	604	-
Approach	SE	NW	SW			
HCM Control Delay, s	0.2	0	12.7			
HCM LOS	B					
Minor Lane/Major Mvmt	NWT	NWR	SEL	SETSWLn1		
Capacity (veh/h)	-	-	636	-	505	
HCM Lane V/C Ratio	-	-	0.027	-	0.076	
HCM Control Delay (s)	-	-	10.8	-	12.7	
HCM Lane LOS	-	-	B	-	B	
HCM 95th %tile Q(veh)	-	-	0.1	-	0.2	

HCM 6th TWSC
4: Highway 211 & Dubarko Road

07/08/2020

Intersection												
Int Delay, s/veh	4.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↕		↕	↕		↕			↕	↕
Traffic Vol, veh/h	8	8	33	53	38	33	43	274	13	4	162	2
Future Vol, veh/h	8	8	33	53	38	33	43	274	13	4	162	2
Conflicting Peds, #/hr	2	0	0	0	0	2	0	0	0	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	-	-	90	-	-	125	-	-	-	-	-	330
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	1	1	1	5	5	5	2	2	2	5	5	5
Mvmt Flow	9	9	37	59	42	37	48	304	14	4	180	2
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	639	606	182	621	601	315	184	0	0	320	0	0
Stage 1	190	190	-	409	409	-	-	-	-	-	-	-
Stage 2	449	416	-	212	192	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.51	6.21	7.15	6.55	6.25	4.12	-	-	4.15	-	-
Critical Hdwy Stg 1	6.11	5.51	-	6.15	5.55	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.51	-	6.15	5.55	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	3.545	4.045	3.345	2.218	-	-	2.245	-	-
Pot Cap-1 Maneuver	390	413	863	395	410	718	1391	-	-	1223	-	-
Stage 1	814	745	-	613	591	-	-	-	-	-	-	-
Stage 2	591	594	-	783	736	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	326	392	861	358	390	715	1388	-	-	1221	-	-
Mov Cap-2 Maneuver	326	392	-	358	390	-	-	-	-	-	-	-
Stage 1	778	741	-	586	565	-	-	-	-	-	-	-
Stage 2	496	568	-	738	732	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	11.4			16.2			1			0.2		
HCM LOS	B			C								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR		
Capacity (veh/h)	1388	-	-	356	861	371	715	1221	-	-		
HCM Lane V/C Ratio	0.034	-	-	0.05	0.043	0.273	0.051	0.004	-	-		
HCM Control Delay (s)	7.7	0	-	15.6	9.4	18.3	10.3	8	0	-		
HCM Lane LOS	A	A	-	C	A	C	B	A	A	-		
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.1	1.1	0.2	0	-	-		

HCM 6th TWSC
5: Langensand Road & Dubarko Road

07/08/2020

Intersection												
Int Delay, s/veh	5.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖ ↗		↕			↖ ↗			↕			
Traffic Vol, veh/h	18	1	1	1	15	22	4	20	2	9	5	16
Future Vol, veh/h	18	1	1	1	15	22	4	20	2	9	5	16
Conflicting Peds, #/hr	0	0	0	0	0	0	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	115	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	5	5	5	18	18	18	8	8	8	23	23	23
Mvmt Flow	20	1	1	1	17	25	4	22	2	10	6	18

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	87	67	15	67	75	23	24	0	0	24	0	0
Stage 1	35	35	-	31	31	-	-	-	-	-	-	-
Stage 2	52	32	-	36	44	-	-	-	-	-	-	-
Critical Hdwy	7.15	6.55	6.25	7.28	6.68	6.38	4.18	-	-	4.33	-	-
Critical Hdwy Stg 1	6.15	5.55	-	6.28	5.68	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.15	5.55	-	6.28	5.68	-	-	-	-	-	-	-
Follow-up Hdwy	3.545	4.045	3.345	3.662	4.162	3.462	2.272	-	-	2.407	-	-
Pot Cap-1 Maneuver	891	818	1056	888	786	1009	1553	-	-	1465	-	-
Stage 1	973	860	-	946	839	-	-	-	-	-	-	-
Stage 2	953	862	-	940	828	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	848	810	1056	879	778	1009	1553	-	-	1465	-	-
Mov Cap-2 Maneuver	848	810	-	879	778	-	-	-	-	-	-	-
Stage 1	970	854	-	943	836	-	-	-	-	-	-	-
Stage 2	908	859	-	931	822	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.3	9.2	1.1	2.2
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1553	-	-	848	917	900	1465	-	-
HCM Lane V/C Ratio	0.003	-	-	0.024	0.002	0.047	0.007	-	-
HCM Control Delay (s)	7.3	0	-	9.3	8.9	9.2	7.5	0	-
HCM Lane LOS	A	A	-	A	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0.1	0	-	-

HCM Signalized Intersection Capacity Analysis
 1: Wolf Drive/Ten Eyck Road & Highway 26

07/08/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	152	1130	152	8	1022	21	131	15	13	38	13	113
Future Volume (vph)	152	1130	152	8	1022	21	131	15	13	38	13	113
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5		4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97		1.00			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00			1.00	
Frt	1.00	0.98		1.00	1.00	0.85		0.99			0.91	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.96			0.99	
Satd. Flow (prot)	1614	3163		1554	3107	1343		1646			1460	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.57			0.91	
Satd. Flow (perm)	1614	3163		1554	3107	1343		980			1339	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	160	1189	160	8	1076	22	138	16	14	40	14	119
RTOR Reduction (vph)	0	8	0	0	0	11	0	3	0	0	66	0
Lane Group Flow (vph)	160	1341	0	8	1076	11	0	165	0	0	107	0
Confl. Peds. (#/hr)						4						4
Confl. Bikes (#/hr)			2			1						
Heavy Vehicles (%)	3%	3%	3%	7%	7%	7%	1%	1%	1%	6%	6%	6%
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases						6	4			8		
Actuated Green, G (s)	16.2	74.0		1.0	58.8	58.8		31.5			31.5	
Effective Green, g (s)	16.2	74.0		1.0	58.8	58.8		31.5			31.5	
Actuated g/C Ratio	0.13	0.62		0.01	0.49	0.49		0.26			0.26	
Clearance Time (s)	4.5	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			3.0	
Lane Grp Cap (vph)	217	1950		12	1522	658		257			351	
v/s Ratio Prot	c0.10	c0.42		0.01	0.35							
v/s Ratio Perm						0.01		c0.17			0.08	
v/c Ratio	0.74	0.69		0.67	0.71	0.02		0.64			0.30	
Uniform Delay, d1	49.9	15.3		59.3	23.9	15.7		39.3			35.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	12.3	2.0		89.5	2.8	0.0		11.7			0.5	
Delay (s)	62.1	17.3		148.8	26.7	15.8		51.0			36.0	
Level of Service	E	B		F	C	B		D			D	
Approach Delay (s)		22.1			27.3			51.0			36.0	
Approach LOS		C			C			D			D	
Intersection Summary												
HCM 2000 Control Delay		26.5										C
HCM 2000 Volume to Capacity ratio		0.70										
Actuated Cycle Length (s)		120.0				Sum of lost time (s)		13.5				
Intersection Capacity Utilization		79.3%				ICU Level of Service		D				
Analysis Period (min)		15										
c Critical Lane Group												

HCM 6th Signalized Intersection Summary
 1: Wolf Drive/Ten Eyck Road & Highway 26

07/08/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	152	1130	152	8	1022	21	131	15	13	38	13	113
Future Volume (veh/h)	152	1130	152	8	1022	21	131	15	13	38	13	113
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	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	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1709	1709	1709	1654	1654	1654	1736	1736	1736	1668	1668	1668
Adj Flow Rate, veh/h	160	1189	160	8	1076	22	138	16	14	40	14	119
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	7	7	7	1	1	1	6	6	6
Cap, veh/h	186	1765	237	15	1605	698	285	32	24	108	50	267
Arrive On Green	0.11	0.62	0.62	0.01	0.51	0.51	0.26	0.26	0.26	0.26	0.26	0.26
Sat Flow, veh/h	1628	2869	385	1576	3143	1368	876	123	91	270	191	1016
Grp Volume(v), veh/h	160	671	678	8	1076	22	168	0	0	173	0	0
Grp Sat Flow(s),veh/h/ln	1628	1624	1630	1576	1572	1368	1090	0	0	1477	0	0
Q Serve(g_s), s	11.6	32.5	32.9	0.6	30.6	1.0	6.8	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	11.6	32.5	32.9	0.6	30.6	1.0	18.1	0.0	0.0	11.3	0.0	0.0
Prop In Lane	1.00		0.24	1.00		1.00	0.82		0.08	0.23		0.69
Lane Grp Cap(c), veh/h	186	999	1003	15	1605	698	341	0	0	425	0	0
V/C Ratio(X)	0.86	0.67	0.68	0.52	0.67	0.03	0.49	0.00	0.00	0.41	0.00	0.00
Avail Cap(c_a), veh/h	264	999	1003	67	1605	698	341	0	0	425	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	52.2	15.1	15.2	59.1	21.8	14.6	39.9	0.0	0.0	36.9	0.0	0.0
Incr Delay (d2), s/veh	17.6	3.6	3.7	24.7	2.2	0.1	5.0	0.0	0.0	0.6	0.0	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.7	12.6	12.8	0.3	11.7	0.3	4.9	0.0	0.0	4.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	69.8	18.7	18.9	83.8	24.1	14.7	44.9	0.0	0.0	37.5	0.0	0.0
LnGrp LOS	E	B	B	F	C	B	D	A	A	D	A	A
Approach Vol, veh/h		1509			1106			168				173
Approach Delay, s/veh		24.2			24.3			44.9				37.5
Approach LOS		C			C			D				D
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.7	78.3		36.0	18.2	65.8		36.0				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.1	69.9		31.5	19.5	55.5		31.5				
Max Q Clear Time (g_c+I1), s	2.6	34.9		20.1	13.6	32.6		13.3				
Green Ext Time (p_c), s	0.0	13.4		0.7	0.2	9.0		1.0				
Intersection Summary												
HCM 6th Ctrl Delay				26.2								
HCM 6th LOS				C								

HCM 6th TWSC
2: Langensand Road & Highway 26

07/08/2020

Intersection						
Int Delay, s/veh	1.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↓	↑↑	↓	↓
Traffic Vol, veh/h	1085	82	16	1043	34	33
Future Vol, veh/h	1085	82	16	1043	34	33
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	160	215	-	120	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	3	3	7	7	3	3
Mvmt Flow	1142	86	17	1098	36	35
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	1228	0	1725	571
Stage 1	-	-	-	-	1142	-
Stage 2	-	-	-	-	583	-
Critical Hdwy	-	-	4.24	-	6.86	6.96
Critical Hdwy Stg 1	-	-	-	-	5.86	-
Critical Hdwy Stg 2	-	-	-	-	5.86	-
Follow-up Hdwy	-	-	2.27	-	3.53	3.33
Pot Cap-1 Maneuver	-	-	536	-	79	461
Stage 1	-	-	-	-	264	-
Stage 2	-	-	-	-	518	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	536	-	76	461
Mov Cap-2 Maneuver	-	-	-	-	76	-
Stage 1	-	-	-	-	264	-
Stage 2	-	-	-	-	501	-
Approach	EB	WB	NB			
HCM Control Delay, s	0	0.2	51.7			
HCM LOS			F			
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	76	461	-	-	536	-
HCM Lane V/C Ratio	0.471	0.075	-	-	0.031	-
HCM Control Delay (s)	88.9	13.4	-	-	11.9	-
HCM Lane LOS	F	B	-	-	B	-
HCM 95th %tile Q(veh)	1.9	0.2	-	-	0.1	-

HCM 6th TWSC
3: Highway 26 & Vista Loop Drive

07/08/2020

Intersection						
Int Delay, s/veh	0.3					
Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations	↘	↑↑	↑↑		↘	
Traffic Vol, veh/h	37	1070	1027	0	0	15
Future Vol, veh/h	37	1070	1027	0	0	15
Conflicting Peds, #/hr	0	0	0	1	0	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	220	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	3	3	7	7	13	13
Mvmt Flow	38	1103	1059	0	0	15
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	1060	0	-	0	1688	532
Stage 1	-	-	-	-	1060	-
Stage 2	-	-	-	-	628	-
Critical Hdwy	4.16	-	-	-	7.06	7.16
Critical Hdwy Stg 1	-	-	-	-	6.06	-
Critical Hdwy Stg 2	-	-	-	-	6.06	-
Follow-up Hdwy	2.23	-	-	-	3.63	3.43
Pot Cap-1 Maneuver	647	-	-	-	75	464
Stage 1	-	-	-	-	271	-
Stage 2	-	-	-	-	465	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	646	-	-	-	70	463
Mov Cap-2 Maneuver	-	-	-	-	70	-
Stage 1	-	-	-	-	255	-
Stage 2	-	-	-	-	465	-
Approach	SE	NW		SW		
HCM Control Delay, s	0.4	0		13		
HCM LOS				B		
Minor Lane/Major Mvmt	NWT	NWR	SEL	SETSWLn1		
Capacity (veh/h)	-	-	646	-	463	
HCM Lane V/C Ratio	-	-	0.059	-	0.033	
HCM Control Delay (s)	-	-	10.9	-	13	
HCM Lane LOS	-	-	B	-	B	
HCM 95th %tile Q(veh)	-	-	0.2	-	0.1	

HCM 6th TWSC
4: Highway 211 & Dubarko Road

07/08/2020

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	11	46	53	26	49	26	59	264	52	10	318	11
Future Vol, veh/h	11	46	53	26	49	26	59	264	52	10	318	11
Conflicting Peds, #/hr	2	0	0	0	0	2	0	0	0	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	-	-	90	-	-	125	-	-	-	-	-	330
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	1	1	1	5	5	5	2	2	2	5	5	5
Mvmt Flow	12	49	56	28	52	28	63	281	55	11	338	12
Major/Minor	Minor2	Minor1			Major1			Major2				
Conflicting Flow All	839	826	340	856	811	313	352	0	0	338	0	0
Stage 1	362	362	-	437	437	-	-	-	-	-	-	-
Stage 2	477	464	-	419	374	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.51	6.21	7.15	6.55	6.25	4.12	-	-	4.15	-	-
Critical Hdwy Stg 1	6.11	5.51	-	6.15	5.55	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.51	-	6.15	5.55	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	3.545	4.045	3.345	2.218	-	-	2.245	-	-
Pot Cap-1 Maneuver	286	308	705	275	310	720	1207	-	-	1205	-	-
Stage 1	659	627	-	592	574	-	-	-	-	-	-	-
Stage 2	571	565	-	606	612	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	223	284	704	207	286	717	1205	-	-	1203	-	-
Mov Cap-2 Maneuver	223	284	-	207	286	-	-	-	-	-	-	-
Stage 1	615	619	-	552	536	-	-	-	-	-	-	-
Stage 2	462	527	-	508	604	-	-	-	-	-	-	-
Approach	EB	WB			NB			SB				
HCM Control Delay, s	16.6	21.7			1.3			0.2				
HCM LOS	C	C										
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR		
Capacity (veh/h)	1205	-	-	270	704	253	717	1203	-	-		
HCM Lane V/C Ratio	0.052	-	-	0.225	0.08	0.315	0.039	0.009	-	-		
HCM Control Delay (s)	8.2	0	-	22.2	10.6	25.7	10.2	8	0	-		
HCM Lane LOS	A	A	-	C	B	D	B	A	A	-		
HCM 95th %tile Q(veh)	0.2	-	-	0.8	0.3	1.3	0.1	0	-	-		

HCM 6th TWSC
5: Langensand Road & Dubarko Road

07/08/2020

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	23	23	5	2	6	7	4	10	1	23	27	28
Future Vol, veh/h	23	23	5	2	6	7	4	10	1	23	27	28
Conflicting Peds, #/hr	2	0	1	3	0	4	1	0	3	4	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	115	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2	7	7	7	3	3	3
Mvmt Flow	25	25	5	2	7	8	4	11	1	25	30	31

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	129	122	51	138	137	20	63	0	0	16	0	0
Stage 1	98	98	-	24	24	-	-	-	-	-	-	-
Stage 2	31	24	-	114	113	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.17	-	-	4.13	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.263	-	-	2.227	-	-
Pot Cap-1 Maneuver	844	768	1017	833	754	1058	1508	-	-	1595	-	-
Stage 1	908	814	-	994	875	-	-	-	-	-	-	-
Stage 2	986	875	-	891	802	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	815	749	1012	791	735	1050	1505	-	-	1589	-	-
Mov Cap-2 Maneuver	815	749	-	791	735	-	-	-	-	-	-	-
Stage 1	903	799	-	987	869	-	-	-	-	-	-	-
Stage 2	965	869	-	842	788	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.7	9.2	2	2.2
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1505	-	-	815	785	864	1589	-	-
HCM Lane V/C Ratio	0.003	-	-	0.031	0.039	0.019	0.016	-	-
HCM Control Delay (s)	7.4	0	-	9.6	9.8	9.2	7.3	0	-
HCM Lane LOS	A	A	-	A	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0.1	0	-	-

Trip Generation Calculation Worksheet



Land Use Description: Multi-Family Housing (Low-Rise*)
 ITE Land Use Code: 220
 Independent Variable: Dwelling Units
 Quantity: 192 Dwelling Units
 Setting: General Urban/Suburban and Rural
 (Not Close to Rail Transit)

Summary of ITE Trip Generation Data

AM Peak Hour of Adjacent Street Traffic

Trip Equation: $T = 0.31(X) + 22.85$

Directional Distribution: 24% Entering 76% Exiting

PM Peak Hour of Adjacent Street Traffic

Trip Equation: $T = 0.43(X) + 20.55$

Directional Distribution: 63% Entering 37% Exiting

Total Weekday Traffic

Trip Equation: $T = 6.41(X) + 75.31$

Directional Distribution: 50% Entering 50% Exiting

Site Trip Generation Calculations

192 Dwelling Units

	Entering	Exiting	Total
AM Peak Hour	20	62	82
PM Peak Hour	65	38	103
Weekday	653	653	1306

*"Low-Rise" applies to buildings with 2-3 floors.

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

Trip Generation Calculation Worksheet



Land Use Description: Single-Family Attached Housing
 ITE Land Use Code: 215
 Independent Variable: Dwelling Units
 Quantity: 8 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

8 Dwelling Units

	Entering	Exiting	Total
AM Peak Hour	1	3	4
PM Peak Hour	3	2	5
Weekday	29	29	58

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

Trip Generation Calculation Worksheet



Land Use Description: General Office Building
 ITE Land Use Code: 710
 Independent Variable: Gross Floor Area
 Quantity: 5.000 Thousand Square Feet

Summary of ITE Trip Generation Data

AM Peak Hour of Adjacent Street Traffic

Trip Rate: 1.52 trips per ksf
 Directional Distribution: 86% Entering 14% Exiting

PM Peak Hour of Adjacent Street Traffic

Trip Rate: 1.44 trips per ksf
 Directional Distribution: 16% Entering 84% Exiting

Total Weekday Traffic

Trip Rate: 10.84 trips per ksf
 Directional Distribution: 50% Entering 50% Exiting

Site Trip Generation Calculations

5.000 ksf General Office Building

	Entering	Exiting	Total
AM Peak Hour	7	1	8
PM Peak Hour	1	6	7
Weekday	27	27	54

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

Trip Generation Calculation Worksheet



Land Use Description: Single-Family Attached Housing
 ITE Land Use Code: 215
 Independent Variable: Dwelling Units
 Quantity: 92 Dwelling Units
 Setting: General Urban/Suburban and Rural

Summary of ITE Trip Generation Data

AM Peak Hour of Adjacent Street Traffic

Trip Equation: $T = 0.52(X) - 5.70$

Directional Distribution: 31% Entering 69% Exiting

PM Peak Hour of Adjacent Street Traffic

Trip Equation: $T = 0.60(X) - 3.93$

Directional Distribution: 57% Entering 43% Exiting

Total Weekday Traffic

Trip Equation: $T = 7.62(X) - 50.48$

Directional Distribution: 50% Entering 50% Exiting

Site Trip Generation Calculations

92 Dwelling Units

	Entering	Exiting	Total
AM Peak Hour	13	29	42
PM Peak Hour	29	22	51
Weekday	325	325	650

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

Trip Generation Calculation Worksheet



Land Use Description: Single-Family Detached Housing
ITE Land Use Code: 210
Independent Variable: Dwelling Units
Quantity: 50 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

50 Dwelling Units

	Entering	Exiting	Total
AM Peak Hour	9	28	37
PM Peak Hour	32	18	50
Weekday	236	236	472

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

Trip Generation Calculation Worksheet



Land Use Description: Fast-Food Restaurant without Drive-Through
 ITE Land Use Code: 933
 Independent Variable: Gross Floor Area
 Quantity: 5.000 Thousand Square Feet

Summary of ITE Trip Generation Data

AM Peak Hour of Adjacent Street Traffic

Trip Rate: 25.10 trips per ksf
 Directional Distribution: 51% Entering 49% Exiting

PM Peak Hour of Adjacent Street Traffic

Trip Rate: 28.34 trips per ksf
 Directional Distribution: 52% Entering 48% Exiting

Total Weekday Traffic

Trip Rate: 346.23 trips per ksf
 Directional Distribution: 50% Entering 50% Exiting

Site Trip Generation Calculations

5.0 ksf Fast-Food Restaurant w/o Drive Thru

	Entering	Exiting	Total
AM Peak Hour	64	62	126
PM Peak Hour	74	68	142
Weekday	866	866	1732

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

Trip Generation Calculation Worksheet



Land Use Description: Day Care Center
 ITE Land Use Code: 565
 Independent Variable: Gross Floor Area
 Quantity: 5.00 Thousand Square Feet

Summary of ITE Trip Generation Data

AM Peak Hour of Adjacent Street Traffic

Trip Rate: 11.00 trips per ksf
 Directional Distribution: 54% Entering 46% Exiting

PM Peak Hour of Adjacent Street Traffic

Trip Rate: 11.12 trips per ksf
 Directional Distribution: 49% Entering 51% Exiting

Total Weekday Traffic

Trip Rate: 47.62 trips per ksf
 Directional Distribution: 50% Entering 50% Exiting

Site Trip Generation Calculations

5.00 ksf Day Care Center

	Entering	Exiting	Total
AM Peak Hour	30	25	55
PM Peak Hour	27	29	56
Weekday	119	119	238

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

Trip Generation Calculation Worksheet



Land Use Description: Supermarket
ITE Land Use Code: 850
Independent Variable: Gross Floor Area
Quantity: 18.433 Thousand Square Feet

Summary of ITE Trip Generation Data

AM Peak Hour of Adjacent Street Traffic

Trip Rate: 3.82 trips per ksf
Directional Distribution: 58% Entering 42% Exiting

PM Peak Hour of Adjacent Street Traffic

Trip Rate: 9.24 trips per ksf
Directional Distribution: 50% Entering 50% Exiting

Total Weekday Traffic

Trip Rate: 106.78 trips per ksf
Directional Distribution: 50% Entering 50% Exiting

Site Trip Generation Calculations

18.433 ksf Supermarket

	Entering	Exiting	Total
AM Peak Hour	41	29	70
PM Peak Hour	85	85	170
Weekday	984	984	1968

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: 12 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

12 Dwelling Units

	Entering	Exiting	Total
AM Peak Hour	2	4	6
PM Peak Hour	4	3	7
Weekday	43	43	86

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

Trip Generation Calculation Worksheet



Land Use Description: Single-Family Detached Housing
 ITE Land Use Code: 210
 Independent Variable: Dwelling Units
 Quantity: 14 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

14 Dwelling Units

	Entering	Exiting	Total
AM Peak Hour	3	7	10
PM Peak Hour	9	5	14
Weekday	66	66	132

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

Trip Generation Calculation Worksheet



Land Use Description: Multi-Family Housing (Low-Rise)
ITE Land Use Code: 220
Independent Variable: Dwelling Units
Quantity: 130 Dwelling Units

Summary of ITE Trip Generation Data

AM Peak Hour of Adjacent Street Traffic

Trip Rate: 0.46 trips per dwelling unit
Directional Distribution: 23% Entering 77% Exiting

PM Peak Hour of Adjacent Street Traffic

Trip Rate: 0.56 trips per dwelling unit
Directional Distribution: 63% Entering 37% Exiting

Total Weekday Traffic

Trip Rate: 7.32 trips per dwelling unit
Directional Distribution: 50% Entering 50% Exiting

Site Trip Generation Calculations

130 Dwelling Units

	Entering	Exiting	Total
AM Peak Hour	14	46	60
PM Peak Hour	46	27	73
Weekday	476	476	952

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

Trip Generation Calculation Worksheet



Land Use Description: Supermarket
 ITE Land Use Code: 850
 Independent Variable: Gross Floor Area
 Quantity: 25.720 Thousand Square Feet

Summary of ITE Trip Generation Data

AM Peak Hour of Adjacent Street Traffic

Trip Rate: 2.86 trips per ksf
 Directional Distribution: 59% Entering 41% Exiting

PM Peak Hour of Adjacent Street Traffic

Trip Equation: $\ln(T) = 0.81 \ln(X) + 2.92$
 Directional Distribution: 50% Entering 50% Exiting

Total Weekday Traffic

Trip Rate: $T = 89.39(X) + 539.33$
 Directional Distribution: 50% Entering 50% Exiting

Site Trip Generation Calculations

25.720 ksf Supermarket

	Entering	Exiting	Total
AM Peak Hour	44	30	74
PM Peak Hour	129	128	257
Weekday	1419	1419	2838

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

Trip Generation Calculation Worksheet



Land Use Description: Public Park
 ITE Land Use Code: 411
 Independent Variable: Acres
 Quantity: 1.755 Acres

Summary of ITE Trip Generation Data

AM Peak Hour of Adjacent Street Traffic

Trip Rate: 0.02 trips per acre
 Directional Distribution: 59% Entering 41% Exiting

PM Peak Hour of Adjacent Street Traffic

Trip Rate: 0.11 trips per acre
 Directional Distribution: 55% Entering 45% Exiting

Total Weekday Traffic

Trip Rate: 0.78 trips per acre
 Directional Distribution: 50% Entering 50% Exiting

Site Trip Generation Calculations

1.755 Acre Park

	Entering	Exiting	Total
AM Peak Hour	0	0	0
PM Peak Hour	0	0	0
Weekday	1	1	2

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

HCM Signalized Intersection Capacity Analysis
 1: Wolf Drive/Ten Eyck Road & Highway 26

09/29/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	61	852	40	4	1143	11	145	12	3	17	4	157	
Future Volume (vph)	61	852	40	4	1143	11	145	12	3	17	4	157	
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5		4.5			4.5		
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00			1.00		
Fr _t	1.00	0.99		1.00	1.00	0.85		1.00			0.88		
Fl _t Protected	0.95	1.00		0.95	1.00	1.00		0.96			1.00		
Satd. Flow (prot)	1484	2949		1568	3137	1403		1576			1489		
Fl _t Permitted	0.95	1.00		0.95	1.00	1.00		0.53			0.97		
Satd. Flow (perm)	1484	2949		1568	3137	1403		879			1445		
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	
Adj. Flow (vph)	65	906	43	4	1216	12	154	13	3	18	4	167	
RTOR Reduction (vph)	0	3	0	0	0	6	0	1	0	0	95	0	
Lane Group Flow (vph)	65	946	0	4	1216	6	0	169	0	0	94	0	
Heavy Vehicles (%)	12%	12%	12%	6%	6%	6%	6%	6%	6%	3%	3%	3%	
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA		Perm	NA		
Protected Phases	5	2		1	6			4			8		
Permitted Phases						6	4			8			
Actuated Green, G (s)	8.1	69.0		1.0	61.9	61.9		36.5			36.5		
Effective Green, g (s)	8.1	69.0		1.0	61.9	61.9		36.5			36.5		
Actuated g/C Ratio	0.07	0.58		0.01	0.52	0.52		0.30			0.30		
Clearance Time (s)	4.5	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			3.0		
Lane Grp Cap (vph)	100	1695		13	1618	723		267			439		
v/s Ratio Prot	c0.04	0.32		0.00	c0.39								
v/s Ratio Perm						0.00		c0.19			0.07		
v/c Ratio	0.65	0.56		0.31	0.75	0.01		0.63			0.21		
Uniform Delay, d1	54.6	16.0		59.2	23.0	14.1		36.0			31.1		
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00		
Incremental Delay, d2	14.1	1.3		13.0	3.3	0.0		11.0			0.2		
Delay (s)	68.7	17.3		72.2	26.2	14.1		46.9			31.3		
Level of Service	E	B		E	C	B		D			C		
Approach Delay (s)		20.6			26.3			46.9			31.3		
Approach LOS		C			C			D			C		
Intersection Summary													
HCM 2000 Control Delay			25.8									HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.70										
Actuated Cycle Length (s)			120.0									Sum of lost time (s)	13.5
Intersection Capacity Utilization			74.9%									ICU Level of Service	D
Analysis Period (min)			15										
c Critical Lane Group													

HCM 6th Signalized Intersection Summary
 1: Wolf Drive/Ten Eyck Road & Highway 26

09/29/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	61	852	40	4	1143	11	145	12	3	17	4	157
Future Volume (veh/h)	61	852	40	4	1143	11	145	12	3	17	4	157
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	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	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1586	1586	1586	1668	1668	1668	1668	1668	1668	1709	1709	1709
Adj Flow Rate, veh/h	65	906	43	4	1216	12	154	13	3	18	4	167
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	12	12	12	6	6	6	6	6	6	3	3	3
Cap, veh/h	80	1693	80	8	1682	750	316	25	5	57	28	401
Arrive On Green	0.05	0.58	0.58	0.01	0.53	0.53	0.30	0.30	0.30	0.30	0.30	0.30
Sat Flow, veh/h	1511	2929	139	1589	3169	1414	850	81	17	81	93	1318
Grp Volume(v), veh/h	65	466	483	4	1216	12	170	0	0	189	0	0
Grp Sat Flow(s),veh/h/ln	1511	1507	1561	1589	1585	1414	948	0	0	1492	0	0
Q Serve(g_s), s	5.1	22.7	22.7	0.3	35.1	0.5	9.2	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	5.1	22.7	22.7	0.3	35.1	0.5	21.5	0.0	0.0	12.3	0.0	0.0
Prop In Lane	1.00		0.09	1.00		1.00	0.91		0.02	0.10		0.88
Lane Grp Cap(c), veh/h	80	871	903	8	1682	750	345	0	0	487	0	0
V/C Ratio(X)	0.82	0.54	0.54	0.48	0.72	0.02	0.49	0.00	0.00	0.39	0.00	0.00
Avail Cap(c_a), veh/h	132	871	903	68	1682	750	345	0	0	487	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	56.3	15.5	15.5	59.5	21.4	13.3	37.9	0.0	0.0	33.3	0.0	0.0
Incr Delay (d2), s/veh	17.9	2.4	2.3	38.0	2.7	0.0	4.9	0.0	0.0	0.5	0.0	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	8.3	8.6	0.2	13.5	0.2	4.9	0.0	0.0	4.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	74.1	17.8	17.7	97.5	24.2	13.4	42.8	0.0	0.0	33.8	0.0	0.0
LnGrp LOS	E	B	B	F	C	B	D	A	A	C	A	A
Approach Vol, veh/h		1014			1232			170			189	
Approach Delay, s/veh		21.4			24.3			42.8			33.8	
Approach LOS		C			C			D			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.1	73.9		41.0	10.8	68.2		41.0				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.1	64.9		36.5	10.5	59.5		36.5				
Max Q Clear Time (g_c+I1), s	2.3	24.7		23.5	7.1	37.1		14.3				
Green Ext Time (p_c), s	0.0	8.1		0.8	0.0	10.3		1.2				
Intersection Summary												
HCM 6th Ctrl Delay				25.1								
HCM 6th LOS				C								

HCM 6th TWSC
2: Langensand Road & Highway 26

09/29/2022

Intersection						
Int Delay, s/veh	3.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑
Traffic Vol, veh/h	860	37	17	1055	70	17
Future Vol, veh/h	860	37	17	1055	70	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	160	215	-	120	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	13	13	7	7	4	4
Mvmt Flow	915	39	18	1122	74	18
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	954	0	1512	458
Stage 1	-	-	-	-	915	-
Stage 2	-	-	-	-	597	-
Critical Hdwy	-	-	4.24	-	6.88	6.98
Critical Hdwy Stg 1	-	-	-	-	5.88	-
Critical Hdwy Stg 2	-	-	-	-	5.88	-
Follow-up Hdwy	-	-	2.27	-	3.54	3.34
Pot Cap-1 Maneuver	-	-	686	-	109	544
Stage 1	-	-	-	-	346	-
Stage 2	-	-	-	-	507	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	686	-	106	544
Mov Cap-2 Maneuver	-	-	-	-	106	-
Stage 1	-	-	-	-	346	-
Stage 2	-	-	-	-	494	-
Approach	EB	WB	NB			
HCM Control Delay, s	0	0.2	79.1			
HCM LOS			F			
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	106	544	-	-	686	-
HCM Lane V/C Ratio	0.703	0.033	-	-	0.026	-
HCM Control Delay (s)	95.4	11.8	-	-	10.4	-
HCM Lane LOS	F	B	-	-	B	-
HCM 95th %tile Q(veh)	3.7	0.1	-	-	0.1	-

HCM 6th TWSC
3: Highway 26 & Vista Loop Drive

09/29/2022

Intersection						
Int Delay, s/veh	0.7					
Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations	↘	↑↑	↑↑		↘	
Traffic Vol, veh/h	29	815	1035	1	0	72
Future Vol, veh/h	29	815	1035	1	0	72
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	220	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	13	13	6	6	9	9
Mvmt Flow	31	867	1101	1	0	77
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	1102	0	-	0	1598	551
Stage 1	-	-	-	-	1102	-
Stage 2	-	-	-	-	496	-
Critical Hdwy	4.36	-	-	-	6.98	7.08
Critical Hdwy Stg 1	-	-	-	-	5.98	-
Critical Hdwy Stg 2	-	-	-	-	5.98	-
Follow-up Hdwy	2.33	-	-	-	3.59	3.39
Pot Cap-1 Maneuver	569	-	-	-	90	461
Stage 1	-	-	-	-	265	-
Stage 2	-	-	-	-	558	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	569	-	-	-	85	461
Mov Cap-2 Maneuver	-	-	-	-	85	-
Stage 1	-	-	-	-	251	-
Stage 2	-	-	-	-	558	-
Approach	SE	NW		SW		
HCM Control Delay, s	0.4	0		14.4		
HCM LOS				B		
Minor Lane/Major Mvmt	NWT	NWR	SEL	SETSWLn1		
Capacity (veh/h)	-	-	569	-	461	
HCM Lane V/C Ratio	-	-	0.054	-	0.166	
HCM Control Delay (s)	-	-	11.7	-	14.4	
HCM Lane LOS	-	-	B	-	B	
HCM 95th %tile Q(veh)	-	-	0.2	-	0.6	

HCM 6th TWSC
4: Highway 211 & Dubarko Road

09/29/2022

Intersection												
Int Delay, s/veh	4.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↕		↕	↕		↕			↕	↕
Traffic Vol, veh/h	9	9	35	57	42	35	47	308	15	4	182	2
Future Vol, veh/h	9	9	35	57	42	35	47	308	15	4	182	2
Conflicting Peds, #/hr	2	0	0	0	0	2	0	0	0	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	-	-	90	-	-	125	-	-	-	-	-	330
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	1	1	1	5	5	5	2	2	2	5	5	5
Mvmt Flow	10	10	39	63	47	39	52	342	17	4	202	2
Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	712	677	204	693	671	355	206	0	0	361	0	0
Stage 1	212	212	-	457	457	-	-	-	-	-	-	-
Stage 2	500	465	-	236	214	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.51	6.21	7.15	6.55	6.25	4.12	-	-	4.15	-	-
Critical Hdwy Stg 1	6.11	5.51	-	6.15	5.55	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.51	-	6.15	5.55	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	3.545	4.045	3.345	2.218	-	-	2.245	-	-
Pot Cap-1 Maneuver	349	376	839	354	374	682	1365	-	-	1181	-	-
Stage 1	792	729	-	578	563	-	-	-	-	-	-	-
Stage 2	555	565	-	760	720	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	283	355	837	317	353	679	1362	-	-	1179	-	-
Mov Cap-2 Maneuver	283	355	-	317	353	-	-	-	-	-	-	-
Stage 1	752	725	-	549	535	-	-	-	-	-	-	-
Stage 2	454	537	-	712	716	-	-	-	-	-	-	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	12.1		18.4			1			0.2			
HCM LOS	B		C									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR		
Capacity (veh/h)	1362	-	-	315	837	331	679	1179	-	-		
HCM Lane V/C Ratio	0.038	-	-	0.063	0.046	0.332	0.057	0.004	-	-		
HCM Control Delay (s)	7.7	0	-	17.2	9.5	21.2	10.6	8.1	0	-		
HCM Lane LOS	A	A	-	C	A	C	B	A	A	-		
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.1	1.4	0.2	0	-	-		

HCM 6th TWSC
5: Langensand Road & Dubarko Road

09/29/2022

Intersection												
Int Delay, s/veh	5.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	1	1	1	17	24	4	22	2	10	5	18
Future Vol, veh/h	20	1	1	1	17	24	4	22	2	10	5	18
Conflicting Peds, #/hr	0	0	0	0	0	0	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	115	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	5	5	5	18	18	18	8	8	8	23	23	23
Mvmt Flow	22	1	1	1	19	27	4	25	2	11	6	20

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	95	73	16	73	82	26	26	0	0	27	0	0
Stage 1	38	38	-	34	34	-	-	-	-	-	-	-
Stage 2	57	35	-	39	48	-	-	-	-	-	-	-
Critical Hdwy	7.15	6.55	6.25	7.28	6.68	6.38	4.18	-	-	4.33	-	-
Critical Hdwy Stg 1	6.15	5.55	-	6.28	5.68	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.15	5.55	-	6.28	5.68	-	-	-	-	-	-	-
Follow-up Hdwy	3.545	4.045	3.345	3.662	4.162	3.462	2.272	-	-	2.407	-	-
Pot Cap-1 Maneuver	881	812	1055	880	779	1006	1550	-	-	1461	-	-
Stage 1	970	857	-	943	836	-	-	-	-	-	-	-
Stage 2	947	860	-	937	824	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	834	803	1055	871	770	1006	1550	-	-	1461	-	-
Mov Cap-2 Maneuver	834	803	-	871	770	-	-	-	-	-	-	-
Stage 1	967	850	-	940	833	-	-	-	-	-	-	-
Stage 2	898	857	-	927	817	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.4	9.3	1	2.3
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1550	-	-	834	912	892	1461	-	-
HCM Lane V/C Ratio	0.003	-	-	0.027	0.002	0.053	0.008	-	-
HCM Control Delay (s)	7.3	0	-	9.4	9	9.3	7.5	0	-
HCM Lane LOS	A	A	-	A	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0.2	0	-	-

HCM Signalized Intersection Capacity Analysis
 1: Wolf Drive/Ten Eyck Road & Highway 26

09/29/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	164	1288	164	9	1144	23	141	17	15	42	15	123
Future Volume (vph)	164	1288	164	9	1144	23	141	17	15	42	15	123
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5		4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97		1.00			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00			1.00	
Frt	1.00	0.98		1.00	1.00	0.85		0.99			0.91	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.96			0.99	
Satd. Flow (prot)	1614	3166		1554	3107	1343		1645			1462	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.55			0.90	
Satd. Flow (perm)	1614	3166		1554	3107	1343		949			1334	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	173	1356	173	9	1204	24	148	18	16	44	16	129
RTOR Reduction (vph)	0	8	0	0	0	12	0	3	0	0	64	0
Lane Group Flow (vph)	173	1521	0	9	1204	12	0	179	0	0	125	0
Confl. Peds. (#/hr)							4					4
Confl. Bikes (#/hr)			2			1						
Heavy Vehicles (%)	3%	3%	3%	7%	7%	7%	1%	1%	1%	6%	6%	6%
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases						6	4			8		
Actuated Green, G (s)	16.5	74.0		1.0	58.5	58.5		31.5			31.5	
Effective Green, g (s)	16.5	74.0		1.0	58.5	58.5		31.5			31.5	
Actuated g/C Ratio	0.14	0.62		0.01	0.49	0.49		0.26			0.26	
Clearance Time (s)	4.5	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			3.0	
Lane Grp Cap (vph)	221	1952		12	1514	654		249			350	
v/s Ratio Prot	c0.11	c0.48		0.01	0.39							
v/s Ratio Perm						0.01		c0.19			0.09	
v/c Ratio	0.78	0.78		0.75	0.80	0.02		0.72			0.36	
Uniform Delay, d1	50.0	17.0		59.4	25.7	15.9		40.2			36.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	16.4	3.2		128.3	4.4	0.1		16.4			0.6	
Delay (s)	66.4	20.1		187.6	30.1	15.9		56.6			36.6	
Level of Service	E	C		F	C	B		E			D	
Approach Delay (s)		24.8			31.0			56.6			36.6	
Approach LOS		C			C			E			D	
Intersection Summary												
HCM 2000 Control Delay			29.6									HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio			0.78									
Actuated Cycle Length (s)			120.0								13.5	Sum of lost time (s)
Intersection Capacity Utilization			86.2%									ICU Level of Service E
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary
 1: Wolf Drive/Ten Eyck Road & Highway 26

09/29/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	164	1288	164	9	1144	23	141	17	15	42	15	123
Future Volume (veh/h)	164	1288	164	9	1144	23	141	17	15	42	15	123
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	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	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1709	1709	1709	1654	1654	1654	1736	1736	1736	1668	1668	1668
Adj Flow Rate, veh/h	173	1356	173	9	1204	24	148	18	16	44	16	129
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	7	7	7	1	1	1	6	6	6
Cap, veh/h	199	1776	225	17	1581	688	274	33	24	109	52	267
Arrive On Green	0.12	0.61	0.61	0.01	0.50	0.50	0.26	0.26	0.26	0.26	0.26	0.26
Sat Flow, veh/h	1628	2892	366	1576	3143	1368	838	125	93	276	197	1017
Grp Volume(v), veh/h	173	757	772	9	1204	24	182	0	0	189	0	0
Grp Sat Flow(s),veh/h/ln	1628	1624	1634	1576	1572	1368	1055	0	0	1491	0	0
Q Serve(g_s), s	12.5	40.4	41.5	0.7	37.0	1.1	8.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	12.5	40.4	41.5	0.7	37.0	1.1	20.5	0.0	0.0	12.5	0.0	0.0
Prop In Lane	1.00		0.22	1.00		1.00	0.81		0.09	0.23		0.68
Lane Grp Cap(c), veh/h	199	997	1003	17	1581	688	331	0	0	428	0	0
V/C Ratio(X)	0.87	0.76	0.77	0.53	0.76	0.03	0.55	0.00	0.00	0.44	0.00	0.00
Avail Cap(c_a), veh/h	251	997	1003	66	1581	688	331	0	0	428	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	51.7	16.7	16.9	59.0	24.0	15.1	41.0	0.0	0.0	37.3	0.0	0.0
Incr Delay (d2), s/veh	22.6	5.4	5.7	23.1	3.5	0.1	6.4	0.0	0.0	0.7	0.0	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.4	15.9	16.5	0.4	14.4	0.4	5.5	0.0	0.0	4.8	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	74.3	22.1	22.6	82.2	27.5	15.2	47.4	0.0	0.0	38.0	0.0	0.0
LnGrp LOS	E	C	C	F	C	B	D	A	A	D	A	A
Approach Vol, veh/h		1702			1237			182			189	
Approach Delay, s/veh		27.7			27.7			47.4			38.0	
Approach LOS		C			C			D			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.8	78.2		36.0	19.1	64.9		36.0				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	70.0		31.5	18.5	56.5		31.5				
Max Q Clear Time (g_c+I1), s	2.7	43.5		22.5	14.5	39.0		14.5				
Green Ext Time (p_c), s	0.0	14.1		0.7	0.2	8.9		1.0				
Intersection Summary												
HCM 6th Ctrl Delay				29.4								
HCM 6th LOS				C								

HCM 6th TWSC
2: Langensand Road & Highway 26

09/29/2022

Intersection						
Int Delay, s/veh	2.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↓	↑↑	↓	↓
Traffic Vol, veh/h	1243	88	18	1165	36	35
Future Vol, veh/h	1243	88	18	1165	36	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	160	215	-	120	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	3	3	7	7	3	3
Mvmt Flow	1308	93	19	1226	38	37
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	1401	0	1959	654
Stage 1	-	-	-	-	1308	-
Stage 2	-	-	-	-	651	-
Critical Hdwy	-	-	4.24	-	6.86	6.96
Critical Hdwy Stg 1	-	-	-	-	5.86	-
Critical Hdwy Stg 2	-	-	-	-	5.86	-
Follow-up Hdwy	-	-	2.27	-	3.53	3.33
Pot Cap-1 Maneuver	-	-	459	-	55	407
Stage 1	-	-	-	-	215	-
Stage 2	-	-	-	-	478	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	459	-	53	407
Mov Cap-2 Maneuver	-	-	-	-	53	-
Stage 1	-	-	-	-	215	-
Stage 2	-	-	-	-	458	-
Approach	EB	WB	NB			
HCM Control Delay, s	0	0.2	93.4			
HCM LOS			F			
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	53	407	-	-	459	-
HCM Lane V/C Ratio	0.715	0.091	-	-	0.041	-
HCM Control Delay (s)	169.9	14.7	-	-	13.2	-
HCM Lane LOS	F	B	-	-	B	-
HCM 95th %tile Q(veh)	2.9	0.3	-	-	0.1	-

HCM 6th TWSC
3: Highway 26 & Vista Loop Drive

09/29/2022

Intersection						
Int Delay, s/veh	0.6					
Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations	↘	↑↑	↑↑		↘	
Traffic Vol, veh/h	75	1194	1128	0	0	38
Future Vol, veh/h	75	1194	1128	0	0	38
Conflicting Peds, #/hr	0	0	0	1	0	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	220	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	3	3	7	7	13	13
Mvmt Flow	77	1231	1163	0	0	39
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	1164	0	-	0	1934	584
Stage 1	-	-	-	-	1164	-
Stage 2	-	-	-	-	770	-
Critical Hdwy	4.16	-	-	-	7.06	7.16
Critical Hdwy Stg 1	-	-	-	-	6.06	-
Critical Hdwy Stg 2	-	-	-	-	6.06	-
Follow-up Hdwy	2.23	-	-	-	3.63	3.43
Pot Cap-1 Maneuver	590	-	-	-	51	428
Stage 1	-	-	-	-	237	-
Stage 2	-	-	-	-	390	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	589	-	-	-	44	427
Mov Cap-2 Maneuver	-	-	-	-	44	-
Stage 1	-	-	-	-	206	-
Stage 2	-	-	-	-	390	-
Approach	SE	NW		SW		
HCM Control Delay, s	0.7	0		14.3		
HCM LOS				B		
Minor Lane/Major Mvmt	NWT	NWR	SEL	SETSWLn1		
Capacity (veh/h)	-	-	589	-	427	
HCM Lane V/C Ratio	-	-	0.131	-	0.092	
HCM Control Delay (s)	-	-	12	-	14.3	
HCM Lane LOS	-	-	B	-	B	
HCM 95th %tile Q(veh)	-	-	0.5	-	0.3	

HCM 6th TWSC
4: Highway 211 & Dubarko Road

09/29/2022

Intersection												
Int Delay, s/veh	5.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↕		↕	↕		↕	↕		↕	↕
Traffic Vol, veh/h	12	50	57	28	53	28	63	298	56	11	358	12
Future Vol, veh/h	12	50	57	28	53	28	63	298	56	11	358	12
Conflicting Peds, #/hr	2	0	0	0	0	2	0	0	0	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	-	-	90	-	-	125	-	-	-	-	-	330
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	1	1	1	5	5	5	2	2	2	5	5	5
Mvmt Flow	13	53	61	30	56	30	67	317	60	12	381	13
Major/Minor	Minor2	Minor1			Major1			Major2				
Conflicting Flow All	933	920	383	952	903	351	396	0	0	379	0	0
Stage 1	407	407	-	483	483	-	-	-	-	-	-	-
Stage 2	526	513	-	469	420	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.51	6.21	7.15	6.55	6.25	4.12	-	-	4.15	-	-
Critical Hdwy Stg 1	6.11	5.51	-	6.15	5.55	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.51	-	6.15	5.55	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	3.545	4.045	3.345	2.218	-	-	2.245	-	-
Pot Cap-1 Maneuver	247	272	667	236	274	686	1163	-	-	1163	-	-
Stage 1	623	599	-	559	548	-	-	-	-	-	-	-
Stage 2	537	538	-	569	584	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	182	248	666	167	249	683	1161	-	-	1161	-	-
Mov Cap-2 Maneuver	182	248	-	167	249	-	-	-	-	-	-	-
Stage 1	576	590	-	517	506	-	-	-	-	-	-	-
Stage 2	422	497	-	464	575	-	-	-	-	-	-	-
Approach	EB	WB			NB			SB				
HCM Control Delay, s	19.1	27.1			1.3			0.2				
HCM LOS	C	D										
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR		
Capacity (veh/h)	1161	-	-	232	666	213	683	1161	-	-		
HCM Lane V/C Ratio	0.058	-	-	0.284	0.091	0.405	0.044	0.01	-	-		
HCM Control Delay (s)	8.3	0	-	26.6	10.9	32.9	10.5	8.1	0	-		
HCM Lane LOS	A	A	-	D	B	D	B	A	A	-		
HCM 95th %tile Q(veh)	0.2	-	-	1.1	0.3	1.8	0.1	0	-	-		

HCM 6th TWSC
5: Langensand Road & Dubarko Road

09/29/2022

Intersection												
Int Delay, s/veh	5.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↕	↕		↕	↕		↕	↕	↕
Traffic Vol, veh/h	25	25	5	2	6	7	4	11	1	25	29	30
Future Vol, veh/h	25	25	5	2	6	7	4	11	1	25	29	30
Conflicting Peds, #/hr	2	0	1	3	0	4	1	0	3	4	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	115	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2	7	7	7	3	3	3
Mvmt Flow	27	27	5	2	7	8	4	12	1	27	32	33
Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	137	130	54	147	146	21	67	0	0	17	0	0
Stage 1	105	105	-	25	25	-	-	-	-	-	-	-
Stage 2	32	25	-	122	121	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.17	-	-	4.13	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.263	-	-	2.227	-	-
Pot Cap-1 Maneuver	834	761	1013	821	745	1056	1503	-	-	1594	-	-
Stage 1	901	808	-	993	874	-	-	-	-	-	-	-
Stage 2	984	874	-	882	796	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	805	740	1008	776	725	1048	1500	-	-	1588	-	-
Mov Cap-2 Maneuver	805	740	-	776	725	-	-	-	-	-	-	-
Stage 1	896	792	-	986	868	-	-	-	-	-	-	-
Stage 2	963	868	-	829	780	-	-	-	-	-	-	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	9.8		9.3			1.9			2.2			
HCM LOS	A		A									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR			
Capacity (veh/h)	1500	-	-	805	774	856	1588	-	-			
HCM Lane V/C Ratio	0.003	-	-	0.034	0.043	0.019	0.017	-	-			
HCM Control Delay (s)	7.4	0	-	9.6	9.9	9.3	7.3	0	-			
HCM Lane LOS	A	A	-	A	A	A	A	A	-			
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0.1	0.1	-	-			

HCM Signalized Intersection Capacity Analysis
 1: Wolf Drive/Ten Eyck Road & Highway 26

09/29/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	61	768	40	4	1114	11	145	12	3	17	4	157	
Future Volume (vph)	61	768	40	4	1114	11	145	12	3	17	4	157	
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5		4.5			4.5		
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00			1.00		
Fr _t	1.00	0.99		1.00	1.00	0.85		1.00			0.88		
Fl _t Protected	0.95	1.00		0.95	1.00	1.00		0.96			1.00		
Satd. Flow (prot)	1484	2946		1568	3137	1403		1576			1489		
Fl _t Permitted	0.95	1.00		0.95	1.00	1.00		0.53			0.97		
Satd. Flow (perm)	1484	2946		1568	3137	1403		879			1445		
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	
Adj. Flow (vph)	65	817	43	4	1185	12	154	13	3	18	4	167	
RTOR Reduction (vph)	0	3	0	0	0	6	0	1	0	0	107	0	
Lane Group Flow (vph)	65	857	0	4	1185	6	0	169	0	0	82	0	
Heavy Vehicles (%)	12%	12%	12%	6%	6%	6%	6%	6%	6%	3%	3%	3%	
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA		Perm	NA		
Protected Phases	5	2		1	6			4			8		
Permitted Phases						6	4			8			
Actuated Green, G (s)	8.5	69.0		1.0	61.5	61.5		36.5			36.5		
Effective Green, g (s)	8.5	69.0		1.0	61.5	61.5		36.5			36.5		
Actuated g/C Ratio	0.07	0.58		0.01	0.51	0.51		0.30			0.30		
Clearance Time (s)	4.5	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			3.0		
Lane Grp Cap (vph)	105	1693		13	1607	719		267			439		
v/s Ratio Prot	c0.04	0.29		0.00	c0.38								
v/s Ratio Perm						0.00		c0.19			0.06		
v/c Ratio	0.62	0.51		0.31	0.74	0.01		0.63			0.19		
Uniform Delay, d1	54.2	15.3		59.2	22.9	14.3		36.0			30.8		
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00		
Incremental Delay, d2	10.4	1.1		13.0	3.1	0.0		11.0			0.2		
Delay (s)	64.6	16.4		72.2	26.0	14.3		46.9			31.0		
Level of Service	E	B		E	C	B		D			C		
Approach Delay (s)		19.8			26.0			46.9			31.0		
Approach LOS		B			C			D			C		
Intersection Summary													
HCM 2000 Control Delay			25.5									HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.69										
Actuated Cycle Length (s)			120.0									Sum of lost time (s)	13.5
Intersection Capacity Utilization			74.0%									ICU Level of Service	D
Analysis Period (min)			15										
c Critical Lane Group													

HCM 6th Signalized Intersection Summary
 1: Wolf Drive/Ten Eyck Road & Highway 26

09/29/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	61	768	40	4	1114	11	145	12	3	17	4	157
Future Volume (veh/h)	61	768	40	4	1114	11	145	12	3	17	4	157
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	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	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1586	1586	1586	1668	1668	1668	1668	1668	1668	1709	1709	1709
Adj Flow Rate, veh/h	65	817	43	4	1185	12	154	13	3	18	4	167
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	12	12	12	6	6	6	6	6	6	3	3	3
Cap, veh/h	80	1684	89	8	1682	750	316	25	5	57	28	401
Arrive On Green	0.05	0.58	0.58	0.01	0.53	0.53	0.30	0.30	0.30	0.30	0.30	0.30
Sat Flow, veh/h	1511	2912	153	1589	3169	1414	850	81	17	81	93	1318
Grp Volume(v), veh/h	65	423	437	4	1185	12	170	0	0	189	0	0
Grp Sat Flow(s),veh/h/ln	1511	1507	1559	1589	1585	1414	948	0	0	1492	0	0
Q Serve(g_s), s	5.1	19.7	19.7	0.3	33.6	0.5	9.2	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	5.1	19.7	19.7	0.3	33.6	0.5	21.5	0.0	0.0	12.3	0.0	0.0
Prop In Lane	1.00		0.10	1.00		1.00	0.91		0.02	0.10		0.88
Lane Grp Cap(c), veh/h	80	871	901	8	1682	750	345	0	0	487	0	0
V/C Ratio(X)	0.82	0.49	0.49	0.48	0.70	0.02	0.49	0.00	0.00	0.39	0.00	0.00
Avail Cap(c_a), veh/h	145	871	901	68	1682	750	345	0	0	487	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	56.3	14.8	14.8	59.5	21.1	13.3	37.9	0.0	0.0	33.3	0.0	0.0
Incr Delay (d2), s/veh	17.8	1.9	1.9	38.0	2.5	0.0	4.9	0.0	0.0	0.5	0.0	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	7.2	7.4	0.2	12.9	0.2	4.9	0.0	0.0	4.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	74.0	16.8	16.7	97.5	23.6	13.4	42.8	0.0	0.0	33.8	0.0	0.0
LnGrp LOS	E	B	B	F	C	B	D	A	A	C	A	A
Approach Vol, veh/h		925			1201			170				189
Approach Delay, s/veh		20.8			23.8			42.8				33.8
Approach LOS		C			C			D				C
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.1	73.9		41.0	10.8	68.2		41.0				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.1	64.9		36.5	11.5	58.5		36.5				
Max Q Clear Time (g_c+I1), s	2.3	21.7		23.5	7.1	35.6		14.3				
Green Ext Time (p_c), s	0.0	7.1		0.8	0.0	10.1		1.2				
Intersection Summary												
HCM 6th Ctrl Delay				24.7								
HCM 6th LOS				C								

HCM 6th TWSC
2: Langensand Road & Highway 26

09/29/2022

Intersection						
Int Delay, s/veh	4.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↓	↑↑	↓	↓
Traffic Vol, veh/h	776	37	17	1016	90	17
Future Vol, veh/h	776	37	17	1016	90	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	160	215	-	120	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	13	13	7	7	4	4
Mvmt Flow	826	39	18	1081	96	18
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	865	0	1403	413
Stage 1	-	-	-	-	826	-
Stage 2	-	-	-	-	577	-
Critical Hdwy	-	-	4.24	-	6.88	6.98
Critical Hdwy Stg 1	-	-	-	-	5.88	-
Critical Hdwy Stg 2	-	-	-	-	5.88	-
Follow-up Hdwy	-	-	2.27	-	3.54	3.34
Pot Cap-1 Maneuver	-	-	743	-	128	583
Stage 1	-	-	-	-	385	-
Stage 2	-	-	-	-	519	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	743	-	125	583
Mov Cap-2 Maneuver	-	-	-	-	125	-
Stage 1	-	-	-	-	385	-
Stage 2	-	-	-	-	507	-
Approach	EB	WB	NB			
HCM Control Delay, s	0	0.2	80.7			
HCM LOS			F			
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	125	583	-	-	743	-
HCM Lane V/C Ratio	0.766	0.031	-	-	0.024	-
HCM Control Delay (s)	93.8	11.4	-	-	10	-
HCM Lane LOS	F	B	-	-	A	-
HCM 95th %tile Q(veh)	4.4	0.1	-	-	0.1	-

HCM 6th TWSC
3: Dubarko Road/Vista Loop Drive & Highway 26

09/29/2022

Intersection												
Int Delay, s/veh	4.7											
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↖	↕		↖	↕			↕	↖		↕	
Traffic Vol, veh/h	23	719	18	60	981	1	23	6	109	0	18	54
Future Vol, veh/h	23	719	18	60	981	1	23	6	109	0	18	54
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	220	-	-	200	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	13	13	2	2	6	6	2	2	2	9	2	9
Mvmt Flow	24	757	19	63	1033	1	24	6	115	0	19	57
Major/Minor	Major1	Major2				Minor1			Minor2			
Conflicting Flow All	1034	0	0	776	0	0	1467	1975	388	1590	1984	517
Stage 1	-	-	-	-	-	-	815	815	-	1160	1160	-
Stage 2	-	-	-	-	-	-	652	1160	-	430	824	-
Critical Hdwy	4.36	-	-	4.14	-	-	7.54	6.54	6.94	7.68	6.54	7.08
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.68	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.68	5.54	-
Follow-up Hdwy	2.33	-	-	2.22	-	-	3.52	4.02	3.32	3.59	4.02	3.39
Pot Cap-1 Maneuver	606	-	-	836	-	-	89	61	611	67	61	485
Stage 1	-	-	-	-	-	-	338	389	-	197	268	-
Stage 2	-	-	-	-	-	-	423	268	-	555	385	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	606	-	-	836	-	-	53	54	611	45	54	485
Mov Cap-2 Maneuver	-	-	-	-	-	-	53	54	-	45	54	-
Stage 1	-	-	-	-	-	-	324	373	-	189	248	-
Stage 2	-	-	-	-	-	-	319	248	-	426	370	-
Approach	SE	NW				NE			SW			
HCM Control Delay, s	0.3	0.6				39.2			45.4			
HCM LOS						E			E			
Minor Lane/Major Mvmt	NELn1	NELn2	NWL	NWT	NWR	SEL	SET	SERSWLn1				
Capacity (veh/h)	53	611	836	-	-	606	-	-	162			
HCM Lane V/C Ratio	0.576	0.188	0.076	-	-	0.04	-	-	0.468			
HCM Control Delay (s)	140.9	12.2	9.7	-	-	11.2	-	-	45.4			
HCM Lane LOS	F	B	A	-	-	B	-	-	E			
HCM 95th %tile Q(veh)	2.3	0.7	0.2	-	-	0.1	-	-	2.2			

HCM 6th TWSC
4: Highway 211 & Dubarko Road

09/29/2022

Intersection												
Int Delay, s/veh	7.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↕		↕	↕		↕			↕	↕
Traffic Vol, veh/h	9	10	35	135	45	35	47	208	120	4	117	2
Future Vol, veh/h	9	10	35	135	45	35	47	208	120	4	117	2
Conflicting Peds, #/hr	2	0	0	0	0	2	0	0	0	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	-	-	90	-	-	125	-	-	-	-	-	330
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	1	1	1	5	5	5	2	2	2	5	5	5
Mvmt Flow	10	11	39	150	50	39	52	231	133	4	130	2
Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	588	610	132	568	546	302	134	0	0	366	0	0
Stage 1	140	140	-	404	404	-	-	-	-	-	-	-
Stage 2	448	470	-	164	142	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.51	6.21	7.15	6.55	6.25	4.12	-	-	4.15	-	-
Critical Hdwy Stg 1	6.11	5.51	-	6.15	5.55	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.51	-	6.15	5.55	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	3.545	4.045	3.345	2.218	-	-	2.245	-	-
Pot Cap-1 Maneuver	422	411	920	429	441	731	1451	-	-	1176	-	-
Stage 1	865	783	-	617	594	-	-	-	-	-	-	-
Stage 2	592	562	-	831	774	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	348	389	918	386	417	728	1448	-	-	1174	-	-
Mov Cap-2 Maneuver	348	389	-	386	417	-	-	-	-	-	-	-
Stage 1	823	778	-	587	565	-	-	-	-	-	-	-
Stage 2	486	535	-	781	769	-	-	-	-	-	-	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	11.3		21.2			0.9			0.3			
HCM LOS	B		C									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR		
Capacity (veh/h)	1448	-	-	368	918	393	728	1174	-	-		
HCM Lane V/C Ratio	0.036	-	-	0.057	0.042	0.509	0.053	0.004	-	-		
HCM Control Delay (s)	7.6	0	-	15.4	9.1	23.3	10.2	8.1	0	-		
HCM Lane LOS	A	A	-	C	A	C	B	A	A	-		
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.1	2.8	0.2	0	-	-		

HCM 6th TWSC
5: Langensand Road & Dubarko Road

09/29/2022

Intersection												
Int Delay, s/veh	8.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗			↕			↕			↕	
Traffic Vol, veh/h	20	107	1	1	99	44	4	22	2	10	5	18
Future Vol, veh/h	20	107	1	1	99	44	4	22	2	10	5	18
Conflicting Peds, #/hr	0	0	0	0	0	0	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	115	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	5	5	5	18	18	18	8	8	8	23	23	23
Mvmt Flow	22	120	1	1	111	49	4	25	2	11	6	20

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	152	73	16	133	82	26	26	0	0	27	0	0
Stage 1	38	38	-	34	34	-	-	-	-	-	-	-
Stage 2	114	35	-	99	48	-	-	-	-	-	-	-
Critical Hdwy	7.15	6.55	6.25	7.28	6.68	6.38	4.18	-	-	4.33	-	-
Critical Hdwy Stg 1	6.15	5.55	-	6.28	5.68	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.15	5.55	-	6.28	5.68	-	-	-	-	-	-	-
Follow-up Hdwy	3.545	4.045	3.345	3.662	4.162	3.462	2.272	-	-	2.407	-	-
Pot Cap-1 Maneuver	808	812	1055	803	779	1006	1550	-	-	1461	-	-
Stage 1	970	857	-	943	836	-	-	-	-	-	-	-
Stage 2	884	860	-	869	824	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	678	803	1055	704	770	1006	1550	-	-	1461	-	-
Mov Cap-2 Maneuver	678	803	-	704	770	-	-	-	-	-	-	-
Stage 1	967	850	-	940	833	-	-	-	-	-	-	-
Stage 2	726	857	-	739	817	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	10.3		10.4		1		2.3	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1550	-	-	678	805	829	1461	-	-
HCM Lane V/C Ratio	0.003	-	-	0.033	0.151	0.195	0.008	-	-
HCM Control Delay (s)	7.3	0	-	10.5	10.3	10.4	7.5	0	-
HCM Lane LOS	A	A	-	B	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.5	0.7	0	-	-

HCM Signalized Intersection Capacity Analysis
 1: Wolf Drive/Ten Eyck Road & Highway 26

09/29/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	164	1219	164	8	1058	23	151	17	15	42	15	123
Future Volume (vph)	164	1219	164	8	1058	23	151	17	15	42	15	123
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5		4.5			4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97		1.00			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00			1.00	
Frt	1.00	0.98		1.00	1.00	0.85		0.99			0.91	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.96			0.99	
Satd. Flow (prot)	1614	3163		1554	3107	1343		1646			1462	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.56			0.90	
Satd. Flow (perm)	1614	3163		1554	3107	1343		962			1331	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	173	1283	173	8	1114	24	159	18	16	44	16	129
RTOR Reduction (vph)	0	8	0	0	0	13	0	3	0	0	64	0
Lane Group Flow (vph)	173	1448	0	8	1114	11	0	190	0	0	125	0
Confl. Peds. (#/hr)							4					4
Confl. Bikes (#/hr)			2			1						
Heavy Vehicles (%)	3%	3%	3%	7%	7%	7%	1%	1%	1%	6%	6%	6%
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases						6	4			8		
Actuated Green, G (s)	16.8	72.0		1.0	56.2	56.2		33.5			33.5	
Effective Green, g (s)	16.8	72.0		1.0	56.2	56.2		33.5			33.5	
Actuated g/C Ratio	0.14	0.60		0.01	0.47	0.47		0.28			0.28	
Clearance Time (s)	4.5	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			3.0	
Lane Grp Cap (vph)	225	1897		12	1455	628		268			371	
v/s Ratio Prot	c0.11	c0.46		0.01	0.36							
v/s Ratio Perm						0.01		c0.20			0.09	
v/c Ratio	0.77	0.76		0.67	0.77	0.02		0.71			0.34	
Uniform Delay, d1	49.7	17.7		59.3	26.4	17.1		38.9			34.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	14.6	3.0		89.5	3.9	0.1		14.7			0.5	
Delay (s)	64.3	20.7		148.8	30.3	17.2		53.6			34.9	
Level of Service	E	C		F	C	B		D			C	
Approach Delay (s)		25.3			30.9			53.6			34.9	
Approach LOS		C			C			D			C	
Intersection Summary												
HCM 2000 Control Delay			29.6									HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			120.0							13.5		
Intersection Capacity Utilization			84.7%									ICU Level of Service E
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary
 1: Wolf Drive/Ten Eyck Road & Highway 26

09/29/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	164	1219	164	8	1058	23	151	17	15	42	15	123
Future Volume (veh/h)	164	1219	164	8	1058	23	151	17	15	42	15	123
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	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	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1709	1709	1709	1654	1654	1654	1736	1736	1736	1668	1668	1668
Adj Flow Rate, veh/h	173	1283	173	8	1114	24	159	18	16	44	16	129
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	7	7	7	1	1	1	6	6	6
Cap, veh/h	199	1717	230	15	1528	665	295	33	25	115	54	284
Arrive On Green	0.12	0.60	0.60	0.01	0.49	0.49	0.28	0.28	0.28	0.28	0.28	0.28
Sat Flow, veh/h	1628	2869	384	1576	3143	1367	861	118	88	280	193	1017
Grp Volume(v), veh/h	173	722	734	8	1114	24	193	0	0	189	0	0
Grp Sat Flow(s),veh/h/ln	1628	1624	1630	1576	1572	1367	1067	0	0	1491	0	0
Q Serve(g_s), s	12.5	38.6	39.4	0.6	33.9	1.1	9.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	12.5	38.6	39.4	0.6	33.9	1.1	21.2	0.0	0.0	12.2	0.0	0.0
Prop In Lane	1.00		0.24	1.00		1.00	0.82		0.08	0.23		0.68
Lane Grp Cap(c), veh/h	199	972	976	15	1528	665	353	0	0	453	0	0
V/C Ratio(X)	0.87	0.74	0.75	0.52	0.73	0.04	0.55	0.00	0.00	0.42	0.00	0.00
Avail Cap(c_a), veh/h	264	972	976	67	1528	665	353	0	0	453	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	51.7	17.4	17.6	59.1	24.5	16.1	39.6	0.0	0.0	35.7	0.0	0.0
Incr Delay (d2), s/veh	20.4	5.1	5.3	24.7	3.1	0.1	6.0	0.0	0.0	0.6	0.0	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.3	15.3	15.7	0.3	13.1	0.4	5.7	0.0	0.0	4.7	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	72.1	22.6	22.9	83.8	27.6	16.2	45.6	0.0	0.0	36.3	0.0	0.0
LnGrp LOS	E	C	C	F	C	B	D	A	A	D	A	A
Approach Vol, veh/h		1629			1146			193			189	
Approach Delay, s/veh		28.0			27.8			45.6			36.3	
Approach LOS		C			C			D			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.7	76.3		38.0	19.2	62.8		38.0				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.1	67.9		33.5	19.5	53.5		33.5				
Max Q Clear Time (g_c+I1), s	2.6	41.4		23.2	14.5	35.9		14.2				
Green Ext Time (p_c), s	0.0	13.2		0.8	0.2	8.2		1.1				
Intersection Summary												
HCM 6th Ctrl Delay				29.5								
HCM 6th LOS				C								

HCM 6th TWSC
2: Langensand Road & Highway 26

09/29/2022

Intersection						
Int Delay, s/veh	3.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↓	↑↑	↓	↓
Traffic Vol, veh/h	1174	88	18	1079	48	35
Future Vol, veh/h	1174	88	18	1079	48	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	160	215	-	120	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	3	3	7	7	3	3
Mvmt Flow	1236	93	19	1136	51	37
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	1329	0	1842	618
Stage 1	-	-	-	-	1236	-
Stage 2	-	-	-	-	606	-
Critical Hdwy	-	-	4.24	-	6.86	6.96
Critical Hdwy Stg 1	-	-	-	-	5.86	-
Critical Hdwy Stg 2	-	-	-	-	5.86	-
Follow-up Hdwy	-	-	2.27	-	3.53	3.33
Pot Cap-1 Maneuver	-	-	490	-	66	430
Stage 1	-	-	-	-	235	-
Stage 2	-	-	-	-	504	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	490	-	63	430
Mov Cap-2 Maneuver	-	-	-	-	63	-
Stage 1	-	-	-	-	235	-
Stage 2	-	-	-	-	484	-
Approach	EB	WB	NB			
HCM Control Delay, s	0	0.2	103.1			
HCM LOS			F			
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	63	430	-	-	490	-
HCM Lane V/C Ratio	0.802	0.086	-	-	0.039	-
HCM Control Delay (s)	168	14.2	-	-	12.6	-
HCM Lane LOS	F	B	-	-	B	-
HCM 95th %tile Q(veh)	3.6	0.3	-	-	0.1	-

HCM 6th TWSC
3: Dubarko Road/Vista Loop Drive & Highway 26

09/29/2022

Intersection												
Int Delay, s/veh	6.3											
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↖	↕↔		↖	↕↔			↕	↖		↕↔	
Traffic Vol, veh/h	65	1090	45	121	1021	0	8	5	118	0	9	29
Future Vol, veh/h	65	1090	45	121	1021	0	8	5	118	0	9	29
Conflicting Peds, #/hr	0	0	0	0	0	1	0	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	220	-	-	200	-	-	-	-	0	-	-	-
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	2	2	7	7	2	2	2	13	2	13
Mvmt Flow	67	1124	46	125	1053	0	8	5	122	0	9	30
Major/Minor	Major1	Major2		Minor1			Minor2					
Conflicting Flow All	1054	0	0	1170	0	0	2063	2585	585	2003	2608	529
Stage 1	-	-	-	-	-	-	1281	1281	-	1304	1304	-
Stage 2	-	-	-	-	-	-	782	1304	-	699	1304	-
Critical Hdwy	4.16	-	-	4.14	-	-	7.54	6.54	6.94	7.76	6.54	7.16
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.76	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.76	5.54	-
Follow-up Hdwy	2.23	-	-	2.22	-	-	3.52	4.02	3.32	3.63	4.02	3.43
Pot Cap-1 Maneuver	650	-	-	593	-	-	32	25	454	31	24	467
Stage 1	-	-	-	-	-	-	175	235	-	154	229	-
Stage 2	-	-	-	-	-	-	353	229	-	372	229	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	649	-	-	593	-	-	14	18	454	14	17	466
Mov Cap-2 Maneuver	-	-	-	-	-	-	14	18	-	14	17	-
Stage 1	-	-	-	-	-	-	157	211	-	138	180	-
Stage 2	-	-	-	-	-	-	247	180	-	238	205	-
Approach	SE	NW		NE			SW					
HCM Control Delay, s	0.6	1.3		67.1			126					
HCM LOS				F			F					
Minor Lane/Major Mvmt	NELn1	NELn2	NWL	NWT	NWR	SEL	SET	SERSWLn1				
Capacity (veh/h)	15	454	593	-	-	649	-	-	64			
HCM Lane V/C Ratio	0.893	0.268	0.21	-	-	0.103	-	-	0.612			
HCM Control Delay (s)	\$ 532.6	15.8	12.7	-	-	11.2	-	-	126			
HCM Lane LOS	F	C	B	-	-	B	-	-	F			
HCM 95th %tile Q(veh)	2.1	1.1	0.8	-	-	0.3	-	-	2.6			

HCM 6th TWSC
4: Highway 211 & Dubarko Road

09/29/2022

Intersection												
Int Delay, s/veh	17.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↕		↕	↕		↕	↕		↕	↕
Traffic Vol, veh/h	12	53	57	149	55	28	63	191	176	11	246	12
Future Vol, veh/h	12	53	57	149	55	28	63	191	176	11	246	12
Conflicting Peds, #/hr	2	0	0	0	0	2	0	0	0	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	-	-	90	-	-	125	-	-	-	-	-	330
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	1	1	1	5	5	5	2	2	2	5	5	5
Mvmt Flow	13	56	61	159	59	30	67	203	187	12	262	13
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	765	814	264	784	734	301	277	0	0	392	0	0
Stage 1	288	288	-	433	433	-	-	-	-	-	-	-
Stage 2	477	526	-	351	301	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.51	6.21	7.15	6.55	6.25	4.12	-	-	4.15	-	-
Critical Hdwy Stg 1	6.11	5.51	-	6.15	5.55	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.51	-	6.15	5.55	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	3.545	4.045	3.345	2.218	-	-	2.245	-	-
Pot Cap-1 Maneuver	321	313	777	307	344	732	1286	-	-	1150	-	-
Stage 1	722	675	-	595	577	-	-	-	-	-	-	-
Stage 2	571	530	-	659	660	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	247	287	776	226	315	729	1284	-	-	1148	-	-
Mov Cap-2 Maneuver	247	287	-	226	315	-	-	-	-	-	-	-
Stage 1	671	666	-	553	537	-	-	-	-	-	-	-
Stage 2	454	493	-	549	651	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	16.4			66.9			1.2			0.3		
HCM LOS	C			F								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR		
Capacity (veh/h)	1284	-	-	279	776	245	729	1148	-	-		
HCM Lane V/C Ratio	0.052	-	-	0.248	0.078	0.886	0.041	0.01	-	-		
HCM Control Delay (s)	8	0	-	22.1	10	74.7	10.1	8.2	0	-		
HCM Lane LOS	A	A	-	C	B	F	B	A	A	-		
HCM 95th %tile Q(veh)	0.2	-	-	1	0.3	7.4	0.1	0	-	-		

HCM 6th TWSC
5: Langensand Road & Dubarko Road

09/29/2022

Intersection												
Int Delay, s/veh	9.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↕	↕		↕	↕		↕	↕	↕
Traffic Vol, veh/h	25	149	5	2	129	29	4	11	1	25	29	30
Future Vol, veh/h	25	149	5	2	129	29	4	11	1	25	29	30
Conflicting Peds, #/hr	2	0	1	3	0	4	1	0	3	4	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	115	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2	7	7	7	3	3	3
Mvmt Flow	27	164	5	2	142	32	4	12	1	27	32	33
Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	217	130	54	215	146	21	67	0	0	17	0	0
Stage 1	105	105	-	25	25	-	-	-	-	-	-	-
Stage 2	112	25	-	190	121	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.17	-	-	4.13	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.263	-	-	2.227	-	-
Pot Cap-1 Maneuver	739	761	1013	742	745	1056	1503	-	-	1594	-	-
Stage 1	901	808	-	993	874	-	-	-	-	-	-	-
Stage 2	893	874	-	812	796	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	596	740	1008	599	725	1048	1500	-	-	1588	-	-
Mov Cap-2 Maneuver	596	740	-	599	725	-	-	-	-	-	-	-
Stage 1	896	792	-	986	868	-	-	-	-	-	-	-
Stage 2	720	868	-	627	780	-	-	-	-	-	-	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	11.2		11.1			1.9			2.2			
HCM LOS	B		B									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR			
Capacity (veh/h)	1500	-	-	596	746	766	1588	-	-			
HCM Lane V/C Ratio	0.003	-	-	0.046	0.227	0.23	0.017	-	-			
HCM Control Delay (s)	7.4	0	-	11.3	11.2	11.1	7.3	0	-			
HCM Lane LOS	A	A	-	B	B	B	A	A	-			
HCM 95th %tile Q(veh)	0	-	-	0.1	0.9	0.9	0.1	-	-			

HCM 6th AWSC
4: Highway 211 & Dubarko Road

09/29/2022

Intersection	
Intersection Delay, s/veh	14.7
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↕		↕	↕		↕			↕	↕
Traffic Vol, veh/h	9	10	35	135	45	35	47	208	120	4	117	2
Future Vol, veh/h	9	10	35	135	45	35	47	208	120	4	117	2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	1	1	1	5	5	5	2	2	2	5	5	5
Mvmt Flow	10	11	39	150	50	39	52	231	133	4	130	2
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	9.3	12.6	18	10.7
HCM LOS	A	B	C	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	13%	47%	0%	75%	0%	3%	0%
Vol Thru, %	55%	53%	0%	25%	0%	97%	0%
Vol Right, %	32%	0%	100%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	375	19	35	180	35	121	2
LT Vol	47	9	0	135	0	4	0
Through Vol	208	10	0	45	0	117	0
RT Vol	120	0	35	0	35	0	2
Lane Flow Rate	417	21	39	200	39	134	2
Geometry Grp	6	7	7	7	7	7	7
Degree of Util (X)	0.642	0.04	0.063	0.37	0.06	0.229	0.003
Departure Headway (Hd)	5.547	6.828	5.872	6.664	5.572	6.125	5.398
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	650	524	609	540	642	586	662
Service Time	3.576	4.577	3.621	4.402	3.31	3.862	3.136
HCM Lane V/C Ratio	0.642	0.04	0.064	0.37	0.061	0.229	0.003
HCM Control Delay	18	9.9	9	13.3	8.7	10.7	8.2
HCM Lane LOS	C	A	A	B	A	B	A
HCM 95th-tile Q	4.6	0.1	0.2	1.7	0.2	0.9	0

HCM 6th AWSC
4: Highway 211 & Dubarko Road

09/29/2022

Intersection	
Intersection Delay, s/veh	21.2
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↕		↕	↕		↕			↕	↕
Traffic Vol, veh/h	12	53	57	149	55	28	63	191	176	11	246	12
Future Vol, veh/h	12	53	57	149	55	28	63	191	176	11	246	12
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	1	1	1	5	5	5	2	2	2	5	5	5
Mvmt Flow	13	56	61	159	59	30	67	203	187	12	262	13
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	11.2	15.9	29.9	16.4
HCM LOS	B	C	D	C

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	15%	18%	0%	73%	0%	4%	0%
Vol Thru, %	44%	82%	0%	27%	0%	96%	0%
Vol Right, %	41%	0%	100%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	430	65	57	204	28	257	12
LT Vol	63	12	0	149	0	11	0
Through Vol	191	53	0	55	0	246	0
RT Vol	176	0	57	0	28	0	12
Lane Flow Rate	457	69	61	217	30	273	13
Geometry Grp	6	7	7	7	7	7	7
Degree of Util (X)	0.8	0.147	0.115	0.46	0.054	0.517	0.022
Departure Headway (Hd)	6.298	7.672	6.855	7.638	6.544	6.81	6.074
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	576	467	522	471	547	530	589
Service Time	4.332	5.427	4.61	5.383	4.289	4.55	3.813
HCM Lane V/C Ratio	0.793	0.148	0.117	0.461	0.055	0.515	0.022
HCM Control Delay	29.9	11.8	10.5	16.8	9.7	16.7	9
HCM Lane LOS	D	B	B	C	A	C	A
HCM 95th-tile Q	7.8	0.5	0.4	2.4	0.2	2.9	0.1

Queuing and Blocking Report
 2024 Background Plus Site AM Mitigated

09/29/2022

Intersection: 1: Wolf Drive/Ten Eyck Road & Highway 26

Movement	EB	EB	EB	WB	WB	WB	WB	NB	SB
Directions Served	L	T	TR	L	T	T	R	LTR	LTR
Maximum Queue (ft)	189	366	327	79	586	496	88	225	192
Average Queue (ft)	71	208	154	6	343	298	6	104	70
95th Queue (ft)	158	333	278	43	486	437	40	191	138
Link Distance (ft)		538	538		613	613		315	380
Upstream Blk Time (%)					0	0			
Queuing Penalty (veh)					0	0			
Storage Bay Dist (ft)	165			120			70		
Storage Blk Time (%)	0	11			34	31	0		
Queuing Penalty (veh)	1	7			1	4	0		

Intersection: 2: Langensand Road & Highway 26

Movement	EB	EB	WB	NB	NB
Directions Served	T	R	L	L	R
Maximum Queue (ft)	8	8	47	145	833
Average Queue (ft)	0	0	12	136	507
95th Queue (ft)	6	8	39	168	1023
Link Distance (ft)	701				876
Upstream Blk Time (%)					19
Queuing Penalty (veh)					0
Storage Bay Dist (ft)		160	215	120	
Storage Blk Time (%)				87	3
Queuing Penalty (veh)				15	3

Intersection: 3: Dubarko Road/Vista Loop Drive & Highway 26

Movement	SE	SE	NW	NE	NE	SW
Directions Served	L	TR	L	LT	R	LTR
Maximum Queue (ft)	75	9	59	155	92	366
Average Queue (ft)	18	0	21	66	43	152
95th Queue (ft)	54	6	45	156	72	428
Link Distance (ft)		1133		752	752	575
Upstream Blk Time (%)						5
Queuing Penalty (veh)						0
Storage Bay Dist (ft)	220		200			
Storage Blk Time (%)						
Queuing Penalty (veh)						

Queuing and Blocking Report
 2024 Background Plus Site AM Mitigated

09/29/2022

Intersection: 4: Highway 211 & Dubarko Road

Movement	EB	EB	WB	WB	NB	SB	SB
Directions Served	LT	R	LT	R	LTR	LT	R
Maximum Queue (ft)	38	48	114	70	166	80	17
Average Queue (ft)	16	22	48	25	73	33	1
95th Queue (ft)	42	50	85	54	132	60	9
Link Distance (ft)	645		745		654	862	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	90		125		330		
Storage Blk Time (%)	0						
Queuing Penalty (veh)	0						

Intersection: 5: Langensand Road & Dubarko Road

Movement	EB	EB	WB	NB	SB
Directions Served	L	TR	LTR	LTR	LTR
Maximum Queue (ft)	41	80	106	10	14
Average Queue (ft)	15	42	55	0	0
95th Queue (ft)	44	65	89	6	7
Link Distance (ft)		604	851	716	706
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	115				
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 30

Queuing and Blocking Report
 2024 Background Plus Site Trips PM Mitigated

09/29/2022

Intersection: 1: Wolf Drive/Ten Eyck Road & Highway 26

Movement	EB	EB	EB	WB	WB	WB	WB	NB	SB
Directions Served	L	T	TR	L	T	T	R	LTR	LTR
Maximum Queue (ft)	190	551	527	77	519	448	92	227	209
Average Queue (ft)	152	347	303	9	349	294	10	112	89
95th Queue (ft)	226	521	485	46	476	415	52	192	176
Link Distance (ft)		538	538		613	613		315	380
Upstream Blk Time (%)		2	1		0				
Queuing Penalty (veh)		0	0		0				
Storage Bay Dist (ft)	165			120			70		
Storage Blk Time (%)	12	16			38	35	0		
Queuing Penalty (veh)	74	26			3	8	0		

Intersection: 2: Langensand Road & Highway 26

Movement	EB	WB	NB	NB
Directions Served	R	L	L	R
Maximum Queue (ft)	5	60	145	703
Average Queue (ft)	0	15	129	381
95th Queue (ft)	4	47	174	822
Link Distance (ft)				876
Upstream Blk Time (%)				2
Queuing Penalty (veh)				0
Storage Bay Dist (ft)	160	215	120	
Storage Blk Time (%)			84	1
Queuing Penalty (veh)			29	0

Intersection: 3: Dubarko Road/Vista Loop Drive & Highway 26

Movement	SE	SE	SE	NW	NW	NE	NE	SW
Directions Served	L	T	TR	L	T	LT	R	LTR
Maximum Queue (ft)	99	13	25	153	64	143	158	323
Average Queue (ft)	31	1	1	63	3	55	57	110
95th Queue (ft)	70	7	12	127	33	134	106	317
Link Distance (ft)		1135	1135		800	615	615	575
Upstream Blk Time (%)								0
Queuing Penalty (veh)								0
Storage Bay Dist (ft)	220			200				
Storage Blk Time (%)				0				
Queuing Penalty (veh)				0				

Queuing and Blocking Report
 2024 Background Plus Site Trips PM Mitigated

09/29/2022

Intersection: 4: Highway 211 & Dubarko Road

Movement	EB	EB	WB	WB	NB	SB	SB
Directions Served	LT	R	LT	R	LTR	LT	R
Maximum Queue (ft)	60	67	120	74	251	160	42
Average Queue (ft)	33	32	60	22	100	69	6
95th Queue (ft)	58	59	103	56	193	125	24
Link Distance (ft)	645		745		654	862	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)		90		125			330
Storage Blk Time (%)		0	0				
Queuing Penalty (veh)		0	0				

Intersection: 5: Langensand Road & Dubarko Road

Movement	EB	EB	WB	SB
Directions Served	L	TR	LTR	LTR
Maximum Queue (ft)	39	95	95	39
Average Queue (ft)	22	45	48	3
95th Queue (ft)	49	70	77	20
Link Distance (ft)		604	851	706
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	115			
Storage Blk Time (%)		0		
Queuing Penalty (veh)		0		

Network Summary

Network wide Queuing Penalty: 142

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

TEN EXCK RD at PIONEER BLVD, City of Sandy, Clackamas County, 01/01/2016 to 12/31/2020

CDS380
09/29/2022

CITY OF SANDY, CLACKAMAS COUNTY

SER#	INVEST	RD DFT	UNLOC?	D C S V L K LAT	CLASS	DIST	LONG	CITY STREET	RD CHAR	INT-TYPE	INT-REL	OFFRD	WTHR	CRASH	TRLR QTY	SPCL USE	MOVE	PH TYPE	SVRTY	E X RES	LOC	ACT EVENT	CAUSE
								FIRST STREET	DIRCT	(MEDIAN)	INT-REL	OFFRD	WTHR	CRASH	TRLR QTY								
								SECOND STREET	DIRCT	LEGS	TRAF-	RNDFT	SURF	COLL	OWNER								
								LONG	LOCIN	(LANES)	CONTL	DRVWY	LIGHT	SVRTY	V# TYPE								

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OREGON... DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
 TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
 URBAN NON-SYSTEM CRASH LISTING
WOLF DR at PROCTOR BLVD, City of Sandy, Clackamas County, 01/01/2016 to 12/31/2020

CDS380
 09/29/2022

CITY OF SANDY, CLACKAMAS COUNTY

SER#	INVEST	RD DFT	UNLOC?	D C S V L K LAT	CLASS	DIST	LONG	CITY STREET	RD CHAR	INT-TYPE	INT-REL	OFFRD	WTHR	CRASH	TRLR QTY	SPCL USE	MOVE	FROM	TO	P# TYPE	SVRTY	E X RES	LOC	ACT EVENT	CAUSE
								FIRST STREET		(MEDIAN)															
								SECOND STREET		LEGS	TRAF-	RNDFT	SURF	COLL	OWNER										
								LONG		(#LANES)	CONTL	DRVWY	LIGHT	SVRTY	V# TYPE										

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OREGON... DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
 TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
 URBAN NON-SYSTEM CRASH LISTING
WOLF DR at PIONEER BLVD, City of Sandy, Clackamas County, 01/01/2016 to 12/31/2020

1 - 3 of 3 Crash records shown.

SER#	P	R	J	S	W	D	DATE	CLASS	CITY STREET	INT-TYPE	INT-REL	OFFRD	WTHR	CRASH	SPL USE	MOVE	PH TYPE	SVRTY	E	X	RES	LOC	ERROR	ACT EVENT	CAUSE
INVEST	E	A	I	C	O	DAY		DIST	FIRST STREET	(MEDIAN)	TRAF-	RNDFT	SURF	COLL	TRLR QTY	FROM	INJ	G	E	L	I	ONS	FED		
UNLOC?	D	C	S	V	L	K	LAT	LONG	LEGS	(LANES)	CONTL	DRVWY	LIGHT	SVRTY	V# TYPE	OWNER	PRTC	INJ	S	V	R	T	LOC		
00635	N	N	N				02/17/2020	17	PIONEER BLVD	5-LEG	N	N	CLR	S-1STOP	01	NONE	01	DRVR	NONE	00	UNK	UNK	000	00	29
NONE							WOLF DR		S	TRF SIGNAL	N	DRY	REAR		N/A								000	00	
N							45-23 49.25 -122.15		06	0	N	DAY	PDO		FSNGR CAR		01	DRVR	NONE	00	UNK	UNK	000	00	
N							19.77			02 NONE	9		STOP		N/A								012	00	
										FSNGR CAR			S-N		FSNGR CAR		01	DRVR	NONE	00	UNK	UNK	000	00	
03463	N	N	N				12/21/2020	14	PIONEER BLVD	5-LEG	N	N	CLR	S-1STOP	01	NONE	01	DRVR	NONE	00	UNK	UNK	000	00	27,29
CITY							WOLF DR		W	TRF SIGNAL	N	DRY	REAR		N/A								000	00	
N							10A		06	0	N	DAY	PDO		FSNGR CAR		01	DRVR	NONE	00	UNK	UNK	000	00	
N							45-23 49.25 -122.15			02 NONE	9		STOP		N/A								011	00	
							19.74			FSNGR CAR			W-E		FSNGR CAR		01	DRVR	NONE	00	UNK	UNK	000	00	
00512	N	N	N				02/07/2017	14	PIONEER BLVD	5-LEG	N	N	RAIN	ANG-OTH	01	NONE	0	TURN-L					000	00	04
CITY							WOLF DR		CN	TRF SIGNAL	N	WET	TURN		PRVTE		S-W						000	00	
N							4P		04	0	N	DUSK	INJ		FSNGR CAR		01	DRVR	INJC	55	F	OR-Y	000	00	
N							45-23 49.25 -122.15			02 NONE	0		STRGHT		PRVTE		W-E						000	00	
							19.74			FSNGR CAR			W-E		FSNGR CAR		01	DRVR	NONE	63	M	OR-Y	020	00	
																						000	00		
																						000	00		
																						000	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
DUBARKO RD at EAGLE CRK-SANDY HY, City of Sandy, Clackamas County, 01/01/2016 to 12/31/2020

1 - 4 of 27 Crash records shown.

SR#	P	R	J	S	M	DATE	CLASS	CITY STREET	INT-TYPE	INT-REL	OFFRD	WTHR	CRASH	SPL USE	MOVE	A	S	CAUSE						
INVEST	E	A	I	C	O	DAY	DIST	FIRST STREET	(MEDIAN)	INT-REL	RNDFT	SURF	COLL	TRLR QTY	FROM	INJ	G	E	LICNS					
UNLOC?	D	C	S	V	L	K	LONG	LES	(#LANES)	CONTL	DRVTY	LIGHT	SVRTY	V# TYPE	PH TYPE	SVRTY	E	X	RES	LOC	ERROR	ACT EVENT		
02296	N	N	N	N	N	07/06/2019	16	DUBARKO RD	CROSS	N	N	CLR	S-1STOP	01	NONE	9	STRGHT							27,29,32
N	N	N	N	N	N	SA		EAGLE CRK-SANDY HY	N	NONE	N	DRY	REAR	N/A	NE-SW	01	DRVR	NONE	00	UNK	UNK	000	000	00
N	N	N	N	N	N	11A		017200100800	0	0	N	DAY	PDO	FSNGR CAR								000	000	00
						45:23	22.65	-122.15						02	NONE	9	STOP						011	00
							48.74							N/A	NE-SW							000	000	00
														FSNGR CAR								000	000	00
01165	N	N	N	N	N	03/10/2016	16	DUBARKO RD	CROSS	N	N	CLR	O-1STOP	01	NONE	0	BACK							10
NONE						TH		EAGLE CRK-SANDY HY	E	STOP SIGN	N	DRY	BACK	PRVTE	W	-E						000	000	00
N	N	N	N	N	N	6P		017200100800	0	0	N	DAY	INJ	FSNGR CAR								011	000	10
						45:23	22.76	-122.15						02	NONE	0	STOP						012	00
							48.39							PRVTE	E	-W						000	000	00
														FSNGR CAR								000	000	00
04008	N	N	N	N	N	11/02/2018	16	DUBARKO RD	CROSS	N	N	CLD	PED	01	NONE	0	STRGHT							02
NONE						FR		EAGLE CRK-SANDY HY	E	STOP SIGN	N	WET	PED	PRVTE	E	-W						000	000	00
N	N	N	N	N	N	7P		017200100800	0	0	N	DLIT	INJ	FSNGR CAR								029	000	02
						45:23	22.54	-122.15						01	DRVR	NONE	74	M	OR-Y	OR<25			000	02
							48.5																000	00
01095	N	N	N	N	N	03/04/2016	16	DUBARKO RD	CROSS	N	N	CLD	S-1STOP	01	NONE	0	STRGHT							27,07,32
NONE						FR		EAGLE CRK-SANDY HY	SW	STOP SIGN	N	DRY	SS-O	PRVTE	NE-SW								000	00
N	N	N	N	N	N	4P		017200100800	0	0	N	DAY	INJ	FSNGR CAR								016,043,052	010	27,07,32
						45:23	22.76	-122.15						01	DRVR	NONE	30	M	OR-Y	OR<25			000	00
							48.39							01	DRVR	NONE	18	F	OR-Y	OR<25			000	00
														02	PSNG	NO<5	01	F				000	000	00
														02	NONE	0	STOP						012	00
														FSNGR CAR								000	000	00
														03	NONE	0	STRGHT						000	00
														PRVTE	SW-NE							000	000	00
														FSNGR CAR								000	000	00
														01	DRVR	INJB	26	M	OR-Y	OR<25			000	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

DUBARKO RD at EAGLE CRK-SANDY HY, City of Sandy, Clackamas County, 01/01/2016 to 12/31/2020
5 - 8 of 27 Crash records shown.

CDS360
09/29/2022

CITY OF SANDY, CLACKAMAS COUNTY

SER#	P	R	J	S	M	D	DATE	CLASS	CITY STREET	INT-TYPE	INT-REL	OFFRD	WTHR	CRASH	SPL USE	MOVE	A	S	CAUSE											
RD DFT	E	L	G	N	H	R	TIME	FROM	SECOND STREET	RD CHAR	LEGS	RNDFT	SURF	COLL	TRLR QTY	FROM	INJ	G	E	L	I	C	LOC	RES	LOC	ACT	EVENT	CAUSE		
UNLOC?	D	C	S	V	L	K	LAT	LONG	LES	LOCIN	CONTL	DRVY	LIGHT	SVRTY	V# TYPE	TO	PH TYPE	SVRTY	E	X	R	E	RES	LOC	ERRR	ACT	EVENT	CAUSE		
00763	N	N	N	N	N	N	02/17/2016	16	DUBARKO RD	INTER	CROSS	N	N	BAIN	S-1STOP	01	NONE	9	STRGHT										07	
									EAGLE CRK-SANDY HY	SW	NONE	N	WET	REAR	N/A	S -N												00	00	
							45 23 22.76	-122.15	017200100800	06	0	N	DLIT	PDO	PSNGR CAR	01	DRVR	NONE	00	Unk	UNK							00	00	
							48.39								02	NONE	9	STOP										012	00	
															N/A	S -N												000	00	
															PSNGR CAR	01	DRVR	NONE	00	Unk	UNK							000	00	
																												UNK	00	
01324	N	N	N	N	N	N	04/19/2018	16	DUBARKO RD	INTER	CROSS	N	N	CLR	S-1STOP	01	NONE	0	STRGHT										29	
									EAGLE CRK-SANDY HY	SW	UNKNOWN	N	DRY	REAR	PRVTE	SM-NE												000	00	
							45 23 22.55	-122.15	017200100800	06	0	N	DAY	INJ	PSNGR CAR	01	DRVR	NONE	19	M	OR-Y							000	29	
							48.5								02	NONE	0	STOP										012	00	
															PRVTE	SM-NE												000	00	
															PSNGR CAR	01	DRVR	INJC	21	F	OR-Y							000	00	
															02	NONE	0	STOP										012	00	
															PRVTE	SM-NE												000	00	
															PSNGR CAR	02	PSNG	INJC	18	M								000	00	
02483	N	N	N	N	N	N	09/09/2020	16	DUBARKO RD	INTER	CROSS	N	Y	CLD	FX OBJ	01	NONE	9	STRGHT										043	10
									EAGLE CRK-SANDY HY	SW	NONE	N	DRY	FLX	N/A	NE-SW												000	00	
							45 23 22.54	-122.15	017200100800	05	0	N	DAY	PDO	PSNGR CAR	01	DRVR	NONE	00	Unk	UNK							000	00	
							48.5																					UNK	00	
03589	N	N	N	N	N	N	08/05/2016	16	DUBARKO RD	INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE	0	STRGHT											02
									EAGLE CRK-SANDY HY	CN	STOP SIGN	N	DRY	ANGL	PRVTE	E -W												015	00	
							45 23 22.76	-122.15	017200100800	01	0	N	DAY	INJ	PSNGR CAR	01	DRVR	INJC	77	M	OTH-Y							000	02	
							48.39								02	NONE	0	STRGHT										000	00	
															PRVTE	N -S												000	00	
															PSNGR CAR	01	DRVR	NONE	40	M	OR-Y							000	00	
																												OR<25	00	
03967	N	N	N	N	N	N	08/30/2016	16	DUBARKO RD	INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE	0	STRGHT											02
									EAGLE CRK-SANDY HY	CN	STOP SIGN	N	DRY	ANGL	PRVTE	W -E												015	00	
							45 23 22.76	-122.15	017200100800	04	0	N	DAY	INJ	PSNGR CAR	01	DRVR	INJC	61	F	OTH-Y							000	02	
							48.39								01	NONE	0	STRGHT										015	00	
															PRVTE	W -E												000	00	
															PSNGR CAR	02	PSNG	INJC	06	F								000	00	

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CDS360 09/29/2022 OREGON... DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
 TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
 URBAN NON-SYSTEM CRASH LISTING
DUBARKO RD at EAGLE CRK-SANDY HY, City of Sandy, Clackamas County, 01/01/2016 to 12/31/2020
 9 - 13 of 27 Crash records shown.

SER#	P	R	J	S	W	D	DATE	CLASS	CITY STREET	INT-TYPE	INT-REL	INT-REL	RD CHAR	OFFRD	WTHR	CRASH	SPCL USE	MOVE	FROM	PH TYPE	SVRTY	E	X	RES	LOC	ERROR	ACT EVENT	CAUSE	
RD DFT	E	L	G	N	H	R	TIME	FROM	SECOND STREET	LEGS	TRAF-	TRAF-	DIRECT	RNDFT	SURF	COLL	OWNER	TRLR QTY	FROM	PH TYPE	SVRTY	E	X	RES	LOC	ERROR	ACT EVENT	CAUSE	
UNLOC?	D	C	S	V	L	K	LAT	LONG	LS	(LANES)	CONTL	CONTL	LOCIN	DRVY	LIGHT	SVRTY	PRVTE	S	N	01	DRVR	INJB	53	F	OR-Y	OR<25	000	000	
02427	N	N	N	N	N	N	05/31/2016	16	DUBARKO RD	CROSS	N	N	INTER	N	CLR	ANGL-OTH	01 NONE	9	STRGHT	01	DRVR	INJB	53	F	OR-Y	OR<25	000	000	00
							TU		EAGLE CRK-SANDY HY	STOP SIGN	N	N	CN	UNK	ANGL	N/A	N/A	W-E											03, 32
N	N	N	N	N	N	N	11A		017200100800	0	0	N	DAY	PCO	FSNGR CAR	FSNGR CAR	01	DRVR	NONE	00	UNK	UNK	UNK	UNK	000	000	00	00	00
							45:23	22.76	-122.15								02 NONE	9	STRGHT										000
							48:39			N/A	N/A	FSNGR CAR					FSNGR CAR	N-S										000	
02031	N	N	N	N	N	N	05/06/2016	16	DUBARKO RD	CROSS	N	N	INTER	N	CLR	ANGL-OTH	01 NONE	9	STRGHT	01	DRVR	NONE	00	UNK	UNK	UNK	000	000	00
							FR		EAGLE CRK-SANDY HY	STOP SIGN	N	N	CN	DRY	ANGL	N/A	N/A	N-S											00
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							45:23	22.76	-122.15								02 NONE	9	STRGHT										000
							48:39			N/A	N/A	FSNGR CAR					FSNGR CAR	E-W										000	
00805	N	N	N	N	N	N	03/01/2017	16	DUBARKO RD	CROSS	N	N	INTER	N	CLD	ANGL-OTH	01 NONE	0	STRGHT	01	DRVR	INJC	17	F	OR-Y	OR<25	000	015	00
							WE		EAGLE CRK-SANDY HY	STOP SIGN	N	N	CN	DRY	ANGL	FSNGR CAR	PRVTE	W-E											00
N	N	N	N	N	N	N	3P		017200100800	0	0	N	DAY	INJ	FSNGR CAR	FSNGR CAR	01	DRVR	NONE	00	UNK	UNK	UNK	UNK	000	000	00	00	00
							45:23	22.76	-122.15								02 NONE	0	STRGHT										000
							48:39			FSNGR CAR	FSNGR CAR	FSNGR CAR					FSNGR CAR	S-N										000	
										03 NONE	0	STOP					03 NONE	0	STOP										000
										FSNGR CAR	FSNGR CAR	FSNGR CAR					FSNGR CAR	E-W										022	
00846	N	N	N	N	N	N	03/04/2017	16	DUBARKO RD	CROSS	N	N	INTER	N	RAIN	ANGL-OTH	01 NONE	0	STRGHT	01	DRVR	INJB	27	F	OR-Y	OR<25	000	000	00
							SA		EAGLE CRK-SANDY HY	STOP SIGN	N	N	CN	WET	ANGL	FSNGR CAR	PRVTE	W-E											015
N	N	N	N	N	N	N	6P		017200100800	0	0	N	DLIT	INJ	FSNGR CAR	FSNGR CAR	01	DRVR	NONE	21	M	OR-Y	OR<25	000	000	00	00	00	00
							45:23	22.76	-122.15								02 NONE	0	STRGHT										000
							48:39			FSNGR CAR	FSNGR CAR	FSNGR CAR					FSNGR CAR	N-S										000	

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.

OREGON... DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
 TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
 URBAN NON-SYSTEM CRASH LISTING
DUBARKO RD at LANGENGAND RD, City of Sandy, Clackamas County, 01/01/2016 to 12/31/2020

1 - 1 of 1 Crash records shown.

SER#	P	R	J	S	M	DATE	CLASS	CITY STREET	RD CHAR	INT-TYPE	INT-REL	OFFRD	WTHR	CRASH	SPL USE	TRLR QTY	MOVE	A	S	CAUSE																
INVEST	E	A	I	C	O	DAY	DIST	FIRST STREET	DIRECT	(MEDIAN)	TRAF-	RNDFT	SURF	COLL	OWNER	FROM	TO	PH TYPE	SVRTY	E	X	RES	LOC	ERROR	ACT EVENT	CAUSE										
UNLOC?	D	C	S	V	L	K	LAT	LONG	LOCIN	(LANES)	CONTL	DRVWY	LIGHT	SVRTY	V# TYPE	ANGL	OTH	01	NONE	9	STRGHT	W	-E	01	DRVR	NONE	00	Unk	UNK	000	00	00				
00720	N	N	N	N	N	02/24/2020	16	DUBARKO RD	INTER	CROSS	N	N	CLD	ANGL-OTH	01	NONE	9	STRGHT	01	DRVR	NONE	00	Unk	UNK	000	00	00	00	00	00	00	00				
								LANGENGAND RD	CN	0	0	0	DAY	PDO	FSNGR	CAR	N/A	W	-E	01	DRVR	NONE	00	Unk	UNK	000	000	000	000	000	000	000	00	00		

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirement, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

Preliminary Traffic Signal Warrant Analysis



Project Name: Dubarko Road Development

Intersection: Highway 26 at Langensand Road

Scenario: 2024 Background Plus Site Trips

Number of Major Street Lanes: 2

PM Peak Hour Volume 2359 (sum of both approaches)

Number of Minor Street Lanes 1

PM Peak Hour Volume 70 (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	1333	420	
Minor Street Volume	40	105	No
Condition B - Interruption of Continuous Traffic			
Major Street Volume	1333	630	
Minor Street Volume	40	53	No
Combination Warrant^c			
Major Street Volume	1333	504	
Minor Street Volume	40	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: Dubarko Road Development

Intersection: Highway 26 at Dubarko Road

Scenario: 2024 Background Plus Site Trips

Number of Major Street Lanes: 2

PM Peak Hour Volume 2342 (sum of both approaches)

Number of Minor Street Lanes 1

PM Peak Hour Volume 30 (highest-volume approach)^a

Posted or 85th percentile speed > 40 mph: Yes

(Without delay diversions)

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	1323	420	
Minor Street Volume	17	105	No
Condition B - Interruption of Continuous Traffic			
Major Street Volume	1323	630	
Minor Street Volume	17	53	No
Combination Warrant^c			
Major Street Volume	1323	504	
Minor Street Volume	17	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: Dubarko Road Development

Intersection: Highway 211 at Dubarko Road

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

Number of Major Street Lanes: 1 PM Peak Hour Volume 699 (sum of both approaches)

Number of Minor Street Lanes: 1 PM Peak Hour Volume 204 (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	395	350	
Minor Street Volume	115	105	Yes
Condition B - Interruption of Continuous Traffic			
Major Street Volume	395	525	
Minor Street Volume	115	53	No
Combination Warrant^c			
Major Street Volume	395	420	
Minor Street Volume	115	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: Dubarko Road Development

Intersection: Dubarko Road at Langensand Road

Scenario: 2024 Background Plus Site Trips

Number of Major Street Lanes: 1

PM Peak Hour Volume 317 (sum of both approaches)

Number of Minor Street Lanes 1

PM Peak Hour Volume 76 (highest-volume approach)^a

Posted or 85th percentile speed > 40 mph: No

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	179	500	
Minor Street Volume	43	150	No
Condition B - Interruption of Continuous Traffic			
Major Street Volume	179	750	
Minor Street Volume	43	75	No
Combination Warrant^c			
Major Street Volume	179	600	
Minor Street Volume	43	120	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)

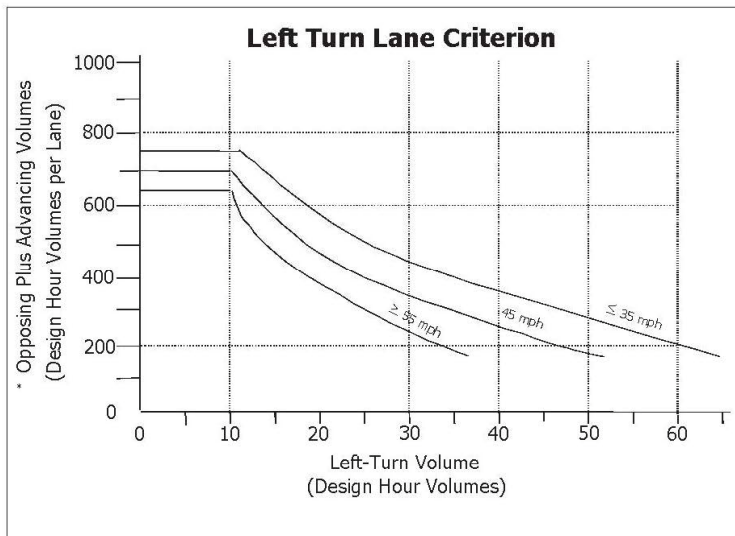


Project Name: Bull Run Terrace Subdivision
 Approach: Highway 26 WB at Dubarko Road
 Scenario: 2024 Background plus Site Trips

Number of Advancing Lanes: 2
 Number of Opposing Lanes: 2
 Major-Street Design Speed: 55 mph

	AM Volume	PM Volume
Advancing Volume for Design Hour:	1042	1142
Opposing Volume for Design Hour:	760	1200
Design Hour Volume Per Lane:	901	1171
Number of Left Turns per Hour:	60	121
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: Bull Run Terrace Subdivision
 Approach: Highway 26 Eastbound at Dubarko Road
 Scenario: 2024 Background Plus Site Trips

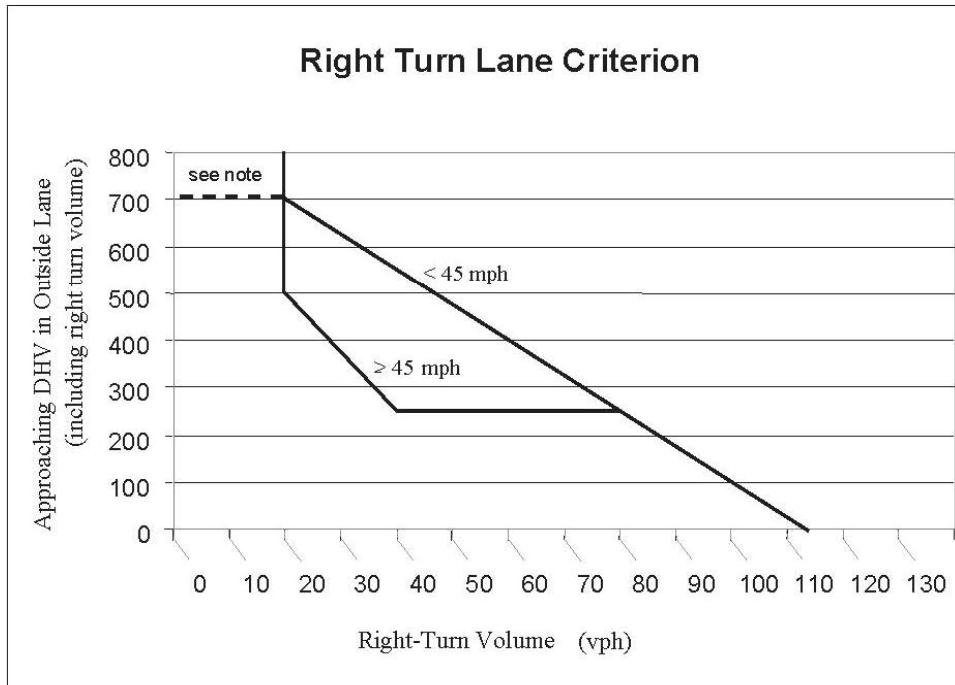
Major-Street Design Speed: 55 mph

	AM Volume	PM Volume
Number of Right Turns per Hour:	18	45
Approaching DVH in Outside Lane:	376	590
Calculated Turn Volume Threshold:	30	20
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.

Left-Turn Lane Warrant Analysis (ODOT Methodology)

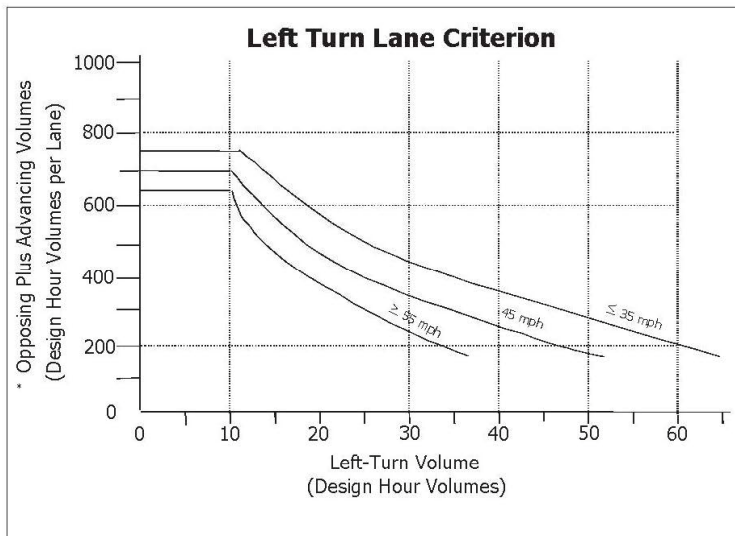


Project Name: Bull Run Terrace Subdivision
 Approach: Highway 211 NB at Dubarko Road
 Scenario: 2024 Background plus Site Trips

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:	375	430
Opposing Volume for Design Hour:	121	257
Design Hour Volume Per Lane:	496	687
Number of Left Turns per Hour:	47	63
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: Bull Run Terrace Subdivision
 Approach: Highway 211 Northbound at Dubarko Road
 Scenario: 2020 Existing Conditions

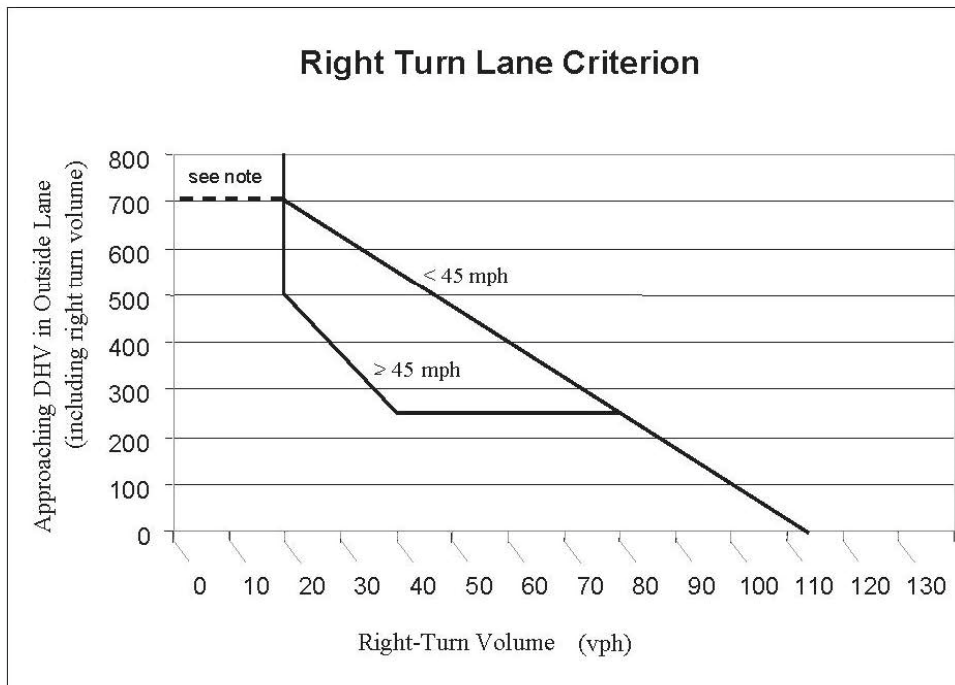
Major-Street Design Speed: 45 mph

	AM Volume	PM Volume
Number of Right Turns per Hour:	13	52
Approaching DVH in Outside Lane:	321	366
Calculated Turn Volume Threshold:	34	31
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.



EXHIBIT F
TERAGAN
& ASSOCIATES, INC.
ARBORICULTURAL CONSULTANTS

MEMORANDUM

DATE: December 14, 2019
TO: Alex Reverman (Roll Tide Corporation)
FROM: Todd Prager, RCA #597, ISA Board Certified Master Arborist
RE: Tree Plan for the Dubarko Road Subdivision and Condominiums

Summary

This report includes tree removal, preservation, and protection recommendations for the proposed Dubarko Road Subdivision and Condominiums in Sandy, Oregon.

Background

Roll Tide Corporation is proposing to construct a four lot subdivision and 216 unit condominium complex with parking, street access, sidewalks, utilities, and open space at the east end of Dubarko Road in Sandy, Oregon. An existing conditions map of the site and trees is provided in Attachment 1. The proposed site plan with the proposed tree removal and retention is provided in Attachment 2. A detail of the grove of trees to be retained along Highway 26 is provided in Attachment 3.

The assignment requested of our firm for this project was to:

- Assess the existing grove of trees along Highway 26;
- Identify the trees to be removed and retained in the grove;
- Identify trees that are in good condition within the park tract within the northwest portion of the site; and
- Provide tree protection recommendations for the trees to be retained in the grove and park.

Tree Assessment

On September 12 and December 11, 2019 I completed the inventory of existing trees in the grove and park.

The complete inventory data for each tree is provided in Attachment 4 and includes the tree number, common name, scientific name, trunk diameter (DBH), crown

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Phone: 971.295.4835 • Fax: 503.697.1976
Email: todd@teragan.com • Website: teragan.com

radius, health condition, structural condition, pertinent comments, and whether it is an onsite 11-inch DBH or greater tree in good condition to be retained.¹

The tree numbers in the inventory in Attachment 4 correspond to the tree numbers on the plans in Attachments 1 through 3.

Note that since the site is 15.91 acres, Section 17.102.50 requires 48 trees over 11-inch DBH that are in good condition to be retained. My assignment was to identify at least 48 trees in the grove that meet this criteria. While I assessed 97 trees total in the grove and park, I found 59 that were over 11-inch DBH and in good condition.

Tree Removal and Retention

This section of the report includes tree removal and retention recommendations based on the proposed site plan.

Tree Removal

The standard tree protection requirements in the City of Sandy Code range from at least 10 feet from the trunks of retained trees (SDC 17.102.50.B.1) to five feet beyond the driplines (SDC 17.92.10.D) unless otherwise approved by the Planning Director.

A typical alternative minimum protection zone allows encroachments no closer than a radius from a tree of .5 feet per inch of DBH as long as no more than 25 percent of the critical root protection zone area (estimated at one foot radius per inch of DBH) is impacted. Figure 1 illustrates this concept.

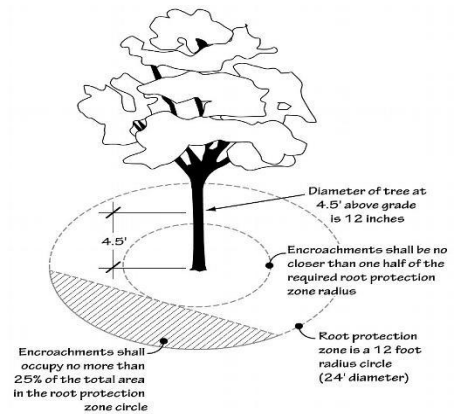


Figure 1: Alternative minimum protection zone

Using the criteria described above, while considering the tree conditions and their locations relative to grading, paving, construction, and other site improvements, 21 of the assessed trees at the edges of the grove and park are proposed for removal.

Note that the grove is comprised of relatively young trees that are competing for space, water, nutrients, and light. The grove could benefit from selective thinning of trees to improve the growth of the more dominant trees that are presently in good condition. Also, invasive understory and vine species such as Himalayan blackberry (*Rubus armeniacus*) and English ivy (*Hedera helix*) should be removed to improve the condition of the understory and prevent vine growth on the retained trees. At a minimum, the trees in the grove that are in good condition will be retained while other trees may be marked for selective removal to improve the overall health of the grove. The invasive understory species may also be removed to improve the health of the grove.

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.

Tree Retention

Fifty-nine (59) trees within the grove and park that are in good condition and over 11-inch DBH are proposed to be retained. Tree preservation has been maximized to the extent practicable with trees removed only as necessary for building construction, parking lot construction, street construction, and improvements to Highway 26. Note that trees 15584.1 and 15644 are in poor or very poor health and/or structural condition, along the new edges of the grove, and proposed for removal for safety purposes.

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 15.91 acres in size so 48 trees over 11-inch DBH in good condition are required to be retained. The proposed preservation includes 59 trees over 11-inch DBH in good condition within the grove along Highway 26 and park tract to be retained. 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 within the grove of trees along Highway 26. Clusters of trees will also be retained within the park tract. This criterion is met.

3. Trees proposed for retention shall be healthy and likely to grow to maturity, and be located to minimize the potential for blow-down following the harvest.

Finding: All of the trees subject to this standard are in good health condition and likely to grow to maturity. Future selective thinning of the grove is recommended to improve the availability of space, water, nutrients, and light for the retained trees. Also, invasive understory and vine species such as Himalayan blackberry and English ivy should be removed to improve the condition of the understory and prevent vine growth on the retained trees.

Trees along portions of the southwest, east, and north sides of the grove are proposed for removal for construction. It will be important to reassess and monitor the trees along the newly exposed edges following site clearing and periodically during construction and after high wind events to ensure they do not pose a high risk. Since the bulk of the grove will be retained, I anticipate that the overall grove will remain viable. However, selective thinning of trees within the grove should be delayed until the changes in wind dynamics from edge tree removal is more thoroughly assessed. Retaining more of the interior trees will help to protect the overall integrity of grove from blow-down during the near term. It will also be very

important to protect the root zones of the trees in the grove and park tract from construction impacts with tree protection fencing and other measures to further minimize the risk of blow-down. Tree protection measures are further described in the next section of this report.

Since the bulk of the grove will be retained and measures to monitor and protect the trees in the grove and park tract will be implemented, this criterion is met.

4. If possible, at least two of the required trees per acre must be of conifer species.

Finding: All 59 trees over 11-inch DBH and in good condition 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: The trees that are over 11-inch DBH and in good condition that are within the conservation easement along Highway 26 will be counted towards the tree retention standards. This criterion is met.

Tree Protection Recommendations

The standard tree protection requirements in the City of Sandy Code range from at least 10 feet from the trunks of retained trees (SDC 17.102.50.B.1) to five feet beyond the driplines (SDC 17.92.10.D) unless otherwise approved by the Planning Director.

A typical alternative minimum protection zone allows encroachments no closer than a radius from a tree of .5 feet per inch of DBH as long as no more than 25 percent of the critical root protection zone area (estimated at one foot radius per inch of DBH) is impacted. Figure 1 illustrates this concept.

The reason for using this alternative is because it allows the tree protection zone to better relate to the size of the tree and its root zone. For example, a 10 foot tree protection setback would not be adequate for a 36-inch DBH tree which should have a minimum setback of at least 18 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 critical root zone radii of 1 foot per inch of DBH is shown for the trees to be retained along the edges of the grove and park on the plan sheets in Attachments 2 and 3. The trees to be retained can be adequately protected by placing tree protection fencing as shown in Attachments 2 and 3. 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 Attachments 2 and 3. 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.
- *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.
- *Retaining Wall on North Side of Grove*: A low retaining wall is recommended on the north side of the grove of trees along Highway 26 to eliminate grading in the tree protection zone to better protect the root systems of the trees at the northern edge of the grove.
- *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*: Trees along portions of the southwest, east, and north sides of the grove are proposed for removal for construction. It will be important to reassess and monitor the trees along the newly exposed 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.
- *Selective Thinning of Grove Trees*: Selective thinning of the grove is recommended to improve the availability of space, water, nutrients, and light for the retained trees. Also, invasive understory and vine species such as Himalayan blackberry and English ivy should be removed to improve the condition of the understory and prevent vine growth on the retained trees.

Any thinning of trees within the grove should be delayed until the changes in wind dynamics from edge tree removal is more thoroughly assessed. Retaining more of the interior trees will help to protect the overall integrity of the grove from blow-down during the near term. After, site adaptations of the trees are better understood in the following two to three storm seasons following disturbance, the project arborist may prescribe a selective thinning treatment.

Additional tree protection recommendations for the trees to be retained are provided in Attachment 5.

Conclusion

Fifty-nine (59) trees over 11-inch DBH in good condition are proposed to be retained within the grove of trees along Highway 26 and park tract at the northeast portion of the site. The required tree retention for the 15.91 acre site is 48 trees.

While the grove of trees will have areas of disturbance along the edges, I anticipate that the overall grove will remain viable. It will be important to reassess and monitor the trees along the newly exposed edges following site clearing and periodically during construction and after high wind events to ensure they do not pose a high risk.

Once the grove is stabilized, I recommend selective thinning of trees to improve the availability of space, water, nutrients, and light for the retained trees. Also, invasive understory and vine species such as Himalayan blackberry and English ivy should be removed to improve the condition of the understory and prevent vine growth on the retained trees.

Please contact me if you have questions, concerns, or need any additional information.

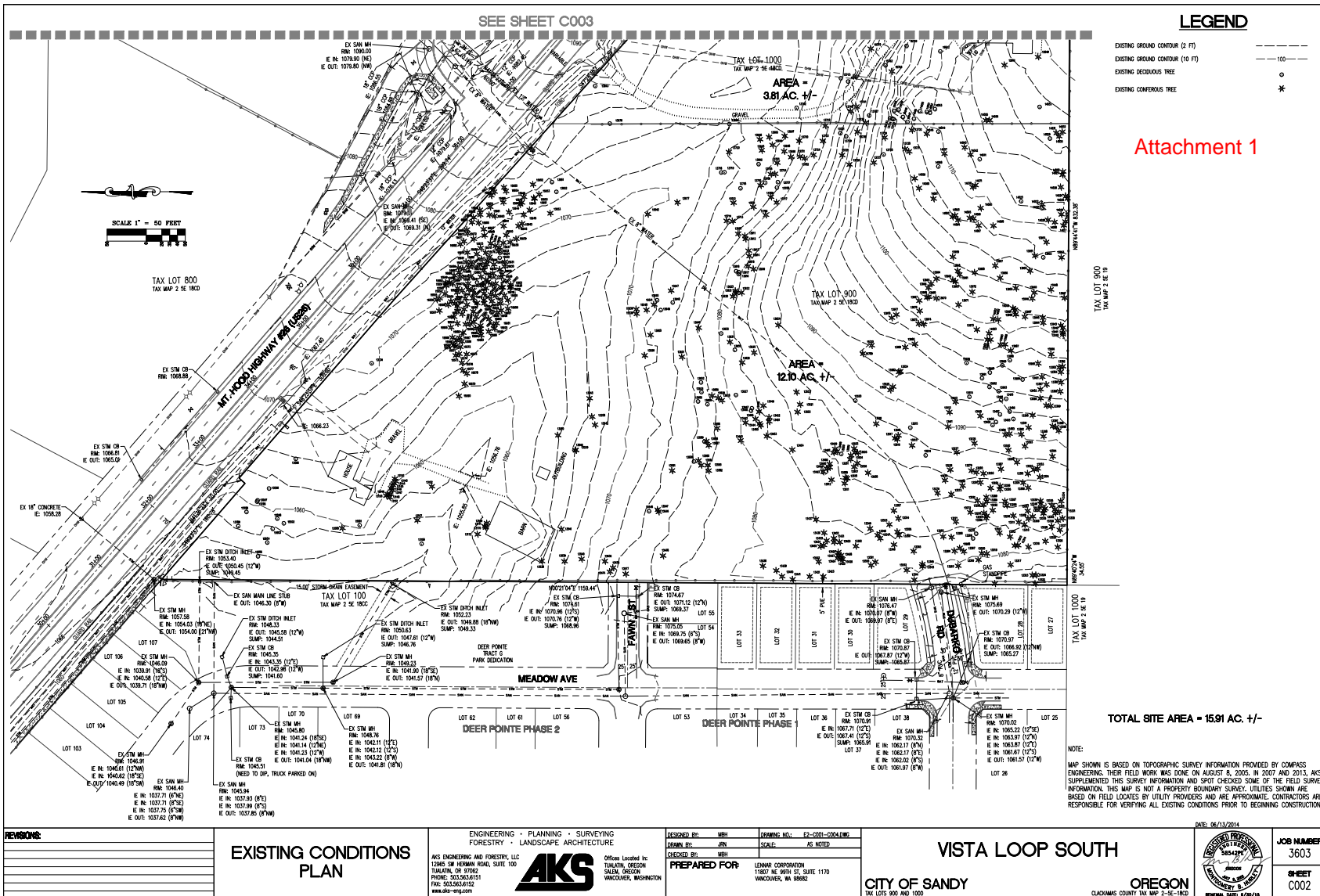
Sincerely,



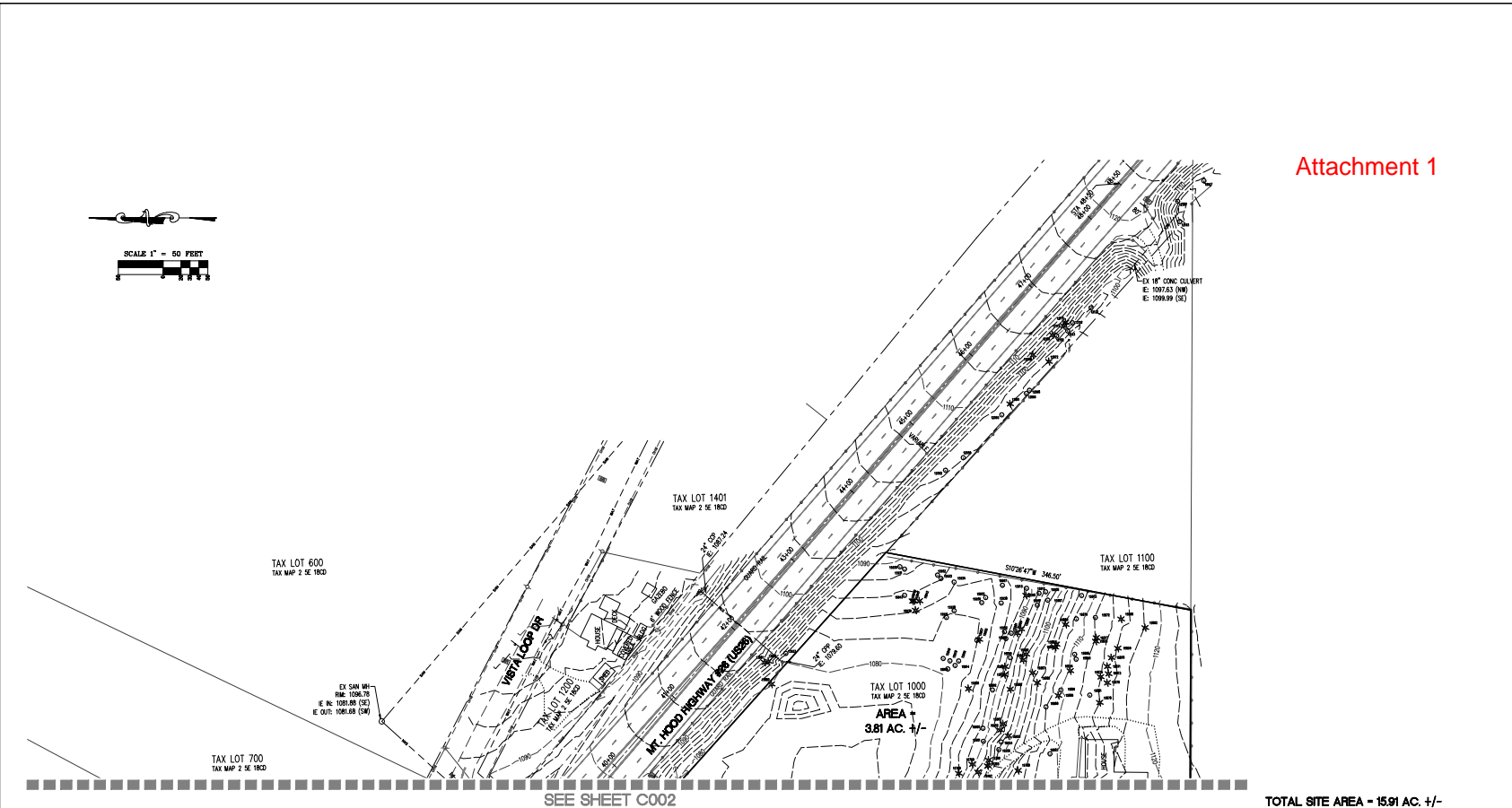
Todd Prager

*ASCA Registered Consulting Arborist #597
ISA Board Certified Master Arborist, WE-6723B
ISA Qualified Tree Risk Assessor
AICP, American Planning Association*

Attachments: Attachment 1 - Existing Site Conditions with Existing Trees
Attachment 2 - Site Plan with Trees Removal and Retention
Attachment 3 - Grove Detail with Tree Removal and Protection
Attachment 4 - Tree Inventory
Attachment 5 - Tree Protection Recommendations
Attachment 6 - Assumptions and Limiting Conditions



Attachment 1



NOTE:
 MAP SHOWN IS BASED ON TOPOGRAPHIC SURVEY INFORMATION PROVIDED BY COMPASS ENGINEERING. THEIR FIELD WORK WAS DONE ON AUGUST 8, 2005, IN 2007 AND 2013. AFS SUPPLEMENTED THIS SURVEY INFORMATION AND SPOT CHECKED SOME OF THE FIELD SURVEY INFORMATION. THIS MAP IS NOT A PROPERTY BOUNDARY SURVEY. UTILITIES SHOWN ARE BASED ON FIELD LOCATES BY UTILITY PROVIDERS AND ARE APPROXIMATE. CONTRACTORS ARE RESPONSIBLE FOR VERIFYING ALL EXISTING CONDITIONS PRIOR TO BEGINNING CONSTRUCTION.

REVISIONS:

EXISTING CONDITIONS PLAN

ENGINEERING • PLANNING • SURVEYING
 FORESTRY • LANDSCAPE ARCHITECTURE

AKS

AKS ENGINEERING AND FORESTRY, LLC
 12065 SW KERNAN ROAD, SUITE 100
 TUALATIN, OR 97062
 PHONE: 503.563.6151
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Offices Located In:
 TUALATIN, OREGON
 SALEM, OREGON
 WAINWATER, WASHINGTON

DESIGNED BY: MSH	DRAWING NO.: E2-0001-C004-TM3
DRAWN BY: JBN	SCALE: AS NOTED
CHECKED BY: MSH	DATE: 06/13/2014
PREPARED FOR: LENOIR CORPORATION 11807 NE 90TH ST, SUITE 1170 WAINWATER, WA 98662	

VISTA LOOP SOUTH

CITY OF SANDY
 TAX LOTS 900 AND 1000

OREGON
 CLATSOP COUNTY TAX MAP 2-5E-18C2

REGISTERED PROFESSIONAL SURVEYOR
 54440
 CLATSOP COUNTY

JOB NUMBER
 3603

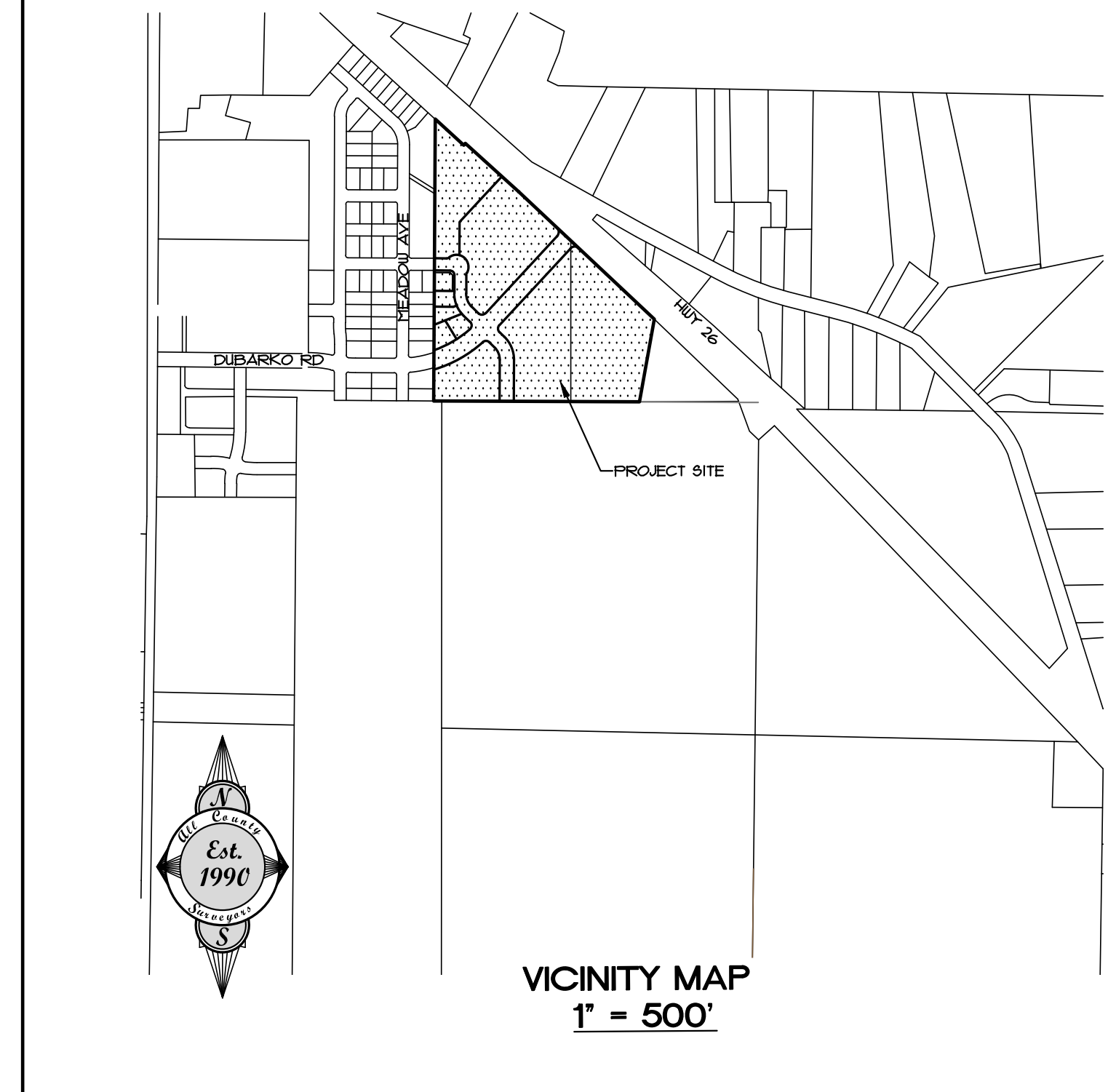
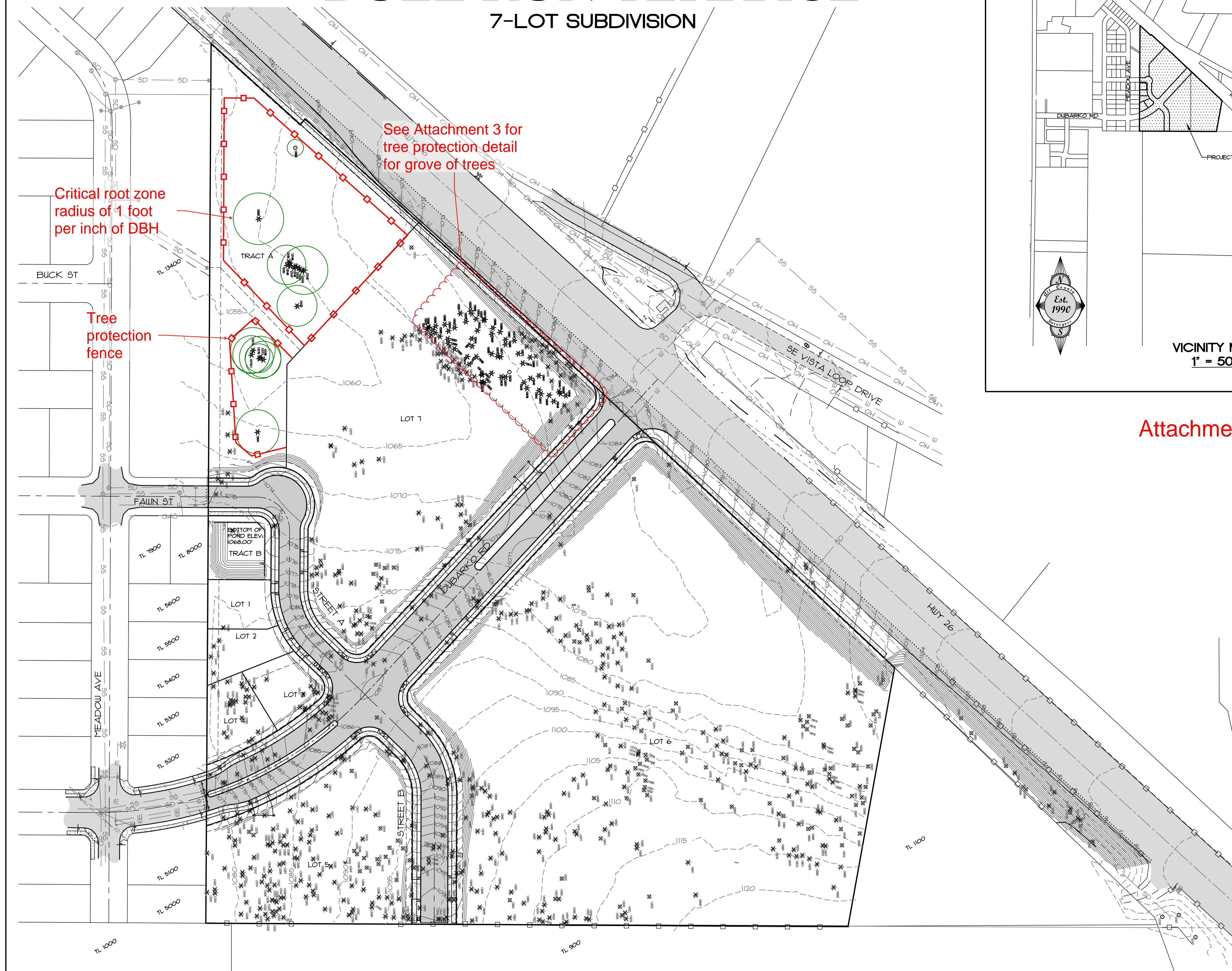
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 C003

Attachment 1

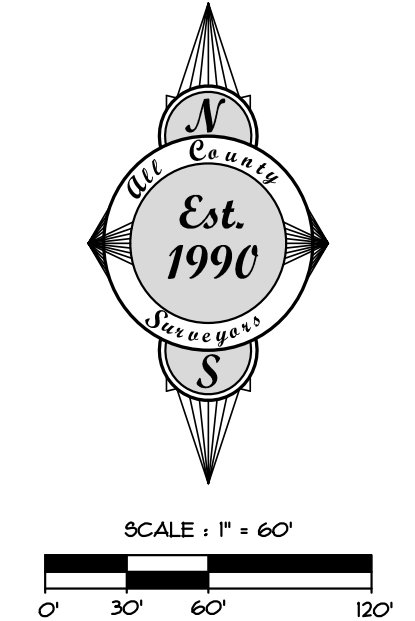
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12005	MAHLE	20	13300	CEDR	10	14920	ALDER	8	16570	DOUGLAS FR	10	18170	DOUGLAS FR	10	19770	DOUGLAS FR	10
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12007	MAHLE	20	13302	CEDR	12	14922	ALDER	8	16572	DOUGLAS FR	12	18172	DOUGLAS FR	12	19772	DOUGLAS FR	12
12008	MAHLE	20	13303	CEDR	12	14923	ALDER	8	16573	DOUGLAS FR	12	18173	DOUGLAS FR	12	19773	DOUGLAS FR	12
12009	MAHLE	20	13304	CEDR	12	14924	ALDER	8	16574	DOUGLAS FR	12	18174	DOUGLAS FR	12	19774	DOUGLAS FR	12
12010	MAHLE	20	13305	CEDR	12	14925	ALDER	8	16575	DOUGLAS FR	12	18175	DOUGLAS FR	12	19775	DOUGLAS FR	12
12011	MAHLE	20	13306	CEDR	12	14926	ALDER	8	16576	DOUGLAS FR	12	18176	DOUGLAS FR	12	19776	DOUGLAS FR	12
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BULL RUN TERRACE

7-LOT SUBDIVISION



Attachment 2



CLIENT: ROLL TIDE PROPERTIES CORPORATION CORNELIUS, OR 97113	PROJECT: BULL RUN TERRACE SUBDIVISION TREE RETENTION EXHIBIT	LOCATION: 40808 & 41010 HWY 26, SANDY, OR 97055		DESIGNED: CTH	DATE: 12/14/2019
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				APPROVED: RLMT	
				DATE: 12/14/2019	
				REVISION: 1	
				NO. 1	
				DATE: 12/14/2019	
				DESIGNED: CTH	
				DRAWN: CTH	
				CHECKED: RLMT	
				APPROVED: RLMT	
				DATE: 12/14/2019	
				REVISION: 1	
				NO. 1	
				DATE: 12/14/2019	
				DESIGNED: CTH	
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Attachment 4

Tree No	Common Name	Scientific Name	DBH ¹	C-Rad ²	Condition ³	Structure ³	Comments	Treatment	Onsite Trees >11" DBH in Good Cond. to be Retained
13096	Douglas-fir	<i>Pseudotsuga menziesii</i>	11	10	good	good		retain	x
13134	bigleaf maple	<i>Acer macrophyllum</i>	55	38	good	fair	open grown, multiple leaders at 10', cable constricting lower trunk	remove	
13142	Douglas-fir	<i>Pseudotsuga menziesii</i>	32	28	fair	fair	one sided, codominant at 5' with included bark, 70% girdled at lower trunk	retain	
13143	Douglas-fir	<i>Pseudotsuga menziesii</i>	13	13	fair	poor	overtopped by adjacent trees, poor trunk taper	retain	
13144	Douglas-fir	<i>Pseudotsuga menziesii</i>	34	23	good	fair	multiple leaders at 5' with included bark, one sided, west 10" leader dead	retain	x
13145	Douglas-fir	<i>Pseudotsuga menziesii</i>	14	5	fair	poor	overtopped by adjacent trees, poor trunk taper	retain	
13146	Douglas-fir	<i>Pseudotsuga menziesii</i>	26	23	good	fair	one sided	retain	x
13147	Douglas-fir	<i>Pseudotsuga menziesii</i>	15	19	good	fair	one sided, marginal trunk taper	retain	x
13148	Douglas-fir	<i>Pseudotsuga menziesii</i>	25	24	good	fair	one sided	retain	x
13149	Douglas-fir	<i>Pseudotsuga menziesii</i>	17	20	poor	poor	overtopped by adjacent trees, one sided, suppressed	retain	
13150	Douglas-fir	<i>Pseudotsuga menziesii</i>	22	30	good	fair	one sided	retain	x
13151	Douglas-fir	<i>Pseudotsuga menziesii</i>	24,12	25	good	fair	one sided, codominant at ground level	retain	x
13152	Douglas-fir	<i>Pseudotsuga menziesii</i>	37	26	good	fair	open grown, multiple leaders at 25'	retain	x
13169	Douglas-fir	<i>Pseudotsuga menziesii</i>	24	24	good	fair	one sided	retain	x
13170	Douglas-fir	<i>Pseudotsuga menziesii</i>	19	20	good	fair	one sided	retain	x
13171	western redcedar	<i>Thuja plicata</i>	28	20	good	fair	moderately one sided	retain	x
13172	western redcedar	<i>Thuja plicata</i>	30	17	good	fair	one sided, pressed against trees 13172.1	retain	x
13172.1	Douglas-fir	<i>Pseudotsuga menziesii</i>	25	21	good	fair	one sided, pressed against trees 13172	retain	x
13538	western redcedar	<i>Thuja plicata</i>	39	24	good	fair	codominant at 6' with included bark	remove	
13539	Douglas-fir	<i>Pseudotsuga menziesii</i>	32	23	good	fair	moderately one sided	remove	
13540	western redcedar	<i>Thuja plicata</i>	37,33	29	good	fair	codominant at 3' with included bark	remove	
13541	western redcedar	<i>Thuja plicata</i>	29	21	good	good		retain	x
13653	Douglas-fir	<i>Pseudotsuga menziesii</i>	11	15	fair	fair	thin crown, large wound at lower trunk	remove	
15500	Douglas-fir	<i>Pseudotsuga menziesii</i>	34	21	good	good		retain	x
15546	Douglas-fir	<i>Pseudotsuga menziesii</i>	15	15	good	poor	25% live crown ratio, poor trunk taper	retain	x
15550	Douglas-fir	<i>Pseudotsuga menziesii</i>	6	0	very poor	very poor	dead	retain	
15551	Douglas-fir	<i>Pseudotsuga menziesii</i>	30	15	good	fair	codominant at 1', west stem has 33% live crown ratio	retain	x
15552	n/a	n/a	n/a	n/a	n/a	n/a	same as tree 15551	n/a	n/a
15553	Douglas-fir	<i>Pseudotsuga menziesii</i>	13	15	good	poor	25% live crown ratio, poor trunk taper	retain	x
15554	Douglas-fir	<i>Pseudotsuga menziesii</i>	11	10	fair	poor	poor trunk taper, suppressed	retain	
15555	Douglas-fir	<i>Pseudotsuga menziesii</i>	30	25	good	fair	moderately one sided	retain	x



Attachment 4

Tree No	Common Name	Scientific Name	DBH ¹	C-Rad ²	Condition ³	Structure ³	Comments	Treatment	Onsite Trees >11" DBH in Good Cond. to be Retained
15556	Douglas-fir	<i>Pseudotsuga menziesii</i>	12	10	poor	poor	overtopped by adjacent trees, suppressed	retain	
15557	grand fir	<i>Abies grandis</i>	22	20	good	fair	one sided, codominant at 30' with included bark	retain	x
15558	Douglas-fir	<i>Pseudotsuga menziesii</i>	12	15	good	poor	33% live crown ratio, poor trunk taper	retain	x
15562	Douglas-fir	<i>Pseudotsuga menziesii</i>	20	15	good	fair	40% live crown ratio, marginal trunk taper	retain	x
15564	Douglas-fir	<i>Pseudotsuga menziesii</i>	14	15	good	poor	marginal trunk taper, 33% live crown ratio	retain	x
15565	Douglas-fir	<i>Pseudotsuga menziesii</i>	11	15	fair	fair	one sided, marginal trunk taper, 5" codominant dead stem at 3'	retain	
15566	Douglas-fir	<i>Pseudotsuga menziesii</i>	23	20	good	fair	one sided	retain	x
15567	Douglas-fir	<i>Pseudotsuga menziesii</i>	17	15	good	fair	marginal trunk taper, 40% live crown ratio	retain	x
15568	Douglas-fir	<i>Pseudotsuga menziesii</i>	7	0	very poor	very poor	dead	retain	
15569	Douglas-fir	<i>Pseudotsuga menziesii</i>	11	8	fair	poor	poor trunk taper	retain	
15570	Douglas-fir	<i>Pseudotsuga menziesii</i>	14	15	fair	fair	one sided, overtopped by adjacent trees	retain	
15571	Douglas-fir	<i>Pseudotsuga menziesii</i>	9	5	fair	poor	poor trunk taper, suppressed	retain	
15582	Douglas-fir	<i>Pseudotsuga menziesii</i>	10	5	fair	poor	poor trunk taper, suppressed	retain	
15583	Douglas-fir	<i>Pseudotsuga menziesii</i>	13	15	good	poor	poor trunk taper, 25% live crown ratio	retain	x
15584	Douglas-fir	<i>Pseudotsuga menziesii</i>	14	15	good	fair	marginal trunk taper, 40% live crown ratio	retain	x
15584.1	Douglas-fir	<i>Pseudotsuga menziesii</i>	8	0	very poor	very poor	dead	remove	
15585	Douglas-fir	<i>Pseudotsuga menziesii</i>	15	20	good	poor	35% live crown ratio, poor trunk taper	retain	x
15589	Douglas-fir	<i>Pseudotsuga menziesii</i>	18	20	good	poor	33% live crown ratio, marginal trunk taper	retain	x
15590	Douglas-fir	<i>Pseudotsuga menziesii</i>	13	15	good	poor	35% live crown ratio, poor trunk taper	retain	x
15612	Douglas-fir	<i>Pseudotsuga menziesii</i>	9	0	very poor	very poor	dead	retain	
15614	Douglas-fir	<i>Pseudotsuga menziesii</i>	9	10	fair	poor	25% live crown ratio, poor trunk taper	retain	
15615	Douglas-fir	<i>Pseudotsuga menziesii</i>	14	15	good	poor	25% live crown ratio, poor trunk taper	retain	x
15619	Douglas-fir	<i>Pseudotsuga menziesii</i>	20,16	20	good	fair	codominant at ground level with included bark, marginal trunk taper	retain	x
15620	n/a	n/a	n/a	n/a	n/a	n/a	same as tree 15619	n/a	n/a
15621	n/a	n/a	n/a	n/a	n/a	n/a	duplicate tree point?	n/a	n/a
15622	Douglas-fir	<i>Pseudotsuga menziesii</i>	19	20	good	fair	one sided, bowed trunk, marginal trunk taper	retain	x
15623	Douglas-fir	<i>Pseudotsuga menziesii</i>	8	10	good	poor	one sided, poor trunk taper	retain	
15624	Douglas-fir	<i>Pseudotsuga menziesii</i>	9	0	very poor	very poor	dead	retain	
15630	Douglas-fir	<i>Pseudotsuga menziesii</i>	18	20	good	fair	one sided	retain	x
15631	Douglas-fir	<i>Pseudotsuga menziesii</i>	24	20	good	fair	one sided	retain	x
15632	Douglas-fir	<i>Pseudotsuga menziesii</i>	13	15	good	poor	40% live crown ratio, poor trunk taper	retain	x
15638	Douglas-fir	<i>Pseudotsuga menziesii</i>	21	20	good	fair	one sided	retain	x
15639	Douglas-fir	<i>Pseudotsuga menziesii</i>	14	15	good	fair	one sided, marginal trunk taper, bowed trunk	retain	x

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Attachment 4

Tree No	Common Name	Scientific Name	DBH ¹	C-Rad ²	Condition ³	Structure ³	Comments	Treatment	Onsite Trees >11" DBH in Good Cond. to be Retained
15640	Douglas-fir	<i>Pseudotsuga menziesii</i>	15	15	good	fair	one sided, 70% live crown ratio, marginal trunk taper	retain	x
15641	Douglas-fir	<i>Pseudotsuga menziesii</i>	19	20	good	fair	40% live crown ratio, marginal trunk taper	retain	x
15642	Douglas-fir	<i>Pseudotsuga menziesii</i>	19	15	good	fair	moderately one sided, marginal trunk taper, 50% live crown ratio	retain	x
15643	Douglas-fir	<i>Pseudotsuga menziesii</i>	16	15	good	fair	one sided	retain	x
15644	Douglas-fir	<i>Pseudotsuga menziesii</i>	17	20	good	poor	33% live crown ratio, marginal trunk taper	remove	
15645	Douglas-fir	<i>Pseudotsuga menziesii</i>	24	25	good	fair	one sided	retain	x
15646	Douglas-fir	<i>Pseudotsuga menziesii</i>	16	15	good	fair	one sided	retain	x
15648	Douglas-fir	<i>Pseudotsuga menziesii</i>	17	15	good	fair	one sided, 60% live crown ratio, marginal trunk taper	retain	x
15649	Douglas-fir	<i>Pseudotsuga menziesii</i>	16	20	good	fair	one sided, marginal trunk taper	retain	x
15649.1	Douglas-fir	<i>Pseudotsuga menziesii</i>	17	20	good	fair	moderately one sided, marginal trunk taper	retain	x
15650	Douglas-fir	<i>Pseudotsuga menziesii</i>	23,16	25	good	fair	codominant at ground level, north stem has poor trunk taper	remove	
15651	n/a	n/a	n/a	n/a	n/a	n/a	same as tree 15650	n/a	n/a
15654	Douglas-fir	<i>Pseudotsuga menziesii</i>	21	20	good	fair	one sided, codominant at 12' with included bark	remove	
15655	Douglas-fir	<i>Pseudotsuga menziesii</i>	24	25	good	fair	one sided	remove	
15656	Douglas-fir	<i>Pseudotsuga menziesii</i>	16	15	good	fair	marginal trunk taper, 40% live crown ratio	remove	
15659	Douglas-fir	<i>Pseudotsuga menziesii</i>	21	20	good	fair	moderately one sided, 6" dead codominant stem at base of trunk	remove	
15660	Douglas-fir	<i>Pseudotsuga menziesii</i>	19	20	good	fair	35% live crown ratio, marginal trunk taper, dead 8" codominant stem at 15'	remove	
15662	Douglas-fir	<i>Pseudotsuga menziesii</i>	8	0	very poor	very poor	dead	remove	
15666	Douglas-fir	<i>Pseudotsuga menziesii</i>	13	15	good	fair	marginal trunk taper, 35% live crown ratio	remove	
15667	Douglas-fir	<i>Pseudotsuga menziesii</i>	16	15	good	fair	40% live crown ratio, marginal trunk taper	remove	
15668	Douglas-fir	<i>Pseudotsuga menziesii</i>	14	15	good	fair	40% live crown ratio, marginal trunk taper	retain	x
15669	Douglas-fir	<i>Pseudotsuga menziesii</i>	15	15	good	fair	one sided, overtopped by adjacent trees	remove	
15670	Douglas-fir	<i>Pseudotsuga menziesii</i>	23	20	good	fair	moderately one sided	remove	
15671	Douglas-fir	<i>Pseudotsuga menziesii</i>	10	10	good	poor	one sided, poor trunk taper	remove	
15672	Douglas-fir	<i>Pseudotsuga menziesii</i>	15	20	good	poor	33% live crown ratio, marginal trunk taper	remove	
15673	Douglas-fir	<i>Pseudotsuga menziesii</i>	15	15	good	fair	35% live crown ration, marginal trunk taper	retain	x
15674	Douglas-fir	<i>Pseudotsuga menziesii</i>	13	10	good	poor	25% live crown ratio, poor trunk taper	retain	x
15677	Douglas-fir	<i>Pseudotsuga menziesii</i>	13	10	good	poor	25% live crown ratio, poor trunk taper	retain	x
15678	Douglas-fir	<i>Pseudotsuga menziesii</i>	14	10	good	poor	33% live crown ratio, poor trunk taper	retain	x



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Tree No	Common Name	Scientific Name	DBH ¹	C-Rad ²	Condition ³	Structure ³	Comments	Treatment	Onsite Trees >11" DBH in Good Cond. to be Retained
15679	Douglas-fir	<i>Pseudotsuga menziesii</i>	16,12	20	good	fair	codominant at ground level with included bark, south stem has marginal trunk taper with 25% live crown ratio	retain	x
15680	Douglas-fir	<i>Pseudotsuga menziesii</i>	11	10	good	poor	25% live crown ratio, poor trunk taper	retain	x
15681	Douglas-fir	<i>Pseudotsuga menziesii</i>	14	10	good	poor	poor trunk taper, 20% live crown ratio	retain	x
15682	Douglas-fir	<i>Pseudotsuga menziesii</i>	26	20	good	fair	one sided	remove	
15685	Douglas-fir	<i>Pseudotsuga menziesii</i>	22	20	good	fair	moderately one sided	retain	x
15686	Douglas-fir	<i>Pseudotsuga menziesii</i>	25	25	good	fair	one sided	retain	x
15688	Douglas-fir	<i>Pseudotsuga menziesii</i>	20	20	good	fair	marginal trunk taper, 50% live crown ratio	retain	x
15690	Douglas-fir	<i>Pseudotsuga menziesii</i>	16	20	good	poor	33% live crown ratio, poor trunk taper	retain	x

¹DBH is the trunk diameter in inches measured in accordance with International Society of Arboriculture standards.

²C-Rad is the approximate crown radius in feet.

³Condition and Structure ratings range from very poor, poor, fair, to good.

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Attachment 5 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.
 - c. Have all contractors sign memoranda of understanding regarding the goals of tree protection. The memoranda should include a penalty for violating the tree protection plan. The penalty should equal the resulting fines issued by the local jurisdiction plus the appraised value of the tree(s) within the violated tree protection zone per the current Trunk Formula Method as outline in the current edition of the *Guide for Plant Appraisal* by the Council of Tree & Landscape Appraisers. The penalty should be paid to the owner of the property.
2. Fencing
 - a. Trees to remain in the grove should be protected by installation of tree protection fencing as shown in Attachments 2 and 3.
 - 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.

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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 are capable of damaging the retained trees and plants.
6. The retained trees may need to be fertilized if recommended by the project arborist.
7. Any deviation from the recommendations in this section should receive prior approval from the project arborist.

Attachment 6 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 Roll Tide Corporation 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 existing grove of trees along Highway 26;
 - Identify the trees to be removed and retained in the grove;
 - Identify trees that are in good condition within the park tract within the northwest portion of the site; and
 - Provide tree protection recommendations for the trees to be retained in the grove.



TERAGAN & ASSOCIATES, INC. ARBORICULTURAL CONSULTANTS

MEMORANDUM

DATE: September 15, 2020
TO: Alex Reverman (Roll Tide Corporation)
FROM: Todd Prager, RCA #597, ISA Board Certified Master Arborist
RE: Additional Tree Preservation at the Dubarko Road Subdivision and Condominiums

Summary

This report includes recommendations for preserving additional trees along the west property line at the proposed Dubarko Road Subdivision and Condominiums in Sandy, Oregon.

Background

Teragan & Associates prepared an arborist report dated December 14, 2019 with a tree assessment, preservation, removal, and protection recommendations for the Dubarko Road Subdivision and Condominiums project.

Roll Tide Corporation has requested my review and recommendations regarding the preservation of additional trees along the west property line of the site.

Tree Assessment

On September 15, 2020, I assessed the additional trees along the west property line of the site. Attachment 1 is a site plan with the tree locations and Attachment 2 is a summary of my assessment data for each tree.

Of the six trees that I assessed, all but one (tree 13438) can be retained and protected according to the recommendations in the next section of this report.

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3145 Westview Circle • Lake Oswego, OR 97034
Phone: 971.295.4835 • Fax: 503.697.1976
Email: todd@teragan.com • Website: teragan.com

Tree Protection Recommendations

The standard tree protection requirements in the City of Sandy Code range from at least 10 feet from the trunks of retained trees (SDC 17.102.50.B.1) to five feet beyond the driplines (SDC 17.92.10.D) unless otherwise approved by the Planning Director.

A typical alternative minimum protection zone allows encroachments no closer than a radius from a tree of .5 feet per inch of DBH as long as no more than 25 percent of the critical root protection zone area (estimated at one foot radius per inch of DBH) is impacted. Figure 1 illustrates this concept.

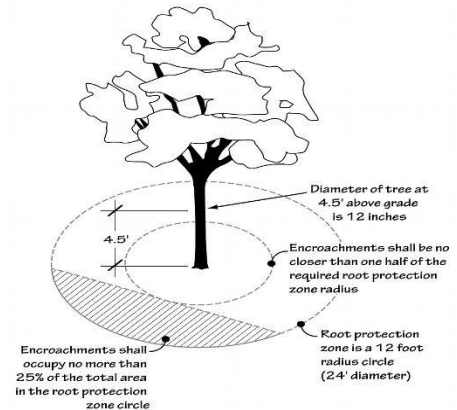


Figure 1: Alternative minimum protection zone

The critical root zone radii of 1 foot per inch of DBH and typical minimum construction setback of .5 feet per inch of DBH is shown for the trees to be retained along the west property line in Attachment 1. The trees to be retained will have at least 75 percent of their critical roots zones radii protected from construction. However, trees 13421 and 13423 will have encroachments for construction of the driveway for lot 4 closer than a radius of .5 feet per inch of DBH from their trunks.

Even with the driveway construction, the trees along the west property line can be retained and protected as follows:

- *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.
- *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 stump of the tree 13438 shall be stump ground to protect the root systems of the trees to be retained.
- *Curb/Pavement Construction:* Construction of the new curb/paving in the tree protection zone of trees 13421 and 13423 shall occur under project arborist supervision. Use extruded curbs and a modified pavement profile as shown in Figure 1 for new pavement in the tree protection zones.

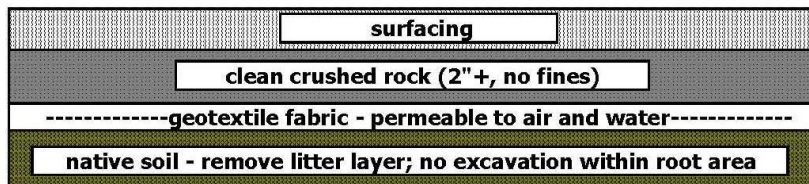


Figure 1. Sample profile for areas within tree protection zones. Depth of rock is dependent on grading.

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The additional tree protection recommendations from my December 14, 2019 report are provided in Attachment 3.

Conclusion

Five of the six additional trees along the west property line of the site can be retained and protected according to the recommendations in this report.

Please contact me if you have questions, concerns, or need any additional information.

Sincerely,

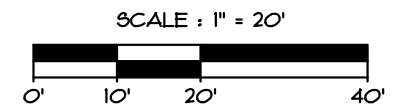
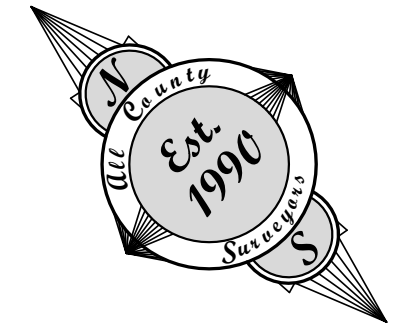
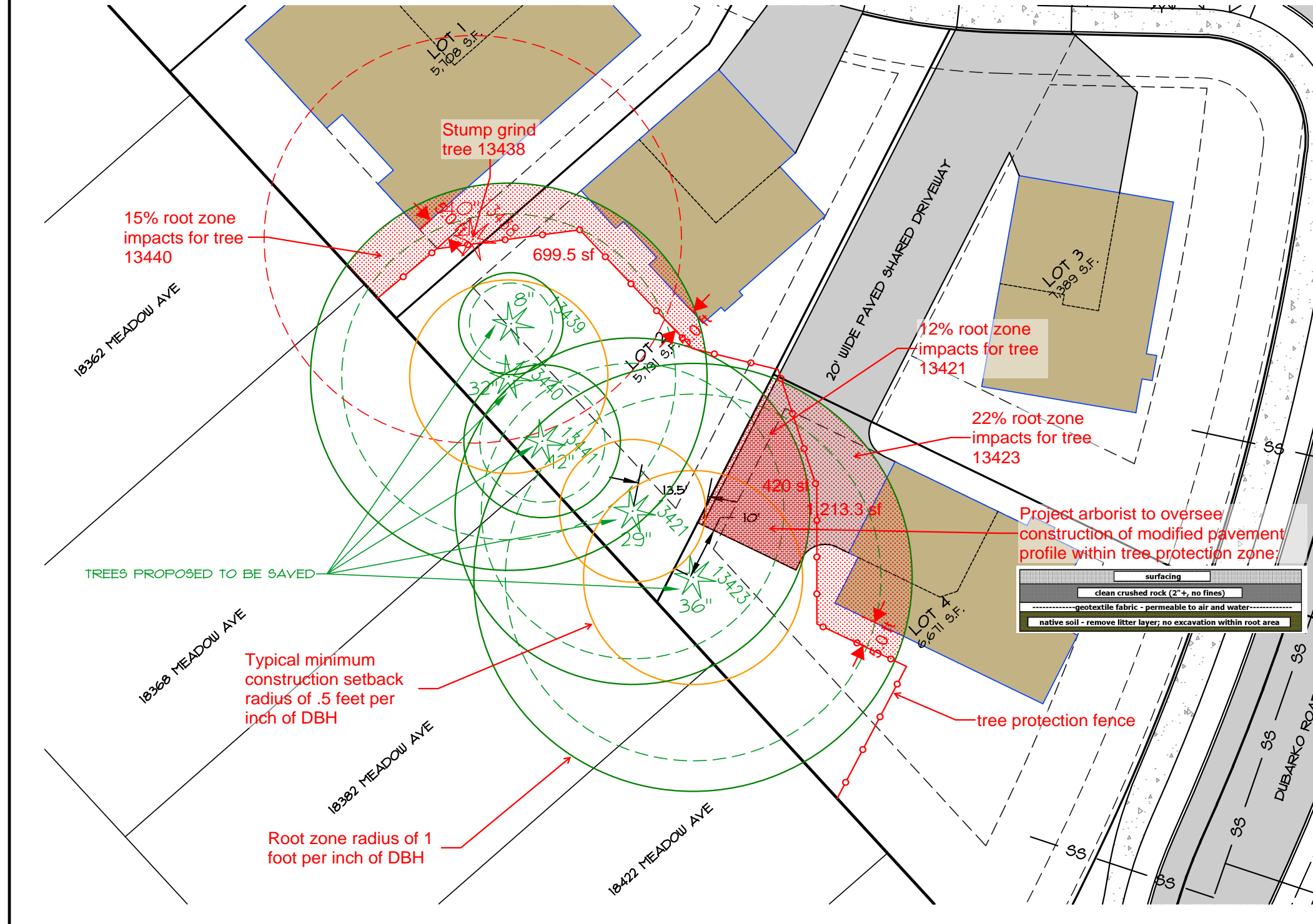


Todd Prager

*ASCA Registered Consulting Arborist #597
ISA Board Certified Master Arborist, WE-6723B
ISA Qualified Tree Risk Assessor
AICP, American Planning Association*

Attachments: Attachment 1 - Site Plan with Additional Tree Removal and Retention
Attachment 2 - Additional Tree Inventory
Attachment 3 - Tree Protection Recommendations
Attachment 4 - Assumptions and Limiting Conditions

BULLRUN TERRACE TREES ON WEST SIDE OF PROPERTY



Attachment 1

All County Surveyors & Planners, Inc.
 Surveying, Planning and Civil Engineering
 P.O. Box 955 Sandy, OR 97055
 Phone: (503) 668-3151
 Fax: (503) 668-4730
 Subject to General Conditions 2006 ©

19-035-Planning.dwg
 DATE OF PLOT: 9/03/20



Attachment 2

Tree No	Common Name	Scientific Name	DBH ¹	C-Rad ²	Condition ³	Structure ³	Comments	Treatment
13421	Douglas-fir	<i>Pseudotsuga menziesii</i>	34	20	good	fair	swelling at lower trunk, previously lost top with new top at 15'	retain
13423	Douglas-fir	<i>Pseudotsuga menziesii</i>	42	20	good	fair	moderately one sided	retain
13438	Douglas-fir	<i>Pseudotsuga menziesii</i>	46	20	good	fair	moderately one sided	remove
13439	Douglas-fir	<i>Pseudotsuga menziesii</i>	10	10	good	fair	overtopped by adjacent trees, one sided	retain
13440	Douglas-fir	<i>Pseudotsuga menziesii</i>	38	20	good	fair	moderately one sided	retain
13441	Douglas-fir	<i>Pseudotsuga menziesii</i>	15	15	fair	fair	overtopped by adjacent trees, marginal trunk taper, small Porodaedalea conks at lower trunk	retain

¹DBH is the trunk diameter in inches measured in accordance with International Society of Arboriculture standards.

²C-Rad is the approximate crown radius in feet.

³Condition and Structure ratings range from very poor, poor, fair, to good.

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Attachment 3 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.
 - c. Have all contractors sign memoranda of understanding regarding the goals of tree protection. The memoranda should include a penalty for violating the tree protection plan. The penalty should equal the resulting fines issued by the local jurisdiction plus the appraised value of the tree(s) within the violated tree protection zone per the current Trunk Formula Method as outline in the current edition of the *Guide for Plant Appraisal* by the Council of Tree & Landscape Appraisers. The penalty should be paid to the owner of the property.
2. Fencing
 - a. Trees to remain in the grove should be protected by installation of tree protection fencing as shown in Attachment 1.
 - b. The fencing should be put in place before the ground is cleared in order to protect the trees and the soil around the trees from disturbances.
 - c. Fencing should be established by the project arborist based on the needs of the trees to be protected and to facilitate construction.
 - d. Fencing should consist of 6-foot high steel fencing on concrete blocks or 6-foot metal fencing secured to the ground with 8-foot metal posts placed no farther than ten feet apart to prevent it from being moved by contractors, sagging, or falling down.
 - e. Fencing should remain in the position that is established by the project arborist and not be moved without approval from the project arborist until final project approval.
3. Signage
 - a. All tree protection fencing should have signage as follows so that all contractors understand the purpose of the fencing:

TREE PROTECTION ZONE

**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.

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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 are capable of damaging the retained trees and plants.
6. The retained trees may need to be fertilized if recommended by the project arborist.
7. Any deviation from the recommendations in this section should receive prior approval from the project arborist.

Attachment 4
Assumptions and Limiting Conditions

1. Any legal description provided to the consultant is assumed to be correct. The site plans and other information provided by Roll Tide Corporation and their consultants was the basis of the information provided in this report.
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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 review and provide recommendations regarding the preservation of additional trees along the west property line of the site.