City of Sandy

Agenda

City Council Special Meeting

Meeting Date: Monday, November 30, 2020

Meeting Time: 6:00 PM

Page

1. MEETING FORMAT NOTICE

The City Council will conduct this meeting electronically using the Zoom video conference platform. Members of the public may listen, view, and/or participate in this meeting using Zoom. Using Zoom is free of charge. See the instructions below:

- To login to the electronic meeting online using your computer, click this link: https://us02web.zoom.us/j/83316840746
- If you would rather access the meeting via telephone, dial (253) 215-8782. When prompted, enter the following meeting number: 833 1684 0746
- If you do not have access to a computer or telephone and would like to take part in the meeting, please contact City Hall by Friday November 27 and arrangements will be made to facilitate your participation.

2. PLEDGE OF ALLEGIANCE

3. ROLL CALL

4. PUBLIC HEARING - BULL RUN TERRACE

4.1. LAND USE FILE: 19-050 CPA ZC SUB SAP TREE 3 - 894

Bull Run Terrace

Type IV Zone Map Amendment, Comprehensive Plan Map Amendment, Specific Area Plan Overlay, and development of a 7 lot subdivision for two parcels totaling approximately 15.91 acres.

Staff Report
Staff PowerPoint Slides
EXHIBITS A-R: Applicant Submittals
EXHIBITS S-BB: Agency Comments
EXHIBITS CC-EE: Additional Documents from Staff
EXHIBITS FF-DDDD: Public Comments
EXHIBITS EEEE-GGGG: Revised Agency Comments
EXHIBITS HHHH-PPPP Additional Exhibits
Ordinance 2020-25

5. ADJOURN

Staff Report

Meeting Date: November 30, 2020

From Shelley Denison, Associate Planner

SUBJECT: 19-050 CPA ZC SUB SAP TREE Bull Run Terrace

BACKGROUND:
The applicant, Roll Tide Properties Corp., requests a Type IV Zone Map Amendment, Comprehensive Plan Map Amendment, and development of a 7 lot subdivision for two parcels totaling approximately 15.91 acres. Four lots are proposed as R-1 (low-density residential) zoning and will each contain a single family dwelling. One lot is proposed to have the R-3 (high-density residential) zoning designation. The exact number of multifamily units will be determined with a subsequent design review application for this lot, but according to the submitted traffic impact study the site has the potential to have 130 apartment units. One lot is proposed to have the R-2 (medium-density residential) zoning designation. The maximum number of dwelling units for this lot is 17, but the actual number of units will be determined in a future design review application. Finally, one lot is proposed to have the C-3 (village commercial) zoning designation. This lot will likely contain a mix of commercial and residential development.

The applicant also proposes to dedicate 1.95 acres for the eventual construction of Deer Pointe Park and will adopt the Parks and Open Space zoning designation. This proposal also includes extension of Dubarko Road to intersect with Highway 26 at the existing intersection of Vista Loop Drive with Highway 26.

BUDGETARY IMPACT:
N/A

RECOMMENDATION:
The Planning Commission recommends the City Council adopt Ordinance 2020-25, approving 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.

SUGGESTED MOTION:
"I move to approve the first reading of Ordinance 2020-25."

LIST OF ATTACHMENTS/EXHIBITS:
Attachment 1: Staff Report
Attachment 2: Exhibits A-PPPP
Attachment 3: Ordinance 2020-25

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

WHERE INNOVATION MEETS ELEVATION

CITY COUNCIL STAFF REPORT
(DRAFT FINDINGS OF FACT and FINAL ORDER
TYPE IV DECISION)

DATE: November 23, 2020

FILE NO.: 19-050 CPA/ZC/SUB/SAP/TREE

PROJECT NAME: Bull Run Terrace

APPLICANT/OWNER: Roll Tide Properties Corp

LEGAL DESCRIPTION: T2 R5E Section 18CD, Tax Lots 900 and 1000

The above-referenced proposal was reviewed concurrently as a Type IV comprehensive plan amendment, zone change, subdivision, and specific area plan overlay with tree removal. The following Findings of Fact are adopted supporting approval of the plan in accordance with Chapter 17 of the Sandy Municipal Code.

EXHIBITS:

Applicant's Submittals:

A. Land Use Application
B. Project Narrative (Revised July 2020)
C. Civil Plan Set (Originally submitted July 2020)
   - Sheet 1 – Cover Sheet, Preliminary Plat Map, and Future Street Plan
   - Sheet 2 – Preliminary Plat Map
   - Sheet 3 – Existing Conditions and Tree Retention Plan
   - Sheet 4 – Tree Tables
   - Sheet 5 – Master Street and Utility Plan
   - Sheet 6 – Street Sections
   - Sheet 7 – Street Tree Plan and Parking Analysis
   - Sheet 8 – Proposed Striping Plan
   - Sheet 9 – Preliminary Grading and Erosion Control Plan
   - Sheet 10 – Slope Analysis
D. Preliminary Storm Drainage Design and Calculations
E. Public Need Analysis
F. Traffic Impact Study
G. Arborist Report
H. Wetland Determination Report
I. Geotechnical Report

J. Revised Preliminary Plat (Revised September 29, 2020)
K. Revised Existing Conditions (Revised September 29, 2020)
L. Revised Tree Tables (Revised September 29, 2020)
M. Revised Master Street and Utility Plan (Revised September 29, 2020)
N. Building Footprint Plan for Lots 1-4 (Revised September 29, 2020)
O. Revised Arborist Report: Tree Retention (Revised September 29, 2020)
P. Tree Removal Plan
Q. Screening Concept Plan
R. Revised Traffic Analysis (Revised September 29, 2020)

Agency Comments:
S. City Engineer (February 20, 2020)
T. Sandy Fire District No. 72 (February 25, 2020)
U. PGE (February 25, 2020)
V. City of Sandy Transit (February 28, 2020)
W. City Transportation Engineer (February 28, 2020)
X. ODOT (March 20, 2020)
Y. City of Sandy Public Works (April 29, 2020)
Z. City Transportation Engineer (August 10, 2020)
AA. City Engineer (August 12, 2020)
BB. Sandy Fire District No. 72 (August 13, 2020)

Additional Documents from Staff:
CC. Pre-application Notes from January 10, 2018, October 10, 2018
DD. Incompleteness Letter dated January 27, 2020
EE. Completeness Letter dated February 14, 2020

Public Comments:
FF. Amelia Williams Robinson (April 23, 2020)
GG. Miriam Chmykhalov (April 23, 2020)
HH. Tom and Linda Hunt (April 26, 2020)
II. Vincent and Lynn Mandina (April 28, 2020)
JJ. Vadim and Miriam Verbelchul (April 28, 2020)
KK. Nicola Skinner (April 30, 2020)
LL. Kathleen Walker (May 1, 2020)
MM. David and Nancy Allan (May 1, 2020)
NN. Izaac McKenzie (May 1, 2020)
OO. Ann Ruhl (May 1, 2020)
PP. Lesley Lowe (May 1, 2020)
QQ. Lonnie Stermon (May 1, 2020)
RR. Tom and Linda Hunt (May 5, 2020)
SS. Gary and Val Roche (May 5, 2020)
TT. Gary and Val Roche (May 6, 2020)
UU. Scott Ruehrdanz (May 7, 2020)
VV. Marion Gunderson (May 26, 2020)
WW. Christian Vedder (May 27, 2020)

XX. Ann Smith Vedder (May 27, 2020)
YY. Susan Dulley (June 2, 2020)
ZZ. Yoshi Hosaka and Itsuo Hosaka (July 28, 2020)
AAA. Gary and Val Roche (July 31, 2020)
BBB. David and Nancy Allan (July 30, 2020)
CCC. David and Nancy Allan (July 31, 2020)
DDD. Dennis Fetter (August 3, 2020)
EEE. Jessica Hutson (August 5, 2020)
FFF. Lee Grundmeyer (August 6, 2020)
GGG. Izaac McKenzie (August 7, 2020)
HHH. Marilyn E. (August 10, 2020)
III. Ryan Clifford (August 14, 2020)
JJJ. Ann Ruhl (August 17, 2020)
KKK. Cameron Strey (August 20, 2020)
LLL. Katie Smith (August 20, 2020)
MMM. Scott Ruehrdanz (August 20, 2020)
NNN. Eileen Suchanek (August 20, 2020)
OOO. Ann Vedder (August 20, 2020)
PPP. Ann Vedder (August 20, 2020)
QQQ. Kelly French (August 20, 2020)
RRR. Rachael Ruehrdanz (August 20, 2020)
SSS. Lori Pyles (August 21, 2020)
TTT. Cameron Zebroff (August 21, 2020)
UUU. Heather Fitch (August 22, 2020)
VVV. Lonnie Stermon (August 23, 2020)
WWW. Nicola A. Skinner (August 24, 2020)
XXX. Izaac McKenzie (August 24, 2020)
YYY. Liza Chatterton (August 24, 2020)
ZZZ. Dough Marshall (August 24, 2020)
AAAA. Zoey McKenzie (August 24, 2020)
BBBB. Makoto Lane (August 24, 2020)
CCCC. Kathleen Walker (August 24, 2020)
DDDD. Ann Ruhl (October 27, 2020)

Revised Agency Comments
EEEE. City Engineer (October 9, 2020)
FFFF. ODOT (October 9, 2020)
GGGG. City Transportation Engineer (October 8, 2020)

Additional Exhibits
HHHH. Previous Staff Report (August 14, 2020)
IIII. Initial Power Point Presentation (August 24, 2020)
JJJJ. Memo from Tracy Brown (October 21, 2020)
KKKK. Email from Mike Robinson (October 26, 2020)
LLLL. Parks and Trails Advisory Board Minutes from June 10, 2020
MMMM. Parks and Trails Advisory Board Minutes from July 8, 2020

NNNN. Parks and Trails Advisory Board Recommendation (November 13, 2020)
OOOO. Revised Staff Report for Planning Commission (October 19, 2020)
PPPP. Second Power Point Presentation (October 26, 2020)

FINDINGS OF FACT

General

1. These findings are based on the applicant's submittals received on December 30, 2019, July 14, 2020, September 29, 2020, and other information as detailed in this document. Staff deemed the application incomplete on January 27, 2020. The applicant submitted additional materials on February 11, 2020. The application was deemed complete on February 14, 2020 and the original 120-day deadline was June 13, 2020. However, due to the unforeseen effects of COVID-19 affecting the timing of public hearings, the applicant agreed to a deadline extension of 30 days to July 13, 2020.

2. 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.

3. On May 13, 2020 the Development Services Director sent the applicant the following: "Instead of requesting 120-day extensions and going back and forth between the applicant and city staff we are going to invoke ORS 227.178 (10) to remove the 120-day clock provisions for the Bull Run Terrace application." Therefore, this application does not have a 120-day deadline as the proposal includes a comprehensive plan map amendment.

4. This report is based upon the exhibits listed in this document, as well as agency comments and public testimony.

5. The subject site is approximately 15.91 acres. The site is located at 40808 and 41010 Highway 26.

6. The parcel has a Comprehensive Plan Map designation of Village and a Zoning Map designation of R-1, Low Density Residential; R-2, Medium Density Residential; and C-3. Village Commercial.

7. This subject property was previously approved for an 88-lot subdivision known as Vista Loop South (File No. 05-029). Vista Loop South received a few tentative plat extensions and one plat reinstatement, but the subdivision was never constructed, and the approval expired in 2015.

8. The applicant, Roll Tide Properties Corp., requests a Type IV Zone Map Amendment, Comprehensive Plan Map Amendment, Specific Area Plan and development of a 7-lot subdivision for two parcels totaling approximately 15.91 acres. Four lots are proposed to have the R-1 zoning designation and are proposed to each contain a single family dwelling. One lot is proposed to have the R-3 zoning designation. One lot is proposed to have the R-2

zoning designation. The exact number of multifamily dwelling units will be determined with a subsequent design review application for these lots, but according to the applicant the maximum number of dwelling units on the R-3 land is 130 units and the maximum number of dwelling units on the R-2 land is 17 units for a total of 147 dwelling units. While the C-3 zoning district will have to contain some commercial development there is a decent chance the C-3 land will also contain some residential dwelling units. The development code allows for multi-family residential in the C-3 zoning district so long as the dwelling units are above, beside or behind a commercial business.

9. On September 29, 2020 the applicant submitted additional information as requested by staff and the Planning Commission. The additional information is included as Exhibits J through R, and include the following modifications:

    A. Revised Plan Sheets, including revised sheets for the Preliminary Plan (Exhibit J), Existing Conditions (Exhibit K), Tree Tables (Exhibit L), and the Master Street and Utility Plan (Exhibit M). These sheets include the following changes:

        a) The zoning designation proposed for Lot 5 has been modified from R-3 to a combination of R-2 and R-1. With this change the maximum allowed density on this lot is reduced by seven dwelling units from 24 units to 17 units.
        b) A 20-foot setback line is shown on all lots adjacent to Highway 26, Dubarko Road, and Street B.
        c) A 40 foot by 40 foot easement is shown at the Northeast corner of Lot 7 to accommodate a future traffic signal.
        d) The stormwater system is redesigned to eliminate the need for a stormwater easement and utility line along the west property line of Lots 1, 2, and 4. This modification to the stormwater system allows for five existing trees along the west lot line of the subdivision to be retained.
        e) An additional public stormwater facility has been added as Tract C to the west of Lot 5. New flow control and water quality manholes will also be installed to discharge stormwater into the existing storm system in Dubarko Road from this facility.
        f) The alignment of "Street B" is modified to provide a 300-foot centerline radius for this street per City of Sandy requirements.
        g) An additional Storm and Sanitary manhole are added in "Street B" to accommodate the new street geometry for this street.
        h) A meandering walkway is shown along the east side of the proposed park.
        i) Five additional trees located on Lots 2 and 4 are proposed to be retained.

    B. A building footprint plan (Exhibit N) for Lots 1 through 4 is included and details that each lot can accommodate a dwelling.

    C. A Revised Arborist Report (Exhibit O) is included detailing five additional retention trees on Lots 2 and 4. Retention of these trees was determined possible with the removal of the stormwater utility line.

D. A Tree Removal Plan (Exhibit P) is included to describe how tree removal adjacent to the proposed tree preservation easement on Lot 7 will be accomplished.

E. A Screening Concept Plan (Exhibit Q) is included detailing additional landscape plantings along the west property line of Lots 1, 2, and 4 and along Tracts B and C that are intended to partially screen this area of the proposed development from existing residences to the west.

F. A Revised Traffic Analysis (Exhibit R) is included to address ODOT comments.

10. While this proposal will undoubtfully increase traffic on Dubarko Road the Average Daily Traffic (ADT) concerns that were recently 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 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 is Fawn Street/Street A. The four proposed single family homes 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. To alleviate potential traffic concerns and to deter trips from heading west on Fawn Street staff recommends that trip distribution is limited from Lot 7. **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.**

11. Notification of the proposed application was mailed to affected agencies on February 14, 2020 and to affected property owners within 500 feet of the subject property on April 17, 2020. A correction to the notice was sent on May 5, 2020.

12. Due to concerns raised by City planning staff as well as by surrounding residents, the applicant requested additional time to modify the application for this proposed development. On May 21, 2020, a notification was mailed to affected property owners stating that the Planning Commission meeting was rescheduled to Monday, July 27, 2020 at 7:00 pm. The City Council meeting was rescheduled to Tuesday, September 8, 2020 at 7:00 pm.

13. After additional discussion, the applicant and City staff agreed to move the public hearing dates once more. A notice was sent on July 23, 2020 informing affected property owners that

the Planning Commission meeting will be held on August 24, 2020 and the City Council meeting on October 19, 2020.

14. A legal notice was submitted to the newspaper on August 5, 2020 to be published on August 12, 2020 informing residents of the public hearings.

15. During the Planning Commission meeting on August 24, 2020 the Commission granted a continuance of the public hearing. An additional Planning Commission hearing was scheduled for October 26, 2020.

16. On October 26, 2020 the Planning Commission reconvened to continue the public hearing for Bull Run Terrace. After hearing additional input from staff, the applicant, and the public the Planning Commission made the following motion:

    Motion: Motion to recommend to the City Council approval of the application per the staff report, with an additional condition of approval to implement a trip cap per the transportation analysis.
    Moved By: Commissioner Mobley
    Seconded By: Commissioner Maclean-Wenzel
    Yes votes: Carlton, Lesowski, Maclean-Wenzel, Logan, Mobley and Mayton
    No votes: None
    Abstentions: None

17. Agency comments were received from the City Transportation Engineer, City Engineer, Sandy Transit, Public Works, ODOT, Sandy Fire District No. 72, and PGE. Revised comments were received from the City Engineer, ODOT, and the City Transportation Engineer (Exhibits, EEEE, FFFF, and GGGG).

18. At publication of this staff report 59 written public comments were received. The main concerns expressed by residents include the following:

    A. The loss of trees, thus lowering the aesthetic quality of the area as well as privacy for existing homes.
    B. The capacity of the police to effectively patrol multi-family dwelling areas.
    C. The possibility of criminal activity at multi-family dwelling areas.
    D. Being previously told that the land would not be developed as residential.
    E. Acres of commercial land use being put into a deficit.
    F. Concerns about effects of multi-family housing on property values.
    G. Requests for developers to pay the full cost of development-related infrastructure improvements.
    H. The development not being aligned with the city's Comprehensive Plan.
    I. Concerns about the zoning change not meeting the intent of SDC Chapter 17.26.

19. Staff is sympathetic to all concerns raised by the public but does not know of any research which shows that an increase in multi-family housing decreases property values for single family homes. There is certainly nothing within the Sandy municipal code which relates

multi-family housing and property values, nor is there a way to evaluate this. Furthermore, 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 5.01 acres of R-2 designated land.

17.24 – Comprehensive Plan Amendment Procedures

20. Chapter 17.24, Comprehensive Plan Amendment Procedures, contains review criteria for Comprehensive Plan amendments. The comprehensive plan map change and 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). The Comprehensive Plan states that area and density increase within a village may be increased or decreased up to 20 percent. Changes greater than 20 percent will require a Plan Map amendment. The applicant's analysis shows that the maximum residential density with the existing zoning designations on the R-2 and R-1 lands is 101 dwelling units. The applicant's analysis shows that the maximum residential density with the proposed zoning designations on the R-3, R-2, and R-1 lands is 152 dwelling units. It should be noted that this doesn't include the potential dwelling units on the C-3 land. Therefore, the potential increase in residential density is 38.2 percent which exceeds the threshold as defined in the comprehensive plan. Therefore, a Plan Map amendment is required.

21. Section 17.24.70 (A) specifies the change being proposed is the best means of meeting the identified public need. This proposal achieves some major goals consistent with long range planning objectives in the City of Sandy, including but not limited to the following:
    A. Extending Dubarko Road to intersect with Highway 26 consistent with the Transportation System Plan that was adopted in 2011;
    B. Installing Street B to the south consistent with the Transportation System Plan that was adopted in 2011;
    C. Extending Fawn Street to the east;
    D. Expanding the Deer Pointe park consistent with the goals of the Parks and Trails Advisory Board and the current revisions that are being considered for the Parks and Trails Master Plan;
    E. Creating available commercial land in the C-3 zoning district consistent with the 2040 Plan that was created in 1997;
    F. Fulfilling housing needs as defined in the Urbanization Study that was adopted in 2015; and,
    G. Providing a mixture of housing types consistent with the goals of the 2040 Plan that was created in 1997.

22. The City Council adopted an updated Urbanization Study in February 2015 (Ordinance 2015-01). This study projected the land needs for the Urban Growth Boundary to the year 2034 and concluded there is expected to be a surplus of 13.9 acres of high density residential land and a deficit of 51.8 acres of commercial land for the planning period. The proposed change

would increase the commercial land supply by 0.77 acres and reduce the residential land supply by the same amount.

23. The applicant's original proposed modifications would have resulted in the following:

    Commercial = deficit of 1.71 acres (previously a surplus of 1.13 acres)
    Low Density Residential = surplus of 11.74 acres (previously a surplus of 19.2 acres)
    Medium Density Residential = surplus of 12.09 (previously a surplus of 17.1 acres)
    High Density Residential = surplus of 23.60 acres (previously a surplus of 12.6 acres)
    Industrial is not applicable to this application

24. Because the original proposal would have resulted in a deficit of the 20-year supply of commercial lands and created a Goal 9 violation, the applicant revised their proposal to include commercial land. Additionally, the applicant further revised their application to include R-2 land.

25. The applicant's revised proposal will result in the following:

    Commercial = surplus of 1.90 acres (previously a surplus of 1.13 acres)
    Low Density Residential = surplus of 11.74 acres (previously a surplus of 19.2 acres)
    Medium Density Residential = surplus of 13.32 (previously a surplus of 17.1 acres)
    High Density Residential = surplus of 19.28 acres (previously a surplus of 12.6 acres)
    Industrial is not applicable to this application

    The applicant's surplus numbers on page 11 of their narrative are slightly different, but the above numbers are the correct numbers based on recent comprehensive plan map amendments.

26. Section 17.24.70(B) requires the change to conform to all applicable Statewide Planning Goals.

    Goal 1: Citizen Involvement
    The application is being reviewed through a Type IV process that requires at least two public hearings. A public notice was sent to adjoining property owners, a legal notice published in the Sandy Post, and a notice of the proposal was sent to the Department of Land Conservation and Development. The Planning Commission reviewed the application at a public hearing on August 24, 2020 and continued the hearing to October 26, 2020. On October 26, 2020 the Planning Commission made a recommendation to approve the request. On November 30, 2020 the City Council will hold a public hearing to most likely make a decision 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 G). 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. That said, staff finds that to adequately protect the required retention trees on Lot 7 the protection area shall be consistent with Chapter 17.92. **The applicant shall install tree protection fencing at the critical root zone of 1 foot per 1 inch DBH to protect the 64 retention trees 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 up to 1.426 acres of parkland to the City. 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 current revisions that are being considered for the Parks Master Plan. Staff finds that parkland dedication is preferable so long as the development to the east of the park is complementary to the parkland. As explained below, 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 or east of the parkland, but instead is proposing future commercial development. The applicant's narrative states, "in order to address the spirit of the requirement in this section, the applicant proposes constructing a widened sidewalk along the eastern park frontage adjacent to Lot 7". 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 commercial development (albeit mixed use or traditional commercial) having active

storefronts or patios 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. Additionally, this kind of "active frontage" creates pedestrian interest and engagement. **Staff recommends that the design review approval for Lot 7 shall be conditioned to incorporate storefronts, patios 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 M) 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. **Staff recommends that the applicant 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. Staff also recommends that the design review approval for Lot 7 incorporate a landscape buffer that provides visibility between Lot 7 and the parkland but provides a visually attractive separation.**

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 revised 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 modifications to the comprehensive plan increases the potential diversity in housing types by providing additional multi-family housing.

Goal 11: Public Facilities and Services
Not Applicable

Goal 12: Transportation
The applicant contracted with a Traffic Engineer to prepare a Traffic Impact Study (Exhibit F). With development of this project, Dubarko Road will be extended through the property to connect with Highway 26. The submitted traffic study evaluated five existing intersections to determine if they are expected to operate within capacity under year 2021 traffic conditions either with or without the addition of site trips from the proposed development. The study did not identify any required mitigation. According to the traffic study, the proposed development would produce 71 peak AM trips, 86 peak PM trips, and 1,114 total daily trips. The proposed zone change is projected to result in a significant change to traffic volumes as measured under the "reasonable worst case" development scenarios and therefore will have a significant effect on operation of area roadways and intersections at the planning horizon as defined by Oregon's Transportation Planning Rule. Accordingly, some form of mitigation is necessary to meet

the requirements of Oregon's TPR. The City Transportation Engineer (Exhibits AA and GGGG) states that the development will implement a key project in the city's TSP, namely Dubarko Road. 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.** ODOT states (Exhibit FFFF), "The TIS has identified that 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. The study 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. ODOT is supportive of the proposed trip cap." The City Transportation Engineer (Exhibit GGGG) 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.**

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 shown in Finding 21, 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.

17.26 – Zoning District Amendments

27. The applicant is proposing a change in zoning districts as shown in the following table:

Zoning District	Existing Acres	Proposed Acres
R-1	8.05	0.59
R-2	5.01	1.23
R-3	0.00	6.50
C-3	2.84	3.61

28. Chapter 17.26 sets forth review criteria and procedural requirements for quasi-judicial and legislative zoning map amendments. The applicant is requesting a quasi-judicial zoning map amendment to modify the zoning district boundaries for the site.

29. Section 17.26.40 outlines the procedures for a quasi-judicial zoning map amendment.

30. 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 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.

31. 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.

32. 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.

17.30 – Zoning Districts

33. The total gross acreage for the entire property is 15.91 acres. After removal of the right-of-way and proposed parkland tract, the net site area (NSA) for the subject property is reduced to 11.59 net acres with four zoning districts. The area proposed to be zoned R-1 contains 0.59 net acres. The area proposed to be zoned R-2 contains 1.23 net acres. The area proposed to be zoned R-3 contains 6.50 net acres. The area proposed to be zoned C-3 contains 3.61 net acres.

34. For the area zoned R-1, a minimum of 5 and a maximum of 8 units per acre are allowed. 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. The minimum density for the subject area is .59 net acres x 5 units/net acre = 2.95 rounded down to 2 units. The maximum density for the subject area is .59 net acres x 8 units/net acre = 4.72 rounded up to 5 units. The applicant is proposing 4 units which is within the density range.

35. For the area zoned R-2, a minimum of 8 and a maximum of 14 units per acre are allowed. The minimum density for the subject area is 1.23 net acres x 8 units/net acre = 9.84 rounded up to 10 units. The maximum density for the subject area is 1.23 net acres x 14 units/net acre = 17.22 rounded down to 17 units. The applicant has not identified the exact number of units which will be built in the subject area. **This will be reviewed in a future design review process.**

36. For the area zoned R-3, a minimum of 10 and a maximum of 20 units per acre are allowed. The minimum density for the subject area is 6.5 net acres x 10 units/acre = 65 units. The maximum density for the subject area is 6.5 net acres x 20 units/acre = 130 units. The applicant has not identified the exact number of units which will be built in the subject area. **This will be reviewed in a future design review process.**

17.32 – Parks & Open Space (POS)

37. The applicant proposes dedicating some parkland and zoning the land as Parks and Open Space (POS).

38. Section 17.32.10 contains the permitted uses in the POS zoning district. The applicant proposes a park dedication consistent with parkland in the Parks Master Plan per Section 17.32.10 (A)(1).

17.36 – Low Density Residential (R-1)

39. The applicant proposes constructing four single-family dwellings as permitted in this zoning district. As shown in paragraph 19, the applicant is proposing an appropriate number of units given density requirements.

40. Section 17.36.30 contains the design standards for this zone. As shown on Sheet C2 of the plan set (Exhibit C), all lots in the proposed subdivision contain at least 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 this road. Access to this lot will be across an access easement on Lot 3. The proposed building footprints shown on Sheet C2 indicate that all lots are capable of complying with applicable setbacks in the zone. The details of these development standards will be reviewed with the submittal of building permits.

41. Section 17.36.40(A) requires that water service be connected to all dwellings in the proposed subdivision. Section 17.36.40(B) requires that all proposed dwelling units be connected to sanitary service if currently within 200 feet from the site, which it is. Section 17.36.40(C) requires that the location of any real improvements to the property must provide for a future street network to be developed. Section 17.36.40(D) requires that all dwelling units must have frontage or approved access to public streets. The applicant proposes to meet all of these requirements.

42. 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.

43. Staff questioned the building potential of Lots 3 and 4 on the original applicant submission. Since the previous hearing, the applicant provided more information about these lots' buildable areas and staff's concerns have been satisfied.

17.38 – Medium Density Residential (R-2)

44. The applicant is proposing 1.23 net acres of R-2 land. As noted in Finding 33, the applicant will be allowed to develop between 10 and 17 dwelling units on the subject property.

45. **The future design review application will include a review of development standards and requirements.**

17.40 – High Density Residential (R-3)

46. The applicant is proposing 6.5 net acres of R-3 land on one lot. As noted in Finding 34, the applicant will be allowed to develop between 65 and 130 dwelling units on the subject property. The exact number of units in this zoning district will be determined with a future design review application.

47. **The future design review application will include a review of development standards and requirements.**

17.46 – Village Commercial (C-3)

48. The applicant proposes 3.61 net acres of C-3 land. This is an increase in commercial land by 0.77 acres. While the C-3 zoning district will have to contain some commercial development there is a decent chance the C-3 land will also contain some residential dwelling units. The exact number of potential residential units is not known at this time. If residential units are proposed on the C-3 land the dwelling units will be assessed in a future design review.

49. **Any future development on the land zoned C-3 will require a design review in accordance with the development standards found in Section 17.46.30 and the Sandy Municipal Code.**

17.54 – Specific Area Plan Overlay

50. 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."

51. 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".

52. The applicant proposes shifting of zoning district boundaries 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. That said, staff finds that to adequately protect the required retention trees on Lot 7 the protection area shall be consistent with Chapter 17.92. **The applicant shall install tree protection fencing at the critical root zone of 1 foot per 1 inch DBH to protect the 64 retention trees on the subject property.** Additional 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 the plan set shall be modified to detail additional right-of-way to accommodate the swales.**

53. 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 and zone map change proposes to add High Density Residential (R-3) and Parks and Open Space (POS), increase Village Commercial (C-3), remove Medium Density Residential (R-2), and reduce Low Density Residential (R-1). The Comprehensive Plan states that area and density increase within a village may be increased or decreased up to 20 percent. Changes greater than 20 percent will require a Plan Map amendment. The applicant's analysis shows that the maximum residential density with the existing zoning designations on the R-2 and R-1 lands is 101 dwelling units. The applicant's analysis shows that the maximum residential density with the proposed zoning designations on the R-3 and R-1 lands is 163 dwelling units. Therefore, the potential increase in residential density is 61.9 percent which exceeds the threshold as defined in the comprehensive plan.

54. 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.

55. 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.

56. 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. The applicant's narrative elaborates on the objectives of their proposal and the desire to include a few single family dwellings, multi-family dwellings, and village commercial development. The narrative also elaborates on dedications, including 1.43 acres of parkland.

    B. Site and Context. A map of the site and existing context shall identify the project area. The applicant submitted a 10-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, with the exception of Lot 7, which is the Village Commercial lot. The development of 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 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, Public Works Director, ODOT, Fire Marshal and the Transit Director 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 proposal includes increasing the amount of available commercial lands by 0.77 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.

17.56 – Hillside Development

57. The applicant submitted a Geotechnical and Slope Stability Investigation (Exhibit I) 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 I) shall be conditions for development.** The Public Works Director

stated the following: "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.**

17.74 –Accessory Development

58. 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.**

17.80 – Additional Setbacks on Collector and Arterial Streets

59. 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 J) details the 20-foot setbacks to Highway 26, Dubarko Road, and Street B.

17.82 – Special Setbacks on Transit Streets

60. 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. 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 Road and a new local street. **The dwellings on Lots 3 and 4 shall be designed to meet all of the requirements as specified in Chapter 17.82 and will be assessed in a future design review.**

61. The applicant proposes that all single-family units will meet the requirements of Section 17.82.20(B), which requires that dwellings shall have a primary entrance connecting directly between the street and building interior and outlines requirements for the pedestrian route. **The adherence to this code section for the future multi-family units will be determined in a future design review process.**

62. The applicant proposes that all single-family units will meet the requirements of Section 17.82.20(C), which 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 adherence to this code section for the future multi-family units will be determined in a future design review process.**

63. 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 will be determined in a future design review process.**

17.84 – Improvements Required with Development

64. Section17.84.20(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.**

65. 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.

66. As required by Section 17.84.39(A)(2), 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 planter strips as required. As required by Section 17.84.39(A)(4), the applicant intends to construct all sidewalk improvements as required by this section.

67. No exceptions or modifications listed in Section 17.84.39(A)(3) are requested with the application.

68. In relation to Sections 17.84.39(B), 17.84.39(C), 17.84.39(D), and 17.84.39(E), no pedestrian or bicycle facilities other than sidewalks and on-street bicycle lanes have been identified or proposed in the application.

69. Section 17.84.40(A) requires that the developer construct adequate public transit facilities. **The proposed development will require 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 1 and Lot 5. Engineering specifications are available from the Transit Department.**

70. Section 17.84.50 outlines the requirements for providing a traffic study. The applicant included a Traffic Impact Study with the application (Exhibits F and R). The study did identify some required mitigation. According to the revised traffic study, the proposed residential development (not including the commercial lot) would produce 71 peak AM trips, 86 peak PM trips, and 1,114 total daily trips. The proposed zone change is projected to potentially result in a significant increase in traffic volumes as measured under the "reasonable worst case" development scenarios and therefore may have a significant effect on operation of area roadways and intersections at the planning horizon as defined by

Oregon's Transportation Planning Rule. Accordingly, some form of mitigation is necessary to meet the requirements of Oregon's TPR. The City Transportation Engineer (Exhibit M) states that the development will implement a key project in the city's TSP, namely Dubarko Road. 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.** ODOT states (Exhibit FFFF), "The TIS has identified that 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. The study 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. ODOT is supportive of the proposed trip cap." The City Transportation Engineer (Exhibit FFFF) 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.**

71. The proposed street and utility plan depicts Dubarko Road between its current eastern terminus and proposed Street A with a 76 ft. wide right-of-way consisting of a 0.5 foot monumentation strip, a six-foot sidewalk, a five-foot planter strip, a 0.5 foot curb, a five foot bike lane, a 17-foot travel lane and half of an 8 foot median (i.e. 4 feet) for a total half section equaling 38 feet and a full street section equaling 76 feet. 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 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.**

72. 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. The City Transportation Engineer (Exhibit M) states that a traffic signal at Dubarko Road and Highway 26 will be needed in the near future based on future development but did not recommend a traffic signal at this time. The revised Preliminary Plat (Exhibit J) details a 40 foot by 40 foot traffic signal easement. 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. 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).

73. 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). **The alignment of the intersection of Street B and Dubarko Road shall be revised to provide the minimum 100 feet of tangent section to comply with the Development Code or as otherwise approved by the City Engineer.**

74. 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.**

75. Dubarko Road will contain a dedicate 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 Public Works Director 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.

76. The proposed development does not include any long straight street segments or cul-de-sac streets and is thus not required to follow the standards in Section 17.84.50(C).

77. Section 17.84.50(D) requires that development sites shall be provided with access from a public street improved to City standards. 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. All new streets are proposed as full street improvements with the exception of improvements along Highway 26. No off-site improvements have been identified or are warranted with the construction of this subdivision. All streets are proposed as full streets; with no three-quarter streets being proposed.

78. 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.**

79. 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.

80. Proposed streets meet the requirements of 17.94.50(H). The future street plan (Exhibit C, Sheet 1) 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). No private streets are proposed in the development.

81. Section 17.84.60 outlines the requirements of public facility extensions. The applicant submitted a utility plan (Exhibit C, Sheet 5) 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.

82. Franchise utilities will be provided to all lots within the proposed subdivision as required in Section 17.84.80. The location of these utilities will be identified on construction plans and installed or guaranteed prior to final plat approval. The applicant does not anticipate extending franchise utilities beyond the site. All franchise utilities other than streetlights will be installed underground. The developer will make all necessary arrangements with franchise utility providers. The developer will install underground conduit for street lighting.

83. 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.

84. Section 17.84.100 outlines the requirements for mail delivery facilities. **The location and type of mail delivery facilities shall be coordinated with the City Engineer and the Post Office as part of the construction plan process.**

85. 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.

86. The intersection of Dubarko Road and Highway 26 requires a grant of access from ODOT. **Prior to final plat approval the applicant shall obtain a grant of access or other necessary approval from ODOT for access to Highway 26 at Dubarko Road.**

87. The City Transportation Engineer (Exhibit M) stated that conditions of approval should be included requiring the development comply with the standards and procedures specified by ODOT. He went on to say that ODOT requirements and standards associated with frontage improvements where the development abuts Highway 26 shall be made conditions of approval with the development.

17.86 – Parkland and Open Space

88. The applicant intends to dedicate parkland as outlined in the requirements of Section 17.86.

89. 17.86.10(2) contains the calculation requirements for parkland dedication. The formula is acres = proposed units x (persons/unit) x 0.0043. For the four single family homes, acres = 4 x 3 x 0.0043 = 0.05 acres. For the maximum development of 147 multifamily units, acres = 147 x 2 x 0.0043 = 1.26 acres. Combined, this totals 1.31 acres. The applicant proposes to dedicate 1.426 acres of parkland and is thus in compliance with this requirement.

90. If the applicant proposes multifamily dwellings as part of the development of Lot 7 which is proposed to be zoned C-3 the applicant is eligible for parks fee in-lieu credit up to 0.11 acres (the rounded difference between the required amount of parkland dedication and the proposed amount of parkland dedication). **The applicant can propose up to 13 multifamily units (13 x 2 x 0.0043 = 0.11 acres) prior to incurring parks fee in-lieu charges. Anything beyond 13 multifamily units on Lot 7 will incur parks fee in-lieu fees per the calculations as defined in the Sandy Development Code. However, if the applicant does not propose any multifamily units on Lot 7 the applicant will not be owed a monetary credit.**

91. 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 or east of the parkland, but instead are proposing future commercial development. The applicant's narrative states, "in order to address the spirit of the requirement of this requirement in this section, the applicant proposes constructing a widened sidewalk along the eastern park frontage adjacent to Lot 7". 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 commercial development (albeit mixed use or traditional commercial) having active storefronts or patios 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. **Staff recommends that the design review approval for Lot 7 shall**

be conditioned to incorporate storefronts, patios 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 M) 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. **Staff recommends that the applicant 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. Staff also recommends that the design review approval for Lot 7 incorporate a landscape buffer that provides visibility between Lot 7 and the parkland but provides a visually attractive separation.**

92. On June 10, 2020, the applicant brought the parkland dedication proposal to the Sandy Parks and Trails Advisory Board. At the meeting, the Board verbally agreed to provide the applicant SDC credits in exchange for development of the park.

93. The Parks and Trail Advisory Board provided a set of recommendations (exhibit NNNN) which contains a recommendation for the City to pursue a development agreement with the developer to include the following: Allow the developer to make initial improvements to the newly configured Deer Pointe Park in place 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 prior to final plat approval or as otherwise established in a development agreement.**

94. 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 applicant shall also provide a Phase I Environmental Assessment.**

95. 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.**

17.92 – Landscaping and Screening

96. Section 17.92.10 contains general provisions for landscaping. As required by Section 17.92.10 (C), trees over 25-inches circumference measured at a height of 4.5 feet above grade are considered significant and should be preserved to the greatest extent practicable and integrated into the design of a development. A 25-inch circumference tree measured at 4.5 feet above grade has roughly an eight-inch diameter at breast height (DBH). Based on the Planning Commission interpretation from May 15, 2019, Subsection 17.92.10(C) does not apply to residential subdivisions. Tree protection fencing and tree retention 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.

97. Section 17.92.20 lists the requirements for minimum landscaping improvements. **The details of this section will be considered with submittal of a design review application for the proposed multi-family units and commercial property.**

98. 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 D, Sheet 7) does not show the distance between trees. **The applicant shall update the Street Tree Plan to show the distance between trees, and this distance shall be 30 feet on center.**

    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 either aerate the planter strip soil at the subdivision stage and install fencing around the planter strips to protect the soil from compaction or shall aerate the soil at the individual home construction phase.**

    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).

99. 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.**

100. 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 specifies to City staff for review and approval concurrent with construction plan review.**

101. 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.**

102. 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 Q). The applicant is proposing to retain five additional conifers (Exhibit O), 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 Q) along Lots 1, 2, 4, and Tracts B and C. Deciduous trees shall be at least 1.5 inches at planting and the cedars shall be at least 6 to 8 feet in height at planting.**

103. 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.**

17.98 – Parking, Loading, and Access Requirements

104. 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 7.

105. Section 17.98.20(A) requires that each single family dwelling unit is required to provide at least two off-street parking spaces. **Compliance with this requirement 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.**

106. Section 17.98.60 has specifications for parking lot design and size of parking spaces. No lots are proposed to gain access from an arterial or collector street (17.98.80).

107. Section 17.98.90 requires that all streets proposed will be improved to city standards.

108. 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. Staff has concerns with the proposed driveway on Lot 7 as it's within 150 feet of the intersection of Dubarko Road and Highway 26. **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.**

109. Section 17.98.110 outlines the requirements for vision clearance. **The requirements of this section will 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.**

110. 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.**

111. 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 7 shows that 20 on-street parking spaces have been identified in compliance with this standard. No parking courts are proposed by the applicant.

17.100 – Land Division

112. 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.**

113. Pre-application conferences were held with the City on January 10, 2018, June 12, 2018, and October 10, 2018 per 17.100.60(A).

114. As required by Section 17.100.60(E), the proposed subdivision is designed to be consistent with the density, setback, design standards, dimensional standards in the R-1 zoning district. **The details of the development in the R-3 and R-2 districts will be addressed with a future design review application.** As illustrated in Exhibit C, Sheet 1, the proposed street system is consistent with the City's Transportation System Plan and Comprehensive Plan. The City has indicated that all public facilities have capacity to serve the proposed subdivision. All improvements in the proposed development are designed in compliance with City standards. The applicant proposes developing the subdivision in a single phase.

115. Section 17.100.60(E)(1) requires subdivisions to be consistent with the density, setback, and dimensional standards of the base zoning district, unless modified by a Planned Development approval. The application for the subdivision is being processed through a Type IV procedure. The proposal is consistent with density and other dimensional standards of the base zoning district.

116. Section 17.100.60(E)(2) requires subdivisions to be consistent with the design standards set forth in this chapter. Consistency with design standards in this chapter are discussed under each subsection below. Conditions of approval can be adopted where necessary to bring the proposal into compliance with applicable standards.

117. 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 and extending Street B to the south.

118. Section 17.100.60(E)(4) requires that adequate public facilities are available or can be provided to serve the proposed subdivision. All public utilities including water, sewer and stormwater are available or will be constructed by the applicant to serve the subdivision. The applicant also intends to dedicate public parkland, the calculation of which can be found in the review of Chapter 17.86 in this document.

119. Section 17.100.60(E)(5) requires all proposed improvements to meet City standards through the completion of conditions as listed within this final order and as detailed within these findings. The detailed review of proposed improvements is contained in this report. Staff has identified a few aspects of the proposed subdivision improvements requiring additional information or modification by the applicant, but conditions of approval can be adopted to bring the proposal into compliance with City standards. In order to meet the standards as defined in the Sandy Development Code the applicant shall submit items for staff to analyze prior to earthwork, grading, excavation, or construction.

120. 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. That said, the applicant is proposing that the design of the multi family dwellings occurs at a future date.

121. Section 17.100.80 provides standards for denial of a development application due to physical land constraints. The subject site does not contain any physical constraints that would make it unsuitable for the proposed subdivision.

122. The subject property abuts Highway 26 and notification of the proposal was sent to ODOT as required by Section 17.100.90.

123. As required by 17.100.100(A), a traffic impact study prepared in compliance with the City standards was submitted with the application (Exhibit F). With the exception of a revised

striping plan, frontage improvements on the Highway 26 frontage, and applying a trip cap to the subject property, this study does not identify any issues requiring mitigation by the applicant.

124. None of the special traffic generators listed in section 17.100.100(B) are located near the subject site.

125. While 17.100.100(C) calls for a rectangular grid pattern, the proposed street layout is predominantly controlled by the alignment of Dubarko Road that will be extended through the site from the current terminus to connect with Highway 26. The future street plan details Street B extending south consistent with the TSP. The only other street in the subdivision is the extension of Street A into the property. The proposed intersection of Street A and Dubarko Road seems logical and appropriate considering the nearby intersection of Dubarko Road and Highway 26. Staff finds that the proposed street layout represents a logical street pattern.

126. A future street plan in compliance with the requirements of 17.100.100(D) is included in Exhibit C, Sheet 1.

127. Given the requirements in Section 17.100.100(E), the proposed street layout on the subject property is limited because of the alignment of Dubarko Road, Street B, and the location of Fawn Street extended into the property. In addition, because the development type includes two large lot multi family development sites, the street network is further limited. Given these facts, the proposed street layout represents a logical design.

128. 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. **Staff recommends the applicant 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.**

129. 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 J) details a 40 foot by 40 foot traffic signal easement.

130. 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. **Staff recommends the applicant modify the plat to include a vehicular easement on Lot 4 as necessary to accommodate maneuvering for vehicles on Lot 3.**

131. 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.

132. All streets in the proposed subdivision have a minimum curve radius as required by Section 17.100.180(B).

133. 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.

134. 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).

135. 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.

136. 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 29 feet of frontage along a public street therefore meeting the requirements of Section 17.100.220(C).

137. 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).

138. 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 Public Works Director the existing 8-inch diameter water line resides in an easement granted to the City of Sandy recorded at 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 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 Rd. connected to the existing 18-inch water line at the west end of the site and the existing 12-inch line on Highway 26.** Due to the elevation of the site relative to the existing water reservoirs on Vista Loop Drive this line will be a low-pressure, high volume line and will be used for fire protection. The cost difference between a standard diameter water line and the required 18-inch water line is eligible for Water System Development Charge (SDC) credits. The amount of the credit provided will be based on the Water System Construction Cost Credit table in the Water System Development Charge Methodology adopted by City Council motion on September 5, 2017. Section 17.84.60D SMC states: "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)". **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 cost difference between a standard diameter (8 inch) water line and the required 12-inch water line is eligible for Water System Development Charge (SDC) credits. The amount of the credit provided will be based on the Water System Construction Cost Credit table in the Water System Development Charge Methodology adopted by City Council motion on September 5, 2017.

139. 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. According to the Public Works Director the recently adopted Wastewater System Facilities Plan (2019) identified a capacity deficiency in the Southeast pump station and force main as well as several conveyance lines downstream. The City will adopt a Sanitary Sewer SDC surcharge on each Equivalent Residential Unit developed in the basin served by the Southeast pump station. The surcharge amount will be calculated by dividing the estimated cost of the required capacity improvements by the estimated number of dwelling units that can be built in the pump station drainage basin. The surcharge will be collected with each building permit issued in the basin.

140. Section 17.100.250(A) details requirements for stormwater detention and treatment. A public stormwater quality and detention facility is proposed as Tract B to be located north of Lot 1 and south of the Fawn Street extension. This facility has been sized and located to accommodate the water quality and stormwater detention needs of all streets in addition to Lots 1-4. The applicant submitted a revised utility plan (Exhibit M) detailing a second stormwater facility identified as Tract C in the SW corner of the property. The revised utility plan also removed the 15 foot wide public stormwater easement and utilities along the west lot line of Lots 1, 2, and 4. The water quality and detention needs of Lots 5-7 will be accommodated on each of those lots and stormwater from Lots 5 and 6 will be routed to flow through Tract B. After onsite detention and water quality treatment, stormwater from Lot 7 will be piped and connected to the existing storm line in the park. **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).

141. 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.**

142. 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 7.

143. Grass seeding shall be completed as required by Section 17.100.300. The submitted preliminary Grading and Erosion Control Plan (Exhibit C, Sheer 9) provides additional details to address erosion control concerns. A separate Grading and Erosion Control Permit will be required prior to any site grading. Erosion control requirements are defined in greater detail in Chapter 15.44 of this document.

17.102 – Urban Forestry

144. Section 17.102.20 contains information on the applicability of Urban Forestry regulations. An Arborist Report is included as Exhibit G. 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. The inventory is included in Exhibit C, Sheet 4 and the proposed retention trees are shown in Exhibit C, Sheet 3.

145. The property contains 15.91 acres requiring retention of 48 trees, 11 inches and greater DBH (15.91 x 3 = 47.73). The applicant is proposing to retain an additional five trees on Lots 2 and 4 (Tree Nos. 13439, 13440, 13441, 13421, and 13423). The revised submitted plan (Exhibit O) identifies 64 trees that will be retained. All of the trees proposed for retention are conifers, primarily Doug fir, at least 11 inches DBH, and in good condition as identified by the arborist.

146. A majority of the proposed retention trees are located along Highway 26 in Lot 7, which is proposed to be zoned C-3, Village Commercial. As indicated on the Preliminary Plat (Exhibit C, Sheet C-2), the applicant is proposing to place a conservation easement over an area that encompasses the retention trees along Highway 26, including their critical root zones. Staff believes there could be a future conflict between retention trees along the Highway and future commercial property visibility on Lot 7.

147. The Arborist Report (Exhibit G) provides recommendations for protection of retained trees including identification of the recommended tree protection zone for these trees. The requirements of 17.102.50(B) will be complied with prior to any grading or tree removal on the site. **The applicant shall install tree protection fencing at the critical root zone of 1 foot per 1 inch DBH to protect the 64 retention trees on the subject property as well as all trees on adjacent properties. 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) 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. 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.

148. The Tree Preservation Plan (Exhibit C) 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 in a way that does not harm or damage adjacent trees.** The applicant submitted a Tree Removal Plan (Exhibit P) 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. Staff recommends that the applicant not fully remove all the trees adjacent to the retention trees but rather leave snags. **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.**

149. **To ensure protection of the required retention trees, the applicant shall record a tree protection covenant specifying protection of trees on the subject property and limiting removal without submittal of an Arborist's Report and City approval.**

15.30 – Dark Sky

150. 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.**

15.44 – Erosion Control

151. The applicant submitted a Geotechnical Engineering Report (Exhibit I) prepared by GeoPacific Engineering, Inc., dated August 16, 2005. The Public Works Director stated the following: "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.**

152. **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.**

153. 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.**

154. Recent development has sparked unintended rodent issues in surrounding neighborhoods. Prior to development of the site, **the applicant shall have a licensed pest control agent evaluate the site to determine if pest eradication is needed.**

RECOMMENDATION:

The Planning Commission 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 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) Extending Fawn Street to the east;
4) Expanding the Deer Pointe park consistent with the goals of the Parks and Trails Advisory Board and the current revisions that are being considered for the Parks and Trails Master Plan;
5) Creating available commercial land in the C-3 zoning district consistent with the 2040 Plan that was created in 1997;
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.

CONDITIONS:

A. The applicant shall submit a complete set of revised plans to the Planning Division with the following revisions:

1. Fire turnaround easements on Lots 5 and 6 as approved by the Sandy Fire District Fire Marshal.

2. Detail the alignment of the intersection of Street B and Dubarko Road to provide the minimum 100 feet of tangent section or as otherwise approved by the City Engineer.

3. Modify the plat to include a vehicular easement on Lot 4 as necessary to accommodate maneuvering for vehicles on Lot 3.

B. 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 is needed.

5. Submit revised plans detailing how the traffic signal easement will impact the tree retention area.

6. Install tree protection fencing at the critical root zone of 1 foot per 1 inch DBH to protect the 64 retention trees on the subject property as well as all trees on adjacent properties. 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) 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. 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. 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.

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.

C. 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 Public Works 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.

3. 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).

4. 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 affect on-street parking spaces.

5. Submit a revised cross-section for the portion of Dubarko Road between the existing terminus and Street A.

6. Specify the locations of street lights on all streets being improved within and adjacent to the subdivision. Street lights shall be full cut-off, shall not exceed 4,150 Kelvins, and

shall conform to the Dark Sky standards of Chapter 15.30. The locations of light fixtures shall be reviewed in detail with construction plans.

7. 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.

8. Submit additional details/confirmation on any proposed retaining walls, including heights meeting code requirements and an architectural finish.

9. 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.

10. Submit a revised utility plan to include broadband fiber locations as detailed by the SandyNet Manager.

11. Call PGE Service Coordination at 503-323-6700 when the developer is ready to start the project.

12. Explore locations for green street swales. If green streets are practicable the plan set shall be modified to detail additional right-of-way to accommodate the swales.

13. 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.

D. 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 plan review, inspection and permit fees as determined by the Public Works Director.

3. Pay addressing fees at $40 for the subdivision plus $5 per lot.

4. Obtain a grant of access or other necessary approval from ODOT for access to Highway 26 at Dubarko Road.

5. 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) 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 1 and Lot 5. Engineering specifications are available from the Transit Department.
c) Replace the existing waterline with an 8 inch diameter water line at a depth approved by the City Engineer.
d) An 18 inch water line in Dubarko Rd. connected to the existing 18 inch water line at the west end of the site and the existing 12 inch line on Highway 26.
e) 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.

6. Clear, grade, and seed the proposed parkland as specified by the City in the construction plans. The applicant shall also provide a Phase I Environmental Assessment. 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.

7. 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 Q) along Lots 1, 2, 4, and Tracts B and C. Deciduous trees shall be at least 1.5 inches at planting and the cedars shall be at least 6 to 8 feet in height at planting.

8. Aerate the planter strips to a depth of 3 feet prior to planting street trees. The applicant shall either aerate the planter strip soil at the subdivision stage and install fencing around the planter strips to protect the soil from compaction or shall aerate the soil at the individual home construction phase.

9. Record a tree protection covenant specifying protection of trees on the subject property and limiting removal without submittal of an Arborist's Report and City approval.

10. Submit a true and exact reproducible copy (Mylar) of the Final Plat for final review and signature.

E. Conditions related to future development of the lots:

1. Design review approval for Lot 7 shall incorporate storefronts, patios and usable windows facing the parkland.

2. Design review approval for Lot 7 shall incorporate a landscape buffer that provides visibility between Lot 7 and the parkland but provides a visually attractive separation.

3. Any future design review application on Lot 5 will include a review of development standards (17.38.30), minimum requirements (17.38.40) and additional requirements (17.38.50) for R-2 zoned development.

4. Any future design review application on Lot 6 will include a review of development standards (17.40.30), minimum requirements (17.40.40) and additional requirements (17.40.50) for R-3 zoned development.

5. Any future development on the land zoned C-3 (Lot 7) will require a design review in accordance to the development standards found in Section 17.46.30 and the Sandy Municipal Code.

6. If the applicant proposes multifamily dwellings as part of the development of Lot 7 which is proposed to be zoned C-3 the applicant is eligible for parks fee in-lieu credit up to 0.11 acres (the rounded difference between the required amount of parkland dedication and the proposed amount of parkland dedication). The applicant can propose up to 13 multifamily units (13 x 2 x 0.0043 = 0.11 acres) prior to incurring parks fee in-lieu charges. Anything beyond 13 multifamily units on Lot 7 will incur parks fee in-lieu fees per the calculations as defined in the Sandy Development Code. However, if the applicant does not propose any multifamily units on Lot 7 the applicant will not be owed a monetary credit.

7. The dwellings on Lots 3 and 4 shall be designed to meet all of the requirements as specified in Chapter 17.82 and will be assessed in a future design review.

8. Orientation of the future multi-family units that have frontage on both Highway 26 and Dubarko Road will be determined in a future design review process.

9. 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.

10. 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.

11. 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.

F. General Conditions of Approval:

1. The Final Plat shall be recorded as detailed in Section 17.100.60 (I).

2. 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.

3. The subject property shall be subject to a trip cap of 340 PM net new peak hour trips.

4. If entry signs are desired, the applicant shall submit a detailed plan showing the location of such signage and a sign permit application.

5. All parking, driveway and maneuvering areas shall be constructed of asphalt, concrete, or other approved material.

6. 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.

7. 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).

8. All recommendations in Section 6 of the submitted Geotechnical and Slope Stability Investigation (Exhibit I) shall be conditions for development.

9. All utilities shall be installed underground and in conformance with City standards. The applicant shall install utilities underground with individual service to each lot.

10. 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.

11. All public utility installations shall conform to the City's facilities master plans.

12. The intersection of Highway 26 and Dubarko Road shall be constructed as a full-access intersection in compliance with the TSP.

13. As required by Section 17.98.130, all parking, driveway and maneuvering areas shall be constructed of asphalt, concrete, or other approved material.

14. 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.

15. All new public sanitary sewer and waterlines shall be a minimum of 8 inches in diameter.

16. 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.

17. 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).

18. If the applicant chooses to postpone street tree and/or landscaping installation, the applicant shall post a performance bond equal to 120 percent of the cost of the 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.

19. 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).

20. 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.

21. 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.

22. Successors-in-interest of the applicant shall comply with site development requirements prior to the issuance of building permits.

23. 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.

24. 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.

25. Comply with all other conditions or regulations imposed by the Sandy Fire District or state and federal agencies. Compliance is made a part of this approval and any violations of these conditions and/or regulations may result in the review of this approval and/or revocation of approval.

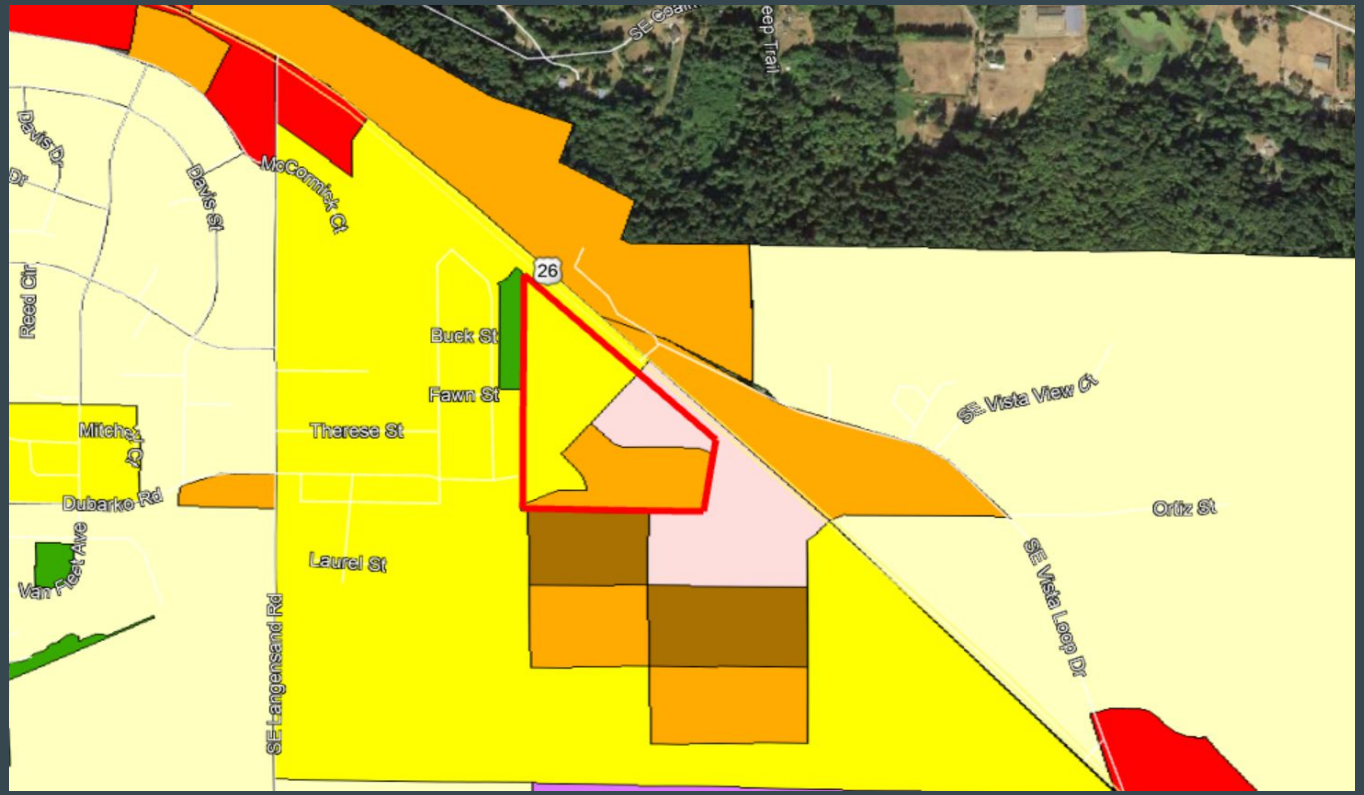
26. Adhere to all standards and requirements that are defined by ODOT, including the Dubarko Road connection to Highway 26 and all required improvements along Highway 26 including stormwater facilities constructed as necessary to be consistent with local, ODOT, and ADA standards.

Bull Run Terrace

City Council 11/30/2020

Vicinity Map

Zoning Map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26
Buck St
Fawn St
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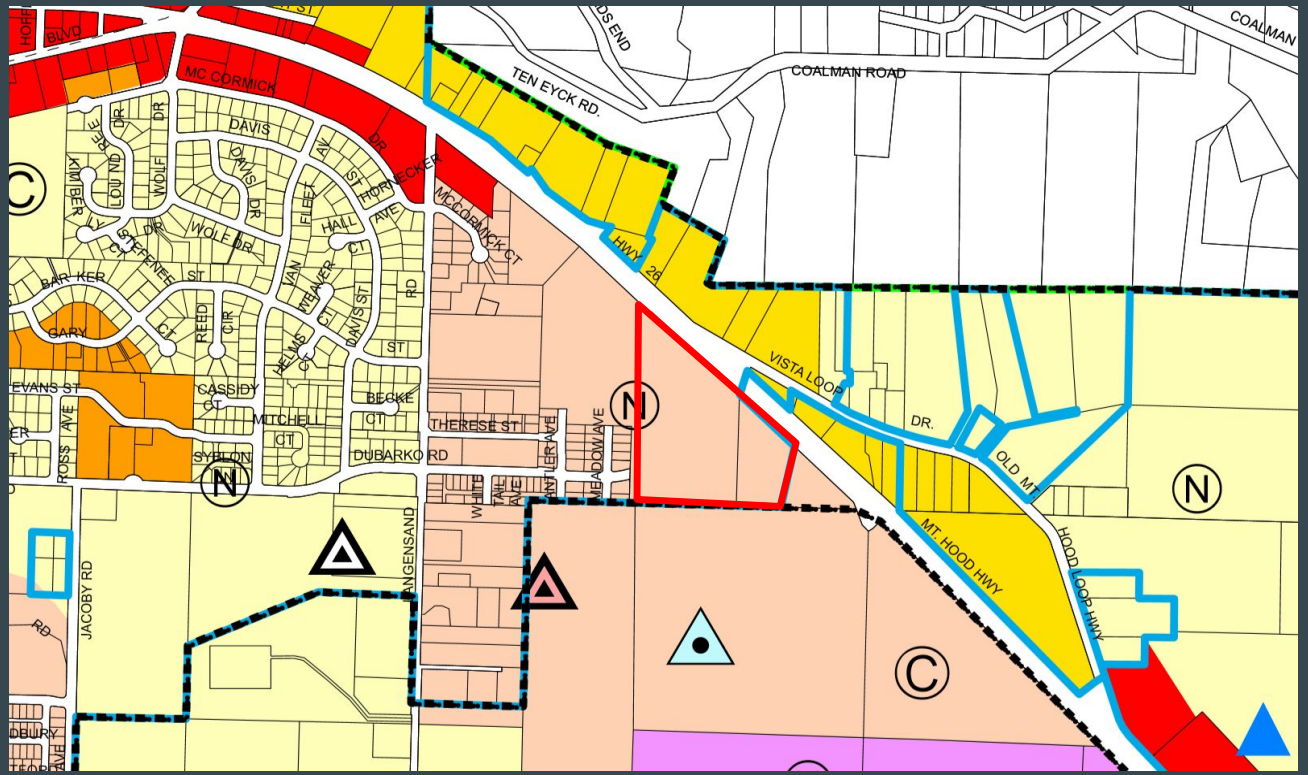
Mitchell Ct
Dubarko Rd
Van Fleet Ave
Laurel St
SE Tangensend Rd
SE Vista View Ct
Ortiz St
SE Vista Loop Dr
N

Comprehensive Plan Map



Request

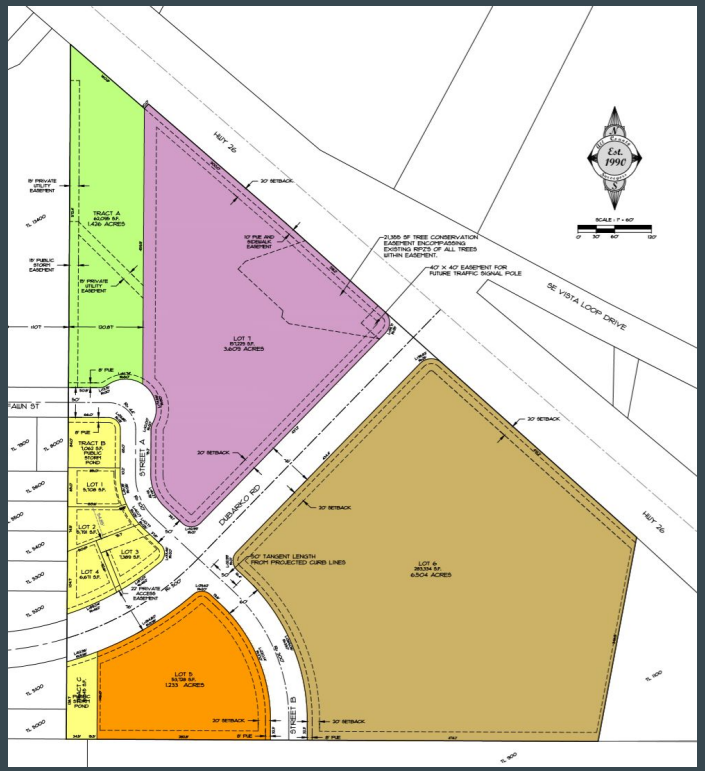
The applicant is requesting the following:

- Zone map amendment (Type IV)
- Comprehensive plan amendment (Type IV)
- Specific area plan (Type IV)
- Subdivision (Type II)
- Tree removal (Type II)

History

- Presented to Planning Commission on August 24, 2020, at which time Commission granted a continuance.
- Presented to Planning Commission again on October 26, 2020.

Zone Map Amendment



LEGEND

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

Zone Map Amendment (cont.)

Zoning District	Existing Acres	Proposed Acres
R-1	8.05	0.59
R-2	5.01	1.23
R-3	0.00	6.50
C-3	2.84	3.61

Comprehensive Plan Map Amendment

- Required in Village area when maximum density changes by more than 20%.
- Will result in the following changes to UGB land inventory:

Land Type	Current Acre Surplus	Proposed Acre Surplus
Commercial	1.13	1.90
Low-Density Residential	19.20	11.74
Medium-Density Residential	17.10	13.32
High-Density Residential	12.60	19.28

Comprehensive Plan Map Amendment (cont.)

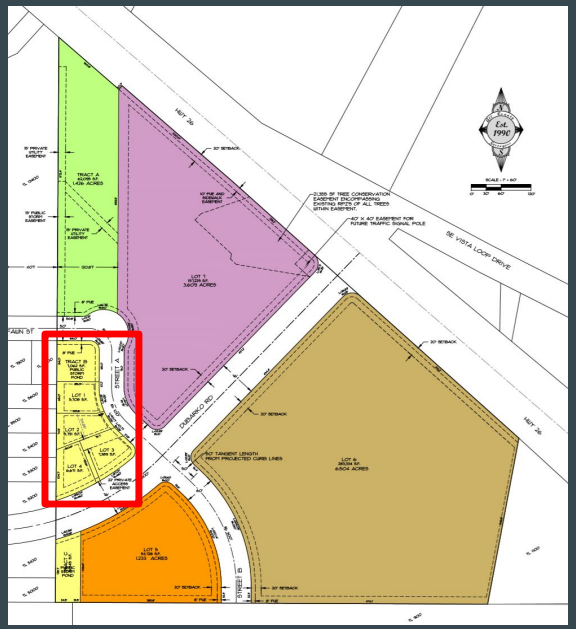
- Goal 1: Citizen Involvement
  - Notice and public hearings
- Goal 2: Land Use Planning
  - Staff has reviewed this application against zoning district amendment and comprehensive plan amendment code requirements, and have notified relevant state agencies.
- Goal 5: Natural Resources
  - Staff recommends a condition to install fencing to protect the site's retention trees.
- Goal 8: Recreational Needs
  - Dedication of 1.426 acres of parkland to the City for Deer Point Park. Future design review will require that buildings on Lot 7 face the park. The modified proposal includes a meandering walkway in the park.
- Goal 9: Economic Development
  - Requires adequate surplus of buildable commercial and industrial land. Proposed changes allow for this surplus.

Comprehensive Plan Map Amendment (cont.)

- Goal 10: Housing
  - Providing mixed housing types, including multi-family, offers more options for residents.
- Goal 12: Transportation
  - The connection of Dubarko Road to Highway 26 is a goal in the TSP.
- Goal 13: Urbanization
  - The proposed development accommodates additional residential and commercial uses within the UGB.

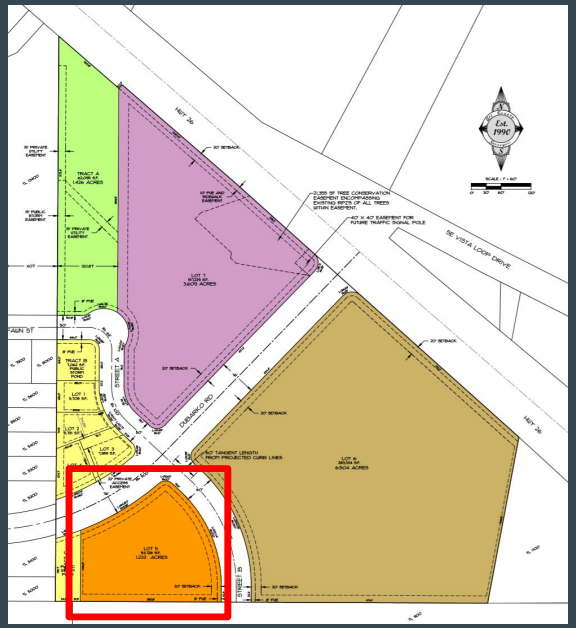
Low Density Residential (R-1)

- Lots 1-4
- Meets density requirements (one detached single family home per lot)



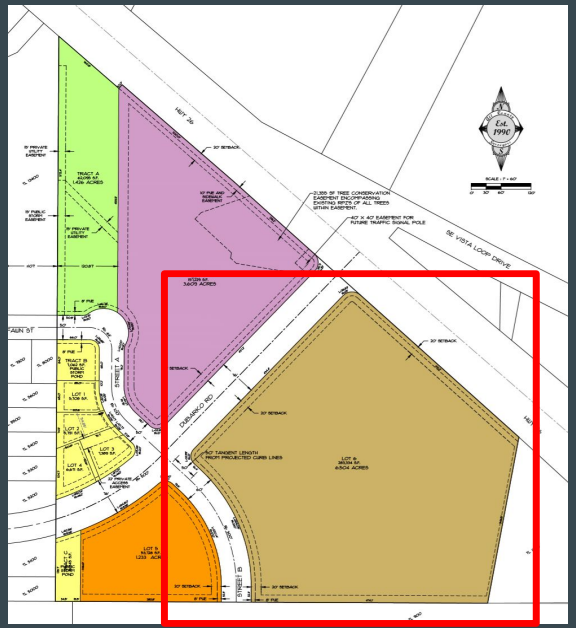
Medium Density Residential (R-2)

- Lot 5
- Density requirements allow for a maximum of 14 units
- The future design review application will include a review of development standards, minimum requirements, and additional requirements.



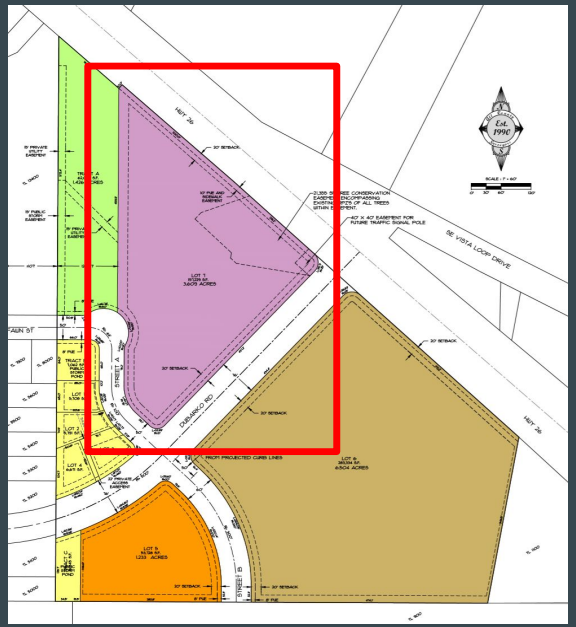
High Density Residential (R-3)

- Lot 6
- Density requirements allow for a maximum of 130 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
- The future design review application will include a review of development standards, minimum requirements, and additional requirements.



Specific Area Plan Overlay

Required by comprehensive plan due to density increase

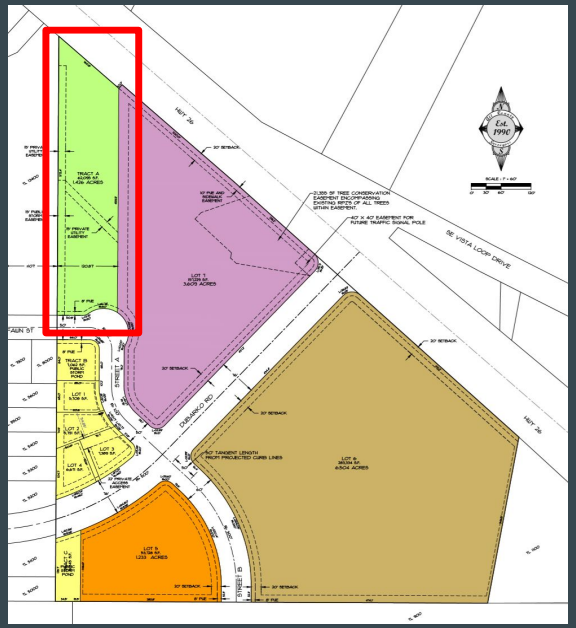
Specific Area Plan Overlay

Required by comprehensive plan due to density increase

“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....[Specific Area Plans] are intended to promote coordinated planning concepts and pedestrian-oriented mixed-use development.”

Park Dedication

- Requires 1.31 acres, and applicant is proposing 1.426 acres
- Staff recommends that the design review approval for Lot 7 shall include activated frontages facing the parkland
- Updated proposal includes walkway through park



Potential Public Benefits

- Connection of Dubarko Road to Highway 26
- Extension of Deer Pointe Park

Public Comments

- Loss of trees, thus lowering the aesthetic quality of the area as well as privacy for existing homes.
- The capacity of the police to effectively patrol multi-family dwelling areas.
- The possibility of criminal activity at multi-family dwelling areas.
- Being previously told that the land would not develop as residential.
- Concerns about effects of multi-family housing on property values.
- Relevance to Comprehensive Plan and potential for “spot zoning.”
- Traffic and parking concerns

Applicant's Submittals:

Click the exhibit to jump to the applicable page
(Note: links not operative in full agenda packet view)

A. Land Use Application
B. Project Narrative (Revised July 2020)
C. Civil Plan Set (Originally submitted July 2020)

- Sheet 1 – Cover Sheet, Preliminary Plat Map, and Future Street Plan
- Sheet 2 – Preliminary Plat Map
- Sheet 3 – Existing Conditions and Tree Retention Plan
- Sheet 4 – Tree Tables
- Sheet 5 – Master Street and Utility Plan
- Sheet 6 – Street Sections
- Sheet 7 – Street Tree Plan and Parking Analysis
- Sheet 8 – Proposed Striping Plan
- Sheet 9 – Preliminary Grading and Erosion Control Plan
- Sheet 10 – Slope Analysis

D. Preliminary Storm Drainage Design and Calculations
E. Public Need Analysis
F. Traffic Impact Study
G. Arborist Report
H. Wetland Determination Report
I. Geotechnical Report
J. Revised Preliminary Plat (Revised September 29, 2020)
K. Revised Existing Conditions (Revised September 29, 2020)
L. Revised Tree Tables (Revised September 29, 2020)
M. Revised Master Street and Utility Plan (Revised September 29, 2020)
N. Building Footprint Plan for Lots 1-4 (Revised September 29, 2020)
O. Revised Arborist Report: Tree Retention (Revised September 29, 2020)
P. Tree Removal Plan
Q. Screening Concept Plan
R. Revised Traffic Analysis (Revised September 29, 2020)

SANDY

General Land Use Application

1 page

EXHIBIT A

Name of Project:	Bull Run Terrace Subdivision (supplemental Land Use Application)
Location or Address:	40808 and 41010 Highway 26

Map & Tax Lot #	**T:** 2S	**R:** 5E	**Section:** 18CD	**Tax Lot (s):** 900 and 1000

Request: Comprehensive Plan map amendment, Zone Change, Specific Area Plan, seven lot subdivision, and tree removal

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

Applicant (if different than owner) same as owner	Owner Roll Tide Properties Corp.
Address	Address P.O. Box 703
City/State/Zip	City/State/Zip Cornelius, OR. 97113
Email	Email davevandehey@accessmax.com
Phone	Phone 503-327-6084
Signature	Signature

Staff Use Only

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

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

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
July 2020

Revised Narrative: *This revised project narrative is intended to replace the previously submitted narrative dated December 2019.*

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-3, High Density Residential, C-3, Village Commercial, and POS, Parks and Open Space

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

Owner / Applicant
Roll Tide Properties Corporation
P.O. Box 703
Cornelius, OR. 97113
Phone: 503-327-6084
Email: dave.vandehey@accessmax.com

Consultant Team:
Civil Engineer / Surveyor
All County Surveyors & Planners, Inc.
Ray Moore, P.E., P.L.S.
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Sandy, OR 97055
Phone: 503-668-3151
Fax: 503-668-4730
Email: raym@allcountysurveyors.com

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Tracy Brown Planning Consultants, LLC
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Economic Consultant
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Johnson Economics
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Portland, OR. 97205
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Traffic Engineer
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Ard Engineering
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Sherwood, OR 97140
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Arborist
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Teragan & Associates
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Lake Oswego, OR 97034
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Email: todd@teragan.com

Wetland Consultant
Jack Dalton
Environmental Science & Assessment LLC
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Portland, Or 97214
Office: 503-478-0424
Cell: 971-413-6738
Email: Jack@esapdx.com

Geotechnical Engineer
GeoPacific
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Portland, OR 97224

Legal Counsel
Michael Robinson
Schwabe, Williamson & Wyatt
Pacwest Center 1211 SW 5th Avenue, Suite 190 Portland, OR 97204
Office: (503) 796-3756
Email: mrobinson@schwabe.com

I. Project Description

Roll Tide Properties Corporation has submitted this application seeking the following approvals:

- Type IV, Comprehensive Plan map amendment to designate 1.43 of proposed parkland dedication Parks and Open Space (POS) and to increase density on the site by more than 20 percent;
- 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-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.

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), intended to be developed with single-family detached dwellings, two lots (Lots 5 and 6) to be zoned R-3, proposed to be developed with multi-family units, and one lot (Lot 7) zoned C-3. The use proposed for Lot 7 has not determined at this time. Development on Lots 5 - 7 will 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 1.43 acres (62,095 square feet) of parkland (Tract A) and a 0.16 acre (7,062 square feet) storm water tract (Tract B) to the City. As shown on submitted plans, the proposed parkland dedication is located directly east of 1.4 acres of undeveloped parkland conveyed to the City as part of the Deer Pointe 2 Subdivision in 2007.

The subject property is gently sloping from the Southeast corner to the Northwest corner towards Highway 26. The primary access to the property will be from an extension of Dubarko Road constructed through the middle of site to intersect with Highway 26. In addition, a collector street (Street B) identified on the City's Transportation System Plan will be extended to the southern line of the property and an existing local street, Fawn Street, will be extended onto the property. The applicant attended pre-application conferences with the City on 1/30/18, 6/12/18, and 10/10/18.

The table below compares the area of existing zoning designations on the property with that proposed with this application

Area Comparison of Existing Zoning Designations to Proposed Zoning

	Existing (gross acres)	Existing (net acres)*	Proposed (net acres)
C-3, Village Commercial	2.84	2.13	3.61
R-1, Low Density Residential	8.05	6.04 (48 units max.)	0.59 (5 units max.)
R-2, Medium Density Residential	5.01	3.76 (53 units max.)	0.00
R-3, High Density Residential	0.00	0.00	7.91 (158 units max.)
POS, Parks and Open Space	0.00	0.00	1.43
Rights of Way	0.00	3.98	2.21
Public Tracts (stormwater tract)	0.00	0.00	0.16
Total Area	15.91	15.91	15.91

** - Net acres assume a 25% reduction in gross acres for public roads*

As shown on this table the applicant proposes increasing the area of C-3 zoning by 1.48 acres, reducing the area of R-1 zoning by 5.45 acres, eliminating the area zoned R-2, adding 7.91 acres of R-3 zone property, and dedicating 1.43 acres of parkland proposed to be zoned Parks and Open Space.

II. Approval Requests

The following approvals are requested with this application:

- Type IV Comprehensive Plan Map Amendment;
- Type IV Zoning Map amendment;
- Type IV Specific Area Plan;
- Type II Subdivision; and,
- Type II Tree Removal.

III. Items Submitted With This Application

- Land Use Application
- Supplemental Land Use Application No. 1
- Notification List and Mailing Labels
- Exhibit A - Project Narrative *(Revised July, 2020)*
- Exhibit B - Civil Plans *(Revised July, 2020)*
  - 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

- Exhibit C - Preliminary Stormwater Report
- Exhibit D - Public Need Analysis *(Revised July, 2020)*
- Exhibit E - Traffic Impact Study *(Revised July, 2020)*
- Exhibit F - Arborist Report
- Exhibit G - Wetland Determination
- Exhibit H - DSL Offsite Determination
- Exhibit I - Geotechnical and Slope Stability Investigation
- Exhibit J - Clackamas County Record of Survey: SN 2007-384

IV. Background

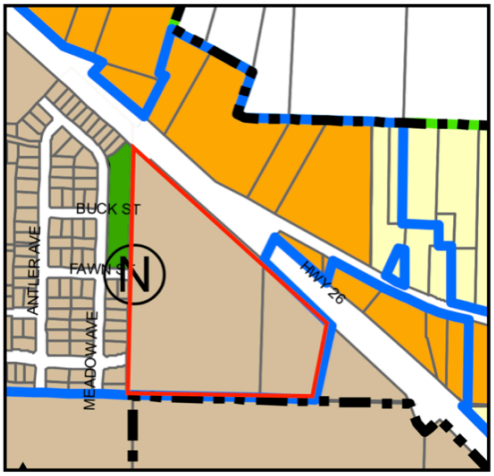
Previous Approval

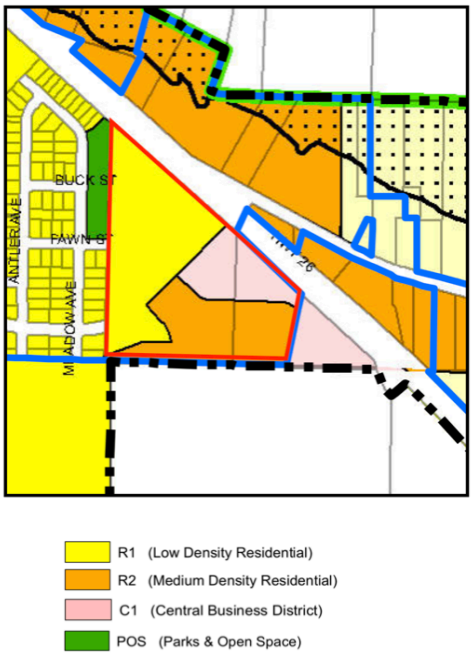
On October 9, 2006, the Planning Commission approved a residential subdivision on the subject property known as "Vista Loop South" (File No. 05-029 SUB). This application involved an 81-lot residential subdivision, dedication of 1.23 acres parkland, and a zone change to adjust the zoning district boundaries on the property. The zoning district boundaries were adjusted according to this configuration however, due to the cost of project improvements, the project was never completed or bonded within the required timeline and the subdivision approval expired. A new property owner purchase the property and on May 31, 2013, (File No. 13-021 SUB/PR) and because of the economic recession in 2008-2010, the tentative plat for this subdivision was reinstated for one year. The plat was then reinstated for a second year. The applicant did complete required public improvements or bond these improvement within the required timeline and the tentative plat expired for a second time on May 31, 2015.

Existing Comprehensive Plan Map and Zoning Map

As shown on a portion of the Comprehensive Plan Map below, the entire property contains a "Village" Plan designation. The "N" shown on this map shows the conceptual location for a future neighborhood park when it was adopted in 1997. Arguably, this park has already been dedicated with the Deer Pointe Subdivision as detailed below.

As shown below, the current zoning designation for the property is a combination of R-1, R-2, and C-3 zoning designations on the property.





2015 Urbanization Study

The current Urbanization Study for the City was adopted by the City Council in 2015. In 2014, City staff completed a buildable lands inventory and housing needs analysis for the urban growth boundary. The results of this study indicate the city has a projected deficit of buildable land in the Low Density Residential, Medium Density Residential, and Commercial Plan designations and a surplus in the High Density Residential and Industrial Plan designations.

Table S-7. Estimate of land needs by gross acres, Sandy UGB, 2014-2034

Land Use Type	Land Need Surplus (deficit)
Low Density Residential	(276.8)
Medium Density Residential	(4.5)
High Density Residential	13.9
Commercial	(51.8)
Industrial	45.0
Total Land Needs	**(333.1)**

Source: City of Sandy

Following adoption of this study, the City started work on a study to expand the Urban Growth Boundary. This study looked at all lands within the existing UGB and properties outside the UGB but within the Urban Reserve boundary. In February 2017, the Urban Growth Boundary Expansion Analysis was adopted by both Clackamas County and the City

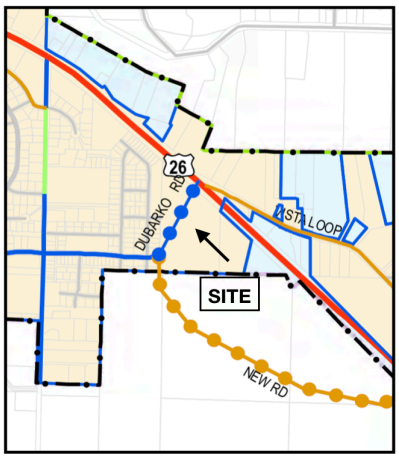
and the study became final and the UGB was expanded. As shown on table below from this study, all land use categories have a projected land surplus.

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**

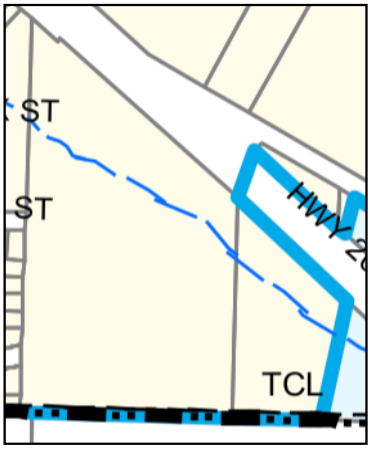
Transportation System Plan

The City's 2011 Transportation System Plan identifies the location of future roads on the subject property. This plan shows that Dubarko Road, a minor arterial is planned to traverse the property from its current terminus in the Deer Point Subdivision to intersect with Highway 26. Dubarko Road is included in the city's Capital Improvement Plan. In addition, a "New Road" classified as a collector is shown intersecting with Dubarko Road extending to the southern property line of the subject property. None of the other system plans in this study show any planned improvements except the Pedestrian System Plan which shows sidewalks along the Highway 26 frontage of the site.



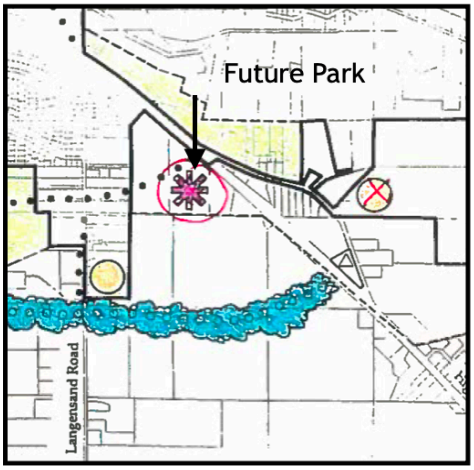
Natural Resources

The subject property does not contain any areas encumbered with the Flood and Slope Overlay or are there any regulated steep slopes. The City's Local Wetland Inventory identifies an intermittent stream on the property labeled as "TCL" as shown on the figure below. Prior to submittal of this application the applicant hired a wetland consultant to evaluate the site for wetlands. This report submitted as Exhibit G did not identify any wetlands or stream resources on the site. In addition, an Offsite Wetlands Determination request form was sent to the Division of State Lands. This review also found "it is unlikely that there are jurisdictional wetlands or waterways on the property" (Exhibit H).



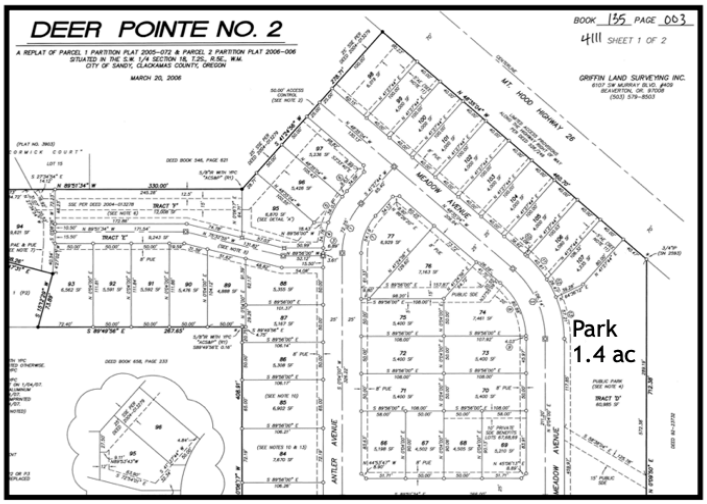
Adopted Parks Master Plan

The current Parks Master Plan was adopted in 1997. As shown on a portion of the Park Facility Plan from the master plan, a Proposed Community Park is shown in the vicinity of the subject property. As shown below, 1.4 acres was dedicated as part of the Deer Point No. 2 Subdivision.



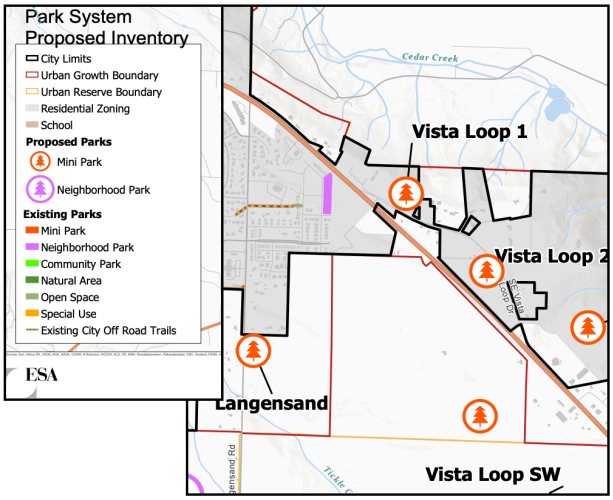
Adjacent Parkland Dedication

As shown on the Deer Pointe No. 2 Subdivision plat below, this subdivision dedicated 1.4 acres of land for a future park. This area is located directly to the west of the subject property and at this time it has not been improved.



Parks Master Plan Update

The City has engaged ESA, a consultant to prepare an update to the Parks and Trails Master Plan. The figure below from the city's website shows a portion of the Park System Proposed Inventory in the vicinity of the Bull Run Terrace project. The existing park shown on this plan is the park dedicated as described above. This figure does not show any proposed park on the subject property.



V. 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 then reviewed. The following code chapters have been reviewed in this narrative:

Chapter	Title
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)
17.40	High Density Residential (R-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 currently contains a Village Comprehensive Plan designation. 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 1.43 acre parkland dedication Parks and Open Space (POS). In addition, the applicant is requesting Comprehensive Plan approval to increase the maximum density on the property by more than 20 percent. As stated on Page 8 of the Comprehensive Plan, "A shifting of the underlying zoning district boundaries to accommodate development constraints and land divisions for specific development proposals may be increased or decreased up to 20%. Changes greater than 20% will require a Plan Map amendment." The applicant proposes increasing the density on the property by 61 percent. A Specific Area Plan request is also included with this application.*

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 to Parks and Open Space (POS). In addition the applicant proposes increasing density by more than 20 percent also requiring a Plan Amendment.*

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, development of the property 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 applicant's proposal to dedicate 1.43 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 and the applicant's willingness to construct park improvement will ensure completion of park improvements in a timely manner.

Approval of this request also will allow 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 R-3 zoning proposed for the site is the only zoning designation to provide sufficient development density (10 - 20 units) to help cover construction costs.

The applicant believes the proposed Comprehensive Plan amendments to designate land for Parks and Open Space and to increase the allowed density on the site 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 to all applicable Statewide Planning Goals.
***RESPONSE**: As reviewed below, the proposed Comprehensive Plan Map amendment conforms to all applicable Statewide Planning Goals.*

<u>Goal 1 - Citizen Involvement</u> 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 Planning Commission and Sandy City Council. Goal 1 is satisfied.

<u>Goal 2 - Land Use Planning</u> 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 (Exhibit G). 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 (Exhibit H). 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 (Exhibit F). 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 know 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 1.43 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, the city is projected to have a surplus of land in all land use categories 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 from 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 area with proposal
LDR	19.2		(5.54)	**13.63**
MDR	17.1		(3.76)	**13.34**
HDR	12.6	15.07	7.91	**22.98**
Commercial	3.6	1.13	1.48	**2.61**
Industrial	32.8		0.00	**32.8**

<u>Goal 10 - Housing</u> - 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 designated land, eliminate MDR designated land, and add HDR designated land does not adversely affect the city's 20 year buildable lands supply of residential lands. Goal 10 is satisfied.

<u>Goal 11 - Public Facilities</u> - 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.

<u>Goal 12 - Transportation</u> - In order to evaluate compliance with this goal, the applicant contracted with a Traffic Engineer to prepare a Traffic Impact Study (Exhibit E) for the project. 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-3, C-3, and POS (Parks and Open Space). As shown on Table 3 of the traffic study below the proposed zone change results in a slight increase in vehicle trips compared to uses under existing zoning.

The submitted traffic study evaluated five existing intersections to determine if they are expected to operate acceptably under the proposal. The conclusion of the study is that all study intersections are expected to operate within capacity under year 2022 traffic conditions either with or without with the addition of site trips from the proposed development. In addition, the study also concluded that under a reasonable worst case scenario, the proposed zone change would result in fewer than 400 average daily trips than would be allowed under the existing zoning and this increase is considered a "small increase in traffic". 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.

Table 3 - Zone Change Trip Generation Summary

	AM Peak Hour			PM Peak Hour			Daily
	In	Out	Total	In	Out	Total	Total
Existing R1, R2 and C3 Zoning							
8.05 Acres R-1 (52 Homes)	10	28	38	32	19	51	490
5.01 Acres R-2 (56 Homes)	10	31	41	35	20	55	528
2.84 Acres C-3 (30,900 sf Retail)	18	11	29	57	61	118	1166
-Pass-by Trips (34%)	-5	-5	-10	-20	-20	-40	-396
Net Trips (Existing Zoning)	**33**	**65**	**98**	**104**	**80**	**184**	**1788**
Proposed Zoning							
0.75 Acres R-1 (6 Homes)	1	3	4	4	2	6	56
7.91 Acres R-3 (158 Apartments)	17	56	73	55	33	88	1156
3.12 Acres C-3 (34,000 sf Retail)	20	12	32	62	68	130	1284
-Pass-by Trips (34%)	-5	-5	-10	-22	-22	-44	-436
1.43 Acres POS (Public Park)	0	0	0	0	0	0	2
Net Trips (Proposed Zoning)	**33**	**66**	**99**	**99**	**81**	**180**	**2062**
Net Change In Site Trips	**0**	**1**	**1**	**-5**	**1**	**-4**	**274**

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 is requesting 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 in developing an economically successful 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 Traffic Impact Study (Exhibit E) 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 that the proposal is expected to result in a slight increase of traffic from what would be expected under current zoning and there would be no significant traffic impact to any roads caused by the proposal. 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 the 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 includes 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 designation changes 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 1.43 acres of the property as Parks and Open Space as required by the city, to shift the current zoning designations, and to increase density on the site by more than 20 percent. 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 public hearings before both the Planning Commission and City Council 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 within an area designated as Village on the Comprehensive Plan map. The applicant is proposing to dedicate 1.43 acres of parkland and designating this area POS as required by the city. The applicant proposes shifting zoning district boundaries and increasing the residential density of the site 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, two lots (Lots 5 and 6) zoned R-3, High Density Residential proposed to contain multi-family dwellings, and one lot (Lot 7) to be zoned C-3. In addition, the proposal includes dedication of 1.43 acres of parkland (Tract A) and a public stormwater facility (Tract B). The details of the development of multi-family units on Lots 5 and 6 and uses permitted in the C-3 zoning district will be evaluated 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 will require 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 in 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 1.43 acres of parkland (Tract A) as shown on the Preliminary Plat submitted with this application. Although a proposed park is not shown on the city's draft release of the Parks and Trails Master Plan Update available for viewing on the city's website, the applicant is proposing to dedicate parkland anyway. The proposed parkland will expand the 1.4 acre parkland dedication provided in 2006 with development Deer Pointe 2 Subdivision located directly west of the subject property. The proposed 1.43 acre parkland dedication will increase the total parkland in this neighborhood of the city to area 2.83 acres. The applicant is aware the city has contracted with a consultant to prepare a master*

plan for this park and has offered to work with the city by constructing park improvements in exchange for SDC credits.

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 x 5 = 2.95, rounded down to 2 units) and the maximum density is 5 units (0.59 x 8 = 4.72, rounded up to 5 units). Four lots are proposed to contain single family detached dwellings in compliance with the allowed housing type and required density range.*

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.

High density residential areas are generally located immediately adjacent to village commercial centers or the Central Business District. Commercial development, including home businesses and limited neighborhood retail, is considered appropriate in high density residential developed in conjunction with villages or immediately north of the Central Business District. High density residential areas are generally located nearby Village Commercial Centers, the Central Business District and/or public facilities such as schools or parks. The HDR Plan designation encompasses one zoning district designation.
***RESPONSE**: The area proposed for R-3 zoning contains 7.91 net acres requiring a minimum density of 79 units (7.91 x 10 = 79.1) and a maximum density of 158 units (7.91 x 20 = 158.2). Two lots (Lots 5 and 6) are proposed to contain multi-family dwellings an allowed housing type in this zoning district. Lot 5 is located immediately adjacent and diagonally across Dubarko Drive from Lot 7 proposed to be zoned C-3, Village Commercial and Lot 6 is located across Dubarko Road directly east of Lot 7. The exact number of dwelling units proposed on these lots 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, high density residential, village commercial, and parks and open space. The applicant is requesting approval to include parks and open space in this village as required by this city. Also as specified in this section, the applicant has requested approval to shift underlying zoning district boundaries through a Specific Area Plan and a Comprehensive Plan amendment to allow density on this site to be increased by more than 20 percent.*

The applicant proposes increasing the area devoted to C-3 zoning by 1.48 acres from 2.13 net acres to 3.61 net acres, decreasing the area of R-1 zoning, eliminating R-2 zoning, and adding R-3 and POS zoning. The addition of R-3 zoning is projected to increase residential density by 61 percent from a maximum of 101 units under current zoning to a maximum of 163 units with proposed zoning. The submitted application includes both Specific Area Plan approval and a Plan Map amendment 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 proposed to contain 3.61 acres. As detailed above, the subject property currently contains 2.13 net acres (2.84 gross acres) zoned C-3. The proposal is to increase the area zoned C-3 by 1.48 acres. As noted in this section, the Village Commercial area is intended to help form the core of the village. The location proposed to be zoned C-3 is located adjacent to parkland, has frontage on both Highway 26 and Dubarko Drive and is across the street from two lots zoned for high density residential development and four lots zoned for low density residential. This lot is well positioned to serve as a central component of this village. The use proposed for this lot is not known at this time and will be determined following approval of the current application with a subsequent land use 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 intends dedicating 1.43 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 (Exhibit E), 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 1.43 acres. This area has been sized based on the maximum density proposed for the both the R-1 and R-3 lots based on 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 current Parks Master Plan show a future park in the vicinity of the subject property. The Deer Pointe 2 Subdivision dedicated a 1.4 acre park when it was platted in 2006. The current Parks and Trails Master Plan preliminary mapping does not show any proposed parkland on the subject property. Despite current mapping the applicant proposes dedicating 1.43 acres of parkland with this proposal. The applicant reviewed this proposal with the city's Parks and Trails Advisory Committee on two separate occasions.*

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, 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		(5.54)	**13.63**
MDR	17.1		(3.76)	**13.34**
HDR	12.6	15.07	7.91	**22.98**
Commercial	3.6	1.13	1.48	**2.61**
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 on the Comprehensive Plan map. The applicant's proposal to increase the area zoned C-3, dedicate a 1.43 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 1.48 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 steep slopes, potential hazards, or significant natural features exist on the site. The details of the design of*

structures on the 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**: Lots 5 and 6 proposed to contain R-3, High Density Residential 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 contains 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 (Exhibit E) 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 does 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 R-3 and POS zoning and to remove R-2 zoning. As a result of these changes, the projected residential density for the property will be increased by more than 20 percent and the applicant has requested a Comprehensive Plan Map amendment 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, High Density Residential, and Village Commercial. In addition, the applicant proposes dedicating 1.43 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 submitted project narrative. In general, the applicant strives to create a mixed-use development to include detached single family dwellings, multi-family dwellings, and village commercial. In addition, the applicant proposes dedicating 1.43 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 (ExhibitD) 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) are to be zoned R-1, Low Density Residential and will be constructed with single-family residential dwellings, two lots (Lots 5 and 6) are to be zoned R-3, High Density Residential and will contain multi-family units, and one lot (Lot 7) is proposed to be zoned C-3, Village Commercial. In addition, the applicant proposes

dedicating 1.43 acres of parkland (Tract A) and constructing and dedicating a public stormwater facility (Tract B).

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 two tracts to be dedicated to the city. The subject property contains a gross site area of 15.91 acres. After deducting public rights-of-way and proposed dedications (park and stormwater facility), the net developable site area (NSA) is 12.11 acres with three zoning districts. Six of the seven lots are proposed to contain residential development, Lots 1 - 4 zoned R-1 and Lots 5 and 6 zoned R-3 and one lot (Lot 7) will be zoned C-3, Village Commercial.*

The area identified to be zoned R-1 contains 0.59 net acres after removing the proposed public stormwater tract (Tract B). This zone allows a minimum of 5 and a maximum of 8 units per net acre. The minimum density is calculated by multiplying the NSA x the required minimum density (0.59 acres x 5 units/net acres = 2.95 units round down to 2 units). The maximum density is determined by multiplying the NSA x the allowed maximum density (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. The applicant proposes platting four units in compliance with the required density range.

The area identified to be zoned R-3 (Lot 5 and 6) contains a net area of 7.91 acres. The R-3 zone allows a minimum of 10 and a maximum of 20 units per net acre. The minimum density is calculated by multiplying the NSA x the required minimum density (7.91 acres x 10 units/acre = 79 units). The maximum density is determined by multiplying the NSA x the allowed maximum density (7.91 acres x 20 units/acre = 158 units).

As a result of these calculations the density range for the residential portion of the subject property is a minimum of 81 units (2 + 79) and a maximum of 163 units (5 + 158). At this time the applicant does not know the exact number of units that will be constructed on Lot 5 and 6 zoned R-3. This number is likely to be less that the maximum allowed and will be determined with a design review application 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 1.43 acres (Tract A) to be designated and used as public parkland. The land proposed for parkland abuts the 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 indicated a consultant has been hired to prepare a master plan for the Deer Pointe Park. With dedication of the additional land with the current proposal, this master plan can now be designed to include park improvements and amenities for a new 2.83 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.*

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 single-family detached dwellings as permitted in this zoning district.*

17.36.30 - DEVELOPMENT STANDARDS

Type	**Standard**	***Proposed***
A. Minimum Lot Area - Single detached dwelling	5,500 square ft.	*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	50 ft	*Complies*
C. Minimum Lot Frontage	20 ft. except as allowed by Section 17.100.160	*Complies.*
D. Minimum Average Lot Depth	No minimum	*Complies*
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)	*All lots are capable of complying with setbacks. Setbacks will be confirmed with submittal of building permits.*
F. Projections into Required Setbacks	See Chapter 17.74	*No projections are proposed at this time.*
G. Accessory Structures in Required Setbacks	See Chapter 17.74	*No accessory structures are proposed at this time.*
H. Structure Height	35 ft. maximum	*To be determined.*
I. Building Site Coverage	No minimum	*Complies*
J. Off-Street Parking	See Chapter 17.98	*See Chapter 17.98.*

***Response:** As shown on Sheet C2 of 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 but 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 is shown on Sheet C7 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 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 17.40 - 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 two lots (Lots 5 and 6) to be zoned R-3 allowing a maximum of 158 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 17.56 - 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 (Sheet C10) the site contains a small area of slopes exceeding 25 percent. A Geotechnical and Slope Stability Investigation (Exhibit I) 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, Lots 5 - 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 these lots 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 will 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 on Sheet C6, 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: *No exceptions or modifications to the sidewalk standards of this section are requested with this application except, the applicant proposes constructing the sidewalk in this section at five feet rather than six feet due to the increased median width along Dubarko Road north of Street B.*

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) Pedestrians amenities such as covered walk-ways, awnings, visual corridors and benches will be encouraged. For every two benches provided, the minimum parking requirements will be reduced by one, up to a maximum of four benches per site. Benches shall have direct access to the circulation system.
Response: *The 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 Sheet C5 of 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 (Exhibit E). 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 ½ street improvement includes curb and pavement 2 feet beyond the center line of the right-of-way. A ¾ street improvement includes curbs on both sides of the side and full pavement between curb faces.
Response: *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.*

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 submitted with this application as part of Sheet C1. This plan shows 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 8.65%, and the extension of Fawn Street, a local street will have a grade of 1% to 6.6%. 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 and the extension of Fawn Street will have a centerline radii of 100 feet. Both of these streets comply with this standard. Street B ("New Street") is proposed to be designed with a centerline radii less than 300 feet as shown on submitted plans. A reduced centerline radii is proposed due to the assumed 25-mph posted speed and the location of this curve near a stop controlled intersection. A greater centerline radius is not needed given these conditions. A tighter radius will encourage drivers to slow down as they approach this stop controlled intersection and slower approach speeds are more pedestrian friendly. This area of the development is expected to have a large number of pedestrians using these facilities due to proposed future densities on lots 5 and 6 and proximity to the proposed park. The applicant believes a reduction of centerline radii and vehicle speeds for this street is warranted.*

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 61 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 insect 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 (Sheet C5) 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 Sheet C5, 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: *A 15-foot public storm easement is proposed along the back of Lots 1-4 and a storm easement and sanitary sewer easement are identified in Tract A. 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 shows a conceptual neighborhood park located on the subject property although it is not clear if this conceptual requirement has already satisfied with the parkland dedicated as part of the Deer Pointe 2 Subdivision in 2007. As noted above, the current Parks and Trails Master Plan update available on the city's website does not show a park on the subject property. A representative of the Parks Boards stated this is an error. Regardless, the applicant proposes dedicating 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.

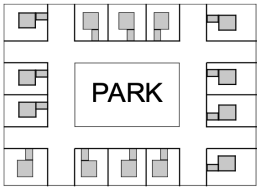
Response: *The proposed residential subdivision is subject to the provisions of this chapter.*

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 and multi-family dwellings is proposed. The applicant proposes dedicating 1.43 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 and the two lots for multi-family dwellings. One lot is proposed for to be zoned C-3. These lots are currently proposed to contain a maximum of 163 units. As such, the proposal results in the following formulas: 1) single-family lots: 4 (proposed single-family residential units) x 3 (persons/unit) x 0.0043 (per person park land dedication factor) = 0.0516 acres rounded to 0.05 acres, and 2) 2 multi-family lots to contain up to 158 units: 158 (proposed multi-family units) x 2 (persons/unit) x 0.0043 (per person park land dedication factor) = 1.358 acres rounded to 1.36 acres. The combined total required parkland dedication is 1.41 acres (0.05 + 1.36). As shown on submitted plans, the applicant proposes dedicating 1.43 acres of parkland exceeding the minimum parkland dedication required by this section by 0.02 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 the East by Lot 7 proposed to be zoned C-3, Village Commercial. The details of the development of Lot 7 is not known at this time and will be determined following a pre-application conference and submittal of a design review application at a later date. In order to address the spirit of the requirement in this section, the applicant proposes constructing a widened sidewalk along the eastern park frontage adjacent to Lot 7.*

2. The required dedication shall be contained as a contiguous unit and not separated into pieces or divided by roadways.
Response: *The proposed 1.43 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. In addition, the applicant is interested in partnering with the city to construct park improvements in exchange for Park SDC credits.*

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 park 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**: City staff indicated at the pre-application conference parkland dedication would be required and this was also articulated by the Parks and Trails Advisory Board at a meeting on June 10, 2020. As noted above, the current draft Parks and Trails Plan update does not show a proposed park in this location. Despite this problem, the applicant proposes dedicating 1.43 acres of parkland with this application exceeding the required dedication calculated in Section 17.86.10(2) above by 0.02 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-3, High Density Residential.

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 on sheet C7 of 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 is 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 provided with 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-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 a future design review application for the multi-family units and development on Lot 7.*

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 on Sheet C7 of 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 sheet shows that 20 on-street parking spaces in compliance with this standard have been identified.*

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 designed to be consistent with density, setback, and dimensional standards in the R-1, 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 (Sheet C1), 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 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 submitting a design review application 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 expected to result in a slight increase in traffic generated by the development and does not warrant any mitigation.*

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 (Exhibit E) 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 (Exhibit E). With the exception of a revised striping plan and frontage improvements on 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 (Sheet C1) 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 (Sheet C1). 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. Finally, a public storm easement is proposed along the back of Lots 1, 2, and 4 and public and private utility easements are proposed across Tract A.*

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 is proposed 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 (Exhibit I) .*

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-3 zoning district does 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 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. Because Lot 7 will be zoned C-3, Village Commercial, the applicant prefers that access on Dubarko Road be a full access.*

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 that 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. This facility has been sized and located to accommodate the water quality and stormwater detention needs of all streets in addition 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 as Exhibit C.*

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 on Sheet C6.*

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 as Sheet C7.*

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 (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.*

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 as Exhibit F. 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 is included on Sheet C4 of the plan set and the proposed retention trees are shown on Sheet C3. The subject property contains 15.91 acres requiring retention of 48 trees, 11 inches and greater DBH (15.91 x 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. Sheet C4 lists all trees in the inventory area by number, species, condition, and whether it is proposed to be retained or removed.*

The submitted plan identifies 59 trees that will be retained. All of the trees proposed for retention are conifers, at least 11-inches DBH, and in "good" condition as identified by the Arborist. 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 (Exhibit F) provides recommendations for protection of retained trees including identification of the recommended tree protection zone for these trees. 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

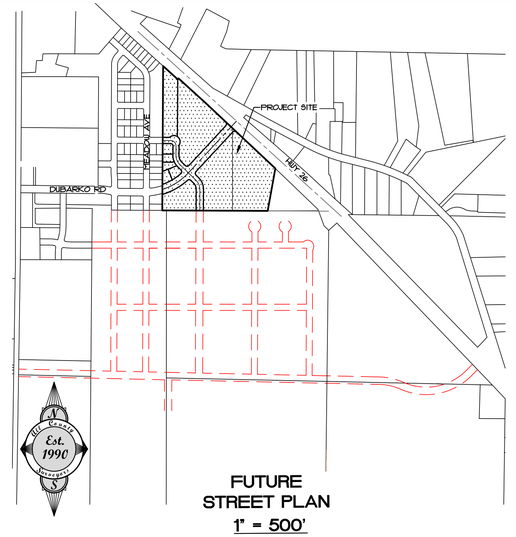
The applicant requests Specific Area Plan approval to shift the zoning district boundaries for the property, a Comprehensive Plan and Map amendment to designate Tract A, a proposed park, as Parks and Open Space (POS), and to increase density on the site by more than 20 percent. The proposal also includes a Zoning Map amendment to change 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-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 and the two R-3 zoned lots (Lot 5 and 6) may contain a maximum of 158 multi-family units. Lot 7 zoned C-3 will be developed according to the standards of that zone. The applicant proposes dedicating 1.43 acres to the city to be used as a public park. 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.

BULL RUN TERRACE

7-LOT SUBDIVISION

EXHIBIT C



FUTURE
STREET PLAN
1" = 500'

SCALE : 1" = 80'
0' 40' 80' 160'

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

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

SHEET INDEX

1. COVER SHEET & FUTURE STREET PLAN
2. PRELIMINARY PLAT MAP AND SPECIFIC AREA PLAN
3. EXISTING CONDITIONS AND TREE RETENTION PLAN
4. TREE TABLES
5. MASTER STREET & UTILITY PLAN
6. STREET SECTIONS
7. PRELIMINARY STREET TREE & PARKING PLAN
8. PROPOSED STRIPING PLAN
9. PRELIMINARY GRADING & EROSION CONTROL PLAN
10. SLOPE ANALYSIS

SHEET C1 OF 10

NO.	REVISION	BY	DATE
-	-	-	-

DESIGNED: CTH
DRAWN: CTH
CHECKED: RLH
APPROVED: RLH

REGISTERED PROFESSIONAL LAND SURVEYOR
OREGON JULY 14, 2006 SKYLER L. MOORE
RENEWAL DATE: 12/31/2020

SCALE VERT: N/A HORIZ: 1"=80'
DATE: 01/26/2018
FILE:19-035-Planning.dwg
LEGAL SECTION 18 TWP. 2S RANGE 5E

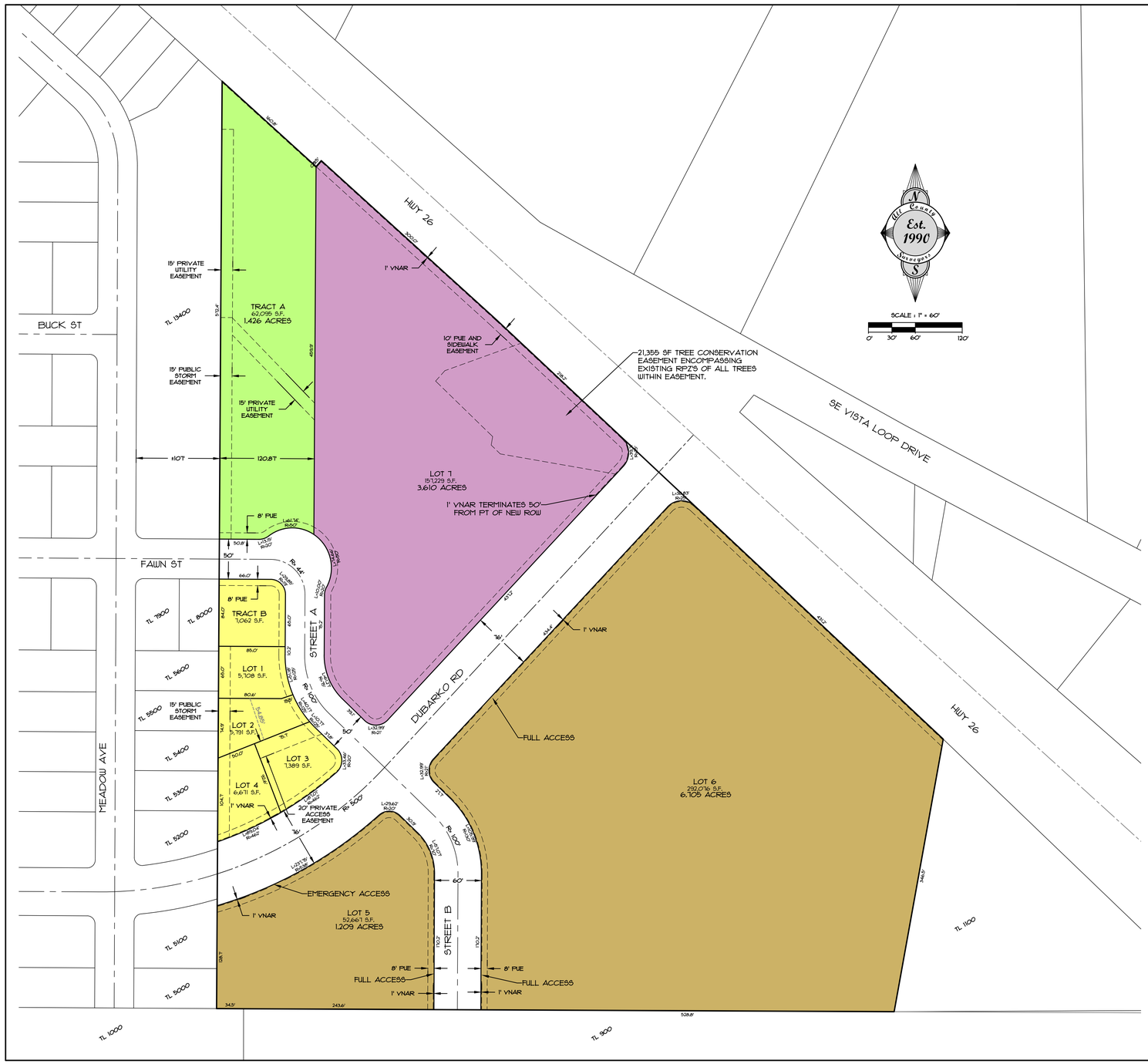
PROJECT: **BULL RUN TERRACE SUBDIVISION**
COVER SHEET, PRELIMINARY PLAT MAP, AND FUTURE STREET PLAN

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

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

DATE OF PLAT 06/29/2020

CLIENT: ROLL TIDE PROPERTIES CORPORATION PO BOX 103 CORNELIUS, OR 97113



AREA TOTALS

TOTAL SITE AREA	= 693,058 SF = 15.910 ACRES
TRACT A (PARK)	= 62,095 SF = 1.426 ACRES
TRACT B (POND)	= 7,062 SF = 0.162 ACRES
R-1 SINGLE FAMILY	= 25,559 SF = 0.587 ACRES
R-3 MULTI-FAMILY	= 344,743 SF = 7.914 ACRES
C-3 COMMERCIAL	= 157,229 SF = 3.610 ACRES
PUBLIC ROW	= 96,370 SF = 2.212 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-3 MULTI-FAMILY MIN DENSITY
7.91 AC*(10 UNITS/AC) = 79.1 = 79 UNITS

R-3 MULTI-FAMILY MAX DENSITY
7.91 AC*(20 UNITS/AC) = 158.2 = 158 UNITS

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.

LEGEND

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

SHEET C2 OF 10

DATE	NO.	REVISION	BY
-	-	-	-

DESIGNED: CTH
DRAWN: CTH
CHECKED: RLM
APPROVED: RLM

REGISTERED PROFESSIONAL ENGINEER
OREGON
RAY L. MOORE
RENEWAL DATE: 12/31/2020

SCALE VERT: N/A HORIZ: 1"=60'
DATE: 07/26/2018
FILE: 19-035-Planning.dwg

SECTION	TWP.	RANGE
18	2S	5E

LEGAL

PROJECT: **BULL RUN TERRACE SUBDIVISION**

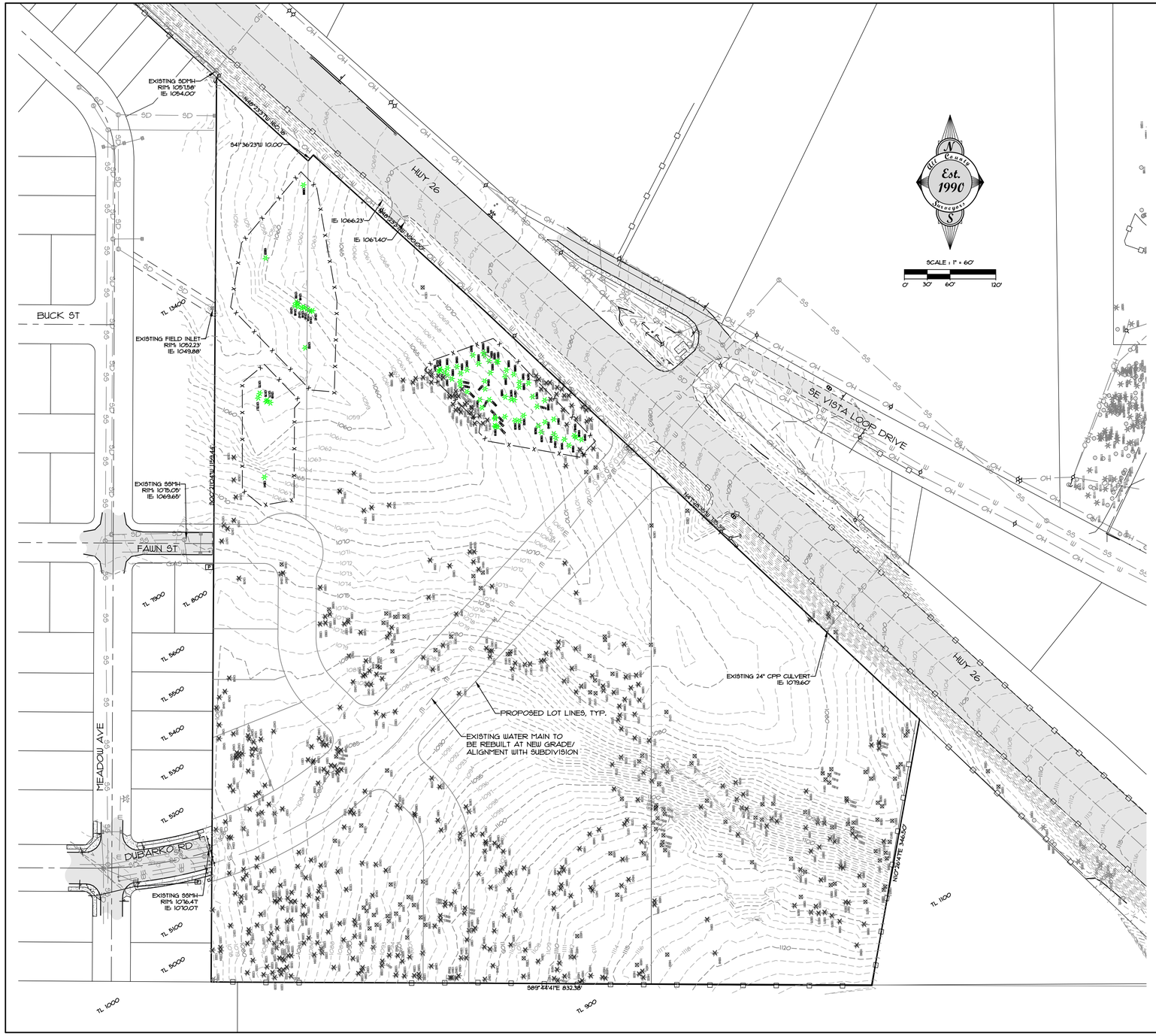
PRELIMINARY PLAT MAP AND SPECIFIC AREA PLAN

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

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

DATE OF PLOT 06/29/2020

CLIENT: ROLL TIDE PROPERTIES CORPORATION
PO BOX 703
CORNELIUS, OR 97113



LEGEND

- PROPERTY LINE
- LOT LINE
- EXISTING BUILDING
- EXISTING EDGE OF PAVEMENT
- EXISTING SIDEWALK/CONCRETE
- EXISTING CURB
- EXISTING WATER LINE
- EXISTING STORM LINE
- EXISTING SANITARY LINE
- EXISTING GAS LINE
- EXISTING TELEPHONE LINE
- 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
- NEW WATER LINE
- NEW SANITARY LINE
- NEW STORM LINE
- SAWCUT 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

— x — x — x —

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 1.1.102.5.0(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:

59 TREES

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.
2. UNDERGROUND UTILITIES SHOWN ON THIS SURVEY ARE LIMITED TO THOSE ITEMS VISIBLE BY SURFACE INSPECTION AND LOCATES PAINTED ON THE GROUND AS OF THE DATE OF THIS SURVEY. SUBSURFACE STRUCTURES, IF ANY, ARE NOT SHOWN.
3. UNDERGROUND UTILITY LOCATIONS MUST BE POTHOLED AND VERIFIED PRIOR TO CONSTRUCTION.
4. THE ELEVATION DATUM IS BASED ON THE CITY OF SANDY BENCHMARK #33. THE BENCHMARK IS LOCATED AT THE INTERSECTION OF MCCORMICK AND LANGENSEND. THE PUBLISHED ELEVATION IS 1021.51'

SHEET C3 OF 10

BY	REVISION	NO.	DATE
–	–	–	–

DESIGNED: CTH
DRAWN: CTH
CHECKED: RLH
APPROVED: RLH

REGISTERED PROFESSIONAL LAND SURVEYOR — OREGON — JULY 29, 1978 — GREGORY L. MOORE — RENEWAL DATE: 12/31/2020

SCALE — VERT: N/A — HORIZ: 1"=60'
DATE: 01/26/2018
FILE:19-035-Planning.dwg

LEGAL — SECTION: 18 — TWP: 2S — RANGE: 5E

PROJECT:
BULL RUN TERRACE SUBDIVISION
EXISTING CONDITIONS AND TREE RETENTION PLAN

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

CLIENT:
ROLL TIDE PROPERTIES CORPORATION
PO BOX 1023
CORNELIUS, OR 97113

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

DATE OF PLOT: 06/29/2020

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, 70% 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
13147	DOUGLAS-FIR	15	GOOD	ONE SIDED, MARGINAL TRUNK TAPER	RETAIN
13148	DOUGLAS-FIR	25	GOOD	ONE SIDED	RETAIN
13149	DOUGLAS-FIR	17	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
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
15546	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
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

TREE PRESERVATION INVENTORY

TREE NO.	SPECIES (COMMON NAME)	DBH (INCHES)	CONDITION	COMMENTS	TREATMENT
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 11" DBH AND GREATER DEEMED TO BE VIABLE BY ARBORIST INSPECTION.

TOTAL NUMBER OF VIABLE, 11"+ DBH TREES TO BE PRESERVED: 59

SHEET C4 OF 10

NO.	DATE	REVISION	BY
-	-	-	-

DESIGNED: CTH
DRAWN: CTH
CHECKED: RLM
APPROVED: RLM

REGISTERED PROFESSIONAL LAND SURVEYOR OREGON JULY 14, 2006 RAY L. MOORE 56429 RENEWAL DATE: 12/31/2020

SCALE VERT: N/A HORIZ: 1"=60'
DATE: 01/26/2018
FILE:19-035-Planning.dwg
LEGAL SECTION 18 TWP: 2S RANGE: 5E

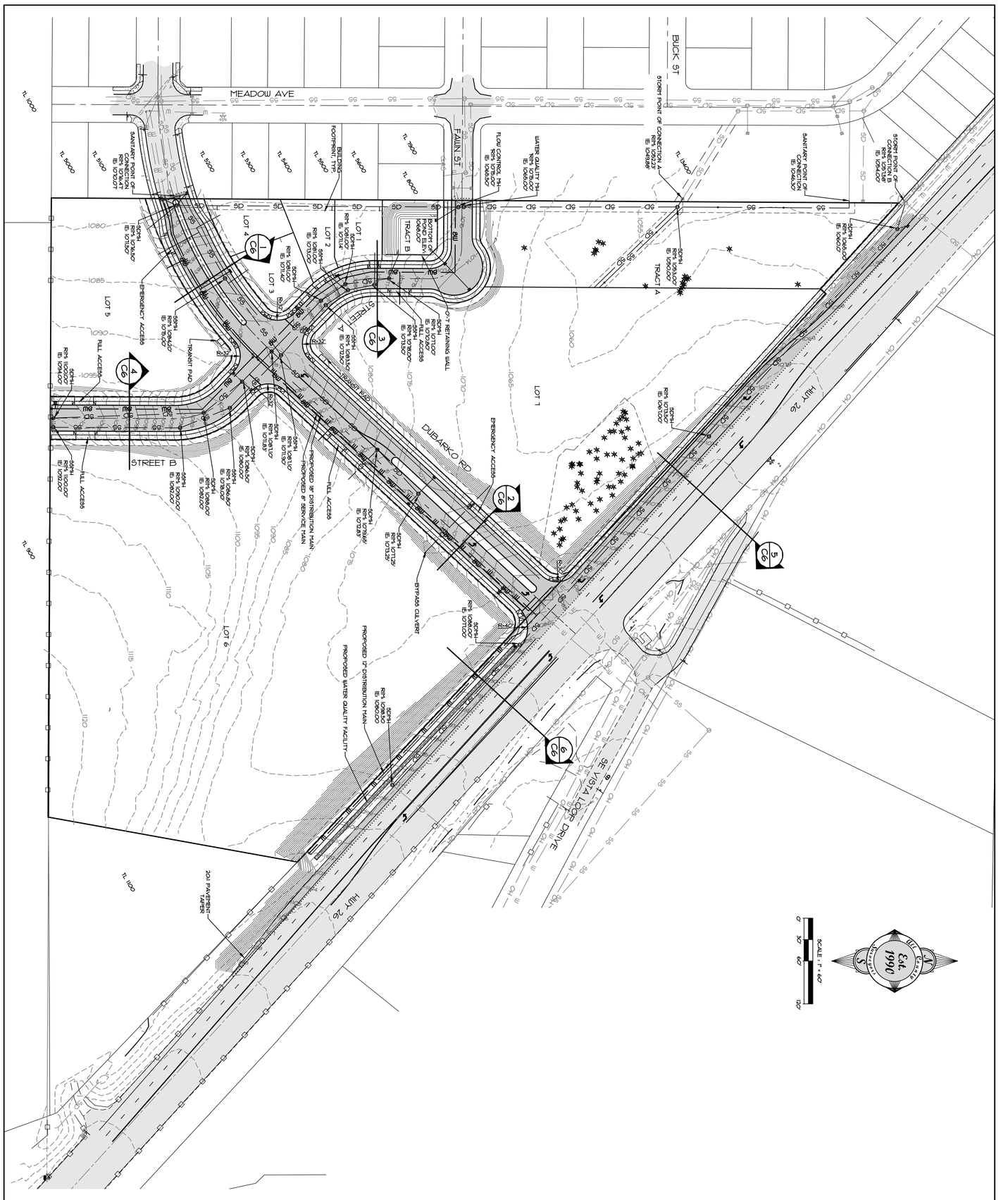
PROJECT: **BULL RUN TERRACE SUBDIVISION**
TREE TABLES

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

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

DATE OF PLOT: 06/29/2020

CLIENT: ROLL TIDE PROPERTIES CORPORATION P.O. BOX 203 CORNELIUS, OR 97113



CLIENT:

ROLL TIDE
PROPERTIES CORPORATION
PO BOX 103
CORNELIUS, OR 97113

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

DATE OF PLOT: 06/29/2020

PROJECT:

BULL RUN TERRACE SUBDIVISION

MASTER STREET AND UTILITY PLAN

LOCATION:

40808 & 41010 HWY 26, SANDY, OR 97055

SCALE	VERT: N/A HORIZ: 1"=60'
DATE:	07/26/2018
FILE:	19-035-Planning.dwg

LEGAL

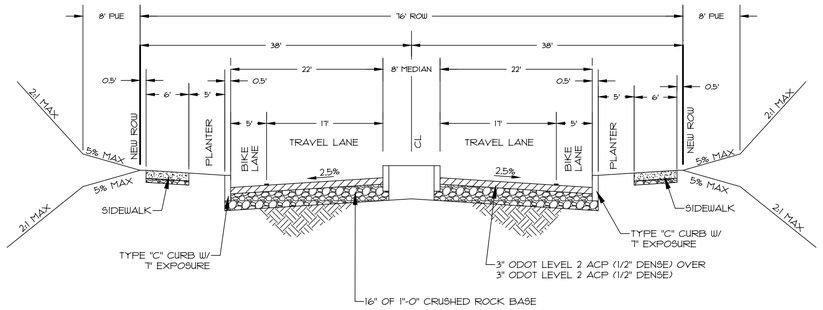
SECTION	TWP.	RANGE
18	2S	5E

REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 29, 1988
RAY L. MOORE
RENEWAL DATE: 12/31/2020

DATE	NO.	REVISION	BY
–	–	–	–

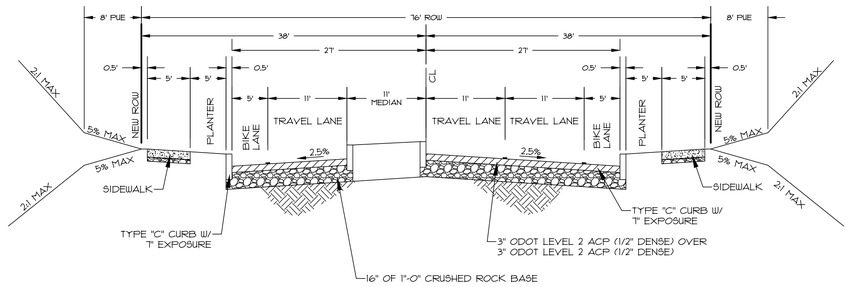
DESIGNED: CTH
DRAWN: CTH
CHECKED: RLM
APPROVED: RLM

SHEET C5
OF 10



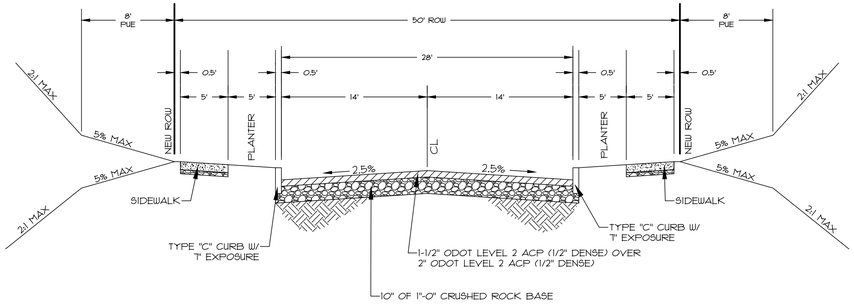
SECTION (1) (76' ROW - FULL STREET IMPROVEMENTS)

DUBARKO ROAD - ARTERIAL STREET
NTS



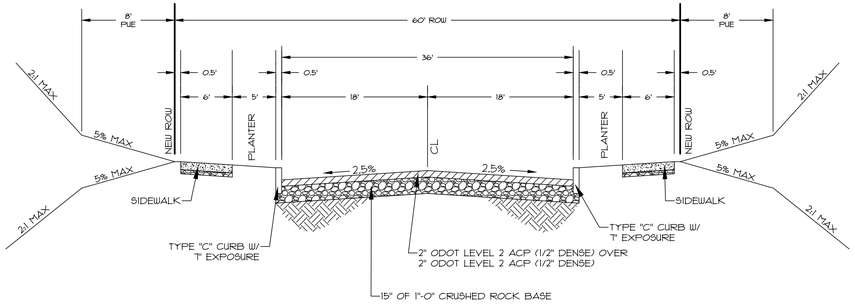
SECTION (2) (76' ROW - FULL STREET IMPROVEMENTS)

DUBARKO ROAD - ARTERIAL STREET
NTS



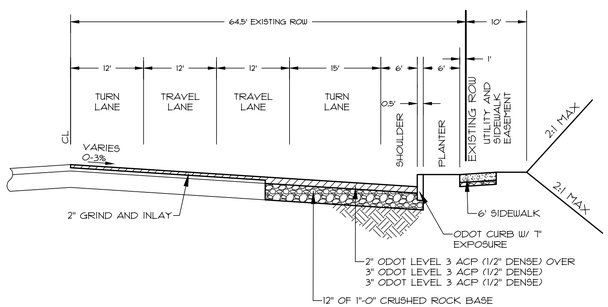
SECTION (3) (50' ROW - FULL STREET IMPROVEMENTS)

STREET A - LOCAL STREET
NTS



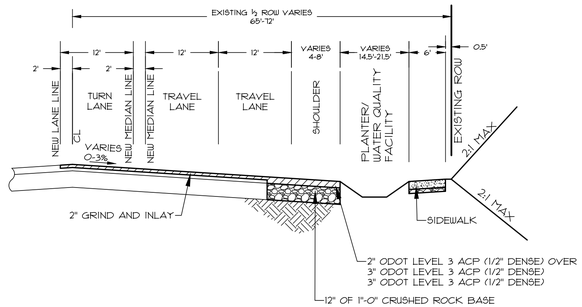
SECTION (4) (60' ROW - FULL STREET IMPROVEMENTS)

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	NO.	DATE	REVISION
-	-	-	-

DESIGNED: CTH
DRAWN: CTH
CHECKED: RLM
APPROVED: RLM

SHEET C6 OF 10

OREGON JULY 10, 1974 SKYLER L. MOORE 86230 RENEWAL DATE: 12/31/2020

SCALE VERT: N/A HORIZ: 1"=50'
DATE: 01/26/2018
FILE:19-035-Planning.dwg
LEGAL SECTION 18 TWP: 2S RANGE: 5E

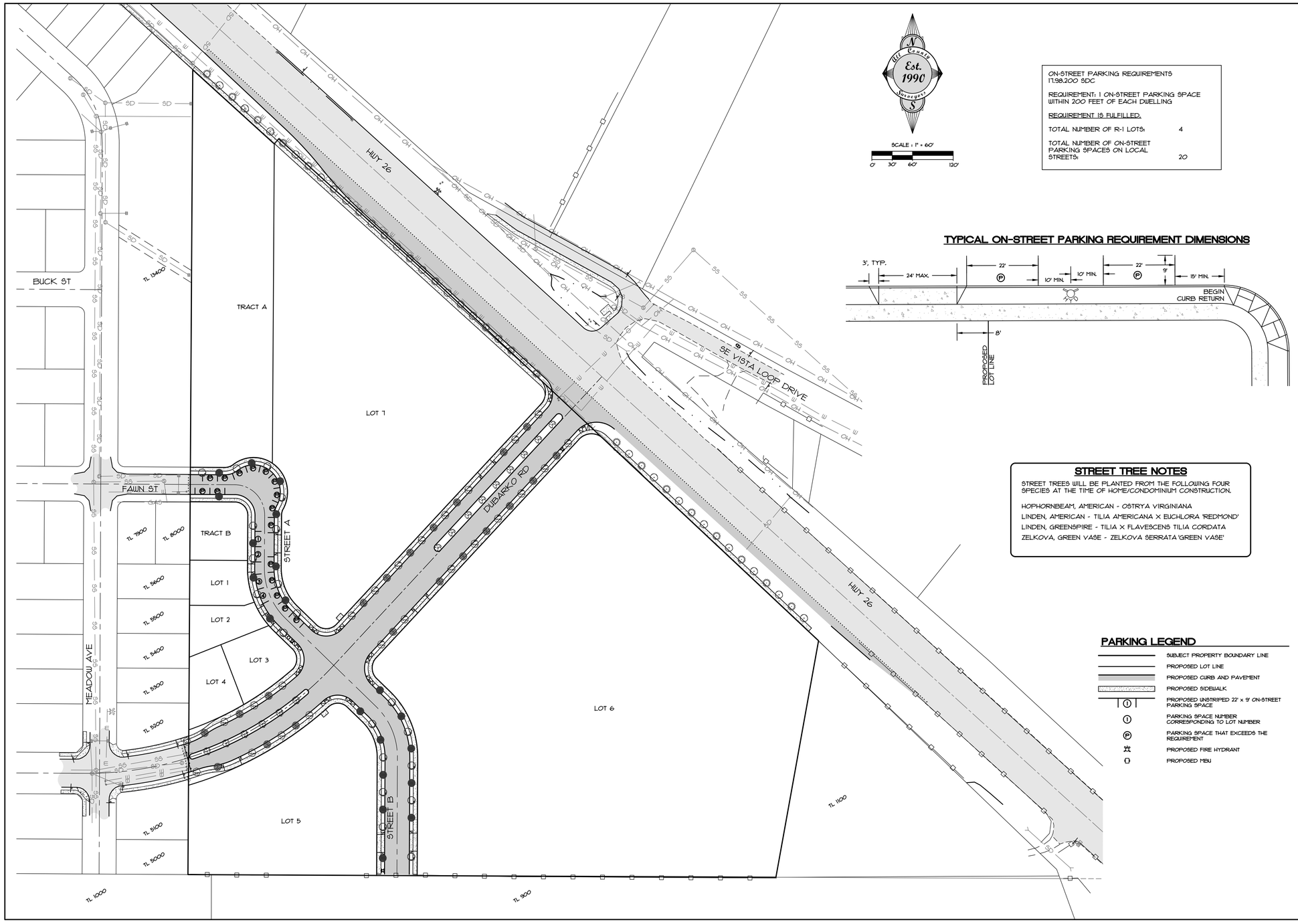
PROJECT:
BULL RUN TERRACE SUBDIVISION
STREET SECTIONS

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

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

DATE OF PLOT: 06/29/2020

CLIENT:
ROLL TIDE
PROPERTIES CORPORATION
P.O. BOX 103
CORNELIUS, OR 97113



ON-STREET PARKING REQUIREMENTS
17.98.200 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
- PARKING SPACE NUMBER CORRESPONDING TO LOT NUMBER
- PARKING SPACE THAT EXCEEDS THE REQUIREMENT
- PROPOSED FIRE HYDRANT
- PROPOSED MBU

SHEET C7 OF 10

NO.	DATE	REVISION	BY
-	-	-	-

DESIGNED: CTH
DRAWN: CTH
CHECKED: RLM
APPROVED: RLM

OREGON JULY 13, 1976 SKYLER L. MOORE 90474 RENEWAL DATE: 12/31/2020

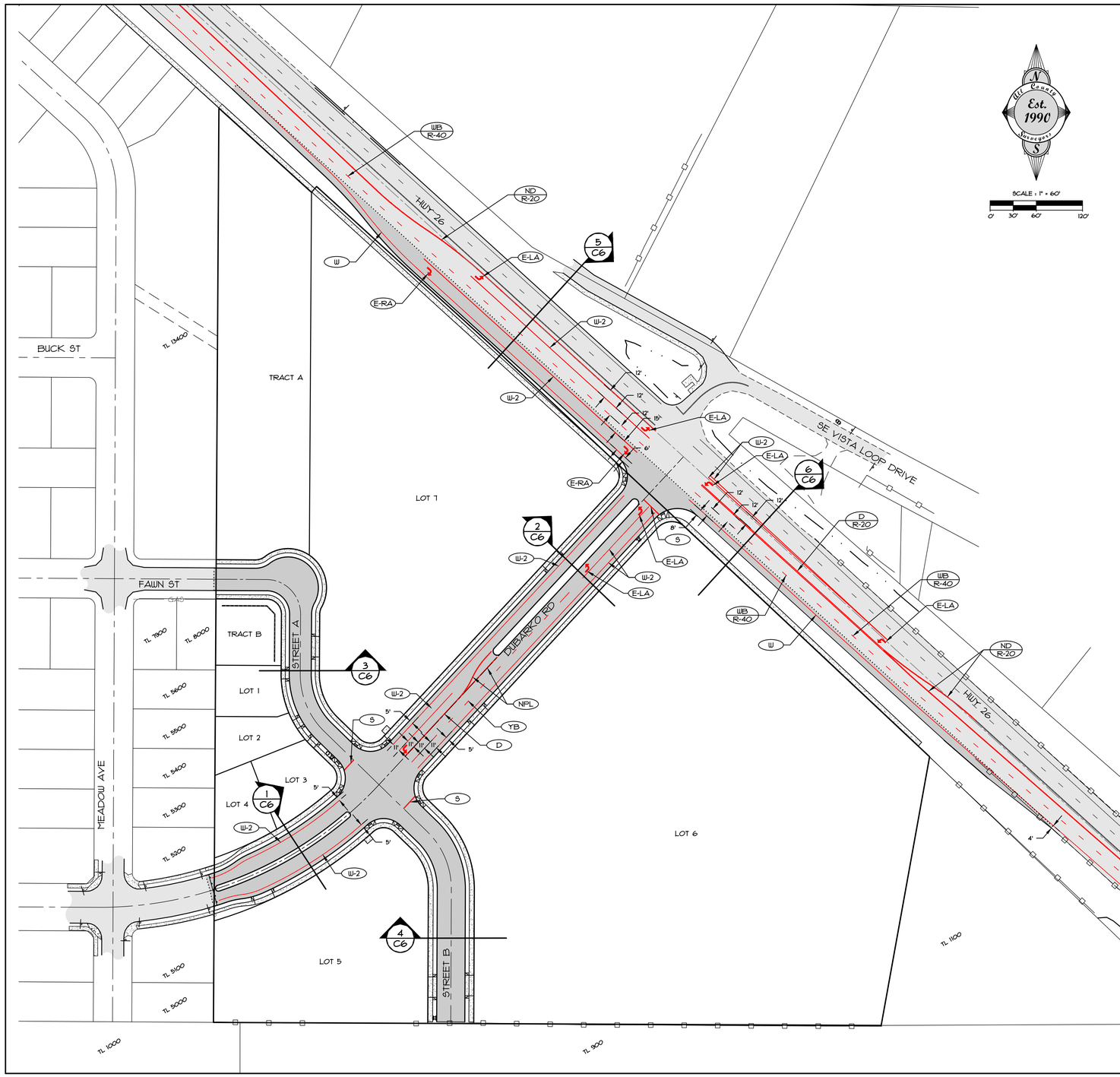
SCALE: VERT: N/A HORIZ: 1"=60'
DATE: 01/26/2018
FILE:19-035-Planning.dwg
LEGAL: SECTION 18 TWP: 2S RANGE: 5E

PROJECT:
BULL RUN TERRACE SUBDIVISION
STREET TREE PLAN & PARKING ANALYSIS

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

Cell County Surveyors & Planners, Inc.
Surveying, Planning and Civil Engineering
P.O. Box 955 Sandy, OR 97055
Phone: (503) 668-3151
Fax: (503) 668-4730
DATE OF PLOT: 06/29/2020

CLIENT:
ROLL TIDE
PROPERTIES CORPORATION
PO BOX 923
CORNELIUS, OR 97113



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
NPL	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'

SHEET C8 OF 10

NO.	DATE	REVISION	BY
-	-	-	-

DESIGNED: CTH
DRAWN: CTH
CHECKED: RLH
APPROVED: RLH

OREGON JULY 14, 1978 SKYLER L. MOORE 90574 RENEWAL DATE: 12/31/2020

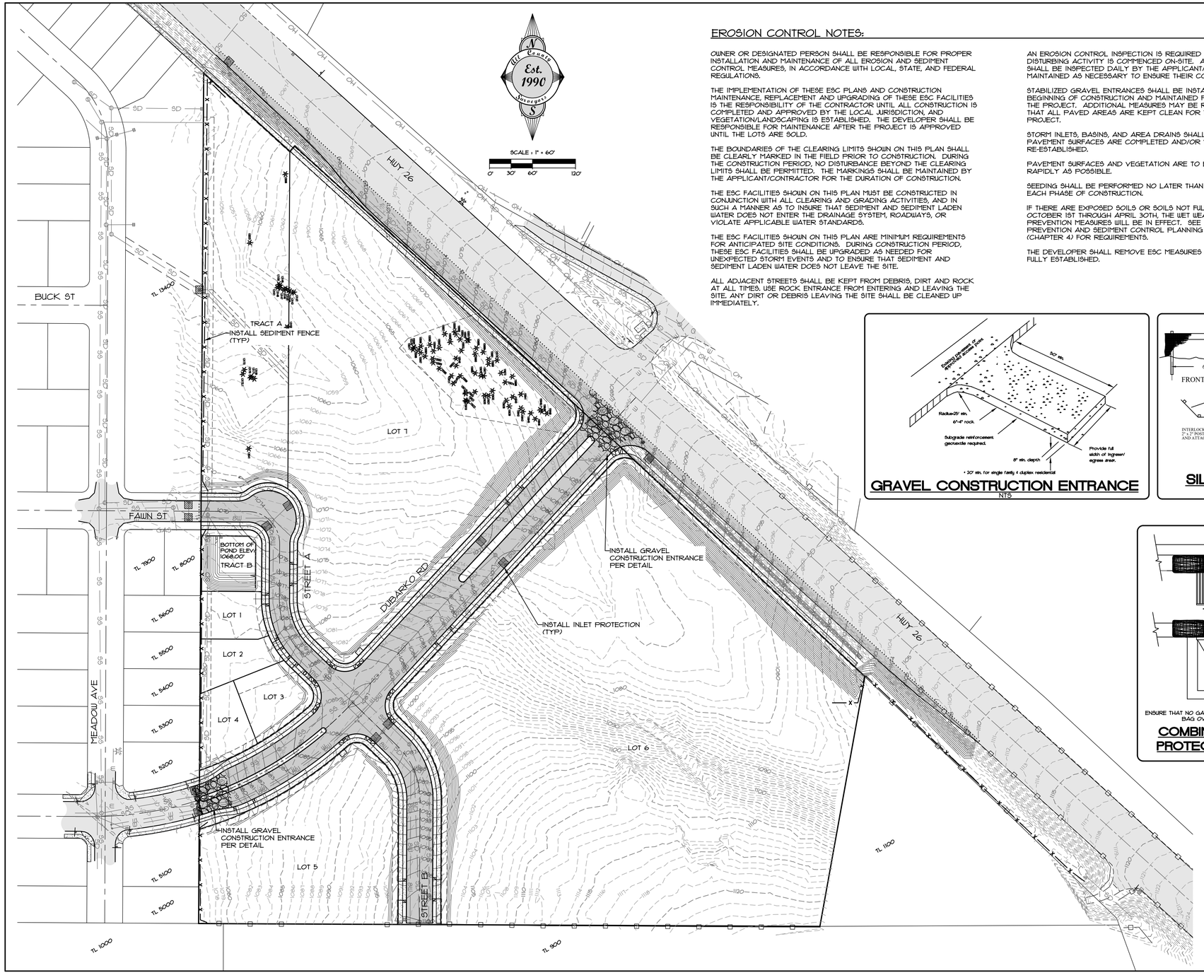
SCALE: VERT: N/A HORIZ: 1"=60'
DATE: 01/26/2018
FILE:19-035-Planning.dwg
LEGAL: SECTION 18 TWP. 2S RANGE 5E

PROJECT: **BULL RUN TERRACE SUBDIVISION**
PROPOSED STRIPING PLAN

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

Surveyors & Planners, Inc.
Surveying, Planning and Forestry Services
P.O. Box 955, Sandy, OR 97055
Phone: (503) 668-3151
Fax: (503) 668-4730
DATE OF PLOT: 06/29/2020

CLIENT: ROLL TIDE PROPERTIES CORPORATION P.O. BOX 103 CORNELIUS, OR 97113



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.

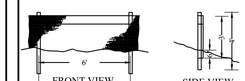
PAVEMENT SURFACES AND VEGETATION ARE TO BE PLACED AS RAPIDLY AS POSSIBLE.

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

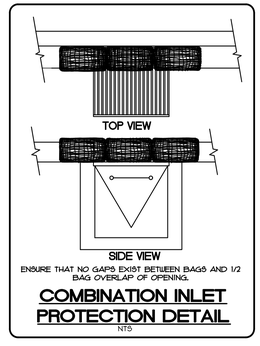
IF THERE ARE EXPOSED SOILS OR SOILS NOT FULLY ESTABLISHED FROM OCTOBER 1ST THROUGH APRIL 30TH, THE WET WEATHER EROSION PREVENTION MEASURES WILL BE IN EFFECT. SEE THE EROSION PREVENTION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL (CHAPTER 4) FOR REQUIREMENTS.

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

GRAVEL CONSTRUCTION ENTRANCE
NTS



SILT FENCE DETAIL
NTS



COMBINATION INLET PROTECTION DETAIL
NTS

SHEET C9 OF 10

NO.	DATE	REVISION	BY
–	–	–	–

DESIGNED: CTH
DRAWN: CTH
CHECKED: RLM
APPROVED: RLM

REGISTERED PROFESSIONAL ENGINEER — OREGON — JULY 14, 2006 — SHAY L. MOORE — RENEWAL DATE: 12/31/2020

SCALE — VERT: N/A — HORIZ: 1"=60'
DATE: 01/26/2018
FILE:19-035-Planning.dwg
LEGAL — SECTION: 18 — TWP: 2S — RANGE: 5E

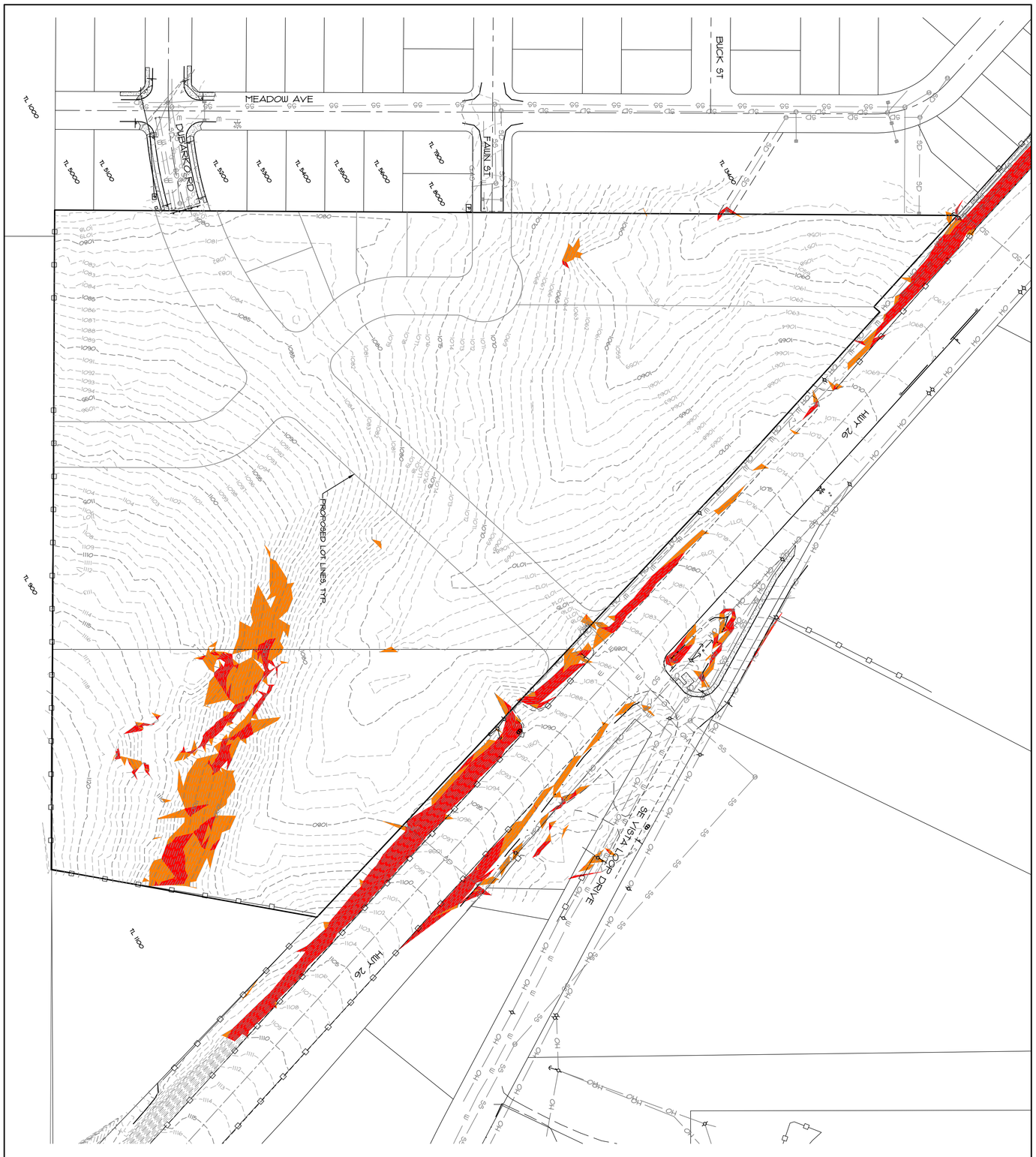
PROJECT: **BULL RUN TERRACE SUBDIVISION**
PRELIMINARY GRADING AND EROSION CONTROL PLAN

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

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

DATE OF PLOT: 06/29/2020

CLIENT: ROLL TIDE PROPERTIES CORPORATION PO BOX 1003 CORNELIUS, OR 97113


MEADOW AVE
BUCK ST
DUBARKO RD
FAUN ST
HWY 26
SE VISTA LOOP DRIVE
PROPOSED LOT LINES, TYP.
TL 1000
TL 1400
TL 5000
TL 5100
TL 5200
TL 5300
TL 5400
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TL 6600
TL 6700
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TL 6900
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EXHIBIT D

Preliminary Storm Drainage Design and Calculations For the Bull Run Terrace Subdivision

November 20, 2019

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RENEWAL DATE: 12/31/2020

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-Vicinity Map
-Site Layout
-Pre-Developed Areas
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Appendix B
-Standard Formulas
-Coefficients
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-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 Stated Department of Agriculture (USDA). The post-development soil is assumed to be the same as pre-development.

Soil Type: 15B, Cazadero silty clay loam. Hydrologic Group “C”
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 x 85) + (5.68AC x 81)] / (5.19+5.68) = 82.91= **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 x 85) + (5.16AC x 81)+ (0.85AC x 86)] / (2.75+5.16+0.85) = 82.74
= **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 (Tc), 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 X 0.2 X 2.11
Q = 0.38 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.

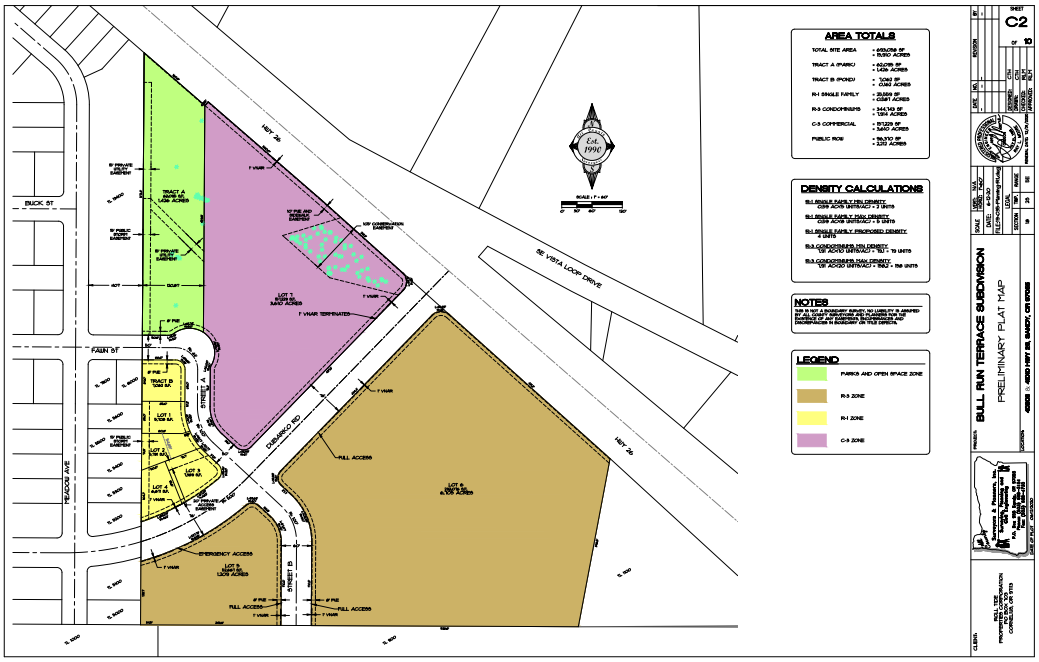
A Storm Water Treatment Device CDS Model CDS2015-4-C can be used to adequately treat the water for the site

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.

JOHNSON ECONOMICS

EXHIBIT E



PUBLIC NEED ANALYSIS FOR ROLLTIDE PROPERTY

RESIDENTIAL LANDS
CITY OF SANDY

JULY, 2020

621 SW ALDER, SUITE 605, PORTLAND, OR 97205 503/295-7832

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CONCLUSIONS REGARDING THE PROPOSED ZONE CHANGE 5

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INTRODUCTION

Johnson Economics was asked to prepare an assessment of the public need for residential as well as commercial uses in the City of Sandy. This work is in support of a comprehensive plan and zone change application for a 15.91-acre site located south of Highway 26 at the future intersection with Dubarko Road.

LOCATION OF SUBJECT SITE

SOURCE: Clackamas Maps

Current zoning on the site include 2.84 acres of C-3 (Village Commercial), 8.05 acres designated R-1 (Low Density Residential), and 5.01 acres designated R-2 (Medium Density Residential). The proposed change in zoning would increase the C-3 zoned area to 3.61 acres, reduce the R-1 zoned property to 0.59 acres, and rezone 7.91 acres to R-3 (High Density Residential). In addition, 1.43 acres would be set aside as POS (Parks and Open Space), 2.21 would be right of way, and 0.16 would be a public stormwater tract. The change in designation would allow for up to 158 rental apartment units on the R-3 property, while reducing density in the R-1 and R-2 tracts from a current max of 101 units to a max of 5 units. The net impact assuming development at maximum allowed density would increase residential capacity on the site by 62 units, with a shift from low- and medium-density product to rental apartments. The commercial/employment capacity on the site would be increased by roughly 1.5 net acres.

Area Comparison of Existing to Proposed Zoning

	Existing (gross acres)	Existing (net acres)*	Proposed (net acres)
C-3, Village Commercial	2.84	2.13	3.61
R-1, Low Density Residential	8.05	6.04 (48 units max.)	0.59 (5 units max.)
R-2, Medium Density Residential	5.01	3.76 (53 units max.)	0.00
R-3, High Density Residential	0.00	0.00	7.91 (158 units max.)
POS, Parks and Open Space	0.00	0.00	1.43
Rights of Way	0.00	3.98	2.21
Public Tracts (stormwater tract)	0.00	0.00	0.16
Total Area	15.91	15.91	15.91

**** - Net acres assumes 25% reduction for public roads***

This analysis addresses the public need for the requested change. In addition, the analysis will discuss whether the proposed change on the property represents an appropriate zoning boundary modification and the degree to which the development represents a sound, stable, and desirable development proposal. Following is a brief summary of the designations from the City of Sandy's Development Code:

> Sandy's C3 zone *"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."*
>
> 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.*
>
> *High density residential areas are generally located immediately adjacent to village commercial centers or the Central Business District. Commercial development, including home businesses and limited neighborhood retail, is considered appropriate in high density residential developed in conjunction with villages or immediately north of the Central Business District. High density residential areas are generally located nearby Village Commercial Centers, the Central Business District and/or public facilities such as schools or parks. The HDR Plan designation encompasses one zoning district designation."*

The proposed R3 zoning allows a range of multi-family residential uses, including duplexes, townhomes, and residential facilities. The minimum allowed residential density is 10 units per acre with a maximum of 20 units per acre. The predominant use on the site is likely to be common wall multi-family and/or rental apartments.

This analysis relies on employment data provided by the US Census, assessment of developed and vacant land provided by Metro's RLIS, the City of Sandy Urbanization Study (2015), and Portland State University's Population Research Center's population estimates. This analysis supports the following findings:

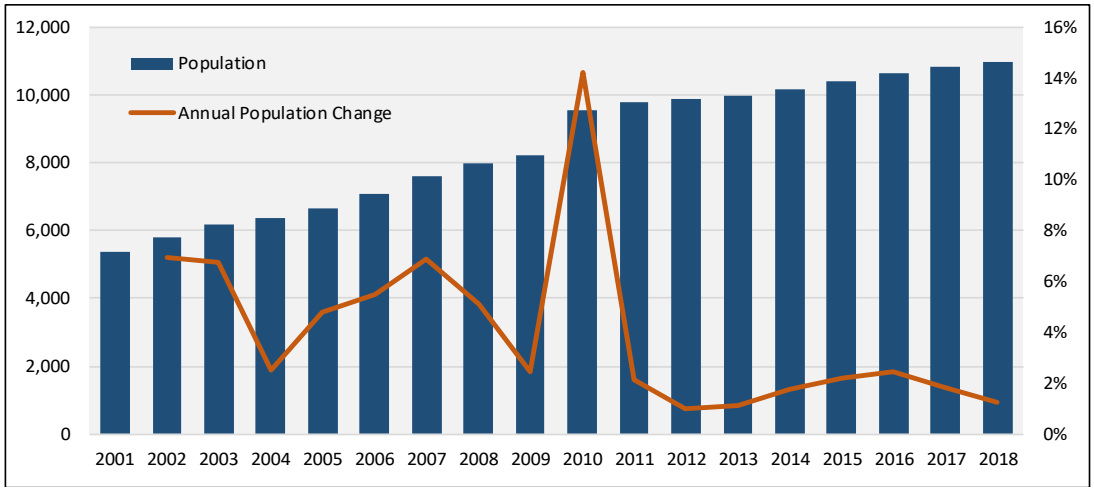
- The change in use would provide capacity for additional housing options, which may alleviate local housing affordability issues while providing increased demographic support for the proximate commercial concentrations in central Sandy.
- The entitlement change would be expected to bring the property into active urban use and be supportive of the City's planning policies.

Residential Land Needs

Population

Portland State University's Population Research Center provides intercensal population estimates for the State of Oregon, which are considered to be more accurate than Census Bureau estimates. The Center estimates that in 2001 Sandy's population was 5,380 and grew to 10,990 by 2018. This represents an increase of 104% since 2001 and an average growth rate of 4.3% over this same period. However, much of this growth took place before 2011. From 2011 through 2018 average annual growth was only 1.7%. Portland State University's population forecast programs most recent forecast for the Sandy UGB projected average annual growth of 2.7% through 2040.

Historical Population, Sandy (2001-2018) [1]

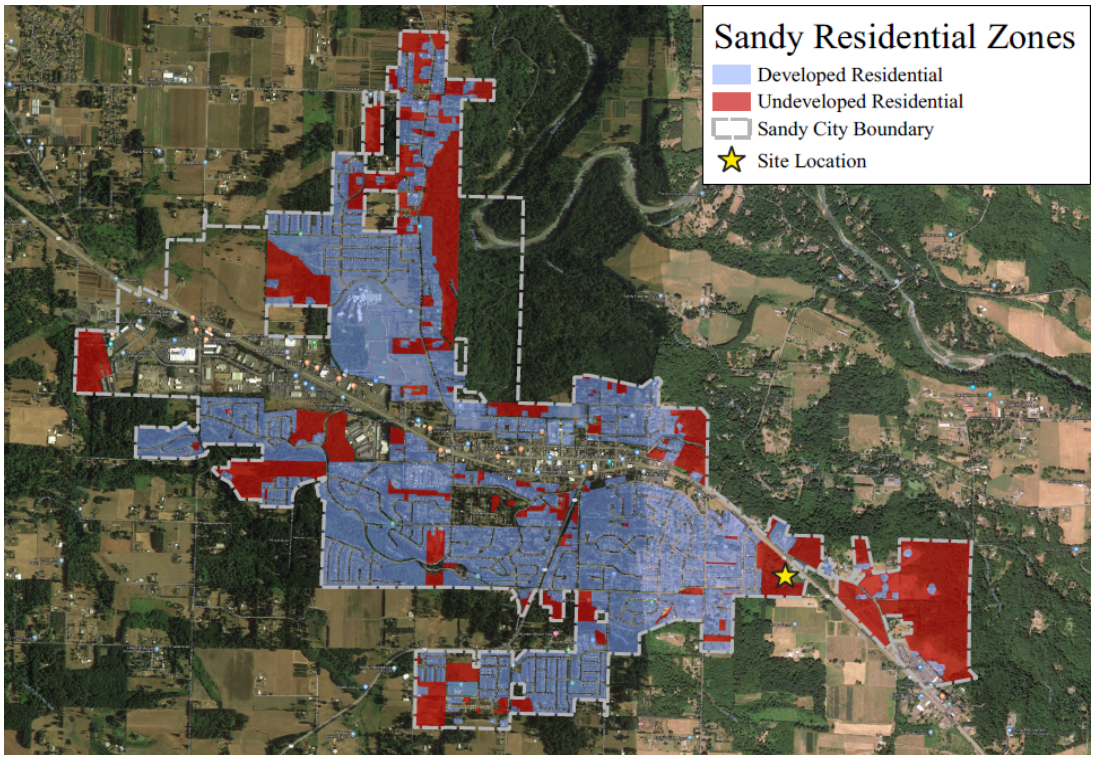


Population and Housing

As mentioned earlier, Portland State University's Center estimates that in 2001 Sandy's population was 5,380 and grew to 10,990 by 2018. This represents an increase of 104% since 2001 and an average growth rate of 4.7% over this same period. For the purposes of this study, assuming that levels of residential density in Sandy remain constant, the demand for residential land will likely follow the city's forecasted population within the UGB of 2.7%. According to Metro's RLIS, Sandy currently has 865.7 acres of residentially zoned, developed land. Projecting 20

[1] Portland State University Population Research Center

years forward to 2038, the city will likely need an additional 609.2 acres to meet a total need of 1,474.9 acres of residential land. Currently, the city has a total of 1,295.6 acres of land zoned for residential uses. This amount of land is 178.6 acres short of the projected need by 2038 based on historic development patterns.



SUMMARY OF RESIDENTIAL ZONED LAND SUPPLY, CITY OF SANDY[2]

Zone	Developed		Undeveloped		% Developed	
	Parcels	Acres	Parcels	Acres	Parcels	Acres
R1	74	137.5	30	39.4	71.2%	77.7%
R2	76	194.1	31	71.4	71.0%	73.1%
R3	58	125.8	29	53.0	66.7%	70.4%
SFR	114	408.3	53	266.9	68.3%	60.5%
Total Residential	322	865.7	143	430.6	69.2%	**66.8%**

The City has developed just over 70% of its land for multifamily and 66.8% for residential more broadly. While additional capacity is expected to be available through redevelopment, this is inherently more difficult and typically more expensive to deliver. Increasing the City's multifamily residential land inventory would increase local capacity for residential products that can meet a broad range of price points. Affordability of housing has become a major

2 Metro, RLIS system

concern during the recent expansion cycle and provision of higher density housing options is seen as a major tool in addressing affordability concerns.

Site Suitability for Proposed Uses

The subject site does not have any significant physical development constraints and enjoys visibility from Highway 26. The proposed use pattern will place a public park and the low density residential uses on the western edge of the property, providing a buffer between more intensive uses on the remainder of the site and the R-3 zoned property to the east and south. The proposed development pattern allows for a relatively efficient utilization of the site, with an efficiency of 84% (net developable area divided by total area, excluding park dedication). This is significantly higher than would be achievable with the current zoning designation, and supports more efficient land utilization.

Clustering residential density along Highway 26 and at the future intersection with Dubarko will provide excellent access to the residents, including to the commercial development on the site and the extensive commercial options in the city's downtown core (roughly a mile and a half west and three minutes away) as well as larger format retailers to the west of downtown. The intersection of Dubarko and Highway 26 is expected to collect the bulk of traffic from commercial and multi-family development on the site.

Conclusions Regarding the Proposed Zone Change

The proposed zone change is responsive to the City's projected need for additional residential capacity. Lennar Corporation, who previously controlled the site, spent a decade and significant investment trying to generate a viable development program for the site. The cost of the connection to Highway 26 and the infrastructure investment requirements in the village overlay were too great to be offset by the value of the underlying property. While technically capable of supporting development, these economic constraints make the site effectively undevelopable under the current zoning designation.

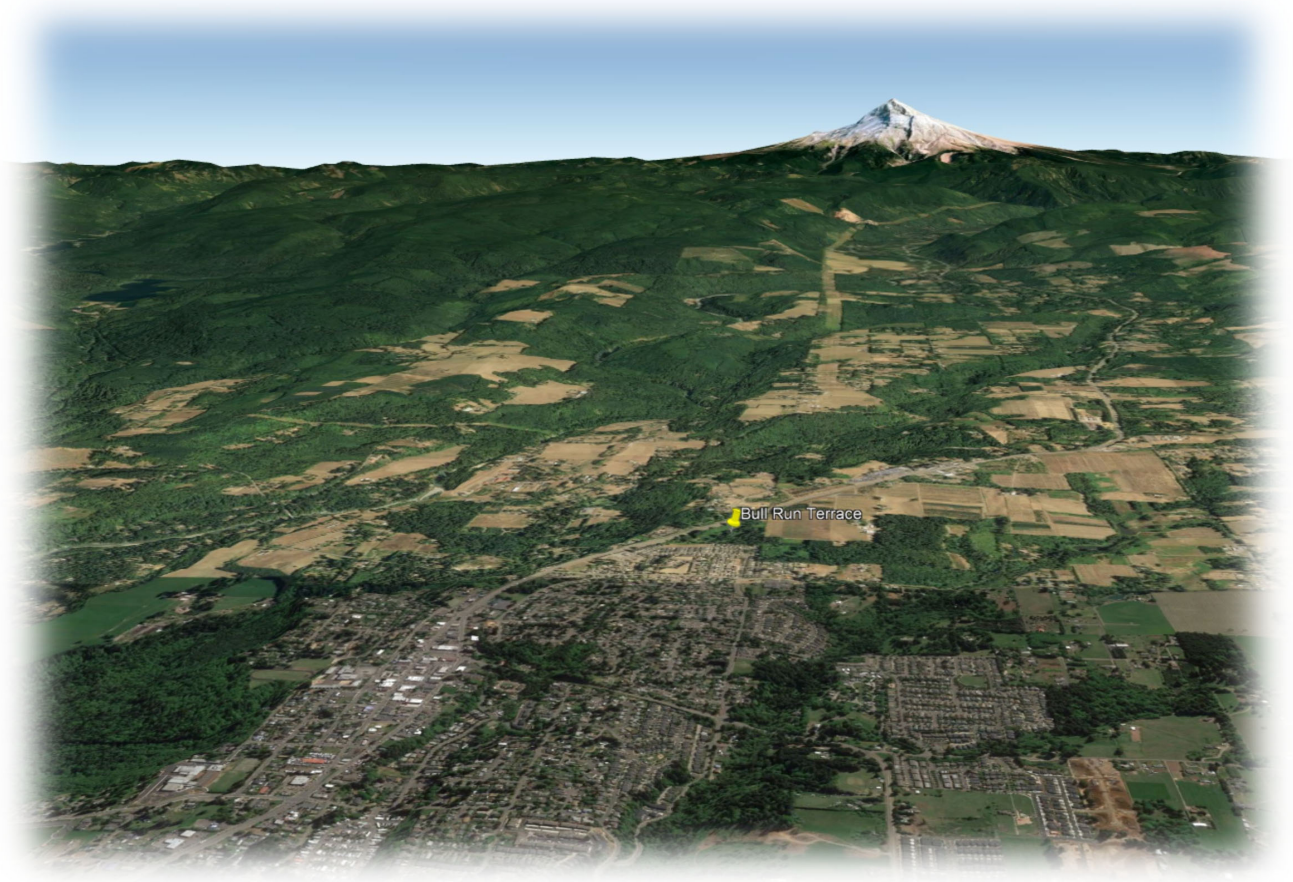
A key criteria in the City of Sandy is the degree to which the development represents a sound, stable, and desirable development proposal. Increasing the allowed residential density as proposed will provide the ability of the site to support necessary infrastructure investments to open up development. Under the current zoning the economic constraints outlined preclude a "sound, stable" development program for the site.

Allowing the proposed change in zoning will accelerate the development of the property while better addressing the City of Sandy's land use needs and public policy objectives. Dubarko's connection to Highway 26 can't be completed unless this site is developed, which has a significant impact on the City's broader street system. In addition, development of the site will provide more tax revenue as well as providing needed park space. The proposed use will also provide a "middle housing" product in the market that will address the local need for more low-cost housing choices.

EXHIBIT F

BULL RUN TERRACE
TRAFFIC IMPACT STUDY

SANDY, OREGON



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

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BULL RUN TERRACE SUBDIVISION
TRAFFIC IMPACT STUDY

SANDY, OREGON

PREPARED FOR:
Alex Reverman

PREPARED BY:
Michael Ard, PE
Ard Engineering

DATE:
July 12, 2020

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 158 apartment units and 4 single-family homes, 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 proposed subdivision, the subject property is projected to generate 76 new site trips during the morning peak hour, 92 trips during the evening peak hour, and 1,194 new daily site trips.

3. Based on the operational analysis, the study intersections currently operate acceptably and are projected to continue to operate acceptably under year 2022 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 2022 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. An additional analysis showing operation of the study intersections with the new Dubarko Road at Highway 26 intersection restricted to right-in, right-out only demonstrates that there is sufficient capacity for such diversions even if all northeast-bound left-turning vehicles diverted to alternative travel paths.

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 safety improvements have not significantly improved. It is recommended that ODOT consider allowing installation of all-way stop control at this intersection. 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. The northbound left-turn lane would not be needed at the time of project completion if the intersection is limited to right-in, right-out only. 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. 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-3, C-3 and POS zoning. This zone change is projected to result in a negligible change to traffic volumes as measured under the “reasonable worst case” development scenarios and therefore will not have a significant effect on operation of area roadways and intersections at the planning horizon as defined by Oregon’s Transportation Planning Rule.

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 158 apartment units and 4 single-family homes. 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.

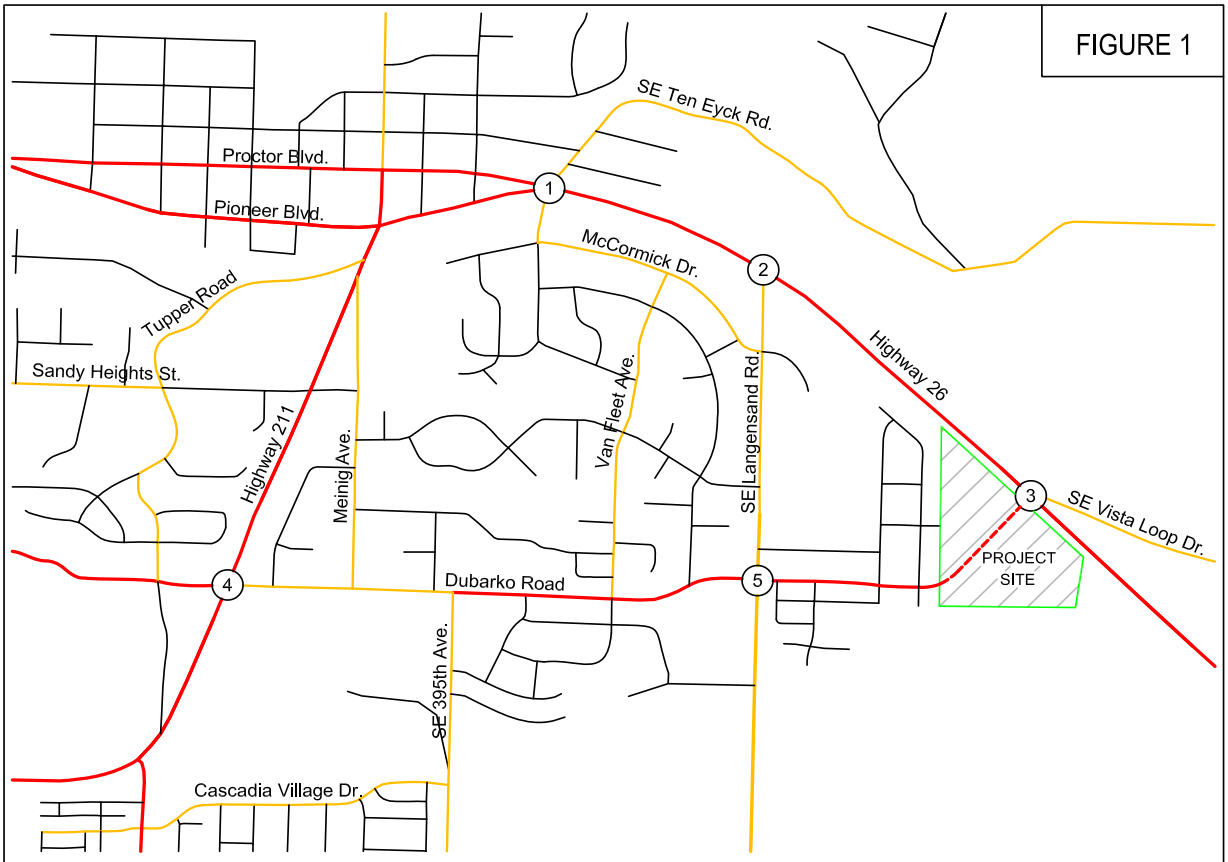
The intersection of US Highway 26 at SE Vista Loop Drive is currently a T- intersection controlled by a stop sign on the southwest-bound Vista Loop Drive approach. Through traffic traveling along Highway 26 does not stop. The southwest-bound approach has a single, shared lane for all turning movements. 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.

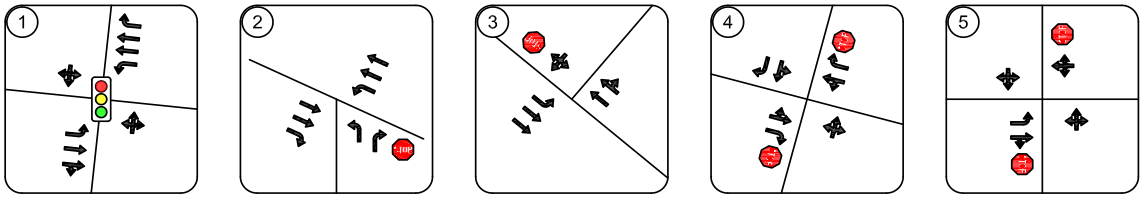
The intersection of Oregon Highway 211 at Dubarko Road is a four-way intersection controlled by stop signs on the eastbound and westbound Dubarko Road approaches. The southbound, eastbound and westbound approaches each have a shared through/left lane, a bike lane, and a dedicated right-turn lane. The 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

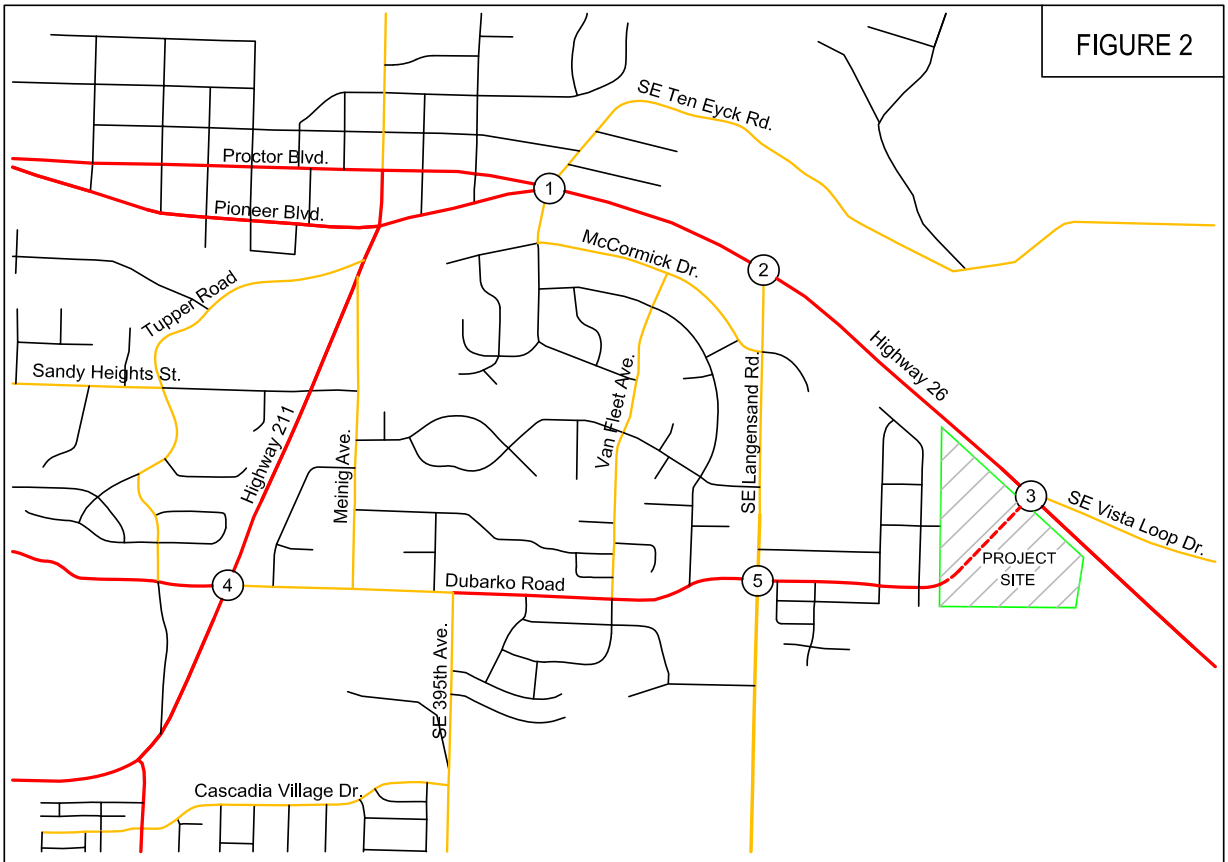
evening peak hour, and a seasonal adjustment of 1.08 was applied to the remaining local and commuter traffic volumes. Following this adjustment, the 676 March recreational trips and the 498 peak-season through trips were added to determine the total peak-season traffic volumes. These calculated through 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.

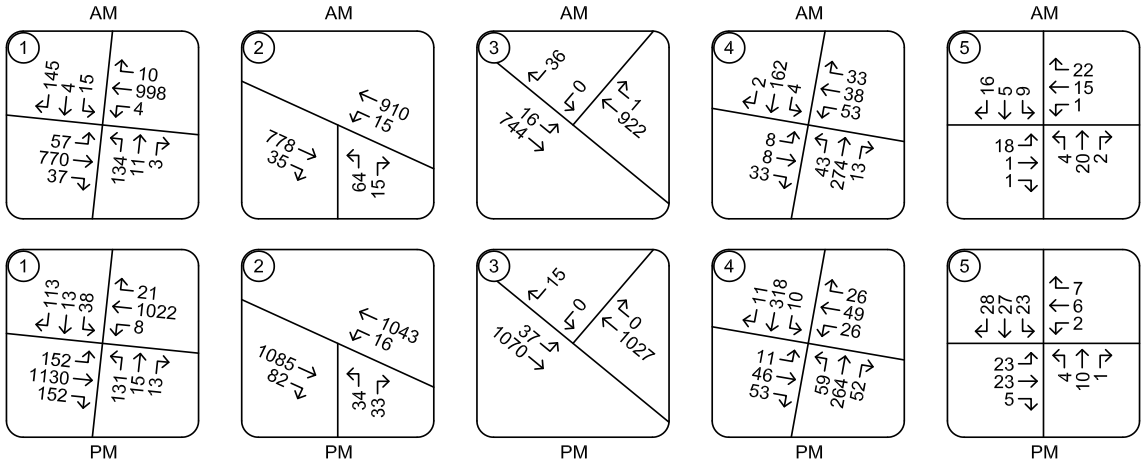
The observed traffic volumes along Highway 211 also had a seasonal adjustment of 1.08 applied to represent peak-season traffic volumes.

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





TRAFFIC VOLUMES
2020 Existing 30th-Highest Hour (August) Conditions
Morning and Evening Peak Hours

PAGE 10

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. The intersection of Highway 211 at Dubarko Road is required to operate with a v/c ratio of 0.90 or less on all 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 158 apartment units and 4 single-family homes. Although some commercial development is expected to occur in the longer-range future, a separate application and analysis will be prepared for the future commercial development. To estimate the number of trips that will be generated by residential development within the proposed subdivision, trip rates from the *TRIP GENERATION MANUAL, 10th EDITION* were used. Data from land-use code 210, *Single-Family Detached* Housing, and 220, *Multi-Family Housing*, were used. The trip estimates are based on the number of dwelling units.

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

Table 2 - Proposed Development Trip Generation Summary

	AM Peak Hour			PM Peak Hour			Daily
	In	Out	Total	In	Out	Total	Total
158 Apartment Units	17	56	73	55	33	88	1156
4 Single-Family Homes	1	2	3	3	1	4	38
Total Site Trips	18	58	76	58	34	92	1,194

Zone Change

In addition to evaluation of the increase in site trips expected upon completion of residential 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.

The subject property is currently zoned with a mix of 8.05 acres of R-1, 5.01 acres of R-2 and 2.84 acres of C-3 zoning. Under the proposed subdivision plan, 2.21 acres will be dedicated as public right-of-way, 0.75 acres will be zoned R-1, 7.91 acres will be zoned R-3, 3.61 acres will be zoned C-3 (with just 3.12 acres available for development due to 0.49 acres being placed into a tree conservation easement), and 1.43 acres will be zoned POS (Parks & Open Space).

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 on the following page. 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
	In	Out	Total	In	Out	Total	Total
Existing R1, R2 and C3 Zoning							
8.05 Acres R-1 (52 Homes)	10	28	38	32	19	51	490
5.01 Acres R-2 (56 Homes)	10	31	41	35	20	55	528
2.84 Acres C-3 (30,900 sf Retail)	18	11	29	57	61	118	1166
-Pass-by Trips (34%)	-5	-5	-10	-20	-20	-40	-396
Net Trips (Existing Zoning)	**33**	**65**	**98**	**104**	**80**	**184**	**1788**
Proposed Zoning							
0.75 Acres R-1 (6 Homes)	1	3	4	4	2	6	56
7.91 Acres R-3 (158 Apartments)	17	56	73	55	33	88	1156
3.12 Acres C-3 (34,000 sf Retail)	20	12	32	62	68	130	1284
-Pass-by Trips (34%)	-5	-5	-10	-22	-22	-44	-436
1.43 Acres POS (Public Park)	0	0	0	0	0	0	2
Net Trips (Proposed Zoning)	**33**	**66**	**99**	**99**	**81**	**180**	**2062**
Net Change In Site Trips	**0**	**1**	**1**	**-5**	**1**	**-4**	**274**

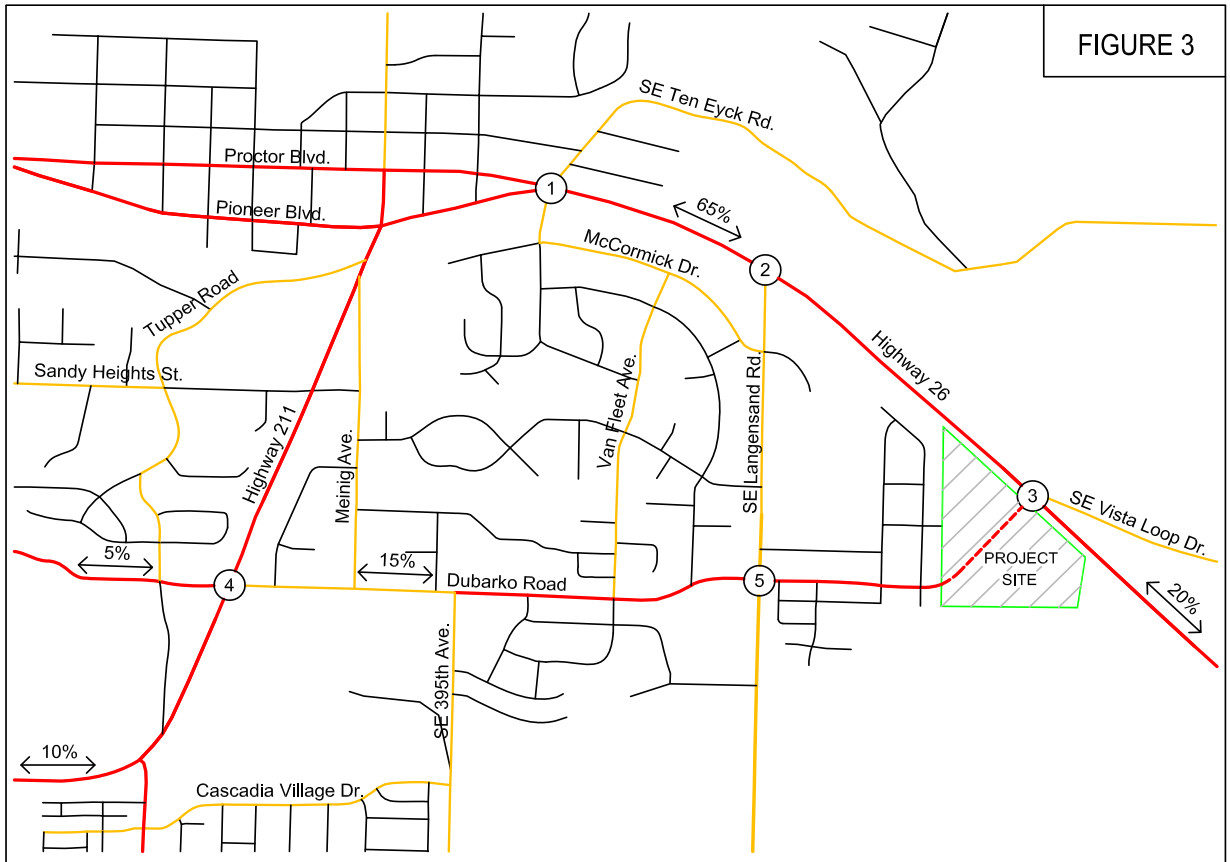
Based on the zone change analysis, the proposed zone change would result in no significant change in site trips at the planning horizon. Specifically, during the morning peak hour, a net increase of one trip is projected and during the evening peak hour a decrease of 4 trips is projected. Although there is a projected increase of 274 daily trips, these trips would primarily occur in the off-peak hours and since the daily increase is fewer than 400 trips the proposed zone change qualifies as a "small increase in traffic" and per Oregon Highway Plan Policy 1F5 will not degrade the performance of existing or planned transportation facilities. Accordingly, the proposed change in zoning will conform to the requirements of Oregon's Transportation Planning Rule. A detailed analysis based on the requirements of Oregon's Transportation Planning Rule is provided on page 26 of this report.

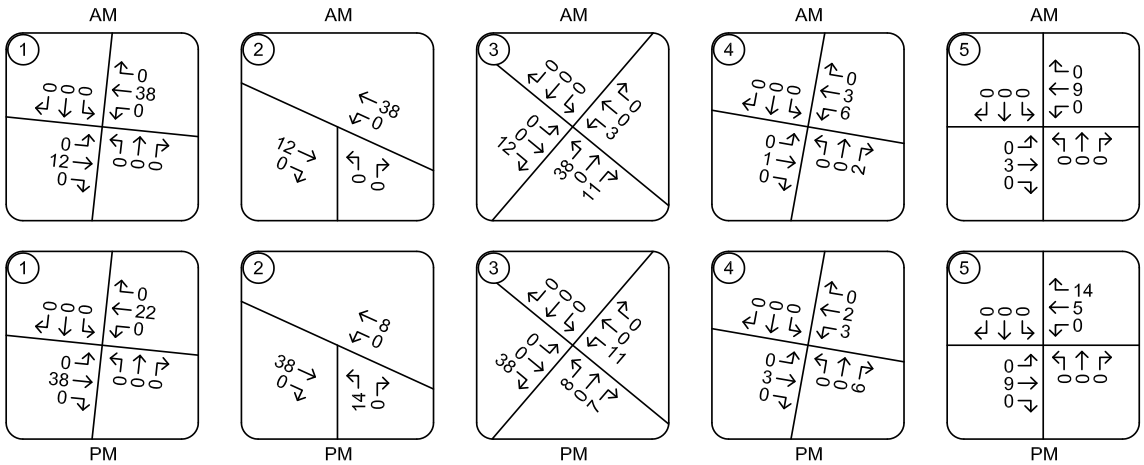
TRIP DISTRIBUTION

The directional distribution of site trips to and from the project site was estimated based the existing travel patterns in the site vicinity, as well as the locations of likely trip destinations and major transportation routes. Overall, 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 15.

FIGURE 3





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

PAGE 15

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 two years. Accordingly, the analysis was conducted for year 2022 traffic conditions.

Prior to adding the projected site trips to the study intersections, the existing traffic volumes were adjusted to account for background traffic growth over time. 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 17 shows the projected year 2022 background traffic volumes at the study intersections during the morning and evening peak hours.

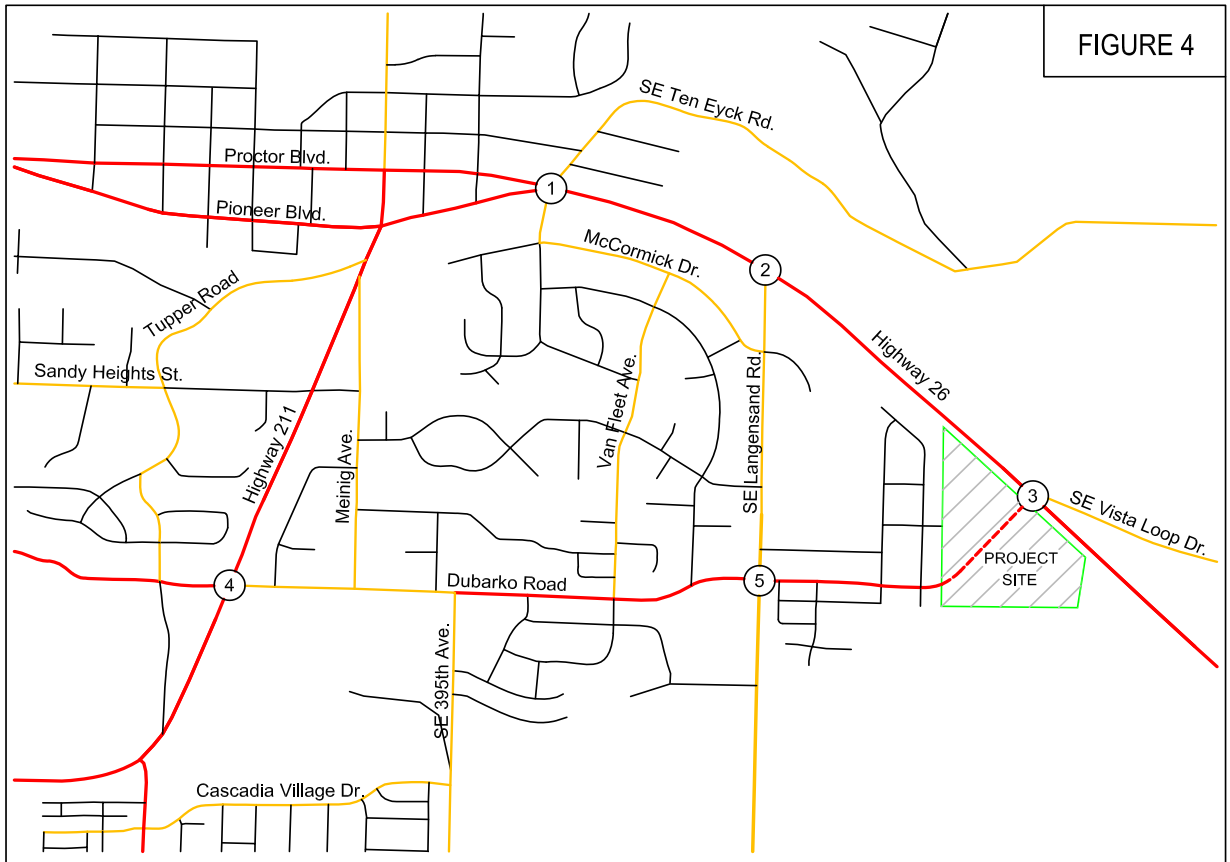
BACKGROUND VOLUMES PLUS SITE TRIPS

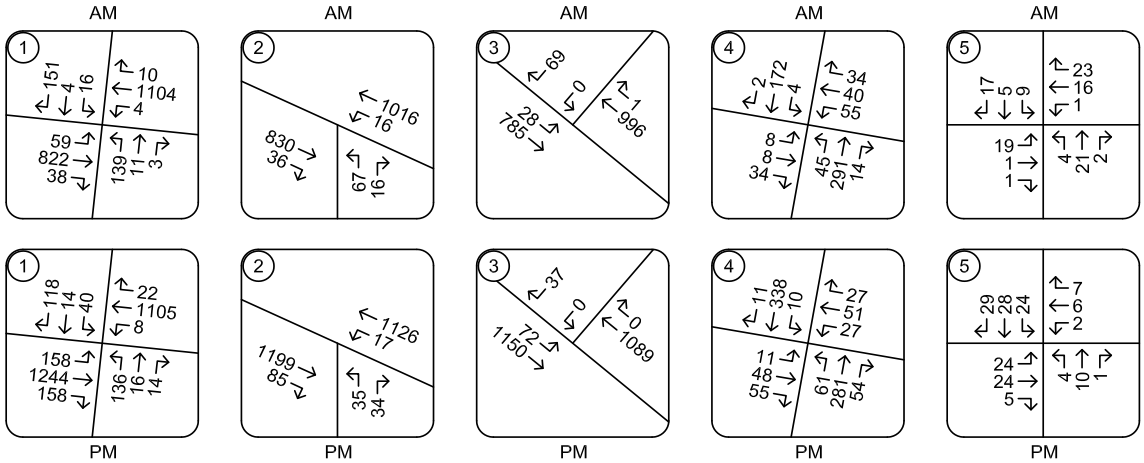
Peak hour trips calculated to be generated by the proposed development were added to the projected year 2022 background traffic volumes to obtain the year 2022 total traffic volumes following completion of the proposed residential development.

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 18 shows the projected year 2022 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 6 on page 19 shows the year 2022 turning movement volumes for the morning and evening peak hour with full site development if the Dubarko Road connection to Highway 26 is limited to right-in, right-out only.

FIGURE 4

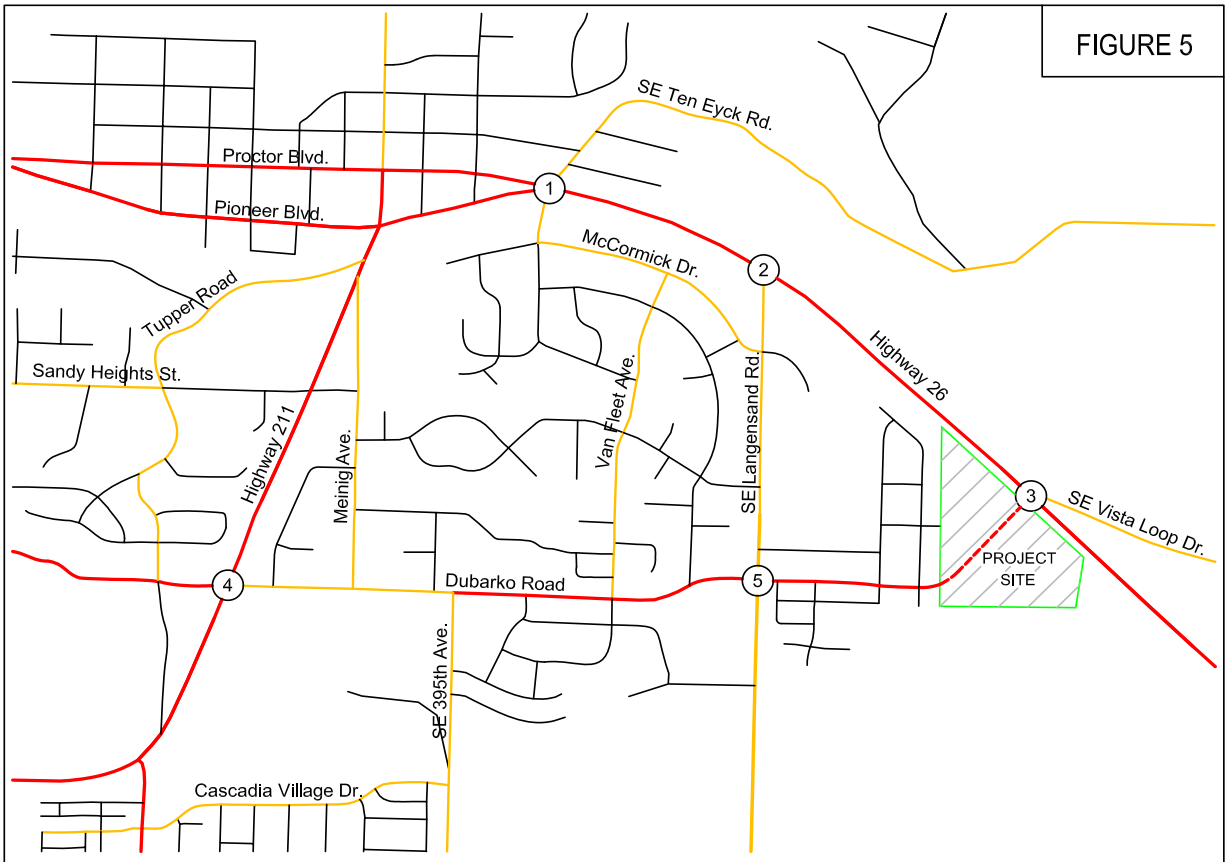


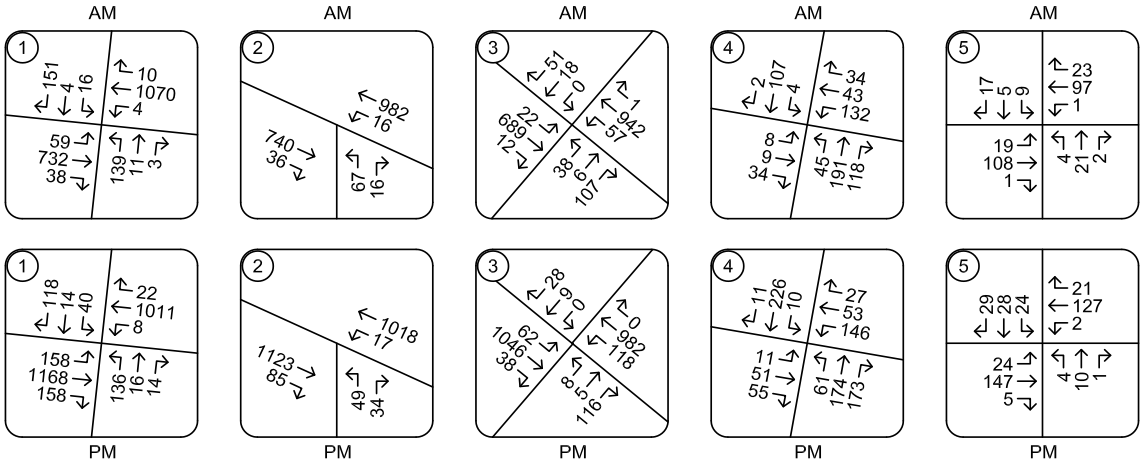


TRAFFIC VOLUMES
2022 Background Conditions
Morning and Evening Peak Hours

PAGE 17

FIGURE 5

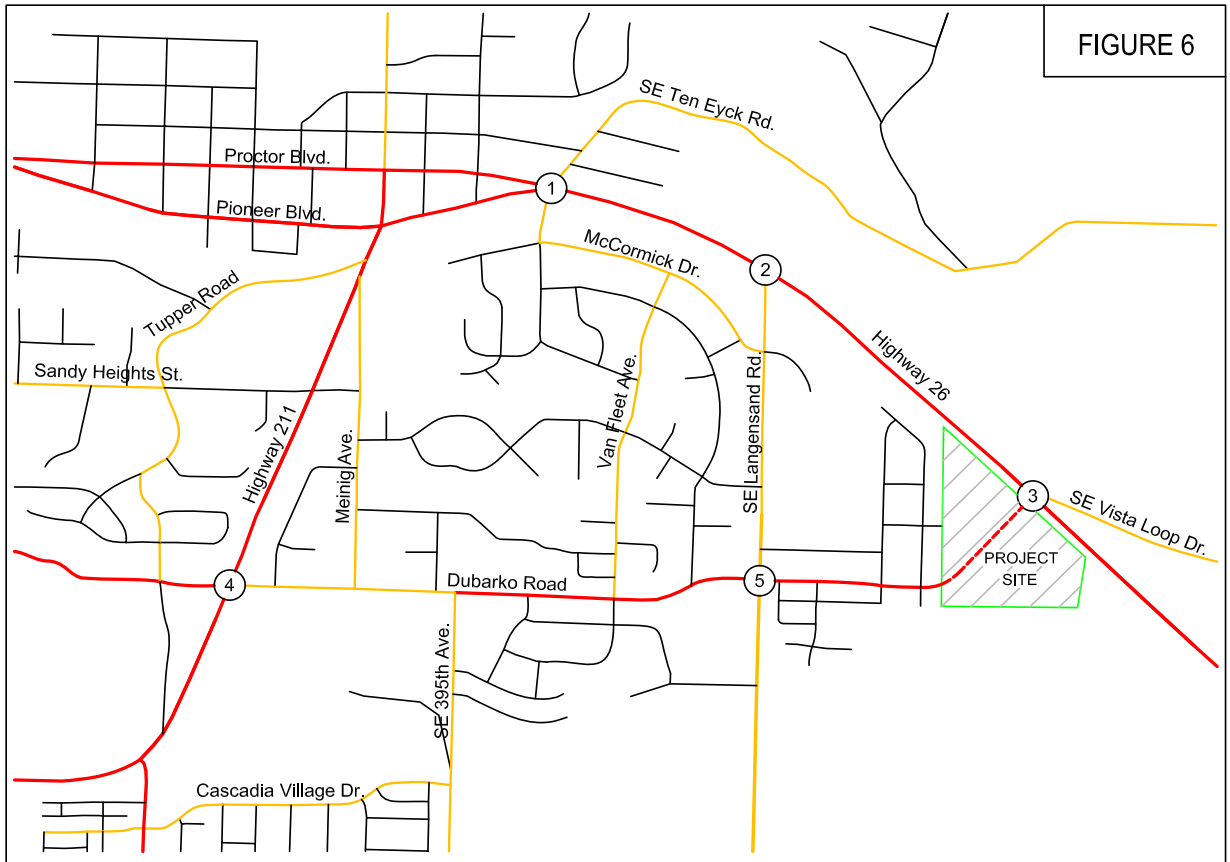


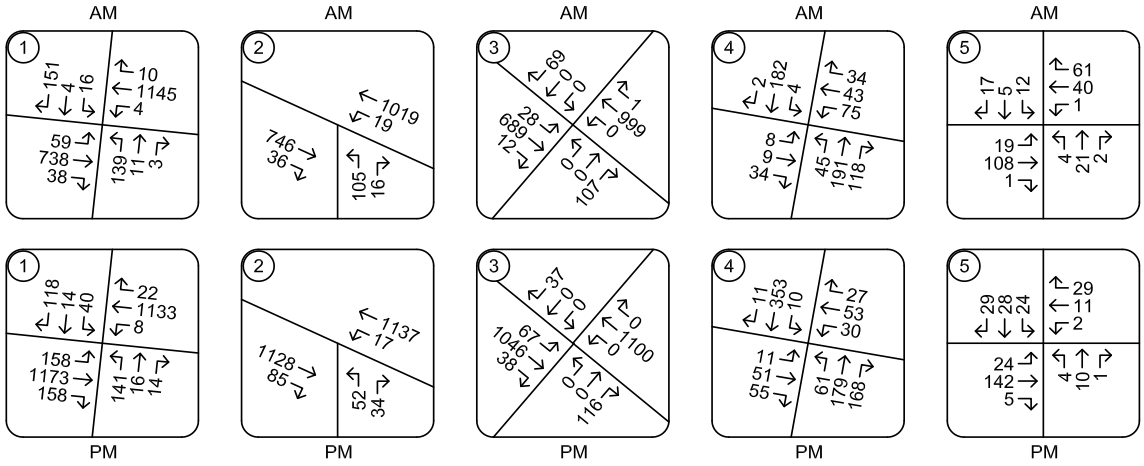


TRAFFIC VOLUMES
2022 Background Plus Site Trips
Morning and Evening Peak Hours

PAGE 18

FIGURE 6





(Left-turning traffic entering and exiting the site via Highway 26 is diverted to Langensand Rd.)

TRAFFIC VOLUMES
2022 Background Plus Site Trips Conditions (Restricted)
Morning and Evening Peak Hours

PAGE 19

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 2022 Future Conditions

Intersection	AM Peak Hour			PM Peak Hour		
	Delay	LOS	v/c*	Delay	LOS	v/c*
Highway 26 at Ten Eyck Road						
2022 Background Conditions	24.4	C	0.67	28.0	C	0.75
2022 Background plus Site	24.1	C	0.66	28.1	C	0.72
2022 Background plus Site RIRO	25.3	C	0.69	28.6	C	0.75
Highway 26 at Langensand Road						
2022 Background Conditions	77.4	F	0.31 / 0.62	137.4	F	0.39 / 0.62
2022 Background plus Site	56.8	F	0.30 / 0.52	129.9	F	0.36 / 0.71
2022 Background plus Site RIRO	107.2	F	0.31 / 0.85	168.9	F	0.36 / 0.83
Highway 26 at Vista Loop Drive						
2022 Background Conditions	11.4	B	0.30 / 0.05	13.9	B	0.34 / 0.09
2022 Background plus Site	157.0	F	0.28 / 0.75	412.7	F	0.32 / 0.75
2022 Background plus Site RIRO	14.0	B	0.30 / 0.16	15.2	C	0.32 / 0.25
Highway 211 at Dubarko Road						
2022 Background Conditions	19.6	C	0.23 / 0.30	28.8	D	0.26 / 0.36
2022 Background plus Site	21.0	C	0.23 / 0.47	54.3	F	0.26 / 0.79
2022 Background plus Site RIRO	20.0	C	0.23 / 0.35	28.6	D	0.27 / 0.37
Dubarko Road at Langensand Road						
2022 Background Conditions	9.4	A	0.05	9.8	A	0.04
2022 Background plus Site	10.3	B	0.17	11.1	B	0.22
2022 Background plus Site RIRO	10.3	B	0.15	11.1	B	0.22

*(major street v/c) / (minor-street v/c) is shown for unsignalized ODOT intersections.

Based on the results of the operational analysis, the study intersections are projected to operate acceptably through year 2021 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.

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 157 seconds during the morning peak hour and 413 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. As shown by the right-in, right-out analysis, even if all site trips diverted to avoid these delays the remaining study intersections would continue to operate acceptably.

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 2022 background plus site trips conditions during the morning and evening peak hours. Based on the analysis, the projected 95th percentile queue lengths were 38 feet during the morning peak hour and 80 feet during the evening peak hour. Accordingly, it is recommended that if a new turn lane is provided it should have a storage length of at least 100 feet.

The queuing analysis also showed a projected northeast-bound 95th-percentile queue length on Dubarko Road approaching Highway 26 of up to 277 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 2013 through December 2017) 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 seven reported collisions during the five-year analysis period. These included six rear-end collisions and one turning-movement collision. The crashes resulted in no serious injuries or fatalities and four 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 three turning-movement collisions, one angle collision, 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 five 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 no reported crashes during the five-year analysis period.

The intersection of Highway 211 at Dubarko Road had 27 reported crashes during the five-year analysis period. These included 15 angle collisions, 5 turning-movement collisions, 5 rear-end collisions, 1 backing collision, and 1 sideswipe-overtaking collision. The crashes resulted in no incapacitating injuries or fatalities. There were six "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 recently undertook safety improvements at this intersection, including re-alignment of the minor-street approaches to intersect at a 90-degree angle and the addition of some striping 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 2022 conditions with completion of the Dubarko Road connection to Highway 26. Accordingly, it is recommended that ODOT consider allowing installation of all-way stop control at this intersection. 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 ODOT consider allowing installation of all-way stop control 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 2022 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.

An additional traffic signal warrant analysis was prepared for the intersection of Highway 211 at Dubarko Road assuming that traffic is restricted to right-in, right-out only for the intersection of Highway 26 at Dubarko Road. Under this scenario, the side-street volumes are significantly reduced for the Dubarko Road approach to Highway 211 and traffic signal warrants are not projected to be met. This analysis also demonstrates that the triggering event that causes signal warrants to be marginally met 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 traffic volumes for Highway 211 at Dubarko Road are only projected to marginally meet signal warrants for 30th-highest hour conditions if all proposed developments are constructed, 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 and evening peak hours, with an average delay of 24 seconds or less for the highest-delay (northbound) approach and a maximum v/c ratio of 0.74.

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 may not be needed if all-way stop control is installed at the intersection as recommended based on the safety analysis, or if a traffic signal is installed at the intersection.

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 a net increase of one trip during the morning peak hour, a decrease of 4 trips during the evening peak hour, and an increase of 274 daily trips. The projected change in peak-hour trips represents a negligible change in traffic and will therefore not degrade the performance of any existing or planned transportation facilities during the peak hours. Additionally, according to Oregon Highway Plan policy 1F5:

"If an amendment subject to OAR 660-012-0060 increases the volume to capacity ratio further, or degrades the performance of a facility so that it does not meet an adopted mobility target at the planning horizon, it will significantly affect the facility unless it falls within the thresholds listed below for a small increase in traffic."

It further defines that:

"In applying "avoid further degradation" for state highway facilities already operating above the mobility targets in Table 6 or Table 7 or those otherwise approved by the Oregon Transportation Commission, or facilities projected to be above the mobility targets at the planning horizon, a small increase in traffic does not cause 'further degradation' of the facility."

Finally, it states that:

The threshold for a small increase in traffic between the existing plan and the proposed amendment is defined in terms of the increase in total average daily trip volumes as follows:

• *Any proposed amendment that does not increase the average daily trips by more than 400.*

Since the proposed zone change would result in a net increase of fewer than 400 average daily trips, it is defined as a "small increase in traffic" and therefore as not degrading the performance of existing or planned transportation facilities.

Since the proposed land use action does not include changes to the functional classification system, change the standards of the functional classification system, result in types or levels of travel or access inconsistent with the functional classification of the surrounding street network or degrade the performance of existing or planned transportation facilities, the proposed annexation and zone change will not result in a significant effect as defined under Oregon's Transportation Planning Rule. Accordingly, no mitigation is necessary or recommended in conjunction with the proposed land use action.

CONCLUSIONS

All study intersections are projected to operate within capacity under year 2022 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. An additional analysis showing operation of the study intersections with the new Dubarko Road at Highway 26 intersection restricted to right-in, right-out only demonstrates that there is sufficient capacity for such diversions even if all northeast-bound left-turning vehicles diverted to alternative travel paths.

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 ODOT consider allowing installation of all-way stop control at this intersection. No other safety improvements are recommended for the study area intersections at this time.

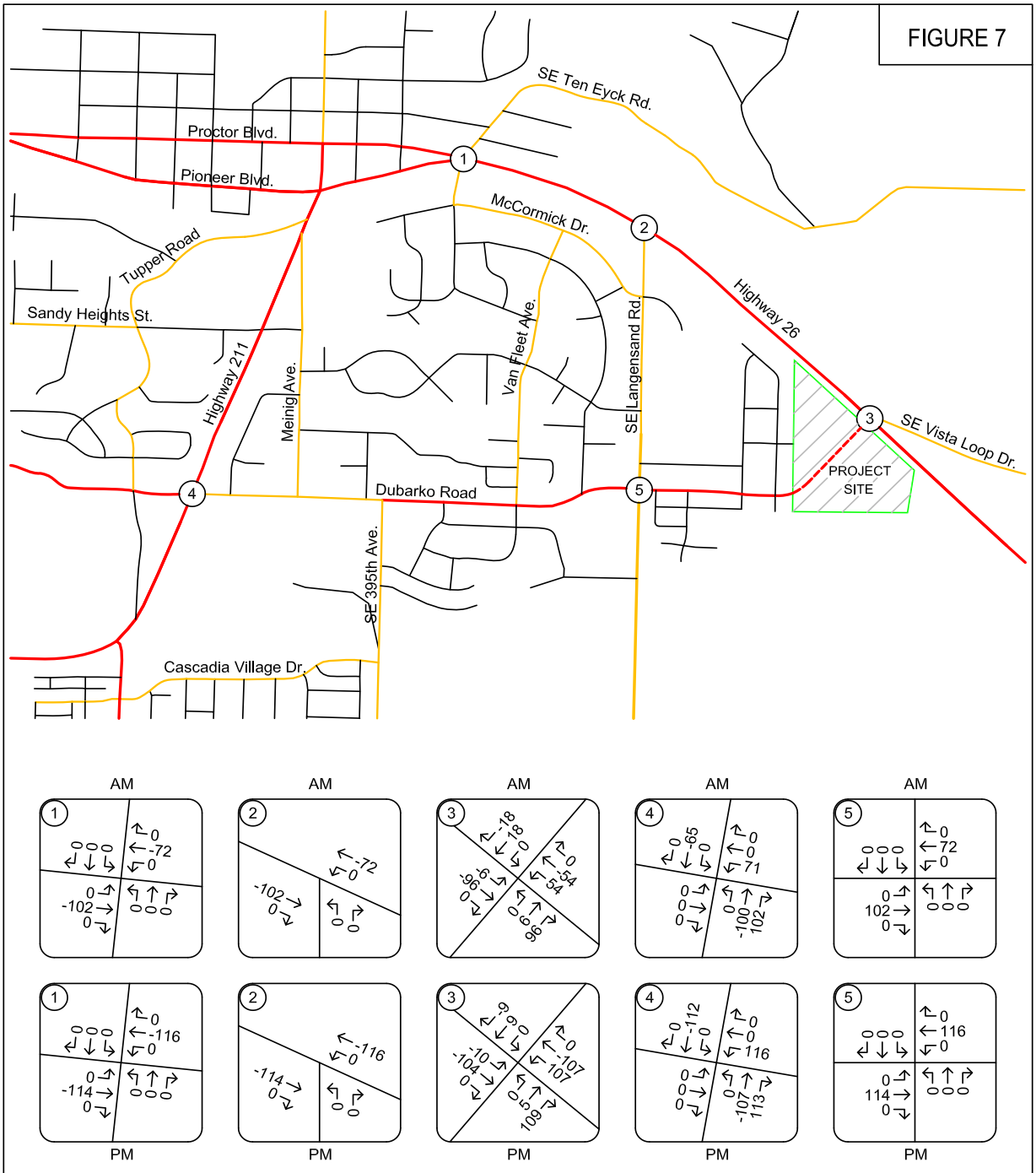
Based on the warrant analysis, a northwest-bound left-turn lane and a southeast-bound right-turn lane are projected to be warranted at the intersection of Highway 26 at Dubarko Road with completion of the Dubarko Road extension. The northbound left-turn lane would not be needed at the time of project completion if the intersection is limited to right-in, right-out only. 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-3, C-3 and POS zoning. This zone change is projected to result in a negligible change to traffic volumes as measured under the “reasonable worst case” development scenarios and therefore will not have a significant effect on operation of area roadways and intersections at the planning horizon as defined by Oregon’s Transportation Planning Rule.

APPENDIX

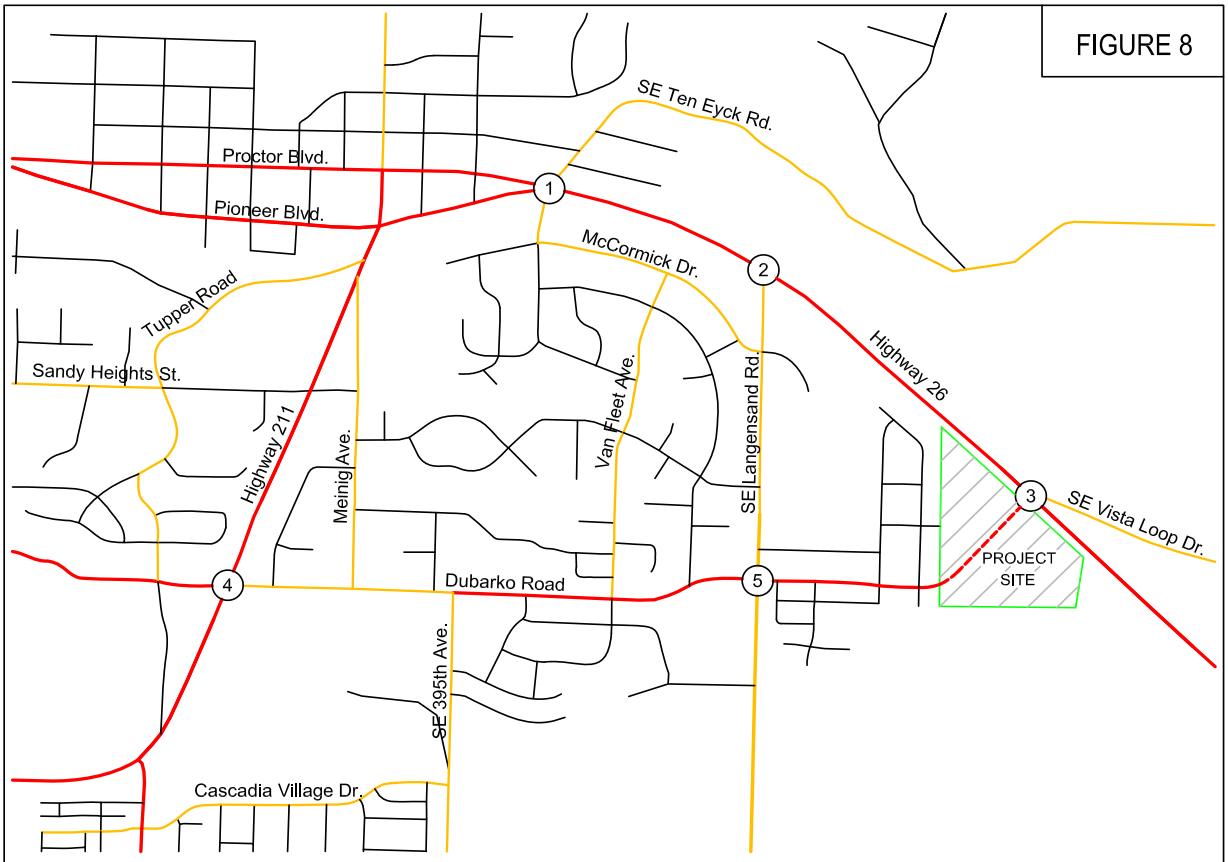
FIGURE 7

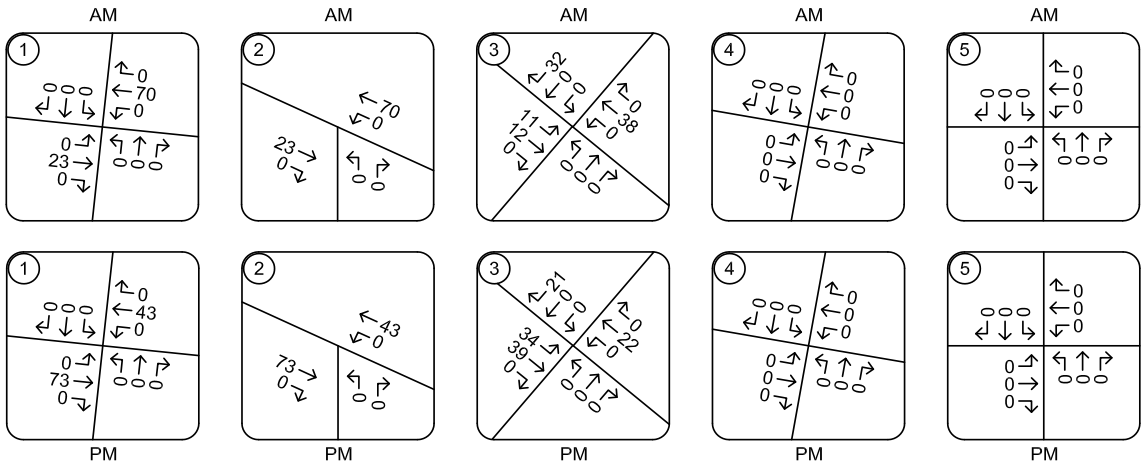


TRAFFIC VOLUMES
Diverted Trips Following Dubarko Connection to Hwy. 26
Morning and Evening Peak Hours

PAGE
APP1

FIGURE 8





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

PAGE
APP2

Total Vehicle Summary

All Traffic Data Services Inc.

Clay Carney
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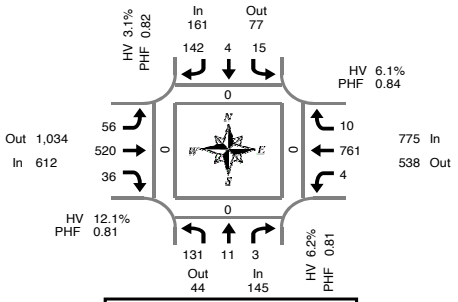


Peak Hour Summary
7:00 AM to 8:00 AM

SE Ten Eyck Rd & Hwy 26

Wednesday, March 20, 2019
7:00 AM to 9:00 AM

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				

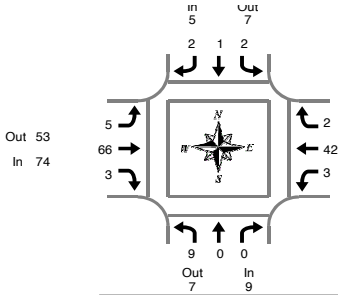
By Movement	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	131	11	3	145	15	4	142	161	56	520	36	612	4	761	10	775	1,693
%HV	6.9%	0.0%	0.0%	6.2%	13.3%	25.0%	1.4%	3.1%	8.9%	12.7%	8.3%	12.1%	75.0%	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	0	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

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



SE Ten Eyck Rd & Hwy 26

Wednesday, March 20, 2019
7:00 AM to 9:00 AM

Peak Hour Summary
7:00 AM to 8:00 AM

Heavy Vehicle 5-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval
Time	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	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	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval
Time	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	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

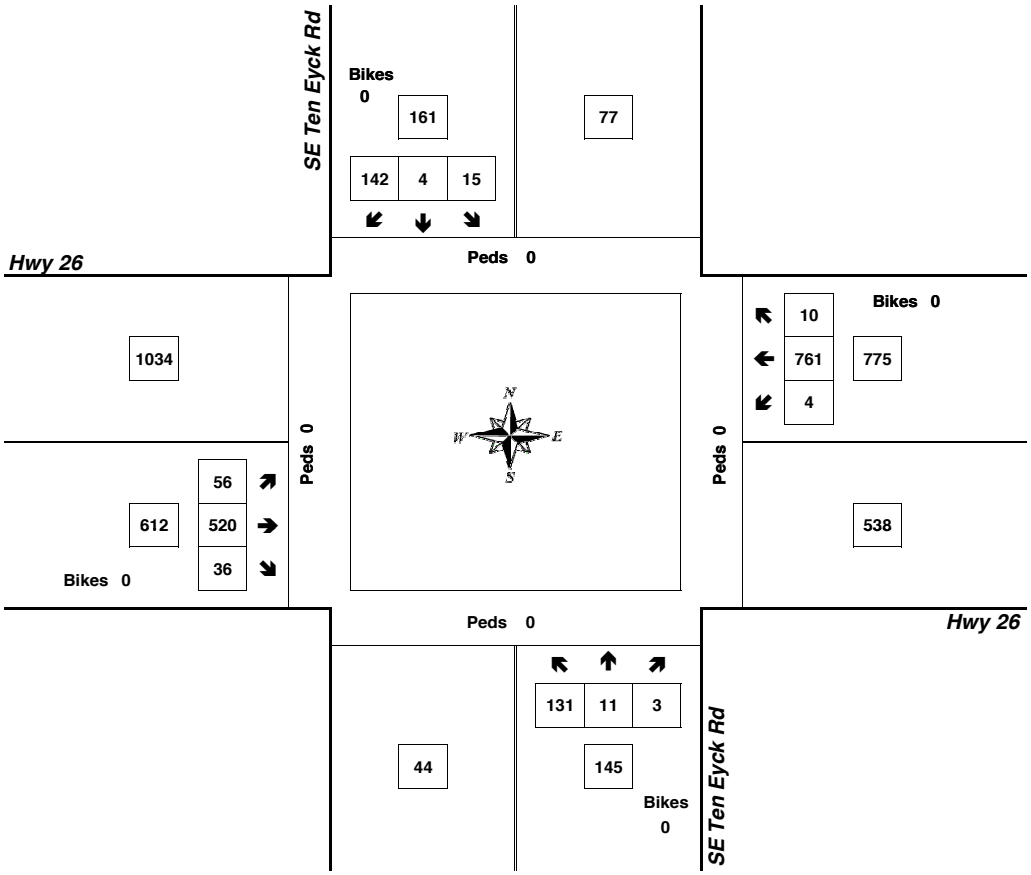
Interval Start	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval
Time	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	Total
7:00 AM	9	0	0	9	2	1	2	5	5	66	3	74	3	42	2	47	135
7:15 AM	6	0	0	6	3	1	4	8	4	73	3	80	1	44	2	47	141
7:30 AM	3	0	0	3	2	0	5	7	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

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740

SE Ten Eyck Rd & Hwy 26

7:00 AM to 8:00 AM
Wednesday, March 20, 2019

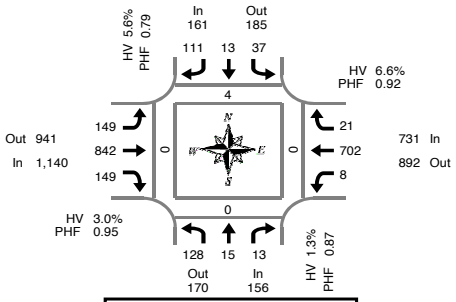


Approach	PHF	HV%	Volume
EB	0.81	12.1%	612
WB	0.84	6.1%	775
NB	0.81	6.2%	145
SB	0.82	3.1%	161
Intersection	0.93	8.0%	1,693

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
4:10 PM to 5:10 PM

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	66	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	0	2	3	0	16	65	10	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				

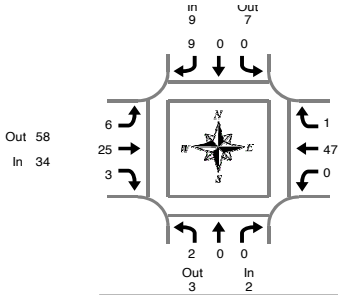
By Movement	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	128	15	13	156	37	13	111	161	149	842	149	1,140	8	702	21	731	2,188
%HV	1.6%	0.0%	0.0%	1.3%	0.0%	0.0%	8.1%	5.6%	4.0%	3.0%	2.0%	3.0%	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

All Traffic Data Services Inc.
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	4	0	10	1	11	15
4:05 PM	0	0	0	0	1	0	0	1	0	6	0	6	0	3	1	4	11
4:10 PM	0	0	0	0	0	0	0	0	0	2	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
4:20 PM	0	0	0	0	0	0	2	2	1	3	0	4	0	5	1	6	12
4:25 PM	0	0	0	0	0	0	1	1	0	5	1	6	0	4	0	4	11
4:30 PM	0	0	0	0	0	0	2	2	1	0	0	1	0	3	0	3	6
4:35 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	5	5
4:40 PM	0	0	0	0	0	0	1	1	0	3	0	3	0	2	0	2	6
4:45 PM	0	0	0	0	0	0	0	0	1	1	0	2	0	4	0	4	6
4:50 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	7	7
4:55 PM	0	0	0	0	0	0	1	1	1	2	1	4	0	0	0	0	5
5:00 PM	0	0	0	0	0	0	0	0	0	4	1	5	0	1	0	1	6
5:05 PM	0	0	0	0	0	0	0	0	0	2	0	2	0	5	0	5	7
5:10 PM	0	0	0	0	0	0	0	0	1	3	0	4	0	4	0	4	8
5:15 PM	0	0	0	0	0	0	0	0	1	1	0	2	0	2	0	2	4
5:20 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	5	0	5	6
5:25 PM	0	0	0	0	0	0	0	0	0	2	0	2	0	1	0	1	3
5:30 PM	0	0	0	0	0	0	0	0	0	3	1	4	0	3	0	3	7
5:35 PM	0	0	0	0	0	0	0	0	1	1	0	2	0	4	0	4	6
5:40 PM	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	2
5:45 PM	1	0	0	1	0	0	0	0	0	2	0	2	0	3	0	3	6
5:50 PM	1	0	0	1	0	0	0	0	0	1	1	2	0	4	0	4	7
5:55 PM	0	0	0	0	0	0	0	0	1	2	0	3	0	5	0	5	8
Total Survey	4	0	0	4	1	0	9	10	10	53	5	68	0	91	3	94	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
4:15 PM	2	0	0	2	0	0	5	5	3	11	1	15	0	12	1	13	35
4:30 PM	0	0	0	0	0	0	3	3	1	3	0	4	0	10	0	10	17
4:45 PM	0	0	0	0	0	0	1	1	2	3	1	6	0	11	0	11	18
5:00 PM	0	0	0	0	0	0	0	0	1	9	1	11	0	10	0	10	21
5:15 PM	0	0	0	0	0	0	0	0	1	4	0	5	0	8	0	8	13
5:30 PM	0	0	0	0	0	0	0	0	1	6	1	8	0	7	0	7	15
5:45 PM	2	0	0	2	0	0	0	0	1	5	1	7	0	12	0	12	21
Total Survey	4	0	0	4	1	0	9	10	10	53	5	68	0	91	3	94	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

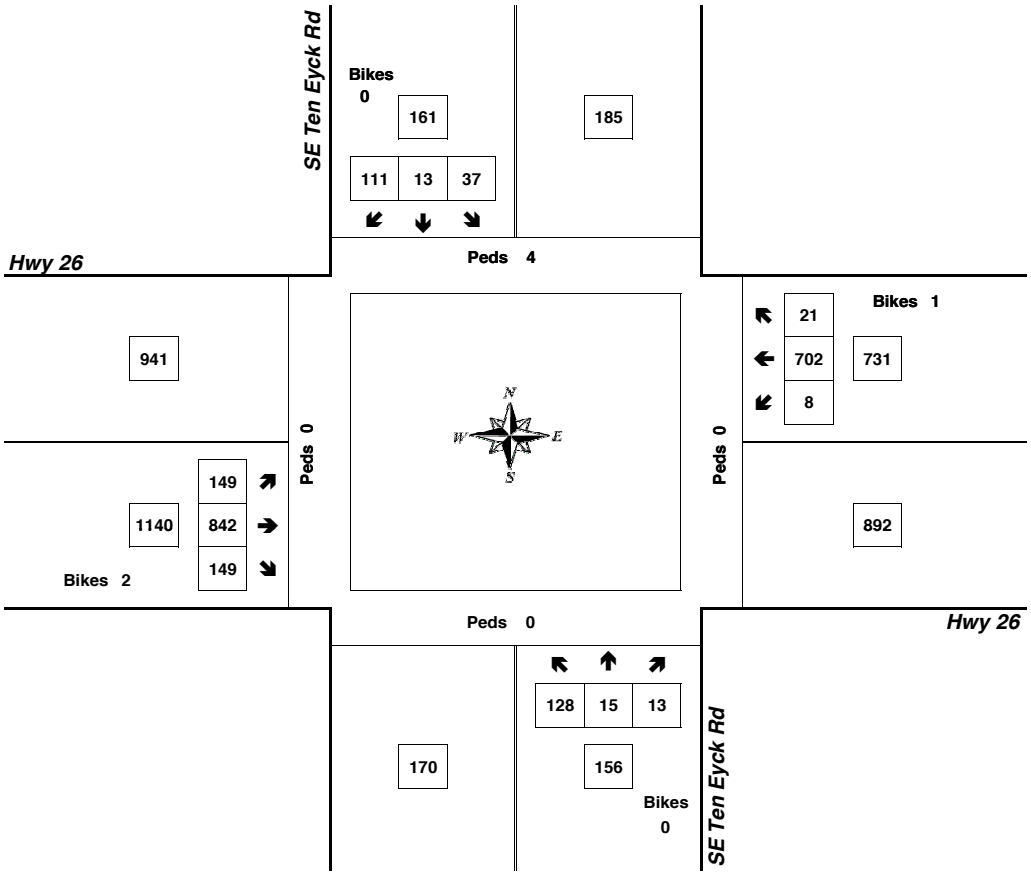
Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	2	0	0	2	1	0	9	10	6	29	2	37	0	54	3	57	106
4:15 PM	2	0	0	2	0	0	9	9	7	26	3	36	0	43	1	44	91
4:30 PM	0	0	0	0	0	0	4	4	5	19	2	26	0	39	0	39	69
4:45 PM	0	0	0	0	0	0	1	1	5	22	3	30	0	36	0	36	67
5:00 PM	2	0	0	2	0	0	0	0	4	24	3	31	0	37	0	37	70

Peak Hour Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740

SE Ten Eyck Rd & Hwy 26

4:10 PM to 5:10 PM
Tuesday, March 19, 2019

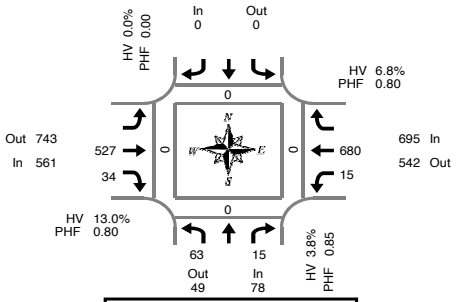


Approach	PHF	HV%	Volume
EB	0.95	3.0%	1,140
WB	0.92	6.6%	731
NB	0.87	1.3%	156
SB	0.79	5.6%	161
Intersection	0.94	4.3%	2,188

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 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				

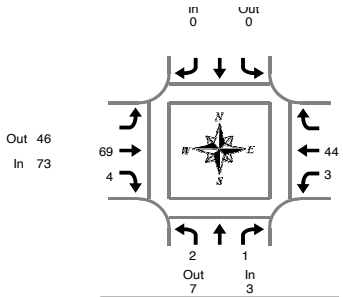
By Movement	Northbound SE Langensand Rd				Southbound SE Langensand Rd				Eastbound Hwy 26				Westbound Hwy 26				Total
	L		R	Total				Total	T	R	Total		L	T		Total	
Volume	63		15	78				0	527	34	561		15	680		695	1,334
%HV	3.2%	NA	6.7%	3.8%	NA	NA	NA	0.0%	13.1%	11.8%	13.0%		20.0%	6.5%	NA	6.8%	9.2%
PHF	0.88		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

All Traffic Data Services Inc.
Clay Carney
(503) 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

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

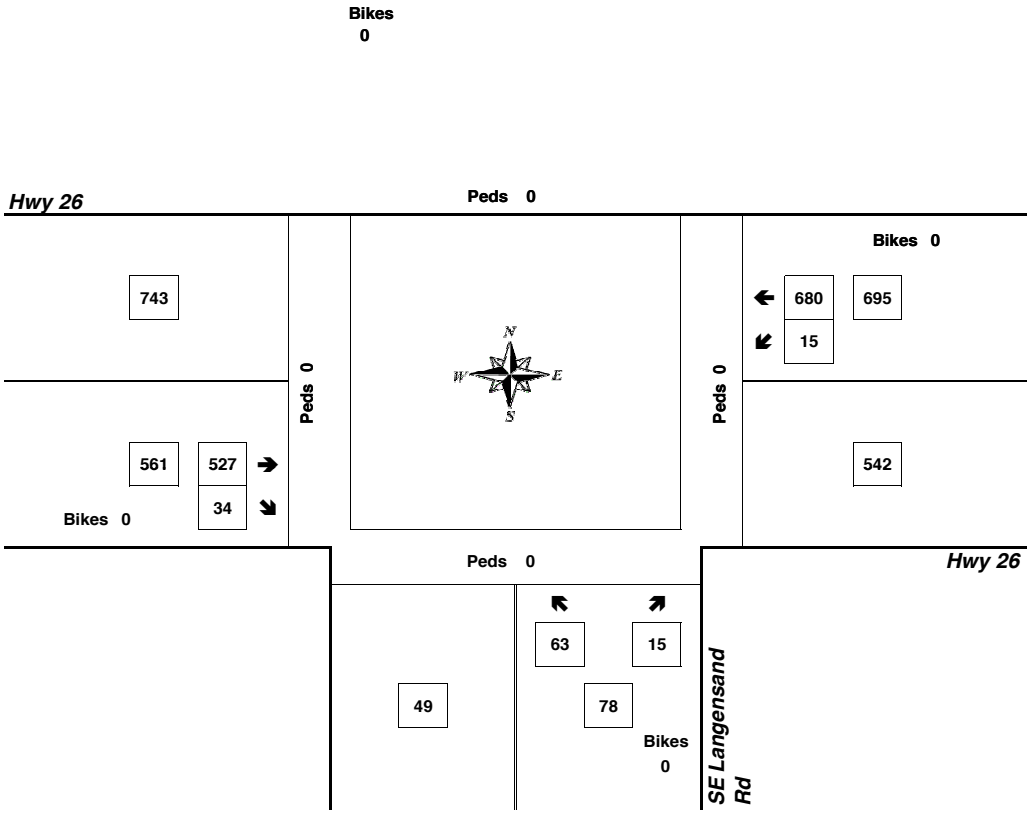
Interval Start Time	Northbound SE Langensand Rd				Southbound SE Langensand Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
	L		R	Total				Total	T	R	Total	L	T		Total	
7:00 AM	2		1	3				0	66	5	71	3	48		51	125
7:15 AM	3		1	4				0	76	4	80	3	47		50	134
7:30 AM	3		2	5				0	69	5	74	2	51		53	132
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

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740

SE Langensand Rd & Hwy 26

7:05 AM to 8:05 AM
Wednesday, March 20, 2019

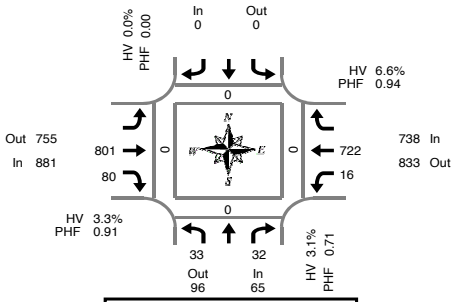


Approach	PHF	HV%	Volume
EB	0.80	13.0%	561
WB	0.80	6.8%	695
NB	0.85	3.8%	78
SB	0.00	0.0%	0
Intersection	0.93	9.2%	1,334

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary

All Traffic Data Services Inc.
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				

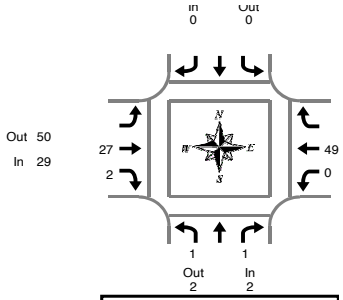
By Movement	Northbound SE Langensand Rd				Southbound SE Langensand Rd				Eastbound Hwy 26				Westbound Hwy 26				Total
	L		R	Total				Total	T	R	Total		L	T		Total	
Volume	33		32	65				0	801	80	881		16	722		738	1,684
%HV	3.0%	NA	3.1%	3.1%	NA	NA	NA	0.0%	3.4%	2.5%	3.3%		0.0%	6.8%	NA	6.6%	4.8%
PHF	0.49		0.80	0.71				0.00	0.93	0.69	0.91		0.57	0.93		0.94	0.93

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

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



SE Langensand 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 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				0	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

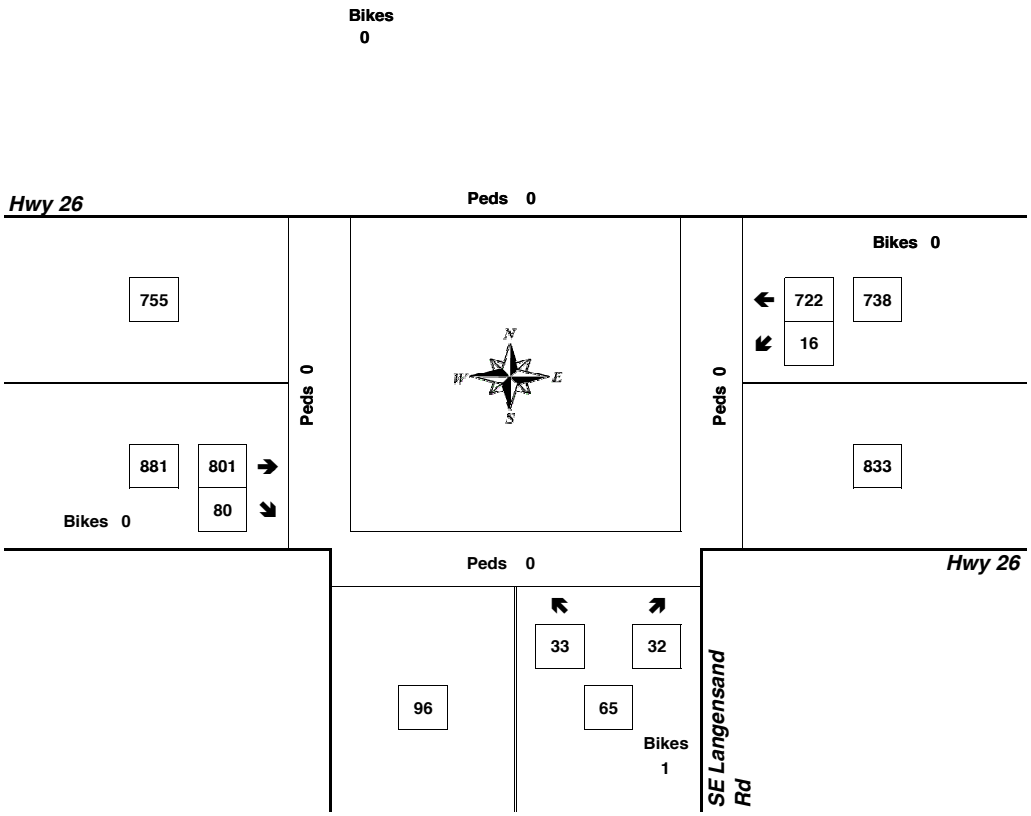
Interval Start Time	Northbound SE Langensand Rd				Southbound SE Langensand Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
	L		R	Total				Total	T	R	Total	L	T		Total	
4:00 PM	1		1	2				0	33	2	35	0	58		58	95
4:15 PM	1		1	2				0	25	3	28	0	46		46	76
4:30 PM	0		1	1				0	16	2	18	0	42		42	61
4:45 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

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740

SE Langensand Rd & Hwy 26

4:10 PM to 5:10 PM
Tuesday, March 19, 2019

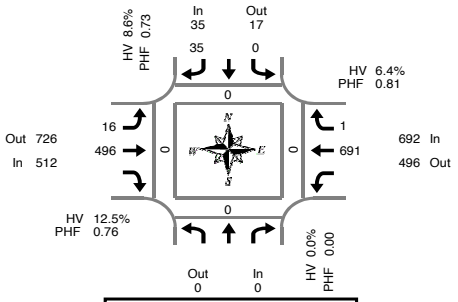


Approach	PHF	HV%	Volume
EB	0.91	3.3%	881
WB	0.94	6.6%	738
NB	0.71	3.1%	65
SB	0.00	0.0%	0
Intersection	0.93	4.8%	1,684

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
7:00 AM to 8:00 AM

SE Vista Loop Dr & Hwy 26

Wednesday, March 20, 2019
7:00 AM to 9:00 AM

5-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
				Bikes	L		R	Bikes	L	T		Bikes		T	R	Bikes		North	South	East	West
7:00 AM				0	0		6	0	1	25		0		68	0	0	100	0	0	0	0
7:05 AM				0	0		2	0	0	25		0		54	0	0	81	0	0	0	0
7:10 AM				0	0		4	0	1	24		0		80	0	0	109	0	0	0	0
7:15 AM				0	0		2	0	2	32		0		71	0	0	107	0	0	0	0
7:20 AM				0	0		2	0	2	51		0		63	0	0	118	0	0	0	0
7:25 AM				0	0		4	0	1	31		0		62	0	0	98	0	0	0	0
7:30 AM				0	0		1	0	2	46		0		62	1	0	112	0	0	0	0
7:35 AM				0	0		4	0	0	43		0		49	0	0	96	0	0	0	0
7:40 AM				0	0		4	0	3	54		0		45	0	0	106	0	0	0	0
7:45 AM				0	0		4	0	0	54		0		44	0	0	102	0	0	0	0
7:50 AM				0	0		0	0	2	53		0		57	0	0	112	0	0	0	0
7:55 AM				0	0		2	0	2	58		0		36	0	0	98	0	0	0	0
8:00 AM				0	0		3	0	1	52		0		31	0	0	87	0	0	0	0
8:05 AM				0	0		2	0	3	44		0		40	0	0	89	0	0	0	0
8:10 AM				0	1		1	0	0	42		0		50	0	0	94	0	0	0	0
8:15 AM				0	0		0	0	1	46		0		32	0	0	79	0	0	0	0
8:20 AM				0	0		1	0	2	38		0		46	0	0	87	0	0	0	0
8:25 AM				0	0		0	0	3	39		0		42	0	0	84	0	0	0	0
8:30 AM				0	0		2	0	0	61		0		42	0	0	105	0	0	0	0
8:35 AM				0	0		0	0	0	56		0		44	0	0	100	0	0	0	0
8:40 AM				0	1		2	0	0	64		0		52	0	0	119	0	0	0	0
8:45 AM				0	0		1	0	0	66		0		56	0	0	123	0	0	0	0
8:50 AM				0	0		0	0	2	56		0		49	0	0	107	0	0	0	0
8:55 AM				0	0		2	0	2	61		0		42	0	0	107	0	0	0	0
Total Survey				0	2		49	0	30	1,121		0		1,217	1	0	2,420	0	0	0	0

15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
				Bikes	L		R	Bikes	L	T		Bikes		T	R	Bikes		North	South	East	West
7:00 AM				0	0		12	0	2	74		0		202	0	0	290	0	0	0	0
7:15 AM				0	0		8	0	5	114		0		196	0	0	323	0	0	0	0
7:30 AM				0	0		9	0	5	143		0		156	1	0	314	0	0	0	0
7:45 AM				0	0		6	0	4	165		0		137	0	0	312	0	0	0	0
8:00 AM				0	1		6	0	4	138		0		121	0	0	270	0	0	0	0
8:15 AM				0	0		1	0	6	123		0		120	0	0	250	0	0	0	0
8:30 AM				0	1		4	0	0	181		0		138	0	0	324	0	0	0	0
8:45 AM				0	0		3	0	4	183		0		147	0	0	337	0	0	0	0
Total Survey				0	2		49	0	30	1,121		0		1,217	1	0	2,420	0	0	0	0

Peak Hour Summary
7:00 AM to 8:00 AM

By Approach	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Total	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				

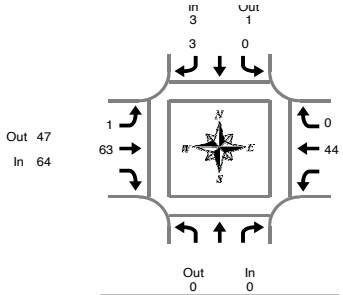
By Movement	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Total
				Total	L		R	Total	L	T		Total		T	R	Total	
Volume				0	0		35	35	16	496		512		691	1	692	1,239
%HV	NA	NA	NA	0.0%	0.0%	NA	8.6%	8.6%	6.3%	12.7%	NA	12.5%	NA	6.4%	0.0%	6.4%	9.0%
PHF				0.00	0.00		0.73	0.73	0.80	0.75		0.76		0.81	0.25	0.81	0.93

Rolling Hour Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
				Bikes	L		R	Bikes	L	T		Bikes		T	R	Bikes		North	South	East	West
7:00 AM				0	0		35	0	16	496		0		691	1	0	1,239	0	0	0	0
7:15 AM				0	1		29	0	18	560		0		610	1	0	1,219	0	0	0	0
7:30 AM				0	1		22	0	19	569		0		534	1	0	1,146	0	0	0	0
7:45 AM				0	2		17	0	14	607		0		516	0	0	1,156	0	0	0	0
8:00 AM				0	2		14	0	14	625		0		526	0	0	1,181	0	0	0	0

Heavy Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 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

Heavy Vehicle 5-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
				Total	L		R	Total	L	T		Total		T	R	Total	
7:00 AM				0	0		0	0	0	6		6		4	0	4	10
7:05 AM				0	0		0	0	0	4		4		5	0	5	9
7:10 AM				0	0		1	1	0	2		2		3	0	3	6
7:15 AM				0	0		0	0	0	3		3		2	0	2	5
7:20 AM				0	0		0	0	0	7		7		1	0	1	8
7:25 AM				0	0		0	0	0	5		5		3	0	3	8
7:30 AM				0	0		0	0	0	8		8		6	0	6	14
7:35 AM				0	0		1	1	0	4		4		5	0	5	10
7:40 AM				0	0		1	1	1	9		10		3	0	3	14
7:45 AM				0	0		0	0	0	7		7		3	0	3	10
7:50 AM				0	0		0	0	0	5		5		8	0	8	13
7:55 AM				0	0		0	0	0	3		3		1	0	1	4
8:00 AM				0	0		0	0	1	8		9		3	0	3	12
8:05 AM				0	0		1	1	1	10		11		5	0	5	17
8:10 AM				0	0		1	1	0	3		3		6	0	6	10
8:15 AM				0	0		0	0	0	4		4		3	0	3	7
8:20 AM				0	0		0	0	1	4		5		2	0	2	7
8:25 AM				0	0		0	0	1	5		6		3	0	3	9
8:30 AM				0	0		0	0	0	11		11		4	0	4	15
8:35 AM				0	0		0	0	0	5		5		8	0	8	13
8:40 AM				0	1		0	1	0	7		7		3	0	3	11
8:45 AM				0	0		0	0	0	8		8		4	0	4	12
8:50 AM				0	0		0	0	1	5		6		6	0	6	12
8:55 AM				0	0		0	0	0	1		1		3	0	3	4
Total Survey				0	1		5	6	6	134		140		94	0	94	240

Heavy Vehicle 15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
				Total	L		R	Total	L	T		Total		T	R	Total	
7:00 AM				0	0		1	1	0	12		12		12	0	12	25
7:15 AM				0	0		0	0	0	15		15		6	0	6	21
7:30 AM				0	0		2	2	1	21		22		14	0	14	38
7:45 AM				0	0		0	0	0	15		15		12	0	12	27
8:00 AM				0	0		2	2	2	21		23		14	0	14	39
8:15 AM				0	0		0	0	2	13		15		8	0	8	23
8:30 AM				0	1		0	1	0	23		23		15	0	15	39
8:45 AM				0	0		0	0	1	14		15		13	0	13	28
Total Survey				0	1		5	6	6	134		140		94	0	94	240

Heavy Vehicle Peak Hour Summary
7:00 AM to 8:00 AM

By Approach	Northbound SE Vista Loop Dr			Southbound SE Vista Loop Dr			Eastbound Hwy 26			Westbound Hwy 26			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	0	0	0	3	1	4	64	47	111	44	63	107	111
PHF	0.00			0.38			0.73			0.79			0.73

By Movement	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Total
				Total	L		R	Total	L	T		Total		T	R	Total	
Volume				0	0		3	3	1	63		64		44	0	44	111
PHF				0.00	0.00		0.38	0.38	0.25	0.75		0.73		0.79	0.00	0.79	0.73

Heavy Vehicle Rolling Hour Summary
7:00 AM to 9:00 AM

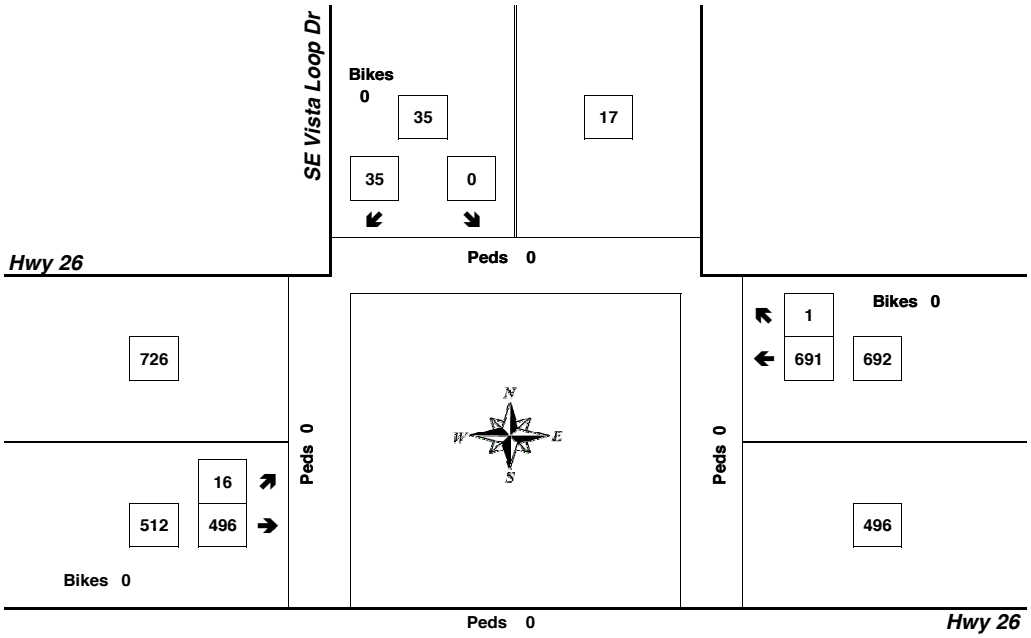
Interval Start Time	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
				Total	L		R	Total	L	T		Total		T	R	Total	
7:00 AM				0	0		3	3	1	63		64		44	0	44	111
7:15 AM				0	0		4	4	3	72		75		46	0	46	125
7:30 AM				0	0		4	4	5	70		75		48	0	48	127
7:45 AM				0	1		2	3	4	72		76		49	0	49	128
8:00 AM				0	1		2	3	5	71		76		50	0	50	129

Peak Hour Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740

SE Vista Loop Dr & Hwy 26

7:00 AM to 8:00 AM
Wednesday, March 20, 2019



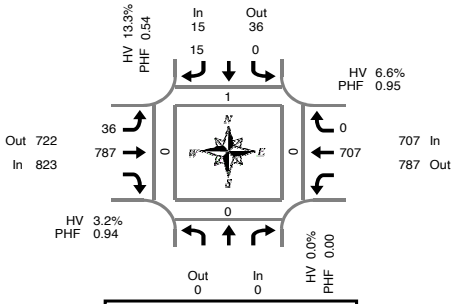
Bikes 0

Approach	PHF	HV%	Volume
EB	0.76	12.5%	512
WB	0.81	6.4%	692
NB	0.00	0.0%	0
SB	0.73	8.6%	35
Intersection	0.93	9.0%	1,239

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
4:15 PM to 5:15 PM

SE Vista Loop Dr & Hwy 26

Tuesday, March 19, 2019
4:00 PM to 6:00 PM

5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
				Bikes	L		R	Bikes	L	T		Bikes		T	R	Bikes		North	South	East	West
4:00 PM				0	0		2	0	1	53		0		55	0	0	111	0	0	0	0
4:05 PM				0	1		0	0	2	65		0		60	0	0	128	0	0	0	0
4:10 PM				0	0		3	0	5	61		0		62	0	0	131	0	0	0	0
4:15 PM				0	0		1	0	7	68		0		53	0	0	129	0	0	0	0
4:20 PM				0	0		3	0	2	86		0		68	0	0	159	0	0	0	0
4:25 PM				0	0		2	0	1	50		0		44	0	0	97	0	0	0	0
4:30 PM				0	0		2	0	3	76		1		63	0	0	144	0	0	0	0
4:35 PM				0	0		1	0	4	69		0		54	0	0	128	0	0	0	0
4:40 PM				0	0		0	0	2	51		1		68	0	0	121	1	0	0	0
4:45 PM				0	0		1	1	1	59		0		59	0	0	120	0	0	0	0
4:50 PM				0	0		0	0	2	70		0		59	0	0	131	0	0	0	0
4:55 PM				0	0		1	0	4	64		0		58	0	0	127	0	0	0	0
5:00 PM				0	0		2	0	3	69		0		54	0	0	128	0	0	0	0
5:05 PM				0	0		1	0	3	64		0		58	0	0	126	0	0	0	0
5:10 PM				0	0		1	0	4	61		0		69	0	0	135	0	0	0	0
5:15 PM				0	0		0	0	0	57		0		44	0	0	101	0	0	0	0
5:20 PM				0	0		0	0	1	73		0		39	0	0	113	0	0	0	0
5:25 PM				0	0		4	0	2	61		0		41	0	0	108	0	0	0	0
5:30 PM				0	0		2	0	4	76		0		39	0	0	121	0	0	0	0
5:35 PM				0	0		0	0	1	56		0		39	0	0	96	0	0	0	0
5:40 PM				0	0		3	0	0	62		0		29	0	0	94	0	0	0	0
5:45 PM				0	0		1	0	0	79		0		46	0	0	126	0	0	0	0
5:50 PM				0	0		0	0	1	60		0		45	0	0	106	0	0	0	0
5:55 PM				0	0		2	0	3	70		0		42	0	0	117	0	0	0	0
Total Survey				0	1		32	1	56	1,560		2		1,248	0	0	2,897	1	0	0	0

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
				Bikes	L		R	Bikes	L	T		Bikes		T	R	Bikes		North	South	East	West
4:00 PM				0	1		5	0	8	179		0		177	0	0	370	0	0	0	0
4:15 PM				0	0		6	0	10	204		0		165	0	0	385	0	0	0	0
4:30 PM				0	0		3	0	9	196		2		185	0	0	393	1	0	0	0
4:45 PM				0	0		2	1	7	193		0		176	0	0	378	0	0	0	0
5:00 PM				0	0		4	0	10	194		0		181	0	0	389	0	0	0	0
5:15 PM				0	0		4	0	3	191		0		124	0	0	322	0	0	0	0
5:30 PM				0	0		5	0	5	194		0		107	0	0	311	0	0	0	0
5:45 PM				0	0		3	0	4	209		0		133	0	0	349	0	0	0	0
Total Survey				0	1		32	1	56	1,560		2		1,248	0	0	2,897	1	0	0	0

Peak Hour Summary
4:15 PM to 5:15 PM

By Approach	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Total	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	0.0%				13.3%				3.2%				6.6%				4.9%				
PHF	0.00				0.54				0.94				0.95				0.97				

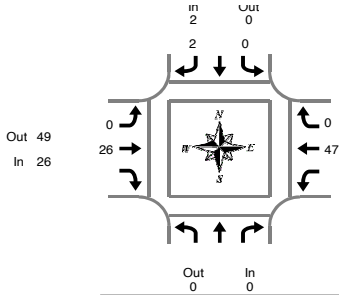
By Movement	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26			Total
				Total	L		R	Total	L	T		Total		T	R	Total	
Volume				0	0		15	15	36	787		823		707	0	707	1,545
%HV	NA	NA	NA	0.0%	0.0%	NA	13.3%	13.3%	0.0%	3.3%	NA	3.2%	NA	6.6%	0.0%	6.6%	4.9%
PHF				0.00	0.00		0.54	0.54	0.90	0.93		0.94		0.95	0.00	0.95	0.97

Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
				Bikes	L		R	Bikes	L	T		Bikes		T	R	Bikes		North	South	East	West
4:00 PM				0	1		16	1	34	772		2		703	0	0	1,526	1	0	0	0
4:15 PM				0	0		15	1	36	787		2		707	0	0	1,545	1	0	0	0
4:30 PM				0	0		13	1	29	774		2		666	0	0	1,482	1	0	0	0
4:45 PM				0	0		15	1	25	772		0		588	0	0	1,400	0	0	0	0
5:00 PM				0	0		16	0	22	788		0		545	0	0	1,371	0	0	0	0

Heavy Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



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

Heavy Vehicle 5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
				Total	L		R	Total	L	T		Total		T	R	Total	
4:00 PM				0	0		1	1	0	2		2		10	0	10	13
4:05 PM				0	1		0	1	1	6		7		2	0	2	10
4:10 PM				0	0		1	1	1	2		3		7	0	7	11
4:15 PM				0	0		0	0	0	3		3		3	0	3	6
4:20 PM				0	0		1	1	0	6		6		4	0	4	11
4:25 PM				0	0		1	1	0	3		3		3	0	3	7
4:30 PM				0	0		0	0	0	1		1		1	0	1	2
4:35 PM				0	0		0	0	0	0		0		5	0	5	5
4:40 PM				0	0		0	0	0	3		3		3	0	3	6
4:45 PM				0	0		0	0	0	1		1		3	0	3	4
4:50 PM				0	0		0	0	0	2		2		8	0	8	10
4:55 PM				0	0		0	0	0	1		1		1	0	1	2
5:00 PM				0	0		0	0	0	4		4		4	0	4	8
5:05 PM				0	0		0	0	0	1		1		8	0	8	9
5:10 PM				0	0		0	0	0	1		1		4	0	4	5
5:15 PM				0	0		0	0	0	2		2		1	0	1	3
5:20 PM				0	0		0	0	0	0		0		5	0	5	5
5:25 PM				0	0		0	0	0	0		0		1	0	1	1
5:30 PM				0	0		0	0	0	2		2		2	0	2	4
5:35 PM				0	0		0	0	0	0		0		4	0	4	4
5:40 PM				0	0		0	0	0	2		2		2	0	2	4
5:45 PM				0	0		0	0	0	2		2		1	0	1	3
5:50 PM				0	0		0	0	0	0		0		2	0	2	2
5:55 PM				0	0		0	0	0	2		2		3	0	3	5
Total Survey				0	1		4	5	2	46		48		87	0	87	140

Heavy Vehicle 15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
				Total	L		R	Total	L	T		Total		T	R	Total	
4:00 PM				0	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

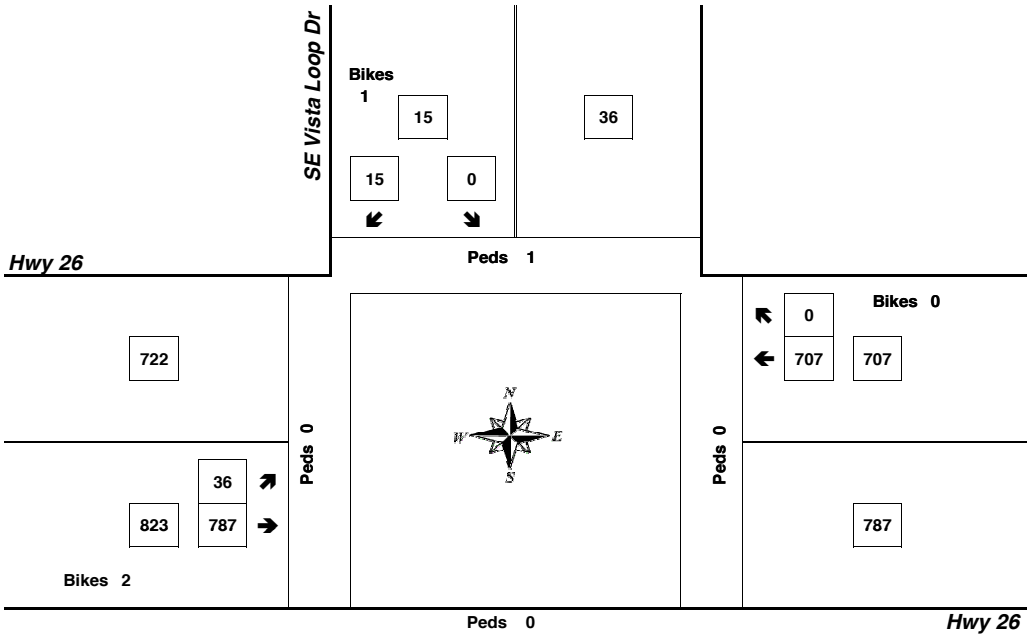
Interval Start Time	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
				Total	L		R	Total	L	T		Total		T	R	Total	
4:00 PM				0	1		4	5	2	30		32		50	0	50	87
4:15 PM				0	0		2	2	0	26		26		47	0	47	75
4:30 PM				0	0		0	0	0	16		16		44	0	44	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

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740

SE Vista Loop Dr & Hwy 26

4:15 PM to 5:15 PM
Tuesday, March 19, 2019



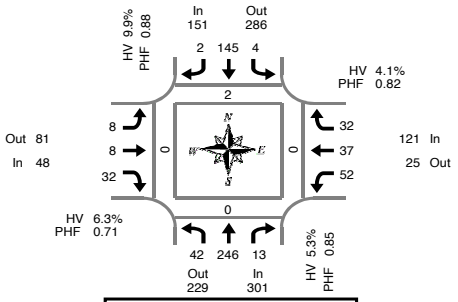
Bikes 0

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

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



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

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	0	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				

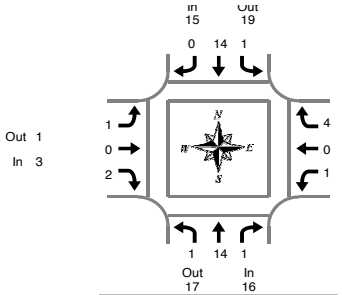
By Movement	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	42	246	13	301	4	145	2	151	8	8	32	48	52	37	32	121	621
%HV	2.4%	5.7%	7.7%	5.3%	25.0%	9.7%	0.0%	9.9%	12.5%	0.0%	6.3%	6.3%	1.9%	0.0%	12.5%	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

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



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	1	0	1	1
7:05 AM	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	2
7:10 AM	0	1	0	1	0	0	0	0	0	0	1	1	0	0	1	1	3
7:15 AM	0	1	0	1	0	0	0	0	0	0	1	1	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
7:25 AM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	2	2	3
7:30 AM	0	1	0	1	0	2	0	2	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	3
7:40 AM	0	3	1	4	0	0	0	0	0	0	0	0	0	0	1	1	5
7:45 AM	0	0	0	0	0	3	0	3	0	0	0	0	0	0	0	0	3
7:50 AM	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	4
8:00 AM	0	6	0	6	0	2	0	2	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
8:10 AM	0	2	0	2	0	0	0	0	0	0	0	0	1	1	0	2	4
8:15 AM	1	2	0	3	0	1	0	1	0	0	0	0	0	0	0	0	4
8:20 AM	0	2	0	2	0	2	0	2	0	1	0	1	0	0	0	0	5
8:25 AM	0	2	0	2	0	1	0	1	0	0	0	0	0	0	0	0	3
8:30 AM	0	3	0	3	0	2	0	2	0	0	0	0	0	0	0	0	5
8:35 AM	0	3	0	3	0	4	0	4	0	0	0	0	0	0	0	0	7
8:40 AM	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	2
8:45 AM	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
8:50 AM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
8:55 AM	0	0	0	0	0	2	0	2	0	0	0	0	0	1	0	1	3
Total Survey	2	31	1	34	1	31	0	32	1	1	2	4	3	3	4	10	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
7:15 AM	0	1	0	1	1	1	0	2	1	0	1	2	1	0	2	3	8
7:30 AM	0	5	1	6	0	4	0	4	0	0	0	0	0	0	1	1	11
7:45 AM	1	0	0	1	0	6	0	6	0	0	0	0	0	0	0	0	7
8:00 AM	0	8	0	8	0	5	0	5	0	0	0	0	2	1	0	3	16
8:15 AM	1	6	0	7	0	4	0	4	0	1	0	1	0	0	0	0	12
8:30 AM	0	7	0	7	0	7	0	7	0	0	0	0	0	0	0	0	14
8:45 AM	0	2	0	2	0	3	0	3	0	0	0	0	0	1	0	1	6
Total Survey	2	31	1	34	1	31	0	32	1	1	2	4	3	3	4	10	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

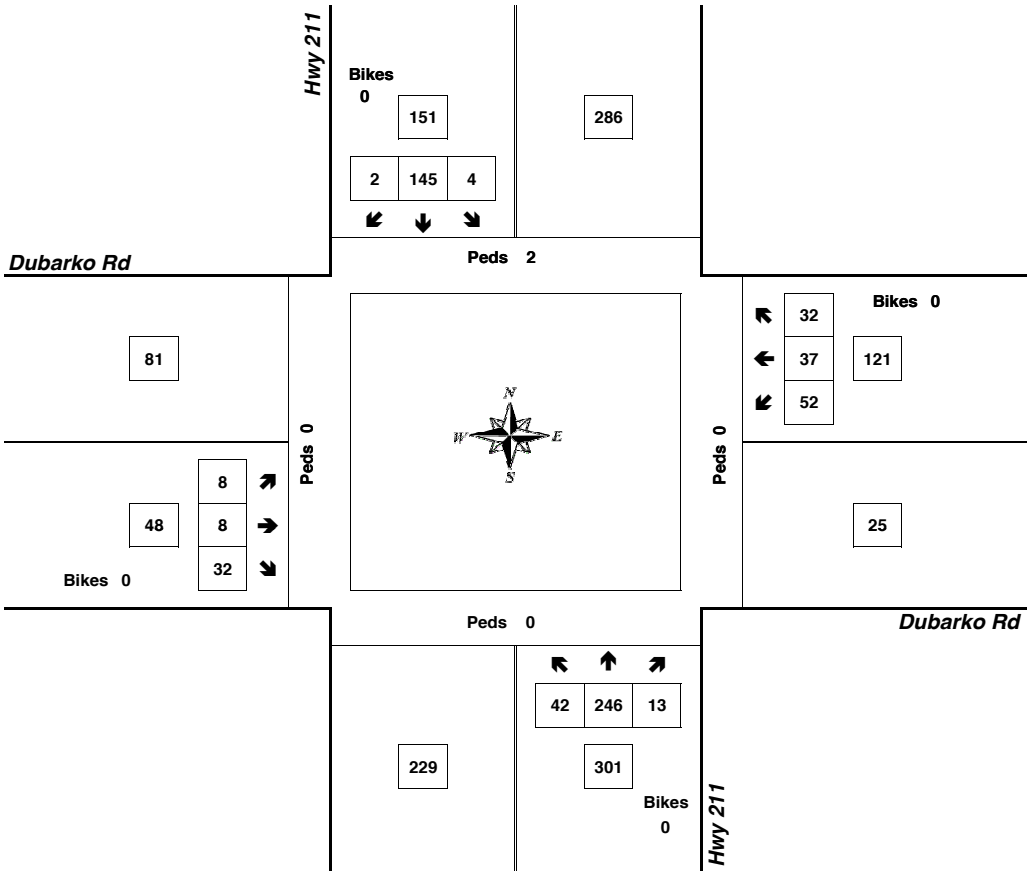
Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	1	8	1	10	1	12	0	13	1	0	2	3	1	1	4	6	32
7:15 AM	1	14	1	16	1	16	0	17	1	0	1	2	3	1	3	7	42
7:30 AM	2	19	1	22	0	19	0	19	0	1	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

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740

Hwy 211 & Dubarko Rd

7:05 AM to 8:05 AM
Wednesday, March 20, 2019

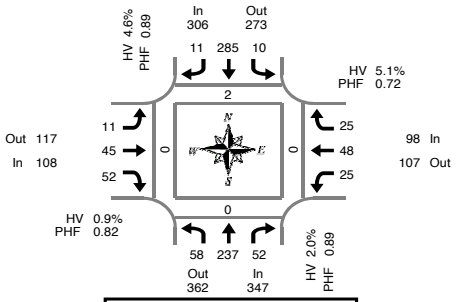


Approach	PHF	HV%	Volume
EB	0.71	6.3%	48
WB	0.82	4.1%	121
NB	0.85	5.3%	301
SB	0.88	9.9%	151
Intersection	0.90	6.3%	621

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
4:05 PM to 5:05 PM

Hwy 211 & Dubarko Rd

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 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	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
4:10 PM	10	17	2	0	1	19	0	0	0	4	3	0	3	4	3	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
4:20 PM	6	12	1	0	1	14	1	0	2	3	4	0	5	7	4	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
4:30 PM	4	22	3	0	0	19	3	0	1	2	2	0	5	5	1	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
4:40 PM	2	17	4	0	0	22	0	0	0	2	1	0	1	3	3	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
4:50 PM	3	22	6	0	1	19	1	0	1	0	4	0	1	1	2	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
5:00 PM	4	17	6	0	1	42	0	0	0	3	14	0	1	4	4	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
5:10 PM	8	24	4	0	1	13	1	0	1	8	2	0	2	1	3	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
5:20 PM	1	19	6	0	1	29	1	0	1	2	2	0	1	4	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
5:30 PM	5	19	6	0	0	19	1	0	1	5	5	0	0	2	3	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
5:40 PM	5	19	7	0	0	29	1	0	0	8	3	0	1	2	0	1	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
5:50 PM	4	13	2	0	0	20	3	0	2	5	3	0	0	5	3	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
Total Survey	110	439	103	0	18	534	22	0	18	101	99	1	45	77	45	1	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
4:15 PM	15	48	11	0	4	55	3	0	7	13	11	1	8	16	6	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
4:45 PM	17	65	16	0	3	68	4	0	1	12	14	0	5	9	3	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
5:15 PM	10	46	16	0	2	65	3	0	2	9	14	0	8	11	3	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
5:45 PM	13	41	12	0	1	54	4	0	2	14	9	0	5	6	4	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

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
%HV	2.0%				4.6%				0.9%				5.1%				3.1%				
PHF	0.89				0.89				0.82				0.72				0.94				

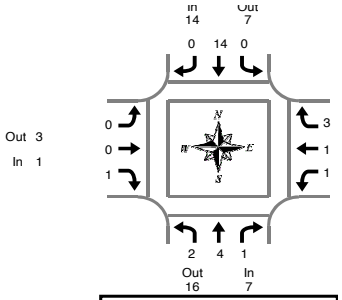
By Movement	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	58	237	52	347	10	285	11	306	11	45	52	108	25	48	25	98	859
%HV	3.4%	1.7%	1.9%	2.0%	0.0%	4.9%	0.0%	4.6%	0.0%	0.0%	1.9%	0.9%	4.0%	2.1%	12.0%	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	268	12	0	11	45	41	1	26	47	24	0	823	2	0	1	0
4:15 PM	54	240	56	0	9	268	12	0	11	46	50	1	23	41	26	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
4:45 PM	56	229	61	0	9	280	10	0	6	54	63	0	19	33	20	1	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

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	1	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

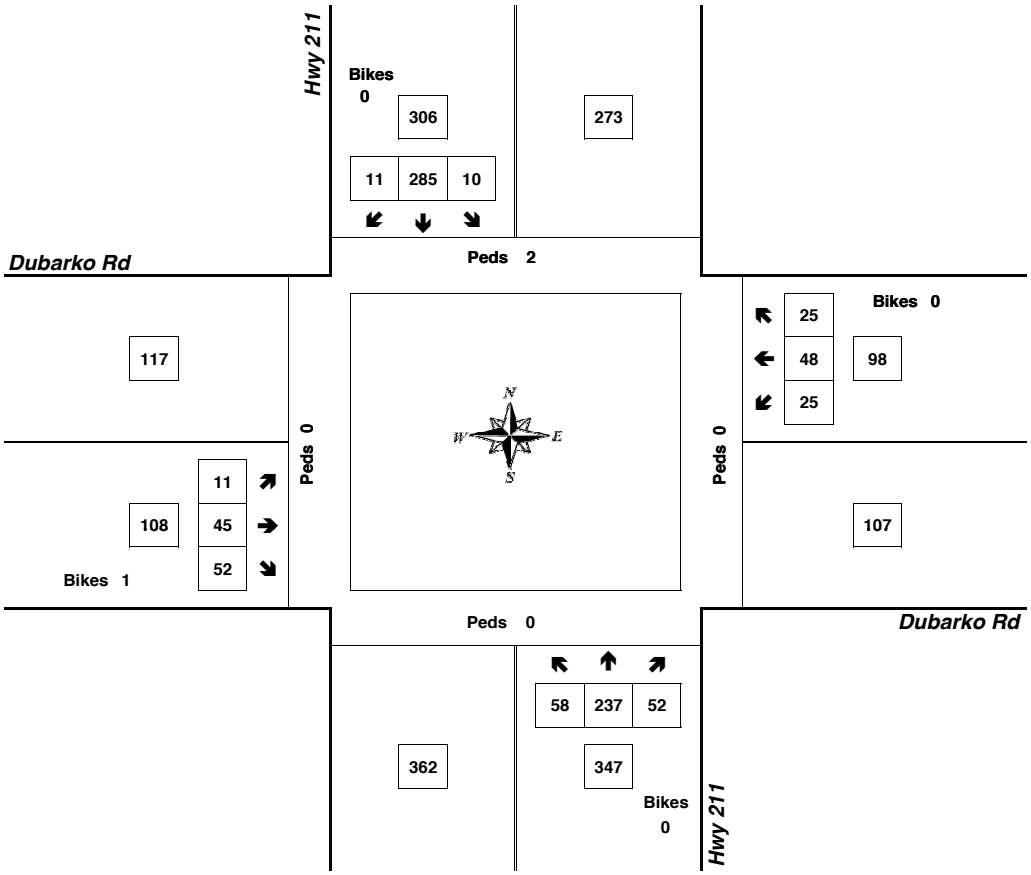
Peak Hour Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740

Hwy 211 & Dubarko Rd

4:05 PM to 5:05 PM
Tuesday, March 19, 2019



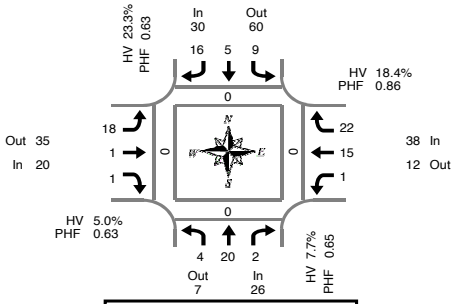
Approach	PHF	HV%	Volume
EB	0.82	0.9%	108
WB	0.72	5.1%	98
NB	0.89	2.0%	347
SB	0.89	4.6%	306
Intersection	0.94	3.1%	859

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

All Traffic Data Services Inc.

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	2	0	0	6	0	0	0	0
7:05 AM	2	1	0	0	1	0	3	0	1	1	0	0	0	2	3	0	14	0	0	0	0
7:10 AM	0	0	0	0	1	0	0	0	1	0	0	0	0	1	2	0	5	0	0	0	0
7:15 AM	0	2	1	0	0	1	1	0	2	0	0	0	0	0	1	0	8	0	0	0	0
7:20 AM	0	0	0	0	0	0	0	0	3	0	0	0	1	3	2	0	9	0	0	0	0
7:25 AM	0	0	0	0	2	2	3	0	1	0	0	0	0	1	2	0	11	0	0	0	0
7:30 AM	0	6	0	0	0	0	3	0	0	0	0	0	0	1	1	0	11	0	0	0	0
7:35 AM	1	2	0	0	0	0	0	0	0	0	1	0	0	2	0	0	6	0	0	0	0
7:40 AM	0	0	1	0	2	1	3	0	0	0	0	0	0	2	2	0	11	0	0	0	0
7:45 AM	0	1	0	0	2	0	1	0	2	0	0	0	0	0	3	0	9	0	0	0	0
7:50 AM	1	1	0	0	1	0	2	0	3	0	0	0	0	1	3	0	12	0	0	0	0
7:55 AM	0	4	0	0	0	0	0	0	3	0	0	0	0	0	2	0	9	0	0	0	0
8:00 AM	0	3	0	0	0	1	0	0	2	0	0	0	0	2	1	0	9	0	0	0	0
8:05 AM	0	1	0	0	0	1	1	0	3	0	0	0	0	3	1	0	10	0	0	0	0
8:10 AM	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	3	1	0	0	0
8:15 AM	0	2	0	0	0	0	1	0	3	0	0	0	0	1	1	0	8	0	0	0	0
8:20 AM	1	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	5	0	0	0	0
8:25 AM	1	0	0	0	0	1	1	0	3	0	1	0	0	0	1	0	8	0	0	1	0
8:30 AM	0	0	0	0	0	0	0	0	2	2	0	0	1	2	1	0	8	0	0	0	0
8:35 AM	1	0	0	0	1	0	0	0	1	1	1	0	1	2	0	0	8	0	0	0	0
8:40 AM	1	1	0	0	0	3	2	0	1	0	0	0	0	1	0	0	9	0	0	0	0
8:45 AM	1	3	0	0	0	1	2	0	3	0	2	0	1	2	1	0	16	0	0	0	0
8:50 AM	1	4	1	0	0	1	2	0	2	0	0	0	0	1	3	0	15	0	0	0	0
8:55 AM	1	2	1	0	0	0	1	0	1	0	0	0	0	2	1	0	9	0	0	0	0
Total Survey	12	35	4	0	11	14	29	0	38	5	5	0	4	31	31	0	219	1	0	1	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	25	0	0	0	0
7:15 AM	0	2	1	0	2	3	4	0	6	0	0	0	1	4	5	0	28	0	0	0	0
7:30 AM	1	8	1	0	2	1	6	0	0	0	1	0	0	5	3	0	28	0	0	0	0
7:45 AM	1	6	0	0	3	0	3	0	8	0	0	0	0	1	8	0	30	0	0	0	0
8:00 AM	0	5	0	0	1	2	2	0	5	0	0	0	0	5	2	0	22	1	0	0	0
8:15 AM	2	2	0	0	0	2	3	0	7	1	1	0	0	1	2	0	21	0	0	1	0
8:30 AM	2	1	0	0	1	3	2	0	4	3	1	0	2	5	1	0	25	0	0	0	0
8:45 AM	3	9	2	0	0	2	5	0	6	0	2	0	1	5	5	0	40	0	0	0	0
Total Survey	12	35	4	0	11	14	29	0	38	5	5	0	4	31	31	0	219	1	0	1	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	114	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				

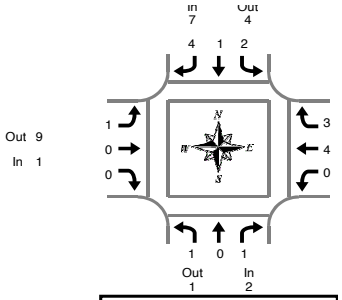
By Movement	Northbound SE Langensand Rd				Southbound SE Langensand Rd				Eastbound Dubarko Rd				Westbound Dubarko Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	4	20	2	26	9	5	16	30	18	1	1	20	1	15	22	38	114
%HV	25.0%	0.0%	50.0%	7.7%	22.2%	20.0%	25.0%	23.3%	5.6%	0.0%	0.0%	5.0%	0.0%	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	111	0	0	0	0
7:15 AM	2	21	2	0	8	6	15	0	19	0	1	0	1	15	18	0	108	1	0	0	0
7:30 AM	4	21	1	0	6	5	14	0	20	1	2	0	0	12	15	0	101	1	0	1	0
7:45 AM	5	14	0	0	5	7	10	0	24	4	2	0	2	12	13	0	98	1	0	1	0
8:00 AM	7	17	2	0	2	9	12	0	22	4	4	0	3	16	10	0	108	1	0	1	0

Heavy Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



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

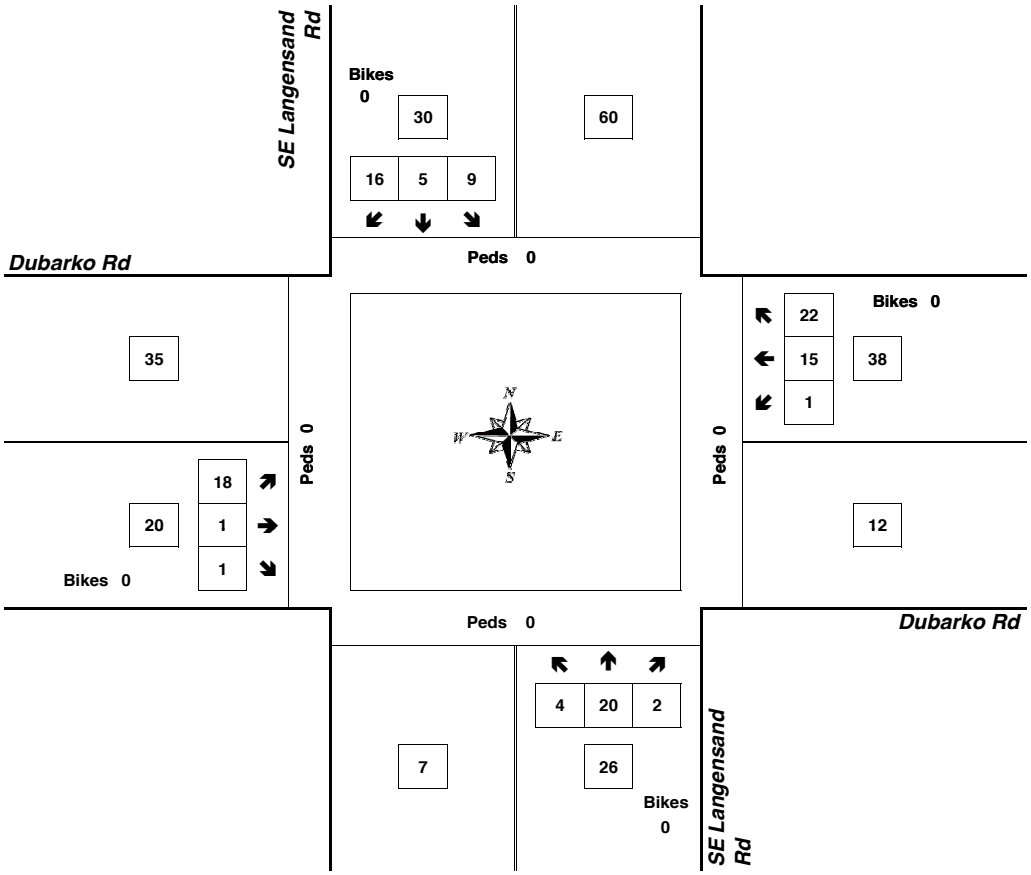
Interval Start Time	Northbound SE Langensand Rd				Southbound SE Langensand Rd				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	1	0	1	2	2	0	4	6	1	0	0	1	0	4	2	6	15
7:15 AM	0	1	1	2	2	1	4	7	1	0	0	1	0	4	2	6	16
7:30 AM	0	1	0	1	2	1	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

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740

SE Langensand Rd & Dubarko Rd

7:05 AM to 8:05 AM
Wednesday, March 20, 2019

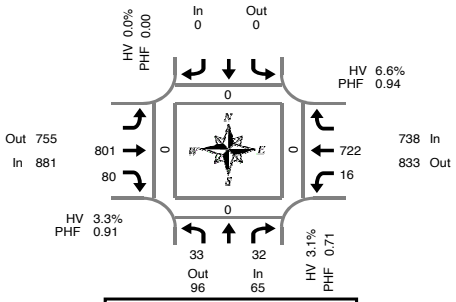


Approach	PHF	HV%	Volume
EB	0.63	5.0%	20
WB	0.86	18.4%	38
NB	0.65	7.7%	26
SB	0.63	23.3%	30
Intersection	0.89	14.9%	114

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary

All Traffic Data Services Inc.
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				

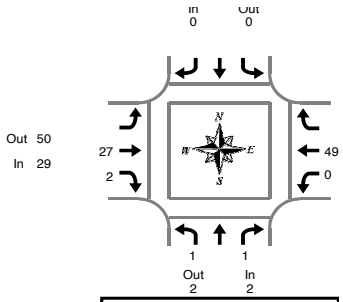
By Movement	Northbound SE Langensand Rd				Southbound SE Langensand Rd				Eastbound Hwy 26				Westbound Hwy 26				Total
	L		R	Total				Total	T	R	Total		L	T		Total	
Volume	33		32	65				0	801	80	881		16	722		738	1,684
%HV	3.0%	NA	3.1%	3.1%	NA	NA	NA	0.0%	3.4%	2.5%	3.3%		0.0%	6.8%	NA	6.6%	4.8%
PHF	0.49		0.80	0.71				0.00	0.93	0.69	0.91		0.57	0.93		0.94	0.93

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

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



SE Langensand 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 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				0	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

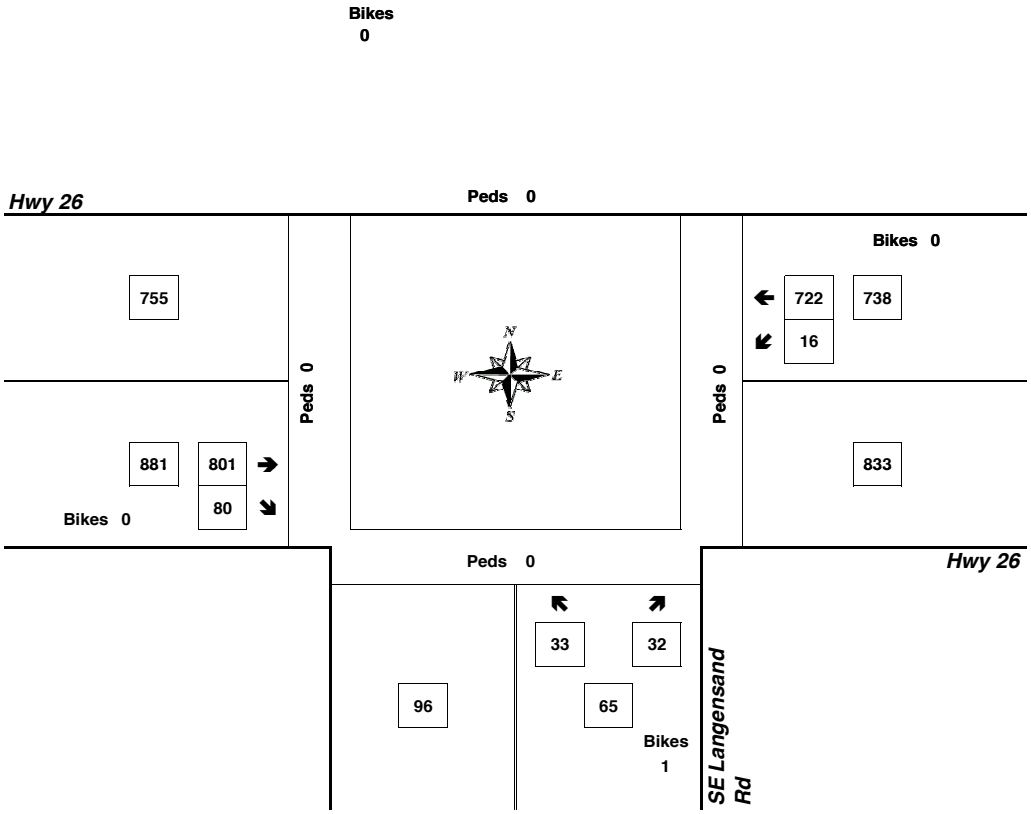
Interval Start Time	Northbound SE Langensand Rd				Southbound SE Langensand Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
	L		R	Total				Total	T	R	Total	L	T		Total	
4:00 PM	1		1	2				0	33	2	35	0	58		58	95
4:15 PM	1		1	2				0	25	3	28	0	46		46	76
4:30 PM	0		1	1				0	16	2	18	0	42		42	61
4:45 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

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740

SE Langensand Rd & Hwy 26

4:10 PM to 5:10 PM
Tuesday, March 19, 2019



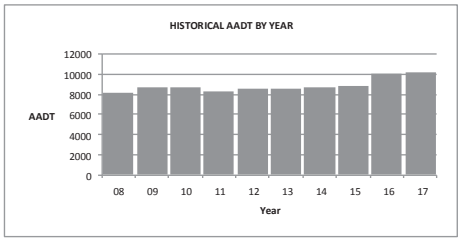
Approach	PHF	HV%	Volume
EB	0.91	3.3%	881
WB	0.94	6.6%	738
NB	0.71	3.1%	65
SB	0.00	0.0%	0
Intersection	0.93	4.8%	1,684

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 (USFS 28)	Site Name:	Rhododendron (03-006)
		Installed:	August, 1995

HISTORICAL TRAFFIC DATA

		Percent of AADT				
Year	AADT	Max Day	Max Hour	10TH Hour	20TH Hour	30TH Hour
2008	8162	233	22.9	20.1	19.1	18.2
2009	8737	197	22.3	19.6	18.4	17.8
2010	8714	207	21.6	19.8	18.9	18.5
2011	8330	214	24.7	20.0	18.6	18.1
2012	8480	227	24.0	21.0	20.2	19.4
2013	8527	213	23.4	21.1	20.3	19.1
2014	8652	216	23.2	21.1	20.3	19.2
2015	8861	242	21.4	20.3	19.4	18.7
2016	10071	208	22.9	19.6	18.8	17.9
2017	10223	200	19.9	19.1	18.1	17.5



2017 TRAFFIC DATA

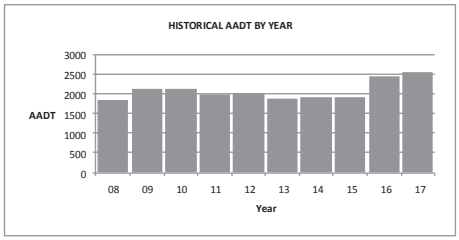
	Average Weekday Traffic	Percent of AADT	Average Daily Traffic	Percent of AADT
January	6744	66	9080	89
February	6533	64	9496	93
March	6763	66	9337	91
April	6166	60	8675	85
May	7675	75	9598	94
June	8568	84	10695	105
July	11291	110	13874	136
August	11738	115	13623	133
September	11300	111	12734	125
October	6589	64	8087	79
November	5493	54	7313	72
December	8753	86	10161	99

For Vehicle Classification data near your project, please go to the following web page: https://www.oregon.gov/ODOT/Data/Documents/TVT_2017.xlsx

Location:	OR35; MP 57.79; MT. HOOD HIGHWAY NO. 26; 0.02 mile east of Warm Springs Highway No. 53 (US26)	Site Name:	Mt. Hood Meadows (03-007)
		Installed:	September, 1995

HISTORICAL TRAFFIC DATA

		Percent of AADT				
Year	AADT	Max Day	Max Hour	10TH Hour	20TH Hour	30TH Hour
2008	1854	398	56.8	44.2	39.9	36.1
2009	2130	***	***	***	***	***
2010	2145	374	49.2	39.5	34.8	33.2
2011	1976	476	79.2	49.1	45.0	39.1
2012	2023	452	65.4	43.4	40.3	37.7
2013	1868	427	68.1	48.7	42.0	37.1
2014	1908	400	60.0	41.9	37.4	33.6
2015	1931	393	50.4	38.6	34.4	32.6
2016	2455	366	55.9	38.3	33.1	31.2
2017	2565	340	52.1	37.7	32.5	31.3



2017 TRAFFIC DATA

	Average Weekday Traffic	Percent of AADT	Average Daily Traffic	Percent of AADT
January	2449	95	3616	141
February	1978	77	3362	131
March	1781	69	2833	110
April	1116	44	2050	80
May	1202	47	1609	63
June	1794	70	2070	81
July	2405	94	2837	111
August	2302	90	2614	102
September	3956	154	3993	156
October	1387	54	1614	63
November	768	30	1156	45
December	2499	97	2966	116

For Vehicle Classification data near your project, please go to the following web page: https://www.oregon.gov/ODOT/Data/Documents/TVT_2017.xlsx

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

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	
Frt	1.00	0.99		1.00	1.00	0.85		1.00			0.88	
Flt 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	
Flt 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(I)	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

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	-

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	SET	SWLn1
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

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	-	-

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	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	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(I)	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

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	-

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	SET	SWLn1
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

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	-	-

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: 158 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

158 Dwelling Units

	Entering	Exiting	Total
AM Peak Hour	17	56	73
PM Peak Hour	55	33	88
Weekday	578	578	1156

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

Trip Generation Calculation Worksheet

Land Use Description: Single-Family Detached Housing
ITE Land Use Code: 210
Independent Variable: Dwelling Units
Quantity: 4 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

4 Dwelling Units

	Entering	Exiting	Total
AM Peak Hour	1	2	3
PM Peak Hour	3	1	4
Weekday	19	19	38

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

Trip Generation Calculation Worksheet

Land Use Description: Single-Family Detached Housing
ITE Land Use Code: 210
Independent Variable: Dwelling Units
Quantity: 52 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

52 Dwelling Units

	Entering	Exiting	Total
AM Peak Hour	10	28	38
PM Peak Hour	32	19	51
Weekday	245	245	490

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

Trip Generation Calculation Worksheet

Land Use Description: Single-Family Detached Housing
ITE Land Use Code: 210
Independent Variable: Dwelling Units
Quantity: 56 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

56 Dwelling Units

	Entering	Exiting	Total
AM Peak Hour	10	31	41
PM Peak Hour	35	20	55
Weekday	264	264	528

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

Trip Generation Calculation Worksheet

Land Use Description: Shopping Center
ITE Land Use Code: 820
Independent Variable: Gross Floor Area
Quantity: 30.9 Thousand Square Feet

Summary of ITE Trip Generation Data

AM Peak Hour of Adjacent Street Traffic
Trip Rate: 0.94 trips per ksf
Directional Distribution: 62% Entering 38% Exiting

PM Peak Hour of Adjacent Street Traffic
Trip Rate: 3.81 trips per ksf
Directional Distribution: 48% Entering 52% Exiting

Total Weekday Traffic
Trip Rate: 37.75 trips per ksf
Directional Distribution: 50% Entering 50% Exiting

Site Trip Generation Calculations

30.9 ksf Shopping Center

	Entering	Exiting	Total
AM Peak Hour	18	11	29
PM Peak Hour	57	61	118
Weekday	583	583	1166

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

Trip Generation Calculation Worksheet

Land Use Description: Single-Family Detached Housing
ITE Land Use Code: 210
Independent Variable: Dwelling Units
Quantity: 6 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

6 Dwelling Units

	Entering	Exiting	Total
AM Peak Hour	1	3	4
PM Peak Hour	4	2	6
Weekday	28	28	56

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: 158 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

158 Dwelling Units

	Entering	Exiting	Total
AM Peak Hour	17	56	73
PM Peak Hour	55	33	88
Weekday	578	578	1156

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

Trip Generation Calculation Worksheet

Land Use Description: Shopping Center
ITE Land Use Code: 820
Independent Variable: Gross Floor Area
Quantity: 34.0 Thousand Square Feet

Summary of ITE Trip Generation Data

AM Peak Hour of Adjacent Street Traffic
Trip Rate: 0.94 trips per ksf
Directional Distribution: 62% Entering 38% Exiting

PM Peak Hour of Adjacent Street Traffic
Trip Rate: 3.81 trips per ksf
Directional Distribution: 48% Entering 52% Exiting

Total Weekday Traffic
Trip Rate: 37.75 trips per ksf
Directional Distribution: 50% Entering 50% Exiting

Site Trip Generation Calculations

34.0 ksf Shopping Center

	Entering	Exiting	Total
AM Peak Hour	20	12	32
PM Peak Hour	62	68	130
Weekday	642	642	1284

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

Trip Generation Calculation Worksheet

Land Use Description: Public Park
ITE Land Use Code: 411
Independent Variable: Acres
Quantity: 1.43 Acres

Summary of ITE Trip Generation Data

AM Peak Hour of Adjacent Street Traffic
Trip Rate: 0.02 trips per acre
Directional Distribution: 58% Entering 42% Exiting

PM Peak Hour of Adjacent Street Traffic
Trip Rate: 0.11 trips per acre
Directional Distribution: 50% Entering 50% Exiting

Total Weekday Traffic
Trip Rate: 0.78 trips per acre
Directional Distribution: 50% Entering 50% Exiting

Site Trip Generation Calculations

1.43 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, 10th Edition* , Institute of Transportation Engineers, 2017

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)	59	822	38	4	1104	10	139	11	3	16	4	151
Future Volume (vph)	59	822	38	4	1104	10	139	11	3	16	4	151
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	
Frt	1.00	0.99		1.00	1.00	0.85		1.00			0.88	
Flt 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	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.54			0.97	
Satd. Flow (perm)	1484	2949		1568	3137	1403		892			1448	
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)	63	874	40	4	1174	11	148	12	3	17	4	161
RTOR Reduction (vph)	0	3	0	0	0	5	0	1	0	0	108	0
Lane Group Flow (vph)	63	911	0	4	1174	6	0	162	0	0	74	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	69.0		1.0	61.6	61.6		36.5			36.5	
Effective Green, g (s)	8.4	69.0		1.0	61.6	61.6		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)	103	1695		13	1610	720		271			440	
v/s Ratio Prot	c0.04	0.31		0.00	c0.37							
v/s Ratio Perm						0.00		c0.18			0.05	
v/c Ratio	0.61	0.54		0.31	0.73	0.01		0.60			0.17	
Uniform Delay, d1	54.2	15.7		59.2	22.7	14.3		35.5			30.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	10.3	1.2		13.0	2.9	0.0		9.4			0.2	
Delay (s)	64.5	16.9		72.2	25.7	14.3		44.9			30.8	
Level of Service	E	B		E	C	B		D			C	
Approach Delay (s)		20.0			25.7			44.9			30.8	
Approach LOS		B			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	25.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	72.8%	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)	59	822	38	4	1104	10	139	11	3	16	4	151
Future Volume (veh/h)	59	822	38	4	1104	10	139	11	3	16	4	151
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	63	874	40	4	1174	11	148	12	3	17	4	161
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	77	1697	78	8	1687	752	321	24	5	56	28	399
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	2935	134	1589	3169	1414	867	79	18	77	94	1311
Grp Volume(v), veh/h	63	449	465	4	1174	11	163	0	0	182	0	0
Grp Sat Flow(s),veh/h/ln	1511	1507	1562	1589	1585	1414	964	0	0	1482	0	0
Q Serve(g_s), s	5.0	21.5	21.5	0.3	33.0	0.4	8.4	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	5.0	21.5	21.5	0.3	33.0	0.4	20.2	0.0	0.0	11.8	0.0	0.0
Prop In Lane	1.00		0.09	1.00		1.00	0.91		0.02	0.09		0.88
Lane Grp Cap(c), veh/h	77	871	903	8	1687	752	351	0	0	484	0	0
V/C Ratio(X)	0.82	0.52	0.52	0.48	0.70	0.01	0.47	0.00	0.00	0.38	0.00	0.00
Avail Cap(c_a), veh/h	145	871	903	68	1687	752	351	0	0	484	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(I)	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	56.4	15.2	15.2	59.5	20.9	13.2	37.3	0.0	0.0	33.1	0.0	0.0
Incr Delay (d2), s/veh	18.2	2.2	2.1	38.0	2.4	0.0	4.4	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	2.3	7.8	8.1	0.2	12.6	0.2	4.6	0.0	0.0	4.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	74.6	17.4	17.3	97.5	23.3	13.3	41.6	0.0	0.0	33.6	0.0	0.0
LnGrp LOS	E	B	B	F	C	B	D	A	A	C	A	A
Approach Vol, veh/h		977			1189			163			182	
Approach Delay, s/veh		21.0			23.4			41.6			33.6	
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	10.6	68.4		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	23.5		22.2	7.0	35.0		13.8				
Green Ext Time (p_c), s	0.0	7.7		0.8	0.0	10.1		1.1				

Intersection Summary												
HCM 6th Ctrl Delay			24.4									
HCM 6th LOS			C									

Intersection	
Int Delay, s/veh	2.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	830	36	16	1016	67	16
Future Vol, veh/h	830	36	16	1016	67	16
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	883	38	17	1081	71	17

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	921	0	1458	442
Stage 1	-	-	-	-	883	-
Stage 2	-	-	-	-	575	-
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	-	-	707	-	118	558
Stage 1	-	-	-	-	360	-
Stage 2	-	-	-	-	521	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	707	-	115	558
Mov Cap-2 Maneuver	-	-	-	-	115	-
Stage 1	-	-	-	-	360	-
Stage 2	-	-	-	-	508	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	64.7
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	115	558	-	-	707	-
HCM Lane V/C Ratio	0.62	0.031	-	-	0.024	-
HCM Control Delay (s)	77.4	11.7	-	-	10.2	-
HCM Lane LOS	F	B	-	-	B	-
HCM 95th %tile Q(veh)	3.1	0.1	-	-	0.1	-

Intersection	
Int Delay, s/veh	0.7

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	28	785	996	1	0	69
Future Vol, veh/h	28	785	996	1	0	69
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	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	30	835	1060	1	0	73

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1061	0	-	0	1539	531
Stage 1	-	-	-	-	1061	-
Stage 2	-	-	-	-	478	-
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	591	-	-	-	99	475
Stage 1	-	-	-	-	279	-
Stage 2	-	-	-	-	570	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	591	-	-	-	94	475
Mov Cap-2 Maneuver	-	-	-	-	94	-
Stage 1	-	-	-	-	265	-
Stage 2	-	-	-	-	570	-

Approach	SE	NW	SW
HCM Control Delay, s	0.4	0	14
HCM LOS			B

Minor Lane/Major Mvmt	NWT	NWR	SEL	SET	SWLn1
Capacity (veh/h)	-	-	591	-	475
HCM Lane V/C Ratio	-	-	0.05	-	0.155
HCM Control Delay (s)	-	-	11.4	-	14
HCM Lane LOS	-	-	B	-	B
HCM 95th %tile Q(veh)	-	-	0.2	-	0.5

Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱		↰	↱		↔			↰	↱
Traffic Vol, veh/h	8	8	34	55	40	34	45	291	14	4	172	2
Future Vol, veh/h	8	8	34	55	40	34	45	291	14	4	172	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	38	61	44	38	50	323	16	4	191	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	675	642	193	657	636	335	195	0	0	341	0	0
Stage 1	201	201	-	433	433	-	-	-	-	-	-	-
Stage 2	474	441	-	224	203	-	-	-	-	-	-	-
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	369	394	851	374	392	700	1378	-	-	1202	-	-
Stage 1	803	737	-	595	577	-	-	-	-	-	-	-
Stage 2	573	579	-	772	728	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	304	373	849	337	371	697	1375	-	-	1200	-	-
Mov Cap-2 Maneuver	304	373	-	337	371	-	-	-	-	-	-	-
Stage 1	765	733	-	567	550	-	-	-	-	-	-	-
Stage 2	475	552	-	726	724	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.6	17.2	1	0.2
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1375	-	-	335	849	351	697	1200	-	-
HCM Lane V/C Ratio	0.036	-	-	0.053	0.044	0.301	0.054	0.004	-	-
HCM Control Delay (s)	7.7	0	-	16.3	9.4	19.6	10.5	8	0	-
HCM Lane LOS	A	A	-	C	A	C	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.1	1.2	0.2	0	-	-

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	19	1	1	1	16	23	4	21	2	9	5	17
Future Vol, veh/h	19	1	1	1	16	23	4	21	2	9	5	17
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	21	1	1	1	18	26	4	24	2	10	6	19

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	91	70	16	70	78	25	25	0	0	26	0	0
Stage 1	36	36	-	33	33	-	-	-	-	-	-	-
Stage 2	55	34	-	37	45	-	-	-	-	-	-	-
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	886	815	1055	884	783	1007	1551	-	-	1462	-	-
Stage 1	972	859	-	944	837	-	-	-	-	-	-	-
Stage 2	950	861	-	939	827	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	842	807	1055	875	775	1007	1551	-	-	1462	-	-
Mov Cap-2 Maneuver	842	807	-	875	775	-	-	-	-	-	-	-
Stage 1	969	853	-	941	834	-	-	-	-	-	-	-
Stage 2	903	858	-	930	821	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.4	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)	1551	-	-	842	914	896	1462	-	-
HCM Lane V/C Ratio	0.003	-	-	0.025	0.002	0.05	0.007	-	-
HCM Control Delay (s)	7.3	0	-	9.4	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	0.2	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)	158	1244	158	8	1105	22	136	16	14	40	14	118
Future Volume (vph)	158	1244	158	8	1105	22	136	16	14	40	14	118
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			1461	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.56			0.90	
Satd. Flow (perm)	1614	3166		1554	3107	1343		964			1337	
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)	166	1309	166	8	1163	23	143	17	15	42	15	124
RTOR Reduction (vph)	0	8	0	0	0	12	0	3	0	0	65	0
Lane Group Flow (vph)	166	1467	0	8	1163	11	0	172	0	0	116	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	1952		12	1522	658		253			350	
v/s Ratio Prot	c0.10	c0.46		0.01	0.37							
v/s Ratio Perm						0.01		c0.18			0.09	
v/c Ratio	0.76	0.75		0.67	0.76	0.02		0.68			0.33	
Uniform Delay, d1	50.1	16.4		59.3	24.9	15.7		39.7			35.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	14.8	2.7		89.5	3.7	0.0		13.8			0.6	
Delay (s)	64.8	19.2		148.8	28.6	15.8		53.5			36.3	
Level of Service	E	B		F	C	B		D			D	
Approach Delay (s)		23.8			29.2			53.5			36.3	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	28.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	83.8%	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 07/08/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	158	1244	158	8	1105	22	136	16	14	40	14	118
Future Volume (veh/h)	158	1244	158	8	1105	22	136	16	14	40	14	118
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	166	1309	166	8	1163	23	143	17	15	42	15	124
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	192	1780	224	15	1594	694	279	33	24	109	51	267
Arrive On Green	0.12	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	2893	364	1576	3143	1368	857	124	92	273	194	1017
Grp Volume(v), veh/h	166	731	744	8	1163	23	175	0	0	181	0	0
Grp Sat Flow(s),veh/h/ln	1628	1624	1634	1576	1572	1368	1073	0	0	1484	0	0
Q Serve(g_s), s	12.0	37.8	38.6	0.6	34.7	1.0	7.4	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	12.0	37.8	38.6	0.6	34.7	1.0	19.3	0.0	0.0	11.9	0.0	0.0
Prop In Lane	1.00		0.22	1.00		1.00	0.82		0.09	0.23		0.69
Lane Grp Cap(c), veh/h	192	999	1005	15	1594	694	336	0	0	426	0	0
V/C Ratio(X)	0.87	0.73	0.74	0.52	0.73	0.03	0.52	0.00	0.00	0.42	0.00	0.00
Avail Cap(c_a), veh/h	251	999	1005	67	1594	694	336	0	0	426	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(I)	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	52.0	16.2	16.3	59.1	23.1	14.8	40.4	0.0	0.0	37.1	0.0	0.0
Incr Delay (d2), s/veh	21.1	4.7	4.9	24.7	3.0	0.1	5.7	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	6.1	14.8	15.3	0.3	13.4	0.3	5.2	0.0	0.0	4.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	73.1	20.9	21.2	83.8	26.1	14.9	46.1	0.0	0.0	37.8	0.0	0.0
LnGrp LOS	E	C	C	F	C	B	D	A	A	D	A	A
Approach Vol, veh/h		1641			1194			175			181	
Approach Delay, s/veh		26.3			26.3			46.1			37.8	
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	18.6	65.4		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	18.5	56.5		31.5				
Max Q Clear Time (g_c+I1), s	2.6	40.6		21.3	14.0	36.7		13.9				
Green Ext Time (p_c), s	0.0	14.2		0.7	0.2	9.2		1.0				

Intersection Summary			
HCM 6th Ctrl Delay		28.0	
HCM 6th LOS		C	

Intersection	
Int Delay, s/veh	2.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1199	85	17	1126	35	34
Future Vol, veh/h	1199	85	17	1126	35	34
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	1262	89	18	1185	37	36

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1351	0	1891	631
Stage 1	-	-	-	-	1262	-
Stage 2	-	-	-	-	629	-
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	-	-	480	-	61	421
Stage 1	-	-	-	-	228	-
Stage 2	-	-	-	-	491	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	480	-	59	421
Mov Cap-2 Maneuver	-	-	-	-	59	-
Stage 1	-	-	-	-	228	-
Stage 2	-	-	-	-	473	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	76.7
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	59	421	-	-	480	-
HCM Lane V/C Ratio	0.624	0.085	-	-	0.037	-
HCM Control Delay (s)	137.4	14.3	-	-	12.8	-
HCM Lane LOS	F	B	-	-	B	-
HCM 95th %tile Q(veh)	2.6	0.3	-	-	0.1	-

Intersection	
Int Delay, s/veh	0.6

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	72	1150	1089	0	0	37
Future Vol, veh/h	72	1150	1089	0	0	37
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	74	1186	1123	0	0	38

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1124	0	-	0	1865	564
Stage 1	-	-	-	-	1124	-
Stage 2	-	-	-	-	741	-
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	611	-	-	-	57	442
Stage 1	-	-	-	-	250	-
Stage 2	-	-	-	-	404	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	610	-	-	-	50	441
Mov Cap-2 Maneuver	-	-	-	-	50	-
Stage 1	-	-	-	-	220	-
Stage 2	-	-	-	-	404	-

Approach	SE	NW	SW
HCM Control Delay, s	0.7	0	13.9
HCM LOS			B

Minor Lane/Major Mvmt	NWT	NWR	SEL	SET	SWLn1
Capacity (veh/h)	-	-	610	-	441
HCM Lane V/C Ratio	-	-	0.122	-	0.086
HCM Control Delay (s)	-	-	11.7	-	13.9
HCM Lane LOS	-	-	B	-	B
HCM 95th %tile Q(veh)	-	-	0.4	-	0.3

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	11	48	55	27	51	27	61	281	54	10	338	11
Future Vol, veh/h	11	48	55	27	51	27	61	281	54	10	338	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	51	59	29	54	29	65	299	57	11	360	12

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	885	872	362	903	856	332	374	0	0	358	0	0
Stage 1	384	384	-	460	460	-	-	-	-	-	-	-
Stage 2	501	488	-	443	396	-	-	-	-	-	-	-
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	267	290	685	255	292	703	1184	-	-	1184	-	-
Stage 1	641	613	-	576	561	-	-	-	-	-	-	-
Stage 2	554	552	-	588	599	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	202	266	684	187	267	700	1182	-	-	1182	-	-
Mov Cap-2 Maneuver	202	266	-	187	267	-	-	-	-	-	-	-
Stage 1	595	604	-	535	521	-	-	-	-	-	-	-
Stage 2	442	513	-	486	591	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	17.7	24.1	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)	1182	-	-	251	684	233	700	1182	-	-
HCM Lane V/C Ratio	0.055	-	-	0.25	0.086	0.356	0.041	0.009	-	-
HCM Control Delay (s)	8.2	0	-	24.1	10.8	28.8	10.4	8.1	0	-
HCM Lane LOS	A	A	-	C	B	D	B	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	1	0.3	1.5	0.1	0	-	-

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	24	24	5	2	6	7	4	10	1	24	28	29
Future Vol, veh/h	24	24	5	2	6	7	4	10	1	24	28	29
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	26	26	5	2	7	8	4	11	1	26	31	32

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	132	125	52	142	141	20	65	0	0	16	0	0
Stage 1	101	101	-	24	24	-	-	-	-	-	-	-
Stage 2	31	24	-	118	117	-	-	-	-	-	-	-
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	840	765	1016	828	750	1058	1506	-	-	1595	-	-
Stage 1	905	811	-	994	875	-	-	-	-	-	-	-
Stage 2	986	875	-	887	799	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	811	745	1011	784	731	1050	1503	-	-	1589	-	-
Mov Cap-2 Maneuver	811	745	-	784	731	-	-	-	-	-	-	-
Stage 1	900	796	-	987	869	-	-	-	-	-	-	-
Stage 2	965	869	-	836	784	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.7	9.3	2	2.2
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1503	-	-	811	780	861	1589	-	-
HCM Lane V/C Ratio	0.003	-	-	0.033	0.041	0.019	0.017	-	-
HCM Control Delay (s)	7.4	0	-	9.6	9.8	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 07/08/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	732	38	4	1070	10	139	11	3	16	4	151
Future Volume (vph)	59	732	38	4	1070	10	139	11	3	16	4	151
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	
Frt	1.00	0.99		1.00	1.00	0.85		1.00			0.88	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.96			1.00	
Satd. Flow (prot)	1484	2947		1568	3137	1403		1575			1489	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.54			0.97	
Satd. Flow (perm)	1484	2947		1568	3137	1403		892			1448	
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)	63	779	40	4	1138	11	148	12	3	17	4	161
RTOR Reduction (vph)	0	3	0	0	0	5	0	1	0	0	111	0
Lane Group Flow (vph)	63	816	0	4	1138	6	0	162	0	0	71	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	69.0		1.0	61.6	61.6		36.5			36.5	
Effective Green, g (s)	8.4	69.0		1.0	61.6	61.6		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)	103	1694		13	1610	720		271			440	
v/s Ratio Prot	c0.04	0.28		0.00	c0.36							
v/s Ratio Perm						0.00		c0.18			0.05	
v/c Ratio	0.61	0.48		0.31	0.71	0.01		0.60			0.16	
Uniform Delay, d1	54.2	15.0		59.2	22.3	14.3		35.5			30.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	10.3	1.0		13.0	2.6	0.0		9.4			0.2	
Delay (s)	64.5	16.0		72.2	24.9	14.3		44.9			30.7	
Level of Service	E	B		E	C	B		D			C	
Approach Delay (s)		19.4			25.0			44.9			30.7	
Approach LOS		B			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	24.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	71.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	59	732	38	4	1070	10	139	11	3	16	4	151
Future Volume (veh/h)	59	732	38	4	1070	10	139	11	3	16	4	151
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	63	779	40	4	1138	11	148	12	3	17	4	161
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	77	1686	87	8	1687	752	321	24	5	56	28	399
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	2916	150	1589	3169	1414	867	79	18	77	94	1311
Grp Volume(v), veh/h	63	402	417	4	1138	11	163	0	0	182	0	0
Grp Sat Flow(s),veh/h/ln	1511	1507	1559	1589	1585	1414	964	0	0	1482	0	0
Q Serve(g_s), s	5.0	18.4	18.5	0.3	31.4	0.4	8.4	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	5.0	18.4	18.5	0.3	31.4	0.4	20.2	0.0	0.0	11.8	0.0	0.0
Prop In Lane	1.00		0.10	1.00		1.00	0.91		0.02	0.09		0.88
Lane Grp Cap(c), veh/h	77	871	901	8	1687	752	351	0	0	484	0	0
V/C Ratio(X)	0.82	0.46	0.46	0.48	0.67	0.01	0.47	0.00	0.00	0.38	0.00	0.00
Avail Cap(c_a), veh/h	145	871	901	68	1687	752	351	0	0	484	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(I)	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	56.4	14.6	14.6	59.5	20.5	13.2	37.3	0.0	0.0	33.1	0.0	0.0
Incr Delay (d2), s/veh	18.2	1.8	1.7	38.0	2.2	0.0	4.4	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	2.3	6.7	6.9	0.2	12.0	0.2	4.6	0.0	0.0	4.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	74.6	16.3	16.3	97.5	22.7	13.3	41.6	0.0	0.0	33.6	0.0	0.0
LnGrp LOS	E	B	B	F	C	B	D	A	A	C	A	A
Approach Vol, veh/h		882			1153			163			182	
Approach Delay, s/veh		20.5			22.8			41.6			33.6	
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	10.6	68.4		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	20.5		22.2	7.0	33.4		13.8				
Green Ext Time (p_c), s	0.0	6.7		0.8	0.0	10.0		1.1				

Intersection Summary												
HCM 6th Ctrl Delay			24.1									
HCM 6th LOS			C									

Intersection	
Int Delay, s/veh	2.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	740	36	16	982	67	16
Future Vol, veh/h	740	36	16	982	67	16
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	787	38	17	1045	71	17

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	825	0	1344	394
Stage 1	-	-	-	-	787	-
Stage 2	-	-	-	-	557	-
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	-	-	770	-	140	599
Stage 1	-	-	-	-	404	-
Stage 2	-	-	-	-	532	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	770	-	137	599
Mov Cap-2 Maneuver	-	-	-	-	137	-
Stage 1	-	-	-	-	404	-
Stage 2	-	-	-	-	520	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	48
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	137	599	-	-	770	-
HCM Lane V/C Ratio	0.52	0.028	-	-	0.022	-
HCM Control Delay (s)	56.8	11.2	-	-	9.8	-
HCM Lane LOS	F	B	-	-	A	-
HCM 95th %tile Q(veh)	2.5	0.1	-	-	0.1	-

Intersection	
Int Delay, s/veh	6

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	22	689	12	57	942	1	38	6	107	0	18	51
Future Vol, veh/h	22	689	12	57	942	1	38	6	107	0	18	51
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	23	725	13	60	992	1	40	6	113	0	19	54

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	993	0	0	738	0	0	1404	1891	369	1525	1897	497
Stage 1	-	-	-	-	-	-	778	778	-	1113	1113	-
Stage 2	-	-	-	-	-	-	626	1113	-	412	784	-
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	629	-	-	864	-	-	99	69	628	75	69	500
Stage 1	-	-	-	-	-	-	355	405	-	210	282	-
Stage 2	-	-	-	-	-	-	439	282	-	569	402	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	629	-	-	864	-	-	62	62	628	52	62	500
Mov Cap-2 Maneuver	-	-	-	-	-	-	62	62	-	52	62	-
Stage 1	-	-	-	-	-	-	342	390	-	202	263	-
Stage 2	-	-	-	-	-	-	338	263	-	443	387	-

Approach	SE	NW	NE	SW
HCM Control Delay, s	0.3	0.5	54.3	39.1
HCM LOS			F	E

Minor Lane/Major Mvmt	NELn1	NELn2	NWL	NWT	NWR	SEL	SET	SER	SWLn1
Capacity (veh/h)	62	628	864	-	-	629	-	-	176
HCM Lane V/C Ratio	0.747	0.179	0.069	-	-	0.037	-	-	0.413
HCM Control Delay (s)	157	12	9.5	-	-	10.9	-	-	39.1
HCM Lane LOS	F	B	A	-	-	B	-	-	E
HCM 95th %tile Q(veh)	3.3	0.6	0.2	-	-	0.1	-	-	1.8

Intersection	
Int Delay, s/veh	6.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	9	34	132	43	34	45	191	118	4	107	2
Future Vol, veh/h	8	9	34	132	43	34	45	191	118	4	107	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	10	38	147	48	38	50	212	131	4	119	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	552	574	121	532	511	282	123	0	0	345	0	0
Stage 1	129	129	-	380	380	-	-	-	-	-	-	-
Stage 2	423	445	-	152	131	-	-	-	-	-	-	-
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	446	430	933	454	462	750	1464	-	-	1197	-	-
Stage 1	877	791	-	636	609	-	-	-	-	-	-	-
Stage 2	611	576	-	843	782	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	373	408	931	411	438	747	1461	-	-	1195	-	-
Mov Cap-2 Maneuver	373	408	-	411	438	-	-	-	-	-	-	-
Stage 1	838	786	-	607	582	-	-	-	-	-	-	-
Stage 2	509	550	-	795	777	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.9	19.2	1	0.3
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1461	-	-	391	931	417	747	1195	-	-
HCM Lane V/C Ratio	0.034	-	-	0.048	0.041	0.466	0.051	0.004	-	-
HCM Control Delay (s)	7.6	0	-	14.7	9	21	10.1	8	0	-
HCM Lane LOS	A	A	-	B	A	C	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.1	2.4	0.2	0	-	-

Intersection	
Int Delay, s/veh	8.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	19	108	1	1	97	23	4	21	2	9	5	17
Future Vol, veh/h	19	108	1	1	97	23	4	21	2	9	5	17
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	21	121	1	1	109	26	4	24	2	10	6	19

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	137	70	16	130	78	25	25	0	0	26	0	0
Stage 1	36	36	-	33	33	-	-	-	-	-	-	-
Stage 2	101	34	-	97	45	-	-	-	-	-	-	-
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	827	815	1055	807	783	1007	1551	-	-	1462	-	-
Stage 1	972	859	-	944	837	-	-	-	-	-	-	-
Stage 2	898	861	-	872	827	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	714	807	1055	708	775	1007	1551	-	-	1462	-	-
Mov Cap-2 Maneuver	714	807	-	708	775	-	-	-	-	-	-	-
Stage 1	969	853	-	941	834	-	-	-	-	-	-	-
Stage 2	758	858	-	742	821	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.2	10.3	1.1	2.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1551	-	-	714	809	810	1462	-	-
HCM Lane V/C Ratio	0.003	-	-	0.03	0.151	0.168	0.007	-	-
HCM Control Delay (s)	7.3	0	-	10.2	10.2	10.3	7.5	0	-
HCM Lane LOS	A	A	-	B	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.5	0.6	0	-	-

HCM Signalized Intersection Capacity Analysis
1: Wolf Drive/Ten Eyck Road & Highway 26 07/09/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	158	1168	158	8	1011	22	136	16	14	40	14	118
Future Volume (vph)	158	1168	158	8	1011	22	136	16	14	40	14	118
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		1645			1461	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.57			0.90	
Satd. Flow (perm)	1614	3163		1554	3107	1343		981			1335	
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)	166	1229	166	8	1064	23	143	17	15	42	15	124
RTOR Reduction (vph)	0	8	0	0	0	12	0	3	0	0	66	0
Lane Group Flow (vph)	166	1387	0	8	1064	11	0	172	0	0	115	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	72.0		1.0	56.5	56.5		33.5			33.5	
Effective Green, g (s)	16.5	72.0		1.0	56.5	56.5		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)	221	1897		12	1462	632		273			372	
v/s Ratio Prot	c0.10	c0.44		0.01	0.34							
v/s Ratio Perm						0.01		c0.18			0.09	
v/c Ratio	0.75	0.73		0.67	0.73	0.02		0.63			0.31	
Uniform Delay, d1	49.8	17.1		59.3	25.6	16.9		37.8			34.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	13.4	2.5		89.5	3.2	0.0		10.6			0.5	
Delay (s)	63.2	19.6		148.8	28.8	17.0		48.4			34.6	
Level of Service	E	B		F	C	B		D			C	
Approach Delay (s)		24.3			29.4			48.4			34.6	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	28.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	81.5%	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 07/09/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	158	1168	158	8	1011	22	136	16	14	40	14	118
Future Volume (veh/h)	158	1168	158	8	1011	22	136	16	14	40	14	118
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	166	1229	166	8	1064	23	143	17	15	42	15	124
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	192	1717	231	15	1541	670	298	35	26	114	53	282
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	2868	385	1576	3143	1367	871	124	93	275	189	1010
Grp Volume(v), veh/h	166	693	702	8	1064	23	175	0	0	181	0	0
Grp Sat Flow(s),veh/h/ln	1628	1624	1630	1576	1572	1367	1088	0	0	1474	0	0
Q Serve(g_s), s	12.0	35.9	36.4	0.6	31.3	1.0	7.1	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	12.0	35.9	36.4	0.6	31.3	1.0	18.7	0.0	0.0	11.6	0.0	0.0
Prop In Lane	1.00		0.24	1.00		1.00	0.82		0.09	0.23		0.69
Lane Grp Cap(c), veh/h	192	972	976	15	1541	670	358	0	0	449	0	0
V/C Ratio(X)	0.86	0.71	0.72	0.52	0.69	0.03	0.49	0.00	0.00	0.40	0.00	0.00
Avail Cap(c_a), veh/h	264	972	976	67	1541	670	358	0	0	449	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(I)	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	52.0	16.9	17.0	59.1	23.6	15.9	38.6	0.0	0.0	35.4	0.0	0.0
Incr Delay (d2), s/veh	18.9	4.5	4.6	24.7	2.6	0.1	4.7	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	6.0	14.2	14.4	0.3	12.1	0.4	5.0	0.0	0.0	4.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	70.9	21.3	21.5	83.8	26.1	15.9	43.3	0.0	0.0	36.0	0.0	0.0
LnGrp LOS	E	C	C	F	C	B	D	A	A	D	A	A
Approach Vol, veh/h		1561			1095			175			181	
Approach Delay, s/veh		26.7			26.3			43.3			36.0	
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	18.7	63.3		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	38.4		20.7	14.0	33.3		13.6				
Green Ext Time (p_c), s	0.0	13.1		0.8	0.2	8.4		1.1				

Intersection Summary			
HCM 6th Ctrl Delay		28.1	
HCM 6th LOS		C	

Intersection	
Int Delay, s/veh	3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1123	85	17	1018	49	34
Future Vol, veh/h	1123	85	17	1018	49	34
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	1182	89	18	1072	52	36

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1271	0	1754	591
Stage 1	-	-	-	-	1182	-
Stage 2	-	-	-	-	572	-
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	-	-	516	-	76	448
Stage 1	-	-	-	-	252	-
Stage 2	-	-	-	-	525	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	516	-	73	448
Mov Cap-2 Maneuver	-	-	-	-	73	-
Stage 1	-	-	-	-	252	-
Stage 2	-	-	-	-	507	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	82.3
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	73	448	-	-	516	-
HCM Lane V/C Ratio	0.707	0.08	-	-	0.035	-
HCM Control Delay (s)	129.9	13.7	-	-	12.2	-
HCM Lane LOS	F	B	-	-	B	-
HCM 95th %tile Q(veh)	3.3	0.3	-	-	0.1	-

Intersection	
Int Delay, s/veh	5.4

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	62	1046	38	118	982	0	8	5	116	0	9	28
Future Vol, veh/h	62	1046	38	118	982	0	8	5	116	0	9	28
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	64	1078	39	122	1012	0	8	5	120	0	9	29

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1013	0	0	1117	0	0	1982	2483	559	1927	2502	508
Stage 1	-	-	-	-	-	-	1226	1226	-	1257	1257	-
Stage 2	-	-	-	-	-	-	756	1257	-	670	1245	-
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	674	-	-	621	-	-	36	29	472	35	28	482
Stage 1	-	-	-	-	-	-	189	249	-	165	241	-
Stage 2	-	-	-	-	-	-	366	241	-	388	244	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	673	-	-	621	-	-	17	21	472	17	20	481
Mov Cap-2 Maneuver	-	-	-	-	-	-	17	21	-	17	20	-
Stage 1	-	-	-	-	-	-	171	225	-	149	194	-
Stage 2	-	-	-	-	-	-	263	194	-	256	221	-

Approach	SE	NW	NE	SW
HCM Control Delay, s	0.6	1.3	55.3	99
HCM LOS			F	F

Minor Lane/Major Mvmt	NELn1	NELn2	NWL	NWT	NWR	SEL	SET	SER	SWLn1
Capacity (veh/h)	18	472	621	-	-	673	-	-	73
HCM Lane V/C Ratio	0.745	0.253	0.196	-	-	0.095	-	-	0.523
HCM Control Delay (s)	$ 412.7	15.2	12.2	-	-	10.9	-	-	99
HCM Lane LOS	F	C	B	-	-	B	-	-	F
HCM 95th %tile Q(veh)	2	1	0.7	-	-	0.3	-	-	2.2

Intersection	
Int Delay, s/veh	13.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	11	51	55	146	53	27	61	174	173	10	226	11
Future Vol, veh/h	11	51	55	146	53	27	61	174	173	10	226	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	54	59	155	56	29	65	185	184	11	240	12

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	716	765	242	734	685	281	254	0	0	371	0	0
Stage 1	264	264	-	409	409	-	-	-	-	-	-	-
Stage 2	452	501	-	325	276	-	-	-	-	-	-	-
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	347	335	799	332	367	751	1311	-	-	1171	-	-
Stage 1	743	692	-	613	591	-	-	-	-	-	-	-
Stage 2	589	544	-	681	676	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	274	309	797	251	338	748	1309	-	-	1169	-	-
Mov Cap-2 Maneuver	274	309	-	251	338	-	-	-	-	-	-	-
Stage 1	694	683	-	573	552	-	-	-	-	-	-	-
Stage 2	475	508	-	574	667	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.4	49	1.2	0.3
HCM LOS	C	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1309	-	-	302	797	269	748	1169	-	-
HCM Lane V/C Ratio	0.05	-	-	0.218	0.073	0.787	0.038	0.009	-	-
HCM Control Delay (s)	7.9	0	-	20.2	9.9	54.3	10	8.1	0	-
HCM Lane LOS	A	A	-	C	A	F	B	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.8	0.2	6	0.1	0	-	-

Intersection	
Int Delay, s/veh	9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	24	147	5	2	127	21	4	10	1	24	28	29
Future Vol, veh/h	24	147	5	2	127	21	4	10	1	24	28	29
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	26	162	5	2	140	23	4	11	1	26	31	32

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	206	125	52	210	141	20	65	0	0	16	0	0
Stage 1	101	101	-	24	24	-	-	-	-	-	-	-
Stage 2	105	24	-	186	117	-	-	-	-	-	-	-
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	752	765	1016	747	750	1058	1506	-	-	1595	-	-
Stage 1	905	811	-	994	875	-	-	-	-	-	-	-
Stage 2	901	875	-	816	799	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	614	745	1011	606	731	1050	1503	-	-	1589	-	-
Mov Cap-2 Maneuver	614	745	-	606	731	-	-	-	-	-	-	-
Stage 1	900	796	-	987	869	-	-	-	-	-	-	-
Stage 2	735	869	-	634	784	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.1	11	2	2.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1503	-	-	614	752	761	1589	-	-
HCM Lane V/C Ratio	0.003	-	-	0.043	0.222	0.217	0.017	-	-
HCM Control Delay (s)	7.4	0	-	11.1	11.1	11	7.3	0	-
HCM Lane LOS	A	A	-	B	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.8	0.8	0.1	-	-

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)	59	738	38	4	1145	10	139	11	3	16	4	151
Future Volume (vph)	59	738	38	4	1145	10	139	11	3	16	4	151
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	
Frt	1.00	0.99		1.00	1.00	0.85		1.00			0.88	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.96			1.00	
Satd. Flow (prot)	1484	2947		1568	3137	1403		1575			1489	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.55			0.97	
Satd. Flow (perm)	1484	2947		1568	3137	1403		900			1448	
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)	63	785	40	4	1218	11	148	12	3	17	4	161
RTOR Reduction (vph)	0	3	0	0	0	5	0	1	0	0	94	0
Lane Group Flow (vph)	63	822	0	4	1218	6	0	162	0	0	89	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)	8.0	68.0		1.0	61.0	61.0		37.5			37.5	
Effective Green, g (s)	8.0	68.0		1.0	61.0	61.0		37.5			37.5	
Actuated g/C Ratio	0.07	0.57		0.01	0.51	0.51		0.31			0.31	
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)	98	1669		13	1594	713		281			452	
v/s Ratio Prot	c0.04	0.28		0.00	c0.39							
v/s Ratio Perm						0.00		c0.18			0.06	
v/c Ratio	0.64	0.49		0.31	0.76	0.01		0.58			0.20	
Uniform Delay, d1	54.6	15.6		59.2	23.7	14.6		34.6			30.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	13.5	1.0		13.0	3.5	0.0		8.4			0.2	
Delay (s)	68.1	16.7		72.2	27.3	14.6		43.0			30.4	
Level of Service	E	B		E	C	B		D			C	
Approach Delay (s)		20.3			27.3			43.0			30.4	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	26.0	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 07/08/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	59	738	38	4	1145	10	139	11	3	16	4	151
Future Volume (veh/h)	59	738	38	4	1145	10	139	11	3	16	4	151
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	63	785	40	4	1218	11	148	12	3	17	4	161
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	77	1662	85	8	1660	741	331	25	6	57	29	408
Arrive On Green	0.05	0.57	0.57	0.01	0.52	0.52	0.31	0.31	0.31	0.31	0.31	0.31
Sat Flow, veh/h	1511	2918	149	1589	3169	1414	875	80	18	78	92	1307
Grp Volume(v), veh/h	63	405	420	4	1218	11	163	0	0	182	0	0
Grp Sat Flow(s),veh/h/ln	1511	1507	1559	1589	1585	1414	972	0	0	1477	0	0
Q Serve(g_s), s	5.0	19.0	19.0	0.3	35.7	0.4	8.3	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	5.0	19.0	19.0	0.3	35.7	0.4	19.9	0.0	0.0	11.6	0.0	0.0
Prop In Lane	1.00		0.10	1.00		1.00	0.91		0.02	0.09		0.88
Lane Grp Cap(c), veh/h	77	859	889	8	1660	741	361	0	0	495	0	0
V/C Ratio(X)	0.82	0.47	0.47	0.48	0.73	0.01	0.45	0.00	0.00	0.37	0.00	0.00
Avail Cap(c_a), veh/h	132	859	889	68	1660	741	361	0	0	495	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(I)	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	56.4	15.2	15.2	59.5	22.1	13.7	36.3	0.0	0.0	32.4	0.0	0.0
Incr Delay (d2), s/veh	18.3	1.9	1.8	38.0	2.9	0.0	4.0	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	2.3	6.9	7.2	0.2	13.7	0.2	4.5	0.0	0.0	4.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	74.7	17.1	17.0	97.5	25.0	13.7	40.4	0.0	0.0	32.8	0.0	0.0
LnGrp LOS	E	B	B	F	C	B	D	A	A	C	A	A
Approach Vol, veh/h		888			1233			163			182	
Approach Delay, s/veh		21.1			25.1			40.4			32.8	
Approach LOS		C			C			D			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.1	72.9		42.0	10.6	67.4		42.0				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.1	63.9		37.5	10.5	58.5		37.5				
Max Q Clear Time (g_c+I1), s	2.3	21.0		21.9	7.0	37.7		13.6				
Green Ext Time (p_c), s	0.0	6.7		0.8	0.0	9.9		1.2				

Intersection Summary												
HCM 6th Ctrl Delay			25.3									
HCM 6th LOS			C									

Intersection	
Int Delay, s/veh	6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	746	36	19	1019	105	16
Future Vol, veh/h	746	36	19	1019	105	16
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	794	38	20	1084	112	17

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	832	0	1376	397
Stage 1	-	-	-	-	794	-
Stage 2	-	-	-	-	582	-
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	-	-	765	-	134	597
Stage 1	-	-	-	-	401	-
Stage 2	-	-	-	-	516	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	765	-	131	597
Mov Cap-2 Maneuver	-	-	-	-	131	-
Stage 1	-	-	-	-	401	-
Stage 2	-	-	-	-	503	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	94.5
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	131	597	-	-	765	-
HCM Lane V/C Ratio	0.853	0.029	-	-	0.026	-
HCM Control Delay (s)	107.2	11.2	-	-	9.8	-
HCM Lane LOS	F	B	-	-	A	-
HCM 95th %tile Q(veh)	5.4	0.1	-	-	0.1	-

Intersection	
Int Delay, s/veh	1.3

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	28	689	12	0	999	1	0	0	107	0	0	69
Future Vol, veh/h	28	689	12	0	999	1	0	0	107	0	0	69
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	-	-	-	-	-	-	-	0	-	-	-
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, %	13	13	2	2	6	6	2	2	2	9	2	9
Mvmt Flow	30	733	13	0	1063	1	0	0	114	0	0	73

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1064	0	0	-	-	0	-	-	373	1491	1870	532
Stage 1	-	-	-	-	-	-	-	-	-	1064	1064	-
Stage 2	-	-	-	-	-	-	-	-	-	427	806	-
Critical Hdwy	4.36	-	-	-	-	-	-	-	6.94	7.68	6.54	7.08
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.68	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.68	5.54	-
Follow-up Hdwy	2.33	-	-	-	-	-	-	-	3.32	3.59	4.02	3.39
Pot Cap-1 Maneuver	589	-	-	0	-	-	0	0	624	80	71	474
Stage 1	-	-	-	0	-	-	0	0	-	226	298	-
Stage 2	-	-	-	0	-	-	0	0	-	558	393	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	589	-	-	-	-	-	-	-	624	63	67	474
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	63	67	-
Stage 1	-	-	-	-	-	-	-	-	-	214	298	-
Stage 2	-	-	-	-	-	-	-	-	-	433	373	-

Approach	SE	NW	NE	SW
HCM Control Delay, s	0.4	0	12.1	14
HCM LOS			B	B

Minor Lane/Major Mvmt	NELn1	NWT	NWR	SEL	SET	SERSWLn1
Capacity (veh/h)	624	-	-	589	-	- 474
HCM Lane V/C Ratio	0.182	-	-	0.051	-	- 0.155
HCM Control Delay (s)	12.1	-	-	11.4	-	- 14
HCM Lane LOS	B	-	-	B	-	- B
HCM 95th %tile Q(veh)	0.7	-	-	0.2	-	- 0.5

Intersection	
Int Delay, s/veh	5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	9	34	75	43	34	45	191	118	4	182	2
Future Vol, veh/h	8	9	34	75	43	34	45	191	118	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	9	10	38	83	48	38	50	212	131	4	202	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	635	657	204	615	594	282	206	0	0	345	0	0
Stage 1	212	212	-	380	380	-	-	-	-	-	-	-
Stage 2	423	445	-	235	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	393	386	839	399	414	750	1365	-	-	1197	-	-
Stage 1	792	729	-	636	609	-	-	-	-	-	-	-
Stage 2	611	576	-	761	720	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	325	365	837	358	392	747	1362	-	-	1195	-	-
Mov Cap-2 Maneuver	325	365	-	358	392	-	-	-	-	-	-	-
Stage 1	754	725	-	605	580	-	-	-	-	-	-	-
Stage 2	507	548	-	714	716	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.7	17.8	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	-	-	345	837	370	747	1195	-	-
HCM Lane V/C Ratio	0.037	-	-	0.055	0.045	0.354	0.051	0.004	-	-
HCM Control Delay (s)	7.7	0	-	16	9.5	20	10.1	8	0	-
HCM Lane LOS	A	A	-	C	A	C	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.1	1.6	0.2	0	-	-

Intersection	
Int Delay, s/veh	8.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	19	108	1	1	40	61	4	21	2	12	5	17
Future Vol, veh/h	19	108	1	1	40	61	4	21	2	12	5	17
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	21	121	1	1	45	69	4	24	2	13	6	19

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	132	76	16	136	84	25	25	0	0	26	0	0
Stage 1	42	42	-	33	33	-	-	-	-	-	-	-
Stage 2	90	34	-	103	51	-	-	-	-	-	-	-
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	833	809	1055	800	777	1007	1551	-	-	1462	-	-
Stage 1	965	854	-	944	837	-	-	-	-	-	-	-
Stage 2	910	861	-	865	822	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	735	799	1055	700	768	1007	1551	-	-	1462	-	-
Mov Cap-2 Maneuver	735	799	-	700	768	-	-	-	-	-	-	-
Stage 1	962	846	-	941	834	-	-	-	-	-	-	-
Stage 2	800	858	-	733	815	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.3	9.6	1.1	2.6
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1551	-	-	735	801	894	1462	-	-
HCM Lane V/C Ratio	0.003	-	-	0.029	0.153	0.128	0.009	-	-
HCM Control Delay (s)	7.3	0	-	10	10.3	9.6	7.5	0	-
HCM Lane LOS	A	A	-	B	B	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.5	0.4	0	-	-

HCM Signalized Intersection Capacity Analysis
1: Wolf Drive/Ten Eyck Road & Highway 26 07/09/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	158	1173	158	8	1133	22	141	16	14	40	14	118
Future Volume (vph)	158	1173	158	8	1133	22	141	16	14	40	14	118
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			1461	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.57			0.90	
Satd. Flow (perm)	1614	3163		1554	3107	1343		971			1335	
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)	166	1235	166	8	1193	23	148	17	15	42	15	124
RTOR Reduction (vph)	0	8	0	0	0	12	0	3	0	0	66	0
Lane Group Flow (vph)	166	1393	0	8	1193	11	0	177	0	0	115	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	73.0		1.0	57.8	57.8		32.5			32.5	
Effective Green, g (s)	16.2	73.0		1.0	57.8	57.8		32.5			32.5	
Actuated g/C Ratio	0.13	0.61		0.01	0.48	0.48		0.27			0.27	
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	1924		12	1496	646		262			361	
v/s Ratio Prot	c0.10	0.44		0.01	c0.38							
v/s Ratio Perm						0.01		c0.18			0.09	
v/c Ratio	0.76	0.72		0.67	0.80	0.02		0.68			0.32	
Uniform Delay, d1	50.1	16.5		59.3	26.2	16.3		39.0			34.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	14.8	2.4		89.5	4.5	0.0		13.1			0.5	
Delay (s)	64.8	18.9		148.8	30.7	16.3		52.2			35.4	
Level of Service	E	B		F	C	B		D			D	
Approach Delay (s)		23.7			31.2			52.2			35.4	
Approach LOS		C			C			D			D	

Intersection Summary				
HCM 2000 Control Delay	28.9	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.75			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.5	
Intersection Capacity Utilization	82.0%	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 07/09/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	158	1173	158	8	1133	22	141	16	14	40	14	118
Future Volume (veh/h)	158	1173	158	8	1133	22	141	16	14	40	14	118
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	166	1235	166	8	1193	23	148	17	15	42	15	124
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	192	1742	233	15	1568	682	290	33	24	112	52	275
Arrive On Green	0.12	0.61	0.61	0.01	0.50	0.50	0.27	0.27	0.27	0.27	0.27	0.27
Sat Flow, veh/h	1628	2870	384	1576	3143	1367	868	121	90	275	192	1016
Grp Volume(v), veh/h	166	696	705	8	1193	23	180	0	0	181	0	0
Grp Sat Flow(s),veh/h/ln	1628	1624	1630	1576	1572	1367	1078	0	0	1483	0	0
Q Serve(g_s), s	12.0	35.4	36.0	0.6	36.8	1.0	7.8	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	12.0	35.4	36.0	0.6	36.8	1.0	19.6	0.0	0.0	11.8	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	192	985	989	15	1568	682	347	0	0	439	0	0
V/C Ratio(X)	0.87	0.71	0.71	0.52	0.76	0.03	0.52	0.00	0.00	0.41	0.00	0.00
Avail Cap(c_a), veh/h	251	985	989	67	1568	682	347	0	0	439	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(I)	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	52.0	16.2	16.3	59.1	24.3	15.3	39.8	0.0	0.0	36.3	0.0	0.0
Incr Delay (d2), s/veh	21.1	4.3	4.4	24.7	3.5	0.1	5.5	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	6.1	13.9	14.2	0.3	14.3	0.3	5.3	0.0	0.0	4.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	73.1	20.5	20.7	83.8	27.8	15.4	45.2	0.0	0.0	36.9	0.0	0.0
LnGrp LOS	E	C	C	F	C	B	D	A	A	D	A	A
Approach Vol, veh/h		1567			1224			180			181	
Approach Delay, s/veh		26.2			28.0			45.2			36.9	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.7	77.3		37.0	18.6	64.4		37.0				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.1	68.9		32.5	18.5	55.5		32.5				
Max Q Clear Time (g_c+I1), s	2.6	38.0		21.6	14.0	38.8		13.8				
Green Ext Time (p_c), s	0.0	13.5		0.8	0.2	8.6		1.0				

Intersection Summary												
HCM 6th Ctrl Delay			28.6									
HCM 6th LOS			C									

Intersection	
Int Delay, s/veh	3.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1128	85	17	1137	52	34
Future Vol, veh/h	1128	85	17	1137	52	34
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	1187	89	18	1197	55	36

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1276	0	1822	594
Stage 1	-	-	-	-	1187	-
Stage 2	-	-	-	-	635	-
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	-	-	514	-	68	446
Stage 1	-	-	-	-	250	-
Stage 2	-	-	-	-	487	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	514	-	66	446
Mov Cap-2 Maneuver	-	-	-	-	66	-
Stage 1	-	-	-	-	250	-
Stage 2	-	-	-	-	470	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	107.6
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	66	446	-	-	514	-
HCM Lane V/C Ratio	0.829	0.08	-	-	0.035	-
HCM Control Delay (s)	168.9	13.8	-	-	12.3	-
HCM Lane LOS	F	B	-	-	B	-
HCM 95th %tile Q(veh)	3.9	0.3	-	-	0.1	-

Intersection	
Int Delay, s/veh	1.3

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	67	1046	38	0	1100	0	0	0	116	0	0	37
Future Vol, veh/h	67	1046	38	0	1100	0	0	0	116	0	0	37
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	-	-	-	-	-	-	-	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	69	1078	39	0	1134	0	0	0	120	0	0	38

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1135	0	0	-	-	0	-	-	559	1812	2390	569
Stage 1	-	-	-	-	-	-	-	-	-	1135	1135	-
Stage 2	-	-	-	-	-	-	-	-	-	677	1255	-
Critical Hdwy	4.16	-	-	-	-	-	-	-	6.94	7.76	6.54	7.16
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.76	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.76	5.54	-
Follow-up Hdwy	2.23	-	-	-	-	-	-	-	3.32	3.63	4.02	3.43
Pot Cap-1 Maneuver	606	-	-	0	-	-	0	0	472	43	33	438
Stage 1	-	-	-	0	-	-	0	0	-	198	275	-
Stage 2	-	-	-	0	-	-	0	0	-	384	241	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	605	-	-	-	-	-	-	-	472	29	29	437
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	29	29	-
Stage 1	-	-	-	-	-	-	-	-	-	175	275	-
Stage 2	-	-	-	-	-	-	-	-	-	254	214	-

Approach	SE	NW	NE	SW
HCM Control Delay, s	0.7	0	15.2	14
HCM LOS			C	B

Minor Lane/Major Mvmt	NELn1	NWT	NWR	SEL	SET	SERSWLn1
Capacity (veh/h)	472	-	-	605	-	- 437
HCM Lane V/C Ratio	0.253	-	-	0.114	-	- 0.087
HCM Control Delay (s)	15.2	-	-	11.7	-	- 14
HCM Lane LOS	C	-	-	B	-	- B
HCM 95th %tile Q(veh)	1	-	-	0.4	-	- 0.3

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	11	51	55	30	53	27	61	179	168	10	353	11
Future Vol, veh/h	11	51	55	30	53	27	61	179	168	10	353	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	54	59	32	56	29	65	190	179	11	376	12

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	854	901	378	873	824	284	390	0	0	371	0	0
Stage 1	400	400	-	412	412	-	-	-	-	-	-	-
Stage 2	454	501	-	461	412	-	-	-	-	-	-	-
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	280	279	671	267	305	748	1169	-	-	1171	-	-
Stage 1	628	603	-	611	589	-	-	-	-	-	-	-
Stage 2	588	544	-	575	589	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	213	255	670	191	278	745	1167	-	-	1169	-	-
Mov Cap-2 Maneuver	213	255	-	191	278	-	-	-	-	-	-	-
Stage 1	582	595	-	566	545	-	-	-	-	-	-	-
Stage 2	469	504	-	471	581	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	18.3	24	1.2	0.2
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1167	-	-	246	670	239	745	1169	-	-
HCM Lane V/C Ratio	0.056	-	-	0.268	0.087	0.369	0.039	0.009	-	-
HCM Control Delay (s)	8.3	0	-	24.9	10.9	28.6	10	8.1	0	-
HCM Lane LOS	A	A	-	C	B	D	B	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	1.1	0.3	1.6	0.1	0	-	-

Intersection	
Int Delay, s/veh	7.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	24	142	5	2	11	29	4	10	1	24	28	29
Future Vol, veh/h	24	142	5	2	11	29	4	10	1	24	28	29
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	26	156	5	2	12	32	4	11	1	26	31	32

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	147	125	52	207	141	20	65	0	0	16	0	0
Stage 1	101	101	-	24	24	-	-	-	-	-	-	-
Stage 2	46	24	-	183	117	-	-	-	-	-	-	-
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	821	765	1016	751	750	1058	1506	-	-	1595	-	-
Stage 1	905	811	-	994	875	-	-	-	-	-	-	-
Stage 2	968	875	-	819	799	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	769	745	1011	614	731	1050	1503	-	-	1589	-	-
Mov Cap-2 Maneuver	769	745	-	614	731	-	-	-	-	-	-	-
Stage 1	900	796	-	987	869	-	-	-	-	-	-	-
Stage 2	919	869	-	642	784	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.9	9.1	2	2.2
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1503	-	-	769	752	915	1589	-	-
HCM Lane V/C Ratio	0.003	-	-	0.034	0.215	0.05	0.017	-	-
HCM Control Delay (s)	7.4	0	-	9.8	11.1	9.1	7.3	0	-
HCM Lane LOS	A	A	-	A	B	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.8	0.2	0.1	-	-

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	333	318	124	431	374	68	201	146
Average Queue (ft)	62	186	139	11	271	221	5	94	56
95th Queue (ft)	147	293	265	62	372	327	36	165	111
Link Distance (ft)		538	538		613	613		315	380
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	165			120			70		
Storage Blk Time (%)	1	9			30	26	0		
Queuing Penalty (veh)	2	5			1	3	0		

Intersection: 2: Langensand Road & Highway 26

Movement	EB	WB	NB	NB
Directions Served	T	L	L	R
Maximum Queue (ft)	4	42	140	234
Average Queue (ft)	0	8	78	113
95th Queue (ft)	3	30	155	490
Link Distance (ft)	701			876
Upstream Blk Time (%)				0
Queuing Penalty (veh)				0
Storage Bay Dist (ft)		215	120	
Storage Blk Time (%)			25	0
Queuing Penalty (veh)			4	0

Intersection: 3: Dubarko Road/Vista Loop Drive & Highway 26

Movement	SE	NW	NE	NE	SW
Directions Served	L	L	LT	R	LTR
Maximum Queue (ft)	61	46	223	92	271
Average Queue (ft)	14	17	105	41	115
95th Queue (ft)	42	38	277	70	292
Link Distance (ft)			752	752	575
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	220	200			
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 4: Highway 211 & Dubarko Road

Movement	EB	EB	WB	WB	NB	SB
Directions Served	LT	R	LT	R	LTR	LT
Maximum Queue (ft)	51	46	120	63	48	23
Average Queue (ft)	15	20	53	19	4	1
95th Queue (ft)	41	44	94	46	23	9
Link Distance (ft)	645		745		654	862
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		90		125		
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)	43	74	94	15	6
Average Queue (ft)	14	38	49	1	0
95th Queue (ft)	40	59	82	8	4
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: 15

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	424	367	101	459	418	86	193	194
Average Queue (ft)	136	262	231	10	288	242	8	93	79
95th Queue (ft)	223	381	352	52	405	363	41	168	166
Link Distance (ft)		538	538		613	613		315	380
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	165			120			70		
Storage Blk Time (%)	9	12			35	31	0		
Queuing Penalty (veh)	52	20			3	7	0		

Intersection: 2: Langensand Road & Highway 26

Movement	EB	WB	NB	NB
Directions Served	R	L	L	R
Maximum Queue (ft)	4	47	134	168
Average Queue (ft)	0	12	61	39
95th Queue (ft)	3	38	136	145
Link Distance (ft)				876
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	160	215	120	
Storage Blk Time (%)			14	
Queuing Penalty (veh)			5	

Intersection: 3: Dubarko Road/Vista Loop Drive & Highway 26

Movement	SE	SE	SE	NW	NW	NW	NE	NE	SW
Directions Served	L	T	TR	L	T	TR	LT	R	LTR
Maximum Queue (ft)	85	22	20	109	15	4	341	126	435
Average Queue (ft)	29	1	2	40	1	0	169	50	233
95th Queue (ft)	64	11	11	80	12	3	338	94	567
Link Distance (ft)		1135	1135		800	800	615	615	575
Upstream Blk Time (%)									7
Queuing Penalty (veh)									0
Storage Bay Dist (ft)	220			200					
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 4: Highway 211 & Dubarko Road

Movement	EB	EB	WB	WB	NB	SB
Directions Served	LT	R	LT	R	LTR	LT
Maximum Queue (ft)	77	73	213	117	64	48
Average Queue (ft)	32	29	84	21	13	4
95th Queue (ft)	64	55	169	69	43	21
Link Distance (ft)	645		745		654	862
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		90		125		
Storage Blk Time (%)	0	0	8	0		
Queuing Penalty (veh)	0	0	2	0		

Intersection: 5: Langensand Road & Dubarko Road

Movement	EB	EB	WB	NB	SB
Directions Served	L	TR	LTR	LTR	LTR
Maximum Queue (ft)	36	76	83	12	38
Average Queue (ft)	17	40	42	0	2
95th Queue (ft)	42	63	66	6	17
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: 88

SER# / INVEST / RD DPT / UNLOC?	S P E D	A L C	D M R G S	J N V	S H L	W O R K	DATE / DAY / TIME / LAT	CLASS / DIST / FROM / LONG	CITY STREET / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S X	LICNS RES	PED LOC	ERROR	ACT	EVENT	CAUSE
00309	N	N	N				01/24/2014	17	PIONEER BLVD	INTER	6-LEG	N	N	CLR	S-1STOP	01	NONE 0	STRGHT										013	07
CITY							FR	0	SE TEN EYCK RD	NE		TRF SIGNAL	N	DRY	REAR		PRVTE	NE-SW								000		00
N							11A			06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	83	F	OR-Y	026	000		07
N							45 23 49.2519839	-122 15 19.73952																OR<25				
																02	NONE 0	STOP									011	013	00
																	PRVTE	NE-SW											
																	MTRCYCLE		01	DRVR	NONE	63	M	OR-Y	000	000			00
																								OR<25					
																03	NONE 0	STOP									022		00
																	PRVTE	NE-SW											
																	PSNGR CAR		01	DRVR	NONE	70	F	OR-Y	000	000			00
																								OR<25					
03162	N	N	N				08/16/2014	14	PIONEER BLVD	INTER	5-LEG	N	N	CLR	S-1STOP	01	NONE 0	STRGHT											29
NO RPT							SA		SE TEN EYCK RD	E		TRF SIGNAL	N	DRY	REAR		UNKN	E -W								000		00
N							4P			06	0		N	DAY	INJ		MTRCYCLE		01	DRVR	NONE	00	M	UNK	026	000			29
N							45 23 49.25	-122 15 19.74	002600100S00															UNK					
																02	NONE 0	STOP									011		00
																	PRVTE	E -W											
																	PSNGR CAR		01	DRVR	NONE	72	M	OR-Y	000	000			00
																								OR<25					
																02	NONE 0	STOP									011		00
																	PRVTE	E -W											
																	PSNGR CAR		02	PSNG	INJC	64	F		000	000			00
03787	N	N	N	N	N		09/15/2015	14	PIONEER BLVD	INTER	5-LEG	N	N	CLR	S-1STOP	01	NONE 0	STRGHT											29
NONE							TU		SE TEN EYCK RD	E		TRF SIGNAL	N	DRY	REAR		PRVTE	E -W								000		00
N							1P			06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	71	M	OR-Y	026	000			29
N							45 23 49.24	-122 15 19.74	002600100S00															OR<25					
																02	NONE 0	STOP									011		00
																	PRVTE	E -W											
																	PSNGR CAR		01	DRVR	INJC	38	F	OTH-Y	000	000			00
																								N-RES					
02412	N	N	N				06/24/2014	14	PIONEER BLVD	INTER	5-LEG	N	N	CLR	S-1STOP	01	NONE 0	STRGHT											29
NONE							TU		SE TEN EYCK RD	SE		TRF SIGNAL	N	DRY	REAR		PRVTE	SE-NW								000		00
N							8A			06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	55	F	OR-Y	026	000			29
N							45 23 49.25	-122 15 19.74	002600100S00															OR<25					
																02	NONE 0	STOP									011		00
																	PRVTE	SE-NW											
																	PSNGR CAR		01	DRVR	INJC	51	F	OR-Y	000	000			00
																								OR<25					

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SER# / INVEST / RD DPT / UNLOC?	S P E D	A L C	D M R G S	J N	S H	W R	C L	O K	DATE / DAY / TIME / LAT	CLASS / DIST / FROM / LONG	CITY STREET / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S X	LICNS RES	PED LOC	ERROR	ACT EVENT	CAUSE
01419	N	N	N						04/25/2013	17	PROCTOR BLVD	INTER	6-LEG	N	N	CLR	S-1STOP	01	NONE 0	STRGHT									07
NONE									TH	0	SE TEN EYCK RD	NE		TRF SIGNAL	N	DRY	REAR		PRVTE	NE-SW							000	00
N									2P			06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	73	M	OR-Y		026	000	07
N									45 23 49.2519839	-122 15 19.73952																OR<25				
																		01	NONE 0	STRGHT									00
																			PRVTE	NE-SW								000	00
																			PSNGR CAR		02	PSNG	NO<5	03	F		000	000	00
																		02	NONE 0	STOP									
																			UNKN	NE-SW								011	00
																			PSNGR CAR		01	DRVR	NONE	00	M	UNK		000	000	00
																										UNK				
00879	N	Y	N		N	N			03/15/2013	14	PROCTOR BLVD	INTER	6-LEG	N	N	CLD	S-1STOP	01	NONE 0	STRGHT									07
CITY									FR		SE TEN EYCK RD	E		TRF SIGNAL	N	DRY	REAR		PRVTE	E -W							000	00
N									4P			06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	48	F	OR-Y		026	000	07
N									45 23 49.2519839	-122 15 19.73952	002600100S00															OR>25				
																		02	NONE 0	STOP									
																			PRVTE	E -W								011	00
																			PSNGR CAR		01	DRVR	INJC	42	F	OR-Y		000	000	00
																										OR<25				
05173	N	N	N						11/08/2016	14	PROCTOR BLVD	INTER	5-LEG	N	N	CLR	ANGL-OTH	01	NONE 9	U-TURN									06
NONE									TU		SE TEN EYCK RD	W		TRF SIGNAL	N	DRY	TURN		N/A	W -W							000	00
N									5P			05	0		N	DUSK	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000	00
N									45 23 49.25	-122 15 19.74	002600200S00		(02)													UNK				
																		02	NONE 9	TURN-R									
																			N/A	NE-W								000	00
																			PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000	00
																										UNK				

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CITY OF SANDY, CLACKAMAS COUNTY **TEN EYCK RD at MT HOOD HY, City of Sandy, Clackamas County, 01/01/2013 to 12/31/2017**

SER# / INVEST RD DPT UNLOC?	S P E D	A L C	R U G S	J I N V	S C H L	W O R K	DATE DAY TIME LAT	CLASS DIST FROM LONG	CITY STREET FIRST STREET SECOND STREET LRS	RD CHAR DIRECT LOCTN	INT-TYPE (MEDIAN) LEGS (#LANES)	INT-REL TRAF- CONTL	OFFRD RNDBT DRVWY	WTHR SURF LIGHT	CRASH COLL SVRTY	SPCL USE TRLR QTY OWNER V# TYPE	MOVE FROM TO	PRTC P# TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACT EVENT	CAUSE

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CITY OF SANDY, CLACKAMAS COUNTY **LANGENSAND RD at MT HOOD HY, City of Sandy, Clackamas County, 01/01/2013 to 12/31/2017**

1 - 4 of 6 Crash records shown.

SER# / INVEST / RD DPT / UNLOC?	S P E D	A L C	D M R G S	J N V	S H L	W O R K	DATE / DAY / TIME / LAT	CLASS / DIST / FROM / LONG	CITY STREET / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	SPCL USE / TRLR QTY / OWNER / V#	TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACT EVENT	CAUSE
05355	N	N	N				11/18/2016	14	LANGENSAND RD	INTER	3-LEG	N	N	RAIN	PED	01 NONE 0		TURN-R										19,02
CITY							FR		MT HOOD HY	S		UNKNOWN	N	WET	PED	PRVTE		S -SE									015	00
N							6P			06	0		N	DUSK	INJ	PSNGR CAR			01	DRVR	NONE	59	M	OR-Y		029	000	02
N							45 23 44.19	-122 15 .03	002600100S00															OR>25				
																		- STRGHT	01	PED	INJC	34	M		I XWK?	000	034	19
																		SE NW										
05056	N	N	N				12/01/2017	14	LANGENSAND RD	INTER	3-LEG	N	N	RAIN	ANGL-STP	01 NONE 0		TURN-R										08
NONE							FR		MT HOOD HY	S		STOP SIGN	N	WET	TURN	PRVTE		NW-S									000	00
N							9P			06	0		N	DLIT	INJ	PSNGR CAR			01	DRVR	NONE	27	F	OR-Y		001	000	08
N							45 23 44.19	-122 15 .03	002600100S00															OR<25				
																02 NONE 0		STOP										
																PRVTE		S -N									012	00
																PSNGR CAR			01	DRVR	INJC	27	F	OR-Y		000	000	00
																								OR<25				
																02 NONE 0		STOP										
																PRVTE		S -N									012	00
																PSNGR CAR			02	PSNG	INJC	25	M			000	000	00
01431	N	N	N				04/14/2017	14	LANGENSAND RD	INTER	3-LEG	N	N	CLR	O-1STOP	01 NONE 9		BACK										10
NONE							FR		MT HOOD HY	S		STOP SIGN	N	DRY	BACK	N/A		N -S									000	00
N							3P			06	0		N	DAY	PDO	PSNGR CAR			01	DRVR	NONE	00	Unk	UNK		000	000	00
N							45 23 44.19	-122 15 .03	002600100S00															UNK				
																02 NONE 9		STOP										
																N/A		S -N									012	00
																PSNGR CAR			01	DRVR	NONE	00	Unk	UNK		000	000	00
																								UNK				
00258	N	N	N				01/20/2014	14	LANGENSAND RD	INTER	3-LEG	N	N	CLR	ANGL-OTH	01 NONE 0		TURN-L										02
NO RPT							MO		MT HOOD HY	CN		STOP SIGN	N	DRY	TURN	PRVTE		S -NW									015	00
N							6A			01	0		N	DARK	PDO	PSNGR CAR			01	DRVR	NONE	00	M	OR-Y		028	000	02
N							45 23 44.1888359	-122 15 .0331919	002600100S00															OR<25				
																02 NONE 0		TURN-L										
																PRVTE		SE-S									000	00
																PSNGR CAR			01	DRVR	NONE	50	M	OR-Y		000	000	00
																								OR<25				
00297	N	N	N	N	N		01/24/2015	14	LANGENSAND RD	INTER	3-LEG	N	N	CLR	O-1 L-TURN	01 NONE 0		STRGHT										02,08
CITY							SA		MT HOOD HY	CN		UNKNOWN	N	DRY	TURN	PRVTE		NW-SE									000	00
N							4P			03	0		N	DAY	INJ	PSNGR CAR			01	DRVR	NONE	21	M	OR-Y		000	000	00
N							45 23 44.19	-122 15 .03	002600100S00															OR<25				

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SER# / INVEST / RD DPT / UNLOC?	S P E D	A L C	D R G S	M J N V	S I H L	W C O K	DATE / DAY / TIME / LAT	CLASS / DIST / FROM / LONG	CITY STREET / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACT	EVENT	CAUSE
																01	NONE 0 PRVTE PSNGR CAR	STRGHT NW-SE									000 000		00 00
																02	NONE 0 PRVTE PSNGR CAR	TURN-L SE-S		01 DRVR	INJC	78 F		OR-Y OR<25		028,004	000 000		00 02,08
04571	N	N	Y	N	N		10/05/2016	14	LANGENSAND RD	INTER	3-LEG	N	N	RAIN	ANGL-OTH	01	NONE 0	TURN-L										013	02,08
CITY							WE		MT HOOD HY	CN		STOP SIGN	N	WET	TURN		PRVTE	S -W								015		00
N N							6P 45 23 44.19	-122 15 .03	002600100S00	04	0		N	DUSK	INJ		PSNGR CAR			01 DRVR	NONE	21 M		OR-Y OR<25		028	000		02
																02	NONE 0 PRVTE PSNGR CAR	STRGHT W -E		01 DRVR	NONE	37 M		OR-Y OR>25		000	000 000	013	00 00
																03	NONE 0 PRVTE PSNGR CAR	STRGHT E -W		01 DRVR	INJB	61 M		OR-Y OR<25		000	022 000		00 00
																03	NONE 0 PRVTE PSNGR CAR	STRGHT E -W		02 PSNG	INJC	59 F				000	022 000		00 00

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CITY OF SANDY, CLACKAMAS COUNTY **MT HOOD HY at VISTA LP DR, City of Sandy, Clackamas County, 01/01/2013 to 12/31/2017**

SER# / INVEST RD DPT UNLOC?	S P E D	A L C	R U G S	J I N V	S C H L	W O R K	DATE DAY TIME LAT	CLASS DIST FROM LONG	CITY STREET FIRST STREET SECOND STREET LRS	RD CHAR DIRECT LOCTN	INT-TYPE (MEDIAN) LEGS (#LANES)	INT-REL TRAF- CONTL	OFFRD RNDBT DRVWY	WTHR SURF LIGHT	CRASH COLL SVRTY	SPCL USE TRLR QTY OWNER V#	TYPE	MOVE FROM TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACT	EVENT	CAUSE

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SER# / INVEST / RD DPT / UNLOC?	S P E D	A L C	D M R G S	J N	S H	W R	DATE / DAY / TIME / LAT	CLASS / DIST / FROM / LONG	CITY STREET / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	SPCL USE / TRLR QTY / OWNER	V#	TYPE	MOVE / FROM / TO	P#	TYPE	PRTC / INJ / SVRTY	A G E	S X	LICNS RES	PED LOC	ERROR	ACT	EVENT	CAUSE
01165	N	N	N				03/10/2016	16	DUBARKO RD	INTER	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		00
N							6P			06	0		N	DAY	INJ	PSNGR CAR				01	DRVR	NONE	22	M	OR-Y					10
N							45 23 22.76	-122 15 48.39	017200100S00																	OR<25				
																	02	NONE 0	STOP											
																PRVTE			E -W									012		00
																PSNGR CAR				01	DRVR	INJC	26	F	OR-Y		000	000		00
																									OR<25					
00533	Y	N	N		N	N	02/07/2014	16	DUBARKO RD	INTER	CROSS	N	N	SNOW	S-1STOP	01 NONE 0			STRGHT											01
NONE							FR	0	EAGLE CRK-SANDY HY	E		STOP SIGN	N	SNO	REAR	UNKN			E -W									000		00
N							4P			06	0		N	DAY	PDO	UNKNOWN				01	DRVR	NONE	00	Unk	UNK		047,026	000		01
N							45 23 22.76124	-122 15 48.3879599																		UNK					
																	02	NONE 0	STOP											
																PRVTE			E -W									011		00
																PSNGR CAR				01	DRVR	NONE	38	F	OR-Y		000	000		00
																									OR<25					
00556	N	N	N				02/07/2014	16	DUBARKO RD	INTER	CROSS	N	N	SNOW	S-1STOP	01 NONE 0			STRGHT										124	10
NONE							FR	0	EAGLE CRK-SANDY HY	E		STOP SIGN	N	SNO	REAR	PRVTE			E -W									001	124	00
N							1P			06	0		N	DAY	PDO	PSNGR CAR				01	DRVR	NONE	21	F	OR-Y		026	000		10
N							45 23 22.76124	-122 15 48.3879599																		OR<25					
																	02	NONE 0	STOP											
																PRVTE			E -W									011		00
																PSNGR CAR				01	DRVR	NONE	19	M	OR-Y		000	000		00
																									OR<25					
																	03	NONE 0	STOP											
																UNKN			E -W									011		00
																PSNGR CAR				01	DRVR	NONE	00	Unk	UNK		000	000		00
																									UNK					
00578	N	N	N				02/07/2014	16	DUBARKO RD	INTER	CROSS	N	N	SNOW	S-1STOP	01 NONE 0			STRGHT										124	07
NONE							FR	0	EAGLE CRK-SANDY HY	E		STOP SIGN	N	ICE	REAR	PRVTE			E -W									000	124	00
N							4P			06	0		N	DAY	PDO	PSNGR CAR				01	DRVR	NONE	36	M	OR-Y		026	000		07
N							45 23 22.76124	-122 15 48.3879599																		OR<25					
																	02	NONE 0	STOP											
																PRVTE			E -W									011		00
																PSNGR CAR				01	DRVR	NONE	45	M	OR-Y		000	000		00
																									OR<25					
03026	N	N	N				07/27/2015	16	DUBARKO RD	INTER	CROSS	N	N	CLR	S-1STOP	01 NONE 0			STRGHT											07,29
CITY							MO		EAGLE CRK-SANDY HY	SW		NONE	N	DRY	REAR	PRVTE			SW-NE									000		00
N							8P			06	0		N	DUSK	INJ	PSNGR CAR				01	DRVR	INJC	19	M	OR-Y		043,026	000		07,29
N							45 23 22.76	-122 15 48.39	017200100S00																	OR<25					

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SER# / INVEST / RD DPT / UNLOC?	S P E D	A L C	D M R G S	J N V	S H L	W R K	DATE / DAY / TIME / LAT	CLASS / DIST / FROM / LONG	CITY STREET / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACT	EVENT	CAUSE
																02	NONE 0	STOP									012	00
																	PRVTE	SW-NE										
																	PSNGR CAR		01	DRVR	INJC	36	M	OR-Y OR<25		000	000		00
01095	N	N	N	N	N		03/04/2016	16	DUBARKO RD	INTER	CROSS	N	N	CLD	S-1STOP	01	NONE 0	STRGHT											27,07,32
CITY							FR		EAGLE CRK-SANDY HY	SW		STOP SIGN	N	DRY	SS-O		PRVTE	NE-SW								000		00
N							4P			06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	30	M	OR-Y OR<25		016,043,052	010		27,07,32
N							45 23 22.76	-122 15 48.39	017200100S00																			
																01	NONE 0	STRGHT									000		00
																	PRVTE	NE-SW										
																	PSNGR CAR		02	PSNG	NO<5	01	F			000	000		00
																02	NONE 0	STOP									012		00
																	PRVTE	NE-SW										
																	PSNGR CAR		01	DRVR	NONE	18	F	OR-Y OR<25		000	000		00
																03	NONE 0	STRGHT									000		00
																	PRVTE	SW-NE										
																	PSNGR CAR		01	DRVR	INJB	26	M	OR-Y OR<25		000	000		00
00763	N	N	N	N	N		02/17/2016	16	DUBARKO RD	INTER	CROSS	N	N	RAIN	S-1STOP	01	NONE 9	STRGHT											07
CITY							WE		EAGLE CRK-SANDY HY	SW		NONE	N	WET	REAR		N/A	S -N								000		00
N							5P			06	0		N	DLIT	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000		00
N							45 23 22.76	-122 15 48.39	017200100S00															UNK					
																02	NONE 9	STOP									012		00
																	N/A	S -N										
																	PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000		00
																								UNK					
00799	N	N	N	N	N		03/08/2013	16	DUBARKO RD	INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT											02
CITY							FR		EAGLE CRK-SANDY HY	CN		STOP SIGN	N	DRY	ANGL		PRVTE	N -S								000		00
N							8P			01	0		N	DUSK	PDO		PSNGR CAR		01	DRVR	NONE	25	M	OTH-Y OR<25		000	000		00
N							45 23 22.7623199	-122 15 48.387348	017200100S00																			
																02	NONE 0	STRGHT									015		00
																	PRVTE	E -W										
																	PSNGR CAR		01	DRVR	NONE	34	M	OR-Y OR<25		028	027		02
01347	N	N	N				04/21/2013	16	DUBARKO RD	INTER	CROSS	N	N	CLD	ANGL-OTH	01	NONE 0	STRGHT											02
CITY							SU		EAGLE CRK-SANDY HY	CN		STOP SIGN	N	DRY	ANGL		PRVTE	W -E								015		00
N							12P			04	0		N	DAY	INJ		PSNGR CAR		01	DRVR	INJC	25	M	OR-Y OR<25		028	000		02
N							45 23 22.7623199	-122 15 48.387348	017200100S00																			

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SER# / INVEST / RD DPT / UNLOC?	S P E D	D M R A L C	J U G S	S I N V	W C H L	O H R K	DATE / DAY / TIME / LAT	CLASS / DIST / FROM / LONG	CITY STREET / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACT EVENT	CAUSE
																01	NONE 0 PRVTE PSNGR CAR	STRGHT W -E									015 000	00 00
																02	NONE 0 PRVTE PSNGR CAR	STRGHT S -N		01 DRVR	INJC	78 M	OR-Y OR<25		000	000 000	00 00
																02	NONE 0 PRVTE PSNGR CAR	STRGHT S -N		02 PSNG	INJC	85 F			000	000 000	00 00
02342	N	N	N				07/01/2013	16	DUBARKO RD	INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT										02
CITY							MO		EAGLE CRK-SANDY HY	CN		STOP SIGN	N	DRY	ANGL		PRVTE	W -E								015	00
N N							2P 45 23 22.7623199	-122 15 48.387348	017200100S00	04	0		N	DAY	PDO		PSNGR CAR		01 DRVR	NONE	18 F	OR-Y OR<25		028	000	02
																02	NONE 0 PRVTE PSNGR CAR	STRGHT S -N		01 DRVR	NONE	30 M	OTH-Y N-RES		000	000 000	00 00
04702	N	N	N	N	N		12/06/2013	16	DUBARKO RD	INTER	CROSS	N	N	CLD	O-1 L-TURN	01	NONE 0	STRGHT										02
CITY							FR		EAGLE CRK-SANDY HY	CN		YIELD	N	DRY	TURN		PRVTE	N -S								000	00
N N							4P 45 23 22.7623199	-122 15 48.387348	017200100S00	01	0		N	DUSK	INJ		PSNGR CAR		01 DRVR	NONE	39 F	OR-Y OR<25		000	000	00
																01	NONE 0 PRVTE PSNGR CAR	STRGHT N -S		02 PSNG	INJC	12 F			000	000 000	00 00
																02	NONE 0 PRVTE PSNGR CAR	TURN-L S -W		01 DRVR	INJC	67 M	OR-Y OR<25		028,004	000 000	00 02
00437	N	N	N				01/25/2014	16	DUBARKO RD	INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT										02
NONE							SA		EAGLE CRK-SANDY HY	CN		STOP SIGN	N	DRY	ANGL		PRVTE	N -S								000	00
N N							1P 45 23 22.76124	-122 15 48.3879599	017200100S00	03	0		N	DAY	PDO		PSNGR CAR		01 DRVR	NONE	36 F	OR-Y OR<25		000	000	00
																02	NONE 0 PRVTE PSNGR CAR	STRGHT W -E		01 DRVR	NONE	17 M	OR-Y OR<25		028	000 000	00 02

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SER# / INVEST / RD DPT / UNLOC?	S P E D	A L C	M R G S	J N V	S H L	W O R K	DATE / DAY / TIME / LAT	CLASS / DIST / FROM / LONG	CITY STREET / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G	S E X	LICNS RES	PED LOC	ERROR	ACT EVENT	CAUSE
00972	N	N	N	N	Y		03/09/2014	16	DUBARKO RD	INTER	CROSS	N	N	CLD	ANGL-OTH	01	NONE 0	STRGHT									03
CITY					SU			EAGLE CRK-SANDY HY	CN		STOP SIGN	N	WET	TURN			PRVTE	W -E								000	00
N					3P				03	0		N	DAY	INJ			PSNGR CAR		01	DRVR	NONE	53	F	OR-Y		021	000	03
N					45 23 22.76124		-122 15 48.3879599	017200100S00																OR<25				
																01	NONE 0	STRGHT									000	00
																	PRVTE	W -E										
																	PSNGR CAR		02	PSNG	INJC	57	F		000	000	000	00
																02	NONE 0	STRGHT									000	00
																	PRVTE	N -S										
																	PSNGR CAR		01	DRVR	NONE	61	F	OR-Y		000	000	00
																								OR<25				
04884	N	N	N	N	N		11/18/2014	16	DUBARKO RD	INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT									02
CITY					TU			EAGLE CRK-SANDY HY	CN		STOP SIGN	N	DRY	ANGL			PRVTE	N -S								000	00
N					5P				01	0		N	DLIT	PDO			PSNGR CAR		01	DRVR	NONE	21	M	OR-Y		000	000	00
N					45 23 22.76		-122 15 48.39	017200100S00																OR<25				
																02	NONE 0	STRGHT									015	00
																	PRVTE	E -W										
																	PSNGR CAR		01	DRVR	NONE	38	M	OR-Y		028	000	02
																								OR<25				
04952	N	N	N	N	N		11/22/2015	16	DUBARKO RD	INTER	CROSS	N	N	CLD	ANGL-OTH	01	NONE 0	TURN-L									03
CITY					SU			EAGLE CRK-SANDY HY	CN		STOP SIGN	N	DRY	TURN			PRVTE	W -NE								000	00
N					4P				03	0		N	DAY	INJ			PSNGR CAR		01	DRVR	INJB	53	F	OTH-Y		021	000	03
N					45 23 22.76		-122 15 48.39	017200100S00																OR<25				
																02	NONE 0	STRGHT									000	00
																	PRVTE	NE-SW										
																	PSNGR CAR		01	DRVR	NONE	19	F	OR-Y		000	000	00
																								OR>25				
																03	NONE 0	STRGHT									000	00
																	PRVTE	SW-NE										
																	PSNGR CAR		01	DRVR	NONE	41	M	OR-Y		000	000	00
																								OR<25				
05614	N	N	N	N	N		12/25/2015	16	DUBARKO RD	INTER	CROSS	N	N	CLD	ANGL-OTH	01	NONE 0	STRGHT									02
CITY					FR			EAGLE CRK-SANDY HY	CN		STOP SIGN	N	WET	ANGL			PRVTE	N -S								000	00
N					6P				01	0		N	DLIT	INJ			PSNGR CAR		01	DRVR	NONE	58	M	OR-Y		000	000	00
N					45 23 22.76		-122 15 48.39	017200100S00																OR>25				
																02	NONE 0	STRGHT									015	00
																	PRVTE	E -W										
																	PSNGR CAR		01	DRVR	INJC	53	M	OR-Y		028	000	02
																								OR<25				

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SER# / INVEST / RD DPT / UNLOC?	S P E D	A L C	D M R G S	J N V	S H L	W O R K	DATE / DAY / TIME / LAT	CLASS / DIST / FROM / LONG	CITY STREET / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / TYPE / OWNER	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACT EVENT	CAUSE
02172	N	N	N				06/05/2015	16	DUBARKO RD	INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT									02
NONE							FR		EAGLE CRK-SANDY HY	CN		STOP SIGN	N	DRY	TURN		PRVTE	W -E								015	00
N							7A			04	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	24	M	OR-Y		028	000	02
N							45 23 22.76	-122 15 48.39	017200100S00															OR<25				
																02	NONE 0	TURN-L										
																	PRVTE	SW-W									000	00
																	PSNGR CAR		01	DRVR	NONE	29	M	OR-Y		000	000	00
																								OR<25				
03589	N	N	N	N	N		08/05/2016	16	DUBARKO RD	INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT									02
CITY							FR		EAGLE CRK-SANDY HY	CN		STOP SIGN	N	DRY	ANGL		PRVTE	E -W								015	00
N							6P			01	0		N	DAY	INJ		PSNGR CAR		01	DRVR	INJC	77	M	OTH-Y		028	000	02
N							45 23 22.76	-122 15 48.39	017200100S00															N-RES				
																02	NONE 0	STRGHT										
																	PRVTE	N -S									000	00
																	PSNGR CAR		01	DRVR	NONE	40	M	OR-Y		000	000	00
																								OR<25				
03967	N	N	N	N	N		08/30/2016	16	DUBARKO RD	INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT									02
CITY							TU		EAGLE CRK-SANDY HY	CN		STOP SIGN	N	DRY	ANGL		PRVTE	W -E								015	00
N							12P			04	0		N	DAY	INJ		PSNGR CAR		01	DRVR	INJC	61	F	OTH-Y		028	000	02
N							45 23 22.76	-122 15 48.39	017200100S00															N-RES				
																01	NONE 0	STRGHT										
																	PRVTE	W -E									015	00
																	PSNGR CAR		02	PSNG	INJC	06	F			000	000	00
																02	NONE 0	STRGHT										
																	PRVTE	S -N									000	00
																	PSNGR CAR		01	DRVR	INJB	53	F	OR-Y		000	000	00
																								OR<25				
02427	N	N	N				05/31/2016	16	DUBARKO RD	INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 9	STRGHT									03,32
CITY							TU		EAGLE CRK-SANDY HY	CN		STOP SIGN	N	UNK	ANGL		N/A	W -E								000	00
N							11A			03	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000	00
N							45 23 22.76	-122 15 48.39	017200100S00															UNK				
																02	NONE 9	STRGHT										
																	N/A	N -S									000	00
																	PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000	00
																								UNK				
02031	N	N	N	N	N		05/06/2016	16	DUBARKO RD	INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 9	STRGHT									02
CITY							FR		EAGLE CRK-SANDY HY	CN		STOP SIGN	N	DRY	ANGL		N/A	N -S								000	00
N							4P			01	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000	00
N							45 23 22.76	-122 15 48.39	017200100S00															UNK				

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SER# / INVEST / RD DPT / UNLOC?	S P E D	A L C	M R G S	J N	S H	W R K	DATE / DAY / TIME / LAT	CLASS / DIST / FROM / LONG	CITY STREET / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES / UNK	PED LOC	ERROR	ACT	EVENT	CAUSE
																02	NONE 9	STRGHT										
																	N/A	E -W									000		00
																	PSNGR CAR			01 DRVR	NONE	00	Unk	UNK		000	000		00
																								UNK					
00805	N	N	N	N	N		03/01/2017	16	DUBARKO RD	INTER	CROSS	N	N	CLD	ANGL-OTH	01	NONE 0	STRGHT										082,013	02
CITY							WE		EAGLE CRK-SANDY HY	CN		STOP SIGN	N	DRY	ANGL		PRVTE	W -E									015		00
N							3P			04	0		N	DAY	INJ		PSNGR CAR			01 DRVR	INJC	17	F	OR-Y		028	000	082	02
N							45 23 22.76	-122 15 48.39	017200100S00															OR<25					
																02	NONE 0	STRGHT										
																	PRVTE	S -N									000	013	00
																	PSNGR CAR			01 DRVR	INJC	43	M	OR-Y		000	000		00
																								OR<25					
																03	NONE 0	STOP										
																	PRVTE	E -W									022		00
																	PSNGR CAR			01 DRVR	INJB	27	F	OR-Y		000	000		00
																								OR<25					
00846	N	N	N	N	N		03/04/2017	16	DUBARKO RD	INTER	CROSS	N	N	RAIN	ANGL-OTH	01	NONE 0	STRGHT											02
CITY							SA		EAGLE CRK-SANDY HY	CN		STOP SIGN	N	WET	ANGL		PRVTE	W -E									015		00
N							6P			04	0		N	DLIT	INJ		PSNGR CAR			01 DRVR	NONE	21	M	OR-Y		028	000		02
N							45 23 22.76	-122 15 48.39	017200100S00															OR<25					
																02	NONE 0	STRGHT										
																	PRVTE	N -S									000		00
																	PSNGR CAR			01 DRVR	INJC	21	F	OR-Y		000	000		00
																								OR<25					
02225	N	N	N				06/07/2017	16	DUBARKO RD	INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT											02
CITY							WE		EAGLE CRK-SANDY HY	CN		STOP SIGN	N	DRY	ANGL		PRVTE	S -N									000		00
N							4P			04	0		N	DAY	INJ		PSNGR CAR			01 DRVR	INJB	40	M	OR-Y		000	000		00
N							45 23 22.76	-122 15 48.39	017200100S00															OR<25					
																02	NONE 0	STRGHT										
																	PRVTE	W -E									015		00
																	PSNGR CAR			01 DRVR	INJC	38	M	OR-Y		028	000		02
																								OR<25					
02958	N	N	N	N	N		07/21/2017	16	DUBARKO RD	INTER	CROSS	N	N	CLR	O-1 L-TURN	01	NONE 0	TURN-L											02
CITY							FR		EAGLE CRK-SANDY HY	CN		STOP SIGN	N	DRY	TURN		PRVTE	S -W									000		00
N							8P			01	0		N	DAY	INJ		PSNGR CAR			01 DRVR	NONE	28	M	OR-Y		028	000		02
N							45 23 22.76	-122 15 48.39	017200100S00															OR<25					
																02	NONE 0	STRGHT										
																	PRVTE	N -S									000		00
																	PSNGR CAR			01 DRVR	INJB	29	F	OR-Y		000	000		00
																								OR<25					

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00647	N	N	N	N	N	02	02/18/2017	16	DUBARKO RD	INTER	CROSS	N	N	RAIN	ANGL-OTH	01	NONE 9	STRGHT									03
CITY			SA						EAGLE CRK-SANDY HY	CN		STOP SIGN	N	WET	ANGL		N/A	W -E								000	00
N			7P							03	0		N	DLIT	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000	00
N			45 23 22.76					-122 15 48.39	017200100S00									UNK									
																02	NONE 9	STRGHT									
																	N/A	N -S								000	00
																	PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000	00
																		UNK									
03467	N	N	N	N	N	08	08/23/2017	16	DUBARKO RD	INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 9	STRGHT									02
CITY			WE						EAGLE CRK-SANDY HY	CN		STOP SIGN	N	DRY	ANGL		N/A	NE-SW								000	00
N			8A							01	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000	00
N			45 23 22.76					-122 15 48.39	017200100S00									UNK									
																02	NONE 9	STRGHT									
																	N/A	E -W								015	00
																	PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000	00
																		UNK									

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CITY OF SANDY, CLACKAMAS COUNTY **DUBARKO RD at LANGENSAND RD, City of Sandy, Clackamas County, 01/01/2013 to 12/31/2017**

1 - 1 of 1 Crash records shown.

SER# / INVEST / RD DPT / UNLOC?	S P E D C	A L S	R U G N	J I N V	S C H L	W O R K	DATE / DAY / TIME / LAT	CLASS / DIST / FROM / LONG	CITY STREET / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACT	EVENT	CAUSE
03066	N	N	N				06/09/2015	16	DUBARKO RD	INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT										083	02
NONE							TU	0	LANGENSAND RD	CN		STOP SIGN	N	DRY	ANGL		PRVTE	N -S									000	00
N							12P			03	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	23	M	OR-Y		000	000		00
N							45 23 23.89	-122 14 59.94																OR<25					
																02	NONE 0	STRGHT											
																	PRVTE	W -E									015		00
																	PSNGR CAR		01	DRVR	NONE	16	F	OR-Y		028	000	083	02
																								OR<25					

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Preliminary Traffic Signal Warrant Analysis

Project Name: Dubarko Road Development
Intersection: Highway 26 at Langensand Road
Scenario: 2022 Background Plus Site Trips
Number of Major Street Lanes: 2 PM Peak Hour Volume 2243 (sum of both approaches)
Number of Minor Street Lanes 1 PM Peak Hour Volume 49 (highest-volume approach)[a]
Posted or 85th percentile speed > 40 mph: Yes
Isolated Population Less than 10,000: No

Warrant 1, Eight-Hour Vehicular Volume

Condition A - Minimum Vehicular Volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on minor street (total of both approaches)			
Major Street	Minor Street	100%	80%	70%	56%	100%	80%	70%	56%
1	1	500	400	350	280	150	120	105	84
2 or more	1	600	480	420	336	150	120	105	84
2 or more	2 or more	600	480	420	336	200	160	140	112
1	2 or more	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on minor street (total of both approaches)			
Major Street	Minor Street	100%	80%	70%	56%	100%	80%	70%	56%
1	1	750	600	525	420	75	60	53	42
2 or more	1	900	720	630	504	75	60	53	42
2 or more	2 or more	900	720	630	504	100	80	70	56
1	2 or more	750	600	525	420	100	80	70	56

Warrant Anaylsis Calculations	8th Highest Hour[b]	Minimum Volume	Warrant Satisfied?
Condition A - Minimum Vehicular Volume			
Major Street Volume	1267	420	
Minor Street Volume	28	105	**No**
Condition B - Interruption of Continuous Traffic			
Major Street Volume	1267	630	
Minor Street Volume	28	53	**No**
Combination Warrant[c]			
Major Street Volume	1267	504	
Minor Street Volume	28	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: 2022 Background Plus Site Trips
Number of Major Street Lanes: 2 PM Peak Hour Volume 2243 (sum of both approaches)
Number of Minor Street Lanes 1 PM Peak Hour Volume 13 (highest-volume approach)[a]
Posted or 85th percentile speed > 40 mph: Yes
Isolated Population Less than 10,000: No

Warrant 1, Eight-Hour Vehicular Volume

Condition A - Minimum Vehicular Volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on minor street (total of both approaches)			
Major Street	Minor Street	100%	80%	70%	56%	100%	80%	70%	56%
1	1	500	400	350	280	150	120	105	84
2 or more	1	600	480	420	336	150	120	105	84
2 or more	2 or more	600	480	420	336	200	160	140	112
1	2 or more	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on minor street (total of both approaches)			
Major Street	Minor Street	100%	80%	70%	56%	100%	80%	70%	56%
1	1	750	600	525	420	75	60	53	42
2 or more	1	900	720	630	504	75	60	53	42
2 or more	2 or more	900	720	630	504	100	80	70	56
1	2 or more	750	600	525	420	100	80	70	56

Warrant Anaylsis Calculations	8th Highest Hour[b]	Minimum Volume	Warrant Satisfied?
Condition A - Minimum Vehicular Volume			
Major Street Volume	1267	420	
Minor Street Volume	7	105	**No**
Condition B - Interruption of Continuous Traffic			
Major Street Volume	1267	630	
Minor Street Volume	7	53	**No**
Combination Warrant[c]			
Major Street Volume	1267	504	
Minor Street Volume	7	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: 2022 Background Plus Site Trips (30th-Highest Hour)
Number of Major Street Lanes: 1 PM Peak Hour Volume 644 (sum of both approaches)
Number of Minor Street Lanes 1 PM Peak Hour Volume 199 (highest-volume approach)[a]
Posted or 85th percentile speed > 40 mph: Yes
Isolated Population Less than 10,000: No

Warrant 1, Eight-Hour Vehicular Volume

Condition A - Minimum Vehicular Volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on minor street (total of both approaches)			
Major Street	Minor Street	100%	80%	70%	56%	100%	80%	70%	56%
1	1	500	400	350	280	150	120	105	84
2 or more	1	600	480	420	336	150	120	105	84
2 or more	2 or more	600	480	420	336	200	160	140	112
1	2 or more	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on minor street (total of both approaches)			
Major Street	Minor Street	100%	80%	70%	56%	100%	80%	70%	56%
1	1	750	600	525	420	75	60	53	42
2 or more	1	900	720	630	504	75	60	53	42
2 or more	2 or more	900	720	630	504	100	80	70	56
1	2 or more	750	600	525	420	100	80	70	56

Warrant Anaylsis Calculations	8th Highest Hour[b]	Minimum Volume	Warrant Satisfied?
Condition A - Minimum Vehicular Volume			
Major Street Volume	364	350	
Minor Street Volume	112	105	**Yes**
Condition B - Interruption of Continuous Traffic			
Major Street Volume	364	525	
Minor Street Volume	112	53	**No**
Combination Warrant[c]			
Major Street Volume	364	420	
Minor Street Volume	112	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: 2022 Background Plus Site Trips (30th-Highest Hour, with RIRO at Hwy 26)
Number of Major Street Lanes: 1 PM Peak Hour Volume 771 (sum of both approaches)
Number of Minor Street Lanes 1 PM Peak Hour Volume 83 (highest-volume approach)[a]
Posted or 85th percentile speed > 40 mph: Yes
Isolated Population Less than 10,000: No

Warrant 1, Eight-Hour Vehicular Volume

Condition A - Minimum Vehicular Volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on minor street (total of both approaches)			
Major Street	Minor Street	100%	80%	70%	56%	100%	80%	70%	56%
1	1	500	400	350	280	150	120	105	84
2 or more	1	600	480	420	336	150	120	105	84
2 or more	2 or more	600	480	420	336	200	160	140	112
1	2 or more	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on minor street (total of both approaches)			
Major Street	Minor Street	100%	80%	70%	56%	100%	80%	70%	56%
1	1	750	600	525	420	75	60	53	42
2 or more	1	900	720	630	504	75	60	53	42
2 or more	2 or more	900	720	630	504	100	80	70	56
1	2 or more	750	600	525	420	100	80	70	56

Warrant Anaylsis Calculations	8th Highest Hour[b]	Minimum Volume	Warrant Satisfied?
Condition A - Minimum Vehicular Volume			
Major Street Volume	436	350	
Minor Street Volume	47	105	**No**
Condition B - Interruption of Continuous Traffic			
Major Street Volume	436	525	
Minor Street Volume	47	53	**No**
Combination Warrant[c]			
Major Street Volume	436	420	
Minor Street Volume	47	84	**No**

[a] Minor-Street right turn volumes are reduced to account for the impact of right-turns on red.
[b] Eighth-highest hour volumes are calculated as 5.65 percent of the expected daily traffic volume.
[c] This warrant should be used only after adequate trial of other alternatives has failed to solve traffic problems.

Preliminary Traffic Signal Warrant Analysis

Project Name: Dubarko Road Development
Intersection: Dubarko Road at Langensand Road
Scenario: 2021 Background Plus Site Trips
Number of Major Street Lanes: 1 PM Peak Hour Volume 306 (sum of both approaches)
Number of Minor Street Lanes 1 PM Peak Hour Volume 74 (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 Anaylsis Calculations	8th Highest Hour[b]	Minimum Volume	Warrant Satisfied?
Condition A - Minimum Vehicular Volume			
Major Street Volume	173	500	
Minor Street Volume	42	150	**No**
Condition B - Interruption of Continuous Traffic			
Major Street Volume	173	750	
Minor Street Volume	42	75	**No**
Combination Warrant[c]			
Major Street Volume	173	600	
Minor Street Volume	42	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.

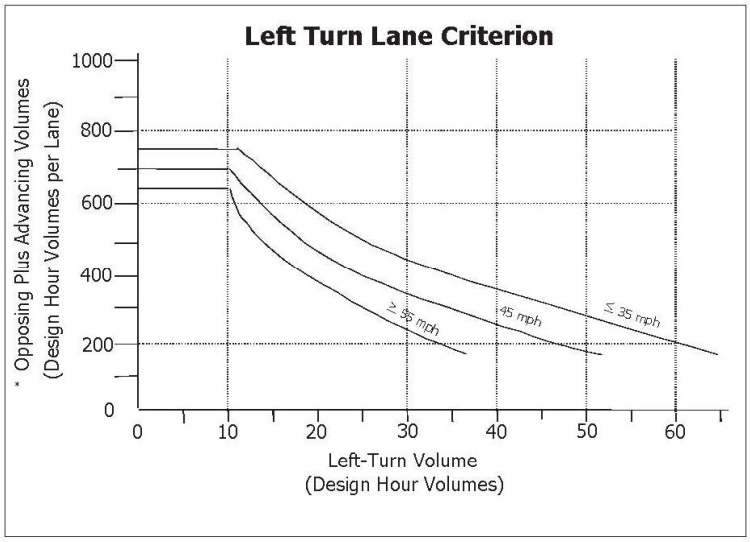
Left-Turn Lane Warrant Analysis (ODOT Methodology)

Project Name: Bull Run Terrace Subdivision
Approach: Highway 26 WB at Dubarko Road
Scenario: 2022 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:	1000	1100
Opposing Volume for Design Hour:	723	1146
Design Hour Volume Per Lane:	861.5	1123
Number of Left Turns per Hour:	57	118
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: 2022 Background Plus Site Trips

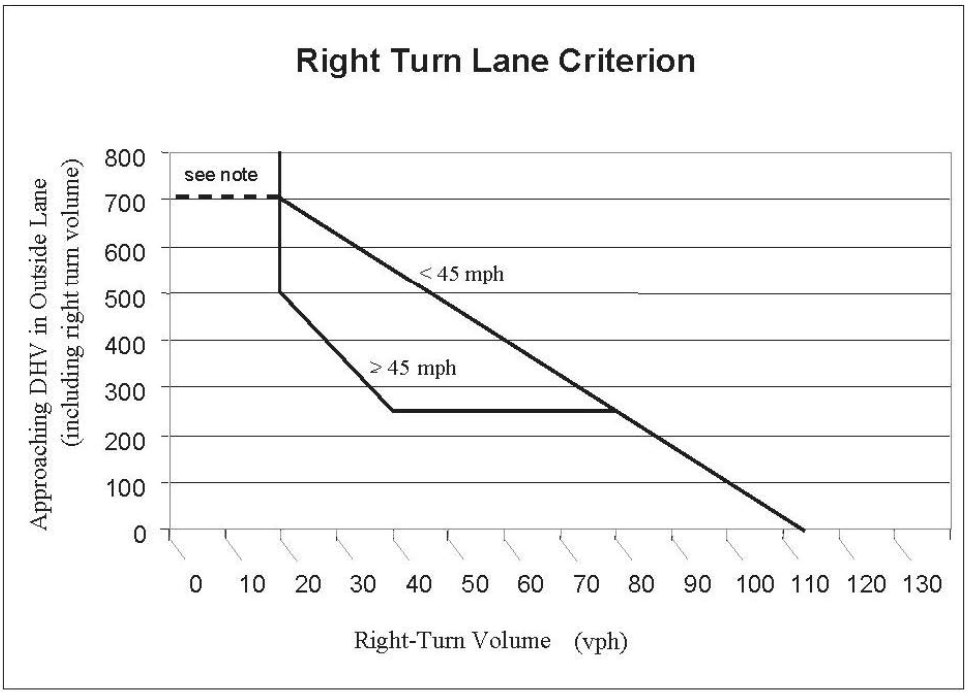
Major-Street Design Speed: 55 mph

	AM Volume	PM Volume
Number of Right Turns per Hour:	12	38
Approaching DVH in Outside Lane:	351	542
Calculated Turn Volume Threshold:	32	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.

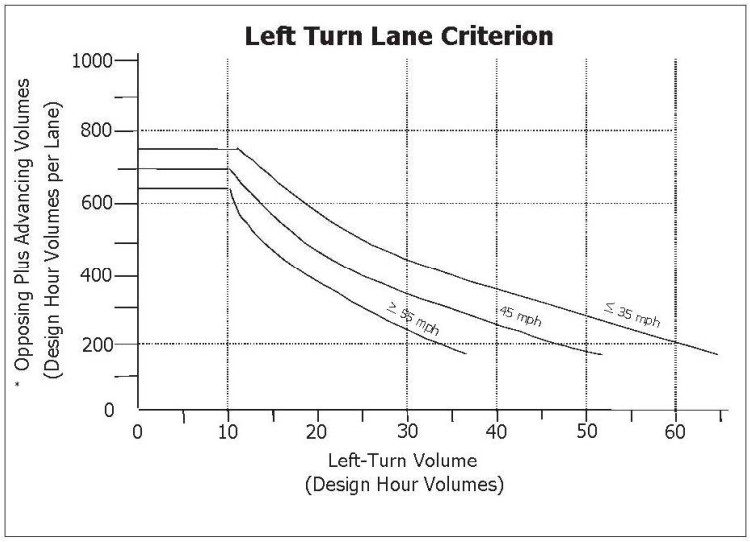
Left-Turn Lane Warrant Analysis (ODOT Methodology)

Project Name: Bull Run Terrace Subdivision
Approach: Highway 211 NB at Dubarko Road
Scenario: 2022 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:	354	408
Opposing Volume for Design Hour:	111	236
Design Hour Volume Per Lane:	465	644
Number of Left Turns per Hour:	45	61
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: 2019 Existing Conditions

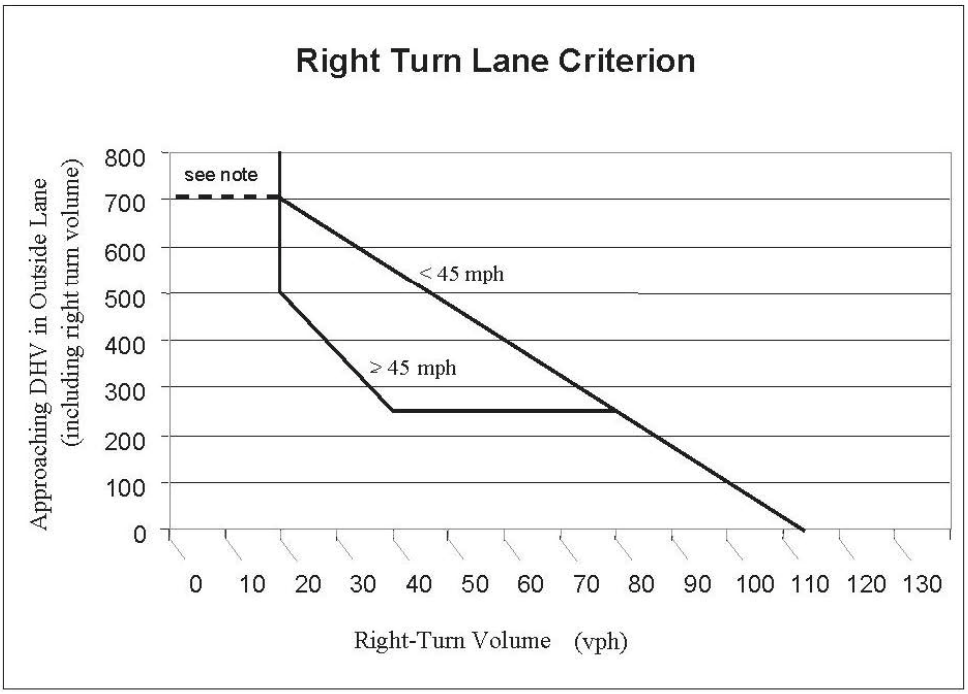
Major-Street Design Speed: 45 mph

	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.

Right-Turn Lane Warrant Analysis (ODOT Methodology)

Project Name: Bull Run Terrace Subdivision
Approach: Dubarko Road Westbound and Langensand Road
Scenario: 2022 Background Plus Site Trips (RIRO)

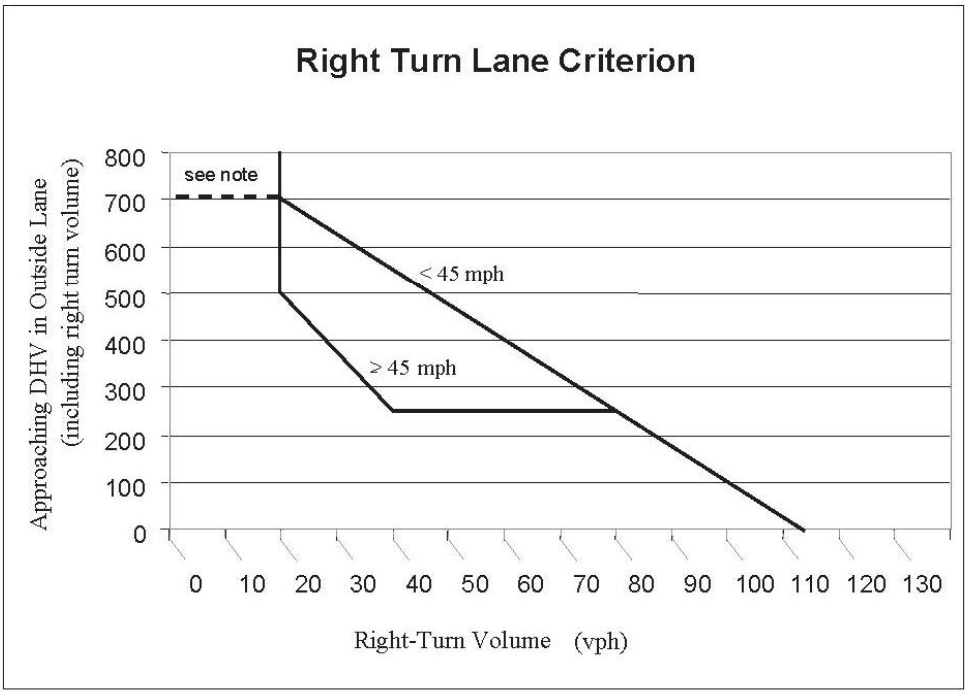
Major-Street Design Speed: 25 mph

	AM Volume	PM Volume
Number of Right Turns per Hour:	61	29
Approaching DVH in Outside Lane:	102	42
Calculated Turn Volume Threshold:	99	107
Right Turn Volume Exceeds Threshold?	**NO**	**NO**

Criterion 1: Vehicular Volume

The vehicular volume criterion is intended for application where the volume of intersecting traffic is the principal reason for considering installation of a right turn lane. The vehicular volume criteria are determined using the curve in Exhibit 7-2.

Exhibit 7-2 Right Turn Lane Criterion



Note: If there is no right turn lane, a shoulder needs to be provided. If this intersection is in a rural area and is a connection to a public street, a right turn lane is needed.

Intersection	
Intersection Delay, s/veh	13.7
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	9	34	132	43	34	45	191	118	4	107	2
Future Vol, veh/h	8	9	34	132	43	34	45	191	118	4	107	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	9	10	38	147	48	38	50	212	131	4	119	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	9.1	12.1	16.4	10.3
HCM LOS	A	B	C	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	13%	47%	0%	75%	0%	4%	0%
Vol Thru, %	54%	53%	0%	25%	0%	96%	0%
Vol Right, %	33%	0%	100%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	354	17	34	175	34	111	2
LT Vol	45	8	0	132	0	4	0
Through Vol	191	9	0	43	0	107	0
RT Vol	118	0	34	0	34	0	2
Lane Flow Rate	393	19	38	194	38	123	2
Geometry Grp	6	7	7	7	7	7	7
Degree of Util (X)	0.6	0.035	0.06	0.353	0.057	0.207	0.003
Departure Headway (Hd)	5.494	6.677	5.724	6.543	5.45	6.031	5.303
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	661	536	624	550	657	596	674
Service Time	3.494	4.423	3.469	4.279	3.186	3.766	3.038
HCM Lane V/C Ratio	0.595	0.035	0.061	0.353	0.058	0.206	0.003
HCM Control Delay	16.4	9.7	8.8	12.8	8.5	10.3	8.1
HCM Lane LOS	C	A	A	B	A	B	A
HCM 95th-tile Q	4	0.1	0.2	1.6	0.2	0.8	0

Intersection	
Intersection Delay, s/veh	18.2
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	11	51	55	149	53	27	61	171	176	10	223	11
Future Vol, veh/h	11	51	55	149	53	27	61	171	176	10	223	11
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	12	54	59	159	56	29	65	182	187	11	237	12
Number of Lanes	0	1	1	0	1	1	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	2
HCM Control Delay	10.7	15.1	24.1	14.7
HCM LOS	B	C	C	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	15%	18%	0%	74%	0%	4%	0%
Vol Thru, %	42%	82%	0%	26%	0%	96%	0%
Vol Right, %	43%	0%	100%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	408	62	55	202	27	233	11
LT Vol	61	11	0	149	0	10	0
Through Vol	171	51	0	53	0	223	0
RT Vol	176	0	55	0	27	0	11
Lane Flow Rate	434	66	59	215	29	248	12
Geometry Grp	6	7	7	7	7	7	7
Degree of Util (X)	0.731	0.136	0.108	0.443	0.051	0.46	0.019
Departure Headway (Hd)	6.176	7.426	6.615	7.428	6.333	6.681	5.945
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	590	484	544	488	568	540	604
Service Time	4.176	5.148	4.337	5.139	4.044	4.396	3.66
HCM Lane V/C Ratio	0.736	0.136	0.108	0.441	0.051	0.459	0.02
HCM Control Delay	24.1	11.3	10.1	15.9	9.4	15	8.8
HCM Lane LOS	C	B	B	C	A	B	A
HCM 95th-tile Q	6.2	0.5	0.4	2.2	0.2	2.4	0.1

TERAGAN & ASSOCIATES, INC.
ARBORICULTURAL CONSULTANTS

MEMORANDUM

EXHIBIT G

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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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.

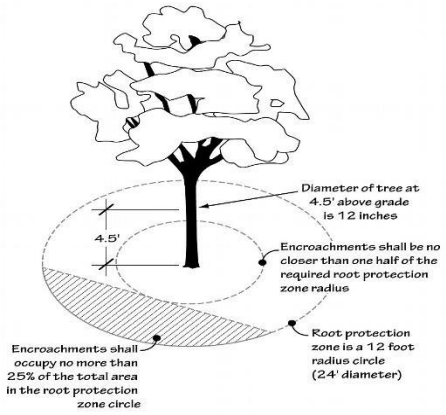

Figure 1: Alterative minimum protection zone

Using the criteria described above, while considering the tree conditions and their locations relative to grading, paving, construction, and other site improvements, 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.

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

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

Teragan & Associates, Inc.
3145 Westview Circle • Lake Oswego, OR 97034
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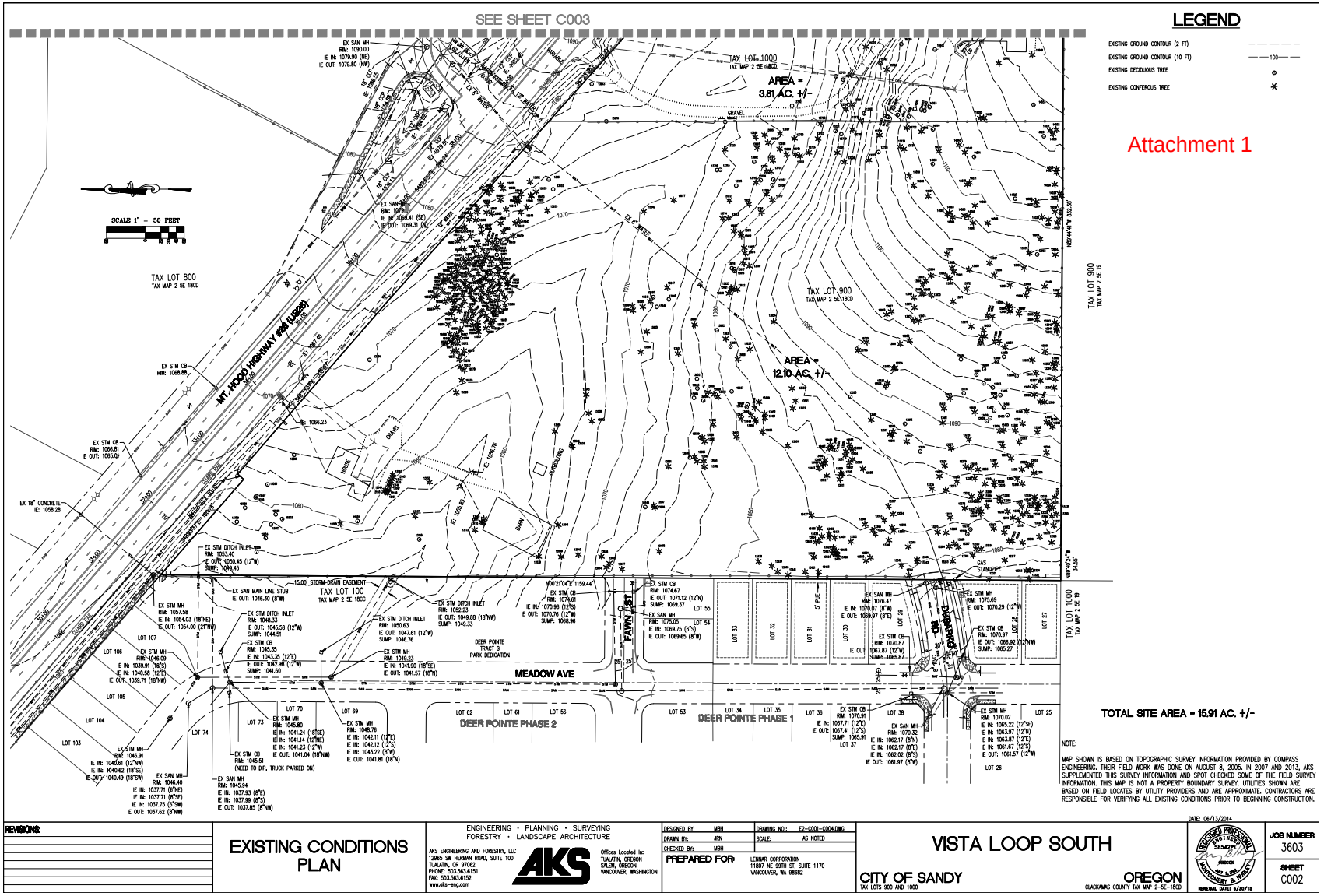
Email: todd@teragan.com • Website: teragan.com


SEE SHEET C003
LEGEND
EXISTING GROUND CONTOUR (2 FT)
EXISTING GROUND CONTOUR (10 FT)
EXISTING DECIDUOUS TREE
EXISTING CONFEROUS TREE
Attachment 1
SCALE 1" = 50 FEET
TAX LOT 800
TAX MAP 2 5E 18CD
TAX LOT 1000
TAX MAP 2 5E 18CD
AREA =
3.81 AC. +/-
TAX LOT 900
TAX MAP 2 5E 18CD
AREA =
12.10 AC. +/-
TAX LOT 900
TAX MAP 2 5E 19
MT. HOOD HIGHWAY #26 (US26)
TAX LOT 100
TAX MAP 2 5E 18CC
15.00' STORM DRAIN EASEMENT
MEADOW AVE
FAWN ST
DEER POINTE PHASE 2
DEER POINTE PHASE 1
DEER POINTE TRACT G PARK DEDICATION
TOTAL SITE AREA = 15.91 AC. +/-
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, AKS 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.
DATE: 06/13/2014
REVISIONS:
EXISTING CONDITIONS PLAN
ENGINEERING • PLANNING • SURVEYING
FORESTRY • LANDSCAPE ARCHITECTURE
AKS ENGINEERING AND FORESTRY, LLC
12965 SW HERMAN ROAD, SUITE 100
TUALATIN, OR 97062
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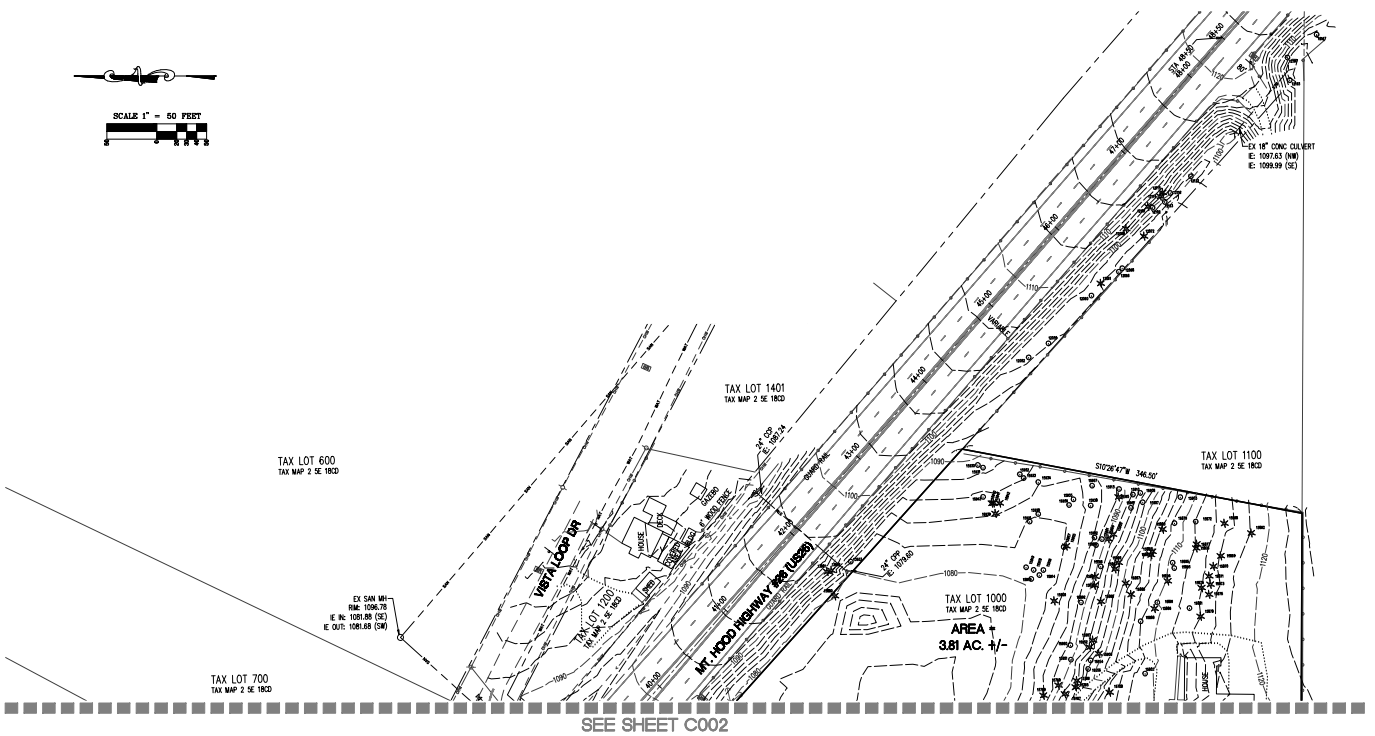
Offices Located In:
TUALATIN, OREGON
SALEM, OREGON
VANCOUVER, WASHINGTON
DESIGNED BY: MBH
DRAWN BY: JRN
CHECKED BY: MBH
DRAWING NO.: E2-C001-C004.DWG
SCALE: AS NOTED
PREPARED FOR:
LENNAR CORPORATION
11807 NE 99TH ST, SUITE 1170
VANCOUVER, WA 98682
VISTA LOOP SOUTH
CITY OF SANDY
TAX LOTS 900 AND 1000
OREGON
CLACKAMAS COUNTY TAX MAP 2-5E-18CD
JOB NUMBER
3603
SHEET
C002

Attachment 1



TOTAL SITE AREA = 15.91 AC. +/-

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, AKS 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.

DATE: 06/13/2014

REVISIONS:

EXISTING CONDITIONS PLAN

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DESIGNED BY:	MBH	DRAWING NO.:	E2-C001-C004.DWG
DRAWN BY:	JRN	SCALE:	AS NOTED
CHECKED BY:	MBH		

PREPARED FOR: LENNAR CORPORATION
11807 NE 99TH ST, SUITE 1170
VANCOUVER, WA 98682

VISTA LOOP SOUTH

CITY OF SANDY
TAX LOTS 900 AND 1000

OREGON
CLACKAMAS COUNTY TAX MAP 2-5E-18CD

REGISTERED PROFESSIONAL ENGINEER
58542PE
OREGON
JULY 9, 2015
MONTGOMERY B. HURLEY
RENEWAL DATE: 6/30/15

JOB NUMBER
3603

SHEET
C003

Attachment 1

TREE NUMBER	SPECIES	DBH (IN
12052	MAPLE	17,19
12055	MAPLE	38
12060	MAPLE	29
12061	CEDAR	26
12066	UNKNOWN DECID.	5
12068	UNKNOWN DECID.	13
12069	DOUGLAS FIR	27
12072	CEDAR	17
12101	DOUGLAS FIR	19
12102	MAPLE	7
12113	MAPLE	14,28
12114	DOUGLAS FIR	22
12115	DOUGLAS FIR	25
12116	MAPLE	12
12122	MAPLE	7,8,15
12167	MAPLE	5,6
12193	UNKNOWN DECID.	12
12197	MAPLE	9
13095	BIG LEAF MAPLE	20
13096	PEAR	12
13097	PEAR	10
13098	FILBERT	8
13134	BIG LEAF MAPLE	32
13142	DOUGLAS FIR	19
13143	DOUGLAS FIR	10
13144	DOUGLAS FIR	36
13145	DOUGLAS FIR	12
13146	DOUGLAS FIR	21
13147	DOUGLAS FIR	13
13148	DOUGLAS FIR	21
13149	DOUGLAS FIR	15
13150	DOUGLAS FIR	19
13151	DOUGLAS FIR	23
13152	DOUGLAS FIR	35
13157	PINE	18
13158	APPLE	22
13169	DOUGLAS FIR	20
13170	DOUGLAS FIR	15
13171	CEDAR	20
13172	CEDAR	29,28
13208	DOUGLAS FIR	22
13209	DOUGLAS FIR	17
13210	DOUGLAS FIR	44
13263	CEDAR	24
13264	CEDAR	10
13265	CEDAR	15
13266	CEDAR	24
13267	DOUGLAS FIR	21
13268	DOUGLAS FIR	17
13269	ALDER	8
13270	ALDER	10
13271	CEDAR	12
13272	CEDAR	12
13273	CEDAR	19
13274	CEDAR	19
13275	DOUGLAS FIR	24
13276	CEDAR	11
13277	CEDAR	36
13278	CEDAR	48
13279	CEDAR	18
13280	DOUGLAS FIR	22
13281	DOUGLAS FIR	16
13282	DOUGLAS FIR	17
13283	CEDAR	32
13284	DOUGLAS FIR	15
13285	DOUGLAS FIR	20
13286	DOUGLAS FIR	20
13287	DOUGLAS FIR	17
13288	CEDAR	12
13289	CEDAR	12
13290	CEDAR	13
13291	CEDAR	40
13292	CEDAR	37
13293	CEDAR	9
13294	CEDAR	6
13295	CEDAR	13
13296	CEDAR	13
13297	CEDAR	13
13298	CEDAR	16
13299	CEDAR	37
13300	SPRUCE	12
13301	CEDAR	8
13302	CEDAR	8
13303	CEDAR	13
13304	DOUGLAS FIR	18
13305	DOUGLAS FIR	12
13306	CEDAR	17
13307	DOUGLAS FIR	27
13308	CEDAR	12
13309	CEDAR	8
13310	CEDAR	8
13311	CEDAR	31
13312	CEDAR	32
13313	CEDAR	13
13314	CEDAR	37
13315	DOUGLAS FIR	13
13316	DOUGLAS FIR	26
13317	DOUGLAS FIR	14
13318	DOUGLAS FIR	28
13319	DOUGLAS FIR	16
13320	CEDAR	13
13321	DOUGLAS FIR	15
13322	CEDAR	40
13323	CEDAR	30
13324	DOUGLAS FIR	16
13325	CEDAR	46
13326	DOUGLAS FIR	26
13327	DOUGLAS FIR	25
13328	CEDAR	11
13329	CEDAR	16
13330	CEDAR	19
13331	CEDAR	12
13332	CEDAR	8
13333	DOUGLAS FIR	13
13334	CEDAR	10
13335	CEDAR	11
13336	CEDAR	10
13337	CEDAR	13
13338	CEDAR	11
13339	CEDAR	14
13340	DOUGLAS FIR	15
13341	DOUGLAS FIR	26
13342	DOUGLAS FIR	13
13343	DOUGLAS FIR	12
13344	DOUGLAS FIR	17
13345	DOUGLAS FIR	27
13346	DOUGLAS FIR	32
13347	DOUGLAS FIR	21
13348	DOUGLAS FIR	12
13349	DOUGLAS FIR	16
13350	DOUGLAS FIR	31
13351	DOUGLAS FIR	11
13352	DOUGLAS FIR	26
13353	DOUGLAS FIR	19
13354	DOUGLAS FIR	24
13355	DOUGLAS FIR	18
13356	DOUGLAS FIR	12
13357	DOUGLAS FIR	13
13382	DOUGLAS FIR	12
13383	DOUGLAS FIR	14
13384	DOUGLAS FIR	14
13385	DOUGLAS FIR	8
13386	DOUGLAS FIR	18
13387	DOUGLAS FIR	18
13388	DOUGLAS FIR	16
13390	DOUGLAS FIR	26
13391	DOUGLAS FIR	24
13392	DOUGLAS FIR	28
13393	DOUGLAS FIR	28
13394	DOUGLAS FIR	12
13395	DOUGLAS FIR	8
13396	DOUGLAS FIR	16
13397	DOUGLAS FIR	14
13398	DOUGLAS FIR	14
13399	DOUGLAS FIR	8
13430	DOUGLAS FIR	9
13431	CEDAR	19
13432	CEDAR	38
13433	CEDAR	12
13434	CEDAR	26
13435	CEDAR	29
13436	ALDER	6
13437	ALDER	6
13438	ALDER	6
13439	ALDER	6
13410	DOUGLAS FIR	39
13411	CEDAR	26
13412	CEDAR	26
13413	DOUGLAS FIR	29
13414	ALDER	10
13415	ALDER	10
13416	ALDER	6
13421	DOUGLAS FIR	29
13422	DOUGLAS FIR	13
13423	DOUGLAS FIR	36
13424	DOUGLAS FIR	24
13425	DOUGLAS FIR	22
13426	DOUGLAS FIR	17
13427	DOUGLAS FIR	8
13428	DOUGLAS FIR	8
13429	DOUGLAS FIR	8
13431	DOUGLAS FIR	11
13431	DOUGLAS FIR	22
13432	DOUGLAS FIR	22
13433	DOUGLAS FIR	22
13434	CEDAR	14
13435	CEDAR	22
13436	DOUGLAS FIR	24
13437	DOUGLAS FIR	14
13438	DOUGLAS FIR	40
13439	DOUGLAS FIR	8
13440	DOUGLAS FIR	32
13441	DOUGLAS FIR	12
13442	CEDAR	32
13443	DOUGLAS FIR	29
13444	DOUGLAS FIR	17
13445	DOUGLAS FIR	8
13446	ALDER	6
13447	ALDER	8
13448	CEDAR	12
13449	DOUGLAS FIR	17
13450	CEDAR	9
13451	DOUGLAS FIR	29
13452	CEDAR	8
13453	DOUGLAS FIR	27
13454	DOUGLAS FIR	19
13455	DOUGLAS FIR	30
13474	DOUGLAS FIR	13
13475	DOUGLAS FIR	16
13476	DOUGLAS FIR	26
13477	DOUGLAS FIR	48
13478	DOUGLAS FIR	48
13493	DOUGLAS FIR	16
13494	DOUGLAS FIR	19
13495	BIG LEAF MAPLE	12
13496	DOUGLAS FIR	12
13497	DOUGLAS FIR	19
13498	DOUGLAS FIR	24
13499	DOUGLAS FIR	15
13500	ALDER	9
13501	CEDAR	13
13502	DOUGLAS FIR	22
13503	CEDAR	9
13504	DOUGLAS FIR	13
13505	DOUGLAS FIR	10
13506	CEDAR	8
13507	CEDAR	16
13508	CEDAR	18
13509	CEDAR	17
13510	DOUGLAS FIR	10
13511	DOUGLAS FIR	30
13512	CEDAR	16
13513	CEDAR	17
13514	ALDER	14
13515	ALDER	8
13516	DOUGLAS FIR	22
13517	CEDAR	13
13518	CEDAR	25
13519	CEDAR	35
13520	ALDER	34
13521	DOUGLAS FIR	35
13522	DOUGLAS FIR	8
13523	DOUGLAS FIR	18
13524	DOUGLAS FIR	17
13525	CEDAR	9
13526	CEDAR	16
13538	CEDAR	17
13539	DOUGLAS FIR	11
13540	CEDAR	26,32
13541	CEDAR	17
13542	DOUGLAS FIR	15
13543	DOUGLAS FIR	35
13544	DOUGLAS FIR	18
13545	FRUIT	36
13546	DOUGLAS FIR	11
13547	DOUGLAS FIR	11
13581	DOUGLAS FIR	30
13582	DOUGLAS FIR	39
13583	DOUGLAS FIR	14
13584	DOUGLAS FIR	17
13585	DOUGLAS FIR	17
13586	HOLLY	10
13587	CEDAR	12
13588	CEDAR	12
13589	ALDER	12
13599	DOUGLAS FIR	14
13600	DOUGLAS FIR	25
13601	DOUGLAS FIR	35
13602	ALDER	15
13603	ALDER	13
13634	ALDER	12
13605	ALDER	12
13606	DOUGLAS FIR	23
13610	DOUGLAS FIR	17
13611	CEDAR	10
13612	CEDAR	10
13613	CEDAR	35
13614	CEDAR	35
13615	DOUGLAS FIR	39
13616	DOUGLAS FIR	19
13617	ALDER	8
13618	ALDER	6
13619	DOUGLAS FIR	14
13620	CEDAR	39
13621	DOUGLAS FIR	10
13622	DOUGLAS FIR	34
13623	DOUGLAS FIR	5
13624	DOUGLAS FIR	34
13625	DOUGLAS FIR	34
13626	DOUGLAS FIR	35
13627	ALDER	13
13628	DOUGLAS FIR	34
13629	DOUGLAS FIR	19
13630	HOLLY	8
13631	DOUGLAS FIR	30
13632	ALDER	11
13646	DOUGLAS FIR	12
13647	DOUGLAS FIR	12
13648	HOLLY	8
13649	HOLLY	9
13650	HOLLY	7
13651	ALDER	9
13652	HOLLY	10
13653	DOUGLAS FIR	6
13676	APPLE	17
13677	DOUGLAS FIR	30
13684	BIG LEAF MAPLE	12
13692	CHERRY	8
13693	CEDAR	40
13694	CEDAR	30
13695	DOUGLAS FIR	15
13696	DOUGLAS FIR	12
13697	CEDAR	16
13698	CEDAR	14
13699	CEDAR	16
13730	CEDAR	30
13731	CEDAR	14
13732	CEDAR	15
13733	CEDAR	17
13734	CEDAR	12
13735	CEDAR	15
13736	ALDER	14
13737	ALDER	6
13738	ALDER	6
13739	CEDAR	15
13710	CEDAR	34
13711	CEDAR	30
11712	CEDAR	46
11713	CEDAR	25
11714	DOUGLAS FIR	17
11715	ALDER	24
11716	DOUGLAS FIR	36
11717	DOUGLAS FIR	12
11718	BIG LEAF MAPLE	42
11719	BIG LEAF MAPLE	6
11720	CEDAR	12
11721	BIG LEAF MAPLE	18
11722	DOUGLAS FIR	17
11723	CEDAR	15
11724	CEDAR	17
11725	DOUGLAS FIR	18
11726	DOUGLAS FIR	34
11727	DOUGLAS FIR	19
11728	FRUIT	36
11729	DOUGLAS FIR	36
11730	DOUGLAS FIR	22
11731	DOUGLAS FIR	34
11732	DOUGLAS FIR	22
11733	ALDER	13
11734	ALDER	14
11735	ALDER	10
11736	DOUGLAS FIR	15
11737	ALDER	12
11738	DOUGLAS FIR	12
11739	BIG LEAF MAPLE	20
11740	CEDAR	18
11741	DOUGLAS FIR	33
11742	BIG LEAF MAPLE	16
11743	ALDER	9
11744	ALDER	8
11796	PEAR	8
11738	PEAR	9
11739	PEAR	8
11843	BIG LEAF MAPLE	12
11880	DOUGLAS FIR	24,24
11881	DOUGLAS FIR	18
11882	DOUGLAS FIR	18,16
11933	BIG LEAF MAPLE	12,16
11940	DOUGLAS FIR	17
11941	DOUGLAS FIR	23
11942	DOUGLAS FIR	14
11943	DOUGLAS FIR	31
11944	DOUGLAS FIR	17
11945	DOUGLAS FIR	6
11946	DOUGLAS FIR	12
11947	DOUGLAS FIR	35
11948	DOUGLAS FIR	9
11949	DOUGLAS FIR	18
11950	DOUGLAS FIR	16
11951	DOUGLAS FIR	20
11952	BIG LEAF MAPLE	24
11953	DOUGLAS FIR	21
11954	DOUGLAS FIR	20
11955	DOUGLAS FIR	40
11956	DOUGLAS FIR	28
11957	DOUGLAS FIR	28
11958	DOUGLAS FIR	20
11959	DOUGLAS FIR	36
11960	CEDAR	6
11961	CEDAR	6
11962	DOUGLAS FIR	24
11963	DOUGLAS FIR	22
11964	DOUGLAS FIR	28
11965	DOUGLAS FIR	28
11966	DOUGLAS FIR	14
11967	DOUGLAS FIR	30
11968	DOUGLAS FIR	8
11969	DOUGLAS FIR	8
11970	DOUGLAS FIR	26
11971	DOUGLAS FIR	16
11972	DOUGLAS FIR	30
11973	DOUGLAS FIR	22
11974	DOUGLAS FIR	18
11975	DOUGLAS FIR	24
11976	CEDAR	10
11977	DOUGLAS FIR	30
11978	DOUGLAS FIR	24
11979	ALDER	12
11990	DOUGLAS FIR	24
11991	DOUGLAS FIR	18
11992	DOUGLAS FIR	18
11993	DOUGLAS FIR	24
11994	DOUGLAS FIR	32
11995	ALDER	16
11996	DOUGLAS FIR	28
11997	DOUGLAS FIR	20
11998	ALDER	8
11999	ALDER	6
11990	ALDER	8
11991	ALDER	8
11992	ALDER	8
11993	ALDER	8
11994	ALDER	8
11995	DOUGLAS FIR	30
11996	DOUGLAS FIR	6
11997	DOUGLAS FIR	28
11998	DOUGLAS FIR	18
11999	DOUGLAS FIR	18
11000	DOUGLAS FIR	16
11001	DOUGLAS FIR	28
11002	DOUGLAS FIR	28
11003	DOUGLAS FIR	6
11016	DOUGLAS FIR	6
11017	DOUGLAS FIR	24
11018	DOUGLAS FIR	26
11019	DOUGLAS FIR	28
14020	CEDAR	8
14021	BIG LEAF MAPLE	25
14022	DOUGLAS FIR	6
14023	BIG LEAF MAPLE	8
14024	DOUGLAS FIR	14
14025	DOUGLAS FIR	32
14026	DOUGLAS FIR	42
14027	DOUGLAS FIR	24
14028	DOUGLAS FIR	32
14029	BIG LEAF MAPLE	24
14030	DOUGLAS FIR	26
14031	DOUGLAS FIR	18
14032	DOUGLAS FIR	24
14033	BIG LEAF MAPLE	16
14041	BIG LEAF MAPLE	28
14042	DOUGLAS FIR	6
14043	DOUGLAS FIR	32
14044	ALDER	8
14045	DOUGLAS FIR	28
14046	BIG LEAF MAPLE	16
14047	ALDER	14
14048	ALDER	8
14049	ALDER	12
14050	ALDER	6
14051	ALDER	8
14052	ALDER	8
14053	ALDER	8
14055	DOUGLAS FIR	18
14056	DOUGLAS FIR	20
14057	DOUGLAS FIR	12
14058	ALDER	14
14059	DOUGLAS FIR	18
14060	DOUGLAS FIR	39
14061	DOUGLAS FIR	39
14062	DOUGLAS FIR	24
14063	DOUGLAS FIR	20
14064	DOUGLAS FIR	16
14065	DOUGLAS FIR	20
14066	DOUGLAS FIR	22
14067	DOUGLAS FIR	12
14068	DOUGLAS FIR	24
14069	DOUGLAS FIR	14
14070	DOUGLAS FIR	22
14071	DOUGLAS FIR	36
15500	DOUGLAS FIR	28
15501	BIG LEAF MAPLE	18
15502	HAZELNUT	6
15503	HAZELNUT	6
15504	HAZELNUT	6
15505	HAZELNUT	6
15538	DOUGLAS FIR	6
15539	DOUGLAS FIR	15
15540	DOUGLAS FIR	24
15541	DOUGLAS FIR	20
15542	CEDAR	15
15543	DOUGLAS FIR	6
15544	DOUGLAS FIR	6
15545	DOUGLAS FIR	8
15546	DOUGLAS FIR	10
15547	DOUGLAS FIR	6
15548	DOUGLAS FIR	6
15549	DOUGLAS FIR	6
15550	DOUGLAS FIR	6
15551	DOUGLAS FIR	10
15552	DOUGLAS FIR	15
15553	DOUGLAS FIR	10
15554	DOUGLAS FIR	10
15555	DOUGLAS FIR	21
15556	DOUGLAS FIR	10
15557	DOUGLAS FIR	15
15558	DOUGLAS FIR	10
15559	DOUGLAS FIR	8
15560	DOUGLAS FIR	8
15561	DOUGLAS FIR	8
15562	DOUGLAS FIR	16
15563	DOUGLAS FIR	8
15564	DOUGLAS FIR	10
15565	DOUGLAS FIR	8
15566	DOUGLAS FIR	15
15567	DOUGLAS FIR	12
15568	DOUGLAS FIR	6
15569	DOUGLAS FIR	10
15570	DOUGLAS FIR	10
15571	DOUGLAS FIR	6
15572	DOUGLAS FIR	10
15573	DOUGLAS FIR	15
15574	DOUGLAS FIR	6
15575	DOUGLAS FIR	12
15576	DOUGLAS FIR	15
15577	DOUGLAS FIR	10
15578	DOUGLAS FIR	15
15579	DOUGLAS FIR	24
15580	DOUGLAS FIR	30
15581	DOUGLAS FIR	6
15582	DOUGLAS FIR	8
15583	DOUGLAS FIR	8
15584	DOUGLAS FIR	10
15585	DOUGLAS FIR	6
15586	DOUGLAS FIR	6
15587	DOUGLAS FIR	6
15588	DOUGLAS FIR	8
15589	DOUGLAS FIR	12
15590	DOUGLAS FIR	10
15591	DOUGLAS FIR	10
15592	DOUGLAS FIR	6
15593	DOUGLAS FIR	12
15594	DOUGLAS FIR	8
15595	DOUGLAS FIR	10
15596	DOUGLAS FIR	6
15597	DOUGLAS FIR	6
15598	DOUGLAS FIR	12
15599	DOUGLAS FIR	6
15600	DOUGLAS FIR	6
15601	DOUGLAS FIR	14
15602	DOUGLAS FIR	6
15603	ALDER	6
15604	ALDER	8
15605	ALDER	8
15606	DOUGLAS FIR	12
15607	DOUGLAS FIR	10
15608	DOUGLAS FIR	18
15609	DOUGLAS FIR	17
15610	DOUGLAS FIR	12
15611	DOUGLAS FIR	8
15612	DOUGLAS FIR	8
15613	DOUGLAS FIR	10
15614	DOUGLAS FIR	6
15615	DOUGLAS FIR	10
15616	DOUGLAS FIR	6
15617	DOUGLAS FIR	6
15618	DOUGLAS FIR	8
15619	DOUGLAS FIR	12
15620	DOUGLAS FIR	15
15621	DOUGLAS FIR	12
15622	DOUGLAS FIR	6
15623	DOUGLAS FIR	6
15624	DOUGLAS FIR	6
15625	DOUGLAS FIR	8
15626	DOUGLAS FIR	10
15627	ALDER	6
15628	DOUGLAS FIR	8
15629	DOUGLAS FIR	8
15630	DOUGLAS FIR	12
15631	DOUGLAS FIR	13
15632	DOUGLAS FIR	10
15633	DOUGLAS FIR	8
15634	ALDER	8
15635	DOUGLAS FIR	6
15636	DOUGLAS FIR	8
15637	DOUGLAS FIR	10
15638	DOUGLAS FIR	15
15639	DOUGLAS FIR	10
15640	DOUGLAS FIR	10
15641	DOUGLAS FIR	12
15642	DOUGLAS FIR	12
15643	DOUGLAS FIR	10
15644	DOUGLAS FIR	12
15645	DOUGLAS FIR	12
15646	DOUGLAS FIR	10
15647	DOUGLAS FIR	10
15648	DOUGLAS FIR	10
15649	DOUGLAS FIR	12
15650	DOUGLAS FIR	12
15651	DOUGLAS FIR	18
15652	DOUGLAS FIR	24
15653	DOUGLAS FIR	12
15654	DOUGLAS FIR	15
15655	DOUGLAS FIR	16
15656	DOUGLAS FIR	14
15657	DOUGLAS FIR	18
15658	DOUGLAS FIR	15
15659	DOUGLAS FIR	18
15660	DOUGLAS FIR	15
15661	DOUGLAS FIR	8
15662	DOUGLAS FIR	6
15663	DOUGLAS FIR	12
15664	DOUGLAS FIR	12
15665	DOUGLAS FIR	15
15666	DOUGLAS FIR	10
15667	DOUGLAS FIR	10
15668	DOUGLAS FIR	10
15669	DOUGLAS FIR	10
15670	DOUGLAS FIR	8
15671	DOUGLAS FIR	8
15672	DOUGLAS FIR	10
15673	DOUGLAS FIR	10
15674	DOUGLAS FIR	10
15675	DOUGLAS FIR	8
15676	DOUGLAS FIR	6
15677	DOUGLAS FIR	8
15678	DOUGLAS FIR	8
15679	DOUGLAS FIR	10
15630	DOUGLAS FIR	8
15681	DOUGLAS FIR	11
15682	DOUGLAS FIR	6
15683	DOUGLAS FIR	6
15684	DOUGLAS FIR	6
15685	DOUGLAS FIR	6
15686	DOUGLAS FIR	17
15687	DOUGLAS FIR	11
15688	DOUGLAS FIR	15
15689	DOUGLAS FIR	8
15690	DOUGLAS FIR	12
15691	DOUGLAS FIR	6
15692	DOUGLAS FIR	8
15693	DOUGLAS FIR	6
15694	DOUGLAS FIR	6
15695	DOUGLAS FIR	6
15696	DOUGLAS FIR	6
15697	DOUGLAS FIR	6
15698	DOUGLAS FIR	6
15699	DOUGLAS FIR	6
15730	ALDER	6
15739	PINE	18
15710	DOUGLAS FIR	32
15740	ALDER	12
15738	UNKNOWN DECID.	9
15739	BIG LEAF MAPLE	12
15762	ALDER	12
15763	UNKNOWN DECID.	10
15765	CEDAR	12
15766	UNKNOWN DECID.	8
15767	DOUGLAS FIR	17
15768	CEDAR	24
15769	DOUGLAS FIR	14
15770	DOUGLAS FIR	25
15802	ELM	8
15841	UNKNOWN DECID.	8
15842	BIG LEAF MAPLE	48
15849	CEDAR	17
15862	CEDAR	12
15868	CEDAR	16
15869	PINE	11
15870	PINE	23
15871	PINE	17
15872	BIG LEAF MAPLE	16
15873	DOUGLAS FIR	20
15874	PINE	12
15875	DOUGLAS FIR	22
15876	DOUGLAS FIR	24
15877	DOUGLAS FIR	16
15878	CEDAR	17
15879	ALDER	17
15880	DOUGLAS FIR	18
15881	BIRCH	15
15882	DOUGLAS FIR	20
15883	DOUGLAS FIR	24
15884	PINE	23
15885	DOUGLAS FIR	18
15886	UNKNOWN DECID.	13
15887	DOUGLAS FIR	25
15888	ALDER	13
15889	DOUGLAS FIR	16
15890	DOUGLAS FIR	36
15891	HOLLY	8
15892	ALDER	13
15893	ALDER	19
15894	DOUGLAS FIR	24
15895	ALDER	19
15896	BIG LEAF MAPLE	16
15897	DOUGLAS FIR	36
15898	DOUGLAS FIR	33
15899	DOUGLAS FIR	30
15900	DOUGLAS FIR	10
15901	BIG LEAF MAPLE	10
15902	BIG LEAF MAPLE	31
15903	BIG LEAF MAPLE	14
15904	BIG LEAF MAPLE	23
15905	CEDAR	10
15907	BIG LEAF MAPLE	17
15908	BIG LEAF MAPLE	20
15909	UNKNOWN DECID.	17
15910	BIG LEAF MAPLE	14,15
15911	ALDER	19
15912	ALDER	18
15913	BIG LEAF MAPLE	9,11,19,16
15914	ALDER	8
15915	CEDAR	17
15916	ALDER	16
15918	ALDER	22
15919	ALDER	36
15920	ALDER	10
15921	ALDER	11
15930	BIG LEAF MAPLE	22
15931	BIG LEAF MAPLE	24
15932	BIG LEAF MAPLE	27
15933	BIG LEAF MAPLE	24
15934	BIG LEAF MAPLE	19
15935	BIG LEAF MAPLE	30
15936	BIG LEAF MAPLE	19
15937	ALDER	17
15938	BIG LEAF MAPLE	19
15939	UNKNOWN DECID.	12
15940	UNKNOWN DECID.	12
15941	UNKNOWN DECID.	12
15942	UNKNOWN DECID.	12
15943	ALDER	14
15950	ALDER	16
15951	BIG LEAF MAPLE	20
15952	DOUGLAS FIR	12
15953	DOUGLAS FIR	18
15954	ALDER	10
15955	ALDER	11
15956	DOUGLAS FIR	17
15957	CHERRY	8

REVISIONS:

EXISTING CONDITIONS TREE TABLE

ENGINEERING • PLANNING • SURVEYING
FORESTRY • LANDSCAPE ARCHITECTURE

AKS ENGINEERING AND FORESTRY, LLC
12965 SW HERMAN ROAD, SUITE 100
TUALATIN, OR 97062
PHONE: 503.563.6151
FAX: 503.563.6152
www.aks-eng.com

Offices Located In:
TUALATIN, OREGON
SALEM, OREGON
VANCOUVER, WASHINGTON

DESIGNED BY: MBH | DRAWING NO.: E2-C001-C004.DWG
DRAWN BY: JRN | SCALE: AS NOTED
CHECKED BY: MBH

PREPARED FOR:
LENNAR CORPORATION
11807 NE 99TH ST, SUITE 1170
VANCOUVER, WA 98682

VISTA LOOP SOUTH

CITY OF SANDY
TAX LOTS 900 AND 1000

OREGON
CLACKAMAS COUNTY TAX MAP 2-5E-18CD

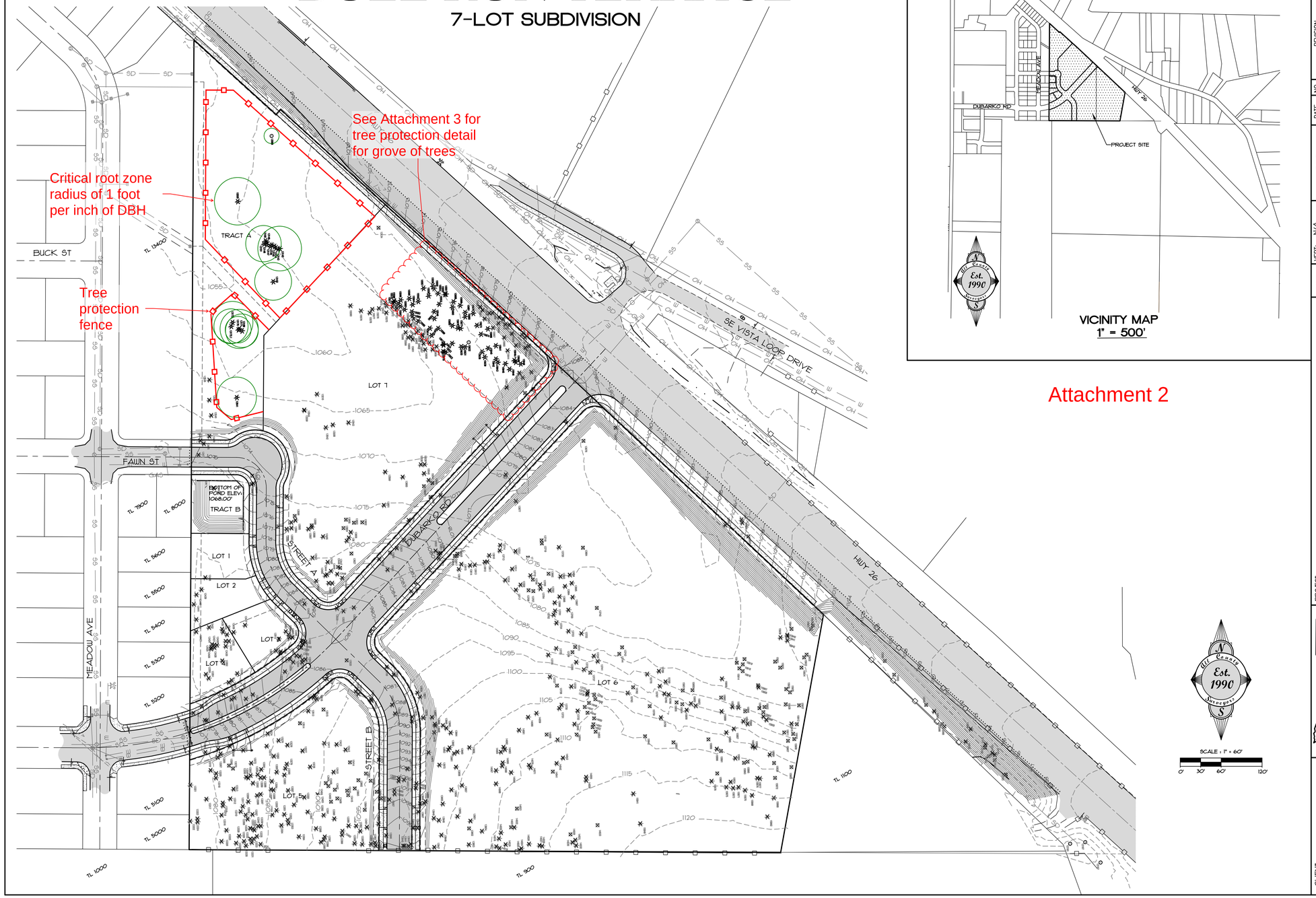
DATE: 06/13/2014
RENEWAL DATE: 6/30/15

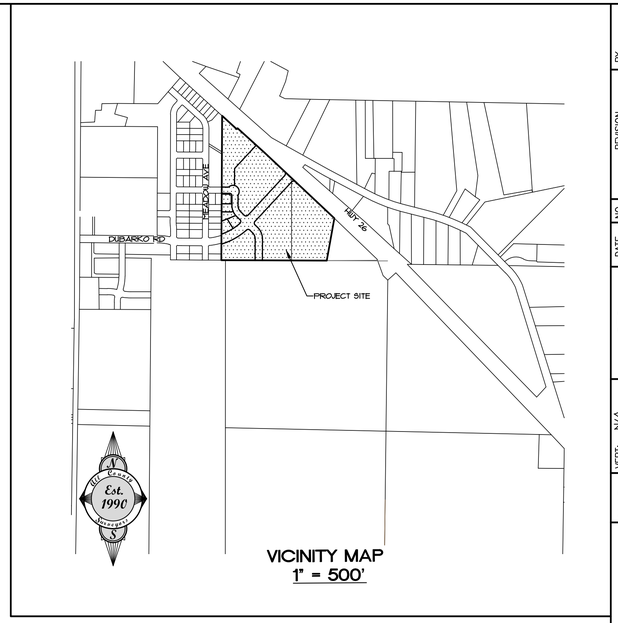
JOB NUMBER 3603

SHEET C004

BULL RUN TERRACE

7-LOT SUBDIVISION





VICINITY MAP
1" = 500'

Attachment 2

DATE	NO.	REVISION	BY
-	-	-	-

SHEET 1 OF 1

DESIGNED: CTH
DRAWN: CTH
CHECKED: RLM
APPROVED: RLM

REGISTERED PROFESSIONAL ENGINEER
OREGON
RAY L. MOORE
RENEWAL DATE: 12/31/2020

SCALE: VERT: N/A HORIZ: 1"=60'
DATE: 07/26/2018
FILE: 19-035-Planning.dwg

LEGAL		
SECTION	TWP.	RANGE
18	2S	5E

PROJECT: BULL RUN TERRACE SUBDIVISION

TREE RETENTION EXHIBIT

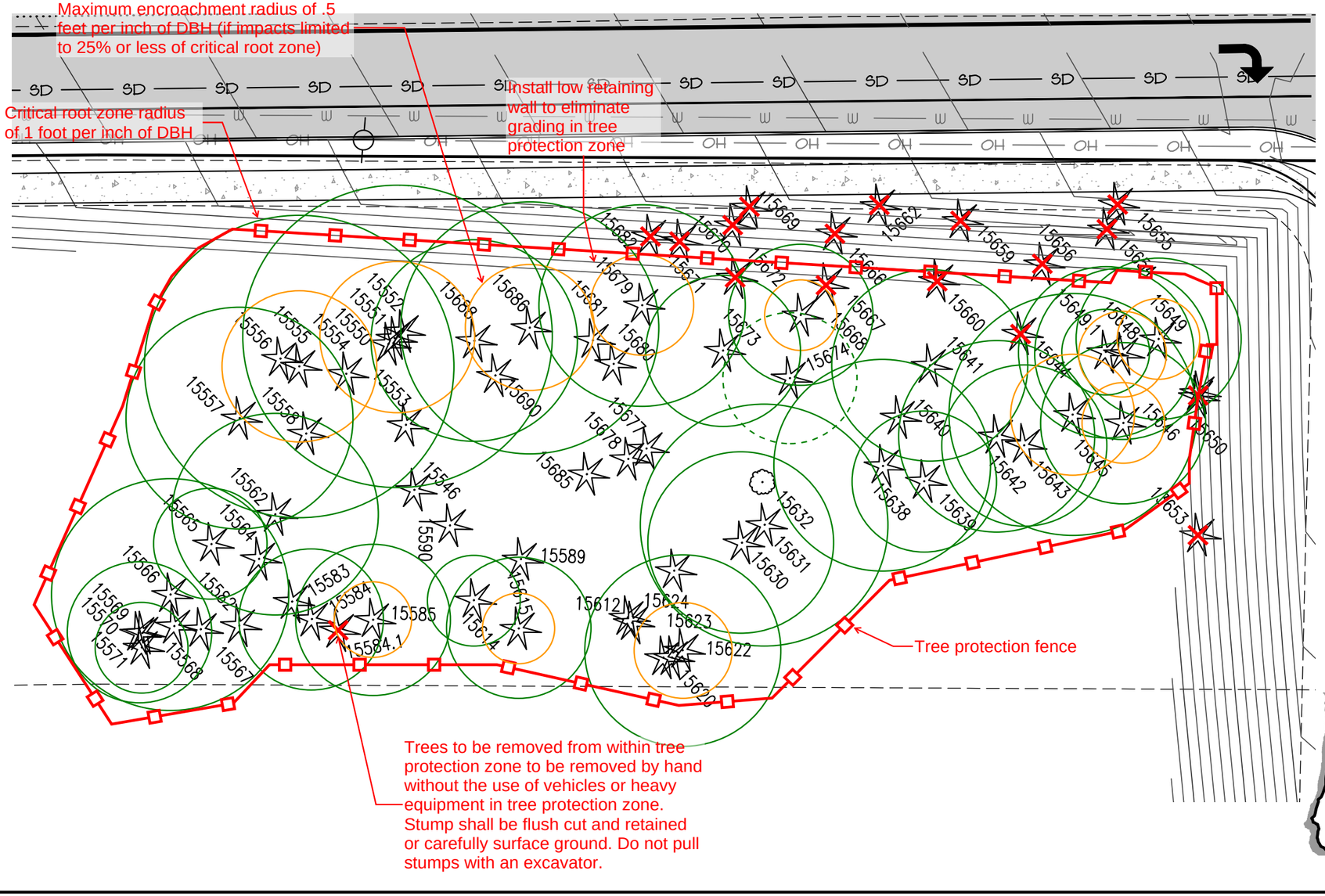
LOCATION: 40808 & 41010 HWY 26, SANDY, OR 97055

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

DATE OF PLOT 12/13/2019

CLIENT: ROLL TIDE PROPERTIES CORPORATION
PO BOX 703
CORNELIUS, OR 97113

GROVE DETAIL



SCALE : 1" = 20'

0' 10' 20' 40'

Attachment 3

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: 9/10/19

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	*Pseudotsuga menziesii*	11	10	good	good		retain	x
13134	bigleaf maple	*Acer macrophyllum*	55	38	good	fair	open grown, multiple leaders at 10', cable constricting lower trunk	remove	
13142	Douglas-fir	*Pseudotsuga menziesii*	32	28	fair	fair	one sided, codominant at 5' with included bark, 70% girdled at lower trunk	retain	
13143	Douglas-fir	*Pseudotsuga menziesii*	13	13	fair	poor	overtopped by adjacent trees, poor trunk taper	retain	
13144	Douglas-fir	*Pseudotsuga menziesii*	34	23	good	fair	multiple leaders at 5' with included bark, one sided, west 10" leader dead	retain	x
13145	Douglas-fir	*Pseudotsuga menziesii*	14	5	fair	poor	overtopped by adjacent trees, poor trunk taper	retain	
13146	Douglas-fir	*Pseudotsuga menziesii*	26	23	good	fair	one sided	retain	x
13147	Douglas-fir	*Pseudotsuga menziesii*	15	19	good	fair	one sided, marginal trunk taper	retain	x
13148	Douglas-fir	*Pseudotsuga menziesii*	25	24	good	fair	one sided	retain	x
13149	Douglas-fir	*Pseudotsuga menziesii*	17	20	poor	poor	overtopped by adjacent trees, one sided, suppressed	retain	
13150	Douglas-fir	*Pseudotsuga menziesii*	22	30	good	fair	one sided	retain	x
13151	Douglas-fir	*Pseudotsuga menziesii*	24,12	25	good	fair	one sided, codominant at ground level	retain	x
13152	Douglas-fir	*Pseudotsuga menziesii*	37	26	good	fair	open grown, multiple leaders at 25'	retain	x
13169	Douglas-fir	*Pseudotsuga menziesii*	24	24	good	fair	one sided	retain	x
13170	Douglas-fir	*Pseudotsuga menziesii*	19	20	good	fair	one sided	retain	x
13171	western redcedar	*Thuja plicata*	28	20	good	fair	moderately one sided	retain	x
13172	western redcedar	*Thuja plicata*	30	17	good	fair	one sided, pressed against trees 13172.1	retain	x
13172.1	Douglas-fir	*Pseudotsuga menziesii*	25	21	good	fair	one sided, pressed against trees 13172	retain	x
13538	western redcedar	*Thuja plicata*	39	24	good	fair	codominant at 6' with included bark	remove	
13539	Douglas-fir	*Pseudotsuga menziesii*	32	23	good	fair	moderately one sided	remove	
13540	western redcedar	*Thuja plicata*	37,33	29	good	fair	codominant at 3' with included bark	remove	
13541	western redcedar	*Thuja plicata*	29	21	good	good		retain	x
13653	Douglas-fir	*Pseudotsuga menziesii*	11	15	fair	fair	thin crown, large wound at lower trunk	remove	
15500	Douglas-fir	*Pseudotsuga menziesii*	34	21	good	good		retain	x
15546	Douglas-fir	*Pseudotsuga menziesii*	15	15	good	poor	25% live crown ratio, poor trunk taper	retain	x
15550	Douglas-fir	*Pseudotsuga menziesii*	6	0	very poor	very poor	dead	retain	
15551	Douglas-fir	*Pseudotsuga menziesii*	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	*Pseudotsuga menziesii*	13	15	good	poor	25% live crown ratio, poor trunk taper	retain	x
15554	Douglas-fir	*Pseudotsuga menziesii*	11	10	fair	poor	poor trunk taper, suppressed	retain	
15555	Douglas-fir	*Pseudotsuga menziesii*	30	25	good	fair	moderately one sided	retain	x

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

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	*Pseudotsuga menziesii*	12	10	poor	poor	overtopped by adjacent trees, suppressed	retain	
15557	grand fir	*Abies grandis*	22	20	good	fair	one sided, codominant at 30' with included bark	retain	x
15558	Douglas-fir	*Pseudotsuga menziesii*	12	15	good	poor	33% live crown ratio, poor trunk taper	retain	x
15562	Douglas-fir	*Pseudotsuga menziesii*	20	15	good	fair	40% live crown ratio, marginal trunk taper	retain	x
15564	Douglas-fir	*Pseudotsuga menziesii*	14	15	good	poor	marginal trunk taper, 33% live crown ratio	retain	x
15565	Douglas-fir	*Pseudotsuga menziesii*	11	15	fair	fair	one sided, marginal trunk taper, 5" codominant dead stem at 3'	retain	
15566	Douglas-fir	*Pseudotsuga menziesii*	23	20	good	fair	one sided	retain	x
15567	Douglas-fir	*Pseudotsuga menziesii*	17	15	good	fair	marginal trunk taper, 40% live crown ratio	retain	x
15568	Douglas-fir	*Pseudotsuga menziesii*	7	0	very poor	very poor	dead	retain	
15569	Douglas-fir	*Pseudotsuga menziesii*	11	8	fair	poor	poor trunk taper	retain	
15570	Douglas-fir	*Pseudotsuga menziesii*	14	15	fair	fair	one sided, overtopped by adjacent trees	retain	
15571	Douglas-fir	*Pseudotsuga menziesii*	9	5	fair	poor	poor trunk taper, suppressed	retain	
15582	Douglas-fir	*Pseudotsuga menziesii*	10	5	fair	poor	poor trunk taper, suppressed	retain	
15583	Douglas-fir	*Pseudotsuga menziesii*	13	15	good	poor	poor trunk taper, 25% live crown ratio	retain	x
15584	Douglas-fir	*Pseudotsuga menziesii*	14	15	good	fair	marginal trunk taper, 40% live crown ratio	retain	x
15584.1	Douglas-fir	*Pseudotsuga menziesii*	8	0	very poor	very poor	dead	remove	
15585	Douglas-fir	*Pseudotsuga menziesii*	15	20	good	poor	35% live crown ratio, poor trunk taper	retain	x
15589	Douglas-fir	*Pseudotsuga menziesii*	18	20	good	poor	33% live crown ratio, marginal trunk taper	retain	x
15590	Douglas-fir	*Pseudotsuga menziesii*	13	15	good	poor	35% live crown ratio, poor trunk taper	retain	x
15612	Douglas-fir	*Pseudotsuga menziesii*	9	0	very poor	very poor	dead	retain	
15614	Douglas-fir	*Pseudotsuga menziesii*	9	10	fair	poor	25% live crown ratio, poor trunk taper	retain	
15615	Douglas-fir	*Pseudotsuga menziesii*	14	15	good	poor	25% live crown ratio, poor trunk taper	retain	x
15619	Douglas-fir	*Pseudotsuga menziesii*	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	*Pseudotsuga menziesii*	19	20	good	fair	one sided, bowed trunk, marginal trunk taper	retain	x
15623	Douglas-fir	*Pseudotsuga menziesii*	8	10	good	poor	one sided, poor trunk taper	retain	
15624	Douglas-fir	*Pseudotsuga menziesii*	9	0	very poor	very poor	dead	retain	
15630	Douglas-fir	*Pseudotsuga menziesii*	18	20	good	fair	one sided	retain	x
15631	Douglas-fir	*Pseudotsuga menziesii*	24	20	good	fair	one sided	retain	x
15632	Douglas-fir	*Pseudotsuga menziesii*	13	15	good	poor	40% live crown ratio, poor trunk taper	retain	x
15638	Douglas-fir	*Pseudotsuga menziesii*	21	20	good	fair	one sided	retain	x
15639	Douglas-fir	*Pseudotsuga menziesii*	14	15	good	fair	one sided, marginal trunk taper, bowed trunk	retain	x

Teragan Associates, Inc.
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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	*Pseudotsuga menziesii*	15	15	good	fair	one sided, 70% live crown ratio, marginal trunk taper	retain	x
15641	Douglas-fir	*Pseudotsuga menziesii*	19	20	good	fair	40% live crown ratio, marginal trunk taper	retain	x
15642	Douglas-fir	*Pseudotsuga menziesii*	19	15	good	fair	moderately one sided, marginal trunk taper, 50% live crown ratio	retain	x
15643	Douglas-fir	*Pseudotsuga menziesii*	16	15	good	fair	one sided	retain	x
15644	Douglas-fir	*Pseudotsuga menziesii*	17	20	good	poor	33% live crown ratio, marginal trunk taper	remove	
15645	Douglas-fir	*Pseudotsuga menziesii*	24	25	good	fair	one sided	retain	x
15646	Douglas-fir	*Pseudotsuga menziesii*	16	15	good	fair	one sided	retain	x
15648	Douglas-fir	*Pseudotsuga menziesii*	17	15	good	fair	one sided, 60% live crown ratio, marginal trunk taper	retain	x
15649	Douglas-fir	*Pseudotsuga menziesii*	16	20	good	fair	one sided, marginal trunk taper	retain	x
15649.1	Douglas-fir	*Pseudotsuga menziesii*	17	20	good	fair	moderately one sided, marginal trunk taper	retain	x
15650	Douglas-fir	*Pseudotsuga menziesii*	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	*Pseudotsuga menziesii*	21	20	good	fair	one sided, codominant at 12' with included bark	remove	
15655	Douglas-fir	*Pseudotsuga menziesii*	24	25	good	fair	one sided	remove	
15656	Douglas-fir	*Pseudotsuga menziesii*	16	15	good	fair	marginal trunk taper, 40% live crown ratio	remove	
15659	Douglas-fir	*Pseudotsuga menziesii*	21	20	good	fair	moderately one sided, 6" dead codominant stem at base of trunk	remove	
15660	Douglas-fir	*Pseudotsuga menziesii*	19	20	good	fair	35% live crown ratio, marginal trunk taper, dead 8" codominant stem at 15'	remove	
15662	Douglas-fir	*Pseudotsuga menziesii*	8	0	very poor	very poor	dead	remove	
15666	Douglas-fir	*Pseudotsuga menziesii*	13	15	good	fair	marginal trunk taper, 35% live crown ratio	remove	
15667	Douglas-fir	*Pseudotsuga menziesii*	16	15	good	fair	40% live crown ratio, marginal trunk taper	remove	
15668	Douglas-fir	*Pseudotsuga menziesii*	14	15	good	fair	40% live crown ratio, marginal trunk taper	retain	x
15669	Douglas-fir	*Pseudotsuga menziesii*	15	15	good	fair	one sided, overtopped by adjacent trees	remove	
15670	Douglas-fir	*Pseudotsuga menziesii*	23	20	good	fair	moderately one sided	remove	
15671	Douglas-fir	*Pseudotsuga menziesii*	10	10	good	poor	one sided, poor trunk taper	remove	
15672	Douglas-fir	*Pseudotsuga menziesii*	15	20	good	poor	33% live crown ratio, marginal trunk taper	remove	
15673	Douglas-fir	*Pseudotsuga menziesii*	15	15	good	fair	35% live crown ration, marginal trunk taper	retain	x
15674	Douglas-fir	*Pseudotsuga menziesii*	13	10	good	poor	25% live crown ratio, poor trunk taper	retain	x
15677	Douglas-fir	*Pseudotsuga menziesii*	13	10	good	poor	25% live crown ratio, poor trunk taper	retain	x
15678	Douglas-fir	*Pseudotsuga menziesii*	14	10	good	poor	33% live crown ratio, poor trunk taper	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
15679	Douglas-fir	*Pseudotsuga menziesii*	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	*Pseudotsuga menziesii*	11	10	good	poor	25% live crown ratio, poor trunk taper	retain	x
15681	Douglas-fir	*Pseudotsuga menziesii*	14	10	good	poor	poor trunk taper, 20% live crown ratio	retain	x
15682	Douglas-fir	*Pseudotsuga menziesii*	26	20	good	fair	one sided	remove	
15685	Douglas-fir	*Pseudotsuga menziesii*	22	20	good	fair	moderately one sided	retain	x
15686	Douglas-fir	*Pseudotsuga menziesii*	25	25	good	fair	one sided	retain	x
15688	Douglas-fir	*Pseudotsuga menziesii*	20	20	good	fair	marginal trunk taper, 50% live crown ratio	retain	x
15690	Douglas-fir	*Pseudotsuga menziesii*	16	20	good	poor	33% live crown ratio, poor trunk taper	retain	x

[1]**DBH** is the trunk diameter in inches measured in accordance with International Society of Arboriculture standards.

[2]**C-Rad** is the approximate crown radius in feet.

[2]**Condition** 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.

May 3, 2019

EXHIBIT H

Carey Sheldon
PO Box 883
Fairview, OR 97024

RE: Dubarko Road Subdivision – Wetland Determination

Carey:

This letter provides findings of a wetlands determination conducted by Environmental Science & Assessment, LLC (ES&A) at 40808 & 41010 Highway 26 in Sandy, Oregon (TL# 25E18CD00900 & TL#25E18CD01000) to evaluate the existing conditions. The 16.12-acre site is located directly east of a subdivision near Dubarko Road and Meadows Avenue and south of Highway 26 in the east end of Sandy, Oregon (Figure 1; Attachment A). The parcel boundaries and base topographic survey were provided by All County Surveyors and Planners, Inc.

A 6-lot subdivision and 216-unit condominium complex site is planned for the project. The project developer contracted ES&A to determine the presence of jurisdictional resources on site and determine the presence or absence of potential stream or wetland within the site.

METHODOLOGY

Potential wetland areas on the parcel were evaluated using the methodology provided in the Army Corps of Engineers *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region*, (U.S. Army Corps of Engineers, 2010). This methodology defines criteria for hydrology, soils, and vegetation to identify wetland areas.

Two levels of investigation were used to evaluate the presence or absence of Sensitive Areas. The first level included a review of existing and available background data. The second level consisted of an on-site field investigation.

Reviewed background data included the following information:

- Aerial Photography (Google Earth, 2018)
- City of Sandy Local Wetland Inventory (Sri/Shapiro AGCO Inc., 1997)
- USFWS National Wetland Inventory (NWI) (USFWS, 2019)
- Natural Resource Conservation Service (NRCS) Soil Survey of Clackamas County, Oregon (Web Soil Survey, 2019)
- Topography (Metro Data Resource Center's MetroMap, 2018)

The lots within site are currently undeveloped, but a small structure was located on TL 1000 in 2012 based on the available 2012 aerial photos (Figure 2). The only evidence of water or wetland resources on site is an intermittent stream mapped on the City of Sandy Local Wetland Inventory (LWI) extending east to west through the site. The USFWS NWI does not map wetland or waters within the site (Figure 3) and the NRCS soil survey does not map hydric soils on site (Figure 4).

ES&A wetland scientist, Jack Dalton, conducted the site assessment on March 23, 2019, with a preliminary site visit on June 8, 2018. Three (3) wetland determination data plots were established to document existing conditions on-site (Figure 5). The data sheets are included in Appendix C of this report. Data plot locations were mapped in the field using a hand-held resource grade GPS unit and transferred to a base topographic survey provided by All County Surveyors and Planners, Inc. (Attachment A).

EXISTING CONDITIONS

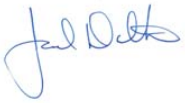
The 16.12-acre site located at 40808 & 41010 Highway 26, Sandy, Oregon (TL# 25E18CD00900 & TL#25E18CD01000) is bordered by Highway 26 to the north and a neighborhood to the west. Agricultural land is located east of the site and a single-family residence is located on the lot directly east (Figure 1). A stub for Dubarko Road and a second road stub for Fawn Street are located along the west site boundary (Figure 2).

The investigation found no water feature at the mapped location in the middle of the site. While there is a narrow linear depression extending roughly east to west through the site, no defined channel bed or bank is present, as documented by site data plot locations (Figure 5). No evidence of ponding was observed in the lowest points in the west end of the site and no evidence of seasonal surface water flow was observed in the area of the mapped stream. The plant community is primarily a weedy cleared field dominated by Himalayan blackberry (*Rubus armeniacus*, FAC) and pasture grasses. The tree groves on site are primarily Douglas fit (*Pseudotsuga menziesii*, FACU) with small clusters of western red-cedar (*Thuja plicata*, FAC). No wetland vegetation is present on site. Soils sampled at the three data plots all lacked hydric soil indicators and showed no evidence of sub-surface saturation, high seasonal groundwater, saturation or other hydrology indicators. Photos documenting the existing conditions and plant community are provided in Attachment B. Detailed plant and soil data is provided in Attachment C.

It is my conclusion that the intermittent stream feature mapped on the LWI mapping is not longer accurate and no stream feature or wetland is currently present on site. Any historic drainage that may have extended through the site has is no longer present and was altered by past land use or a change in the surrounding basin hydrology up slope of site. There is no evidence of any surface water entering the site from the east and no evidence of wetland or seasonal ponded water features was observed in the lowest topographic point of site where wetland or were most likely to be located.

If you have any questions about the findings presented in this letter, I would be happy to discuss the determination findings further.

Sincerely,

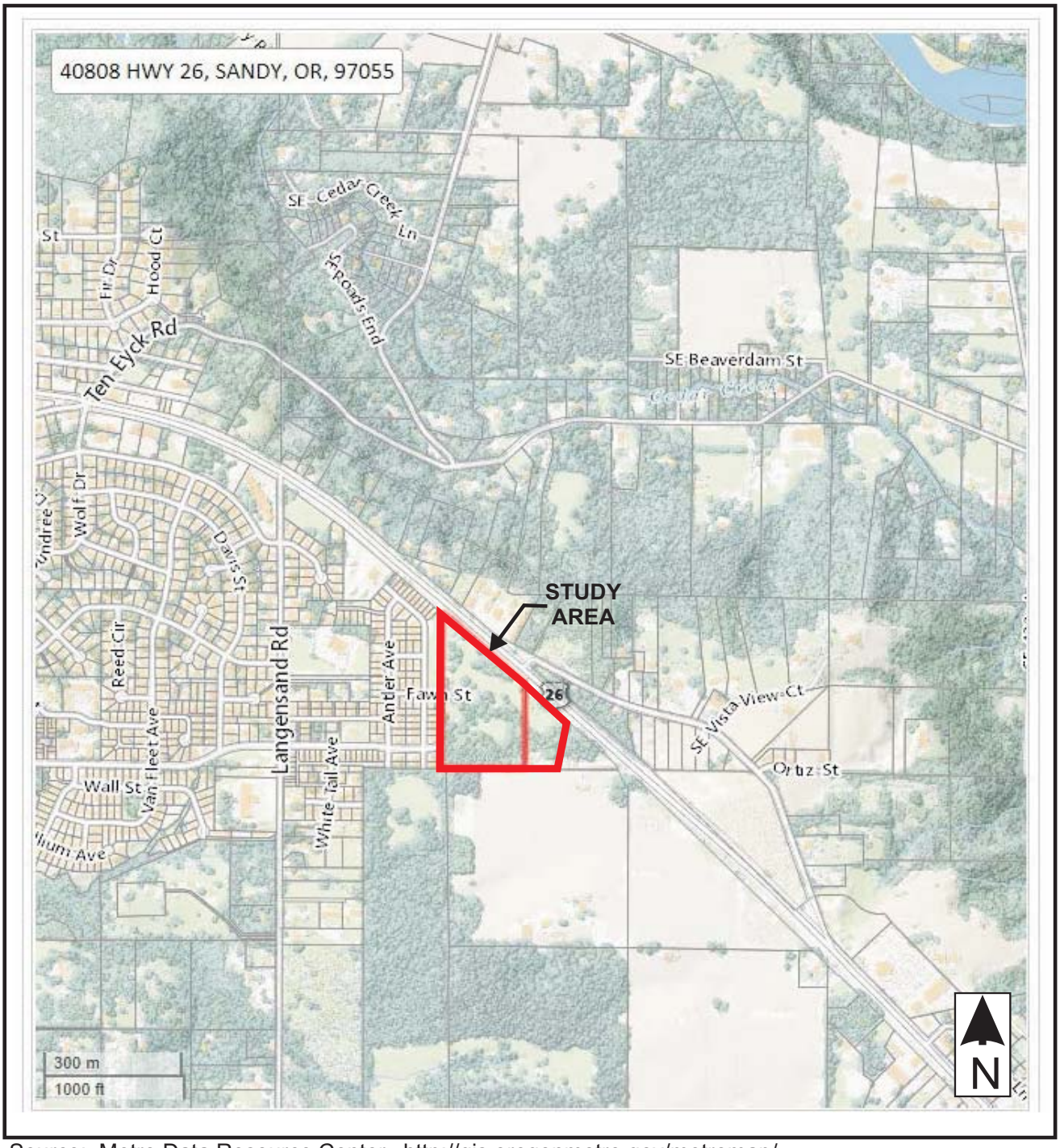


Jack Dalton
Environmental Science & Assessment, LLC

Cc: Alex Reverman (via email)
Ray Moore (via email)

Attachments
A – Figures
B – Site Photos
C - Wetland Determination Data

ATTACHMENT A: FIGURES



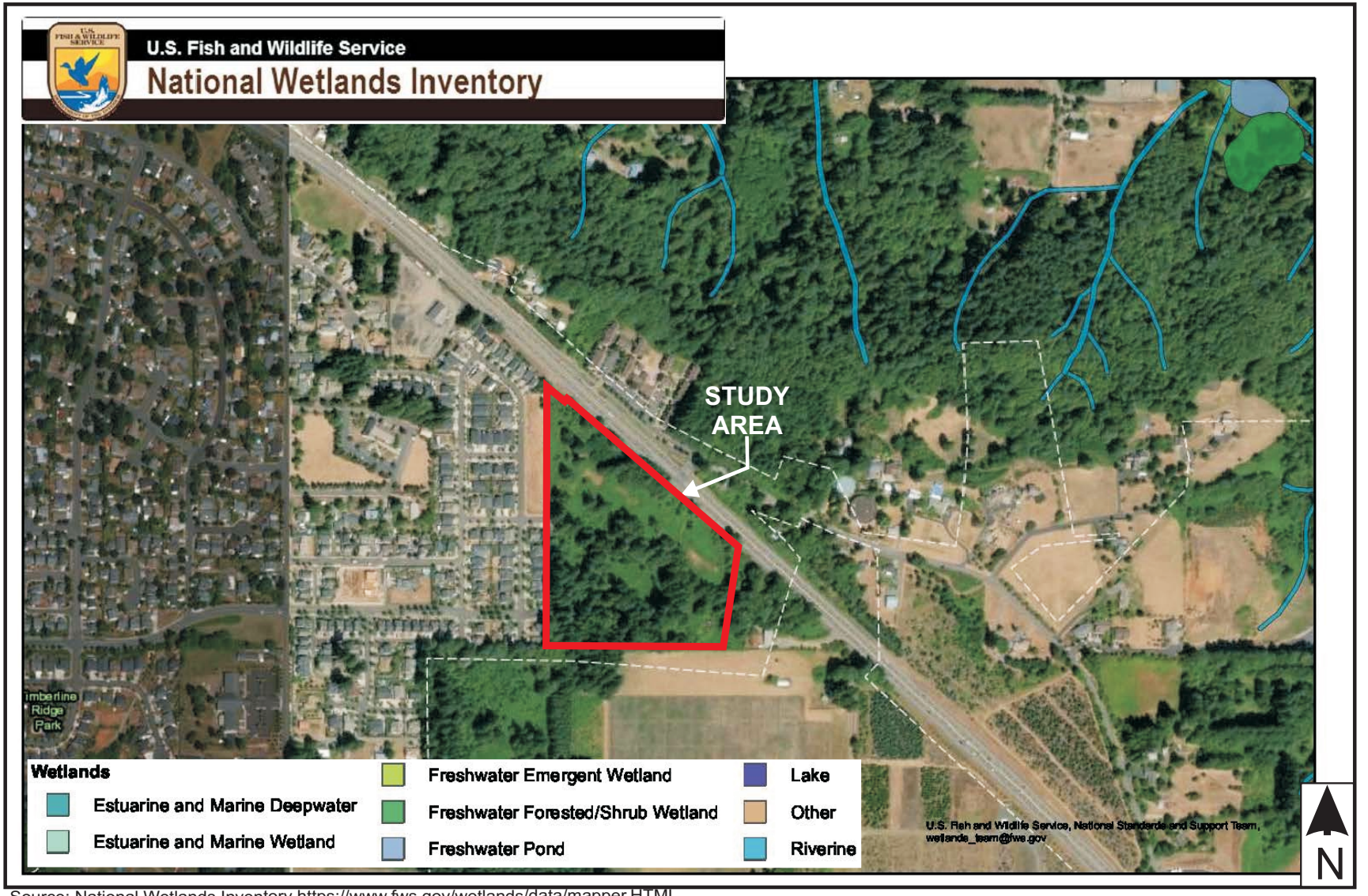
Source: Metro Data Resource Center. http://gis.oregonmetro.gov/metromap/

Environmental Science & Assessment, LLC	Vicinity Map Dubarko Road Subdivision Sandy, Oregon	Figure 1 Approx. Scale: 1in. = 100 ft.

Source: Google Earth

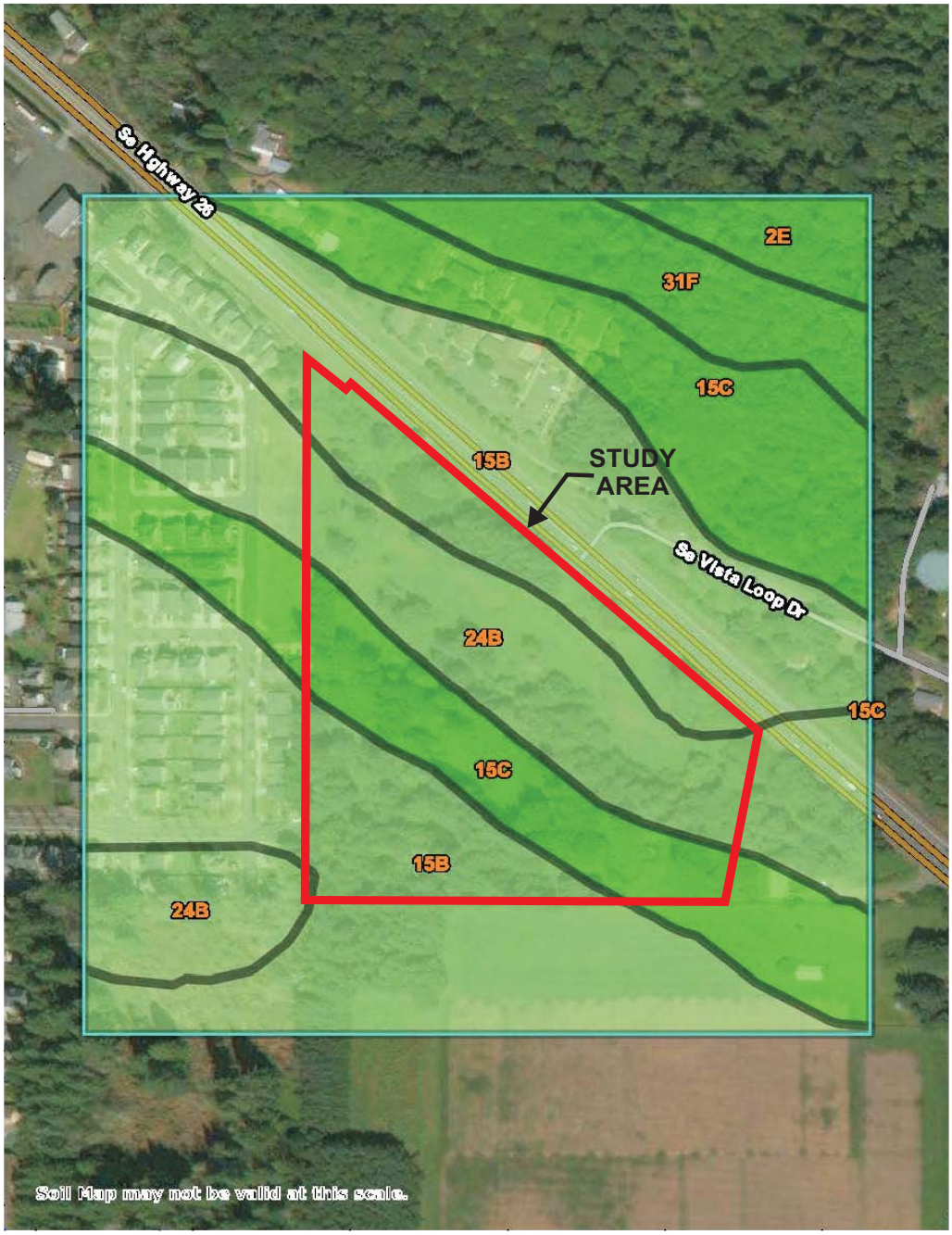
Image Date: 9/3/2018

Environmental Science & Assessment, LLC	Aerial Photograph Dubarko Road Subdivision Sandy, Oregon	Approx. Scale: 1in. = 345ft.	Figure 2



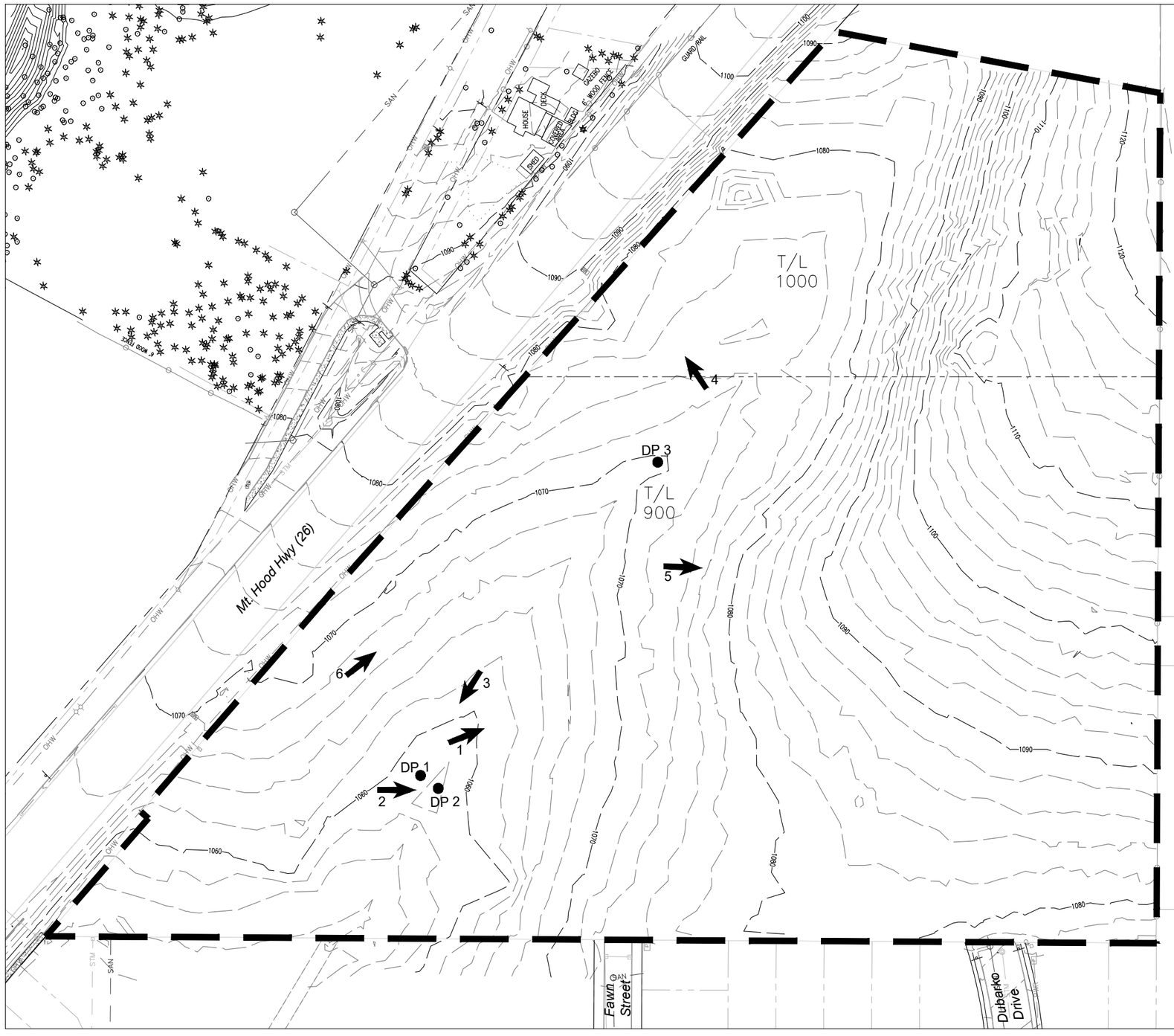
Source: National Wetlands Inventory https://www.fws.gov/wetlands/data/mapper.HTML

Environmental Science & Assessment, LLC	NWI Map Dubarko Road Subdivision Sandy, Oregon	Not to Scale	Figure 3



Source: NRCS Web Soil Survey https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx

Environmental Science & Assessment, LLC	NRCS Soil Map Dubarko Road Subdivision Sandy, Oregon	Figure 4 Not to Scale



Environmental Science & Assessment, LLC

107 SE Washington St., Suite 249
Portland, OR 97214
Phone: 503.478.0424
www.esapdx.com

Existing Conditions Map
Dubarko Road Subdivision
40808, 41010 HWY 26
Sandy, Oregon

Base Map Source:	All County Surveyors & Planners, Inc.
Modified By:	KR
Date:	4/19
Job:	18042
Rev:	00/00

Figure 5

ATTACHMENT B: SITE PHOTOS

Photo 1: View SE of low point in the middle of the site.

Photo 2: View S by DP-1 and DP-2. Shallow swale with no offsite connection.

Photo 3: View NW of the middle of the site.

Photo 4: View NE of overgrown blackberry area.

Photo 5: View S of Doug fir forest in SW corner.

Photo 6: View NE of doug fir grove at N end.

ATTACHMENT C: WETLAND DETERMINATION DATA SHEETS

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Dubarko Road Subdivision City/County: Sandy/Clackamas Sampling Date: 3/28/19

Applicant/Owner: Roll Tide Properties Corp State: OR Sampling Point: DP-1

Investigator(s): Jack Dalton Section, Township, Range: S18 T2S R5E

Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): none Slope (%):

Subregion (LRR): A-Northwest Forests and Coasts Lat: 45.392061° Long: -122.244803° Datum: N/A

Soil Map Unit Name: Cottrell silty clay loam (24B) NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	No X
Hydric Soil Present?	Yes	No X
Wetland Hydrology Present?	Yes	No X

Is the Sampled Area within a Wetland? Yes No X

Remarks: Data point taken at grassy, flat area in the lower topo in west end.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30' diameter)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1. Rubus armeniacus	25	yes	FAC
2.			
3.			
4.			
5.			
	25 = Total Cover		
Herb Stratum (Plot size:)			
1. Schedonorus arundinaceus	50	yes	FAC
2. Agrostis sp.	20	yes	UPL
3. Dactylis glomerata	20	yes	FACU
4. Poa sp.	10		FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species	60	x 3 =	180
FACU species	45	x 4 =	180
UPL species	20	x 5 =	100
Column Totals:	125 (A)		460 (B)

Prevalence Index = B/A = 3.6

Hydrophytic Vegetation Indicators:

- 1 - Rapid Test for Hydrophytic Vegetation
- 2 - Dominance Test is >50%
- 3 - Prevalence Index is ≤3.0[1]
- 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- 5 - Wetland Non-Vascular Plants[1]
- Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes No X

Remarks:

SOIL

Sampling Point: DP-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	7.5 YR 3/2	100			C	M	silt loam	no redox
12-16	7.5YR 4/4	99	7.5YR 4/6	1	C	M	silt loam	
16-20	7.5YR 3/4	99	7.5YR 4/6	1	C	M	silt clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: No saturation/O.R. or evidence of surface flow.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Dubarko Road Subdivision City/County: Sandy/Clackamas Sampling Date: 3/28/19

Applicant/Owner: Roll Tide Properties Corp State: OR Sampling Point: DP-2

Investigator(s): Jack Dalton Section, Township, Range: S18 T2S R5E

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): none Slope (%): _____

Subregion (LRR): A-Northwest Forests and Coasts Lat: 45.392061° Long: -122.244803° Datum: N/A

Soil Map Unit Name: Cottrell silty clay loam (24B) NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No _____	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____ No X	
Wetland Hydrology Present?	Yes _____ No X	

Remarks: Data point taken at low point in linear swale in the west end - no evidence of wetland hydrology.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30' diameter)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1. Rubus armeniacus	50	yes	FAC
2.			
3.			
4.			
5.			
	50 = Total Cover		
Herb Stratum (Plot size: _____)			
1. Schedonorus arundinaceus	50	yes	FAC
2. Agrostis sp.	30	yes	UPL
3. Holcus lanatus	15		FAC
4. Galium aparine	5		FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species 115	x 3 = 345
FACU species 5	x 4 = 20
UPL species 30	x 5 = 150
Column Totals: 150 (A)	515 (B)

Prevalence Index = B/A = 3.43

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks: Veg meets dominance test, but fails prevalence index test - marginal FAC dominated community that lacks FACW or OBL veg.

SOIL

Sampling Point: DP-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-9	7.5 YR 3/2	100			C	M	silt loam	no redox, 10% pebbles
9-12	7.5YR 3/2	99	7.5YR 3/4	1	C	M	silt loam	
12-16	7.5YR 4/4	80	7.5YR 3/2	18	C	M		
			7.5YR 3/4	2	C	M		
16-20	7.5YR 4/4	90	7.5YR 4/6	10	C	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: No saturation, O.R. or evidence of surface flow.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Dubarko Road Subdivision City/County: Sandy/Clackamas Sampling Date: 3/28/19

Applicant/Owner: Roll Tide Properties Corp State: OR Sampling Point: DP-3

Investigator(s): Jack Dalton Section, Township, Range: S18 T2S R5E

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____ Slope (%): _____

Subregion (LRR): A-Northwest Forests and Coasts Lat: 45.392061° Long: -122.244803° Datum: N/A

Soil Map Unit Name: Cottrell silty clay loam (24B) NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____ No X	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____ No X	
Wetland Hydrology Present?	Yes _____ No X	

Remarks: Data point taken up linear depression in middle of site - no wetland hydrology evident.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30' diameter)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1. Rubus armeniacus	50	yes	FAC
2.			
3.			
4.			
5.			
	50 = Total Cover		
Herb Stratum (Plot size: _____)			
1. Holcus lanatus	35	yes	FAC
2. Anthoxanthum odoratum	30	yes	FACU
3. Agrostis sp.	30	yes	UPL
4. Schedonorus arundinaceus	5		FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	_____	x 1 =	_____
FACW species	_____	x 2 =	_____
FAC species	40	x 3 =	120
FACU species	80	x 4 =	320
UPL species	30	x 5 =	150
Column Totals:	150 (A)		590 (B)

Prevalence Index = B/A = 3.9

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No X

Remarks: Marginal degraded plant community - lacks FACW or greater plants.

SOIL

Sampling Point: DP-3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	7.5 YR 3/3	100			C	M	silt loam	no redox,
10-13	7.5YR 4/3	98	10YR 3/6	2	C	M		
13-15	10YR 4/4	95	7.5YR 4/6	5	C	M		
15-20	10YR 4/3	80	7.5YR 4/6	10	C	M		
			10YR 4/4	10				

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: faint O.R. at 13"

OFFSITE WETLAND DETERMINATION REPORT **BATCH**
OREGON DEPARTMENT OF STATE LANDS **WD#:** 2019-0386
775 Summer Street NE, Suite 100, Salem OR 97301-1279 Phone: (503) 986-5200

At your request, an offsite wetland determination has been conducted on the property described below.

County: Clackamas City: Sandy

Agent Name & Address: Tracy Brown, Tracy Brown Planning Consultants, LLC, 17075 Fir Dr., Sandy, OR 97055

Township: 2S Range: 5E Section: 18 Q/Q: CD Tax Lot(s): 900, 1000

Project Name: Site Evaluation

Site Address/Location: 40808 and 41010 Highway 26, Sandy, OR

☐ The National Wetlands Inventory or Local Wetlands Inventory shows a wetland on the property.

☐ The county soil survey shows hydric (wet) soils on the property. Hydric soils indicate that there may be wetlands.

☒ It is unlikely that there are jurisdictional wetlands or waterways on the property based upon a review of wetlands maps, the county soil survey and other information. An onsite investigation by a qualified professional is the only way to be certain that there are no wetlands.

☐ There may be wetlands/waterways on the property that are subject to the state Removal-Fill Law.

- ☒ A state permit is required for ≥ 50 cubic yards of fill, removal, or ground alteration in the wetlands or waterways.
- ☐ A state permit may be required for any amount of fill, removal, or other ground alteration in the Essential Salmonid Habitat and hydrologically associated wetlands.

☐ A state permit will be/will not be required for project because/if .

☐ The proposed parcel division may create a lot that is largely wetland and thus create future development problems.

☐ A wetland delineation by a qualified wetland consultant is recommended prior to site development. The wetland delineation report should be submitted to DSL for review and approval.

☐ A permit may be required by the Army Corps of Engineers: (503) 808-4373

Note: This report is for the state Removal-Fill Law only. City or County permits may be required for the proposed activity.

Comments: Based on a review of the available information, there are no jurisdictional wetlands or waters on the property.

Determination by: _____ Date: 7/03/19

☐ This jurisdictional determination is valid for five years from the above date, unless new information necessitates a revision. Circumstances under which the Department may change a determination and procedures for renewal of an expired determination are found in OAR 141-090-0045 (available on our web site or upon request). The applicant, landowner, or agent may submit a request for reconsideration of this determination in writing within six months from the above date.

☒ **This is a preliminary jurisdictional determination and is advisory only.**

Copy To: ☐ Other ☒ Enclosures: email: tbrownplan@gmail.com
☐ City of Sandy

FOR OFFICE USE ONLY

Entire Lot(s) Checked? ☒ Yes ☐ No **Waters Present** ☐ Yes ☒ No ☐ Maybe **Request Received:** 6/27/2019
LWI Area: Sandy **LWI Code:** N/A **Latitude:** 45.390763 **Longitude:** -122.244278 **Related DSL File #** N/A
Has Wetlands? ☐Y ☒N ☐Unk **ESH?** ☐Y ☒N **Wild & Scenic?** ☐Y ☒N **State Scenic?** ☐Y ☒N **Coast Zone?** ☐Y ☒N ☐Unk
Adjacent Waterbody: N/A **NWI Quad:** Sandy ☒ Scanned ☒ Mailings Completed ☒ Data Entry Completed

proj:# 78454

EXHIBIT I

GeoPacific Engineering, Inc.
Real-World Geotechnical Solutions
• Investigation
• Design
• Construction Support

August 16, 2005

Project No. 05-9266

Cascade Communities, Inc.
13535 SE 145th Avenue
Clackamas, OR 97015

Attention: Don Oakley (Fax 503-658-4544)

RE: **GEOTECHNICAL AND SLOPE STABILITY INVESTIGATION**
VISTA LOOP NORTH AND VISTA LOOP SOUTH SUBDIVISIONS
SANDY, OREGON

This report presents the results of our geotechnical and slope stability investigation of the proposed Vista Loop Planned Development in the City of Sandy, Clackamas County, Oregon. The purpose of our investigation was to evaluate subsurface conditions and slope stability at the site, and provide geotechnical recommendations for site development and construction. Our work was performed in accordance with GeoPacific Engineering, Inc.'s (GeoPacific) proposal letter No. P2463, dated May 4, 2005. The scope of our work included extensive investigation of Vista Loop North with particular attention to slopes on northern portion of the site. On Vista Loop South, the scope of our work was limited to a localized several acre area where slopes exceed 15% grade.

1.0 PROJECT INFORMATION

Location:	The subject property is approximately 25.14 acres located in the City of Sandy, Clackamas County, Oregon (Figure 1).
Owner/ Developer:	Cascade Communities, Inc. 13535 SE 145th Avenue, Clackamas, OR 97015
Civil Engineer:	Don Oakley, P.E. 13535 SE 145th Avenue, Clackamas, OR 97015
Jurisdictional Agency:	City of Sandy, Oregon

2.0 SITE DESCRIPTION AND PROPOSED DEVELOPMENT

The subject property includes approximately 25.14 acres that is divided by Highway 26 and is located in the City of Sandy, Clackamas County, Oregon (Figure 1). Vista Loop North, which is bordered on the south by the street right of way for Highway 26, consists of approximately 9.14 acres. Vista Loop South, which is bordered by Highway 26 on the north, consists of approximately 15.57 acres. These proposed residential developments are situated on the margin of an upland

plateau with Vista Loop North at the top of an approximately 300 foot high slope that forms the southern portion of the Cedar Creek drainage. Slopes on the upland plateau portion of the site generally incline to the west at about 5% to 15% grade. Slopes on the northern portion of Vista Loop North are moderately steep inclining at 40% to 70% grade. An old logging road is present at the top of this slope. Vegetation consists of low grasses, brush, and young to mature trees.

The proposed subdivision layout and grading plan for Vista Loop North and Vista Loop South are shown in Figure 2 and Figure 4, respectively. On Figure 2, the plan also shows conservation easement limits which set the northerly extend of building foundations on Lots 6 through 16. We presume that underground utilities will generally be constructed at depths of less than 10 feet.

3.0 SITE GEOLOGY

The subject property lies on the far eastern margin of the Willamette Valley/Puget Sound physiographic province, a broad structural depression situated between the Coast Range on the west and the Cascade Range on the east. Underlying the site vicinity is the Plio-Pleistocene age (about 2 million years ago) Springwater Formation, a broad fluvial/alluvial fan deposit of outwash sediment derived from the Cascade Range (Schlicker and Finlayson, 1979). Regionally, the Springwater Formation consists of fluvial conglomerate, volcaniclastic sandstone, siltstone and debris flows. The conglomerate typically consists of deeply weathered to decomposed, well-rounded pebbles to cobbles of basalt, andesite and dacite with a sand matrix composed of feldspathic and volcanic lithics. Siltstone units typically consist of quartzofeldspathic silt, volcanic ash and clay. The estimated thickness of the Springwater Formation in the site vicinity based on mapped thicknesses exposed in the Sandy River drainage is 150 to 200 hundred feet.

Underlying the Springwater Formation is the Pliocene age (3 to 5 million years ago) Troutdale Formation, which is informally divided into an upper and lower member (Schlicker and Finlayson, 1979). The upper member consists primarily of indurated sandstone and conglomerate with localized clay seams. In the site vicinity, the estimated thickness of the upper member is 100 to 150 feet. The lower member, also known as the Sandy River Mudstone, consists of moderately-well indurated siltstone, claystone, very-fine-grained sandstone and some volcanic lapilli tuff layers with a total estimated thickness of about 725 feet. In the site vicinity, these strata are generally horizontally bedded with maximum dip angles on the order of 2 degrees (Schlicker and Finlayson, 1979).

4.0 SUBSURFACE CONDITIONS

In order to characterize subsurface conditions on the subject property, GeoPacific conducted a two phase program of subsurface exploration. The first phase consisted of 12 test pits excavated to depths of 8 to 12 feet with an 8-ton trackhoe. The second phase consisted of drilling 3 exploratory borings with a track-mounted drill rig to depths of 51.5 and 61.5 feet below the ground surface, using mud-rotary drilling techniques. Exploration locations shown in Figure 2 were located in the field by pacing distances from apparent property corners and other site features, and as such should be considered approximate.

The following section presents generalized discussions of soil, rock and groundwater conditions anticipated on site based on subsurface explorations performed for the project. Each of the geologic deposits encountered is discussed separately below. For additional details regarding conditions at specific exploration locations, refer to the attached test pit and boring logs.

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Vista Loop

4.1 Soil

Fill: A localized fill wedge is present on the outboard edge of the existing logging road which skirts the top of the moderately steep slope on the northern portion of the site (see Figure 3). This fill consists of organic silt and clayey silt soil that is poorly compacted. In test pits (TP-4, TP-5, & TP-7), the fill ranges between 2 and 5 feet thick.

Topsoil: Over most of the site, the ground surface is directly underlain by topsoil consisting of dark brown, organic SILT (OL) with common fine roots in grassland areas and many roots in forested areas. The observed thickness of topsoil generally varies from about 12 to 18 inches.

Native Soil Horizon/Colluvium: On the gently sloping portions of the site, the topsoil is underlain by a native soil horizon, while on the more steeply sloping portions the topsoil is underlain by colluvial soil. The native soil horizon generally consists of brown to red-brown, clayey SILT (ML) derived from in-place weathering and mineral decomposition. In general, this soil horizon has a stiff to very-stiff consistency. Pocket penetrometer measurements indicate an approximate unconfined compressive strength of 1.5 to greater than 3.0 tons/ft^2. The thickness of this layer ranges between 2 and 3 feet. Colluvial soil underlying the topsoil in sloping areas is derived from weathering, mineral decomposition, erosion and soil creep. The colluvial soil consists of brown to red-brown, clayey SILT (ML) to sandy SILT (ML) with fragments of weathered volcanic rocks and cobbles. In general, the consistency of the colluvial soil ranges from stiff with loose pockets to very-stiff. Pocket penetrometer measurements indicate approximate unconfined compressive strengths of 0.5 to 3.5 tons/ft^2. In test pits, the thickness of colluvial soil ranges between 2.5 and 4 feet.

Residual Soil: Underlying the native and colluvial soil is residual soil derived from in-place decomposition of the Springwater Formation. The residual soil consists of red-brown, clayey SILT (ML), sandy SILT (ML), and silty CLAY (CL) with some sand and weathered rock fragments. In general, this soil horizon has a stiff to very-stiff consistency. Pocket penetrometer measurements indicate an approximate unconfined compressive strength of 1.5 to 3.0 tons/ft^2. In test pits, the thickness of this layer ranges from about 3 feet to greater than 7 feet thick, while in some sloping areas, the residual soil is absent.

Springwater Formation: Underlying the above soil units is the Springwater Formation. In test pits, the Springwater Formation consists of multi-colored, sandy SILT (ML) with clay and abundant weathered volcanic lithics and decomposed rounded cobbles. The consistency is generally medium-stiff to very-stiff but is variable depending on the original sediment mineralogy and degree of weathering and decomposition. In borings, Standard Penetration Test (SPT) N-values generally range between N=5 and N=greater than 50 consistent with a medium-stiff to hard consistency. Springwater Formation extends below the maximum depth explored of 60 feet below the ground surface.

4.2 Soil Moisture and Groundwater

In May of 2005, near surface soil moisture conditions observed in test pits generally ranged from damp to moist. Minor groundwater seepage was observed in test pits TP-1 and TP-3 at a depth of 7 feet below the ground surface.

Seasonal springs are common in the Springwater Formation and tend to occur in localized areas in a variety of topographic settings. No springs or geomorphic evidence of seasonal springs was observed during our reconnaissance of the site. However, we anticipate that minor seasonal perching of infiltrating surface water and localized groundwater seepage may be encountered in cuts and in shallow excavations during the wet weather season. Because mud-rotary drilling techniques do not permit measurement of groundwater, the exploratory borings provided no information regarding groundwater conditions.

5.0 SLOPE STABILITY

For the purpose of evaluating slope stability, we: (1) performed a review of published geologic literature, (2) performed a series of field reconnaissance traverses of the subject property and adjacent areas, (3) conducted a program of subsurface exploration, (4) constructed geologic cross sections and slope stability models, and (5) performed a quantitative analyses of slope stability.

5.1 Regional Landslide Hazard Mapping

Regional slope instability mapping identifies the slopes on the northern margin of the site as a moderate to high relative slope hazard zone based primarily on slope gradient (Hofmeister et al., 2003). Regional geologic hazard mapping of the westward projection of these slopes identifies numerous "landslide topography" features (Schlicker and Finlayson, 1979). Common slope instability in this area is attributed to weak horizons in the Troutdale Formation underlying the lower portion of the slope and erosional oversteeping of slopes by stream undercutting. The mapped "landslide topography" closest to the subject site lies approximately 2,000 feet to the west. Based on our review of 1:24,000 scale topographic mapping, there appears to be a possible landslide feature expressed as benched topography located approximately 500 feet east of the site (see Figure 1).

These mapped hazard zone designations are general in nature based largely on prevailing slopes, and are intended to indicate the need for site-specific geotechnical investigation such as this report.

5.2 Slope Geomorphology and Subsurface Soil Structure

We performed a series of slope reconnaissance traverses of the moderately steep slope on the northern margin the subject site and adjacent property. This north-facing slope is approximately 300 feet high and extends to the bottom of the Cedar Creek drainage, a small tributary to the Sandy River (See Figure 1). Based on review of the site topographic survey (see Figure 2) and clinometer measurements collected during our reconnaissance traverses, the upper portion of this slope inclines at 40% to 70% grade and includes both concave and slightly convex slope geometries. In contrast the lower portion of the slope, inclines at grades of less than 40% with a concave geometry becoming more gentle towards the toe of the slope at Cedar Creek. Figure 3 presents a slope profile constructed using hand-held clinometer and cloth tape techniques.

Based on observations made during our reconnaissance traverses, slope geomorphology on and directly below the site is generally smooth and uniform consistent with relatively stable slope conditions. No geomorphic evidence of significant slope movement, such as benches, closed depressions, scarps, ground cracks, etc., was observed during our reconnaissance.

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Subsurface soil conditions were evaluated in three exploratory borings drilled along the top of slope on the northern margin of the site. Soil samples were collected and standard penetration tests (SPTs) of soil strength were performed on 5 foot intervals. Logs of the borings are presented in Appendix A. The borings indicate that the Springwater Formation underlying the upper portion of the slope generally consists of highly tuffaceous, clayey silt with varying amounts of highly weathered volcanic lithics and decomposed cobbles. Due to the high degree of weathering and decomposition, the consistency of the Springwater Formation is variable, ranging between medium-stiff and hard. Standard penetration tests of soil strength indicate that Springwater Formation within 35 feet of the ground surface is generally medium-stiff to stiff with SPT N-values of between N=5 and N=12. These N-values are considered to be consistent with low to moderate strength and low to moderate resistance to slope instability. In contrast, standard penetration tests indicate that the Springwater Formation at depths of 35 to 60 feet is generally stiff to hard with SPT N-values of N=13 to N= greater than 50 for 1 inch of penetration. These N-values are considered to be consistent with moderate strength and moderate resistance to slope instability.

5.3 Slope Stability – Lower Slope

We performed a qualitative geologic evaluation of the potential for deep seated slope instability in the Troutdale Formation underlying the lower portion of the slope that extends beyond the northern limits of the subject site. Regionally, the lower section of the Troutdale Formation has a relatively high susceptibility to slope instability due to the presence of weak bedding plane layers and a low internal strength. Because reported bedding planes in the Troutdale Formation generally incline gently to the west at approximate dips of 2 to 3 degrees (Schlicker and Finlayson, 1979), weak bedding planes are unlikely to provide potential failure planes slope movement. Regional distribution patterns indicate that slope failures in the lower section of the Troutdale Formation are triggered more by oversteepening of slopes due to undercutting by stream erosion.

In our assessment, the presence of Troutdale Formation underlying the lower portion of the slope beyond the northern boundary of the subject property does not appear to present a significant instability hazard on the subject site, because: (1) the lower slope inclines at relatively gentle grades (about 10% to 40% grade), (2) the slope is not significantly undercut by Cedar Creek, (3) the Troutdale Formation is somewhat buttressed by deposition of colluvial and alluvial sediments at the toe the slope, and (4) we observed no geomorphic evidence of prior, deep-seated slope instability on the lower slope directly below the subject site.

5.4 Slope Stability Modeling and Quantitative Stability Analysis – Upper Slope

Our slope profile and relevant subsurface data was compiled and used to construct a representative geologic cross section of the slope geometry on and adjacent to the northern portion of the site (Figure 3). A quantitative slope model was then constructed and stability analyses performed to evaluate local slope stability under future conditions with the proposed development cuts at the top of slope. Our analysis presumes that a substantial cut is made at the top of the slope as shown in the project grading plan (Figure 2).

The slope was modeled as a multi-layered system with each layer being an isotropic medium. For the stability evaluation, the most critical circular failure surface was found by analyzing 100 potential failure surfaces. Shear strength parameters used in the model were selected based on correlations

with field SPT N-value measurements and our local experience with similar soil and geologic conditions. The parameters assumed in the slope stability calculations are summarized in Table 1.

Table 1 - Summary of Assumed Soil Strength Parameters

Geologic Unit	Moist Unit Weight (pcf)	Friction Angle	Cohesion (psf)
Weathered Springwater Fm.	125	33°	300
Springwater Fm.	130	36°	500
Troutdale Formation	125	32°	250

Slope stability analyses were performed using the SLOPE/W computer program developed by Geo-Slope International of Calgary, Canada. This numerical analysis program utilizes a two-dimensional limiting equilibrium method to calculate the factor of safety of a potential slip surface and incorporates search routines to identify the most critical potential failure surfaces for the cases analyzed. Factors of safety were calculated using Spencer's method of slices. Potential seismic forces were also incorporated into the analysis using a pseudostatic approach. The pseudostatic analysis used a horizontal ground acceleration of 0.1 g, which is approximately 50 percent of our maximum estimated acceleration for a design seismic event (10 percent probability of exceedence in 50 years). Due to the inherent conservatism of the pseudostatic methodology, it is standard engineering practice to utilize one-half to two-thirds of the expected horizontal accelerations in pseudostatic slope stability calculations.

Results of the slope stability factor of safety calculations are presented in Table 2. Graphic plots of the slope model and analysis output are presented in Appendix B.

Table 2 - Summary of Slope Stability Analysis Results

Cross Section	Slope Conditions	Factor of Safety (Static Conditions)	Factor of Safety (Pseudostatic Conditions)
A-A'	Preliminary Plan Finish Grade	1.46	-
A-A'	Preliminary Plan Finish Grade	-	1.19

Our slope stability analysis indicates that a factor of safety of 1.46 is achieved under post development, static conditions with a finish grade setback from the top of the slope of 40 feet (see Appendix B). Pseudostatic stability calculations indicate that the factor of safety under seismic loading during the maximum probable event is 1.1. Potential failure surfaces closer than 40 feet to the top of slope (finish grade) will have reduced factors-of-safety.

In our opinion, the factors of safety presented in Table 2 against slope instability for both static and pseudostatic conditions are adequate for conventional foundation construction that maintains a minimum 40 foot horizontal setback from the top of the moderately-steep slope on the northern margin of Vista Loop North (Lots 6 through 16). Structures located closer than 40 feet horizontal from the top of slope will need to be evaluated individually and will likely require deepened

foundations and/or soil anchors. For the purpose of determining setbacks from the top of slope, "top of slope" refers to the top of slope resulting after the project grading cuts shown on Figure 2 are made.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Our geotechnical investigation indicates that the proposed residential development is geotechnically feasible provided that the site is developed and constructed in accordance with our recommendations. The potential for damaging deep-seated slope instability is considered to be low for conventional house foundations that maintain a minimum setback of 40 feet from the top of the moderately-steep slope on the northern portion of Vista Loop North. Houses on Vista Loop North Lots 6 through 16 that are situated closer than 40 feet from the top of the slope will likely require deep foundations such as drilled piers or driven piles and soil anchors.

Appendix C contains an itemized checklist of soil testing and inspection procedures that are recommended to help guide the project to completion.

6.1 Slope Stability

The northern margin of Vista Loop North is situated at the top of a moderately-steep, 300-foot-high, north-facing slope. In our opinion, the primary slope instability hazard is the potential for localized slope failure on the steeper upper portion of the slope where grades incline up to 70%. Quantitative slope stability modeling and analysis indicates that at distances of less than 40 feet from the top of the slope, the upper slope has a factor of safety against movement of less than 1.46. We recommend that houses supported on conventional shallow foundations maintain a minimum setback of 40 feet from the top of the moderately-steep slope on the northern portion of the property. Houses on Vista Loop North Lots 6 through 16 situated closer than 40 feet from the top of the slope will likely require deep foundations such as drilled piers or driven piles and soil anchors. These foundations will need to be evaluated and designed individually. For maintaining slope stability, stormwater runoff from the development should not be allowed to flow onto the moderately-steep slopes on the northern margin of the development.

Slope gradients on Vista Loop South are generally gentle except for a localized approximately 20 foot high slope inclining at about 35% to 50% grade on the east-central portion of the site (Figure 4). Exploratory test pits indicate that this slope is underlain by relatively competent soils that have a moderate to high resistance to instability on moderate slopes. The preliminary grading plan specifies that 8 feet of structural fill will be placed at the toe of this slope. In our opinion, the potential for damaging slope instability on this slope is low and no special mitigating measures are necessary for slope stability.

6.2 Site Preparation

All areas to be graded should first be cleared of debris, trees, stumps, vegetation, etc., and all debris from clearing should be removed from the site. Organic-rich topsoil should then be stripped. We anticipate that an average stripping depth of 8 to 10 inches will be necessary to remove organic-rich

topsoil. Localized deeper stripping, or tilling and root-picking, to depths of 12 to 24 inches may be necessary to remove thick topsoil and abundant roots around trees. The final depth of stripping removal will be determined on the basis of a site inspection after the initial stripping has been performed. Stripped topsoil should be stockpiled only in designated areas and stripping operations should be observed and documented by GeoPacific.

Once stripping is approved, the area should be aerated, and/or ripped or tilled to a depth of 8 inches, moisture conditioned, and compacted in-place prior to the placement of engineered fill or crushed aggregate base for pavement (dry weather only). Exposed subgrade soils should be evaluated by the geotechnical engineer. For large areas, this evaluation is normally performed by proof-rolling the exposed subgrade with a fully loaded scraper or dump truck. For smaller areas where access is restricted, the subgrade should be evaluated by probing the soil with a steel probe.

Old fill, subsurface structures, etc, in future structural areas should be demolished, removed from the site, and the excavations backfilled with fill compacted to engineered fill specifications. We anticipate that some old fill may be present on Vista Loop North in the vicinity of Lots 49 through 58.

6.4 Rough Grading

Grading for the proposed development should be performed as engineered grading in accordance with Appendix Chapter 33 of the 1997 Uniform Building Code (UBC) with the exceptions and additions noted herein. Proper test frequency and earthwork documentation usually requires daily observation and testing during stripping, rough grading, and placement of engineered fill. Imported fill material must be approved by the geotechnical engineer prior to its arrival on site.

Engineered fill should be compacted in horizontal lifts not exceeding 8 inches using standard compaction equipment. We recommend that engineered fill be compacted to at least 95% of the maximum dry density determined by Standard Proctor AASHTO T-99 or equivalent. Field density testing should conform to ASTM D2922 and D3017, or D1556. Engineered fill should be observed and tested by GeoPacific. Typically, one density test is performed for at least every 2 vertical feet of fill placed or every 500 yd^3, whichever requires more testing. Because the standard of practice is to perform testing on an on-call basis, we recommend that the earthwork contractor be held contractually responsible for test scheduling and frequency.

Earthwork is usually performed in the summer months, generally mid-June to mid-October, when warm dry weather is available for proper moisture conditioning of soils. Earthwork performed during the wet-weather season will probably require expensive measures such as cement treatment or imported granular material to compact fill to the recommended engineering specifications.

The preliminary grading plan for Vista Loop South specifies an approximately 10 foot thick fill in the bottom of a broad drainage swale extending through the site (Figure 4). We anticipate that soft soils and shallow groundwater may be present in the drainage bottom such that subgrade stabilization measures may be necessary to construct structural fills for lots and streets. We recommend that this area be evaluated in construction prior to fill placement. Recommended subgrade stabilization measures may include imported rock stabilization layers, subdrains, drying out ("baking") of exposed subgrade during hot weather conditions, etc.

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6.5 Landscaping Fill

Landscaping fill not supporting structures may consist of organic soils (such as topsoil strippings) that are free of large woody debris and/or other deleterious material. To limit settlement and shifting, landscaping fill should be compacted to a firm, unyielding state as determined by GeoPacific (typically 90% of standard proctor AASHTO T-99 or equivalent).

6.6 Erosion Control Considerations

Due to the presence of gentle to moderate slope gradients, we consider the potential for adverse erosion during construction to be moderate. Erosion at the site during construction can be minimized by implementing the project erosion control plan specified by the civil engineer, which typically includes the use of straw bales, bio-bags, and silt fences. Where used, these erosion control devices should be in place and remain in place throughout site preparation and construction.

Areas of exposed soil requiring immediate and/or temporary protection against exposure should be covered with either mulch or erosion control netting/blankets. Areas of exposed soil requiring permanent stabilization should be seeded with an approved grass seed mixture, or hydroseeded with an approved seed-mulch-fertilizer mixture. Cut and fill slopes should be seeded or planted as soon as possible after construction, so that vegetation has time to become established before the onset of the next wet-weather season.

6.7 Excavating Conditions and Temporary Excavations

Based on subsurface test pit exploration, we anticipate that the planned excavation depths will generally be achievable with conventional heavy equipment. Some boulders may be encountered, particularly in deeper excavations. All temporary cuts in excess of 4 feet in height should be sloped in accordance with U.S. Occupational Safety and Heath Administration (OSHA) regulations (29 CFR Part 1926), or be shored. At the time of our exploration, native soils at the site were generally classified as Type A and Type B Soil. Temporary excavation side slope inclinations as steep as ¾:1 (Type A) and 1H:1V (Type B) may be assumed for planning purposes. This cut slope inclination is applicable to excavations above the water table only. Maintenance of safe working conditions, including temporary excavation stability, is the responsibility of the contractor. Actual slope inclinations at the time of construction should be determined based on safety requirements and actual soil and groundwater conditions.

Vibrations created by traffic and construction equipment may cause some caving and raveling of excavation walls. In such an event, lateral support for the excavation walls should be provided by the contractor to prevent loss of ground support and possible distress to existing or previously constructed structural improvements.

6.8 Utilities

PVC pipe should be installed in accordance with the procedures specified in ASTM D2321. We recommend that structural trench backfill be compacted to at least 95% of the maximum dry density determined by Standard Proctor AASHTO T-99 or equivalent. Initial backfill lift thickness for a ¾"-0 crushed aggregate base may need to be as great as 4 feet to reduce the risk of flattening underlying

flexible pipe. Subsequent lift thickness should not exceed 1 foot. If imported granular fill material is used, then the lifts for large vibrating plate-compaction equipment (e.g. hoe compactor attachments) may be up to 2 feet, provided that proper compaction is being achieved and each lift is tested. Use of large vibrating compaction equipment should be carefully monitored near existing structures and improvements due to the potential for vibration-induced damage.

Adequate density testing should be performed during construction to verify that the recommended relative compaction is achieved. Typically, one density test is taken for every 4 vertical feet of backfill on each 200-lineal-foot section of trench. Franchise utility trenches are generally not compacted unless they are located near a structural area. Trench spoils spread over lots should be kept to a minimum.

6.9 Pavement Construction

It is our understanding that the project will incorporate the standard City pavement section for dry weather construction consisting of 2.5 inches of asphaltic concrete over 8 inches of crushed aggregate (1 ½"-0 or ¾"-0) compacted to at least 95% of AASHTO T-180 or equivalent. For the purpose of evaluating native soil strength for support of pavement, we performed Portable Dynamic Cone Penetrometer (PDCP) field tests which approximate the California Bearing Ratio (CBR) of in-situ soils (see Appendix A). Using a CBR of 10 for in-situ, native soil at damp to dry moisture conditions, and empirical correlations between CBR and resilient modulus (M_r), in-situ native soil strength is considered adequate for support of the standard pavement section assuming a light duty traffic index of 4.0 and a design life of 20 years.

Areas of yielding, native soil subgrade should be tilled to a minimum depth of 12 to 24 inches, aerated, and recompacted in-place to at least 95% of the maximum dry density obtained by AASHTO T-99 or equivalent. GeoPacific recommends that subgrade strength be verified visually by proof-rolling directly on soil subgrade with a loaded dump truck during dry weather and on top of base course in wet weather. Soft areas which rut, pump, or weave by more than ¼ inch on soil and 1/8 inch on base course should be stabilized prior to paving. Generally, one subgrade, one base course, and one asphalt compaction test is performed for every 100 to 200 linear feet of paving.

If pavement areas are to be constructed during wet weather, GeoPacific should review the subgrade and proposed construction methods immediately prior to the placement of base course so that specific recommendations can be provided. Wet-weather pavement construction is likely to require soil amendment, or woven geotextile fabric and a minimum additional 6 inches of crushed aggregate base.

6.10 Anticipated House Foundations

The majority of the subject site to within 40 feet of the top of slope on Vista Ridge North is suitable for shallow foundations bearing on stiff, native soil and/or engineered fill. Foundation design, construction, and setback requirements should conform to the applicable code at the time of permitting. For protection against frost heave, spread footings should be embedded at a minimum depth of 18 inches below exterior grade. The recommended minimum widths for continuous footings supporting wood-framed walls without masonry are presented in Table 3. Minimum reinforcement consisting of three horizontal No. 4 bars, two in the footing and one in the stem wall, is

recommended. Actual footing widths, sizing, and reinforcement should be determined by the house designer, architect- or engineer-of-record.

Table 3 - Recommended Minimum Width of Continuous Spread Footings

Number of Stories	Minimum Width of Continuous Spread Footings
1-Story	12 inches
2-Story	15 inches
3-Story	18 inches

The recommended allowable soil bearing pressure is 1,500 lbs/ft^2 for footings on stiff, native soil and engineered fill. A maximum chimney and column load of 35 kips is recommended for the site. For heavier loads, GeoPacific should be consulted. The coefficient of friction between on-site soil and poured-in-place concrete may be taken as 0.40 (no factor of safety included). The maximum anticipated total and differential footing movements (generally from soil expansion and/or settlement) are 1 inch and ¾ inch over a span of 20 feet, respectively. Excavations near structural footings should not extend within a 1H:1V plane projected downward from the bottom edge of footings.

Footing excavations should penetrate through topsoil and any loose soil to stiff subgrade that is suitable for bearing support. All footing excavations should be trimmed neat, and all loose or softened soil should be removed from the excavation bottom prior to placing reinforcing steel bars. Due to the moisture sensitivity of on-site native soils, foundations constructed during the wet weather season may require overexcavation of footings and backfill with compacted, crushed aggregate.

6.11 House Foundations Incorporating Retaining Walls

Lateral soil pressures recommended by GeoPacific for design of permanent retaining structures with adequate drainage can be calculated using the equivalent fluid unit weights provided in Table 4. The effect of surcharges or live loads on lateral pressures has not been included. The recommended values assume that adequate drainage measures are incorporated, and that no hydrostatic pressures develop behind the walls. The unit weights in Table 4 are for backfill consisting of free-draining granular material such as crushed aggregate; on-site soils are not recommended for use as retaining wall backfill. Wall backfill should be compacted to at least 95% of the maximum dry density determined by ASTM D698 or equivalent.

The average allowable bearing pressure for retaining walls may be taken as 2,000 lbs/ft^2 with a maximum allowable toe pressure of 2,500 lbs/ft^2. The coefficient of friction between native soil or engineered granular fill and poured-in-place concrete may be taken as 0.45 (no factor of safety added).

Subdrains should be installed behind all retaining walls to prevent the build-up of adverse hydrostatic pressure. We recommend that subdrains consist of ADS Highway Grade (or equivalent), perforated, plastic pipe enveloped in a minimum of 3 ft^3 per lineal foot of 2" - ½", open-graded gravel (drain rock) wrapped with geofabric filter (Amoco 4545, Trevia 1120, or equivalent). A minimum 0.5 percent fall should be maintained throughout the drain and non-perforated pipe outlet.

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Table 4 - Recommended Equivalent Fluid Lateral Earth Pressures

	Unrestrained Wall		Restrained Wall	
Type	Level Profile	2H:1V Upslope	Level Profile	2H:1V Upslope
Active Pressure ($lbs/ft^2/ft$)	32	46	-	-
At-Rest Pressure ($lbs/ft^2/ft$)	-	-	50	65
Passive Pressure * ($lbs/ft^2/ft$)	280	280	250	250

* Passive pressure values are allowable and include a factor of safety of 1.5. For passive pressure calculations, the upper 6 inches of embedment should be ignored.

For concrete retaining walls in living spaces, waterproofing and a geocomposite wall drain such as Tuff-N-Dry and Warm-N-Dry or CONTECH C-DRAIN 11K, or equivalent are recommended to minimize the potential for interior moisture problems.

6.12 Footing Subdrains, Roof Drains, and Drainage

Footing subdrains constructed as standard practice should consist of a minimum 3-inch diameter ADS Highway Grade (or equivalent), perforated, plastic pipe enveloped in a minimum of 1 ft^3 per lineal foot of 2"- ½", open, graded gravel (drain rock) wrapped with geofabric filter (Amoco 4545, Trevia 1120, or equivalent). Subdrains should be connected to the storm drain system or daylight to a suitable outfall location. A minimum 0.5% fall should be maintained throughout all subdrains and non-perforated pipe outlets. Footing subdrains are normally installed for mitigating detrimental effects of water on foundations only, and are not intended for elimination of all potential sources of water beneath the house or within crawl spaces.

Additional subdrains such as cut-off trenches or blanket drains may be necessary to facilitate drainage of springs encountered during construction. If springs are encountered during construction, GeoPacific Engineering should be contacted to make site-specific recommendations.

Surface water drainage should be directed away from structures. In no case should roof drains be connected to footing drains.

6.13 Seismic Design

The subject site is located in a region of moderate seismic risk, and moderate levels of earthquake shaking should be anticipated during the design life of the proposed structures and improvements. Probabilistic assessments of the seismic shaking hazard in Oregon predict that in the next 50 years bedrock underlying the subject site has a 10% probability of experiencing a peak ground acceleration (PGA) of 0.18 g, a 5% probability of experiencing a PGA of 0.22 g, and a 2% probability of experiencing a PGA of 0.34 g (Geomatrix, 1995).

Seismic design requirements for single-family homes are included in the Oregon One- and Two-Family Dwelling Specialty Code, which specifies the site location as being in Seismic Design Category D_1. Structures not governed by the One- and Two- Family Dwelling Specialty Code should be designed to resist earthquake loading in accordance with the methodology described in section 1615 of the State of Oregon 2004 Structural Specialty Code (OSSC) Amendments to the 2003 International Building Code (IBC). The maximum considered earthquake ground motion for short period and 1.0 second period spectral response may be determined from map Figures 1615(1) and 1615(2) of the State of Oregon 2004 Structural Specialty Code (OSSC) or the 2003 National Earthquake Hazard Reduction Program (NEHRP) "Recommended Provisions for Seismic Regulations for New Buildings and Other Structures" published by the Building Seismic Safety Council. We recommend Site Class D be used for design per the OSSC, Table 1615.1.1. Using this information, the structural engineer can select the appropriate site coefficient values (F_a and F_v) from Tables 1615.1.2(1) and 1615.1.2(2) of the 2003 IBC to determine the maximum considered earthquake spectral response acceleration for design of the project.

In our opinion, the potential for liquefaction or liquefaction-related ground failure at the subject site is very low, and no special mitigating measures are recommended against liquefaction.

7.0 UNCERTAINTY AND LIMITATIONS

We have prepared this report for the developer and designers, for use on this project only. The report should be provided in its entirety to prospective contractors for bidding and estimating purposes; however, the conclusions and interpretations presented in this report should not be construed as a warranty of the subsurface conditions. Inconsistent conditions can occur between explorations that may not be detected by a geotechnical study. If, during future site operations, subsurface conditions are encountered which vary appreciably from those described herein, GeoPacific should be notified for review of the recommendations of this report, and revision of such if necessary.

We recommend that GeoPacific perform sufficient geotechnical monitoring, testing and consultation during construction to confirm that the conditions encountered are consistent with those indicated by explorations, and to verify that the geotechnical aspects of construction comply with the contract plans and specifications. Recommendations for design changes will be provided should conditions revealed during construction differ from those anticipated. The checklist attached to this report (Appendix C) outlines the minimum recommended geotechnical observations and testing for the project.

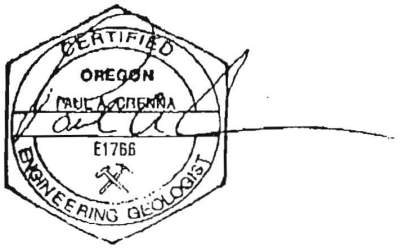
Within the limitations of scope, schedule and budget, GeoPacific attempted to execute these services in accordance with generally accepted professional principles and practices in the fields of geotechnical engineering and engineering geology at the time the report was prepared. No warranty, express or implied, is made. The scope of our work did not include environmental assessments or evaluations regarding the presence or absence of wetlands or hazardous or toxic substances in the soil, surface water, or groundwater at this site.

Project No. 05-9266
Vista Loop

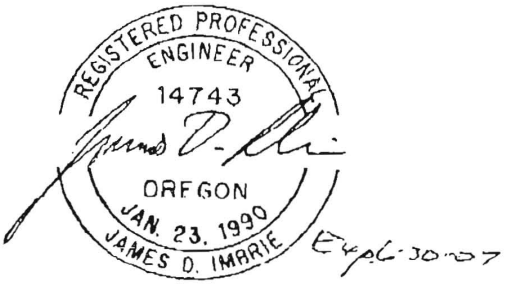
We appreciate this opportunity to be of service.

Sincerely,

GEOPACIFIC ENGINEERING, INC.



Paul A. Crenna, C.E.G.
Engineering Geologist



James D. Imbrie, P.E., C.E.G
Geotechnical Engineer

8.0 REFERENCES CITED

Geomatrix Consultants, 1995, Seismic Design Mapping, State of Oregon: unpublished report prepared for Oregon Department of Transportation, Personal Services Contract 11688, January 1995.

Hofmeister, R.J., Hasenberg, C.S., Madin, I.P, and Wang, Y., 2003, Relative earthquake and landslide hazards in Clackamas County: Oregon Department of Geology and Mineral Industries Open File Report O-03-09, map scale 1:100,000.

Schlicker, H.G. and Finlayson, C.T., 1979, Geology and Geologic Hazards of northwestern Clackamas County, Oregon: Oregon Department of Geology and Mineral Industries, Bulletin No. 99, 79 p., scale 1:24,000.

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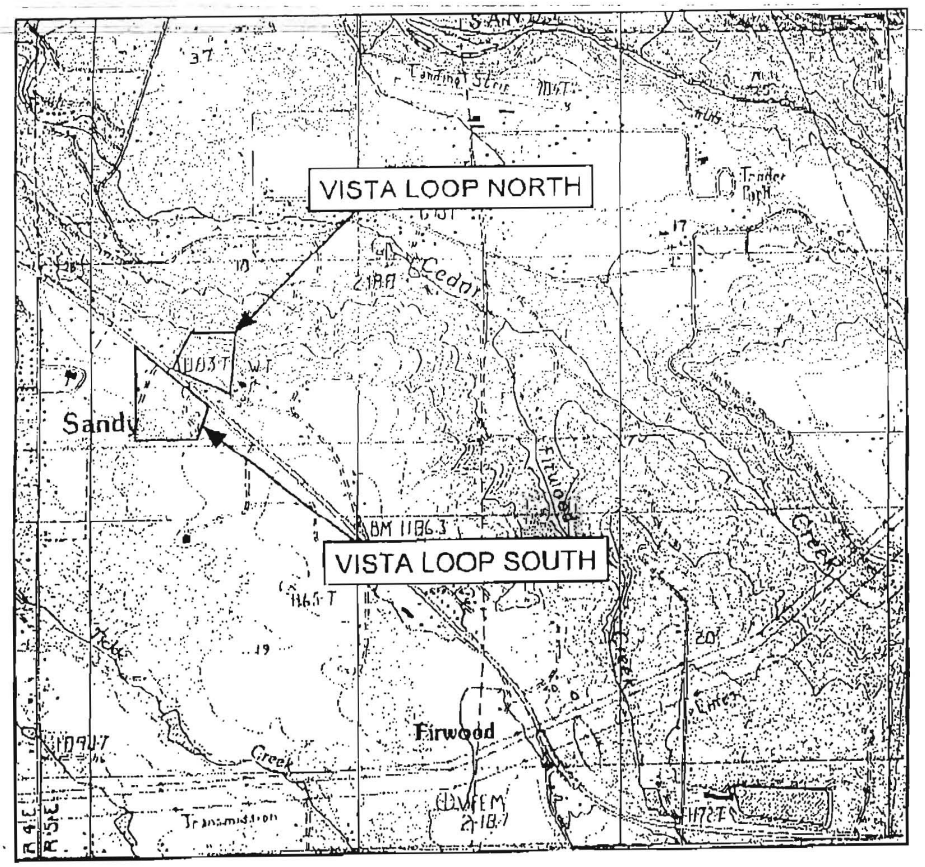
VICINITY MAP

NORTH



Legend

Approximate Scale 1 in = 2,000 ft

Date: 8/16/05
Drawn by: PAC

Base map: U.S. Geological Survey 7.5 minute Topographic Map Series, Bull Run Quadrangle, 1985

Project: Vista Loop Sandy, Oregon	Project No. 05-9266	FIGURE 1

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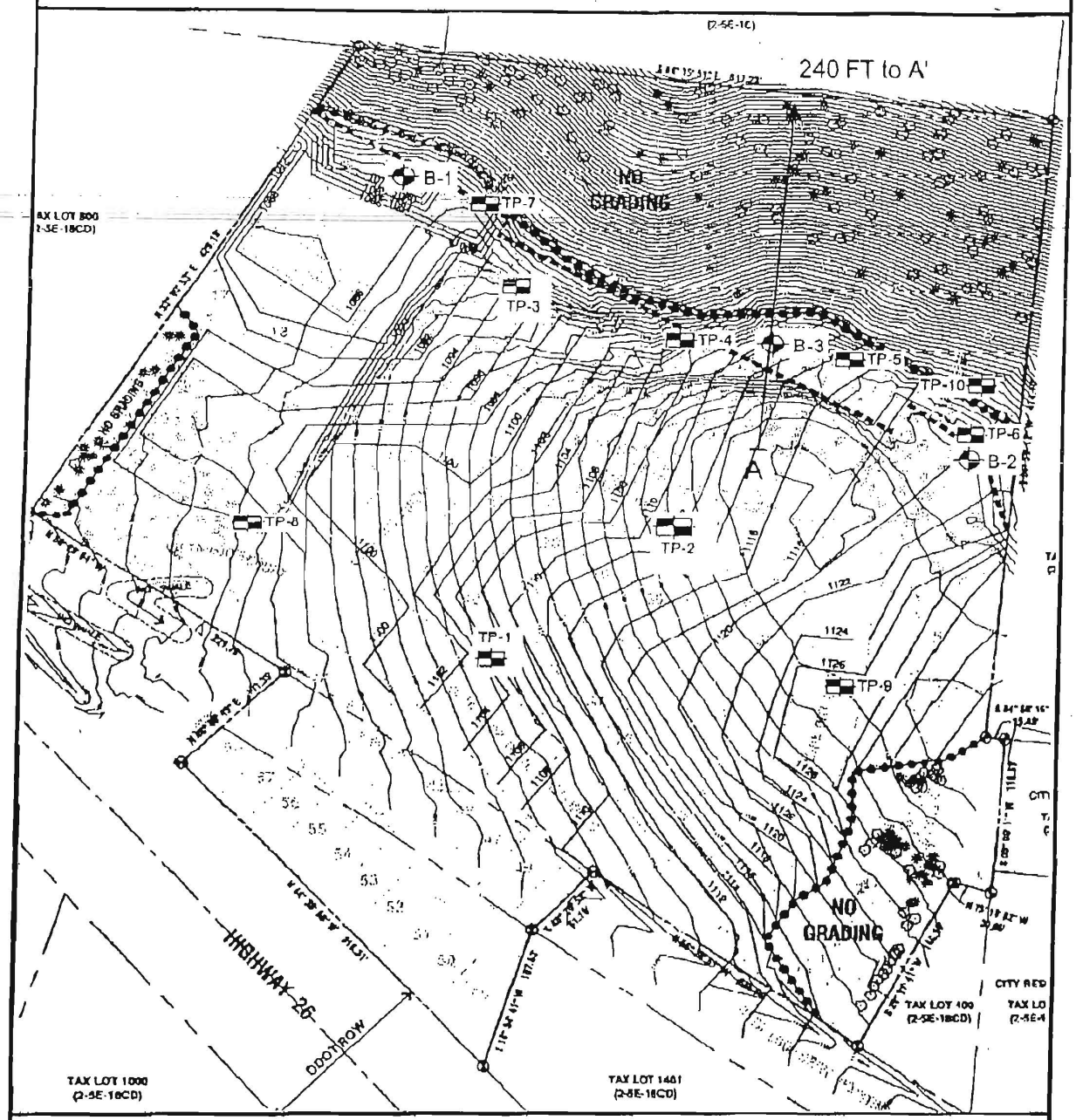
VISTA LOOP NORTH GRADING PLAN WITH EXPLORATIONS



Legend

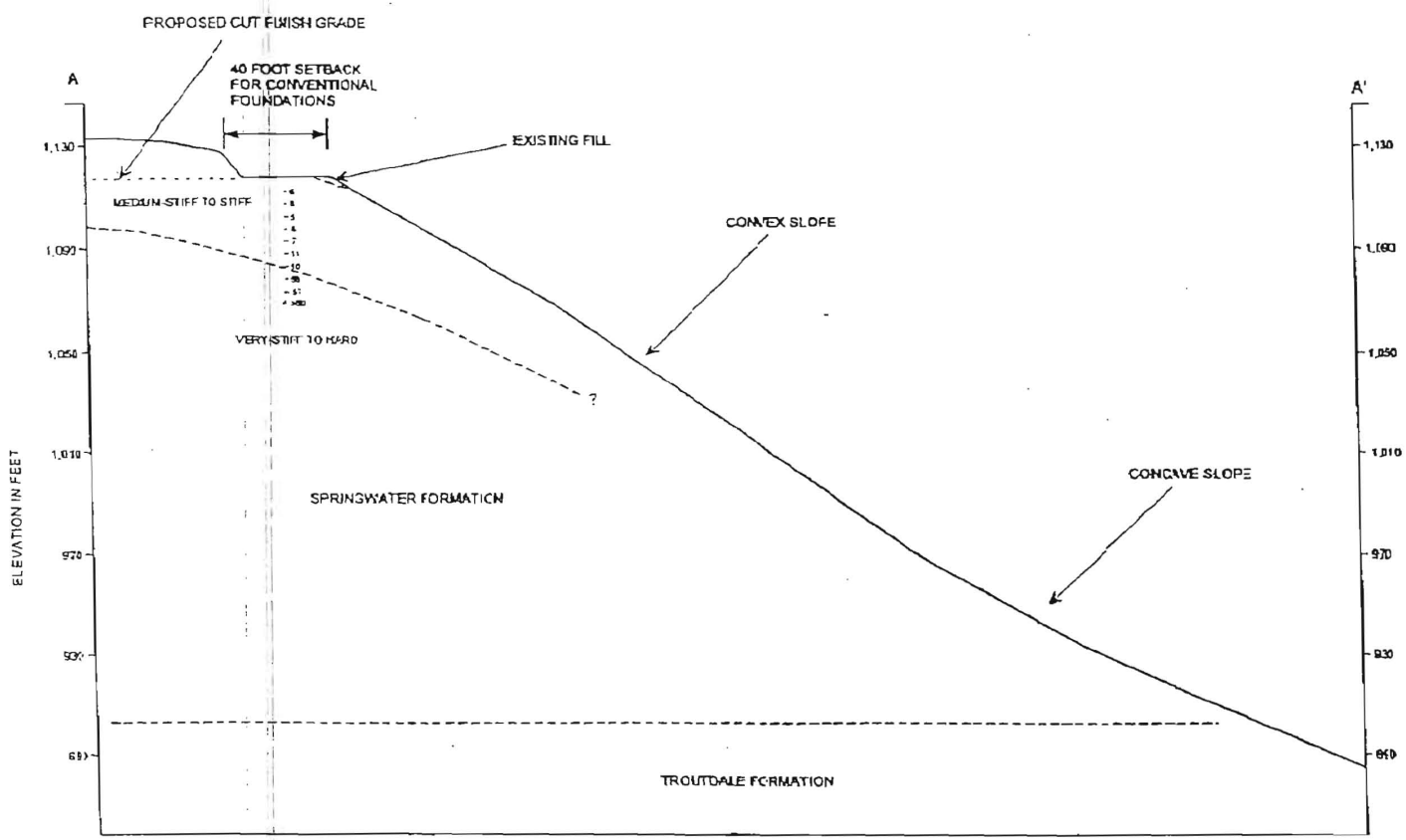
TP-2 EXPLORATORY TEST PIT

B-2 EXPLORATORY BORING

APPROXIMATE SCALE 1 IN = 100 FT

Date: 8/16/05
Drawn by: PAC

Project: Vista Loop Sandy, Oregon	Project No. 05-9266	FIGURE 2



NOTES: (1) SLOPE PROFILE WAS CONSTRUCTED USING HAND-HELD CLINOMETER MEASUREMENTS SOLELY FOR USE IN THIS REPORT AND SHOULD NOT BE CONSIDERED ACCURATE FOR OTHER USES.

(2) LOCATION OF ALL GEOTECHNICAL INFORMATION IS APPROXIMATE

APPROXIMATE SCALE

0 40 80 FEET

IN = 40 FT

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GEOLOGIC CROSS SECTION

Project: Vista Loop North Sandy Oregon	Project No. 05-9266	Drawn By: PAC	FIGURE 3

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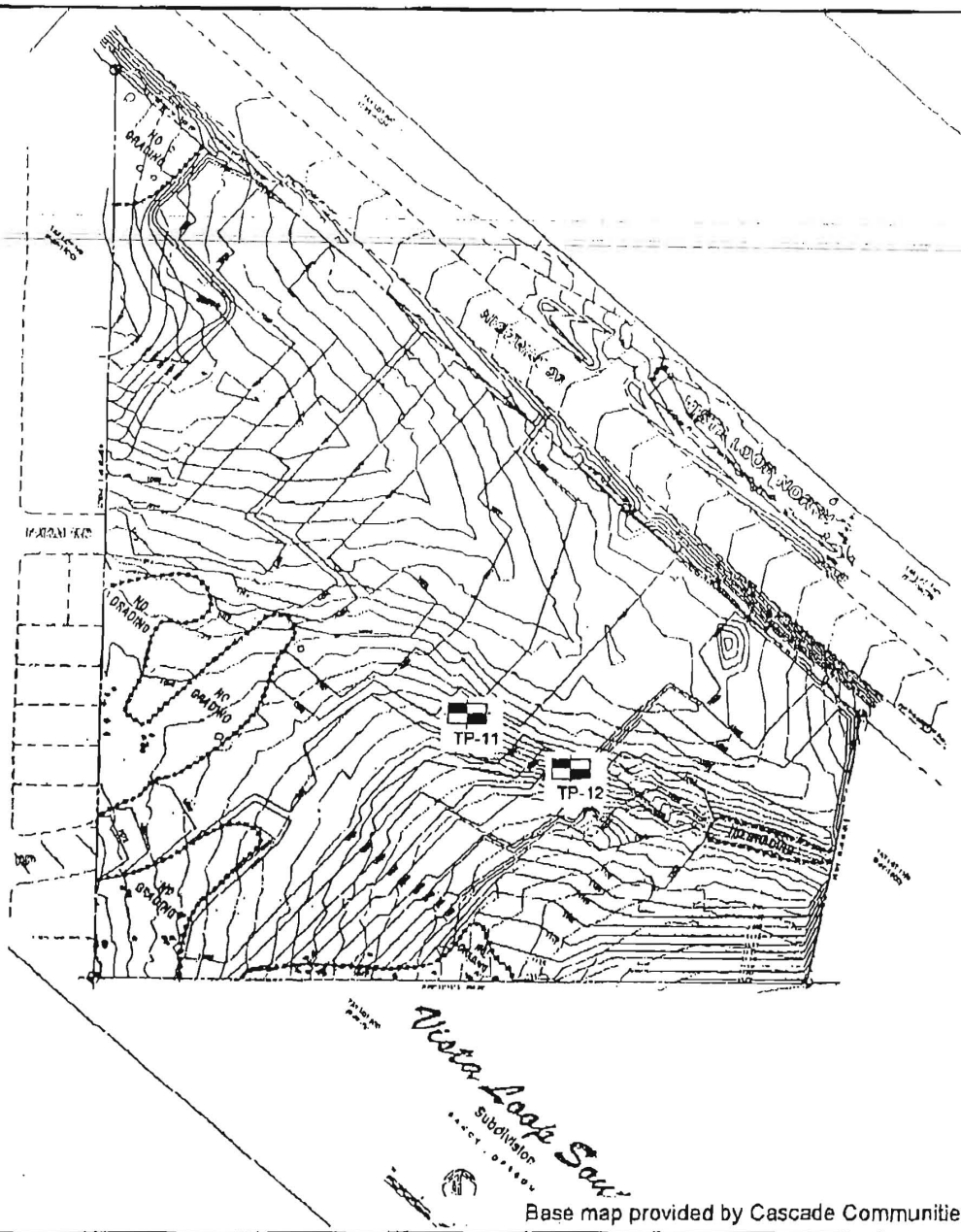
VISTA LOOP SOUTH GRADING PLAN WITH EXPLORATIONS



Base map provided by Cascade Communities, Inc.

Legend

TP-2 EXPLORATORY TEST PIT

APPROXIMATE SCALE 1 IN = 200 FT

Date: 8/15/05
Drawn by: PAC

Project: Vista Loop Sandy, Oregon	Project No. 05-9266	FIGURE 4

Project No. 05-9266
Vista Loop

APPENDIX A

FIELD EXPLORATIONS, SAMPLING, LABORATORY AND FIELD TESTING

On May 18, 2005, twelve exploratory test pits were excavated on the subject property to depths of 8 to 12 feet. On May 31 and June 1 of 2005, three exploratory borings were advanced to depths of 51.5 to 61.5 feet. The approximate exploration locations are shown on Figure 2. A GeoPacific Engineering Geologist evaluated and logged the explorations with regard to soil type, moisture content, relative strength, groundwater content, etc. and collected representative samples. Logs of the explorations are presented in this Appendix. The borings were drilled with track-mounted drill-rigs operated by Geotechnical Explorations, Inc. of Tualatin, Oregon. Standard penetration tests were performed on 5-foot intervals using a standard 2-inch O.D., split-spoon sampler driven with a 140 pound auto-hammer. The test pits were excavated with a 16,000 lbs. trackhoe operated by Dan Fisher Excavating of Banks, Oregon using a 30-inch-wide bucket. All excavations were backfilled immediately after completion of logging and sampling. At the completion of the test pit logging, the test pits were backfilled with the excavated spoils and tamped with the backhoe bucket. This backfill should not be expected to behave as compacted structural fill and some minor settling of the ground surface may occur.

Classification, Moisture Content, and Unit Weights

Soil samples were evaluated, described, and classified in accordance with the Unified Soil Classification System. Rock hardness was characterized using a modified version of the Oregon Department of Transportation (ODOT) Soil and Rock Classification Manual (Table A2). All natural moisture samples were collected in plastic bags, and tested in accordance with the methods outlined in ASTM D2216. Moisture content is expressed as a percentage of the mass of water lost during oven drying to the dry weight of soil.

Moisture-Density Relationship

A Standard Proctor compaction test was performed on one bulk sample from the site to determine the moisture-density relationship of native soils. The test was conducted in accordance with AASHTO T-99. The results obtained may be compared with field densities for the purpose of evaluating relative compaction of fill and native soils. The test results are summarized in Table B1.

Table B1 - Proctor Test Results (AASHTO T-99)

Material Description	Maximum Dry Density (lbs/ft^3)	Optimum Moisture Content
Clayey SILT (ML)	88.0	30.8%

Portable Dynamic Cone Penetrometer Tests

Field tests were conducted with a Portable Dynamic Cone Penetrometer (PDPC) to determine the strength parameters of the native soil for support of pavement.

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TEST PIT LOG

Project: Vista Loop North
Sandy, Oregon

Project No. 05-9266

Test Pit No. **TP-1**

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
						Dark brown, organic SILT (OL), many roots and organics (Topsoil)
1	1.5					Stiff to very stiff, clayey SILT (ML), brown to red-brown, few roots, moist (Native Soil Horizon)
2	2.5					
3	3.0					
4	3.0					Very-stiff, clayey SILT (ML), red-brown, includes sand below 8 feet, damp to moist (Residual Soil)
5						
6						
7						Minor groundwater seepage at 7 feet
8						
9						
10						Test Pit Terminated at 10 feet
11						
12						Note: Minor groundwater seepage encountered at 7 feet
13						
14						
15						
16						
17						

LEGEND

Peg Sample (100 to 1,800 g) | Bucket Sample (5 Gal. Bucket) | Shelby Tube Sample | Seepage | Water Bearing Zone | Water Level at Abandonment

Date Excavated: 5/18/05
Logged By: P. Crenna
Surface Elevation:

GeoPacific Engineering, Inc.
7312 SW Durham Road
Portland, Oregon 97224
Tel: (503) 598-8445 Fax: (503) 598-8705

TEST PIT LOG

Project: Vista Loop North
Sandy, Oregon

Project No. 05-9266

Test Pit No. **TP-2**

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	0.5					Dark brown, organic SILT (OL), many roots (Topsoil)
2	1.5					Stiff, clayey SILT (ML), red-brown, moist (Native Soil)
3	3.0					
4	3.5					Very-stiff, clayey SILT (ML) to silty CLAY (CL), red-brown with localized gray and orange mottling, damp to moist (Residual Soil)
5						
6						
7						
8						
9						
10						Test Pit Terminated at 10 feet
11						
12						Note: No seepage or groundwater encountered.
13						
14						
15						
16						
17						

LEGEND

Bag Sample

Bucket Sample

Shelby Tube Sample

Seepage

Water Bearing Zone

Water Level at Abandonment

Date Excavated: 5/18/05
Logged By: P. Crenna
Surface Elevation:

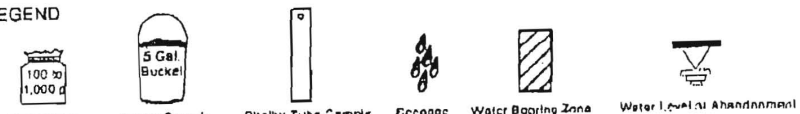
GeoPacific Engineering, Inc.
7312 SW Durham Road
Portland, Oregon 97224
Tel: (503) 598-0445 Fax: (503) 598-8705

TEST PIT LOG

Project: Vista Loop North Sandy, Oregon	Project No. 05-0266	Test Pit No. TP-3

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
						Dark brown, organic SILT (OL), many roots (Topsoil)
1	0.5					
2	1.5					Stiff to very stiff with localized loose pockets, clayey SILT (ML), brown to red-brown, moist (Colluvial soil)
3	3.0					
4	2.5					
5						Very-stiff, clayey SILT (ML) to lean CLAY (CL), red-brown with localized orange and gray mottling, damp to moist (Residual Soil)
6						
7						
0						Minor groundwater seepage at 7 feet
9						
10						Test Pit Terminated at 10 feet
11						
12						Note: Minor groundwater seepage encountered at 7 feet.
13						
14						
15						
16						
17						

LEGEND



Date Excavated: 5/18/05
Logged By: P. Crenna
Surface Elevation:

GeoPacific Engineering Inc
7312 SW Durham Road
Portland, Oregon 97224
Tel: (503) 598-8445 Fax: (503) 598-8705

TEST PIT LOG

Project: Vista Loop North
Sandy, Oregon

Project No. 05-9266

Test Pit No. TP-4

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
1–4						Variable consistency with loose pockets, mixed organic SILT (OL) and clayey SILT (ML), dark brown to red-brown (Poorly Compacted Fill)
5–7	1.5					Stiff to very-stiff, clayey SILT (ML) to silty CLAY (CL), red-brown, moist (Residual Soil)
8–11						Stiff to very-stiff, sandy SILT (ML), multi-colored light yellow-brown, red, brown, orange, gray and black, highly tuffaceous with relict volcanic lithics, moist (Springwater Formation)
12						Test Pit Terminated at 12 feet
13–17						Note: No seepage or groundwater encountered.

LEGEND

Bag Sample

Bucket Sample

Shelby Tube Sample

Seepage

Water Bearing Zone

Water Level at Abandonment

Date Excavated: 5/18/05
Logged By: P. Crenna
Surface Elevation:

GeoPacific Engineering Inc
7312 SW Durham Road
Portland, Oregon 97224
Tel: (503) 598-8445 Fax: (503) 598-8706

TEST PIT LOG

Project: Vista Loop North Sandy, Oregon	Project No. 05-9266	Test Pit No. TP-5

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
1						Variable consistency with loose pockets, mixed organic SILT (OL) and clayey SILT (ML), dark brown to red-brown (Poorly Compacted Fill)
2						
3						Stiff, clayey SILT (ML), red-brown, contains abundant fragments of decomposed volcanic lithics, moist (Colluival Soil)
4						
5	1.5					
6						Stiff to very-stiff, sandy SILT (ML) with clay, multi-colored light yellow-brown, red, brown, orange, gray and black, highly tuffaceous, includes abundant relict volcanic lithics, moist (Springwater Formation)
7						
8						
9						
10						Test Pit Terminated at 10 feet
11						
12						Note: No seepage or groundwater encountered.
13						
14						
15						
16						
17						

LEGEND

Bag Sample

Bucket Sample

Shelby Tube Sample

Seepage

Water Bearing Zone

Water Level at Abandonment

Date Excavated: 5/18/05
Logged By: P. Crenna
Surface Elevation:

GeoPacific Engineering Inc
7312 SW Durham Road
Portland, Oregon 97224
Tel: (503) 590-0445 Fax: (503) 598-8705

TEST PIT LOG

Project: Vista Loop North
Sandy, Oregon

Project No. 05-9266

Test Pit No. **TP- 6**

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
						Dark brown, organic SILT (OL), many roots (Topsoil)
1						
2	1.0					Stiff with loose pockets, clayey SILT (ML) with fragments of decomposed volcanic lithics, red-brown, brown and yellow-brown, moist (Colluvial Soil)
3	0.5					
4	1.0					
5	3.0					
6						Stiff to very-stiff, sandy SILT (ML) with clay and weathered volcanic lithics including cobbles, light gray-brown, yellow-brown, orange, gray and black, highly tuffaceous, moist (Springwater Formation)
7						
8						
9						
10						Test Pit Terminated at 10 feet
11						
12						Note: No seepage or groundwater encountered.
13						
14						
15						
16						
17						

LEGEND

Bag Sample

Bucket Sample

Shelby Tube Sample

Seepage

Water Bearing Zone

Water Level at Abandonment

Date Excavated: 5/18/05
Logged By: P. Crerina
Surface Elevation:

GeoPacific Engineering Inc.
7312 SW Durham Road
Portland, Oregon 97224
Tel: (503) 598-8445 Fax: (503) 598-8705

TEST PIT LOG

Project: Vista Loop North Sandy, Oregon	Project No. 05-9266	Test Pit No. TP-7

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
1–4						Medium-stiff with loose pockets, mixed organic SILT (OL) and clayey SILT (ML), dark brown and red-brown, damp to moist (Fill)
5–7						Stiff, clayey SILT (ML), red-brown, moist (Residual Soil)
8–9						Stiff to very-stiff, sandy SILT (ML) with abundant weathered volcanic lithics, light yellow-brown, brown, red-brown, and gray, moist (Springwater Formation)
10–17						Test Pit Terminated at 10 feet Note: No seepage or groundwater encountered.

LEGEND

Bag Sample

Bucket Sample

Shelby Tube Sample

Seepage

Water Bearing Zone

Water Level at Abandonment

Date Excavated: 5/18/05
Logged By: P. Crenna
Surface Elevation:

GeoPacific Engineering, Inc.
7312 SW Durham Road
Portland, Oregon 97224
Tel: (503) 598-8445 Fax: (503) 598-8705

TEST PIT LOG

Project: Vista Loop North
Sandy, Oregon

Project No. 05-9266

Test Pit No. **TP- 8**

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
1	1.5					
2	3.0					Stiff to very-stiff, sandy SILT (ML) with clay, red-brown, moist (Residual Soil)
3	3.5					
4	3.5					
5						
6						
7						
8						Test Pit Terminated at 8 feet
9						
10						Note: No seepage or groundwater encountered.
11						
12						
13						
14						
15						
16						
17						

LEGEND

Bag Sample

Bucket Sample

Shelby Tube Sample

Seepage

Water Bearing Zone

Water Level at Abandonment

Date Excavated: 5/18/05
Logged By: D. Cronna
Surface Elevation:

GeoPacific Engineering, Inc.
7312 SW Durham Road
Portland, Oregon 97224
Tel: (503) 598-8445 Fax: (503) 598-8705

TEST PIT LOG

Project: Vista Loop North Sandy, Oregon	Project No. 05-9266	Test Pit No. **TP-9**

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
						Dark brown, organic SILT (OL), many roots (Topsoil)
1						
2	3.0					Very-stiff, clayey SILT (ML), red-brown, moist (Native Soil)
3	3.0					
4	3.5					
5						Very-stiff, clayey SILT (ML) to silty CLAY (CL), red-brown, damp to moist (Residual Soil)
6						
7						
8						
9						
10						Test Pit Terminated at 10 feet
11						
12						Note: No seepage or groundwater encountered.
13						
14						
15						
16						
17						

LEGEND

Bag Sample

Bucket Sample

Shelby Tube Sample

Seepage

Water Bearing Zone

Water Level at Abandonment

Date Excavated: 5/18/05
Logged By: P. Crenna
Surface Elevation:

GeoPacific Engineering Inc.
7312 SW Durham Road
Portland, Oregon 97224
Tel: (503) 598-8445 Fax: (503) 598-8705

TEST PIT LOG

Project: Vista Loop North
Sandy, Oregon

Project No. 05-9266

Test Pit No. TP-10

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
1						Dark brown, organic SILT (OL), many roots (Topsoil)
2	2.0					Stiff to very-stiff, clayey SILT (ML), red-brown, includes few weathered volcanic lithics and roots, moist (Colluvial Soil)
3	2.5					
4	3.0					
5						Very-stiff, sandy SILT (ML) with clay and abundant weathered volcanic lithics, includes few cobbles, red-brown, gray, light brown, and yellow-brown, highly tuffaceous, damp to moist (Residual Soil)
6						
7						
8						
9						
10						Test Pit Terminated at 10 feet
11						
12						Note: No seepage or groundwater encountered.
13						
14						
15						
16						
17						

LEGEND

Bag Sample (100 to 1,000 g) | Bucket Sample (5 Gal. Bucket) | Shelby Tube Sample | Seepage | Water Bearing Zone | Water Level at Abandonment

Date Excavated: 5/18/05
Logged By: P. Crenna
Surface Elevation:

GeoPacific Engineering, Inc.
7312 SW Durham Road
Portland, Oregon 97224
Tel: (503) 598-0445 Fax: (503) 598-8705

TEST PIT LOG

Project: Vista Loop North
Sandy, Oregon

Project No. 05-9266

Test Pit No. TP-11

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
						Dark brown, organic SILT (OL), many roots (Topsoil)
1	1.5					Stiff to very-stiff, clayey SILT (ML), brown to red-brown, damp to moist (Native Soil)
2	3.0					
3	3.0					
4	3.0					Very-stiff, clayey SILT (ML), red-brown, damp to moist (Residual Soil)
5						
6						
7						
8						Test Pit Terminated at 8 feet
9						
10						Note: No seepage or groundwater encountered.
11						
12						
13						
14						
15						
16						
17						

LEGEND

Bag Sample

Bucket Sample

Shelby Tube Sample

Seepage

Water Bearing Zone

Water Level at Abandonment

Date Excavated: 5/18/05
Logged By: P. Crenna
Surface Elevation:

GeoPacific Engineering Inc.
7312 SW Durham Road
Portland, Oregon 97224
Tel: (503) 598-0445 Fax: (503) 598-8705

TEST PIT LOG

Project: Vista Loop North
Sandy, Oregon

Project No. 05-8266

Test Pit No. **TP-12**

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
1						Dark brown, organic SILT (OL), many roots (Topsoil)
2	3.0					Very-stiff, clayey SILT (ML), brown to red-brown, damp to moist (Colluvial Soil)
3	3.5					
4	3.5					
5						Very-stiff, clayey SILT (ML), red-brown with gray mottling below 8 feet, damp (Residual Soil)
6						
7						
8						
9						
10						Test Pit Terminated at 10 feet
11						
12						Note: No seepage or groundwater encountered.
13						
14						
15						
16						
17						

LEGEND

100 to 1,000 g — Bag Sample
5 Gal. Bucket — Bucket Sample
Shelby Tube Sample
Seepage
Water Bearing Zone
Water Level at Abandonment

Date Excavated: 5/18/05
Logged By: P. Cronne
Surface Elevation:

GeoPacific Engineering Inc.
7312 SW Durham Road
Portland, Oregon 97224
Tel: (503) 598-8445 Fax: (503) 598-8705

BORING LOG

Project: Vista Loop North
Sandy, Oregon

Job No. 05-9266

Boring No. B-1

Depth (ft)	Sample Type	N-Value	Well Construction	Moisture Content (%)	Water Bearing Zone	Material Description
5		5				Medium-stiff, clayey SILT (ML) and organic SILT (OL), red-brown and dark brown (Fill and Topsoil)
10		21				Medium-stiff to very-stiff, sandy SILT (ML) with clay and abundant fragments of weathered volcanic lithics, highly tuffaceous, red-brown, brown, gray and black, moist (Springwater Formation)
15		6				
20		2/ 50 for 5"				
25		6				Medium-stiff to very-stiff, sandy SILT (ML) with clay and abundant fragments of weathered volcanic lithics, highly tuffaceous, red-brown, brown, gray and black, moist (Springwater Formation)
30		8				
35						

LEGEND

Bag Sample (100 to 1,000 g) | Split-Spoon | Shelby Tube Sample | Static Water Table at Drilling | Static Water Table | Water Bearing Zone

Date Drilled: 5/31/05
Logged By: P. Crenna
Surface Elevation:

GeoPacific Engineering, Inc.
7312 SW Durham Road
Portland, Oregon 97224
Tel: (503) 598-8445 Fax. (503) 598-8705

BORING LOG

Project: Vista Loop North Sandy, Oregon	Job No. 05-9266	Boring No. B-1

Depth (ft)	Sample Type	N-Value	Well Construction	Moisture Content (%)	Water Bearing Zone	Material Description
		7				
40		13				Stiff to hard, sandy SILT (ML), brown to gray, includes volcanic lithics, damp (Springwater Formation)
45		23				
50		50 for 3"				
55		75				Hard, gravelly SILT (ML) with sand and volcanic lithics, indurated, highly tuffaceous, damp (Springwater Formation)
60		50 for 1"				
						Boring Terminated at 61.5 feet
65						Note: No groundwater observations possible due to use of mud-rotary drilling technique.
70						

LEGEND

Bag Sample (100 to 1,000 g) | Split-Spoon | Shelby Tube Sample | Static Water Table at Drilling | Static Water Table | Water Bearing Zone

Date Drilled: 5/31/05
Logged By: P. Crenna
Surface Elevation:

GeoPacific Engineering, Inc.
7312 SW Durham Road
Portland, Oregon 97224
Tel: (503) 598-8445 Fax: (503) 598-8705

BORING LOG

Project: Vista Loop North
Sandy, Oregon

Job No. 05-0266

Boring No. B-2

Depth (ft)	Sample Type	N-Value	Well Construction	Moisture Content (%)	Water Bearing Zone	Material Description
5		0				Soft, clayey SILT (ML), some sand, red-brown, highly tuffaceous, moist (Residual Soil)
10		5				Medium-stiff to stiff, sandy SILT (ML) with clay and abundant fragments of weathered volcanic lithics, red-brown, brown to yellow-brown and gray, highly tuffaceous, moist (Springwater Formation)
15		6				
20		12				
25		9				
30		8				Medium-stiff to stiff, sandy SILT (ML) with clay and abundant fragments of weathered volcanic lithics, red-brown, brown to yellow-brown and gray, highly tuffaceous, moist (Springwater Formation)
35						

LEGEND

100 to 1,000 g — Bag Sample; Split-Spoon; Shelby Tube Sample; Static Water Table at Drilling; Static Water Table; Water Bearing Zone

Date Drilled: 5/31/05
Logged By: P. Crenna
Surface Elevation:

GeoPacific Engineering Inc.
7312 SW Durham Road
Portland, Oregon 97224
Tel: (503) 598-8445 Fax: (503) 598-8705

BORING LOG

Project: Vista Loop North
Sandy, Oregon

Job No. 05-9266

Boring No. B-2

Depth (ft)	Sample Type	N-Value	Well Construction	Moisture Content (%)	Water Bearing Zone	Material Description
40		9				Stiff to hard, sandy SILT (ML) with clay and abundant fragments of weathered volcanic lithics, red-brown, brown to yellow-brown and gray, highly tuffaceous, moist (Springwater Formation)
		49				
45		16				
50		19				
						Boring Terminated at 51.5 feet
55						Note: No groundwater observations possible due to use of mud-rotary drilling technique.
60						
65						
70						

LEGEND

100 to 1,000 g — Bag Sample; Split-Spoon; Shelby Tube Sample; Static Water Table at Drilling; Static Water Table; Water Bearing Zone

Date Drilled: 5/31/05
Logged By: P. Crenna
Surface Elevation:

GeoPacific Engineering Inc.
7312 SW Durham Road
Portland, Oregon 97224
Tel: (503) 598-0445 Fax: (503) 598-8705

BORING LOG

Project: Vista Loop North Sandy, Oregon	Job No. 05-9266	Boring No. B-3

Depth (ft)	Sample Type	N-Value	Well Construction	Moisture Content (%)	Water Bearing Zone	Material Description
5		6				Medium-stiff, sandy SILT (ML) with clay and abundant fragments of weathered volcanic lithics, red-brown, brown, gray and black, highly tuffaceous, moist (Springwater Formation)
10		5				
15		5				
20		8				Medium-stiff to stiff, sandy SILT (ML) with clay and abundant fragments of weathered volcanic lithics, gray, red-brown and brown, highly tuffaceous, moist (Springwater Formation)
25		7				
30		11				
35						

LEGEND

Bag Sample (100 lb 1,000 g) | Split-Spoon | Shelby Tube Sample | Static Water Table at Drilling | Static Water Table | Water Bearing Zone

Date Drilled: 6/1/05
Logged By: P. Crenna
Surface Elevation:

GeoPacific Engineering Inc.
7312 SW Durham Road
Portland, Oregon 97224
Tel: (503) 598-8445 Fax: (503) 598-8705

BORING LOG

Project: Vista Loop North
Sandy, Oregon

Job No. 05-9266

Boring No. **B-3**

Depth (ft)	Sample Type	N-Value	Well Construction	Moisture Content (%)	Water Bearing Zone	Material Description
40		10				Stiff to hard, sandy SILT (ML) with clay pods and abundant fragments of weathered volcanic lithics, gray, brown, buff and light green-brown, highly tuffaceous, moist (Springwater Formation)
		35				
45		57				
50		16/ 50 for 5"				
						Boring Terminated at 51.5 feet
55						Note: No groundwater observations possible due to use of mud-rotary drilling technique.
60						
65						
70						

LEGEND

Bag Sample (100 to 1,000 g) | Split-Spoon | Shelby Tube Sample | Static Water Table at Drilling | Static Water Table | Water Bearing Zone

Date Drilled: 6/1/05
Logged By: P. Crenna
Surface Elevation:

Project No. 05-9266
Vista Loop

APPENDIX B

SLOPE STABILITY QUANTITATIVE MODELING ANALYSIS

GRAPHIC PLOTS AND OUTPUT RESULTS

08/16/2005 11:31 5035987 75 GEOPACIFIC ENG PAGE 40
1.460
Vista Ridge Section A-A'
40-foot horizontal building setback
Material #: 1 Description: Colluvium/Weathered Bedrock Wt: 125 Cohesion: 300 Phi: 33
Material #: 2 Description: Springwater Formation Wt: 130 Cohesion: 500 Phi: 36
Material #: 3 Description: Troutdale Formation Wt: 125 Cohesion: 250 Phi: 32
Material #: 4 Description: Buttress Fill Wt: 125 Cohesion: 200 Phi: 30
Static Factor of Safety: 1.460
Elevation (feet)
Distance (feet)

08/16/2005 11:31 5035988795 GEOPACIFIC ENG PAGE 41
1.190
Vista Ridge Section A-A'
40-foot horizontal building setback
Material #: 1 Description: Colluvium/Weathered Bedrock Wt: 125 Cohesion: 300 Phi: 33
Material #: 2 Description: Springwater Formation Wt: 130 Cohesion: 500 Phi: 36
Material #: 3 Description: Troutdale Formation Wt: 125 Cohesion: 250 Phi: 32
Material #: 4 Description: Buttress Fill Wt: 125 Cohesion: 200 Phi: 30
Pseudostatic Factor of Safety: 1.190
Elevation (feet)
Distance (feet)

Project No. 05-9286
Vista Loop

APPENDIX C

CHECKLIST OF RECOMMENDED SOIL TESTIING & INSPECTIONS

Item No.	Procedure	Timing	By Whom	Done
1	Pre-construction meeting	Prior to beginning site work	Contractor, Developer, Civil and Geotechnical Engineers	
2	Stripping, aeration, and root-picking operations	During stripping	Soil Technician	
3	Compaction testing of engineered fill (96% of Standard Proctor)	During filling, tested every 2 vertical feet per lot	Soil Technician	
4	Compaction testing of trench backfill (95% of Standard Proctor)	During backfilling, tested every 4 vertical feet for every 200 lineal feet	Soil Technician	
5	Street subgrade compaction (95% of Standard Proctor)	Prior to base course every 200 lineal feet	Soil Technician	
6	Base course compaction (95% of Modified Proctor)	Prior to paving, tested every 200 lineal feet	Soil Technician	
7	AC Compaction (91% (bottom lift) / 92% (top lift) of Rice)	During paving, tested every 200 lineal feet	Soil Technician	
8	Final Geotechnical Engineer's certification	Completion of project	Geotechnical Engineer	

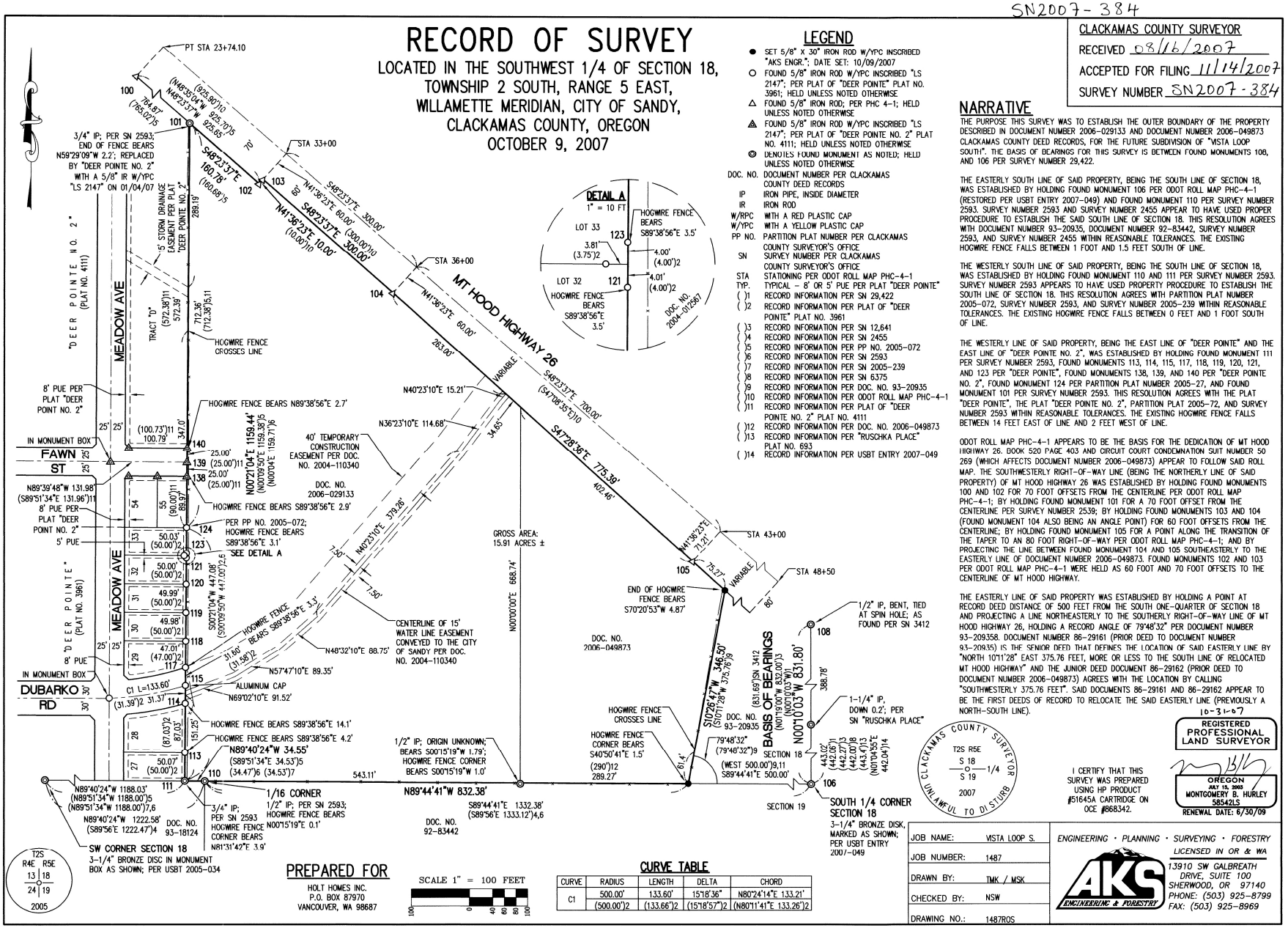
SN2007-384

RECORD OF SURVEY

LOCATED IN THE SOUTHWEST 1/4 OF SECTION 18, TOWNSHIP 2 SOUTH, RANGE 5 EAST, WILLAMETTE MERIDIAN, CITY OF SANDY, CLACKAMAS COUNTY, OREGON

OCTOBER 9, 2007

CLACKAMAS COUNTY SURVEYOR
RECEIVED 08/16/2007
ACCEPTED FOR FILING 11/14/2007
SURVEY NUMBER SN2007-384



LEGEND

- ● SET 5/8" X 30" IRON ROD W/YPC INSCRIBED "AKS ENGR."; DATE SET: 10/09/2007
- ○ FOUND 5/8" IRON ROD W/YPC INSCRIBED "LS 2147"; PER PLAT OF "DEER POINTE" PLAT NO. 3961; HELD UNLESS NOTED OTHERWISE
- △ FOUND 5/8" IRON ROD; PER PHC 4-1; HELD UNLESS NOTED OTHERWISE
- ◬ FOUND 5/8" IRON ROD W/YPC INSCRIBED "LS 2147"; PER PLAT OF "DEER POINTE NO. 2" PLAT NO. 4111; HELD UNLESS NOTED OTHERWISE
- ◎ DENOTES FOUND MONUMENT AS NOTED; HELD UNLESS NOTED OTHERWISE

DOC. NO.	DOCUMENT NUMBER PER CLACKAMAS COUNTY DEED RECORDS
IP	IRON PIPE, INSIDE DIAMETER
IR	IRON ROD
W/RPC	WITH A RED PLASTIC CAP
W/YPC	WITH A YELLOW PLASTIC CAP
PP NO.	PARTITION PLAT NUMBER PER CLACKAMAS COUNTY SURVEYOR'S OFFICE
SN	SURVEY NUMBER PER CLACKAMAS COUNTY SURVEYOR'S OFFICE
STA	STATIONING PER ODOT ROLL MAP PHC-4-1
TYP.	TYPICAL - 8' OR 5' PUE PER PLAT "DEER POINTE"
( )1	RECORD INFORMATION PER SN 29,422
( )2	RECORD INFORMATION PER PLAT OF "DEER POINTE" PLAT NO. 3961
( )3	RECORD INFORMATION PER SN 12,641
( )4	RECORD INFORMATION PER SN 2455
( )5	RECORD INFORMATION PER PP NO. 2005-072
( )6	RECORD INFORMATION PER SN 2593
( )7	RECORD INFORMATION PER SN 2005-239
( )8	RECORD INFORMATION PER SN 6375
( )9	RECORD INFORMATION PER DOC. NO. 93-20935
( )10	RECORD INFORMATION PER ODOT ROLL MAP PHC-4-1
( )11	RECORD INFORMATION PER PLAT OF "DEER POINTE NO. 2" PLAT NO. 4111
( )12	RECORD INFORMATION PER DOC. NO. 2006-049873
( )13	RECORD INFORMATION PER "RUSCHKA PLACE" PLAT NO. 693
( )14	RECORD INFORMATION PER USBT ENTRY 2007-049

NARRATIVE

THE PURPOSE THIS SURVEY WAS TO ESTABLISH THE OUTER BOUNDARY OF THE PROPERTY DESCRIBED IN DOCUMENT NUMBER 2006-029133 AND DOCUMENT NUMBER 2006-049873 CLACKAMAS COUNTY DEED RECORDS, FOR THE FUTURE SUBDIVISION OF "VISTA LOOP SOUTH". THE BASIS OF BEARINGS FOR THIS SURVEY IS BETWEEN FOUND MONUMENTS 108, AND 106 PER SURVEY NUMBER 29,422.

THE EASTERLY SOUTH LINE OF SAID PROPERTY, BEING THE SOUTH LINE OF SECTION 18, WAS ESTABLISHED BY HOLDING FOUND MONUMENT 106 PER ODOT ROLL MAP PHC-4-1 (RESTORED PER USBT ENTRY 2007-049) AND FOUND MONUMENT 110 PER SURVEY NUMBER 2593. SURVEY NUMBER 2593 AND SURVEY NUMBER 2455 APPEAR TO HAVE USED PROPER PROCEDURE TO ESTABLISH THE SAID SOUTH LINE OF SECTION 18. THIS RESOLUTION AGREES WITH DOCUMENT NUMBER 93-20935, DOCUMENT NUMBER 92-83442, SURVEY NUMBER 2593, AND SURVEY NUMBER 2455 WITHIN REASONABLE TOLERANCES. THE EXISTING HOGWIRE FENCE FALLS BETWEEN 1 FOOT AND 1.5 FEET SOUTH OF LINE.

THE WESTERLY SOUTH LINE OF SAID PROPERTY, BEING THE SOUTH LINE OF SECTION 18, WAS ESTABLISHED BY HOLDING FOUND MONUMENT 110 AND 111 PER SURVEY NUMBER 2593. SURVEY NUMBER 2593 APPEARS TO HAVE USED PROPERTY PROCEDURE TO ESTABLISH THE SOUTH LINE OF SECTION 18. THIS RESOLUTION AGREES WITH PARTITION PLAT NUMBER 2005-072, SURVEY NUMBER 2593, AND SURVEY NUMBER 2005-239 WITHIN REASONABLE TOLERANCES. THE EXISTING HOGWIRE FENCE FALLS BETWEEN 0 FEET AND 1 FOOT SOUTH OF LINE.

THE WESTERLY LINE OF SAID PROPERTY, BEING THE EAST LINE OF "DEER POINTE" AND THE EAST LINE OF "DEER POINTE NO. 2", WAS ESTABLISHED BY HOLDING FOUND MONUMENT 111 PER SURVEY NUMBER 2593, FOUND MONUMENTS 113, 114, 115, 117, 118, 119, 120, 121, AND 123 PER "DEER POINTE", FOUND MONUMENTS 138, 139, AND 140 PER "DEER POINTE NO. 2", FOUND MONUMENT 124 PER PARTITION PLAT NUMBER 2005-27, AND FOUND MONUMENT 101 PER SURVEY NUMBER 2593. THIS RESOLUTION AGREES WITH THE PLAT "DEER POINTE", THE PLAT "DEER POINTE NO. 2", PARTITION PLAT 2005-72, AND SURVEY NUMBER 2593 WITHIN REASONABLE TOLERANCES. THE EXISTING HOGWIRE FENCE FALLS BETWEEN 14 FEET EAST OF LINE AND 2 FEET WEST OF LINE.

ODOT ROLL MAP PHC-4-1 APPEARS TO BE THE BASIS FOR THE DEDICATION OF MT HOOD HIGHWAY 26. BOOK 520 PAGE 403 AND CIRCUIT COURT CONDEMNATION SUIT NUMBER 50 269 (WHICH AFFECTS DOCUMENT NUMBER 2006-049873) APPEAR TO FOLLOW SAID ROLL MAP. THE SOUTHWESTERLY RIGHT-OF-WAY LINE (BEING THE NORTHERLY LINE OF SAID PROPERTY) OF MT HOOD HIGHWAY 26 WAS ESTABLISHED BY HOLDING FOUND MONUMENTS 100 AND 102 FOR 70 FOOT OFFSETS FROM THE CENTERLINE PER ODOT ROLL MAP PHC-4-1; BY HOLDING FOUND MONUMENT 101 FOR A 70 FOOT OFFSET FROM THE CENTERLINE PER SURVEY NUMBER 2539; BY HOLDING FOUND MONUMENTS 103 AND 104 (FOUND MONUMENT 104 ALSO BEING AN ANGLE POINT) FOR 60 FOOT OFFSETS FROM THE CENTERLINE; BY HOLDING FOUND MONUMENT 105 FOR A POINT ALONG THE TRANSITION OF THE TAPER TO AN 80 FOOT RIGHT-OF-WAY PER ODOT ROLL MAP PHC-4-1; AND BY PROJECTING THE LINE BETWEEN FOUND MONUMENT 104 AND 105 SOUTHEASTERLY TO THE EASTERLY LINE OF DOCUMENT NUMBER 2006-049873. FOUND MONUMENTS 102 AND 103 PER ODOT ROLL MAP PHC-4-1 WERE HELD AS 60 FOOT AND 70 FOOT OFFSETS TO THE CENTERLINE OF MT HOOD HIGHWAY.

THE EASTERLY LINE OF SAID PROPERTY WAS ESTABLISHED BY HOLDING A POINT AT RECORD DEED DISTANCE OF 500 FEET FROM THE SOUTH ONE-QUARTER OF SECTION 18 AND PROJECTING A LINE NORTHEASTERLY TO THE SOUTHERLY RIGHT-OF-WAY LINE OF MT HOOD HIGHWAY 26, HOLDING A RECORD ANGLE OF 79°48'32" PER DOCUMENT NUMBER 93-209358. DOCUMENT NUMBER 86-29161 (PRIOR DEED TO DOCUMENT NUMBER 93-20935) IS THE SENIOR DEED THAT DEFINES THE LOCATION OF SAID EASTERLY LINE BY "NORTH 10°11'28" EAST 375.76 FEET, MORE OR LESS TO THE SOUTH LINE OF RELOCATED MT HOOD HIGHWAY" AND THE JUNIOR DEED DOCUMENT 86-29162 (PRIOR DEED TO DOCUMENT NUMBER 2006-049873) AGREES WITH THE LOCATION BY CALLING "SOUTHWESTERLY 375.76 FEET". SAID DOCUMENTS 86-29161 AND 86-29162 APPEAR TO BE THE FIRST DEEDS OF RECORD TO RELOCATE THE SAID EASTERLY LINE (PREVIOUSLY A NORTH-SOUTH LINE).

10-31-07

REGISTERED PROFESSIONAL LAND SURVEYOR

I CERTIFY THAT THIS SURVEY WAS PREPARED USING HP PRODUCT #51645A CARTRIDGE ON OCE #668342.

OREGON JULY 19, 2003 MONTGOMERY B. HURLEY 58542LS
RENEWAL DATE: 6/30/09

PREPARED FOR

HOLT HOMES INC.
P.O. BOX 87970
VANCOUVER, WA 98687

SCALE 1" = 100 FEET

100 0 40 60 80 100

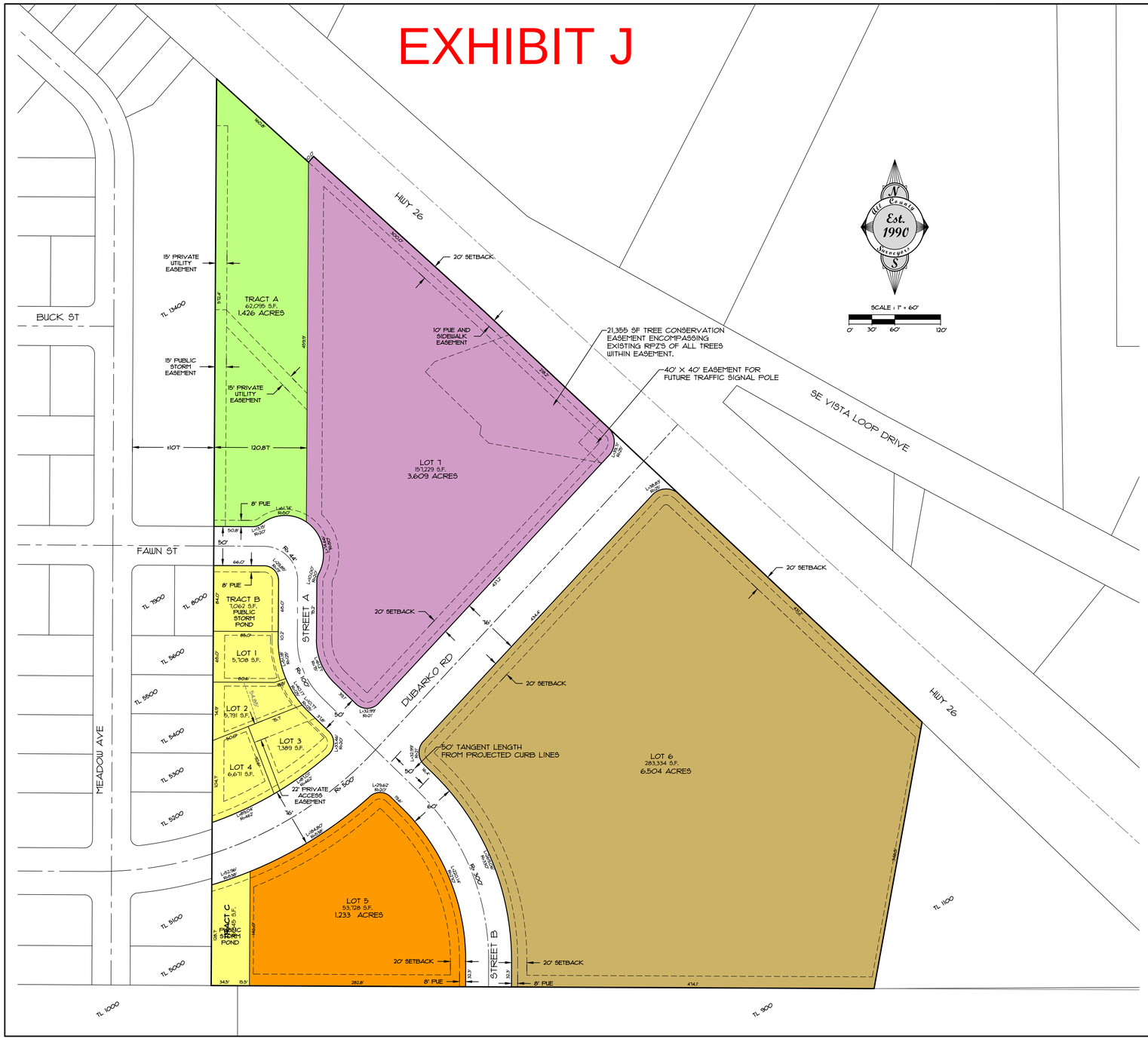
CURVE TABLE

CURVE	RADIUS	LENGTH	DELTA	CHORD
C1	500.00'	133.60'	15°18'36"	N80°24'14"E 133.21'
	(500.00')2	(133.66')2	(15°18'57")2	(N80°11'41"E 133.26')2

JOB NAME:	VISTA LOOP S.
JOB NUMBER:	1487
DRAWN BY:	TMK / MSK
CHECKED BY:	NSW
DRAWING NO.:	1487ROS

ENGINEERING • PLANNING • SURVEYING • FORESTRY
LICENSED IN OR & WA
AKS ENGINEERING & FORESTRY
13910 SW GALBREATH DRIVE, SUITE 100
SHERWOOD, OR 97140
PHONE: (503) 925-8799
FAX: (503) 925-8969

EXHIBIT J



AREA TOTALS

TOTAL SITE AREA	= 693,057 SF = 15.910 ACRES
TRACT A (PARK)	= 62,095 SF = 1.426 ACRES
TRACT B (POND)	= 7,062 SF = 0.162 ACRES
TRACT C (POND)	= 6,845 SF = 0.157 ACRES
R-1 SINGLE FAMILY	= 25,559 SF = 0.587 ACRES
R-2 MULTI-FAMILY	= 53,728 SF = 1.233 ACRES
R-3 MULTI-FAMILY	= 283,334 SF = 6.504 ACRES
C-3 COMMERCIAL	= 157,229 SF = 3.609 ACRES
PUBLIC ROW	= 97,205 SF = 2.232 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.

SHEET C2 OF 10

DATE	NO.	REVISION	BY
-	-	-	-

DESIGNED: CTH
DRAWN: CTH
CHECKED: RLM
APPROVED: RLM

REGISTERED PROFESSIONAL ENGINEER
OREGON
RAY L. MOORE
RENEWAL DATE: 12/31/2020

SCALE: VERT: N/A HORIZ: 1"=60'
DATE: 07/26/2018
FILE: 19-035-Planning.dwg

LEGAL		
SECTION	TWP.	RANGE
18	2S	5E

PROJECT: **BULL RUN TERRACE SUBDIVISION**
PRELIMINARY PLAT MAP AND SPECIFIC AREA PLAN

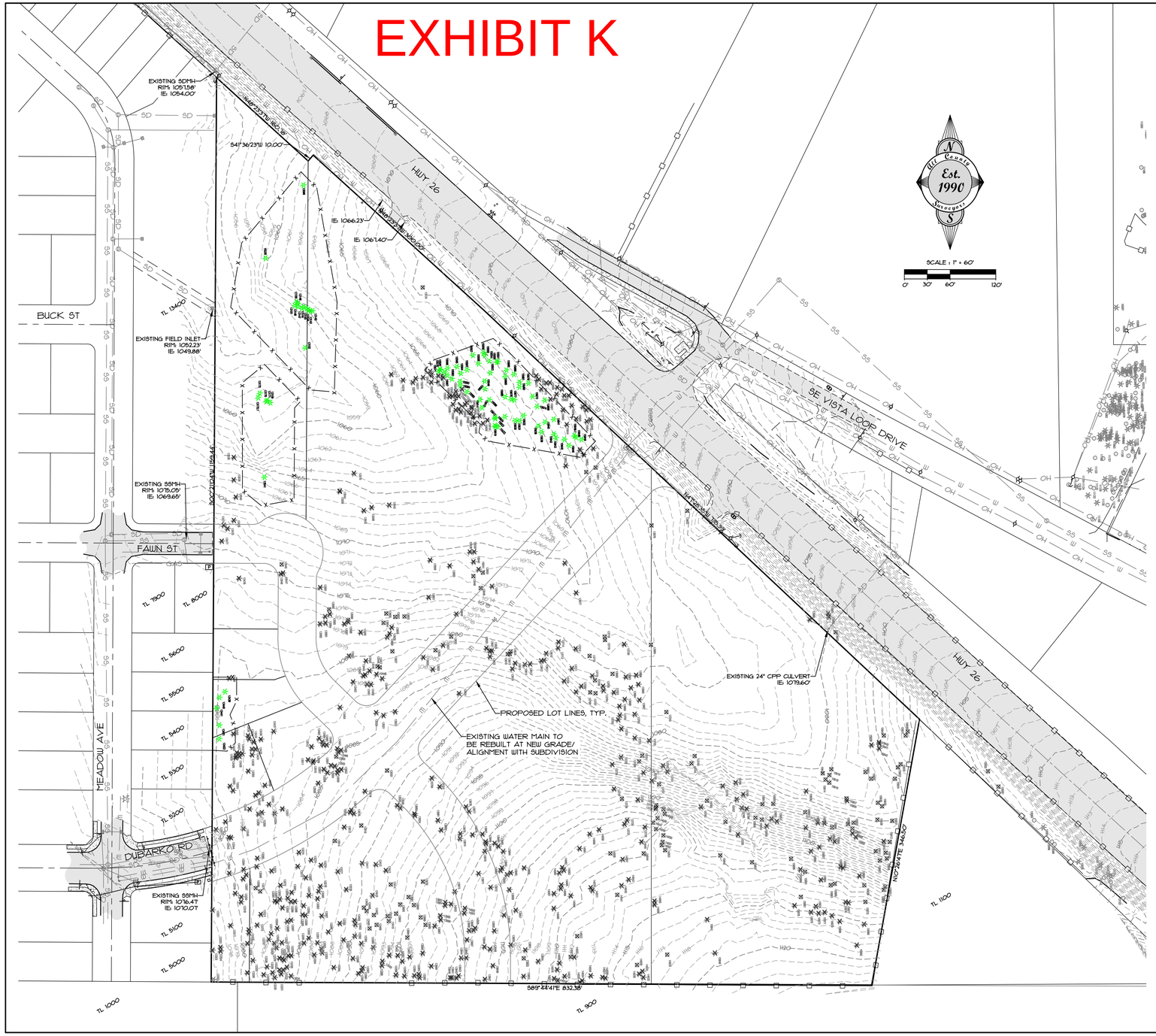
LOCATION: **40808 & 41010 HWY 26, SANDY, OR 97055**

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

DATE OF PLOT 09/28/2020

CLIENT: ROLL TIDE PROPERTIES CORPORATION
PO BOX 703
CORNELIUS, OR 97113

EXHIBIT K



LEGEND

- PROPERTY LINE
- LOT LINE
- EXISTING BUILDING
- EXISTING EDGE OF PAVEMENT
- EXISTING SIDEWALK/CONCRETE
- EXISTING CURB
- EXISTING WATER LINE
- EXISTING STORM LINE
- EXISTING SANITARY LINE
- EXISTING GAS LINE
- EXISTING TELEPHONE LINE
- 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
- NEW WATER LINE
- NEW SANITARY LINE
- NEW STORM LINE
- SAWCUT 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

— x — x — x — 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 11.102.50(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

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.
2. UNDERGROUND UTILITIES SHOWN ON THIS SURVEY ARE LIMITED TO THOSE ITEMS VISIBLE BY SURFACE INSPECTION AND LOCATES PAINTED ON THE GROUND AS OF THE DATE OF THIS SURVEY. SUBSURFACE STRUCTURES, IF ANY, ARE NOT SHOWN.
3. UNDERGROUND UTILITY LOCATIONS MUST BE POTHOLED AND VERIFIED PRIOR TO CONSTRUCTION.
4. THE ELEVATION DATUM IS BASED ON THE CITY OF SANDY BENCHMARK #33. THE BENCHMARK IS LOCATED AT THE INTERSECTION OF MCCORMICK AND LANGENSEND. THE PUBLISHED ELEVATION IS 1021.51'

SHEET C3 OF 10

BY	REVISION	NO.	DATE
-	-	-	-

DESIGNED: CTH
DRAWN: CTH
CHECKED: RLM
APPROVED: RLM

OREGON REGISTERED PROFESSIONAL ENGINEER 69174 RENEWAL DATE: 12/31/2020

SCALE: VERT: N/A HORIZ: 1"=60'
DATE: 07/26/2018
FILE:19-035-Planning.dwg
LEGAL SECTION 18 TWP: 2S RANGE: 5E

PROJECT:
BULL RUN TERRACE SUBDIVISION
EXISTING CONDITIONS AND TREE RETENTION PLAN

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

CLIENT:
ROLL TIDE PROPERTIES CORPORATION
PO BOX 1023
CORNELIUS, OR 97113

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

DATE OF PLOT: 09/18/2020

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, 70% 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
13147	DOUGLAS-FIR	15	GOOD	ONE SIDED, MARGINAL TRUNK TAPER	RETAIN
13148	DOUGLAS-FIR	25	GOOD	ONE SIDED	RETAIN
13149	DOUGLAS-FIR	17	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	37	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 PORODAEDALEA 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
15546	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, 70% 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 11" DBH AND GREATER DEEMED TO BE VIABLE BY ARBORIST INSPECTION.

TOTAL NUMBER OF VIABLE, 11"+ DBH TREES TO BE PRESERVED: 63

EXHIBIT L

SHEET C4 OF 10

NO.	DATE	REVISION	BY
-	-	-	-

DESIGNED: CTH
DRAWN: CTH
CHECKED: RLM
APPROVED: RLM

REGISTERED PROFESSIONAL LAND SURVEYOR OREGON JULY 14, 2006 RAY L. MOORE RENEWAL DATE: 12/31/2020

SCALE: VERT: N/A HORIZ: 1"=60'
DATE: 01/26/2018
FILE:19-035-Planning.dwg
LEGAL SECTION 18 TWP: 2S RANGE: 5E

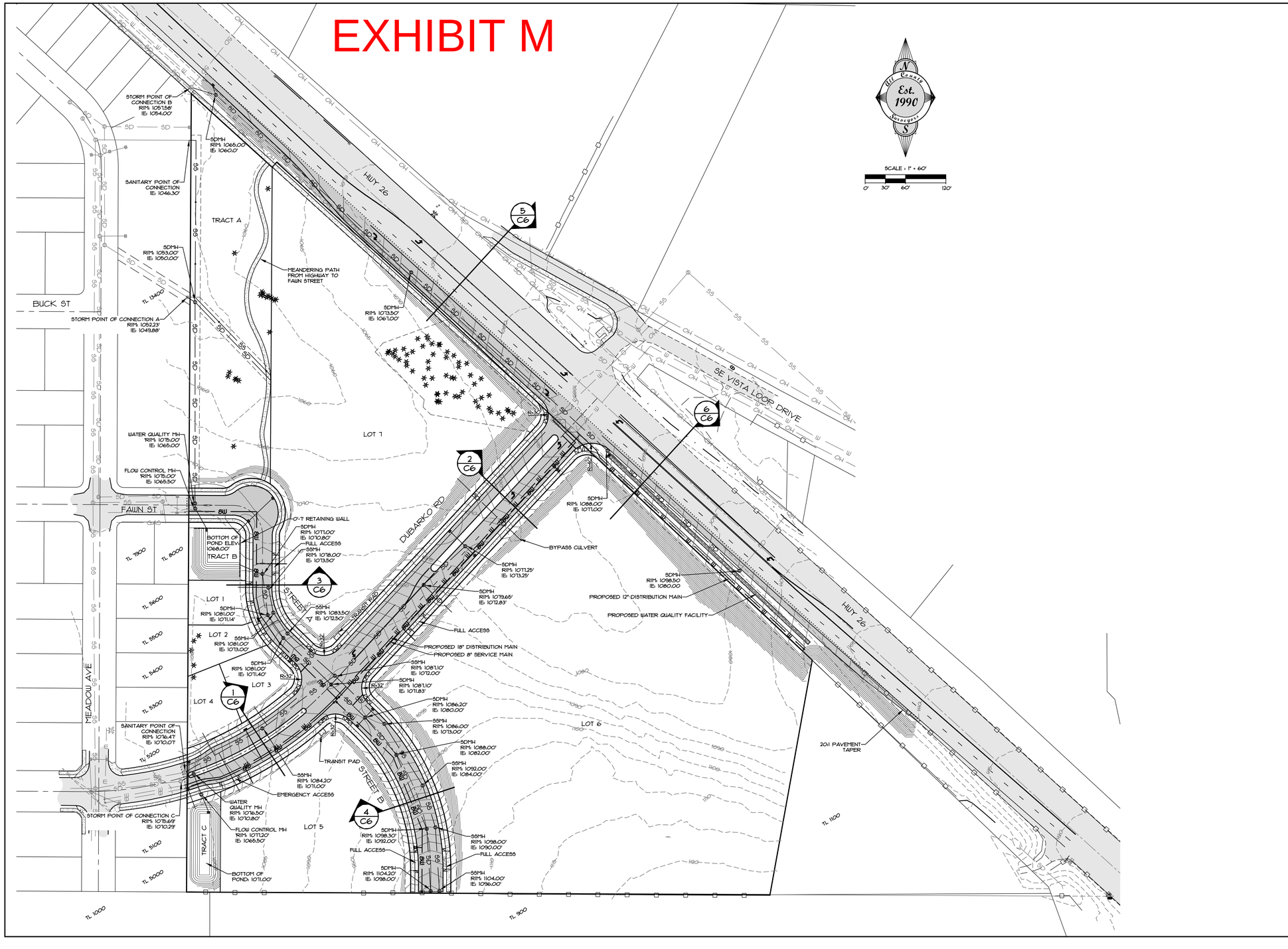
PROJECT: **BULL RUN TERRACE SUBDIVISION**
TREE TABLES

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

CLIENT: ROLL TIDE PROPERTIES CORPORATION PO BOX 903 CORNELIUS, OR 97113

Surveyors & Planners, Inc.
Surveying, Planning and Civil Engineering
P.O. Box 955, Sandy, OR 97055
Phone: (503) 668-3151
Fax: (503) 668-4730
DATE OF PLOT: 09/28/2020

EXHIBIT M



SHEET C5 OF 10

DATE	NO.	REVISION	BY
-	-	-	-

DESIGNED: CTH
DRAWN: CTH
CHECKED: RLM
APPROVED: RLM

REGISTERED PROFESSIONAL ENGINEER
OREGON
RAY L. MOORE
RENEWAL DATE: 12/31/2020

SCALE	VERT: N/A	HORIZ: 1"=60'
DATE: 07/26/2018		
FILE: 19-035-Planning.dwg		

LEGAL		
SECTION	TWP.	RANGE
18	2S	5E

PROJECT: **BULL RUN TERRACE SUBDIVISION**

MASTER STREET AND UTILITY PLAN

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

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

DATE OF PLOT 09/28/2020

CLIENT: ROLL TIDE PROPERTIES CORPORATION
PO BOX 703
CORNELIUS, OR 97113

BULLRUN TERRACE

SINGLE FAMILY HOME FOOTPRINT EXHIBIT

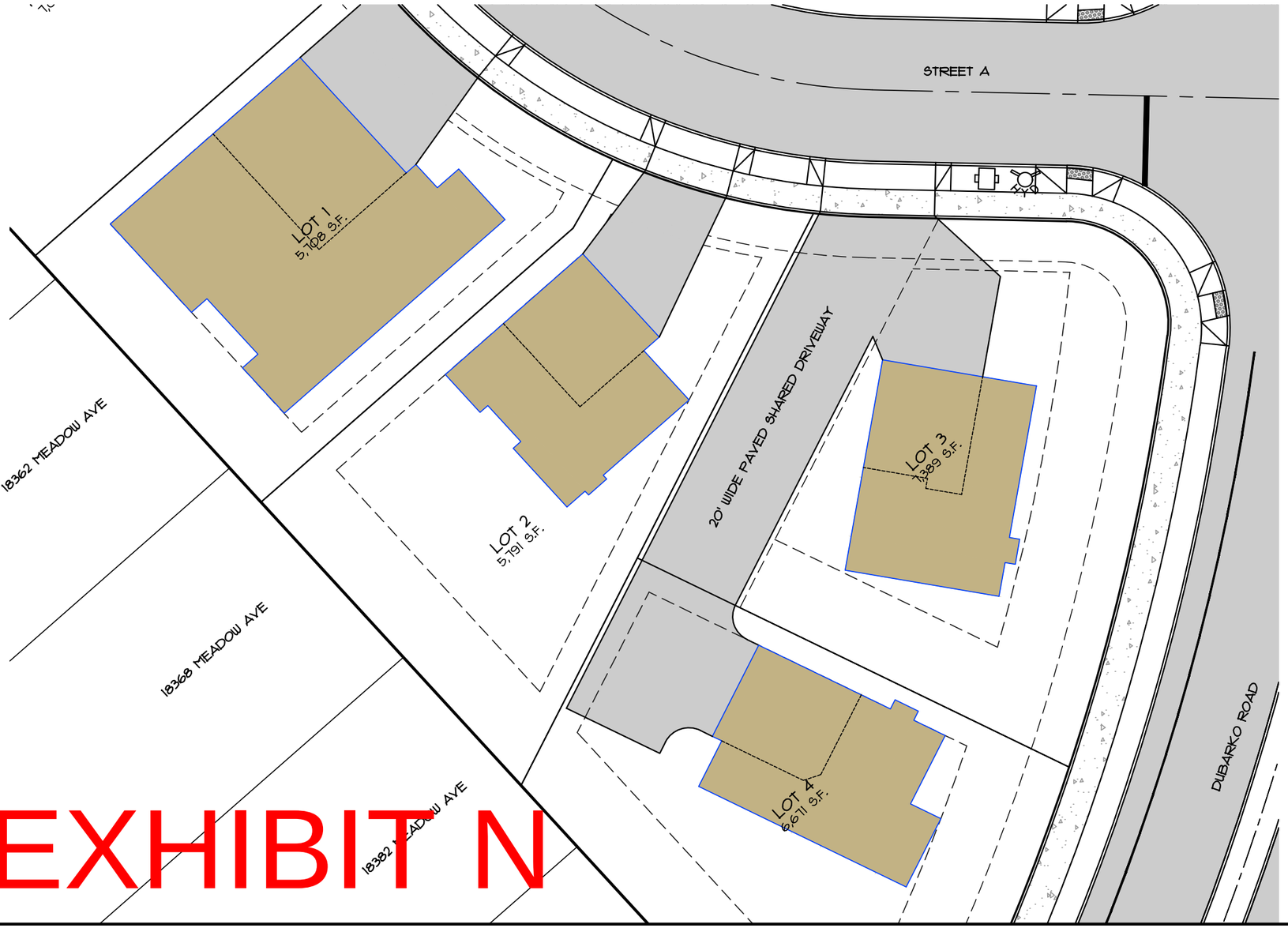


EXHIBIT N

All County Surveyors Est. 1990

SCALE : 1" = 20'

0' 10' 20' 40'

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

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19-035-Planning.dwg
DATE OF PLOT: 9/28/20

EXHIBIT O

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.

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

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.

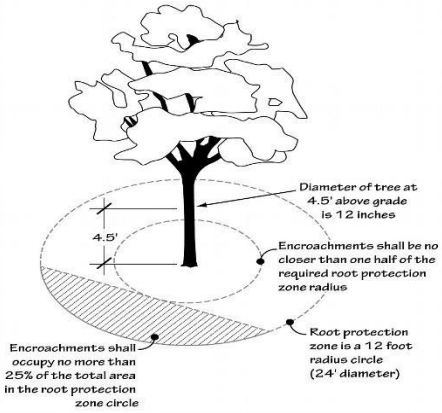

Figure 1: Alterative minimum protection zone

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.

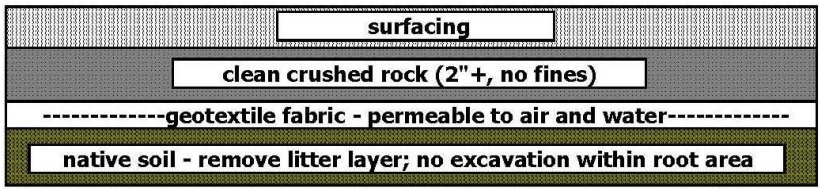

Figure 1. Sample profile for areas within tree protection zones. Depth of rock is dependent on grading.

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

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

Teragan & Associates, Inc.
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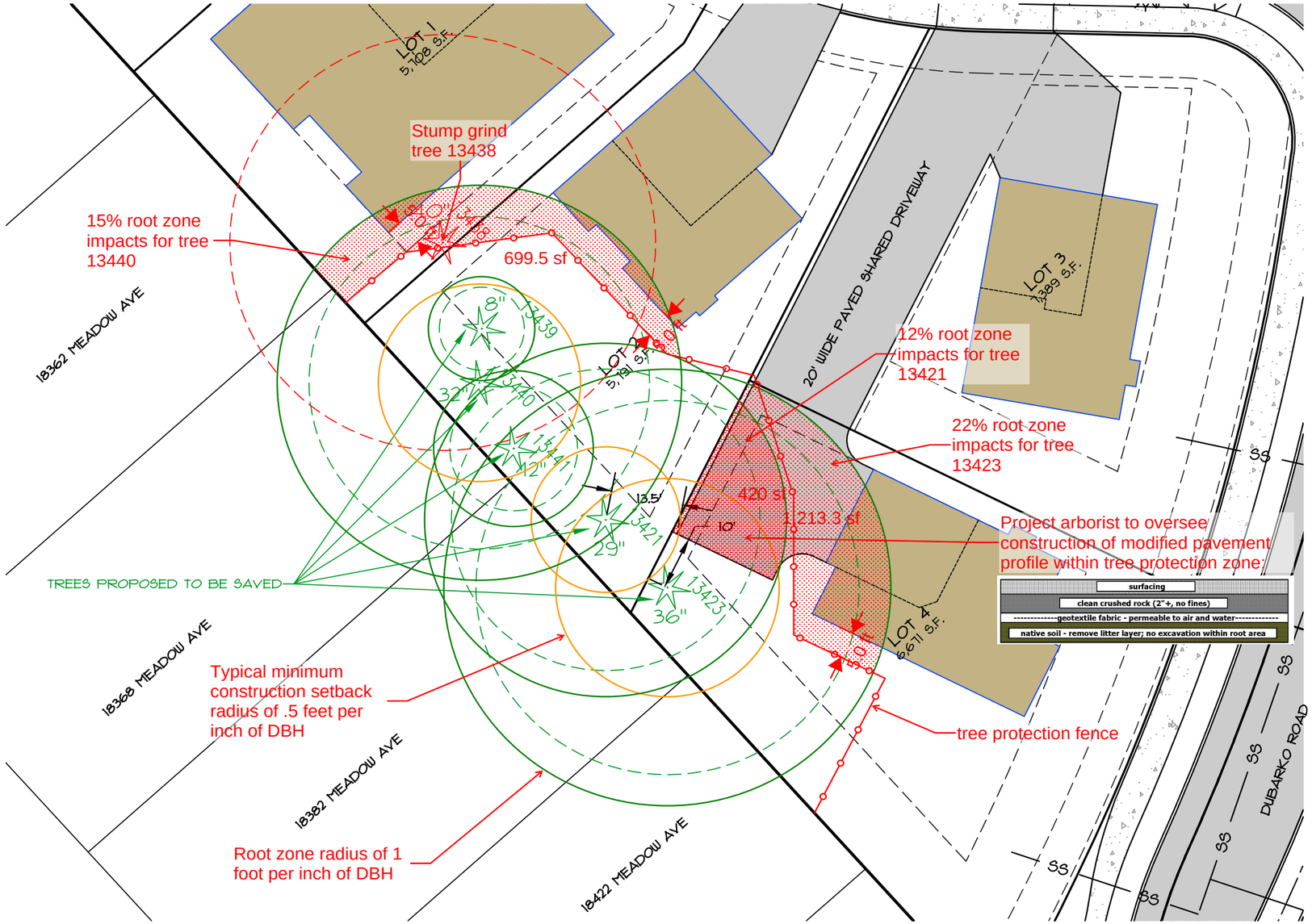
BULLRUN TERRACE

TREES ON WEST SIDE OF PROPERTY



All County Est. 1990 Surveyors

SCALE : 1" = 20'

0' 10' 20' 40'

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
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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	*Pseudotsuga menziesii*	34	20	good	fair	swelling at lower trunk, previously lost top with new top at 15'	retain
13423	Douglas-fir	*Pseudotsuga menziesii*	42	20	good	fair	moderately one sided	retain
13438	Douglas-fir	*Pseudotsuga menziesii*	46	20	good	fair	moderately one sided	remove
13439	Douglas-fir	*Pseudotsuga menziesii*	10	10	good	fair	overtopped by adjacent trees, one sided	retain
13440	Douglas-fir	*Pseudotsuga menziesii*	38	20	good	fair	moderately one sided	retain
13441	Douglas-fir	*Pseudotsuga menziesii*	15	15	fair	fair	overtopped by adjacent trees, marginal trunk taper, small Porodaedalea conks at lower trunk	retain

[1]**DBH** is the trunk diameter in inches measured in accordance with International Society of Arboriculture standards.

[2]**C-Rad** is the approximate crown radius in feet.

[2]**Condition** 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.
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 review and provide recommendations regarding the preservation of additional trees along the west property line of the site.

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Phone: 971.295.4835 • Fax: 503.697.1976
Email: todd@teragan.com • Website: teragan.com

EXHIBIT P

TERAGAN & ASSOCIATES, INC.
ARBORICULTURAL CONSULTANTS

MEMORANDUM

DATE: August 19, 2020
TO: Alex Reverman (Roll Tide Corporation)
FROM: Todd Prager, RCA #597, ISA Board Certified Master Arborist
RE: Tree Removal Plan for the Dubarko Road Project

Our firm provided tree removal, preservation, and protection recommendations dated December 14, 2019 for the proposed Dubarko Road Subdivision and Condominiums in Sandy, Oregon. As a follow up to the report, you requested that I submit a proposal for removal of the trees adjacent to the retention trees. This memorandum includes the tree removal proposal.

- **Tree Removal**: The selected tree service shall coordinate with the project arborist to determine the specific methods that will be used to protect the retention trees during tree removal. The following options will be considered:
  - Directional Felling: If there is a clear path to fell the trees away from the trees to be retained without contacting their crowns or trunks, the trees may be free-felled away from the retained trees.
  - Piece Removal: If the trees cannot be directionally felled, they will need to be climbed, with branches and trunk sections cut off individually in pieces from the top down. If necessary, the pieces will be secured with ropes so they do not contact the crowns or trunks of the retained trees.
  - Crane Removal: The use of a crane may be needed in some cases to remove certain trees where access is limited.

  No heavy equipment is permitted within the critical root zones of the retention trees during tree removal operations.
- **Stump Removal**: The stumps of the trees to be removed from within the critical root zones of the retention trees shall be retained or carefully surface ground.

Please contact me if you have questions, concerns, or need any additional information.

Sincerely,

Todd Prager

Todd Prager
ASCA Registered Consulting Arborist #597
ISA Board Certified Master Arborist, WE-6723B
ISA Qualified Tree Risk Assessor
AICP, American Planning Association

Teragan & Associates, Inc.
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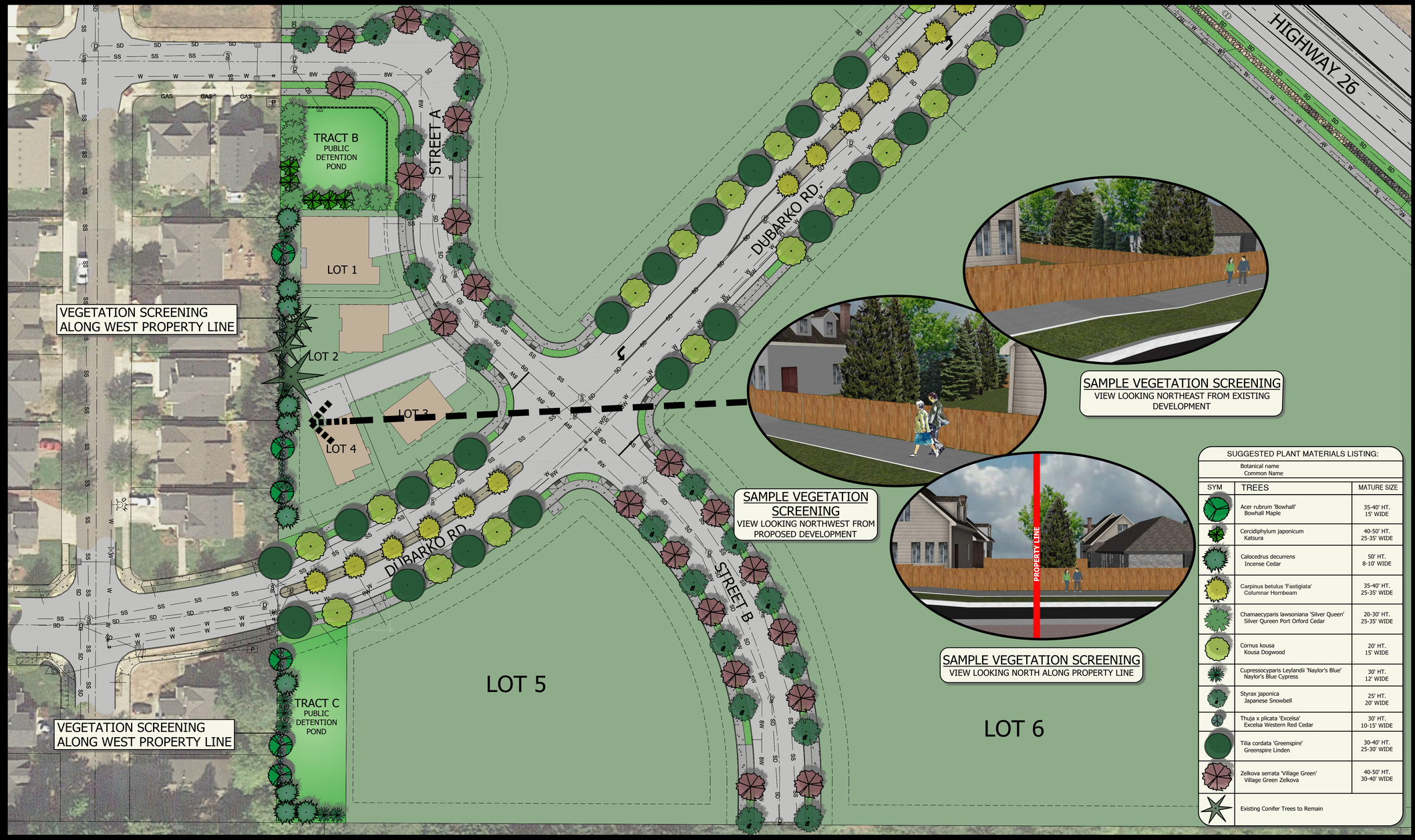


SUGGESTED PLANT MATERIALS LISTING:

SYM	Botanical name / Common Name	MATURE SIZE
TREES		
	Acer rubrum 'Bowhall' Bowhall Maple	35-40' HT. 15' WIDE
	Cercidiphylum japonicum Katsura	40-50' HT. 25-35' WIDE
	Calocedrus decurrens Incense Cedar	50' HT. 8-10' WIDE
	Carpinus betulus 'Fastigiata' Columnar Hornbeam	35-40' HT. 25-35' WIDE
	Chamaecyparis lawsoniana 'Silver Queen' Silver Qureen Port Orford Cedar	20-30' HT. 25-35' WIDE
	Cornus kousa Kousa Dogwood	20' HT. 15' WIDE
	Cupressocyparis Leylandii 'Naylor's Blue' Naylor's Blue Cypress	30' HT. 12' WIDE
	Styrax japonica Japanese Snowbell	25' HT. 20' WIDE
	Thuja x plicata 'Excelsa' Excelsa Western Red Cedar	30' HT. 10-15' WIDE
	Tilia cordata 'Greenspire' Greenspire Linden	30-40' HT. 25-30' WIDE
	Zelkova serrata 'Village Green' Village Green Zelkova	40-50' HT. 30-40' WIDE
	Existing Conifer Trees to Remain	

BULLRUN TERRACE

ROLL TIDE PROPERTIES CORPORATION

40808 & 41010 HIGHWAY 26, SANDY, OR 97055

ALL COUNTY SURVEYORS AND PLANNERS, INC. CIVIL ENGINEER | **MEARS DESIGN GROUP** LANDSCAPE ARCHITECT

SEPTEMBER 2020
ALL RIGHTS RESERVED BY ALL FIRMS

EXHIBIT Q

L1- SCREENING CONCEPT PLAN

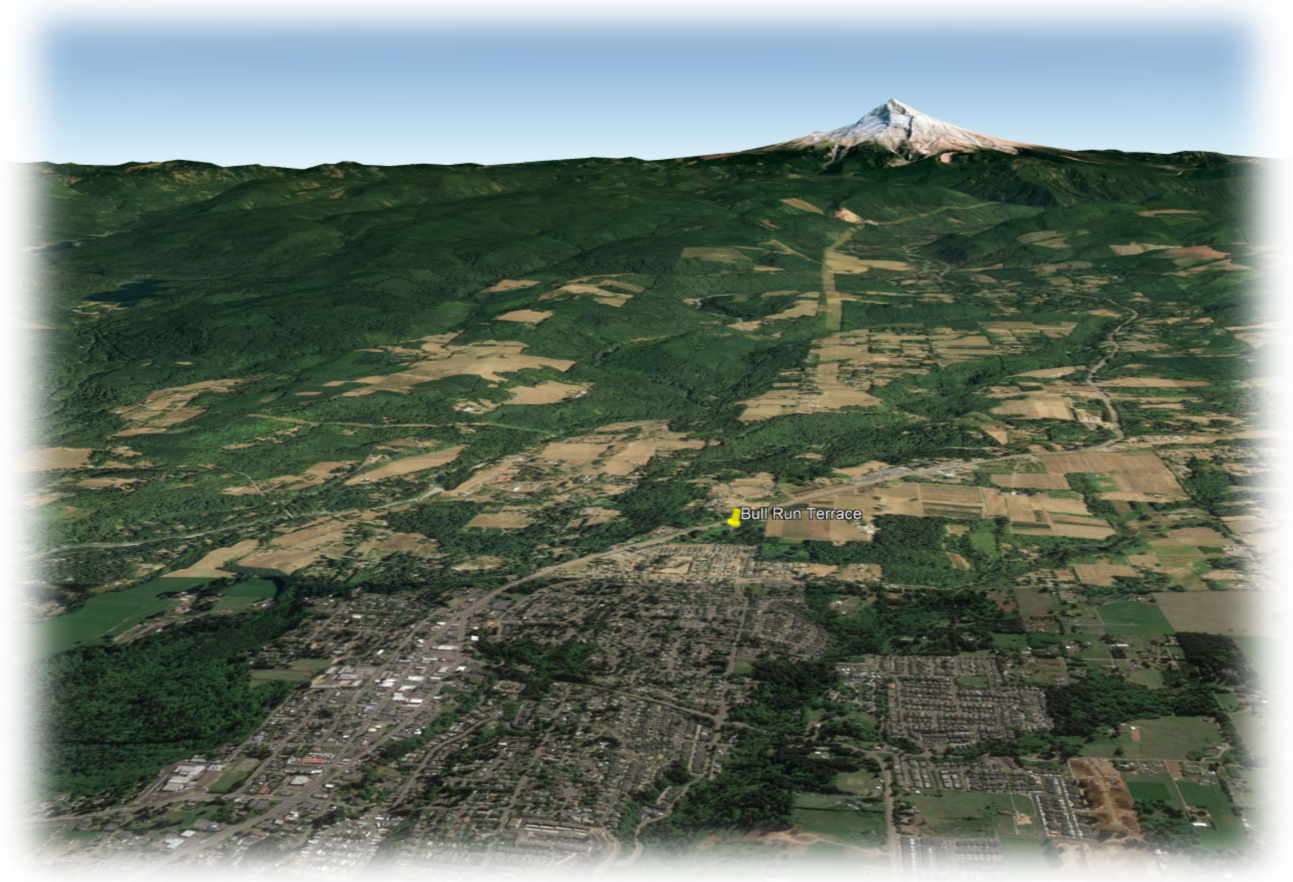
SCALE: 1" = 30'-0"

30' 15' 0' 30' 60'

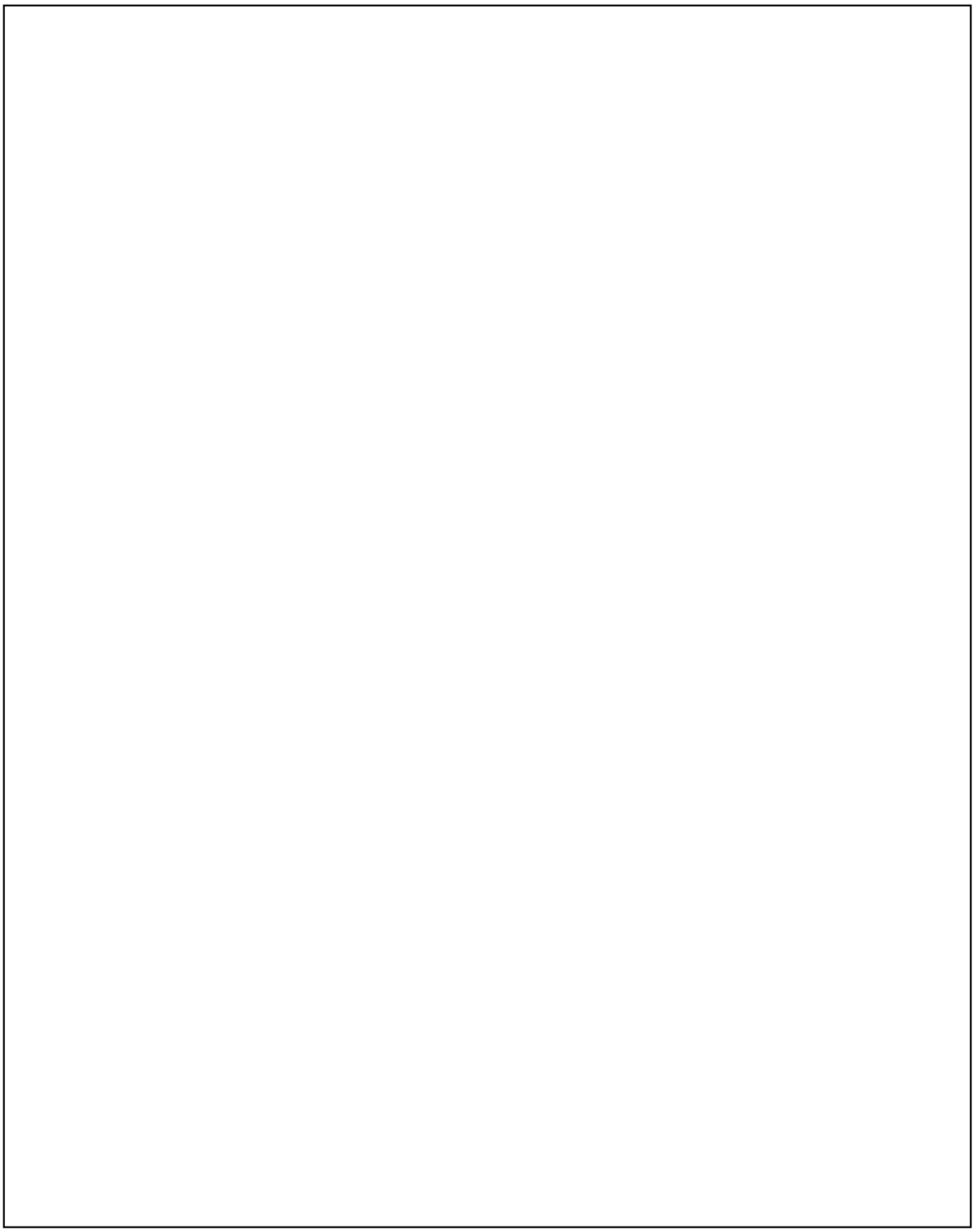
EXHIBIT R

BULL RUN TERRACE
TRAFFIC IMPACT STUDY

SANDY, OREGON

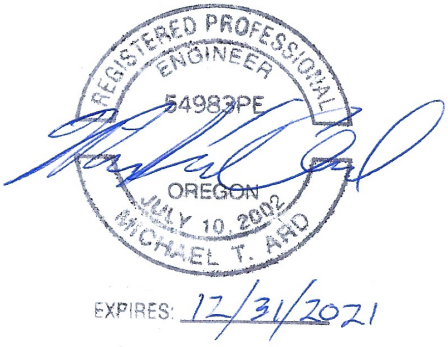


21370 SW Langer Farms Parkway, Suite 142, Sherwood, OR 97140 – (503)862-6960



BULL RUN TERRACE SUBDIVISION
TRAFFIC IMPACT STUDY

SANDY, OREGON



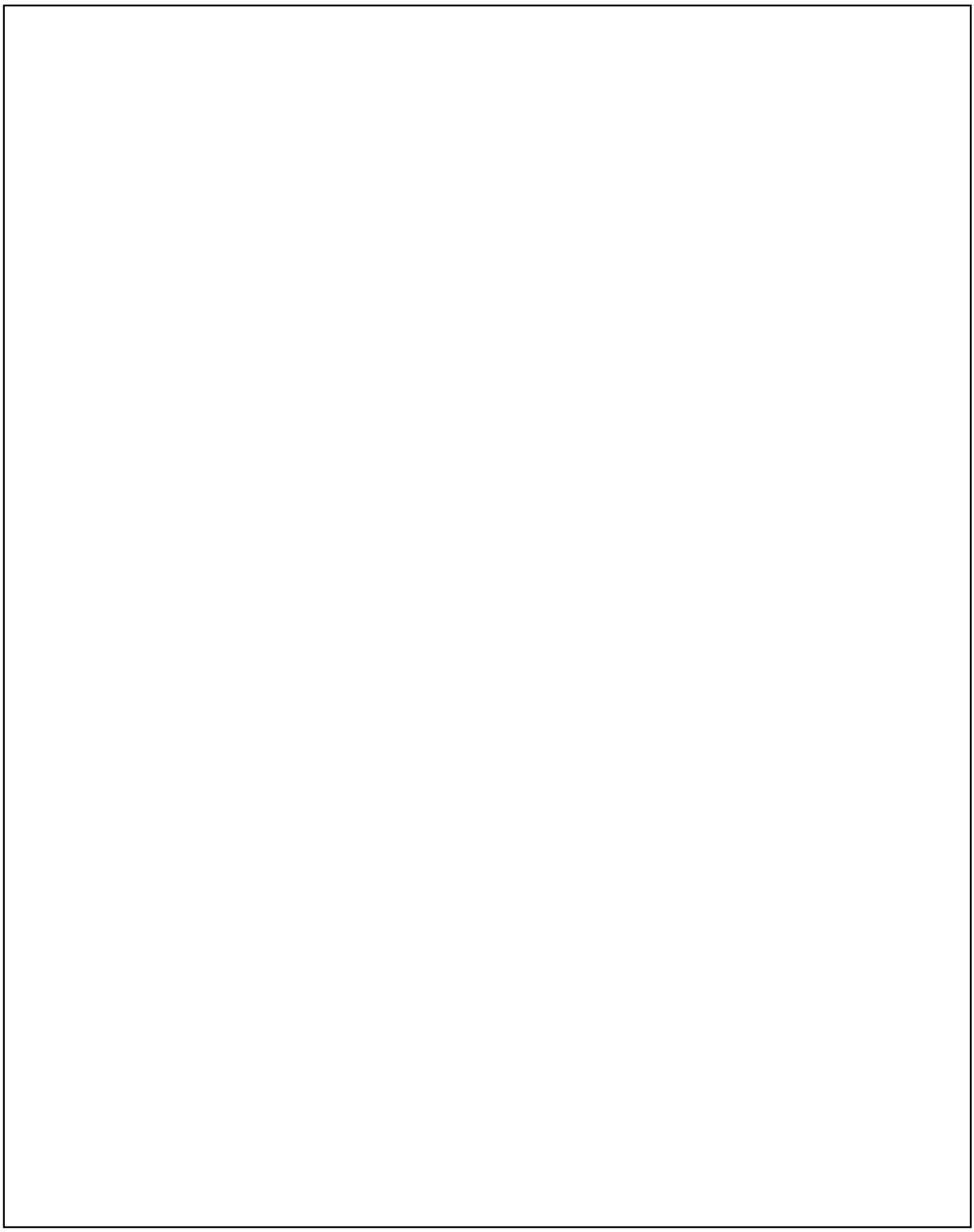
EXPIRES: 12/31/2021

PREPARED FOR:
Alex Reverman

PREPARED BY:
Michael Ard, PE
Ard Engineering

DATE:
September 28, 2020

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



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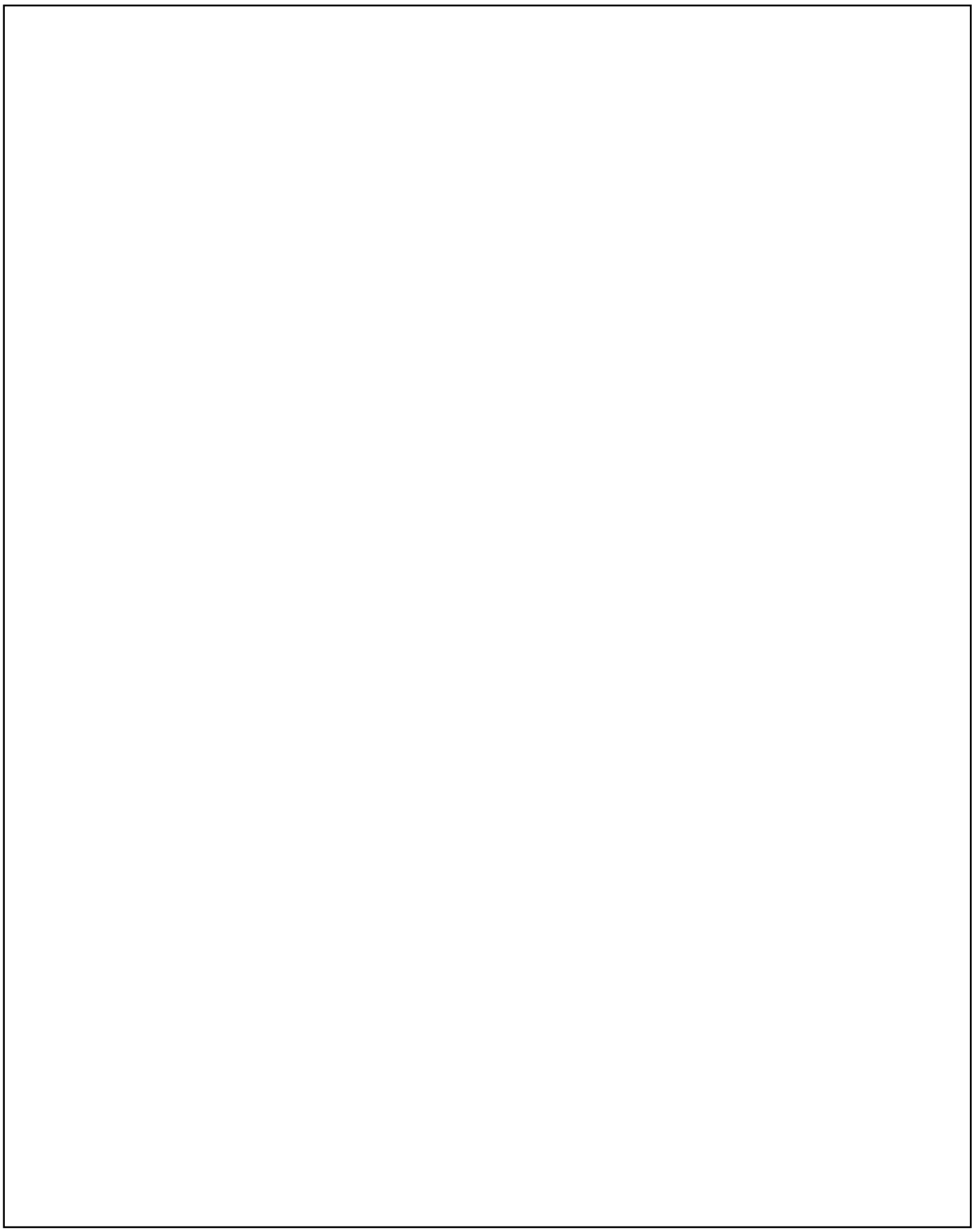


EXECUTIVE SUMMARY

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 147 apartment units and 4 single-family homes, 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 R1, R2, and R-3 zones, the subject property is projected to generate 71 new site trips during the morning peak hour, 86 trips during the evening peak hour, and 1,114 new daily site trips.

3. Based on the operational analysis, the study intersections currently operate acceptably and are projected to continue to operate acceptably under year 2022 background conditions without residential development of the subject property or connection of Dubarko Road to Highway 26.

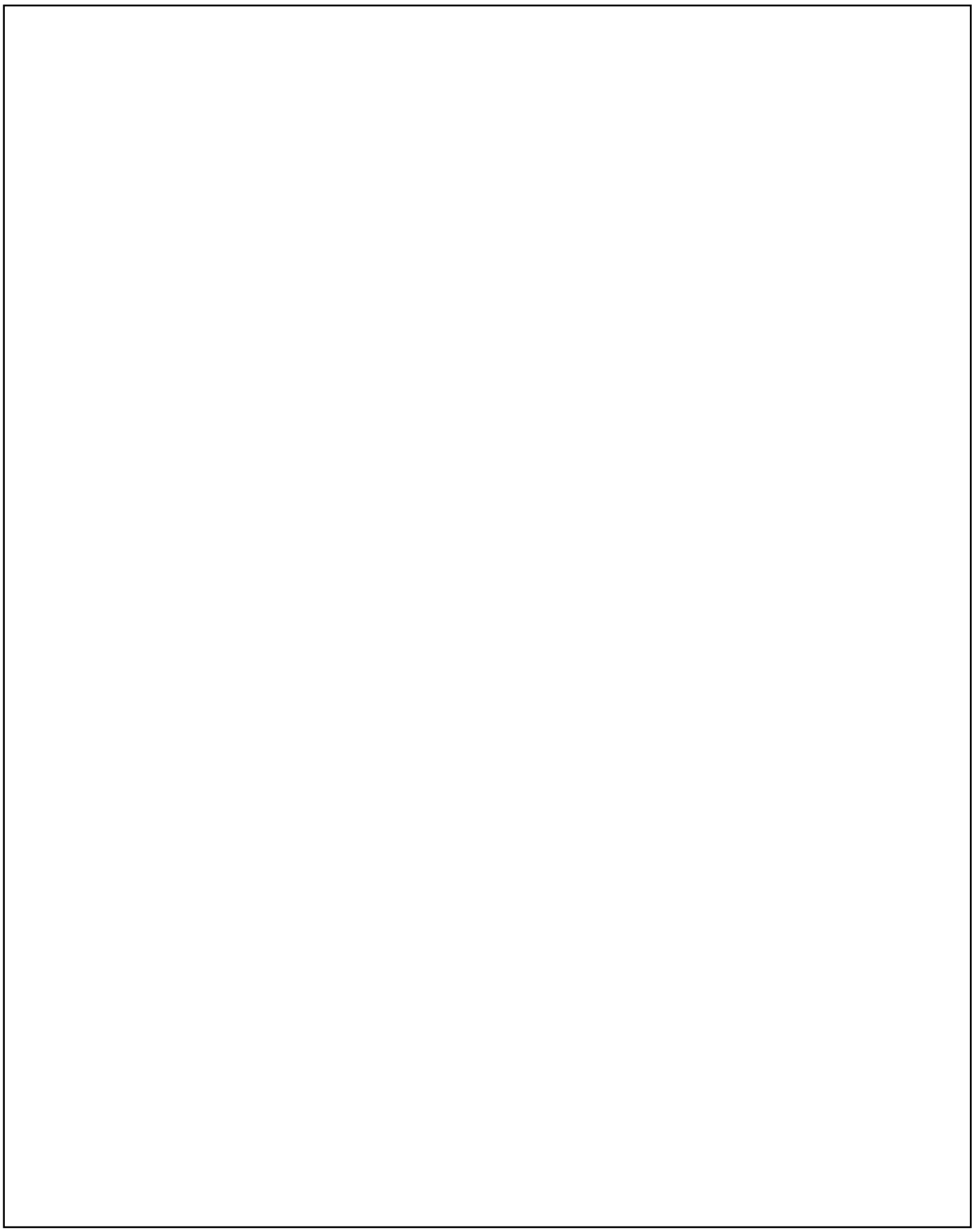
4. All study intersections are projected to operate within capacity under year 2022 traffic conditions either with or without the addition of site trips from the proposed development. However, upon completion of the residential development within the proposed subdivision and the connection of Dubarko 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. An additional analysis showing operation of the study intersections with the new Dubarko Road at Highway 26 intersection restricted to right-in, right-out only demonstrates that there is sufficient capacity for such diversions even if all northeast-bound left-turning vehicles diverted to alternative travel paths.

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 safety improvements have not significantly improved. It is recommended that ODOT consider allowing installation of all-way stop control at this intersection. 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. The northbound left-turn lane would not be needed at the time of project completion if the intersection is limited to right-in, right-out only. 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 147 apartment units and 4 single-family homes. 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.

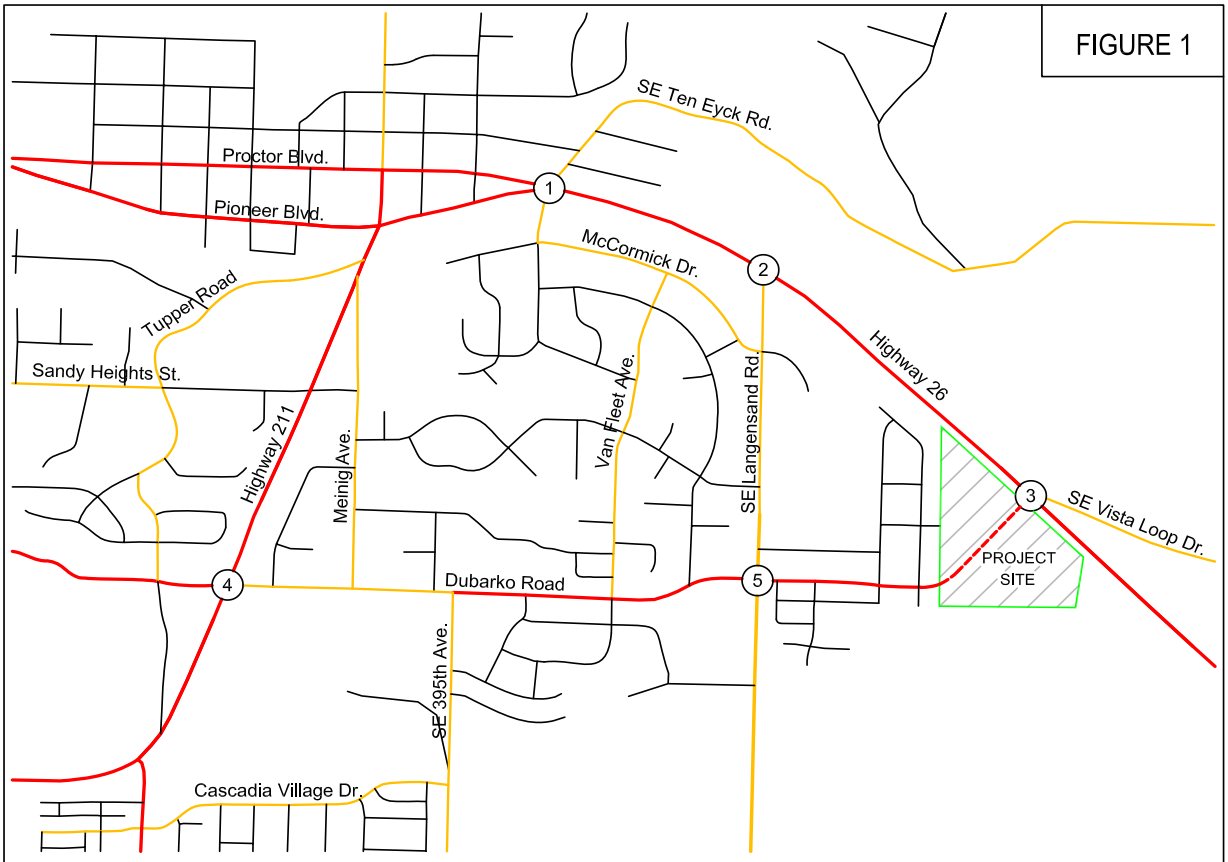
The intersection of US Highway 26 at SE Vista Loop Drive is currently a T- intersection controlled by a stop sign on the southwest-bound Vista Loop Drive approach. Through traffic traveling along Highway 26 does not stop. The southwest-bound approach has a single, shared lane for all turning movements. 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.

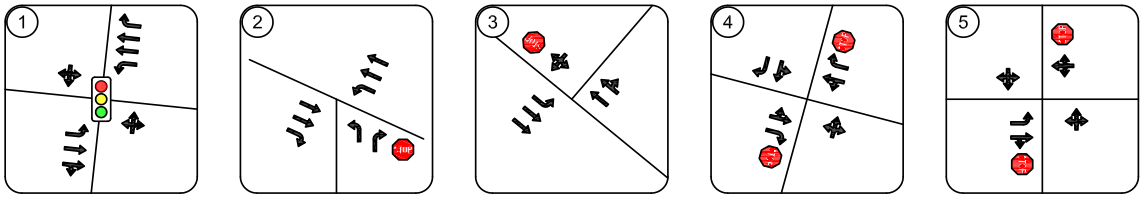
The intersection of Oregon Highway 211 at Dubarko Road is a four-way intersection controlled by stop signs on the eastbound and westbound Dubarko Road approaches. The southbound, eastbound and westbound approaches each have a shared through/left lane, a bike lane, and a dedicated right-turn lane. The 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

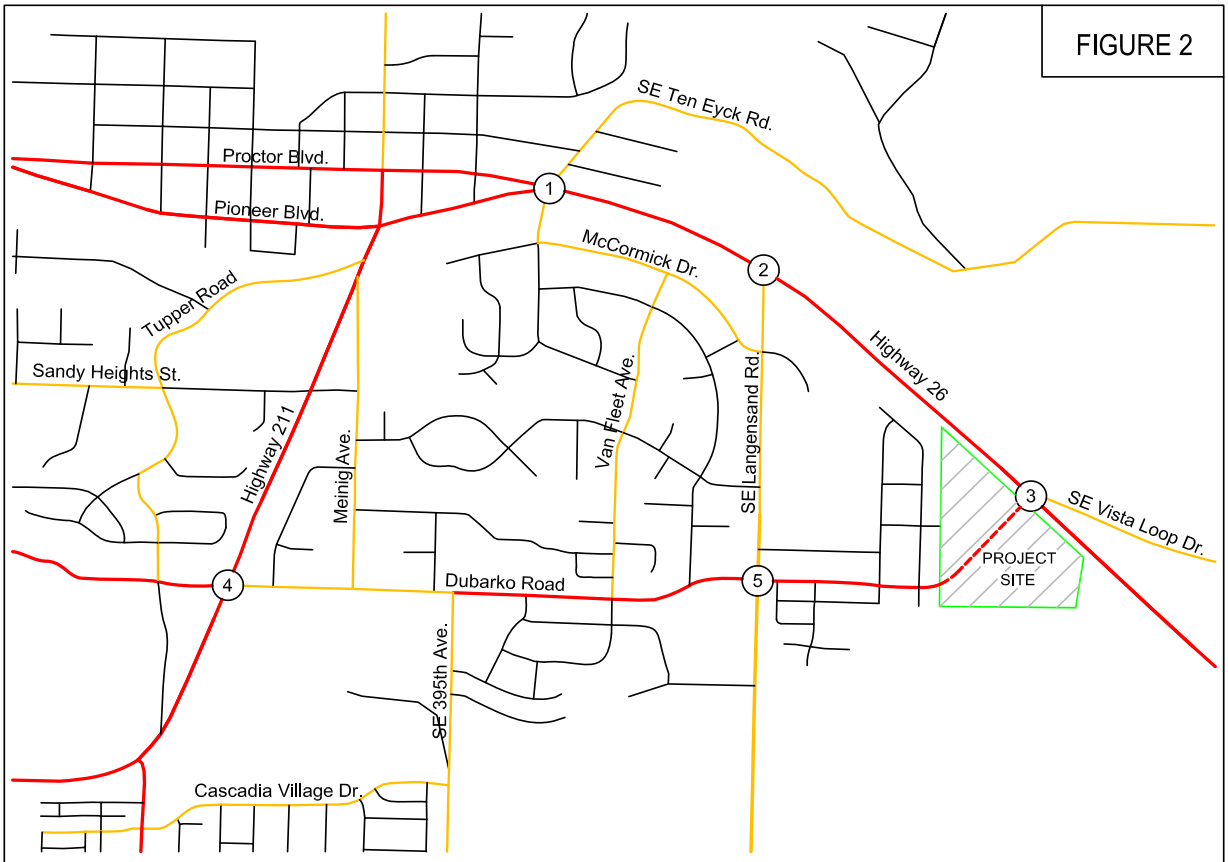
volumes. Following this adjustment, the 676 March recreational trips and the 498 peak-season through trips were added to determine the total peak-season traffic volumes. These calculated through traffic volumes represent the anticipated traffic levels for the intersections along Highway 26 during the 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.

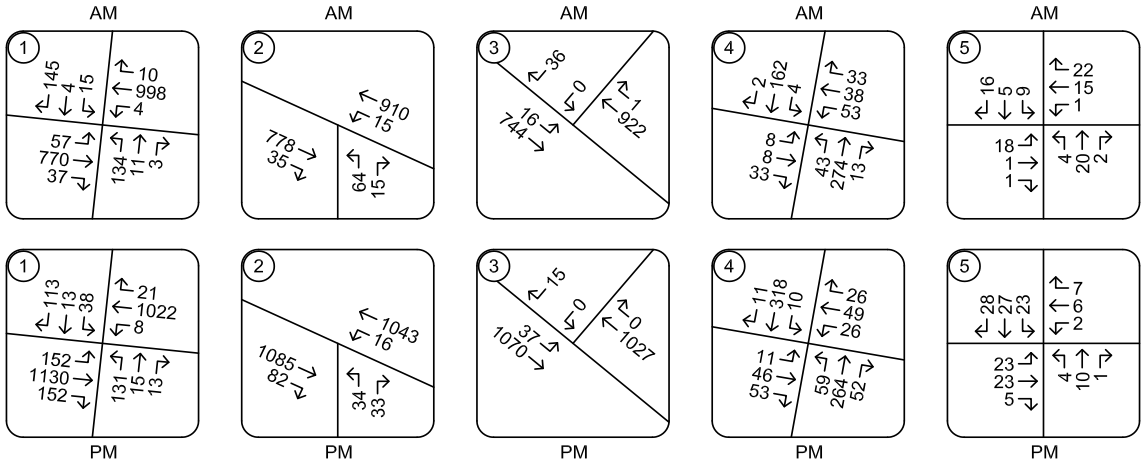
The observed traffic volumes along Highway 211 also had a seasonal adjustment of 1.08 applied to represent peak-season traffic volumes.

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





TRAFFIC VOLUMES
2020 Existing 30th-Highest Hour (August) Conditions
Morning and Evening Peak Hours

PAGE 10

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. The intersection of Highway 211 at Dubarko Road is required to operate with a v/c ratio of 0.90 or less on all 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 147 apartment units and 4 single-family homes. Although some commercial development is expected to occur in the longer-range future, a separate application and analysis will be prepared for the future commercial development. To estimate the number of trips that will be generated by residential development within the proposed subdivision, trip rates from the *TRIP GENERATION MANUAL, 10th EDITION* were used. Data from land-use code 210, *Single-Family Detached* Housing, and 220, *Multi-Family Housing*, were used. The trip estimates are based on the number of dwelling units.

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

Table 2 - Proposed Development Trip Generation Summary

	AM Peak Hour			PM Peak Hour			Daily
	In	Out	Total	In	Out	Total	Total
147 Apartment Units	16	52	68	52	30	82	1076
4 Single-Family Homes	1	2	3	3	1	4	38
Total Site Trips	17	54	71	55	31	86	1,114

Zone Change

In addition to evaluation of the increase in site trips expected upon completion of residential 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, 3.609 acres will be zoned C-3, and 1.426 acres will be zoned POS (Parks & Open Space).

Trip generation for the R-1 zone was calculated assuming single-family 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
	In	Out	Total	In	Out	Total	Total
Existing R1, R2 and C3 Zoning							
6.628 Acres R-1 (46 Homes)	9	25	34	29	17	46	434
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)	**113**	**129**	**242**	**185**	**155**	**340**	**3392**
Proposed Zoning							
0.906 Acres R-1 (6 Homes)	1	3	4	4	2	6	56
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 (39,300 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 (29,300 sf)	65	47	112	136	135	271	3128
-Pass-by Trips (36%)	-20	-20	-40	-49	-49	-98	-1126
1.43 Acres POS (Public Park)	0	0	0	0	0	0	2
Net Trips (Proposed Zoning)	**130**	**143**	**273**	**216**	**186**	**402**	**4370**
Net Change In Site Trips	**17**	**14**	**31**	**31**	**31**	**62**	**978**

Based on the zone change analysis, the proposed zone change could result in a net increase of up to 31 site trips during the morning peak hour, a net increase of 62 trips during the evening peak hour, and a net increase of 978 daily trips. Based on the projected daily increase in site trips, the zone change may result in a significant increase in site traffic as measured at the planning horizon under the "reasonable

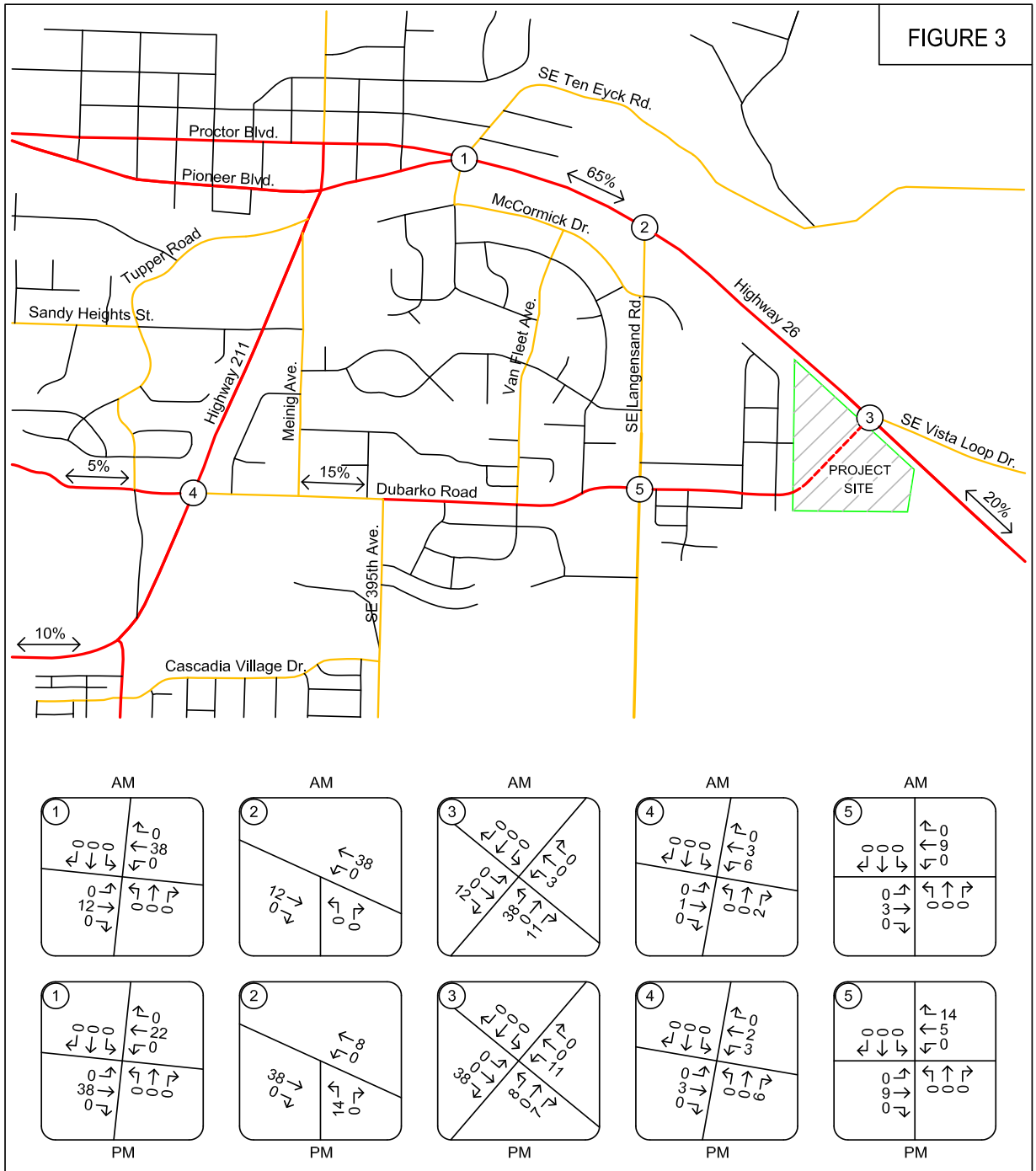
worst case" development scenario. Accordingly, some form of mitigation is necessary to meet the requirements of Oregon's Transportation Planning Rule. A detailed analysis based on the requirements of Oregon's Transportation Planning Rule including a recommended condition of approval which is be sufficient 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 27 of this report.

TRIP DISTRIBUTION

The directional distribution of site trips to and from the project site was estimated based the existing travel patterns in the site vicinity, as well as the locations of likely trip destinations and major transportation routes. Overall, 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

PAGE 16

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 two years. Accordingly, the analysis was conducted for year 2022 traffic conditions.

Prior to adding the projected site trips to the study intersections, the existing traffic volumes were adjusted to account for background traffic growth over time. 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 2022 background traffic volumes at the study intersections during the morning and evening peak hours.

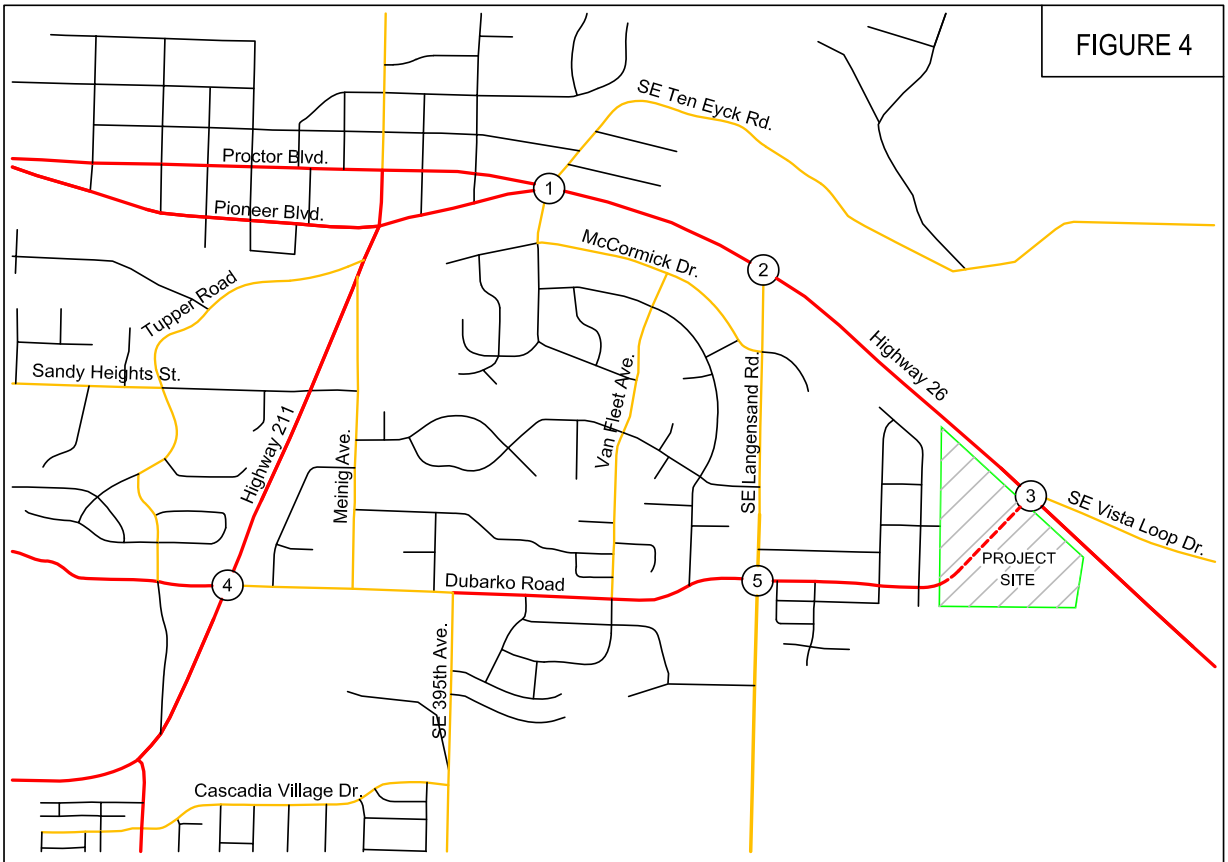
BACKGROUND VOLUMES PLUS SITE TRIPS

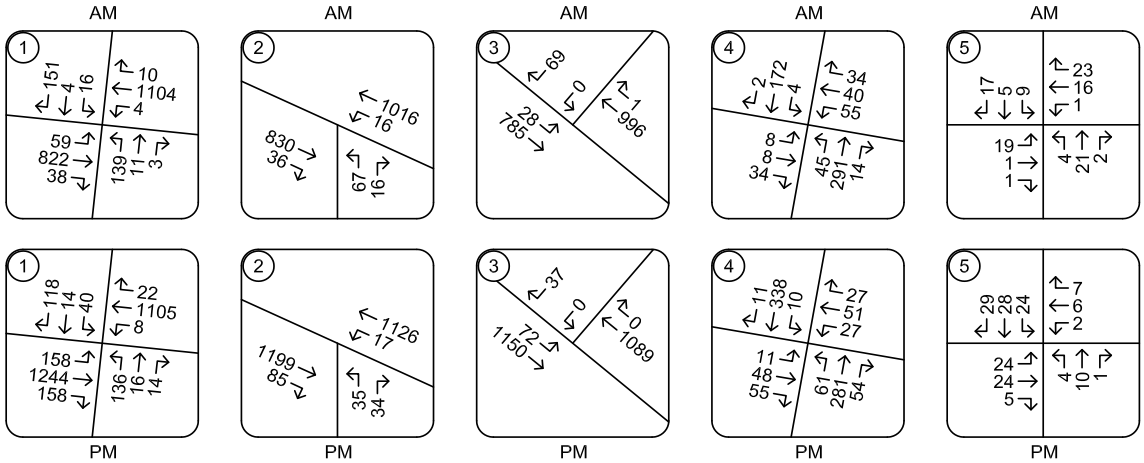
Peak hour trips calculated to be generated by the proposed development were added to the projected year 2022 background traffic volumes to obtain the year 2022 total traffic volumes following completion of the proposed residential development.

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 2022 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 6 on page 20 shows the year 2022 turning movement volumes for the morning and evening peak hour with full site development if the Dubarko Road connection to Highway 26 is limited to right-in, right-out only.

FIGURE 4

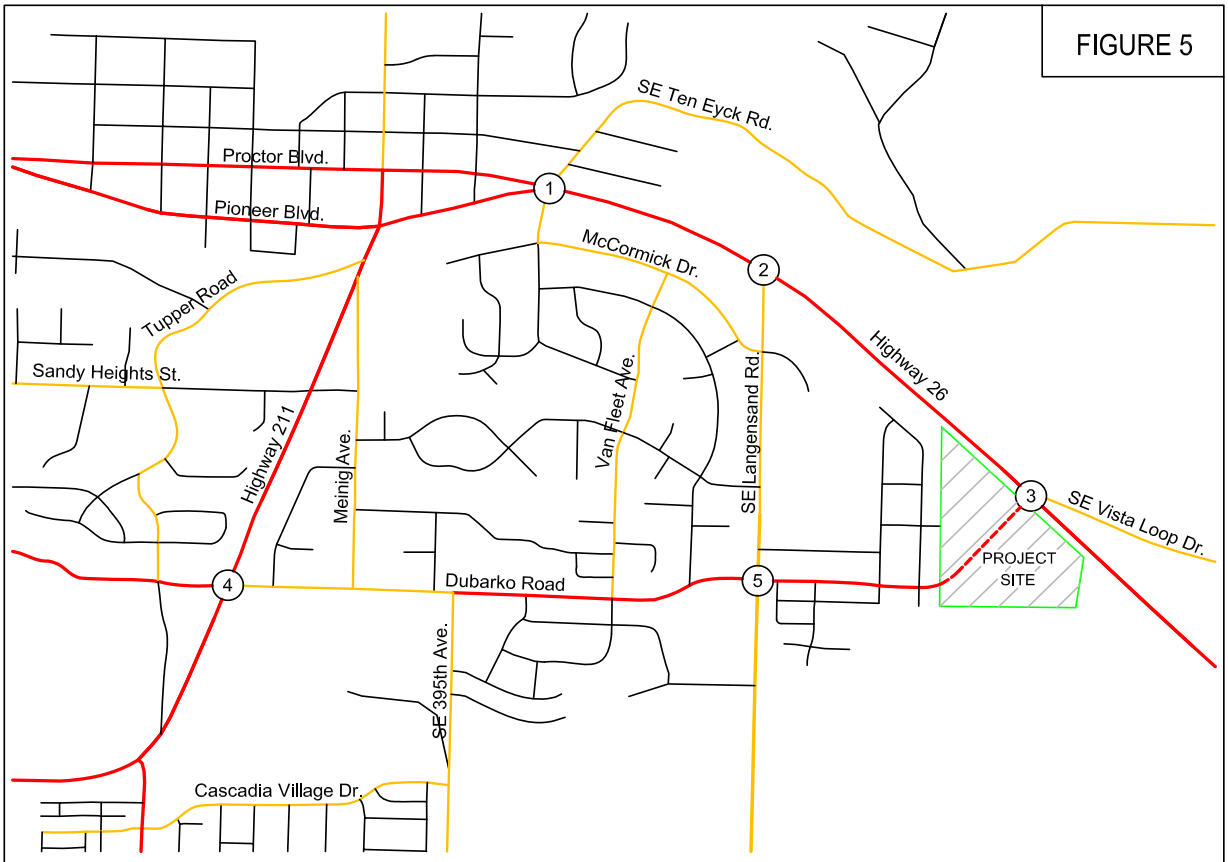


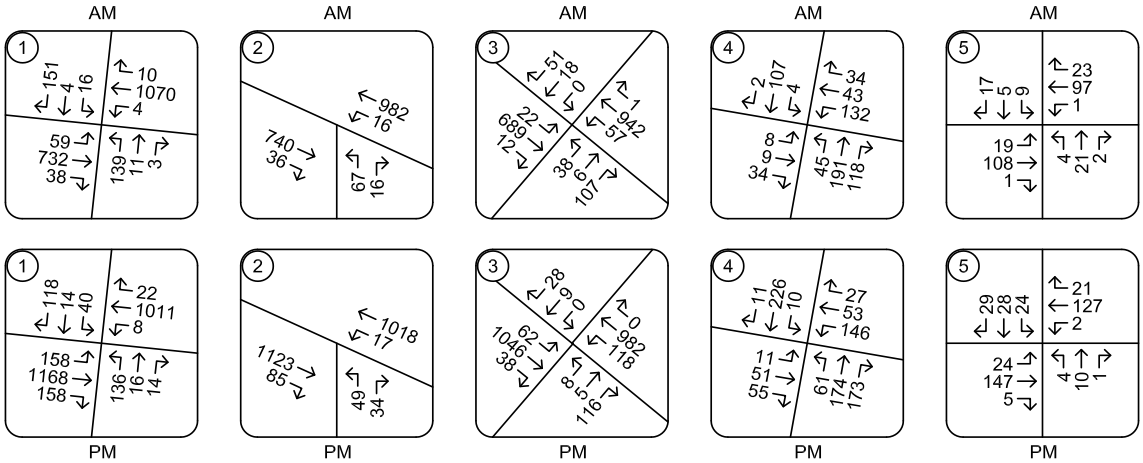


TRAFFIC VOLUMES
2022 Background Conditions
Morning and Evening Peak Hours

PAGE 18

FIGURE 5

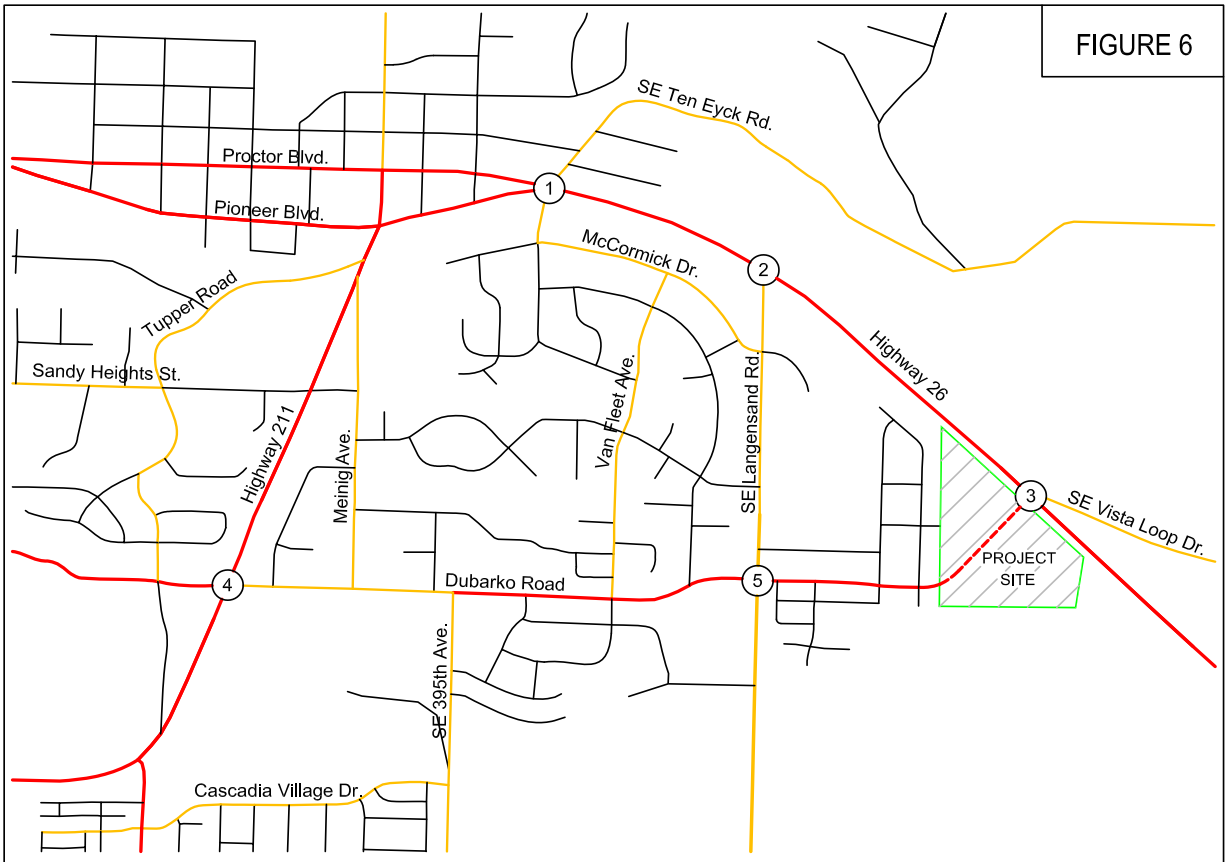


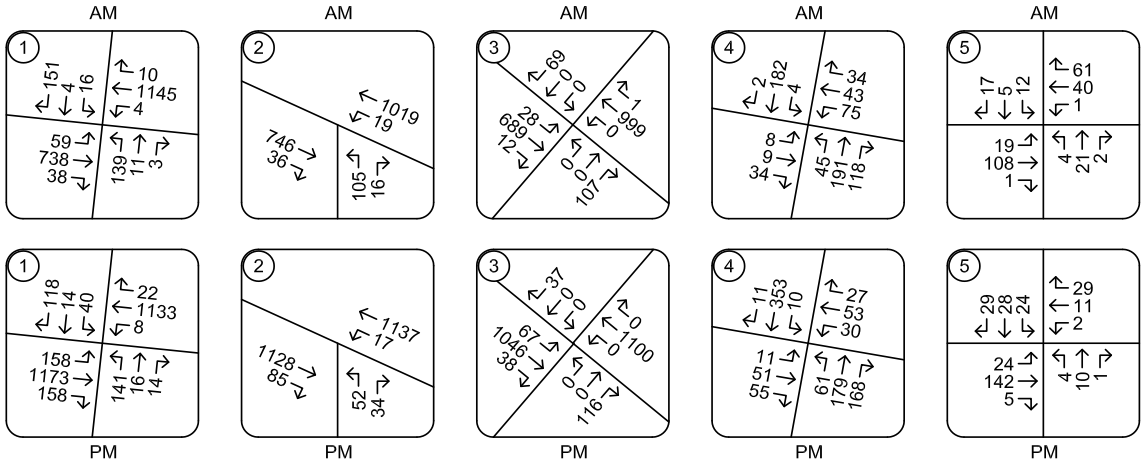


TRAFFIC VOLUMES
2022 Background Plus Site Trips
Morning and Evening Peak Hours

PAGE 19

FIGURE 6





(Left-turning traffic entering and exiting the site via Highway 26 is diverted to Langensand Rd.)

TRAFFIC VOLUMES
2022 Background Plus Site Trips Conditions (Restricted)
Morning and Evening Peak Hours

PAGE 20

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 2022 Future Conditions

Intersection	AM Peak Hour			PM Peak Hour		
	Delay	LOS	v/c*	Delay	LOS	v/c*
Highway 26 at Ten Eyck Road						
2022 Background Conditions	24.4	C	0.67	28.0	C	0.75
2022 Background plus Site	24.1	C	0.66	28.1	C	0.72
2022 Background plus Site RIRO	25.3	C	0.69	28.6	C	0.75
Highway 26 at Langensand Road						
2022 Background Conditions	77.4	F	0.31 / 0.62	137.4	F	0.39 / 0.62
2022 Background plus Site	56.8	F	0.30 / 0.52	129.9	F	0.36 / 0.71
2022 Background plus Site RIRO	107.2	F	0.31 / 0.85	168.9	F	0.36 / 0.83
Highway 26 at Vista Loop Drive						
2022 Background Conditions	11.4	B	0.30 / 0.05	13.9	B	0.34 / 0.09
2022 Background plus Site	157.0	F	0.28 / 0.75	412.7	F	0.32 / 0.75
2022 Background plus Site RIRO	14.0	B	0.30 / 0.16	15.2	C	0.32 / 0.25
Highway 211 at Dubarko Road						
2022 Background Conditions	19.6	C	0.23 / 0.30	28.8	D	0.26 / 0.36
2022 Background plus Site	21.0	C	0.23 / 0.47	54.3	F	0.26 / 0.79
2022 Background plus Site RIRO	20.0	C	0.23 / 0.35	28.6	D	0.27 / 0.37
Dubarko Road at Langensand Road						
2022 Background Conditions	9.4	A	0.05	9.8	A	0.04
2022 Background plus Site	10.3	B	0.17	11.1	B	0.22
2022 Background plus Site RIRO	10.3	B	0.15	11.1	B	0.22

*(major street v/c) / (minor-street v/c) is shown for unsignalized ODOT intersections.

Based on the results of the operational analysis, the study intersections are projected to operate acceptably through year 2021 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.

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 157 seconds during the morning peak hour and 413 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. As shown by the right-in, right-out analysis, even if all site trips diverted to avoid these delays the remaining study intersections would continue to operate acceptably.

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 2022 background plus site trips conditions during the morning and evening peak hours. Based on the analysis, the projected 95th percentile queue lengths were 38 feet during the morning peak hour and 80 feet during the evening peak hour. Accordingly, it is recommended that if a new turn lane is provided it should have a storage length of at least 100 feet.

The queuing analysis also showed a projected northeast-bound 95th-percentile queue length on Dubarko Road approaching Highway 26 of up to 277 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 2013 through December 2017) 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 seven reported collisions during the five-year analysis period. These included six rear-end collisions and one turning-movement collision. The crashes resulted in no serious injuries or fatalities and four 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 three turning-movement collisions, one angle collision, 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 five 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 no reported crashes during the five-year analysis period.

The intersection of Highway 211 at Dubarko Road had 27 reported crashes during the five-year analysis period. These included 15 angle collisions, 5 turning-movement collisions, 5 rear-end collisions, 1 backing collision, and 1 sideswipe-overtaking collision. The crashes resulted in no incapacitating injuries or fatalities. There were six "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 recently undertook safety improvements at this intersection, including re-alignment of the minor-street approaches to intersect at a 90-degree angle and the addition of some striping 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 2022 conditions with completion of the Dubarko Road connection to Highway 26. Accordingly, it is recommended that ODOT consider allowing installation of all-way stop control at this intersection. 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 ODOT consider allowing installation of all-way stop control 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 2022 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.

An additional traffic signal warrant analysis was prepared for the intersection of Highway 211 at Dubarko Road assuming that traffic is restricted to right-in, right-out only for the intersection of Highway 26 at Dubarko Road. Under this scenario, the side-street volumes are significantly reduced for the Dubarko Road approach to Highway 211 and traffic signal warrants are not projected to be met. This analysis also demonstrates that the triggering event that causes signal warrants to be marginally met 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 traffic volumes for Highway 211 at Dubarko Road are only projected to marginally meet signal warrants for 30th-highest hour conditions if all proposed developments are constructed, 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 and evening peak hours, with an average delay of 24 seconds or less for the highest-delay (northbound) approach and a maximum v/c ratio of 0.74.

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 may not be needed if all-way stop control is installed at the intersection as recommended based on the safety analysis, or if a traffic signal is installed at the intersection.

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 18 trips during the evening peak hour, and an increase of 484 daily trips. This represents an increase of 9 percent during the PM peak hour and 11 percent during the evening peak hour. 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 242 net new morning peak hour trips, 340 net evening peak hour trips, and 3,392 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 340 net new PM peak hour site trips is recommended for the subject properties in conjunction with the proposed zone change.

It is anticipated that the R-1, R-2 and R-3 portions of the subject property will be developed in the near term in conformance with the development plan previously analyzed in this report. As such, it is expected that following completion of the proposed residential development the undeveloped C-3 portion of the site will be subject to a cap of no more than 248 additional new PM peak hour trips (340 trip cap – 92 residential trips within the R-1, R-2 and R-3 zones).

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 2022 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. An additional analysis showing operation of the study intersections with the new Dubarko Road at Highway 26 intersection restricted to right-in, right-out only demonstrates that there is sufficient capacity for such diversions even if all northeast-bound left-turning vehicles diverted to alternative travel paths.

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 ODOT consider allowing installation of all-way stop control at this intersection. No other safety improvements are recommended for the study area intersections at this time.

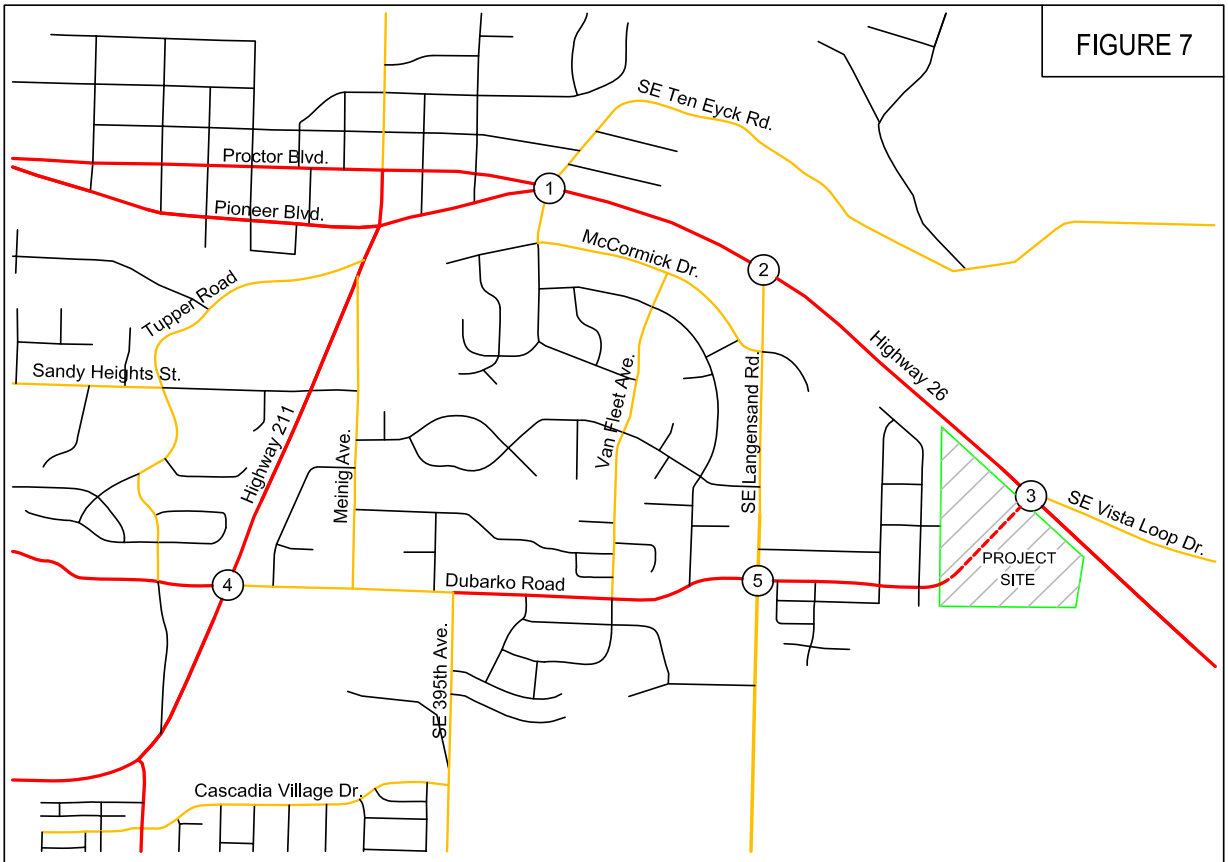
Based on the warrant analysis, a northwest-bound left-turn lane and a southeast-bound right-turn lane are projected to be warranted at the intersection of Highway 26 at Dubarko Road with completion of the Dubarko Road extension. The northbound left-turn lane would not be needed at the time of project completion if the intersection is limited to right-in, right-out only. No other turn lanes or traffic signals are recommended in conjunction with the proposed subdivision.

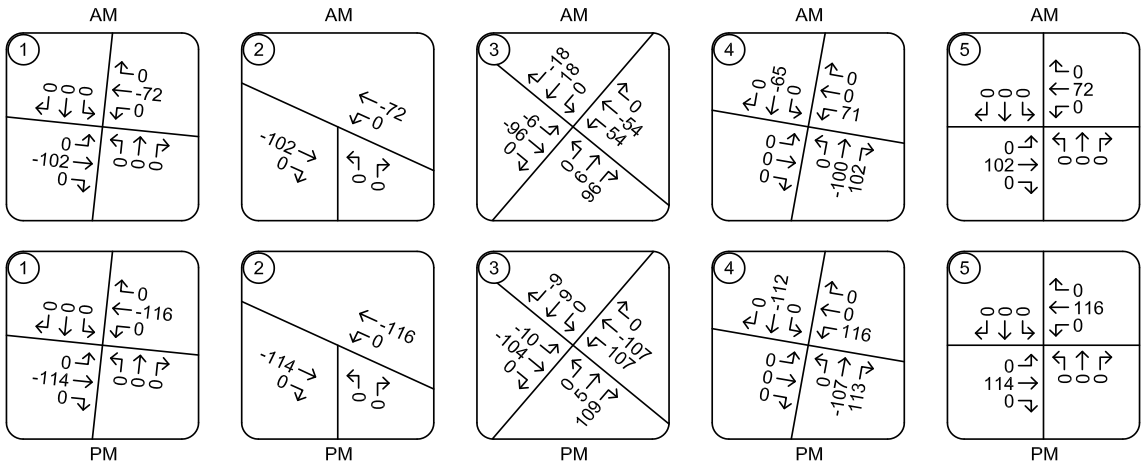
Intersection sight distance was evaluated for the new intersection of Highway 26 at Dubarko Road. The proposed intersection was found to have adequate sight distance in both directions.

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 maximum development within the C-3 portion of the site to 250 net new PM peak hour trips and 2,650 net new daily 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 7

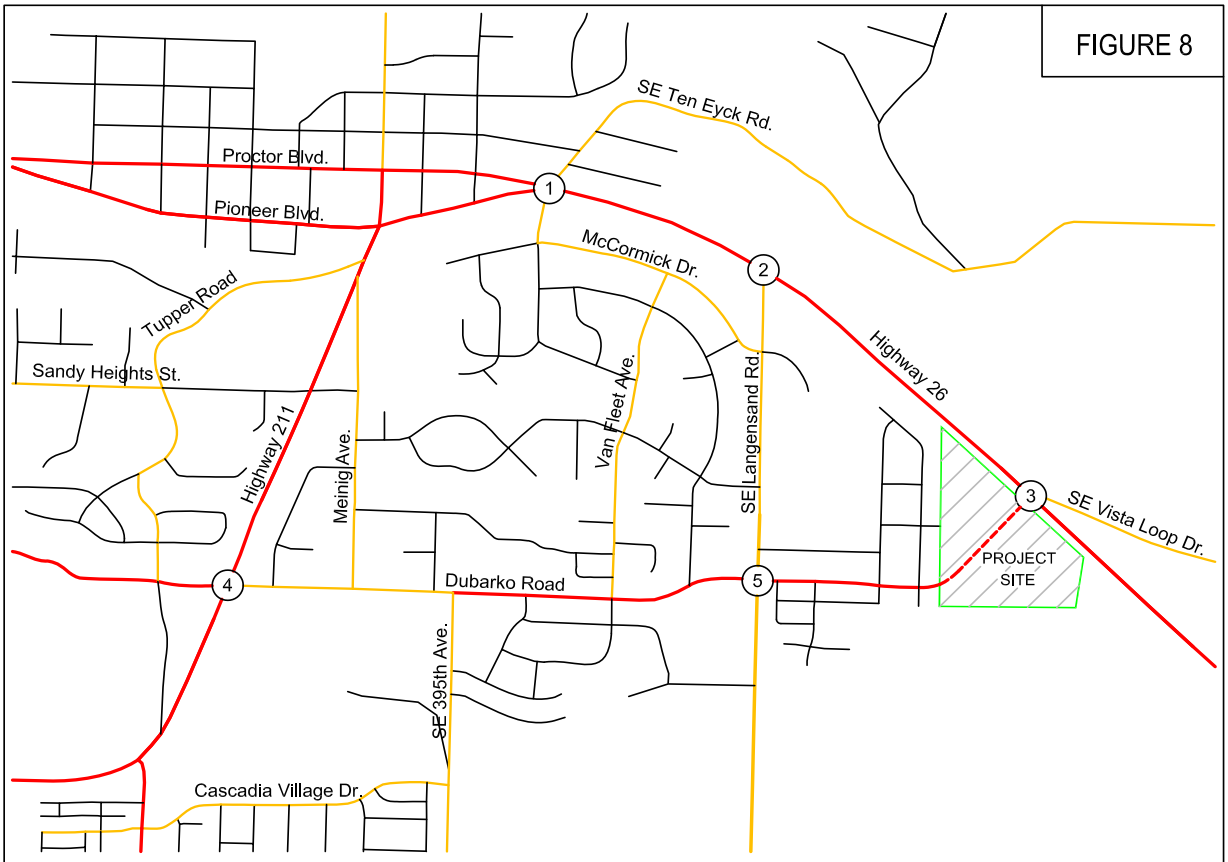


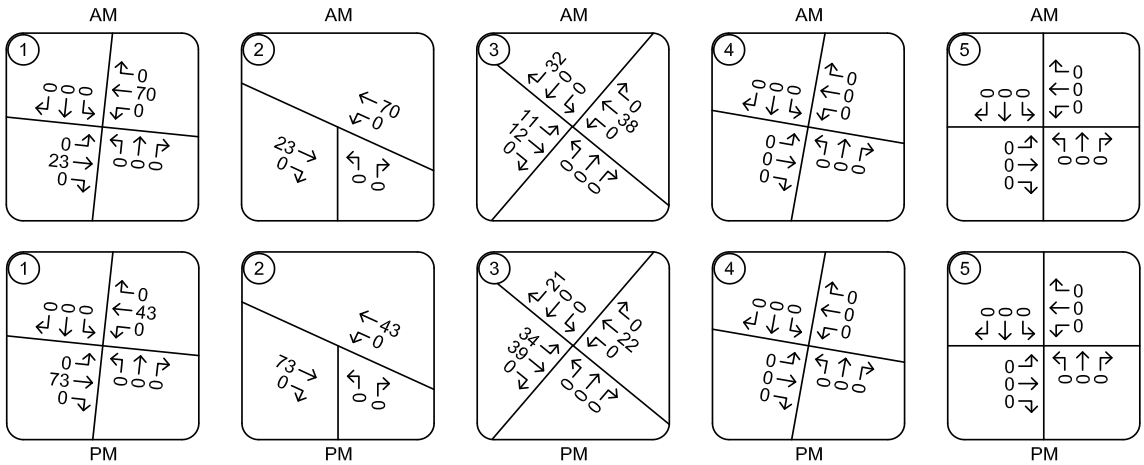


TRAFFIC VOLUMES
Diverted Trips Following Dubarko Connection to Hwy. 26
Morning and Evening Peak Hours

PAGE
APP1

FIGURE 8



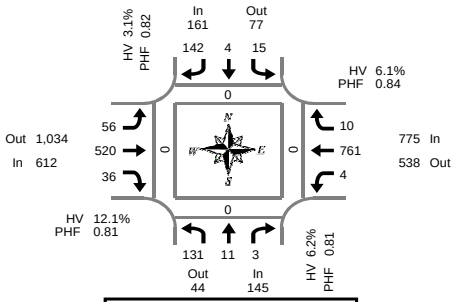


TRAFFIC VOLUMES
"The Views" Development - In-Process Site Trips
Morning and Evening Peak Hours

PAGE
APP2

Total Vehicle Summary

All Traffic Data Services Inc.
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

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				

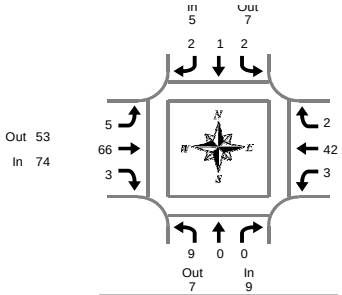
By Movement	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	131	11	3	145	15	4	142	161	56	520	36	612	4	761	10	775	1,693
%HV	6.9%	0.0%	0.0%	6.2%	13.3%	25.0%	1.4%	3.1%	8.9%	12.7%	8.3%	12.1%	75.0%	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	0	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



SE Ten Eyck Rd & Hwy 26

Wednesday, March 20, 2019
7:00 AM to 9:00 AM

Peak Hour Summary
7:00 AM to 8:00 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

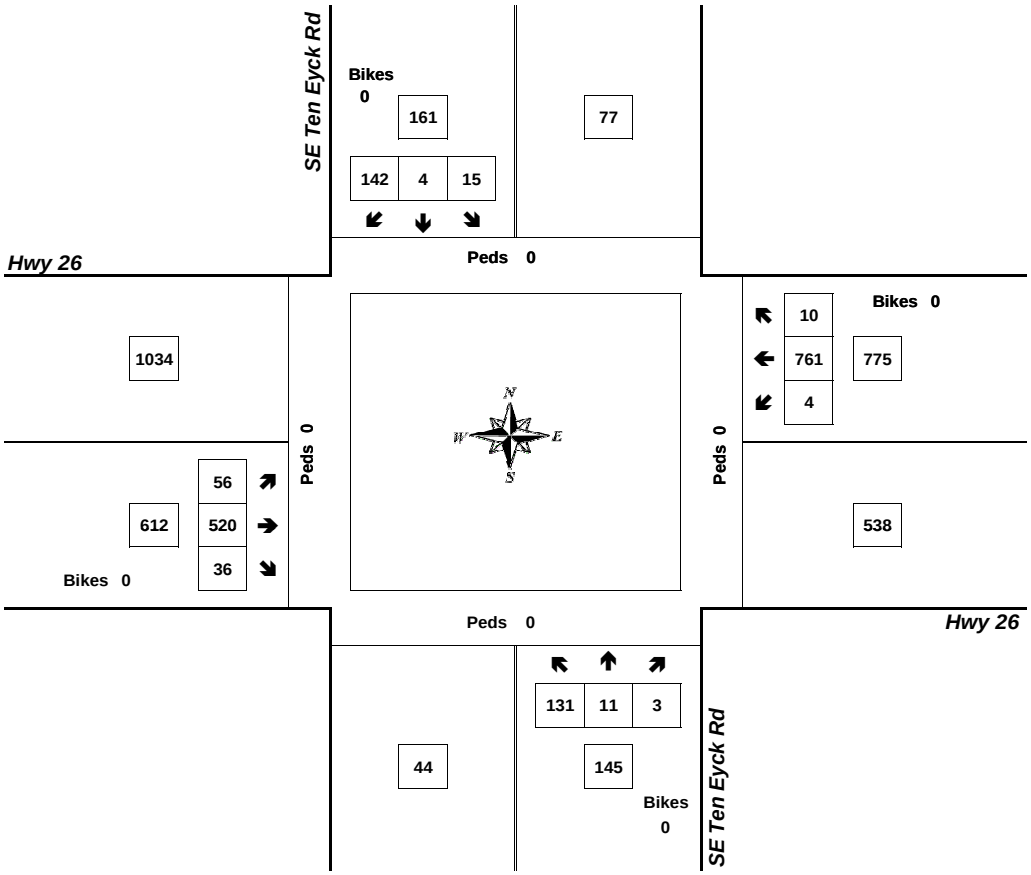
Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	9	0	0	9	2	1	2	5	5	66	3	74	3	42	2	47	135
7:15 AM	6	0	0	6	3	1	4	8	4	73	3	80	1	44	2	47	141
7:30 AM	3	0	0	3	2	0	5	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

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740

SE Ten Eyck Rd & Hwy 26

7:00 AM to 8:00 AM
Wednesday, March 20, 2019

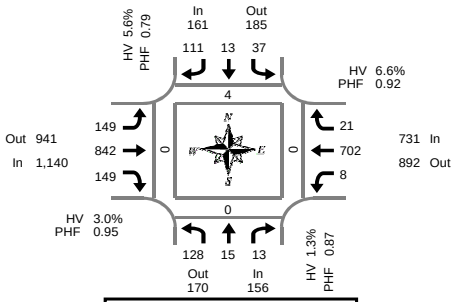


Approach	PHF	HV%	Volume
EB	0.81	12.1%	612
WB	0.84	6.1%	775
NB	0.81	6.2%	145
SB	0.82	3.1%	161
Intersection	0.93	8.0%	1,693

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
4:10 PM to 5:10 PM

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	66	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	0	2	3	0	16	65	10	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

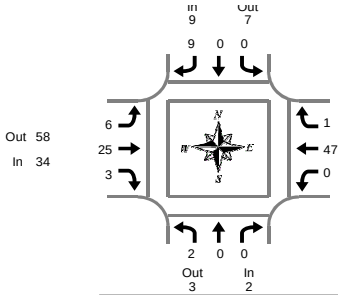
Rolling Hour Summary
4:00 PM to 6:00 PM

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

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740



Peak Hour Summary
4:10 PM to 5:10 PM

SE Ten Eyck 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 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	4	0	10	1	11	15
4:05 PM	0	0	0	0	1	0	0	1	0	6	0	6	0	3	1	4	11
4:10 PM	0	0	0	0	0	0	0	0	0	2	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
4:20 PM	0	0	0	0	0	0	2	2	1	3	0	4	0	5	1	6	12
4:25 PM	0	0	0	0	0	0	1	1	0	5	1	6	0	4	0	4	11
4:30 PM	0	0	0	0	0	0	2	2	1	0	0	1	0	3	0	3	6
4:35 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	5	5
4:40 PM	0	0	0	0	0	0	1	1	0	3	0	3	0	2	0	2	6
4:45 PM	0	0	0	0	0	0	0	0	1	1	0	2	0	4	0	4	6
4:50 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	7	7
4:55 PM	0	0	0	0	0	0	1	1	1	2	1	4	0	0	0	0	5
5:00 PM	0	0	0	0	0	0	0	0	0	4	1	5	0	1	0	1	6
5:05 PM	0	0	0	0	0	0	0	0	0	2	0	2	0	5	0	5	7
5:10 PM	0	0	0	0	0	0	0	0	1	3	0	4	0	4	0	4	8
5:15 PM	0	0	0	0	0	0	0	0	1	1	0	2	0	2	0	2	4
5:20 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	5	0	5	6
5:25 PM	0	0	0	0	0	0	0	0	0	2	0	2	0	1	0	1	3
5:30 PM	0	0	0	0	0	0	0	0	0	3	1	4	0	3	0	3	7
5:35 PM	0	0	0	0	0	0	0	0	1	1	0	2	0	4	0	4	6
5:40 PM	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	2
5:45 PM	1	0	0	1	0	0	0	0	0	2	0	2	0	3	0	3	6
5:50 PM	1	0	0	1	0	0	0	0	0	1	1	2	0	4	0	4	7
5:55 PM	0	0	0	0	0	0	0	0	1	2	0	3	0	5	0	5	8
Total Survey	4	0	0	4	1	0	9	10	10	53	5	68	0	91	3	94	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
4:15 PM	2	0	0	2	0	0	5	5	3	11	1	15	0	12	1	13	35
4:30 PM	0	0	0	0	0	0	3	3	1	3	0	4	0	10	0	10	17
4:45 PM	0	0	0	0	0	0	1	1	2	3	1	6	0	11	0	11	18
5:00 PM	0	0	0	0	0	0	0	0	1	9	1	11	0	10	0	10	21
5:15 PM	0	0	0	0	0	0	0	0	1	4	0	5	0	8	0	8	13
5:30 PM	0	0	0	0	0	0	0	0	1	6	1	8	0	7	0	7	15
5:45 PM	2	0	0	2	0	0	0	0	1	5	1	7	0	12	0	12	21
Total Survey	4	0	0	4	1	0	9	10	10	53	5	68	0	91	3	94	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
4:15 PM	2	0	0	2	0	0	9	9	7	26	3	36	0	43	1	44	91
4:30 PM	0	0	0	0	0	0	4	4	5	19	2	26	0	39	0	39	69
4:45 PM	0	0	0	0	0	0	1	1	5	22	3	30	0	36	0	36	67
5:00 PM	2	0	0	2	0	0	0	0	4	24	3	31	0	37	0	37	70

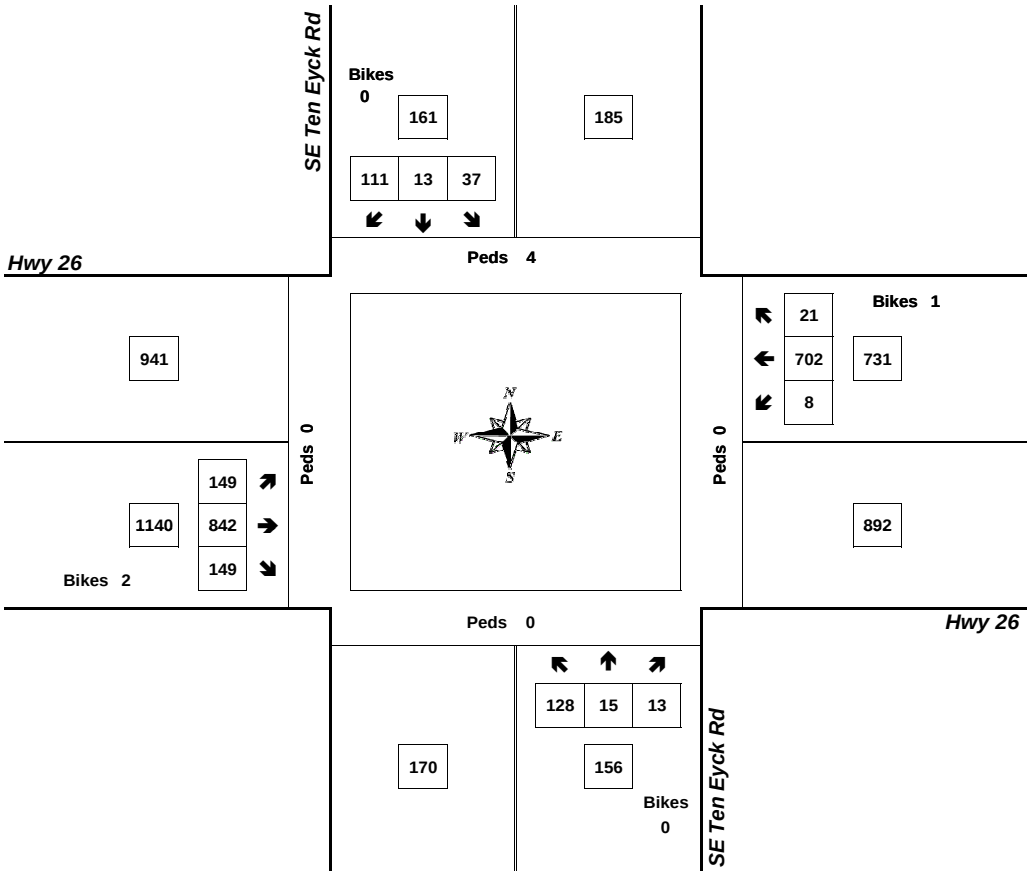
Peak Hour Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740

SE Ten Eyck Rd & Hwy 26

4:10 PM to 5:10 PM
Tuesday, March 19, 2019

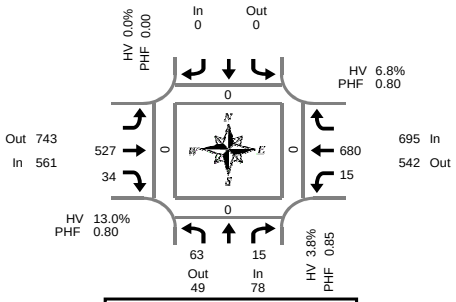


Approach	PHF	HV%	Volume
EB	0.95	3.0%	1,140
WB	0.92	6.6%	731
NB	0.87	1.3%	156
SB	0.79	5.6%	161
Intersection	0.94	4.3%	2,188

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
7:05 AM to 8:05 AM

SE Langensand 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 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				

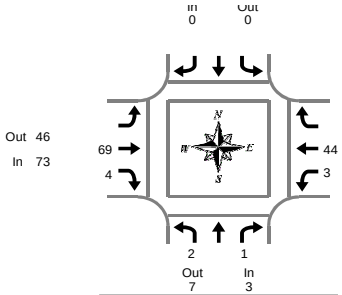
By Movement	Northbound SE Langensand Rd				Southbound SE Langensand Rd				Eastbound Hwy 26				Westbound Hwy 26				Total
	L		R	Total				Total	T	R	Total		L	T		Total	
Volume	63		15	78				0	527	34	561		15	680		695	1,334
%HV	3.2%	NA	6.7%	3.8%	NA	NA	NA	0.0%	NA	13.1%	11.8%	13.0%	20.0%	6.5%	NA	6.8%	9.2%
PHF	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

All Traffic Data Services Inc.
Clay Carney
(503) 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

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

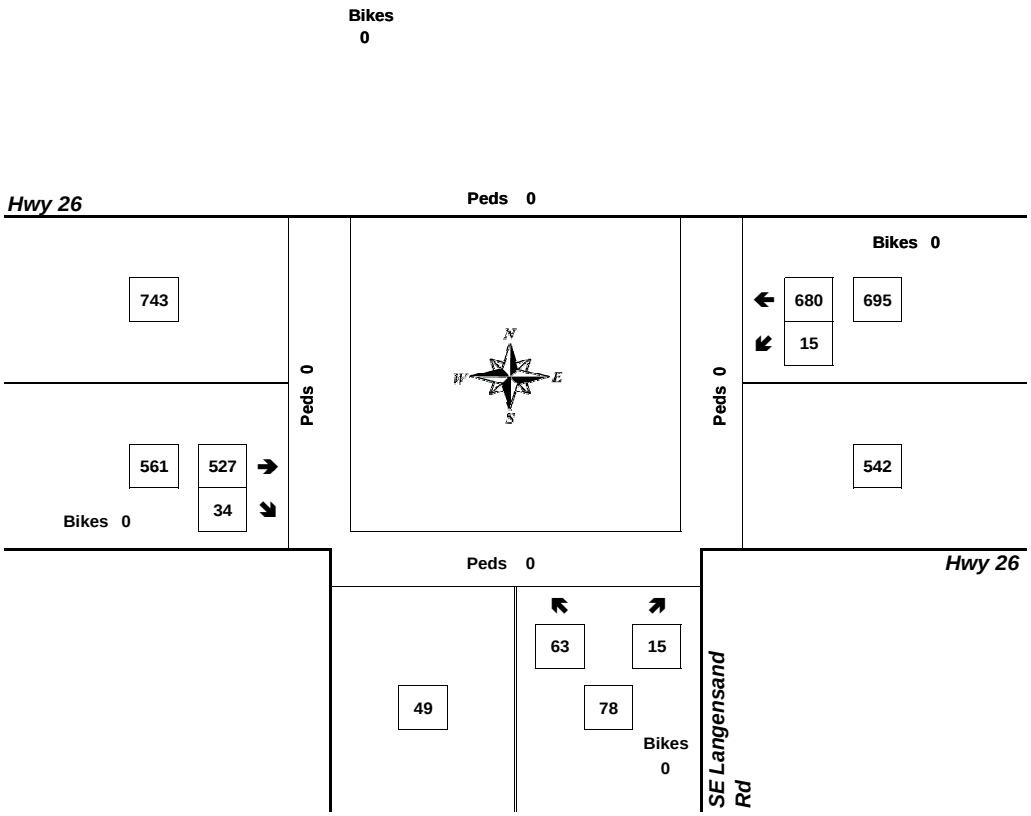
Interval Start Time	Northbound SE Langensand Rd				Southbound SE Langensand Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
	L		R	Total				Total	T	R	Total	L	T		Total	
7:00 AM	2		1	3				0	66	5	71	3	48		51	125
7:15 AM	3		1	4				0	76	4	80	3	47		50	134
7:30 AM	3		2	5				0	69	5	74	2	51		53	132
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

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740

SE Langensand Rd & Hwy 26

7:05 AM to 8:05 AM
Wednesday, March 20, 2019

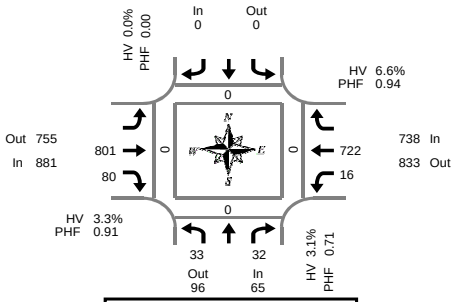


Approach	PHF	HV%	Volume
EB	0.80	13.0%	561
WB	0.80	6.8%	695
NB	0.85	3.8%	78
SB	0.00	0.0%	0
Intersection	0.93	9.2%	1,334

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary

Clay Carney
(503) 833-2740



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

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				

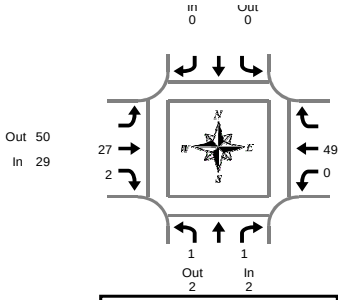
By Movement	Northbound SE Langensand Rd				Southbound SE Langensand Rd				Eastbound Hwy 26				Westbound Hwy 26				Total
	L		R	Total				Total	T	R	Total		L	T		Total	
Volume	33		32	65				0	801	80	881		16	722		738	1,684
%HV	3.0%	NA	3.1%	3.1%	NA	NA	NA	0.0%	3.4%	2.5%	3.3%		0.0%	6.8%	NA	6.6%	4.8%
PHF	0.49		0.80	0.71				0.00	0.93	0.69	0.91		0.57	0.93		0.94	0.93

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

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



SE Langensand 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 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				0	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

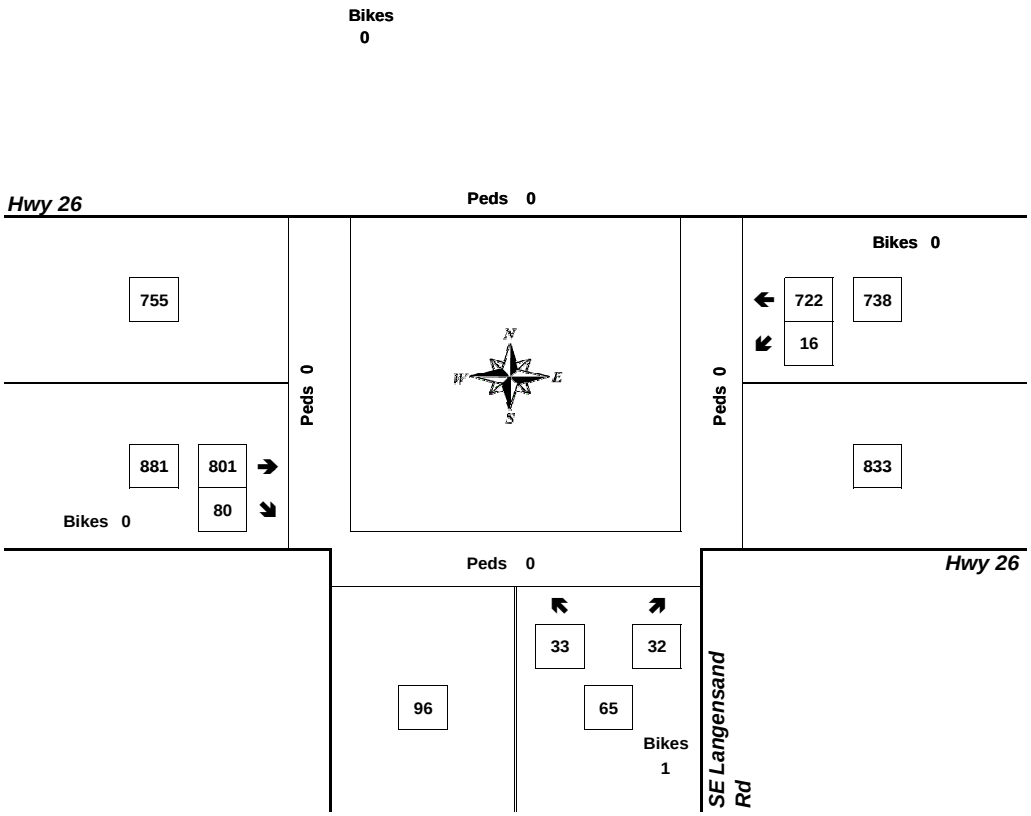
Interval Start Time	Northbound SE Langensand Rd				Southbound SE Langensand Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
	L		R	Total				Total	T	R	Total	L	T		Total	
4:00 PM	1		1	2				0	33	2	35	0	58		58	95
4:15 PM	1		1	2				0	25	3	28	0	46		46	76
4:30 PM	0		1	1				0	16	2	18	0	42		42	61
4:45 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

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740

SE Langensand Rd & Hwy 26

4:10 PM to 5:10 PM
Tuesday, March 19, 2019



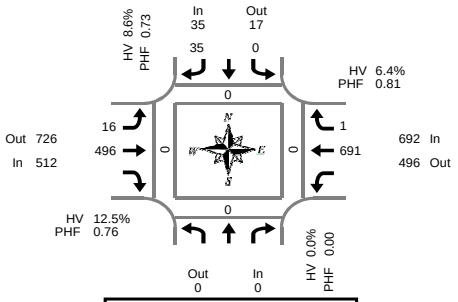
Approach	PHF	HV%	Volume
EB	0.91	3.3%	881
WB	0.94	6.6%	738
NB	0.71	3.1%	65
SB	0.00	0.0%	0
Intersection	0.93	4.8%	1,684

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740



Peak Hour Summary
7:00 AM to 8:00 AM

SE Vista Loop Dr & Hwy 26

Wednesday, March 20, 2019
7:00 AM to 9:00 AM

5-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
				Bikes	L		R	Bikes	L	T		Bikes		T	R	Bikes		North	South	East	West
7:00 AM				0	0		6	0	1	25		0		68	0	0	100	0	0	0	0
7:05 AM				0	0		2	0	0	25		0		54	0	0	81	0	0	0	0
7:10 AM				0	0		4	0	1	24		0		80	0	0	109	0	0	0	0
7:15 AM				0	0		2	0	2	32		0		71	0	0	107	0	0	0	0
7:20 AM				0	0		2	0	2	51		0		63	0	0	118	0	0	0	0
7:25 AM				0	0		4	0	1	31		0		62	0	0	98	0	0	0	0
7:30 AM				0	0		1	0	2	46		0		62	1	0	112	0	0	0	0
7:35 AM				0	0		4	0	0	43		0		49	0	0	96	0	0	0	0
7:40 AM				0	0		4	0	3	54		0		45	0	0	106	0	0	0	0
7:45 AM				0	0		4	0	0	54		0		44	0	0	102	0	0	0	0
7:50 AM				0	0		0	0	2	53		0		57	0	0	112	0	0	0	0
7:55 AM				0	0		2	0	2	58		0		36	0	0	98	0	0	0	0
8:00 AM				0	0		3	0	1	52		0		31	0	0	87	0	0	0	0
8:05 AM				0	0		2	0	3	44		0		40	0	0	89	0	0	0	0
8:10 AM				0	1		1	0	0	42		0		50	0	0	94	0	0	0	0
8:15 AM				0	0		0	0	1	46		0		32	0	0	79	0	0	0	0
8:20 AM				0	0		1	0	2	38		0		46	0	0	87	0	0	0	0
8:25 AM				0	0		0	0	3	39		0		42	0	0	84	0	0	0	0
8:30 AM				0	0		2	0	0	61		0		42	0	0	105	0	0	0	0
8:35 AM				0	0		0	0	0	56		0		44	0	0	100	0	0	0	0
8:40 AM				0	1		2	0	0	64		0		52	0	0	119	0	0	0	0
8:45 AM				0	0		1	0	0	66		0		56	0	0	123	0	0	0	0
8:50 AM				0	0		0	0	2	56		0		49	0	0	107	0	0	0	0
8:55 AM				0	0		2	0	2	61		0		42	0	0	107	0	0	0	0
Total Survey				0	2		49	0	30	1,121		0		1,217	1	0	2,420	0	0	0	0

15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
				Bikes	L		R	Bikes	L	T		Bikes		T	R	Bikes		North	South	East	West
7:00 AM				0	0		12	0	2	74		0		202	0	0	290	0	0	0	0
7:15 AM				0	0		8	0	5	114		0		196	0	0	323	0	0	0	0
7:30 AM				0	0		9	0	5	143		0		156	1	0	314	0	0	0	0
7:45 AM				0	0		6	0	4	165		0		137	0	0	312	0	0	0	0
8:00 AM				0	1		6	0	4	138		0		121	0	0	270	0	0	0	0
8:15 AM				0	0		1	0	6	123		0		120	0	0	250	0	0	0	0
8:30 AM				0	1		4	0	0	181		0		138	0	0	324	0	0	0	0
8:45 AM				0	0		3	0	4	183		0		147	0	0	337	0	0	0	0
Total Survey				0	2		49	0	30	1,121		0		1,217	1	0	2,420	0	0	0	0

Peak Hour Summary
7:00 AM to 8:00 AM

By Approach	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Total	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				

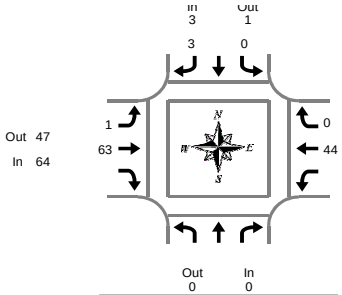
By Movement	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26			Total
				Total	L		R	Total	L	T		Total		T	R	Total	
Volume				0	0		35	35	16	496		512		691	1	692	1,239
%HV	NA	NA	NA	0.0%	0.0%	NA	8.6%	8.6%	6.3%	12.7%	NA	12.5%	NA	6.4%	0.0%	6.4%	9.0%
PHF				0.00	0.00		0.73	0.73	0.80	0.75		0.76		0.81	0.25	0.81	0.93

Rolling Hour Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
				Bikes	L		R	Bikes	L	T		Bikes		T	R	Bikes		North	South	East	West
7:00 AM				0	0		35	0	16	496		0		691	1	0	1,239	0	0	0	0
7:15 AM				0	1		29	0	18	560		0		610	1	0	1,219	0	0	0	0
7:30 AM				0	1		22	0	19	569		0		534	1	0	1,146	0	0	0	0
7:45 AM				0	2		17	0	14	607		0		516	0	0	1,156	0	0	0	0
8:00 AM				0	2		14	0	14	625		0		526	0	0	1,181	0	0	0	0

Heavy Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 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

Heavy Vehicle 5-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
				Total	L		R	Total	L	T		Total		T	R	Total	
7:00 AM				0	0		0	0	0	6		6		4	0	4	10
7:05 AM				0	0		0	0	0	4		4		5	0	5	9
7:10 AM				0	0		1	1	0	2		2		3	0	3	6
7:15 AM				0	0		0	0	0	3		3		2	0	2	5
7:20 AM				0	0		0	0	0	7		7		1	0	1	8
7:25 AM				0	0		0	0	0	5		5		3	0	3	8
7:30 AM				0	0		0	0	0	8		8		6	0	6	14
7:35 AM				0	0		1	1	0	4		4		5	0	5	10
7:40 AM				0	0		1	1	1	9		10		3	0	3	14
7:45 AM				0	0		0	0	0	7		7		3	0	3	10
7:50 AM				0	0		0	0	0	5		5		8	0	8	13
7:55 AM				0	0		0	0	0	3		3		1	0	1	4
8:00 AM				0	0		0	0	1	8		9		3	0	3	12
8:05 AM				0	0		1	1	1	10		11		5	0	5	17
8:10 AM				0	0		1	1	0	3		3		6	0	6	10
8:15 AM				0	0		0	0	0	4		4		3	0	3	7
8:20 AM				0	0		0	0	1	4		5		2	0	2	7
8:25 AM				0	0		0	0	1	5		6		3	0	3	9
8:30 AM				0	0		0	0	0	11		11		4	0	4	15
8:35 AM				0	0		0	0	0	5		5		8	0	8	13
8:40 AM				0	1		0	1	0	7		7		3	0	3	11
8:45 AM				0	0		0	0	0	8		8		4	0	4	12
8:50 AM				0	0		0	0	1	5		6		6	0	6	12
8:55 AM				0	0		0	0	0	1		1		3	0	3	4
Total Survey				0	1		5	6	6	134		140		94	0	94	240

Heavy Vehicle 15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
				Total	L		R	Total	L	T		Total		T	R	Total	
7:00 AM				0	0		1	1	0	12		12		12	0	12	25
7:15 AM				0	0		0	0	0	15		15		6	0	6	21
7:30 AM				0	0		2	2	1	21		22		14	0	14	38
7:45 AM				0	0		0	0	0	15		15		12	0	12	27
8:00 AM				0	0		2	2	2	21		23		14	0	14	39
8:15 AM				0	0		0	0	2	13		15		8	0	8	23
8:30 AM				0	1		0	1	0	23		23		15	0	15	39
8:45 AM				0	0		0	0	1	14		15		13	0	13	28
Total Survey				0	1		5	6	6	134		140		94	0	94	240

Heavy Vehicle Peak Hour Summary
7:00 AM to 8:00 AM

By Approach	Northbound SE Vista Loop Dr			Southbound SE Vista Loop Dr			Eastbound Hwy 26			Westbound Hwy 26			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	0	0	0	3	1	4	64	47	111	44	63	107	111
PHF	0.00			0.38			0.73			0.79			0.73

By Movement	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Total
				Total	L		R	Total	L	T		Total		T	R	Total	
Volume				0	0		3	3	1	63		64		44	0	44	111
PHF				0.00	0.00		0.38	0.38	0.25	0.75		0.73		0.79	0.00	0.79	0.73

Heavy Vehicle Rolling Hour Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
				Total	L		R	Total	L	T		Total		T	R	Total	
7:00 AM				0	0		3	3	1	63		64		44	0	44	111
7:15 AM				0	0		4	4	3	72		75		46	0	46	125
7:30 AM				0	0		4	4	5	70		75		48	0	48	127
7:45 AM				0	1		2	3	4	72		76		49	0	49	128
8:00 AM				0	1		2	3	5	71		76		50	0	50	129

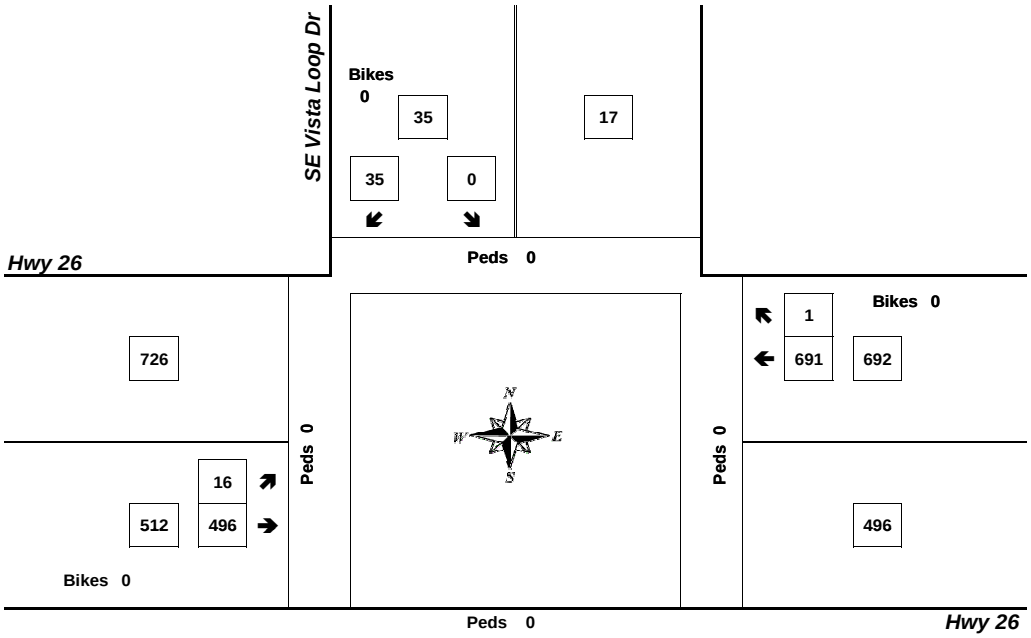
Peak Hour Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740

SE Vista Loop Dr & Hwy 26

7:00 AM to 8:00 AM
Wednesday, March 20, 2019



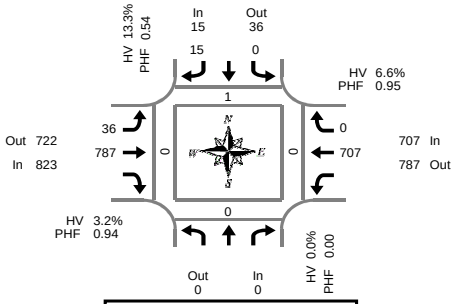
Bikes 0

Approach	PHF	HV%	Volume
EB	0.76	12.5%	512
WB	0.81	6.4%	692
NB	0.00	0.0%	0
SB	0.73	8.6%	35
Intersection	0.93	9.0%	1,239

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



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	Bikes	L	T		Bikes		T	R	Bikes		North	South	East	West
4:00 PM				0	0		2	0	1	53		0		55	0	0	111	0	0	0	0
4:05 PM				0	1		0	0	2	65		0		60	0	0	128	0	0	0	0
4:10 PM				0	0		3	0	5	61		0		62	0	0	131	0	0	0	0
4:15 PM				0	0		1	0	7	68		0		53	0	0	129	0	0	0	0
4:20 PM				0	0		3	0	2	86		0		68	0	0	159	0	0	0	0
4:25 PM				0	0		2	0	1	50		0		44	0	0	97	0	0	0	0
4:30 PM				0	0		2	0	3	76		1		63	0	0	144	0	0	0	0
4:35 PM				0	0		1	0	4	69		0		54	0	0	128	0	0	0	0
4:40 PM				0	0		0	0	2	51		1		68	0	0	121	1	0	0	0
4:45 PM				0	0		1	1	1	59		0		59	0	0	120	0	0	0	0
4:50 PM				0	0		0	0	2	70		0		59	0	0	131	0	0	0	0
4:55 PM				0	0		1	0	4	64		0		58	0	0	127	0	0	0	0
5:00 PM				0	0		2	0	3	69		0		54	0	0	128	0	0	0	0
5:05 PM				0	0		1	0	3	64		0		58	0	0	126	0	0	0	0
5:10 PM				0	0		1	0	4	61		0		69	0	0	135	0	0	0	0
5:15 PM				0	0		0	0	0	57		0		44	0	0	101	0	0	0	0
5:20 PM				0	0		0	0	1	73		0		39	0	0	113	0	0	0	0
5:25 PM				0	0		4	0	2	61		0		41	0	0	108	0	0	0	0
5:30 PM				0	0		2	0	4	76		0		39	0	0	121	0	0	0	0
5:35 PM				0	0		0	0	1	56		0		39	0	0	96	0	0	0	0
5:40 PM				0	0		3	0	0	62		0		29	0	0	94	0	0	0	0
5:45 PM				0	0		1	0	0	79		0		46	0	0	126	0	0	0	0
5:50 PM				0	0		0	0	1	60		0		45	0	0	106	0	0	0	0
5:55 PM				0	0		2	0	3	70		0		42	0	0	117	0	0	0	0
Total Survey				0	1		32	1	56	1,560		2		1,248	0	0	2,897	1	0	0	0

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
				Bikes	L		R	Bikes	L	T		Bikes		T	R	Bikes		North	South	East	West
4:00 PM				0	1		5	0	8	179		0		177	0	0	370	0	0	0	0
4:15 PM				0	0		6	0	10	204		0		165	0	0	385	0	0	0	0
4:30 PM				0	0		3	0	9	196		2		185	0	0	393	1	0	0	0
4:45 PM				0	0		2	1	7	193		0		176	0	0	378	0	0	0	0
5:00 PM				0	0		4	0	10	194		0		181	0	0	389	0	0	0	0
5:15 PM				0	0		4	0	3	191		0		124	0	0	322	0	0	0	0
5:30 PM				0	0		5	0	5	194		0		107	0	0	311	0	0	0	0
5:45 PM				0	0		3	0	4	209		0		133	0	0	349	0	0	0	0
Total Survey				0	1		32	1	56	1,560		2		1,248	0	0	2,897	1	0	0	0

Peak Hour Summary
4:15 PM to 5:15 PM

By Approach	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Total	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	0.0%				13.3%				3.2%				6.6%				4.9%				
PHF	0.00				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		T	R	Total	
Volume				0	0		15	15	36	787		823		707	0	707	1,545
%HV	NA	NA	NA	0.0%	0.0%	NA	13.3%	13.3%	0.0%	3.3%	NA	3.2%	NA	6.6%	0.0%	6.6%	4.9%
PHF				0.00	0.00		0.54	0.54	0.90	0.93		0.94		0.95	0.00	0.95	0.97

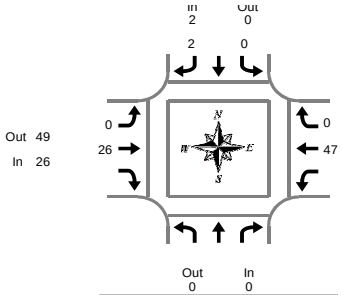
Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
				Bikes	L		R	Bikes	L	T		Bikes		T	R	Bikes		North	South	East	West
4:00 PM				0	1		16	1	34	772		2		703	0	0	1,526	1	0	0	0
4:15 PM				0	0		15	1	36	787		2		707	0	0	1,545	1	0	0	0
4:30 PM				0	0		13	1	29	774		2		666	0	0	1,482	1	0	0	0
4:45 PM				0	0		15	1	25	772		0		588	0	0	1,400	0	0	0	0
5:00 PM				0	0		16	0	22	788		0		545	0	0	1,371	0	0	0	0

Heavy Vehicle Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740



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

Heavy Vehicle 5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
				Total	L		R	Total	L	T		Total		T	R	Total	
4:00 PM				0	0		1	1	0	2		2		10	0	10	13
4:05 PM				0	1		0	1	1	6		7		2	0	2	10
4:10 PM				0	0		1	1	1	2		3		7	0	7	11
4:15 PM				0	0		0	0	0	3		3		3	0	3	6
4:20 PM				0	0		1	1	0	6		6		4	0	4	11
4:25 PM				0	0		1	1	0	3		3		3	0	3	7
4:30 PM				0	0		0	0	0	1		1		1	0	1	2
4:35 PM				0	0		0	0	0	0		0		5	0	5	5
4:40 PM				0	0		0	0	0	3		3		3	0	3	6
4:45 PM				0	0		0	0	0	1		1		3	0	3	4
4:50 PM				0	0		0	0	0	2		2		8	0	8	10
4:55 PM				0	0		0	0	0	1		1		1	0	1	2
5:00 PM				0	0		0	0	0	4		4		4	0	4	8
5:05 PM				0	0		0	0	0	1		1		8	0	8	9
5:10 PM				0	0		0	0	0	1		1		4	0	4	5
5:15 PM				0	0		0	0	0	2		2		1	0	1	3
5:20 PM				0	0		0	0	0	0		0		5	0	5	5
5:25 PM				0	0		0	0	0	0		0		1	0	1	1
5:30 PM				0	0		0	0	0	2		2		2	0	2	4
5:35 PM				0	0		0	0	0	0		0		4	0	4	4
5:40 PM				0	0		0	0	0	2		2		2	0	2	4
5:45 PM				0	0		0	0	0	2		2		1	0	1	3
5:50 PM				0	0		0	0	0	0		0		2	0	2	2
5:55 PM				0	0		0	0	0	2		2		3	0	3	5
Total Survey				0	1		4	5	2	46		48		87	0	87	140

Heavy Vehicle 15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
				Total	L		R	Total	L	T		Total		T	R	Total	
4:00 PM				0	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
				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

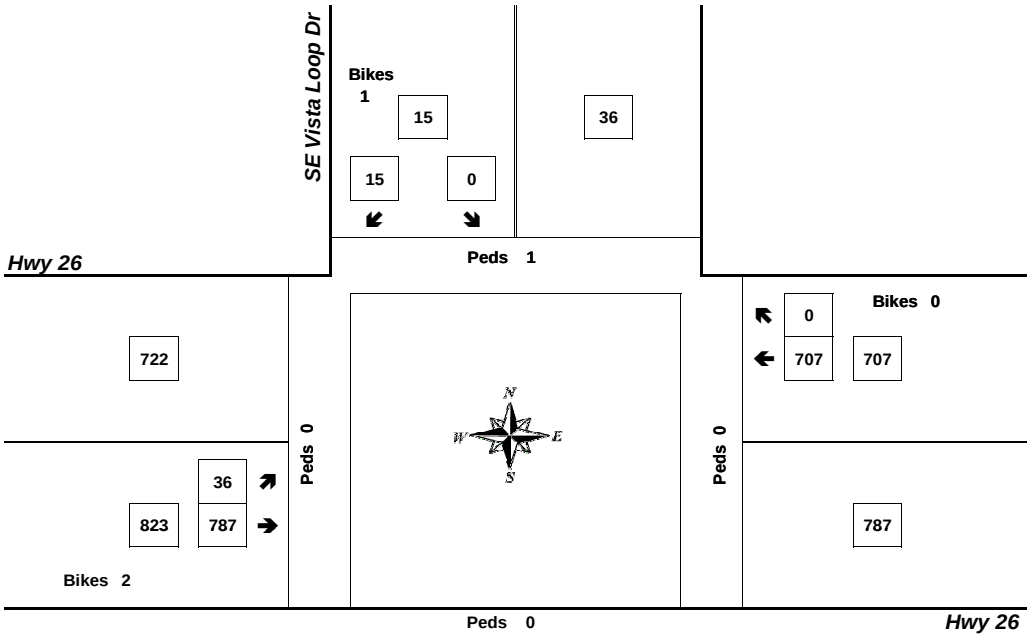
Peak Hour Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740

SE Vista Loop Dr & Hwy 26

4:15 PM to 5:15 PM
Tuesday, March 19, 2019



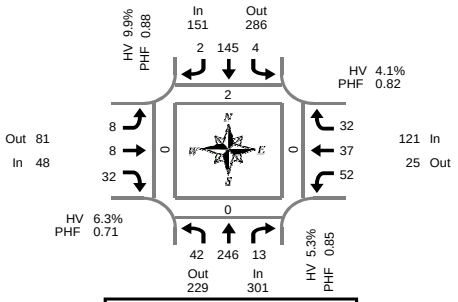
Bikes 0

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

All Traffic Data Services Inc.
Clay Carney
(503) 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	0	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				

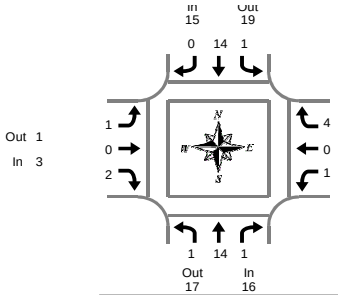
By Movement	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	42	246	13	301	4	145	2	151	8	8	32	48	52	37	32	121	621
%HV	2.4%	5.7%	7.7%	5.3%	25.0%	9.7%	0.0%	9.9%	12.5%	0.0%	6.3%	6.3%	1.9%	0.0%	12.5%	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



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

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	1	0	1	1
7:05 AM	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	2
7:10 AM	0	1	0	1	0	0	0	0	0	0	1	1	0	0	1	1	3
7:15 AM	0	1	0	1	0	0	0	0	0	0	1	1	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
7:25 AM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	2	2	3
7:30 AM	0	1	0	1	0	2	0	2	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	3
7:40 AM	0	3	1	4	0	0	0	0	0	0	0	0	0	0	1	1	5
7:45 AM	0	0	0	0	0	3	0	3	0	0	0	0	0	0	0	0	3
7:50 AM	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	4
8:00 AM	0	6	0	6	0	2	0	2	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
8:10 AM	0	2	0	2	0	0	0	0	0	0	0	0	1	1	0	2	4
8:15 AM	1	2	0	3	0	1	0	1	0	0	0	0	0	0	0	0	4
8:20 AM	0	2	0	2	0	2	0	2	0	1	0	1	0	0	0	0	5
8:25 AM	0	2	0	2	0	1	0	1	0	0	0	0	0	0	0	0	3
8:30 AM	0	3	0	3	0	2	0	2	0	0	0	0	0	0	0	0	5
8:35 AM	0	3	0	3	0	4	0	4	0	0	0	0	0	0	0	0	7
8:40 AM	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	2
8:45 AM	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
8:50 AM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
8:55 AM	0	0	0	0	0	2	0	2	0	0	0	0	0	1	0	1	3
Total Survey	2	31	1	34	1	31	0	32	1	1	2	4	3	3	4	10	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
7:15 AM	0	1	0	1	1	1	0	2	1	0	1	2	1	0	2	3	8
7:30 AM	0	5	1	6	0	4	0	4	0	0	0	0	0	0	1	1	11
7:45 AM	1	0	0	1	0	6	0	6	0	0	0	0	0	0	0	0	7
8:00 AM	0	8	0	8	0	5	0	5	0	0	0	0	2	1	0	3	16
8:15 AM	1	6	0	7	0	4	0	4	0	1	0	1	0	0	0	0	12
8:30 AM	0	7	0	7	0	7	0	7	0	0	0	0	0	0	0	0	14
8:45 AM	0	2	0	2	0	3	0	3	0	0	0	0	0	1	0	1	6
Total Survey	2	31	1	34	1	31	0	32	1	1	2	4	3	3	4	10	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

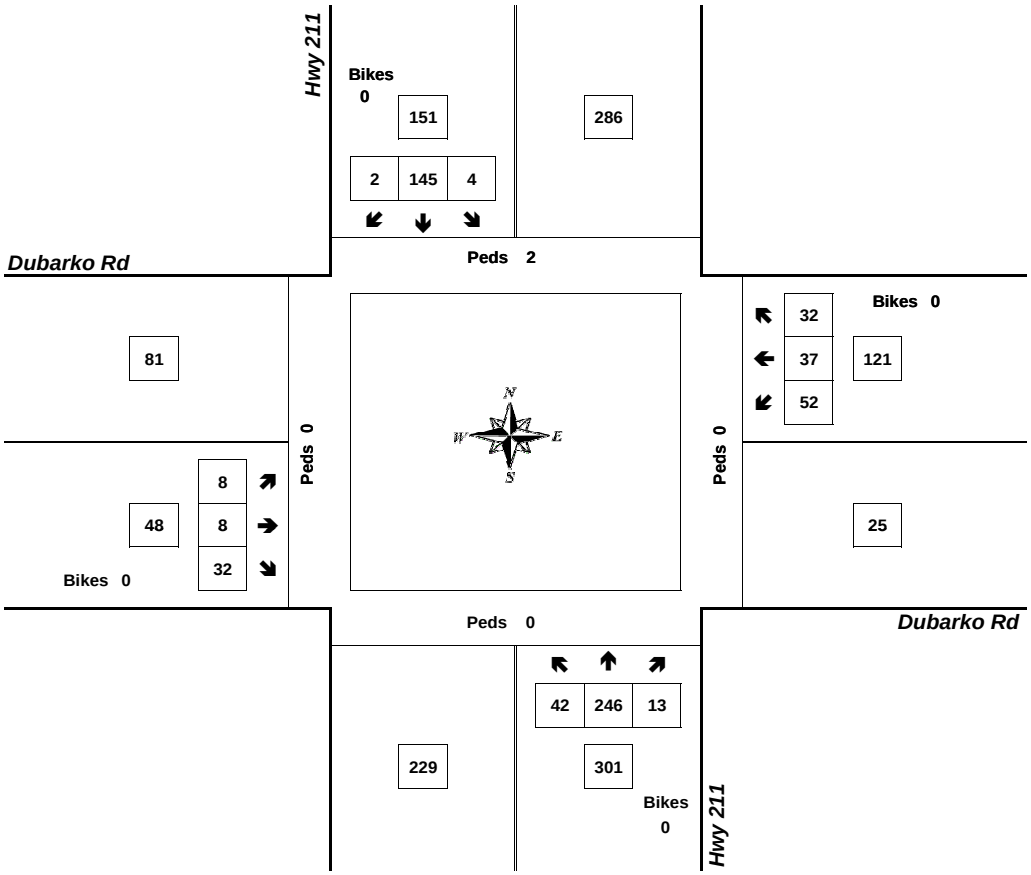
Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	1	8	1	10	1	12	0	13	1	0	2	3	1	1	4	6	32
7:15 AM	1	14	1	16	1	16	0	17	1	0	1	2	3	1	3	7	42
7:30 AM	2	19	1	22	0	19	0	19	0	1	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

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740

Hwy 211 & Dubarko Rd

7:05 AM to 8:05 AM
Wednesday, March 20, 2019

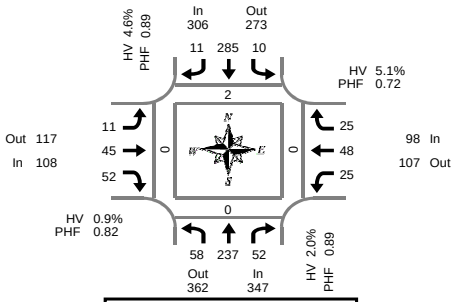


Approach	PHF	HV%	Volume
EB	0.71	6.3%	48
WB	0.82	4.1%	121
NB	0.85	5.3%	301
SB	0.88	9.9%	151
Intersection	0.90	6.3%	621

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
4:05 PM to 5:05 PM

Hwy 211 & Dubarko Rd

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 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	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
4:10 PM	10	17	2	0	1	19	0	0	0	4	3	0	3	4	3	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
4:20 PM	6	12	1	0	1	14	1	0	2	3	4	0	5	7	4	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
4:30 PM	4	22	3	0	0	19	3	0	1	2	2	0	5	5	1	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
4:40 PM	2	17	4	0	0	22	0	0	0	2	1	0	1	3	3	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
4:50 PM	3	22	6	0	1	19	1	0	1	0	4	0	1	1	2	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
5:00 PM	4	17	6	0	1	42	0	0	0	3	14	0	1	4	4	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
5:10 PM	8	24	4	0	1	13	1	0	1	8	2	0	2	1	3	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
5:20 PM	1	19	6	0	1	29	1	0	1	2	2	0	1	4	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
5:30 PM	5	19	6	0	0	19	1	0	1	5	5	0	0	2	3	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
5:40 PM	5	19	7	0	0	29	1	0	0	8	3	0	1	2	0	1	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
5:50 PM	4	13	2	0	0	20	3	0	2	5	3	0	0	5	3	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
Total Survey	110	439	103	0	18	534	22	0	18	101	99	1	45	77	45	1	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
4:15 PM	15	48	11	0	4	55	3	0	7	13	11	1	8	16	6	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
4:45 PM	17	65	16	0	3	68	4	0	1	12	14	0	5	9	3	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
5:15 PM	10	46	16	0	2	65	3	0	2	9	14	0	8	11	3	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
5:45 PM	13	41	12	0	1	54	4	0	2	14	9	0	5	6	4	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

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
%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

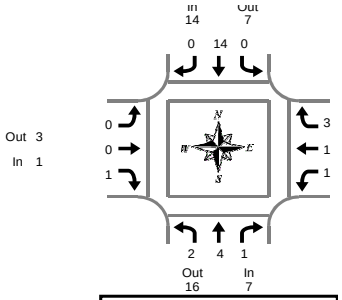
Rolling Hour Summary
4:00 PM to 6:00 PM

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	268	12	0	11	45	41	1	26	47	24	0	823	2	0	1	0
4:15 PM	54	240	56	0	9	268	12	0	11	46	50	1	23	41	26	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
4:45 PM	56	229	61	0	9	280	10	0	6	54	63	0	19	33	20	1	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

Heavy Vehicle Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740



Peak Hour Summary
4:05 PM to 5:05 PM

Hwy 211 & Dubarko Rd

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 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	1	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

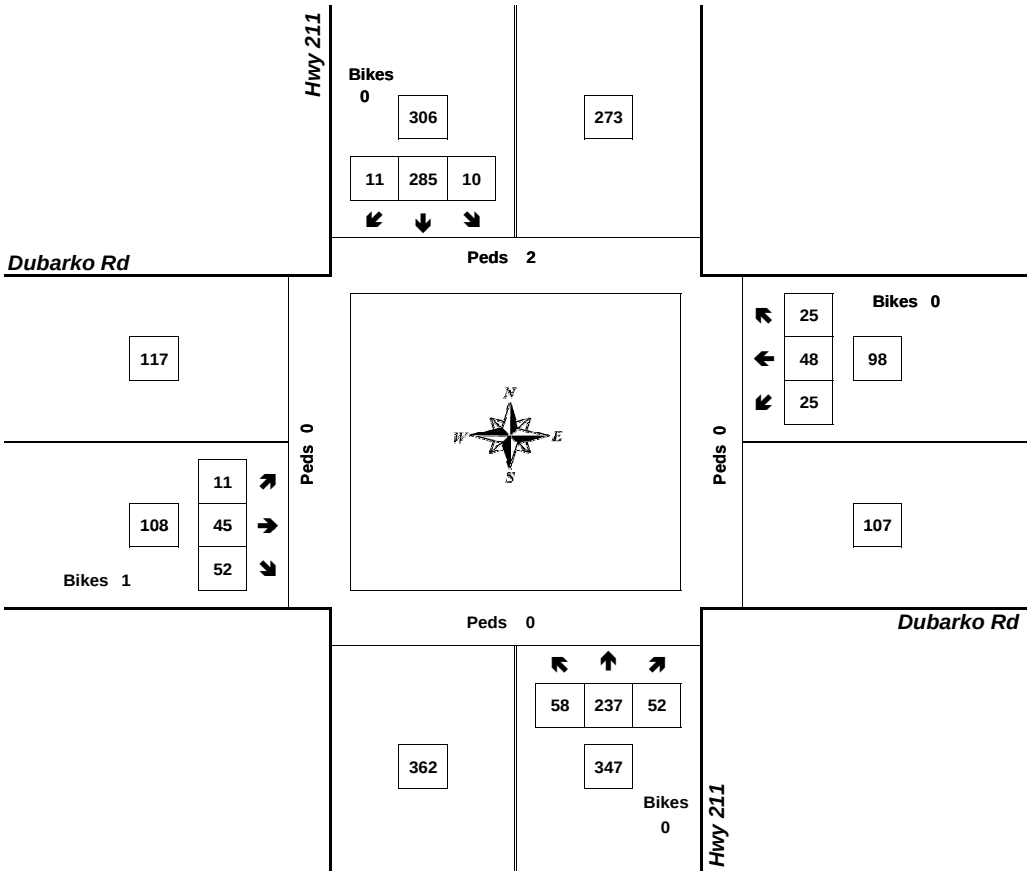
Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	2	4	1	7	0	16	0	16	0	0	2	2	2	1	3	6	31
4:15 PM	0	5	1	6	0	14	0	14	0	0	1	1	1	1	2	4	25
4:30 PM	1	6	2	9	0	8	0	8	0	0	1	1	0	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

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740

Hwy 211 & Dubarko Rd

4:05 PM to 5:05 PM
Tuesday, March 19, 2019

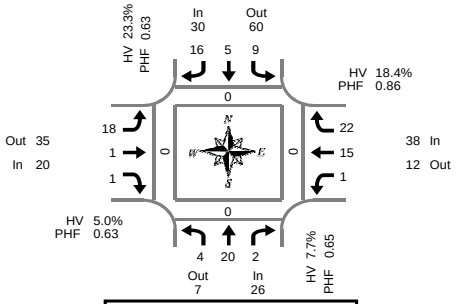


Approach	PHF	HV%	Volume
EB	0.82	0.9%	108
WB	0.72	5.1%	98
NB	0.89	2.0%	347
SB	0.89	4.6%	306
Intersection	0.94	3.1%	859

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

All Traffic Data Services Inc.
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	2	0	0	6	0	0	0	0
7:05 AM	2	1	0	0	1	0	3	0	1	1	0	0	0	2	3	0	14	0	0	0	0
7:10 AM	0	0	0	0	1	0	0	0	1	0	0	0	0	1	2	0	5	0	0	0	0
7:15 AM	0	2	1	0	0	1	1	0	2	0	0	0	0	0	1	0	8	0	0	0	0
7:20 AM	0	0	0	0	0	0	0	0	3	0	0	0	1	3	2	0	9	0	0	0	0
7:25 AM	0	0	0	0	2	2	3	0	1	0	0	0	0	1	2	0	11	0	0	0	0
7:30 AM	0	6	0	0	0	0	3	0	0	0	0	0	0	1	1	0	11	0	0	0	0
7:35 AM	1	2	0	0	0	0	0	0	0	0	1	0	0	2	0	0	6	0	0	0	0
7:40 AM	0	0	1	0	2	1	3	0	0	0	0	0	0	2	2	0	11	0	0	0	0
7:45 AM	0	1	0	0	2	0	1	0	2	0	0	0	0	0	3	0	9	0	0	0	0
7:50 AM	1	1	0	0	1	0	2	0	3	0	0	0	0	1	3	0	12	0	0	0	0
7:55 AM	0	4	0	0	0	0	0	0	3	0	0	0	0	0	2	0	9	0	0	0	0
8:00 AM	0	3	0	0	0	1	0	0	2	0	0	0	0	2	1	0	9	0	0	0	0
8:05 AM	0	1	0	0	0	1	1	0	3	0	0	0	0	3	1	0	10	0	0	0	0
8:10 AM	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	3	1	0	0	0
8:15 AM	0	2	0	0	0	0	1	0	3	0	0	0	0	1	1	0	8	0	0	0	0
8:20 AM	1	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	5	0	0	0	0
8:25 AM	1	0	0	0	0	1	1	0	3	0	1	0	0	0	1	0	8	0	0	1	0
8:30 AM	0	0	0	0	0	0	0	0	2	2	0	0	1	2	1	0	8	0	0	0	0
8:35 AM	1	0	0	0	1	0	0	0	1	1	1	0	1	2	0	0	8	0	0	0	0
8:40 AM	1	1	0	0	0	3	2	0	1	0	0	0	0	1	0	0	9	0	0	0	0
8:45 AM	1	3	0	0	0	1	2	0	3	0	2	0	1	2	1	0	16	0	0	0	0
8:50 AM	1	4	1	0	0	1	2	0	2	0	0	0	0	1	3	0	15	0	0	0	0
8:55 AM	1	2	1	0	0	0	1	0	1	0	0	0	0	2	1	0	9	0	0	0	0
Total Survey	12	35	4	0	11	14	29	0	38	5	5	0	4	31	31	0	219	1	0	1	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	25	0	0	0	0
7:15 AM	0	2	1	0	2	3	4	0	6	0	0	0	1	4	5	0	28	0	0	0	0
7:30 AM	1	8	1	0	2	1	6	0	0	0	1	0	0	5	3	0	28	0	0	0	0
7:45 AM	1	6	0	0	3	0	3	0	8	0	0	0	0	1	8	0	30	0	0	0	0
8:00 AM	0	5	0	0	1	2	2	0	5	0	0	0	0	5	2	0	22	1	0	0	0
8:15 AM	2	2	0	0	0	2	3	0	7	1	1	0	0	1	2	0	21	0	0	1	0
8:30 AM	2	1	0	0	1	3	2	0	4	3	1	0	2	5	1	0	25	0	0	0	0
8:45 AM	3	9	2	0	0	2	5	0	6	0	2	0	1	5	5	0	40	0	0	0	0
Total Survey	12	35	4	0	11	14	29	0	38	5	5	0	4	31	31	0	219	1	0	1	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	114	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

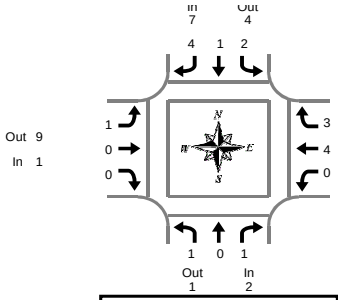
Rolling Hour Summary
7:00 AM to 9:00 AM

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	111	0	0	0	0
7:15 AM	2	21	2	0	8	6	15	0	19	0	1	0	1	15	18	0	108	1	0	0	0
7:30 AM	4	21	1	0	6	5	14	0	20	1	2	0	0	12	15	0	101	1	0	1	0
7:45 AM	5	14	0	0	5	7	10	0	24	4	2	0	2	12	13	0	98	1	0	1	0
8:00 AM	7	17	2	0	2	9	12	0	22	4	4	0	3	16	10	0	108	1	0	1	0

Heavy Vehicle Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740



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

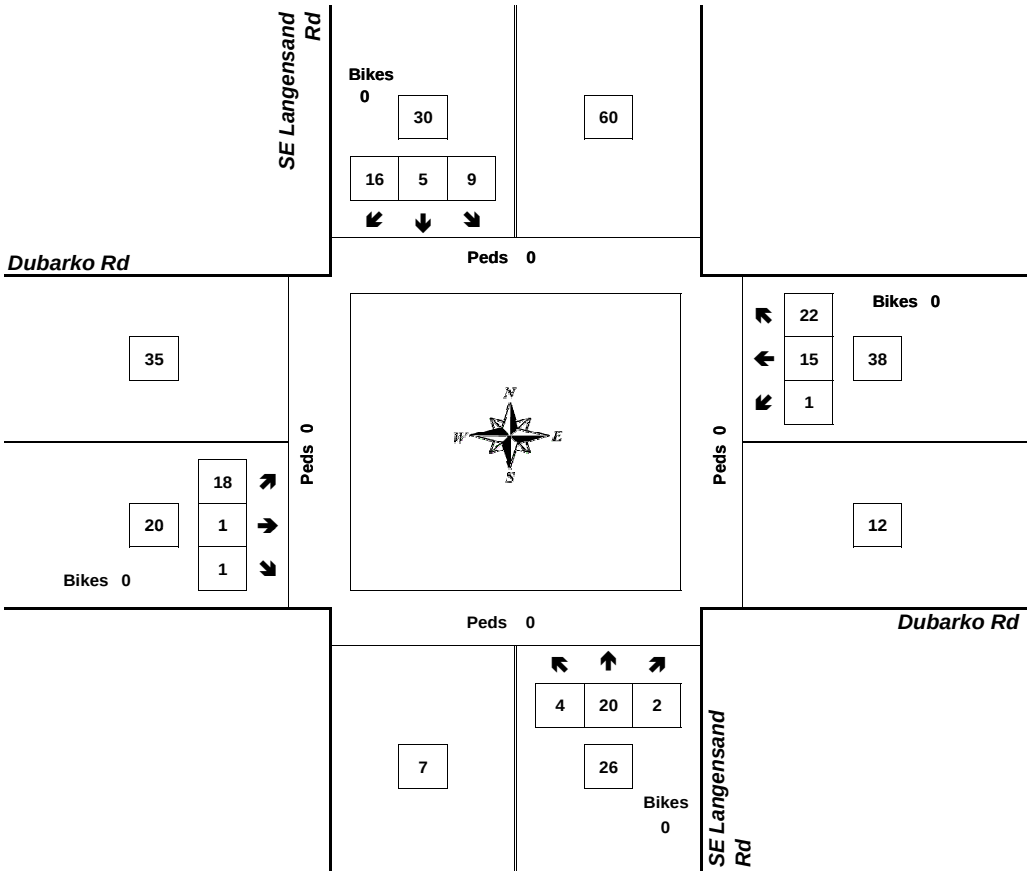
Interval Start Time	Northbound SE Langensand Rd				Southbound SE Langensand Rd				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	1	0	1	2	2	0	4	6	1	0	0	1	0	4	2	6	15
7:15 AM	0	1	1	2	2	1	4	7	1	0	0	1	0	4	2	6	16
7:30 AM	0	1	0	1	2	1	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

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740

SE Langensand Rd & Dubarko Rd

7:05 AM to 8:05 AM
Wednesday, March 20, 2019

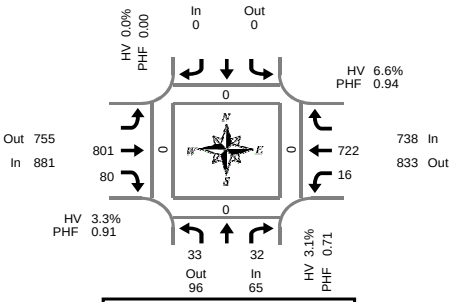


Approach	PHF	HV%	Volume
EB	0.63	5.0%	20
WB	0.86	18.4%	38
NB	0.65	7.7%	26
SB	0.63	23.3%	30
Intersection	0.89	14.9%	114

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary

All Traffic Data Services Inc.
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

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				Total	T	R	Total		L	T		Total	
Volume	33		32	65				0	801	80	881		16	722		738	1,684
%HV	3.0%	NA	3.1%	3.1%	NA	NA	NA	0.0%	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

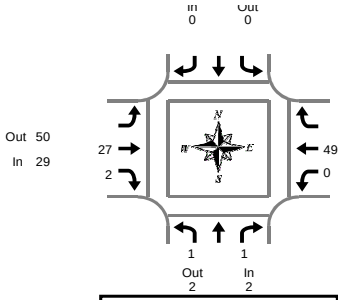
Rolling Hour Summary
4:00 PM to 6:00 PM

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

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740



SE Langensand 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 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				0	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				0	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

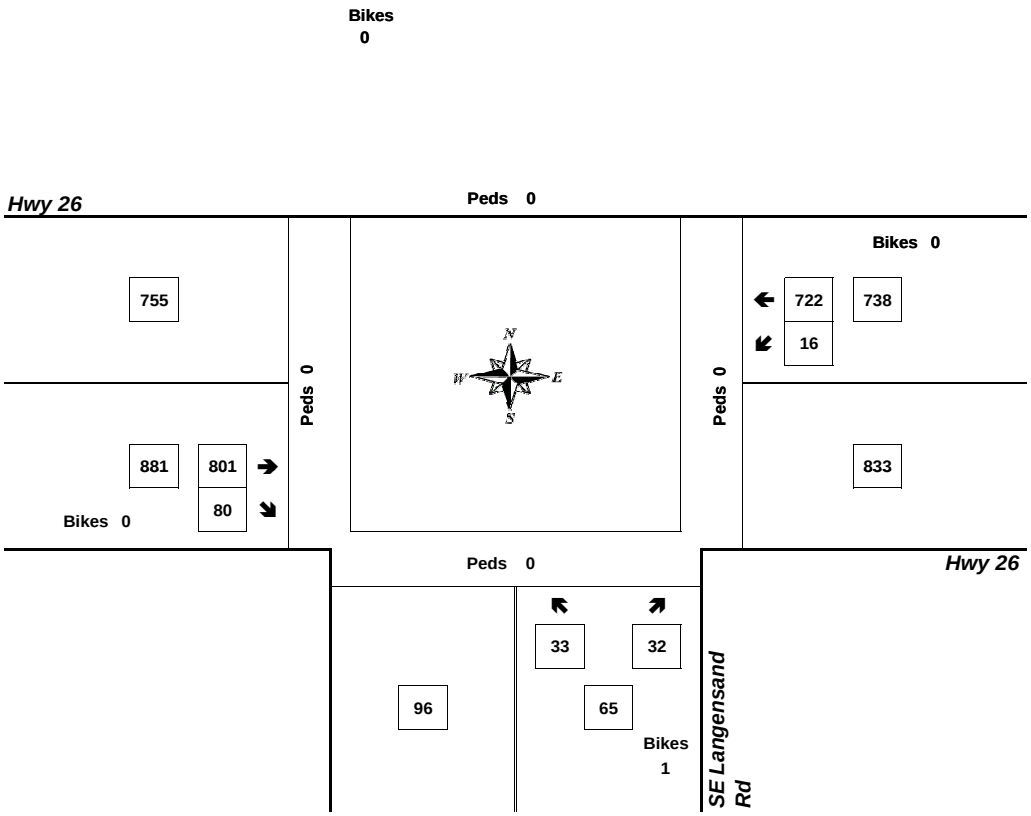
Peak Hour Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740

SE Langensand Rd & Hwy 26

4:10 PM to 5:10 PM
Tuesday, March 19, 2019



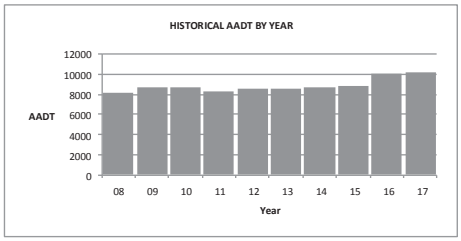
Approach	PHF	HV%	Volume
EB	0.91	3.3%	881
WB	0.94	6.6%	738
NB	0.71	3.1%	65
SB	0.00	0.0%	0
Intersection	0.93	4.8%	1,684

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 (USFS 28)	Site Name:	Rhododendron (03-006)
		Installed:	August, 1995

HISTORICAL TRAFFIC DATA

		Percent of AADT				
Year	AADT	Max Day	Max Hour	10TH Hour	20TH Hour	30TH Hour
2008	8162	233	22.9	20.1	19.1	18.2
2009	8737	197	22.3	19.6	18.4	17.8
2010	8714	207	21.6	19.8	18.9	18.5
2011	8330	214	24.7	20.0	18.6	18.1
2012	8480	227	24.0	21.0	20.2	19.4
2013	8527	213	23.4	21.1	20.3	19.1
2014	8652	216	23.2	21.1	20.3	19.2
2015	8861	242	21.4	20.3	19.4	18.7
2016	10071	208	22.9	19.6	18.8	17.9
2017	10223	200	19.9	19.1	18.1	17.5



2017 TRAFFIC DATA

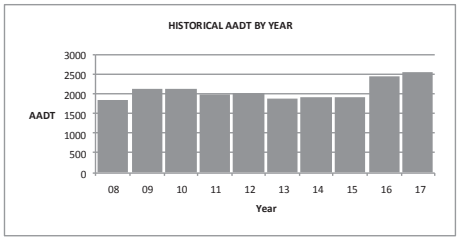
	Average Weekday Traffic	Percent of AADT	Average Daily Traffic	Percent of AADT
January	6744	66	9080	89
February	6533	64	9496	93
March	6763	66	9337	91
April	6166	60	8675	85
May	7675	75	9598	94
June	8568	84	10695	105
July	11291	110	13874	136
August	11738	115	13623	133
September	11300	111	12734	125
October	6589	64	8087	79
November	5493	54	7313	72
December	8753	86	10161	99

For Vehicle Classification data near your project, please go to the following web page: https://www.oregon.gov/ODOT/Data/Documents/TVT_2017.xlsx

Location:	OR35; MP 57.79; MT. HOOD HIGHWAY NO. 26; 0.02 mile east of Warm Springs Highway No. 53 (US26)	Site Name:	Mt. Hood Meadows (03-007)
		Installed:	September, 1995

HISTORICAL TRAFFIC DATA

		Percent of AADT				
Year	AADT	Max Day	Max Hour	10TH Hour	20TH Hour	30TH Hour
2008	1854	398	56.8	44.2	39.9	36.1
2009	2130	***	***	***	***	***
2010	2145	374	49.2	39.5	34.8	33.2
2011	1976	476	79.2	49.1	45.0	39.1
2012	2023	452	65.4	43.4	40.3	37.7
2013	1868	427	68.1	48.7	42.0	37.1
2014	1908	400	60.0	41.9	37.4	33.6
2015	1931	393	50.4	38.6	34.4	32.6
2016	2455	366	55.9	38.3	33.1	31.2
2017	2565	340	52.1	37.7	32.5	31.3



2017 TRAFFIC DATA

	Average Weekday Traffic	Percent of AADT	Average Daily Traffic	Percent of AADT
January	2449	95	3616	141
February	1978	77	3362	131
March	1781	69	2833	110
April	1116	44	2050	80
May	1202	47	1609	63
June	1794	70	2070	81
July	2405	94	2837	111
August	2302	90	2614	102
September	3956	154	3993	156
October	1387	54	1614	63
November	768	30	1156	45
December	2499	97	2966	116

For Vehicle Classification data near your project, please go to the following web page: https://www.oregon.gov/ODOT/Data/Documents/TVT_2017.xlsx

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	
Frt	1.00	0.99		1.00	1.00	0.85		1.00			0.88	
Flt 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	
Flt 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(I)	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

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	-

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	SET	SWLn1
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

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	-	-

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	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	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(I)	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	

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	-

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	SET	SWLn1
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

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	-	-

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: 147 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

147 Dwelling Units

	Entering	Exiting	Total
AM Peak Hour	16	52	68
PM Peak Hour	52	30	82
Weekday	538	538	1076

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

Trip Generation Calculation Worksheet

Land Use Description: Single-Family Detached Housing
ITE Land Use Code: 210
Independent Variable: Dwelling Units
Quantity: 4 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

4 Dwelling Units

	Entering	Exiting	Total
AM Peak Hour	1	2	3
PM Peak Hour	3	1	4
Weekday	19	19	38

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

Trip Generation Calculation Worksheet

Land Use Description: Single-Family Detached Housing
ITE Land Use Code: 210
Independent Variable: Dwelling Units
Quantity: 46 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

46 Dwelling Units

	Entering	Exiting	Total
AM Peak Hour	9	25	34
PM Peak Hour	29	17	46
Weekday	217	217	434

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

Trip Generation Calculation Worksheet

Land Use Description: Single-Family Detached Housing
ITE Land Use Code: 210
Independent Variable: Dwelling Units
Quantity: 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 Detached Housing
ITE Land Use Code: 210
Independent Variable: Dwelling Units
Quantity: 6 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

6 Dwelling Units

	Entering	Exiting	Total
AM Peak Hour	1	3	4
PM Peak Hour	4	2	6
Weekday	28	28	56

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

Trip Generation Calculation Worksheet

Land Use Description: Single-Family Detached Housing
ITE Land Use Code: 210
Independent Variable: Dwelling Units
Quantity: 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: 29.300 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

29.300 ksf Supermarket

	Entering	Exiting	Total
AM Peak Hour	65	47	112
PM Peak Hour	136	135	271
Weekday	1564	1564	3128

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

Trip Generation Calculation Worksheet

Land Use Description: Public Park
ITE Land Use Code: 411
Independent Variable: Acres
Quantity: 1.43 Acres

Summary of ITE Trip Generation Data

AM Peak Hour of Adjacent Street Traffic
Trip Rate: 0.02 trips per acre
Directional Distribution: 58% Entering 42% Exiting

PM Peak Hour of Adjacent Street Traffic
Trip Rate: 0.11 trips per acre
Directional Distribution: 50% Entering 50% Exiting

Total Weekday Traffic
Trip Rate: 0.78 trips per acre
Directional Distribution: 50% Entering 50% Exiting

Site Trip Generation Calculations

1.43 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, 10th Edition* , Institute of Transportation Engineers, 2017

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)	59	822	38	4	1104	10	139	11	3	16	4	151
Future Volume (vph)	59	822	38	4	1104	10	139	11	3	16	4	151
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	
Frt	1.00	0.99		1.00	1.00	0.85		1.00			0.88	
Flt 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	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.54			0.97	
Satd. Flow (perm)	1484	2949		1568	3137	1403		892			1448	
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)	63	874	40	4	1174	11	148	12	3	17	4	161
RTOR Reduction (vph)	0	3	0	0	0	5	0	1	0	0	108	0
Lane Group Flow (vph)	63	911	0	4	1174	6	0	162	0	0	74	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	69.0		1.0	61.6	61.6		36.5			36.5	
Effective Green, g (s)	8.4	69.0		1.0	61.6	61.6		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)	103	1695		13	1610	720		271			440	
v/s Ratio Prot	c0.04	0.31		0.00	c0.37							
v/s Ratio Perm						0.00		c0.18			0.05	
v/c Ratio	0.61	0.54		0.31	0.73	0.01		0.60			0.17	
Uniform Delay, d1	54.2	15.7		59.2	22.7	14.3		35.5			30.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	10.3	1.2		13.0	2.9	0.0		9.4			0.2	
Delay (s)	64.5	16.9		72.2	25.7	14.3		44.9			30.8	
Level of Service	E	B		E	C	B		D			C	
Approach Delay (s)		20.0			25.7			44.9			30.8	
Approach LOS		B			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	25.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	72.8%	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)	59	822	38	4	1104	10	139	11	3	16	4	151
Future Volume (veh/h)	59	822	38	4	1104	10	139	11	3	16	4	151
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	63	874	40	4	1174	11	148	12	3	17	4	161
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	77	1697	78	8	1687	752	321	24	5	56	28	399
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	2935	134	1589	3169	1414	867	79	18	77	94	1311
Grp Volume(v), veh/h	63	449	465	4	1174	11	163	0	0	182	0	0
Grp Sat Flow(s),veh/h/ln	1511	1507	1562	1589	1585	1414	964	0	0	1482	0	0
Q Serve(g_s), s	5.0	21.5	21.5	0.3	33.0	0.4	8.4	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	5.0	21.5	21.5	0.3	33.0	0.4	20.2	0.0	0.0	11.8	0.0	0.0
Prop In Lane	1.00		0.09	1.00		1.00	0.91		0.02	0.09		0.88
Lane Grp Cap(c), veh/h	77	871	903	8	1687	752	351	0	0	484	0	0
V/C Ratio(X)	0.82	0.52	0.52	0.48	0.70	0.01	0.47	0.00	0.00	0.38	0.00	0.00
Avail Cap(c_a), veh/h	145	871	903	68	1687	752	351	0	0	484	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(I)	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	56.4	15.2	15.2	59.5	20.9	13.2	37.3	0.0	0.0	33.1	0.0	0.0
Incr Delay (d2), s/veh	18.2	2.2	2.1	38.0	2.4	0.0	4.4	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	2.3	7.8	8.1	0.2	12.6	0.2	4.6	0.0	0.0	4.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	74.6	17.4	17.3	97.5	23.3	13.3	41.6	0.0	0.0	33.6	0.0	0.0
LnGrp LOS	E	B	B	F	C	B	D	A	A	C	A	A
Approach Vol, veh/h		977			1189			163			182	
Approach Delay, s/veh		21.0			23.4			41.6			33.6	
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	10.6	68.4		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	23.5		22.2	7.0	35.0		13.8				
Green Ext Time (p_c), s	0.0	7.7		0.8	0.0	10.1		1.1				

Intersection Summary			
HCM 6th Ctrl Delay		24.4	
HCM 6th LOS		C	

Intersection	
Int Delay, s/veh	2.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	830	36	16	1016	67	16
Future Vol, veh/h	830	36	16	1016	67	16
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	883	38	17	1081	71	17

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	921	0	1458	442
Stage 1	-	-	-	-	883	-
Stage 2	-	-	-	-	575	-
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	-	-	707	-	118	558
Stage 1	-	-	-	-	360	-
Stage 2	-	-	-	-	521	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	707	-	115	558
Mov Cap-2 Maneuver	-	-	-	-	115	-
Stage 1	-	-	-	-	360	-
Stage 2	-	-	-	-	508	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	64.7
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	115	558	-	-	707	-
HCM Lane V/C Ratio	0.62	0.031	-	-	0.024	-
HCM Control Delay (s)	77.4	11.7	-	-	10.2	-
HCM Lane LOS	F	B	-	-	B	-
HCM 95th %tile Q(veh)	3.1	0.1	-	-	0.1	-

Intersection	
Int Delay, s/veh	0.7

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	28	785	996	1	0	69
Future Vol, veh/h	28	785	996	1	0	69
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	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	30	835	1060	1	0	73

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1061	0	-	0	1539	531
Stage 1	-	-	-	-	1061	-
Stage 2	-	-	-	-	478	-
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	591	-	-	-	99	475
Stage 1	-	-	-	-	279	-
Stage 2	-	-	-	-	570	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	591	-	-	-	94	475
Mov Cap-2 Maneuver	-	-	-	-	94	-
Stage 1	-	-	-	-	265	-
Stage 2	-	-	-	-	570	-

Approach	SE	NW	SW
HCM Control Delay, s	0.4	0	14
HCM LOS			B

Minor Lane/Major Mvmt	NWT	NWR	SEL	SET	SWLn1
Capacity (veh/h)	-	-	591	-	475
HCM Lane V/C Ratio	-	-	0.05	-	0.155
HCM Control Delay (s)	-	-	11.4	-	14
HCM Lane LOS	-	-	B	-	B
HCM 95th %tile Q(veh)	-	-	0.2	-	0.5

Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	8	34	55	40	34	45	291	14	4	172	2
Future Vol, veh/h	8	8	34	55	40	34	45	291	14	4	172	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	38	61	44	38	50	323	16	4	191	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	675	642	193	657	636	335	195	0	0	341	0	0
Stage 1	201	201	-	433	433	-	-	-	-	-	-	-
Stage 2	474	441	-	224	203	-	-	-	-	-	-	-
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	369	394	851	374	392	700	1378	-	-	1202	-	-
Stage 1	803	737	-	595	577	-	-	-	-	-	-	-
Stage 2	573	579	-	772	728	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	304	373	849	337	371	697	1375	-	-	1200	-	-
Mov Cap-2 Maneuver	304	373	-	337	371	-	-	-	-	-	-	-
Stage 1	765	733	-	567	550	-	-	-	-	-	-	-
Stage 2	475	552	-	726	724	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.6	17.2	1	0.2
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1375	-	-	335	849	351	697	1200	-	-
HCM Lane V/C Ratio	0.036	-	-	0.053	0.044	0.301	0.054	0.004	-	-
HCM Control Delay (s)	7.7	0	-	16.3	9.4	19.6	10.5	8	0	-
HCM Lane LOS	A	A	-	C	A	C	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.1	1.2	0.2	0	-	-

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	19	1	1	1	16	23	4	21	2	9	5	17
Future Vol, veh/h	19	1	1	1	16	23	4	21	2	9	5	17
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	21	1	1	1	18	26	4	24	2	10	6	19

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	91	70	16	70	78	25	25	0	0	26	0	0
Stage 1	36	36	-	33	33	-	-	-	-	-	-	-
Stage 2	55	34	-	37	45	-	-	-	-	-	-	-
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	886	815	1055	884	783	1007	1551	-	-	1462	-	-
Stage 1	972	859	-	944	837	-	-	-	-	-	-	-
Stage 2	950	861	-	939	827	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	842	807	1055	875	775	1007	1551	-	-	1462	-	-
Mov Cap-2 Maneuver	842	807	-	875	775	-	-	-	-	-	-	-
Stage 1	969	853	-	941	834	-	-	-	-	-	-	-
Stage 2	903	858	-	930	821	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.4	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)	1551	-	-	842	914	896	1462	-	-
HCM Lane V/C Ratio	0.003	-	-	0.025	0.002	0.05	0.007	-	-
HCM Control Delay (s)	7.3	0	-	9.4	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	0.2	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)	158	1244	158	8	1105	22	136	16	14	40	14	118
Future Volume (vph)	158	1244	158	8	1105	22	136	16	14	40	14	118
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			1461	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.56			0.90	
Satd. Flow (perm)	1614	3166		1554	3107	1343		964			1337	
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)	166	1309	166	8	1163	23	143	17	15	42	15	124
RTOR Reduction (vph)	0	8	0	0	0	12	0	3	0	0	65	0
Lane Group Flow (vph)	166	1467	0	8	1163	11	0	172	0	0	116	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	1952		12	1522	658		253			350	
v/s Ratio Prot	c0.10	c0.46		0.01	0.37							
v/s Ratio Perm						0.01		c0.18			0.09	
v/c Ratio	0.76	0.75		0.67	0.76	0.02		0.68			0.33	
Uniform Delay, d1	50.1	16.4		59.3	24.9	15.7		39.7			35.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	14.8	2.7		89.5	3.7	0.0		13.8			0.6	
Delay (s)	64.8	19.2		148.8	28.6	15.8		53.5			36.3	
Level of Service	E	B		F	C	B		D			D	
Approach Delay (s)		23.8			29.2			53.5			36.3	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	28.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	83.8%	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 07/08/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	158	1244	158	8	1105	22	136	16	14	40	14	118
Future Volume (veh/h)	158	1244	158	8	1105	22	136	16	14	40	14	118
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	166	1309	166	8	1163	23	143	17	15	42	15	124
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	192	1780	224	15	1594	694	279	33	24	109	51	267
Arrive On Green	0.12	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	2893	364	1576	3143	1368	857	124	92	273	194	1017
Grp Volume(v), veh/h	166	731	744	8	1163	23	175	0	0	181	0	0
Grp Sat Flow(s),veh/h/ln	1628	1624	1634	1576	1572	1368	1073	0	0	1484	0	0
Q Serve(g_s), s	12.0	37.8	38.6	0.6	34.7	1.0	7.4	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	12.0	37.8	38.6	0.6	34.7	1.0	19.3	0.0	0.0	11.9	0.0	0.0
Prop In Lane	1.00		0.22	1.00		1.00	0.82		0.09	0.23		0.69
Lane Grp Cap(c), veh/h	192	999	1005	15	1594	694	336	0	0	426	0	0
V/C Ratio(X)	0.87	0.73	0.74	0.52	0.73	0.03	0.52	0.00	0.00	0.42	0.00	0.00
Avail Cap(c_a), veh/h	251	999	1005	67	1594	694	336	0	0	426	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(I)	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	52.0	16.2	16.3	59.1	23.1	14.8	40.4	0.0	0.0	37.1	0.0	0.0
Incr Delay (d2), s/veh	21.1	4.7	4.9	24.7	3.0	0.1	5.7	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	6.1	14.8	15.3	0.3	13.4	0.3	5.2	0.0	0.0	4.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	73.1	20.9	21.2	83.8	26.1	14.9	46.1	0.0	0.0	37.8	0.0	0.0
LnGrp LOS	E	C	C	F	C	B	D	A	A	D	A	A
Approach Vol, veh/h		1641			1194			175			181	
Approach Delay, s/veh		26.3			26.3			46.1			37.8	
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	18.6	65.4		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	18.5	56.5		31.5				
Max Q Clear Time (g_c+I1), s	2.6	40.6		21.3	14.0	36.7		13.9				
Green Ext Time (p_c), s	0.0	14.2		0.7	0.2	9.2		1.0				

Intersection Summary												
HCM 6th Ctrl Delay			28.0									
HCM 6th LOS			C									

Intersection	
Int Delay, s/veh	2.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1199	85	17	1126	35	34
Future Vol, veh/h	1199	85	17	1126	35	34
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	1262	89	18	1185	37	36

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1351	0	1891	631
Stage 1	-	-	-	-	1262	-
Stage 2	-	-	-	-	629	-
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	-	-	480	-	61	421
Stage 1	-	-	-	-	228	-
Stage 2	-	-	-	-	491	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	480	-	59	421
Mov Cap-2 Maneuver	-	-	-	-	59	-
Stage 1	-	-	-	-	228	-
Stage 2	-	-	-	-	473	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	76.7
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	59	421	-	-	480	-
HCM Lane V/C Ratio	0.624	0.085	-	-	0.037	-
HCM Control Delay (s)	137.4	14.3	-	-	12.8	-
HCM Lane LOS	F	B	-	-	B	-
HCM 95th %tile Q(veh)	2.6	0.3	-	-	0.1	-

Intersection	
Int Delay, s/veh	0.6

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	72	1150	1089	0	0	37
Future Vol, veh/h	72	1150	1089	0	0	37
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	74	1186	1123	0	0	38

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1124	0	-	0	1865	564
Stage 1	-	-	-	-	1124	-
Stage 2	-	-	-	-	741	-
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	611	-	-	-	57	442
Stage 1	-	-	-	-	250	-
Stage 2	-	-	-	-	404	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	610	-	-	-	50	441
Mov Cap-2 Maneuver	-	-	-	-	50	-
Stage 1	-	-	-	-	220	-
Stage 2	-	-	-	-	404	-

Approach	SE	NW	SW
HCM Control Delay, s	0.7	0	13.9
HCM LOS			B

Minor Lane/Major Mvmt	NWT	NWR	SEL	SET	SWLn1
Capacity (veh/h)	-	-	610	-	441
HCM Lane V/C Ratio	-	-	0.122	-	0.086
HCM Control Delay (s)	-	-	11.7	-	13.9
HCM Lane LOS	-	-	B	-	B
HCM 95th %tile Q(veh)	-	-	0.4	-	0.3

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	11	48	55	27	51	27	61	281	54	10	338	11
Future Vol, veh/h	11	48	55	27	51	27	61	281	54	10	338	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	51	59	29	54	29	65	299	57	11	360	12

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	885	872	362	903	856	332	374	0	0	358	0	0
Stage 1	384	384	-	460	460	-	-	-	-	-	-	-
Stage 2	501	488	-	443	396	-	-	-	-	-	-	-
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	267	290	685	255	292	703	1184	-	-	1184	-	-
Stage 1	641	613	-	576	561	-	-	-	-	-	-	-
Stage 2	554	552	-	588	599	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	202	266	684	187	267	700	1182	-	-	1182	-	-
Mov Cap-2 Maneuver	202	266	-	187	267	-	-	-	-	-	-	-
Stage 1	595	604	-	535	521	-	-	-	-	-	-	-
Stage 2	442	513	-	486	591	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	17.7	24.1	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)	1182	-	-	251	684	233	700	1182	-	-
HCM Lane V/C Ratio	0.055	-	-	0.25	0.086	0.356	0.041	0.009	-	-
HCM Control Delay (s)	8.2	0	-	24.1	10.8	28.8	10.4	8.1	0	-
HCM Lane LOS	A	A	-	C	B	D	B	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	1	0.3	1.5	0.1	0	-	-

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	24	24	5	2	6	7	4	10	1	24	28	29
Future Vol, veh/h	24	24	5	2	6	7	4	10	1	24	28	29
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	26	26	5	2	7	8	4	11	1	26	31	32

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	132	125	52	142	141	20	65	0	0	16	0	0
Stage 1	101	101	-	24	24	-	-	-	-	-	-	-
Stage 2	31	24	-	118	117	-	-	-	-	-	-	-
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	840	765	1016	828	750	1058	1506	-	-	1595	-	-
Stage 1	905	811	-	994	875	-	-	-	-	-	-	-
Stage 2	986	875	-	887	799	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	811	745	1011	784	731	1050	1503	-	-	1589	-	-
Mov Cap-2 Maneuver	811	745	-	784	731	-	-	-	-	-	-	-
Stage 1	900	796	-	987	869	-	-	-	-	-	-	-
Stage 2	965	869	-	836	784	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.7	9.3	2	2.2
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1503	-	-	811	780	861	1589	-	-
HCM Lane V/C Ratio	0.003	-	-	0.033	0.041	0.019	0.017	-	-
HCM Control Delay (s)	7.4	0	-	9.6	9.8	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 07/08/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	732	38	4	1070	10	139	11	3	16	4	151
Future Volume (vph)	59	732	38	4	1070	10	139	11	3	16	4	151
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	
Frt	1.00	0.99		1.00	1.00	0.85		1.00			0.88	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.96			1.00	
Satd. Flow (prot)	1484	2947		1568	3137	1403		1575			1489	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.54			0.97	
Satd. Flow (perm)	1484	2947		1568	3137	1403		892			1448	
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)	63	779	40	4	1138	11	148	12	3	17	4	161
RTOR Reduction (vph)	0	3	0	0	0	5	0	1	0	0	111	0
Lane Group Flow (vph)	63	816	0	4	1138	6	0	162	0	0	71	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	69.0		1.0	61.6	61.6		36.5			36.5	
Effective Green, g (s)	8.4	69.0		1.0	61.6	61.6		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)	103	1694		13	1610	720		271			440	
v/s Ratio Prot	c0.04	0.28		0.00	c0.36							
v/s Ratio Perm						0.00		c0.18			0.05	
v/c Ratio	0.61	0.48		0.31	0.71	0.01		0.60			0.16	
Uniform Delay, d1	54.2	15.0		59.2	22.3	14.3		35.5			30.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	10.3	1.0		13.0	2.6	0.0		9.4			0.2	
Delay (s)	64.5	16.0		72.2	24.9	14.3		44.9			30.7	
Level of Service	E	B		E	C	B		D			C	
Approach Delay (s)		19.4			25.0			44.9			30.7	
Approach LOS		B			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	24.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	71.8%	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)	59	732	38	4	1070	10	139	11	3	16	4	151
Future Volume (veh/h)	59	732	38	4	1070	10	139	11	3	16	4	151
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	63	779	40	4	1138	11	148	12	3	17	4	161
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	77	1686	87	8	1687	752	321	24	5	56	28	399
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	2916	150	1589	3169	1414	867	79	18	77	94	1311
Grp Volume(v), veh/h	63	402	417	4	1138	11	163	0	0	182	0	0
Grp Sat Flow(s),veh/h/ln	1511	1507	1559	1589	1585	1414	964	0	0	1482	0	0
Q Serve(g_s), s	5.0	18.4	18.5	0.3	31.4	0.4	8.4	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	5.0	18.4	18.5	0.3	31.4	0.4	20.2	0.0	0.0	11.8	0.0	0.0
Prop In Lane	1.00		0.10	1.00		1.00	0.91		0.02	0.09		0.88
Lane Grp Cap(c), veh/h	77	871	901	8	1687	752	351	0	0	484	0	0
V/C Ratio(X)	0.82	0.46	0.46	0.48	0.67	0.01	0.47	0.00	0.00	0.38	0.00	0.00
Avail Cap(c_a), veh/h	145	871	901	68	1687	752	351	0	0	484	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(I)	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	56.4	14.6	14.6	59.5	20.5	13.2	37.3	0.0	0.0	33.1	0.0	0.0
Incr Delay (d2), s/veh	18.2	1.8	1.7	38.0	2.2	0.0	4.4	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	2.3	6.7	6.9	0.2	12.0	0.2	4.6	0.0	0.0	4.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	74.6	16.3	16.3	97.5	22.7	13.3	41.6	0.0	0.0	33.6	0.0	0.0
LnGrp LOS	E	B	B	F	C	B	D	A	A	C	A	A
Approach Vol, veh/h		882			1153			163			182	
Approach Delay, s/veh		20.5			22.8			41.6			33.6	
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	10.6	68.4		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	20.5		22.2	7.0	33.4		13.8				
Green Ext Time (p_c), s	0.0	6.7		0.8	0.0	10.0		1.1				

Intersection Summary			
HCM 6th Ctrl Delay		24.1	
HCM 6th LOS		C	

Intersection	
Int Delay, s/veh	2.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	740	36	16	982	67	16
Future Vol, veh/h	740	36	16	982	67	16
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	787	38	17	1045	71	17

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	825	0	1344	394
Stage 1	-	-	-	-	787	-
Stage 2	-	-	-	-	557	-
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	-	-	770	-	140	599
Stage 1	-	-	-	-	404	-
Stage 2	-	-	-	-	532	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	770	-	137	599
Mov Cap-2 Maneuver	-	-	-	-	137	-
Stage 1	-	-	-	-	404	-
Stage 2	-	-	-	-	520	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	48
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	137	599	-	-	770	-
HCM Lane V/C Ratio	0.52	0.028	-	-	0.022	-
HCM Control Delay (s)	56.8	11.2	-	-	9.8	-
HCM Lane LOS	F	B	-	-	A	-
HCM 95th %tile Q(veh)	2.5	0.1	-	-	0.1	-

Intersection	
Int Delay, s/veh	6

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	22	689	12	57	942	1	38	6	107	0	18	51
Future Vol, veh/h	22	689	12	57	942	1	38	6	107	0	18	51
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	23	725	13	60	992	1	40	6	113	0	19	54

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	993	0	0	738	0	0	1404	1891	369	1525	1897	497
Stage 1	-	-	-	-	-	-	778	778	-	1113	1113	-
Stage 2	-	-	-	-	-	-	626	1113	-	412	784	-
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	629	-	-	864	-	-	99	69	628	75	69	500
Stage 1	-	-	-	-	-	-	355	405	-	210	282	-
Stage 2	-	-	-	-	-	-	439	282	-	569	402	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	629	-	-	864	-	-	62	62	628	52	62	500
Mov Cap-2 Maneuver	-	-	-	-	-	-	62	62	-	52	62	-
Stage 1	-	-	-	-	-	-	342	390	-	202	263	-
Stage 2	-	-	-	-	-	-	338	263	-	443	387	-

Approach	SE	NW	NE	SW
HCM Control Delay, s	0.3	0.5	54.3	39.1
HCM LOS			F	E

Minor Lane/Major Mvmt	NELn1	NELn2	NWL	NWT	NWR	SEL	SET	SER	SWLn1
Capacity (veh/h)	62	628	864	-	-	629	-	-	176
HCM Lane V/C Ratio	0.747	0.179	0.069	-	-	0.037	-	-	0.413
HCM Control Delay (s)	157	12	9.5	-	-	10.9	-	-	39.1
HCM Lane LOS	F	B	A	-	-	B	-	-	E
HCM 95th %tile Q(veh)	3.3	0.6	0.2	-	-	0.1	-	-	1.8

Intersection	
Int Delay, s/veh	6.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱		↰	↱		↔			↰	↱
Traffic Vol, veh/h	8	9	34	132	43	34	45	191	118	4	107	2
Future Vol, veh/h	8	9	34	132	43	34	45	191	118	4	107	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	10	38	147	48	38	50	212	131	4	119	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	552	574	121	532	511	282	123	0	0	345	0	0
Stage 1	129	129	-	380	380	-	-	-	-	-	-	-
Stage 2	423	445	-	152	131	-	-	-	-	-	-	-
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	446	430	933	454	462	750	1464	-	-	1197	-	-
Stage 1	877	791	-	636	609	-	-	-	-	-	-	-
Stage 2	611	576	-	843	782	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	373	408	931	411	438	747	1461	-	-	1195	-	-
Mov Cap-2 Maneuver	373	408	-	411	438	-	-	-	-	-	-	-
Stage 1	838	786	-	607	582	-	-	-	-	-	-	-
Stage 2	509	550	-	795	777	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.9	19.2	1	0.3
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1461	-	-	391	931	417	747	1195	-	-
HCM Lane V/C Ratio	0.034	-	-	0.048	0.041	0.466	0.051	0.004	-	-
HCM Control Delay (s)	7.6	0	-	14.7	9	21	10.1	8	0	-
HCM Lane LOS	A	A	-	B	A	C	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.1	2.4	0.2	0	-	-

Intersection	
Int Delay, s/veh	8.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	19	108	1	1	97	23	4	21	2	9	5	17
Future Vol, veh/h	19	108	1	1	97	23	4	21	2	9	5	17
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	21	121	1	1	109	26	4	24	2	10	6	19

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	137	70	16	130	78	25	25	0	0	26	0	0
Stage 1	36	36	-	33	33	-	-	-	-	-	-	-
Stage 2	101	34	-	97	45	-	-	-	-	-	-	-
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	827	815	1055	807	783	1007	1551	-	-	1462	-	-
Stage 1	972	859	-	944	837	-	-	-	-	-	-	-
Stage 2	898	861	-	872	827	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	714	807	1055	708	775	1007	1551	-	-	1462	-	-
Mov Cap-2 Maneuver	714	807	-	708	775	-	-	-	-	-	-	-
Stage 1	969	853	-	941	834	-	-	-	-	-	-	-
Stage 2	758	858	-	742	821	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.2	10.3	1.1	2.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1551	-	-	714	809	810	1462	-	-
HCM Lane V/C Ratio	0.003	-	-	0.03	0.151	0.168	0.007	-	-
HCM Control Delay (s)	7.3	0	-	10.2	10.2	10.3	7.5	0	-
HCM Lane LOS	A	A	-	B	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.5	0.6	0	-	-

HCM Signalized Intersection Capacity Analysis
1: Wolf Drive/Ten Eyck Road & Highway 26 07/09/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	158	1168	158	8	1011	22	136	16	14	40	14	118
Future Volume (vph)	158	1168	158	8	1011	22	136	16	14	40	14	118
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		1645			1461	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.57			0.90	
Satd. Flow (perm)	1614	3163		1554	3107	1343		981			1335	
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)	166	1229	166	8	1064	23	143	17	15	42	15	124
RTOR Reduction (vph)	0	8	0	0	0	12	0	3	0	0	66	0
Lane Group Flow (vph)	166	1387	0	8	1064	11	0	172	0	0	115	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	72.0		1.0	56.5	56.5		33.5			33.5	
Effective Green, g (s)	16.5	72.0		1.0	56.5	56.5		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)	221	1897		12	1462	632		273			372	
v/s Ratio Prot	c0.10	c0.44		0.01	0.34							
v/s Ratio Perm						0.01		c0.18			0.09	
v/c Ratio	0.75	0.73		0.67	0.73	0.02		0.63			0.31	
Uniform Delay, d1	49.8	17.1		59.3	25.6	16.9		37.8			34.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	13.4	2.5		89.5	3.2	0.0		10.6			0.5	
Delay (s)	63.2	19.6		148.8	28.8	17.0		48.4			34.6	
Level of Service	E	B		F	C	B		D			C	
Approach Delay (s)		24.3			29.4			48.4			34.6	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	28.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	81.5%	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 07/09/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	158	1168	158	8	1011	22	136	16	14	40	14	118
Future Volume (veh/h)	158	1168	158	8	1011	22	136	16	14	40	14	118
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	166	1229	166	8	1064	23	143	17	15	42	15	124
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	192	1717	231	15	1541	670	298	35	26	114	53	282
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	2868	385	1576	3143	1367	871	124	93	275	189	1010
Grp Volume(v), veh/h	166	693	702	8	1064	23	175	0	0	181	0	0
Grp Sat Flow(s),veh/h/ln	1628	1624	1630	1576	1572	1367	1088	0	0	1474	0	0
Q Serve(g_s), s	12.0	35.9	36.4	0.6	31.3	1.0	7.1	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	12.0	35.9	36.4	0.6	31.3	1.0	18.7	0.0	0.0	11.6	0.0	0.0
Prop In Lane	1.00		0.24	1.00		1.00	0.82		0.09	0.23		0.69
Lane Grp Cap(c), veh/h	192	972	976	15	1541	670	358	0	0	449	0	0
V/C Ratio(X)	0.86	0.71	0.72	0.52	0.69	0.03	0.49	0.00	0.00	0.40	0.00	0.00
Avail Cap(c_a), veh/h	264	972	976	67	1541	670	358	0	0	449	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(I)	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	52.0	16.9	17.0	59.1	23.6	15.9	38.6	0.0	0.0	35.4	0.0	0.0
Incr Delay (d2), s/veh	18.9	4.5	4.6	24.7	2.6	0.1	4.7	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	6.0	14.2	14.4	0.3	12.1	0.4	5.0	0.0	0.0	4.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	70.9	21.3	21.5	83.8	26.1	15.9	43.3	0.0	0.0	36.0	0.0	0.0
LnGrp LOS	E	C	C	F	C	B	D	A	A	D	A	A
Approach Vol, veh/h		1561			1095			175			181	
Approach Delay, s/veh		26.7			26.3			43.3			36.0	
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	18.7	63.3		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	38.4		20.7	14.0	33.3		13.6				
Green Ext Time (p_c), s	0.0	13.1		0.8	0.2	8.4		1.1				

Intersection Summary			
HCM 6th Ctrl Delay		28.1	
HCM 6th LOS		C	

Intersection	
Int Delay, s/veh	3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1123	85	17	1018	49	34
Future Vol, veh/h	1123	85	17	1018	49	34
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	1182	89	18	1072	52	36

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1271	0	1754	591
Stage 1	-	-	-	-	1182	-
Stage 2	-	-	-	-	572	-
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	-	-	516	-	76	448
Stage 1	-	-	-	-	252	-
Stage 2	-	-	-	-	525	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	516	-	73	448
Mov Cap-2 Maneuver	-	-	-	-	73	-
Stage 1	-	-	-	-	252	-
Stage 2	-	-	-	-	507	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	82.3
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	73	448	-	-	516	-
HCM Lane V/C Ratio	0.707	0.08	-	-	0.035	-
HCM Control Delay (s)	129.9	13.7	-	-	12.2	-
HCM Lane LOS	F	B	-	-	B	-
HCM 95th %tile Q(veh)	3.3	0.3	-	-	0.1	-

Intersection	
Int Delay, s/veh	5.4

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	62	1046	38	118	982	0	8	5	116	0	9	28
Future Vol, veh/h	62	1046	38	118	982	0	8	5	116	0	9	28
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	64	1078	39	122	1012	0	8	5	120	0	9	29

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1013	0	0	1117	0	0	1982	2483	559	1927	2502	508
Stage 1	-	-	-	-	-	-	1226	1226	-	1257	1257	-
Stage 2	-	-	-	-	-	-	756	1257	-	670	1245	-
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	674	-	-	621	-	-	36	29	472	35	28	482
Stage 1	-	-	-	-	-	-	189	249	-	165	241	-
Stage 2	-	-	-	-	-	-	366	241	-	388	244	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	673	-	-	621	-	-	17	21	472	17	20	481
Mov Cap-2 Maneuver	-	-	-	-	-	-	17	21	-	17	20	-
Stage 1	-	-	-	-	-	-	171	225	-	149	194	-
Stage 2	-	-	-	-	-	-	263	194	-	256	221	-

Approach	SE	NW	NE	SW
HCM Control Delay, s	0.6	1.3	55.3	99
HCM LOS			F	F

Minor Lane/Major Mvmt	NELn1	NELn2	NWL	NWT	NWR	SEL	SET	SER	SWLn1
Capacity (veh/h)	18	472	621	-	-	673	-	-	73
HCM Lane V/C Ratio	0.745	0.253	0.196	-	-	0.095	-	-	0.523
HCM Control Delay (s)	$ 412.7	15.2	12.2	-	-	10.9	-	-	99
HCM Lane LOS	F	C	B	-	-	B	-	-	F
HCM 95th %tile Q(veh)	2	1	0.7	-	-	0.3	-	-	2.2

Intersection	
Int Delay, s/veh	13.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	11	51	55	146	53	27	61	174	173	10	226	11
Future Vol, veh/h	11	51	55	146	53	27	61	174	173	10	226	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	54	59	155	56	29	65	185	184	11	240	12

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	716	765	242	734	685	281	254	0	0	371	0	0
Stage 1	264	264	-	409	409	-	-	-	-	-	-	-
Stage 2	452	501	-	325	276	-	-	-	-	-	-	-
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	347	335	799	332	367	751	1311	-	-	1171	-	-
Stage 1	743	692	-	613	591	-	-	-	-	-	-	-
Stage 2	589	544	-	681	676	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	274	309	797	251	338	748	1309	-	-	1169	-	-
Mov Cap-2 Maneuver	274	309	-	251	338	-	-	-	-	-	-	-
Stage 1	694	683	-	573	552	-	-	-	-	-	-	-
Stage 2	475	508	-	574	667	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.4	49	1.2	0.3
HCM LOS	C	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1309	-	-	302	797	269	748	1169	-	-
HCM Lane V/C Ratio	0.05	-	-	0.218	0.073	0.787	0.038	0.009	-	-
HCM Control Delay (s)	7.9	0	-	20.2	9.9	54.3	10	8.1	0	-
HCM Lane LOS	A	A	-	C	A	F	B	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.8	0.2	6	0.1	0	-	-

Intersection	
Int Delay, s/veh	9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	24	147	5	2	127	21	4	10	1	24	28	29
Future Vol, veh/h	24	147	5	2	127	21	4	10	1	24	28	29
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	26	162	5	2	140	23	4	11	1	26	31	32

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	206	125	52	210	141	20	65	0	0	16	0	0
Stage 1	101	101	-	24	24	-	-	-	-	-	-	-
Stage 2	105	24	-	186	117	-	-	-	-	-	-	-
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	752	765	1016	747	750	1058	1506	-	-	1595	-	-
Stage 1	905	811	-	994	875	-	-	-	-	-	-	-
Stage 2	901	875	-	816	799	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	614	745	1011	606	731	1050	1503	-	-	1589	-	-
Mov Cap-2 Maneuver	614	745	-	606	731	-	-	-	-	-	-	-
Stage 1	900	796	-	987	869	-	-	-	-	-	-	-
Stage 2	735	869	-	634	784	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.1	11	2	2.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1503	-	-	614	752	761	1589	-	-
HCM Lane V/C Ratio	0.003	-	-	0.043	0.222	0.217	0.017	-	-
HCM Control Delay (s)	7.4	0	-	11.1	11.1	11	7.3	0	-
HCM Lane LOS	A	A	-	B	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.8	0.8	0.1	-	-

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)	59	738	38	4	1145	10	139	11	3	16	4	151
Future Volume (vph)	59	738	38	4	1145	10	139	11	3	16	4	151
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	
Frt	1.00	0.99		1.00	1.00	0.85		1.00			0.88	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.96			1.00	
Satd. Flow (prot)	1484	2947		1568	3137	1403		1575			1489	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.55			0.97	
Satd. Flow (perm)	1484	2947		1568	3137	1403		900			1448	
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)	63	785	40	4	1218	11	148	12	3	17	4	161
RTOR Reduction (vph)	0	3	0	0	0	5	0	1	0	0	94	0
Lane Group Flow (vph)	63	822	0	4	1218	6	0	162	0	0	89	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)	8.0	68.0		1.0	61.0	61.0		37.5			37.5	
Effective Green, g (s)	8.0	68.0		1.0	61.0	61.0		37.5			37.5	
Actuated g/C Ratio	0.07	0.57		0.01	0.51	0.51		0.31			0.31	
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)	98	1669		13	1594	713		281			452	
v/s Ratio Prot	c0.04	0.28		0.00	c0.39							
v/s Ratio Perm						0.00		c0.18			0.06	
v/c Ratio	0.64	0.49		0.31	0.76	0.01		0.58			0.20	
Uniform Delay, d1	54.6	15.6		59.2	23.7	14.6		34.6			30.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	13.5	1.0		13.0	3.5	0.0		8.4			0.2	
Delay (s)	68.1	16.7		72.2	27.3	14.6		43.0			30.4	
Level of Service	E	B		E	C	B		D			C	
Approach Delay (s)		20.3			27.3			43.0			30.4	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	26.0	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 07/08/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	59	738	38	4	1145	10	139	11	3	16	4	151
Future Volume (veh/h)	59	738	38	4	1145	10	139	11	3	16	4	151
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	63	785	40	4	1218	11	148	12	3	17	4	161
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	77	1662	85	8	1660	741	331	25	6	57	29	408
Arrive On Green	0.05	0.57	0.57	0.01	0.52	0.52	0.31	0.31	0.31	0.31	0.31	0.31
Sat Flow, veh/h	1511	2918	149	1589	3169	1414	875	80	18	78	92	1307
Grp Volume(v), veh/h	63	405	420	4	1218	11	163	0	0	182	0	0
Grp Sat Flow(s),veh/h/ln	1511	1507	1559	1589	1585	1414	972	0	0	1477	0	0
Q Serve(g_s), s	5.0	19.0	19.0	0.3	35.7	0.4	8.3	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	5.0	19.0	19.0	0.3	35.7	0.4	19.9	0.0	0.0	11.6	0.0	0.0
Prop In Lane	1.00		0.10	1.00		1.00	0.91		0.02	0.09		0.88
Lane Grp Cap(c), veh/h	77	859	889	8	1660	741	361	0	0	495	0	0
V/C Ratio(X)	0.82	0.47	0.47	0.48	0.73	0.01	0.45	0.00	0.00	0.37	0.00	0.00
Avail Cap(c_a), veh/h	132	859	889	68	1660	741	361	0	0	495	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(I)	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	56.4	15.2	15.2	59.5	22.1	13.7	36.3	0.0	0.0	32.4	0.0	0.0
Incr Delay (d2), s/veh	18.3	1.9	1.8	38.0	2.9	0.0	4.0	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	2.3	6.9	7.2	0.2	13.7	0.2	4.5	0.0	0.0	4.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	74.7	17.1	17.0	97.5	25.0	13.7	40.4	0.0	0.0	32.8	0.0	0.0
LnGrp LOS	E	B	B	F	C	B	D	A	A	C	A	A
Approach Vol, veh/h		888			1233			163			182	
Approach Delay, s/veh		21.1			25.1			40.4			32.8	
Approach LOS		C			C			D			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.1	72.9		42.0	10.6	67.4		42.0				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.1	63.9		37.5	10.5	58.5		37.5				
Max Q Clear Time (g_c+I1), s	2.3	21.0		21.9	7.0	37.7		13.6				
Green Ext Time (p_c), s	0.0	6.7		0.8	0.0	9.9		1.2				

Intersection Summary												
HCM 6th Ctrl Delay			25.3									
HCM 6th LOS			C									

Intersection	
Int Delay, s/veh	6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	746	36	19	1019	105	16
Future Vol, veh/h	746	36	19	1019	105	16
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	794	38	20	1084	112	17

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	832	0	1376	397
Stage 1	-	-	-	-	794	-
Stage 2	-	-	-	-	582	-
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	-	-	765	-	134	597
Stage 1	-	-	-	-	401	-
Stage 2	-	-	-	-	516	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	765	-	131	597
Mov Cap-2 Maneuver	-	-	-	-	131	-
Stage 1	-	-	-	-	401	-
Stage 2	-	-	-	-	503	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	94.5
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	131	597	-	-	765	-
HCM Lane V/C Ratio	0.853	0.029	-	-	0.026	-
HCM Control Delay (s)	107.2	11.2	-	-	9.8	-
HCM Lane LOS	F	B	-	-	A	-
HCM 95th %tile Q(veh)	5.4	0.1	-	-	0.1	-

Intersection	
Int Delay, s/veh	1.3

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	28	689	12	0	999	1	0	0	107	0	0	69
Future Vol, veh/h	28	689	12	0	999	1	0	0	107	0	0	69
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	-	-	-	-	-	-	-	0	-	-	-
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, %	13	13	2	2	6	6	2	2	2	9	2	9
Mvmt Flow	30	733	13	0	1063	1	0	0	114	0	0	73

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1064	0	0	-	-	0	-	-	373	1491	1870	532
Stage 1	-	-	-	-	-	-	-	-	-	1064	1064	-
Stage 2	-	-	-	-	-	-	-	-	-	427	806	-
Critical Hdwy	4.36	-	-	-	-	-	-	-	6.94	7.68	6.54	7.08
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.68	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.68	5.54	-
Follow-up Hdwy	2.33	-	-	-	-	-	-	-	3.32	3.59	4.02	3.39
Pot Cap-1 Maneuver	589	-	-	0	-	-	0	0	624	80	71	474
Stage 1	-	-	-	0	-	-	0	0	-	226	298	-
Stage 2	-	-	-	0	-	-	0	0	-	558	393	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	589	-	-	-	-	-	-	-	624	63	67	474
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	63	67	-
Stage 1	-	-	-	-	-	-	-	-	-	214	298	-
Stage 2	-	-	-	-	-	-	-	-	-	433	373	-

Approach	SE	NW	NE	SW
HCM Control Delay, s	0.4	0	12.1	14
HCM LOS			B	B

Minor Lane/Major Mvmt	NELn1	NWT	NWR	SEL	SET	SERSWLn1
Capacity (veh/h)	624	-	-	589	-	- 474
HCM Lane V/C Ratio	0.182	-	-	0.051	-	- 0.155
HCM Control Delay (s)	12.1	-	-	11.4	-	- 14
HCM Lane LOS	B	-	-	B	-	- B
HCM 95th %tile Q(veh)	0.7	-	-	0.2	-	- 0.5

Intersection	
Int Delay, s/veh	5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱		↰	↱		↔			↰	↱
Traffic Vol, veh/h	8	9	34	75	43	34	45	191	118	4	182	2
Future Vol, veh/h	8	9	34	75	43	34	45	191	118	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	9	10	38	83	48	38	50	212	131	4	202	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	635	657	204	615	594	282	206	0	0	345	0	0
Stage 1	212	212	-	380	380	-	-	-	-	-	-	-
Stage 2	423	445	-	235	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	393	386	839	399	414	750	1365	-	-	1197	-	-
Stage 1	792	729	-	636	609	-	-	-	-	-	-	-
Stage 2	611	576	-	761	720	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	325	365	837	358	392	747	1362	-	-	1195	-	-
Mov Cap-2 Maneuver	325	365	-	358	392	-	-	-	-	-	-	-
Stage 1	754	725	-	605	580	-	-	-	-	-	-	-
Stage 2	507	548	-	714	716	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.7	17.8	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	-	-	345	837	370	747	1195	-	-
HCM Lane V/C Ratio	0.037	-	-	0.055	0.045	0.354	0.051	0.004	-	-
HCM Control Delay (s)	7.7	0	-	16	9.5	20	10.1	8	0	-
HCM Lane LOS	A	A	-	C	A	C	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.1	1.6	0.2	0	-	-

Intersection	
Int Delay, s/veh	8.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	19	108	1	1	40	61	4	21	2	12	5	17
Future Vol, veh/h	19	108	1	1	40	61	4	21	2	12	5	17
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	21	121	1	1	45	69	4	24	2	13	6	19

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	132	76	16	136	84	25	25	0	0	26	0	0
Stage 1	42	42	-	33	33	-	-	-	-	-	-	-
Stage 2	90	34	-	103	51	-	-	-	-	-	-	-
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	833	809	1055	800	777	1007	1551	-	-	1462	-	-
Stage 1	965	854	-	944	837	-	-	-	-	-	-	-
Stage 2	910	861	-	865	822	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	735	799	1055	700	768	1007	1551	-	-	1462	-	-
Mov Cap-2 Maneuver	735	799	-	700	768	-	-	-	-	-	-	-
Stage 1	962	846	-	941	834	-	-	-	-	-	-	-
Stage 2	800	858	-	733	815	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.3	9.6	1.1	2.6
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1551	-	-	735	801	894	1462	-	-
HCM Lane V/C Ratio	0.003	-	-	0.029	0.153	0.128	0.009	-	-
HCM Control Delay (s)	7.3	0	-	10	10.3	9.6	7.5	0	-
HCM Lane LOS	A	A	-	B	B	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.5	0.4	0	-	-

HCM Signalized Intersection Capacity Analysis
1: Wolf Drive/Ten Eyck Road & Highway 26 07/09/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	158	1173	158	8	1133	22	141	16	14	40	14	118
Future Volume (vph)	158	1173	158	8	1133	22	141	16	14	40	14	118
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			1461	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.57			0.90	
Satd. Flow (perm)	1614	3163		1554	3107	1343		971			1335	
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)	166	1235	166	8	1193	23	148	17	15	42	15	124
RTOR Reduction (vph)	0	8	0	0	0	12	0	3	0	0	66	0
Lane Group Flow (vph)	166	1393	0	8	1193	11	0	177	0	0	115	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	73.0		1.0	57.8	57.8		32.5			32.5	
Effective Green, g (s)	16.2	73.0		1.0	57.8	57.8		32.5			32.5	
Actuated g/C Ratio	0.13	0.61		0.01	0.48	0.48		0.27			0.27	
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	1924		12	1496	646		262			361	
v/s Ratio Prot	c0.10	0.44		0.01	c0.38							
v/s Ratio Perm						0.01		c0.18			0.09	
v/c Ratio	0.76	0.72		0.67	0.80	0.02		0.68			0.32	
Uniform Delay, d1	50.1	16.5		59.3	26.2	16.3		39.0			34.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	14.8	2.4		89.5	4.5	0.0		13.1			0.5	
Delay (s)	64.8	18.9		148.8	30.7	16.3		52.2			35.4	
Level of Service	E	B		F	C	B		D			D	
Approach Delay (s)		23.7			31.2			52.2			35.4	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	28.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	82.0%	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 07/09/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	158	1173	158	8	1133	22	141	16	14	40	14	118
Future Volume (veh/h)	158	1173	158	8	1133	22	141	16	14	40	14	118
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	166	1235	166	8	1193	23	148	17	15	42	15	124
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	192	1742	233	15	1568	682	290	33	24	112	52	275
Arrive On Green	0.12	0.61	0.61	0.01	0.50	0.50	0.27	0.27	0.27	0.27	0.27	0.27
Sat Flow, veh/h	1628	2870	384	1576	3143	1367	868	121	90	275	192	1016
Grp Volume(v), veh/h	166	696	705	8	1193	23	180	0	0	181	0	0
Grp Sat Flow(s),veh/h/ln	1628	1624	1630	1576	1572	1367	1078	0	0	1483	0	0
Q Serve(g_s), s	12.0	35.4	36.0	0.6	36.8	1.0	7.8	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	12.0	35.4	36.0	0.6	36.8	1.0	19.6	0.0	0.0	11.8	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	192	985	989	15	1568	682	347	0	0	439	0	0
V/C Ratio(X)	0.87	0.71	0.71	0.52	0.76	0.03	0.52	0.00	0.00	0.41	0.00	0.00
Avail Cap(c_a), veh/h	251	985	989	67	1568	682	347	0	0	439	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(I)	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	52.0	16.2	16.3	59.1	24.3	15.3	39.8	0.0	0.0	36.3	0.0	0.0
Incr Delay (d2), s/veh	21.1	4.3	4.4	24.7	3.5	0.1	5.5	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	6.1	13.9	14.2	0.3	14.3	0.3	5.3	0.0	0.0	4.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	73.1	20.5	20.7	83.8	27.8	15.4	45.2	0.0	0.0	36.9	0.0	0.0
LnGrp LOS	E	C	C	F	C	B	D	A	A	D	A	A
Approach Vol, veh/h		1567			1224			180			181	
Approach Delay, s/veh		26.2			28.0			45.2			36.9	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.7	77.3		37.0	18.6	64.4		37.0				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.1	68.9		32.5	18.5	55.5		32.5				
Max Q Clear Time (g_c+I1), s	2.6	38.0		21.6	14.0	38.8		13.8				
Green Ext Time (p_c), s	0.0	13.5		0.8	0.2	8.6		1.0				

Intersection Summary			
HCM 6th Ctrl Delay		28.6	
HCM 6th LOS		C	

Intersection	
Int Delay, s/veh	3.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1128	85	17	1137	52	34
Future Vol, veh/h	1128	85	17	1137	52	34
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	1187	89	18	1197	55	36

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1276	0	1822	594
Stage 1	-	-	-	-	1187	-
Stage 2	-	-	-	-	635	-
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	-	-	514	-	68	446
Stage 1	-	-	-	-	250	-
Stage 2	-	-	-	-	487	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	514	-	66	446
Mov Cap-2 Maneuver	-	-	-	-	66	-
Stage 1	-	-	-	-	250	-
Stage 2	-	-	-	-	470	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	107.6
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	66	446	-	-	514	-
HCM Lane V/C Ratio	0.829	0.08	-	-	0.035	-
HCM Control Delay (s)	168.9	13.8	-	-	12.3	-
HCM Lane LOS	F	B	-	-	B	-
HCM 95th %tile Q(veh)	3.9	0.3	-	-	0.1	-

Intersection	
Int Delay, s/veh	1.3

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	67	1046	38	0	1100	0	0	0	116	0	0	37
Future Vol, veh/h	67	1046	38	0	1100	0	0	0	116	0	0	37
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	-	-	-	-	-	-	-	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	69	1078	39	0	1134	0	0	0	120	0	0	38

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1135	0	0	-	-	0	-	-	559	1812	2390	569
Stage 1	-	-	-	-	-	-	-	-	-	1135	1135	-
Stage 2	-	-	-	-	-	-	-	-	-	677	1255	-
Critical Hdwy	4.16	-	-	-	-	-	-	-	6.94	7.76	6.54	7.16
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.76	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.76	5.54	-
Follow-up Hdwy	2.23	-	-	-	-	-	-	-	3.32	3.63	4.02	3.43
Pot Cap-1 Maneuver	606	-	-	0	-	-	0	0	472	43	33	438
Stage 1	-	-	-	0	-	-	0	0	-	198	275	-
Stage 2	-	-	-	0	-	-	0	0	-	384	241	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	605	-	-	-	-	-	-	-	472	29	29	437
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	29	29	-
Stage 1	-	-	-	-	-	-	-	-	-	175	275	-
Stage 2	-	-	-	-	-	-	-	-	-	254	214	-

Approach	SE	NW	NE	SW
HCM Control Delay, s	0.7	0	15.2	14
HCM LOS			C	B

Minor Lane/Major Mvmt	NELn1	NWT	NWR	SEL	SET	SERSWLn1
Capacity (veh/h)	472	-	-	605	-	- 437
HCM Lane V/C Ratio	0.253	-	-	0.114	-	- 0.087
HCM Control Delay (s)	15.2	-	-	11.7	-	- 14
HCM Lane LOS	C	-	-	B	-	- B
HCM 95th %tile Q(veh)	1	-	-	0.4	-	- 0.3

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	11	51	55	30	53	27	61	179	168	10	353	11
Future Vol, veh/h	11	51	55	30	53	27	61	179	168	10	353	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	54	59	32	56	29	65	190	179	11	376	12

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	854	901	378	873	824	284	390	0	0	371	0	0
Stage 1	400	400	-	412	412	-	-	-	-	-	-	-
Stage 2	454	501	-	461	412	-	-	-	-	-	-	-
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	280	279	671	267	305	748	1169	-	-	1171	-	-
Stage 1	628	603	-	611	589	-	-	-	-	-	-	-
Stage 2	588	544	-	575	589	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	213	255	670	191	278	745	1167	-	-	1169	-	-
Mov Cap-2 Maneuver	213	255	-	191	278	-	-	-	-	-	-	-
Stage 1	582	595	-	566	545	-	-	-	-	-	-	-
Stage 2	469	504	-	471	581	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	18.3	24	1.2	0.2
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1167	-	-	246	670	239	745	1169	-	-
HCM Lane V/C Ratio	0.056	-	-	0.268	0.087	0.369	0.039	0.009	-	-
HCM Control Delay (s)	8.3	0	-	24.9	10.9	28.6	10	8.1	0	-
HCM Lane LOS	A	A	-	C	B	D	B	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	1.1	0.3	1.6	0.1	0	-	-

Intersection	
Int Delay, s/veh	7.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	24	142	5	2	11	29	4	10	1	24	28	29
Future Vol, veh/h	24	142	5	2	11	29	4	10	1	24	28	29
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	26	156	5	2	12	32	4	11	1	26	31	32

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	147	125	52	207	141	20	65	0	0	16	0	0
Stage 1	101	101	-	24	24	-	-	-	-	-	-	-
Stage 2	46	24	-	183	117	-	-	-	-	-	-	-
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	821	765	1016	751	750	1058	1506	-	-	1595	-	-
Stage 1	905	811	-	994	875	-	-	-	-	-	-	-
Stage 2	968	875	-	819	799	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	769	745	1011	614	731	1050	1503	-	-	1589	-	-
Mov Cap-2 Maneuver	769	745	-	614	731	-	-	-	-	-	-	-
Stage 1	900	796	-	987	869	-	-	-	-	-	-	-
Stage 2	919	869	-	642	784	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.9	9.1	2	2.2
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1503	-	-	769	752	915	1589	-	-
HCM Lane V/C Ratio	0.003	-	-	0.034	0.215	0.05	0.017	-	-
HCM Control Delay (s)	7.4	0	-	9.8	11.1	9.1	7.3	0	-
HCM Lane LOS	A	A	-	A	B	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.8	0.2	0.1	-	-

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	333	318	124	431	374	68	201	146
Average Queue (ft)	62	186	139	11	271	221	5	94	56
95th Queue (ft)	147	293	265	62	372	327	36	165	111
Link Distance (ft)		538	538		613	613		315	380
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	165			120			70		
Storage Blk Time (%)	1	9			30	26	0		
Queuing Penalty (veh)	2	5			1	3	0		

Intersection: 2: Langensand Road & Highway 26

Movement	EB	WB	NB	NB
Directions Served	T	L	L	R
Maximum Queue (ft)	4	42	140	234
Average Queue (ft)	0	8	78	113
95th Queue (ft)	3	30	155	490
Link Distance (ft)	701			876
Upstream Blk Time (%)				0
Queuing Penalty (veh)				0
Storage Bay Dist (ft)		215	120	
Storage Blk Time (%)			25	0
Queuing Penalty (veh)			4	0

Intersection: 3: Dubarko Road/Vista Loop Drive & Highway 26

Movement	SE	NW	NE	NE	SW
Directions Served	L	L	LT	R	LTR
Maximum Queue (ft)	61	46	223	92	271
Average Queue (ft)	14	17	105	41	115
95th Queue (ft)	42	38	277	70	292
Link Distance (ft)			752	752	575
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	220	200			
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 4: Highway 211 & Dubarko Road

Movement	EB	EB	WB	WB	NB	SB
Directions Served	LT	R	LT	R	LTR	LT
Maximum Queue (ft)	51	46	120	63	48	23
Average Queue (ft)	15	20	53	19	4	1
95th Queue (ft)	41	44	94	46	23	9
Link Distance (ft)	645		745		654	862
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		90		125		
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)	43	74	94	15	6
Average Queue (ft)	14	38	49	1	0
95th Queue (ft)	40	59	82	8	4
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: 15

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	424	367	101	459	418	86	193	194
Average Queue (ft)	136	262	231	10	288	242	8	93	79
95th Queue (ft)	223	381	352	52	405	363	41	168	166
Link Distance (ft)		538	538		613	613		315	380
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	165			120			70		
Storage Blk Time (%)	9	12			35	31	0		
Queuing Penalty (veh)	52	20			3	7	0		

Intersection: 2: Langensand Road & Highway 26

Movement	EB	WB	NB	NB
Directions Served	R	L	L	R
Maximum Queue (ft)	4	47	134	168
Average Queue (ft)	0	12	61	39
95th Queue (ft)	3	38	136	145
Link Distance (ft)				876
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	160	215	120	
Storage Blk Time (%)			14	
Queuing Penalty (veh)			5	

Intersection: 3: Dubarko Road/Vista Loop Drive & Highway 26

Movement	SE	SE	SE	NW	NW	NW	NE	NE	SW
Directions Served	L	T	TR	L	T	TR	LT	R	LTR
Maximum Queue (ft)	85	22	20	109	15	4	341	126	435
Average Queue (ft)	29	1	2	40	1	0	169	50	233
95th Queue (ft)	64	11	11	80	12	3	338	94	567
Link Distance (ft)		1135	1135		800	800	615	615	575
Upstream Blk Time (%)									7
Queuing Penalty (veh)									0
Storage Bay Dist (ft)	220			200					
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 4: Highway 211 & Dubarko Road

Movement	EB	EB	WB	WB	NB	SB
Directions Served	LT	R	LT	R	LTR	LT
Maximum Queue (ft)	77	73	213	117	64	48
Average Queue (ft)	32	29	84	21	13	4
95th Queue (ft)	64	55	169	69	43	21
Link Distance (ft)	645		745		654	862
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		90		125		
Storage Blk Time (%)	0	0	8	0		
Queuing Penalty (veh)	0	0	2	0		

Intersection: 5: Langensand Road & Dubarko Road

Movement	EB	EB	WB	NB	SB
Directions Served	L	TR	LTR	LTR	LTR
Maximum Queue (ft)	36	76	83	12	38
Average Queue (ft)	17	40	42	0	2
95th Queue (ft)	42	63	66	6	17
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: 88

CITY OF SANDY, CLACKAMAS COUNTY **TEN EYCK RD at PIONEER BLVD, City of Sandy, Clackamas County, 01/01/2013 to 12/31/2017**

1 - 4 of 4 Crash records shown.

SER# / INVEST / RD DPT / UNLOC?	S P E D	A L C	D M R G S	J N V	S H L	W O R K	DATE / DAY / TIME / LAT	CLASS / DIST / FROM / LONG	CITY STREET / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	SPCL USE / TRLR QTY / OWNER / V# TYPE	MOVE / FROM / TO	P# TYPE	PRTC / INJ / SVRTY	A G E	S X	LICNS RES / PED LOC	ERROR	ACT	EVENT	CAUSE
00309	N	N	N				01/24/2014	17	PIONEER BLVD	INTER	6-LEG	N	N	CLR	S-1STOP	01 NONE 0	STRGHT								013	07
CITY							FR	0	SE TEN EYCK RD	NE		TRF SIGNAL	N	DRY	REAR	PRVTE	NE-SW							000		00
N							11A			06	0		N	DAY	PDO	PSNGR CAR		01 DRVR	NONE	83	F	OR-Y	026	000		07
N							45 23 49.2519839	-122 15 19.73952															OR<25				
																02 NONE 0	STOP									
																PRVTE	NE-SW							011	013	00
																MTRCYCLE		01 DRVR	NONE	63	M	OR-Y	000	000		00
																						OR<25				
																03 NONE 0	STOP									
																PRVTE	NE-SW							022		00
																PSNGR CAR		01 DRVR	NONE	70	F	OR-Y	000	000		00
																						OR<25				
03162	N	N	N				08/16/2014	14	PIONEER BLVD	INTER	5-LEG	N	N	CLR	S-1STOP	01 NONE 0	STRGHT									29
NO RPT							SA		SE TEN EYCK RD	E		TRF SIGNAL	N	DRY	REAR	UNKN	E -W							000		00
N							4P			06	0		N	DAY	INJ	MTRCYCLE		01 DRVR	NONE	00	M	UNK	026	000		29
N							45 23 49.25	-122 15 19.74	002600100S00														UNK				
																02 NONE 0	STOP									
																PRVTE	E -W							011		00
																PSNGR CAR		01 DRVR	NONE	72	M	OR-Y	000	000		00
																						OR<25				
																02 NONE 0	STOP									
																PRVTE	E -W							011		00
																PSNGR CAR		02 PSNG	INJC	64	F		000	000		00
03787	N	N	N	N	N		09/15/2015	14	PIONEER BLVD	INTER	5-LEG	N	N	CLR	S-1STOP	01 NONE 0	STRGHT									29
NONE							TU		SE TEN EYCK RD	E		TRF SIGNAL	N	DRY	REAR	PRVTE	E -W							000		00
N							1P			06	0		N	DAY	INJ	PSNGR CAR		01 DRVR	NONE	71	M	OR-Y	026	000		29
N							45 23 49.24	-122 15 19.74	002600100S00														OR<25				
																02 NONE 0	STOP									
																PRVTE	E -W							011		00
																PSNGR CAR		01 DRVR	INJC	38	F	OTH-Y	000	000		00
																						N-RES				
02412	N	N	N				06/24/2014	14	PIONEER BLVD	INTER	5-LEG	N	N	CLR	S-1STOP	01 NONE 0	STRGHT									29
NONE							TU		SE TEN EYCK RD	SE		TRF SIGNAL	N	DRY	REAR	PRVTE	SE-NW							000		00
N							8A			06	0		N	DAY	INJ	PSNGR CAR		01 DRVR	NONE	55	F	OR-Y	026	000		29
N							45 23 49.25	-122 15 19.74	002600100S00														OR<25				
																02 NONE 0	STOP									
																PRVTE	SE-NW							011		00
																PSNGR CAR		01 DRVR	INJC	51	F	OR-Y	000	000		00
																						OR<25				

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CITY OF SANDY, CLACKAMAS COUNTY **TEN EYCK RD at PROCTOR BLVD, City of Sandy, Clackamas County, 01/01/2013 to 12/31/2017**

1 - 3 of 3 Crash records shown.

SER# / INVEST / RD DPT / UNLOC?	S P E D	A L C	D R G S	M J N V	S U H L	W I C K	O	DATE / DAY / TIME / LAT	CLASS / DIST / FROM / LONG	CITY STREET / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACT EVENT	CAUSE
01419	N	N	N					04/25/2013	17	PROCTOR BLVD	INTER	6-LEG	N	N	CLR	S-1STOP	01	NONE 0	STRGHT									07
NONE								TH	0	SE TEN EYCK RD	NE		TRF SIGNAL	N	DRY	REAR		PRVTE	NE-SW								000	00
N								2P			06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	73	M	OR-Y		026	000	07
N								45 23 49.2519839	-122 15 19.73952																OR<25				
																	01	NONE 0	STRGHT									000	00
																		PRVTE	NE-SW										
																		PSNGR CAR		02	PSNG	NO<5	03	F		000	000	00
																	02	NONE 0	STOP									011	00
																		UNKN	NE-SW										
																		PSNGR CAR		01	DRVR	NONE	00	M	UNK		000	000	00
																									UNK				
00879	N	Y	N		N	N		03/15/2013	14	PROCTOR BLVD	INTER	6-LEG	N	N	CLD	S-1STOP	01	NONE 0	STRGHT									07
CITY								FR		SE TEN EYCK RD	E		TRF SIGNAL	N	DRY	REAR		PRVTE	E -W								000	00
N								4P			06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	48	F	OR-Y		026	000	07
N								45 23 49.2519839	-122 15 19.73952	002600100S00															OR>25				
																	02	NONE 0	STOP									011	00
																		PRVTE	E -W										
																		PSNGR CAR		01	DRVR	INJC	42	F	OR-Y		000	000	00
																									OR<25				
05173	N	N	N					11/08/2016	14	PROCTOR BLVD	INTER	5-LEG	N	N	CLR	ANGL-OTH	01	NONE 9	U-TURN									06
NONE								TU		SE TEN EYCK RD	W		TRF SIGNAL	N	DRY	TURN		N/A	W -W								000	00
N								5P			05	0		N	DUSK	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000	00
N								45 23 49.25	-122 15 19.74	002600200S00		(02)													UNK				
																	02	NONE 9	TURN-R									000	00
																		N/A	NE-W										
																		PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000	00
																									UNK				

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CITY OF SANDY, CLACKAMAS COUNTY **TEN EYCK RD at MT HOOD HY, City of Sandy, Clackamas County, 01/01/2013 to 12/31/2017**

SER# / INVEST RD DPT / UNLOC?	S P E D	A L C	R U G S	J I N V	S C H L	W O R K	DATE / DAY / TIME / LAT	CLASS / DIST / FROM / LONG	CITY STREET / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	SPCL USE / TRLR QTY / OWNER / V#	TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS	PED LOC	ERROR	ACT	EVENT	CAUSE

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CITY OF SANDY, CLACKAMAS COUNTY **LANGENSAND RD at MT HOOD HY, City of Sandy, Clackamas County, 01/01/2013 to 12/31/2017**

1 - 4 of 6 Crash records shown.

SER# / INVEST / RD DPT / UNLOC?	S P E D	A L C	D M R G S	J N V	S H L	W O R K	DATE / DAY / TIME / LAT	CLASS / DIST / FROM / LONG	CITY STREET / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	SPCL USE / TRLR QTY / OWNER / V#	TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACT EVENT	CAUSE
05355	N	N	N				11/18/2016	14	LANGENSAND RD	INTER	3-LEG	N	N	RAIN	PED	01	NONE 0	TURN-R										19,02
CITY							FR		MT HOOD HY	S		UNKNOWN	N	WET	PED		PRVTE	S -SE								015	00
N							6P			06	0		N	DUSK	INJ		PSNGR CAR		01	DRVR	NONE	59	M	OR-Y		029	000	02
N							45 23 44.19	-122 15 .03	002600100S00															OR>25				
																		- STRGHT	01	PED	INJC	34	M		I XWK?	000	034	19
																		SE NW									
05056	N	N	N				12/01/2017	14	LANGENSAND RD	INTER	3-LEG	N	N	RAIN	ANGL-STP	01	NONE 0	TURN-R										08
NONE							FR		MT HOOD HY	S		STOP SIGN	N	WET	TURN		PRVTE	NW-S								000	00
N							9P			06	0		N	DLIT	INJ		PSNGR CAR		01	DRVR	NONE	27	F	OR-Y		001	000	08
N							45 23 44.19	-122 15 .03	002600100S00															OR<25				
																02	NONE 0	STOP									
																	PRVTE	S -N								012	00
																	PSNGR CAR		01	DRVR	INJC	27	F	OR-Y		000	000	00
																								OR<25				
																02	NONE 0	STOP									
																	PRVTE	S -N								012	00
																	PSNGR CAR		02	PSNG	INJC	25	M			000	000	00
01431	N	N	N				04/14/2017	14	LANGENSAND RD	INTER	3-LEG	N	N	CLR	O-1STOP	01	NONE 9	BACK										10
NONE							FR		MT HOOD HY	S		STOP SIGN	N	DRY	BACK		N/A	N -S								000	00
N							3P			06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000	00
N							45 23 44.19	-122 15 .03	002600100S00															UNK				
																02	NONE 9	STOP									
																	N/A	S -N								012	00
																	PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000	00
																								UNK				
00258	N	N	N				01/20/2014	14	LANGENSAND RD	INTER	3-LEG	N	N	CLR	ANGL-OTH	01	NONE 0	TURN-L										02
NO RPT							MO		MT HOOD HY	CN		STOP SIGN	N	DRY	TURN		PRVTE	S -NW								015	00
N							6A			01	0		N	DARK	PDO		PSNGR CAR		01	DRVR	NONE	00	M	OR-Y		028	000	02
N							45 23 44.1888359	-122 15 .0331919	002600100S00															OR<25				
																02	NONE 0	TURN-L									
																	PRVTE	SE-S								000	00
																	PSNGR CAR		01	DRVR	NONE	50	M	OR-Y		000	000	00
																								OR<25				
00297	N	N	N	N	N		01/24/2015	14	LANGENSAND RD	INTER	3-LEG	N	N	CLR	O-1 L-TURN	01	NONE 0	STRGHT										02,08
CITY							SA		MT HOOD HY	CN		UNKNOWN	N	DRY	TURN		PRVTE	NW-SE								000	00
N							4P			03	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	21	M	OR-Y		000	000	00
N							45 23 44.19	-122 15 .03	002600100S00															OR<25				

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SER# / INVEST / RD DPT / UNLOC?	S P E D	A L C	D R U G S	M J N V	S I H L	W C O K	DATE / DAY / TIME / LAT	CLASS / DIST / FROM / LONG	CITY STREET / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACT	EVENT	CAUSE
																01	NONE 0	STRGHT										
																	PRVTE	NW-SE									000		00
																	PSNGR CAR		02	PSNG	NO<5	01	F			000	000		00
																02	NONE 0	TURN-L										
																	PRVTE	SE-S									000		00
																	PSNGR CAR		01	DRVR	INJC	78	F	OR-Y OR<25		028,004	000		02,08
04571	N	N	Y	N	N		10/05/2016	14	LANGENSAND RD	INTER	3-LEG	N	N	RAIN	ANGL-OTH	01	NONE 0	TURN-L										013	02,08
CITY							WE		MT HOOD HY	CN		STOP SIGN	N	WET	TURN		PRVTE	S -W								015		00
N							6P			04	0		N	DUSK	INJ		PSNGR CAR		01	DRVR	NONE	21	M	OR-Y OR<25		028	000		02
N							45 23 44.19	-122 15 .03	002600100S00																				
																02	NONE 0	STRGHT										
																	PRVTE	W -E									000	013	00
																	PSNGR CAR		01	DRVR	NONE	37	M	OR-Y OR>25		000	000		00
																03	NONE 0	STRGHT										
																	PRVTE	E -W									022		00
																	PSNGR CAR		01	DRVR	INJB	61	M	OR-Y OR<25		000	000		00
																03	NONE 0	STRGHT										
																	PRVTE	E -W									022		00
																	PSNGR CAR		02	PSNG	INJC	59	F			000	000		00

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CITY OF SANDY, CLACKAMAS COUNTY **MT HOOD HY at VISTA LP DR, City of Sandy, Clackamas County, 01/01/2013 to 12/31/2017**

SER# / INVEST RD DPT UNLOC?	S P E D	A L C	R U G S	J I N V	S C H L	W O R K	DATE DAY TIME LAT	CLASS DIST FROM LONG	CITY STREET FIRST STREET SECOND STREET LRS	RD CHAR DIRECT LOCTN	INT-TYPE (MEDIAN) LEGS (#LANES)	INT-REL TRAF- CONTL	OFFRD RNDBT DRVWY	WTHR SURF LIGHT	CRASH COLL SVRTY	SPCL USE TRLR QTY OWNER V#	TYPE	MOVE FROM TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACT	EVENT	CAUSE

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SER# / INVEST / RD DPT / UNLOC?	S P E D	D M R A L C	J U G S	S I N V	W C H L	O D A K	DATE / DAY / TIME / LAT	CLASS / DIST / FROM / LONG	CITY STREET / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	SPCL USE / TRLR QTY / OWNER / V#	TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACT	EVENT	CAUSE
01165	N	N	N				03/10/2016	16	DUBARKO RD	INTER	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		00
N							6P			06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	22	M	OR-Y		011	000		10
N							45 23 22.76	-122 15 48.39	017200100S00															OR<25					
																02	NONE 0	STOP										
																	PRVTE	E -W								012		00
																	PSNGR CAR		01	DRVR	INJC	26	F	OR-Y		000	000		00
																								OR<25				
00533	Y	N	N		N	N	02/07/2014	16	DUBARKO RD	INTER	CROSS	N	N	SNOW	S-1STOP	01	NONE 0	STRGHT										01
NONE							FR	0	EAGLE CRK-SANDY HY	E		STOP SIGN	N	SNO	REAR		UNKN	E -W								000		00
N							4P			06	0		N	DAY	PDO		UNKNOWN		01	DRVR	NONE	00	Unk	UNK		047,026	000		01
N							45 23 22.76124	-122 15 48.3879599																UNK				
																02	NONE 0	STOP										
																	PRVTE	E -W								011		00
																	PSNGR CAR		01	DRVR	NONE	38	F	OR-Y		000	000		00
																								OR<25				
00556	N	N	N				02/07/2014	16	DUBARKO RD	INTER	CROSS	N	N	SNOW	S-1STOP	01	NONE 0	STRGHT									124	10
NONE							FR	0	EAGLE CRK-SANDY HY	E		STOP SIGN	N	SNO	REAR		PRVTE	E -W								001	124	00
N							1P			06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	21	F	OR-Y		026	000		10
N							45 23 22.76124	-122 15 48.3879599																OR<25				
																02	NONE 0	STOP										
																	PRVTE	E -W								011		00
																	PSNGR CAR		01	DRVR	NONE	19	M	OR-Y		000	000		00
																								OR<25				
																03	NONE 0	STOP										
																	UNKN	E -W								011		00
																	PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000		00
																								UNK				
00578	N	N	N				02/07/2014	16	DUBARKO RD	INTER	CROSS	N	N	SNOW	S-1STOP	01	NONE 0	STRGHT									124	07
NONE							FR	0	EAGLE CRK-SANDY HY	E		STOP SIGN	N	ICE	REAR		PRVTE	E -W								000	124	00
N							4P			06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	36	M	OR-Y		026	000		07
N							45 23 22.76124	-122 15 48.3879599																OR<25				
																02	NONE 0	STOP										
																	PRVTE	E -W								011		00
																	PSNGR CAR		01	DRVR	NONE	45	M	OR-Y		000	000		00
																								OR<25				
03026	N	N	N				07/27/2015	16	DUBARKO RD	INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT										07,29
CITY							MO		EAGLE CRK-SANDY HY	SW		NONE	N	DRY	REAR		PRVTE	SW-NE								000		00
N							8P			06	0		N	DUSK	INJ		PSNGR CAR		01	DRVR	INJC	19	M	OR-Y		043,026	000		07,29
N							45 23 22.76	-122 15 48.39	017200100S00															OR<25				

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SER# / INVEST / RD DPT / UNLOC?	S P E D	D A L C	M R G S	J N V	S H L	W R K	DATE / DAY / TIME / LAT	CLASS / DIST / FROM / LONG	CITY STREET / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACT	EVENT	CAUSE
																02	NONE 0	STOP									012	00
																	PRVTE	SW-NE									012	00
																	PSNGR CAR		01	DRVR	INJC	36	M	OR-Y OR<25		000	000	00
01095	N	N	N	N	N		03/04/2016	16	DUBARKO RD	INTER	CROSS	N	N	CLD	S-1STOP	01	NONE 0	STRGHT										27,07,32
CITY							FR		EAGLE CRK-SANDY HY	SW		STOP SIGN	N	DRY	SS-O		PRVTE	NE-SW								000	00
N							4P			06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	30	M	OR-Y OR<25		016,043,052	010	27,07,32
N							45 23 22.76	-122 15 48.39	01720010OS00																			
																01	NONE 0	STRGHT										
																	PRVTE	NE-SW									000	00
																	PSNGR CAR		02	PSNG	NO<5	01	F			000	000	00
																02	NONE 0	STOP										
																	PRVTE	NE-SW									012	00
																	PSNGR CAR		01	DRVR	NONE	18	F	OR-Y OR<25		000	000	00
																03	NONE 0	STRGHT										
																	PRVTE	SW-NE									000	00
																	PSNGR CAR		01	DRVR	INJB	26	M	OR-Y OR<25		000	000	00
00763	N	N	N	N	N		02/17/2016	16	DUBARKO RD	INTER	CROSS	N	N	RAIN	S-1STOP	01	NONE 9	STRGHT										07
CITY							WE		EAGLE CRK-SANDY HY	SW		NONE	N	WET	REAR		N/A	S -N								000	00
N							5P			06	0		N	DLIT	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000	00
N							45 23 22.76	-122 15 48.39	01720010OS00															UNK				
																02	NONE 9	STOP										
																	N/A	S -N									012	00
																	PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000	00
00799	N	N	N	N	N		03/08/2013	16	DUBARKO RD	INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT										02
CITY							FR		EAGLE CRK-SANDY HY	CN		STOP SIGN	N	DRY	ANGL		PRVTE	N -S								000	00
N							8P			01	0		N	DUSK	PDO		PSNGR CAR		01	DRVR	NONE	25	M	OTH-Y OR<25		000	000	00
N							45 23 22.7623199	-122 15 48.387348	01720010OS00																			
																02	NONE 0	STRGHT										
																	PRVTE	E -W									015	00
																	PSNGR CAR		01	DRVR	NONE	34	M	OR-Y OR<25		028	027	02
01347	N	N	N				04/21/2013	16	DUBARKO RD	INTER	CROSS	N	N	CLD	ANGL-OTH	01	NONE 0	STRGHT										02
CITY							SU		EAGLE CRK-SANDY HY	CN		STOP SIGN	N	DRY	ANGL		PRVTE	W -E								015	00
N							12P			04	0		N	DAY	INJ		PSNGR CAR		01	DRVR	INJC	25	M	OR-Y OR<25		028	000	02
N							45 23 22.7623199	-122 15 48.387348	01720010OS00																			

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																01	NONE 0 PRVTE PSNGR CAR	STRGHT W -E	02	PSNG	INJC	24	F			015 000	00 00
																02	NONE 0 PRVTE PSNGR CAR	STRGHT S -N	01	DRVR	INJC	78	M	OR-Y OR<25		000 000	00 00
																02	NONE 0 PRVTE PSNGR CAR	STRGHT S -N	02	PSNG	INJC	85	F			000 000	00 00
02342	N	N	N				07/01/2013	16	DUBARKO RD	INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT									02
CITY							MO		EAGLE CRK-SANDY HY	CN		STOP SIGN	N	DRY	ANGL		PRVTE	W -E								015	00
N N							2P 45 23 22.7623199	-122 15 48.387348	017200100S00	04	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	18	F	OR-Y OR<25		028 000	02
																02	NONE 0 PRVTE PSNGR CAR	STRGHT S -N	01	DRVR	NONE	30	M	OTH-Y N-RES		000 000	00 00
04702	N	N	N	N	N		12/06/2013	16	DUBARKO RD	INTER	CROSS	N	N	CLD	O-1 L-TURN	01	NONE 0	STRGHT									02
CITY							FR		EAGLE CRK-SANDY HY	CN		YIELD	N	DRY	TURN		PRVTE	N -S								000	00
N N							4P 45 23 22.7623199	-122 15 48.387348	017200100S00	01	0		N	DUSK	INJ		PSNGR CAR		01	DRVR	NONE	39	F	OR-Y OR<25		000 000	00 00
																01	NONE 0 PRVTE PSNGR CAR	STRGHT N -S	02	PSNG	INJC	12	F			000 000	00 00
																02	NONE 0 PRVTE PSNGR CAR	TURN-L S -W	01	DRVR	INJC	67	M	OR-Y OR<25		000 000	00 02
00437	N	N	N				01/25/2014	16	DUBARKO RD	INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT									02
NONE							SA		EAGLE CRK-SANDY HY	CN		STOP SIGN	N	DRY	ANGL		PRVTE	N -S								000	00
N N							1P 45 23 22.76124	-122 15 48.3879599	017200100S00	03	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	36	F	OR-Y OR<25		000 000	00 00
																02	NONE 0 PRVTE PSNGR CAR	STRGHT W -E	01	DRVR	NONE	17	M	OR-Y OR<25		028 000	00 02

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SER# / INVEST / RD DPT / UNLOC?	S P E D	A L C	D M R G S	J N V	S H L	W R K	DATE / DAY / TIME / LAT	CLASS / DIST / FROM / LONG	CITY STREET / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	SPCL USE / TRLR QTY / OWNER / V# TYPE	MOVE / FROM / TO	P# TYPE	PRTC / INJ / SVRTY	A G E	S E X	LICNS / PED LOC	ERROR	ACT EVENT	CAUSE
00972	N	N	N	N	Y		03/09/2014	16	DUBARKO RD	INTER	CROSS	N	N	CLD	ANGL-OTH	01 NONE 0	STRGHT								03
CITY				SU					EAGLE CRK-SANDY HY	CN		STOP SIGN	N	WET	TURN	PRVTE	W -E							000	00
N				3P						03	0		N	DAY	INJ	PSNGR CAR		01 DRVR	NONE	53	F	OR-Y	021	000	03
N				45 23 22.76124				-122 15 48.3879599	017200100S00													OR<25			
																01 NONE 0	STRGHT								
																PRVTE	W -E							000	00
																PSNGR CAR		02 PSNG	INJC	57	F		000	000	00
																02 NONE 0	STRGHT								
																PRVTE	N -S							000	00
																PSNGR CAR		01 DRVR	NONE	61	F	OR-Y	000	000	00
																						OR<25			
04884	N	N	N	N	N		11/18/2014	16	DUBARKO RD	INTER	CROSS	N	N	CLR	ANGL-OTH	01 NONE 0	STRGHT								02
CITY				TU					EAGLE CRK-SANDY HY	CN		STOP SIGN	N	DRY	ANGL	PRVTE	N -S							000	00
N				5P						01	0		N	DLIT	PDO	PSNGR CAR		01 DRVR	NONE	21	M	OR-Y	000	000	00
N				45 23 22.76				-122 15 48.39	017200100S00													OR<25			
																02 NONE 0	STRGHT								
																PRVTE	E -W							015	00
																PSNGR CAR		01 DRVR	NONE	38	M	OR-Y	028	000	02
																						OR<25			
04952	N	N	N	N	N		11/22/2015	16	DUBARKO RD	INTER	CROSS	N	N	CLD	ANGL-OTH	01 NONE 0	TURN-L								03
CITY				SU					EAGLE CRK-SANDY HY	CN		STOP SIGN	N	DRY	TURN	PRVTE	W -NE							000	00
N				4P						03	0		N	DAY	INJ	PSNGR CAR		01 DRVR	INJB	53	F	OTH-Y	021	000	03
N				45 23 22.76				-122 15 48.39	017200100S00													OR<25			
																02 NONE 0	STRGHT								
																PRVTE	NE-SW							000	00
																PSNGR CAR		01 DRVR	NONE	19	F	OR-Y	000	000	00
																						OR>25			
																03 NONE 0	STRGHT								
																PRVTE	SW-NE							000	00
																PSNGR CAR		01 DRVR	NONE	41	M	OR-Y	000	000	00
																						OR<25			
05614	N	N	N	N	N		12/25/2015	16	DUBARKO RD	INTER	CROSS	N	N	CLD	ANGL-OTH	01 NONE 0	STRGHT								02
CITY				FR					EAGLE CRK-SANDY HY	CN		STOP SIGN	N	WET	ANGL	PRVTE	N -S							000	00
N				6P						01	0		N	DLIT	INJ	PSNGR CAR		01 DRVR	NONE	58	M	OR-Y	000	000	00
N				45 23 22.76				-122 15 48.39	017200100S00													OR>25			
																02 NONE 0	STRGHT								
																PRVTE	E -W							015	00
																PSNGR CAR		01 DRVR	INJC	53	M	OR-Y	028	000	02
																						OR<25			

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02172	N	N N				06/05/2015	16	DUBARKO RD	INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT										02
NONE						FR		EAGLE CRK-SANDY HY	CN		STOP SIGN	N	DRY	TURN		PRVTE	W -E								015	00
N						7A			04	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	24	M	OR-Y		028	000	02
N						45 23 22.76	-122 15 48.39	017200100S00															OR<25				
															02	NONE 0	TURN-L										
																PRVTE	SW-W								000	00
																PSNGR CAR		01	DRVR	NONE	29	M	OR-Y		000	000	00
																							OR<25				
03589	N	N N		N	N	08/05/2016	16	DUBARKO RD	INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT										02
CITY						FR		EAGLE CRK-SANDY HY	CN		STOP SIGN	N	DRY	ANGL		PRVTE	E -W								015	00
N						6P			01	0		N	DAY	INJ		PSNGR CAR		01	DRVR	INJC	77	M	OTH-Y		028	000	02
N						45 23 22.76	-122 15 48.39	017200100S00															N-RES				
															02	NONE 0	STRGHT										
																PRVTE	N -S								000	00
																PSNGR CAR		01	DRVR	NONE	40	M	OR-Y		000	000	00
																							OR<25				
03967	N	N N		N	N	08/30/2016	16	DUBARKO RD	INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT										02
CITY						TU		EAGLE CRK-SANDY HY	CN		STOP SIGN	N	DRY	ANGL		PRVTE	W -E								015	00
N						12P			04	0		N	DAY	INJ		PSNGR CAR		01	DRVR	INJC	61	F	OTH-Y		028	000	02
N						45 23 22.76	-122 15 48.39	017200100S00															N-RES				
															01	NONE 0	STRGHT										
																PRVTE	W -E								015	00
																PSNGR CAR		02	PSNG	INJC	06	F			000	000	00
															02	NONE 0	STRGHT										
																PRVTE	S -N								000	00
																PSNGR CAR		01	DRVR	INJB	53	F	OR-Y		000	000	00
																							OR<25				
02427	N	N N				05/31/2016	16	DUBARKO RD	INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 9	STRGHT										03,32
CITY						TU		EAGLE CRK-SANDY HY	CN		STOP SIGN	N	UNK	ANGL		N/A	W -E								000	00
N						11A			03	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000	00
N						45 23 22.76	-122 15 48.39	017200100S00															UNK				
															02	NONE 9	STRGHT										
																N/A	N -S								000	00
																PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000	00
																							UNK				
02031	N	N N		N	N	05/06/2016	16	DUBARKO RD	INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 9	STRGHT										02
CITY						FR		EAGLE CRK-SANDY HY	CN		STOP SIGN	N	DRY	ANGL		N/A	N -S								000	00
N						4P			01	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000	00
N						45 23 22.76	-122 15 48.39	017200100S00															UNK				

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																02	NONE 9	STRGHT										
																	N/A	E -W									000		00
																	PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000		00
																								UNK					
00805	N	N	N	N	N		03/01/2017	16	DUBARKO RD	INTER	CROSS	N	N	CLD	ANGL-OTH	01	NONE 0	STRGHT										082,013	02
CITY							WE		EAGLE CRK-SANDY HY	CN		STOP SIGN	N	DRY	ANGL		PRVTE	W -E									015		00
N							3P			04	0		N	DAY	INJ		PSNGR CAR		01	DRVR	INJC	17	F	OR-Y		028	000	082	02
N							45 23 22.76	-122 15 48.39	017200100S00															OR<25					
																02	NONE 0	STRGHT										
																	PRVTE	S -N									000	013	00
																	PSNGR CAR		01	DRVR	INJC	43	M	OR-Y		000	000		00
																								OR<25					
																03	NONE 0	STOP										
																	PRVTE	E -W									022		00
																	PSNGR CAR		01	DRVR	INJB	27	F	OR-Y		000	000		00
																								OR<25					
00846	N	N	N	N	N		03/04/2017	16	DUBARKO RD	INTER	CROSS	N	N	RAIN	ANGL-OTH	01	NONE 0	STRGHT											02
CITY							SA		EAGLE CRK-SANDY HY	CN		STOP SIGN	N	WET	ANGL		PRVTE	W -E									015		00
N							6P			04	0		N	DLIT	INJ		PSNGR CAR		01	DRVR	NONE	21	M	OR-Y		028	000		02
N							45 23 22.76	-122 15 48.39	017200100S00															OR<25					
																02	NONE 0	STRGHT										
																	PRVTE	N -S									000		00
																	PSNGR CAR		01	DRVR	INJC	21	F	OR-Y		000	000		00
																								OR<25					
02225	N	N	N				06/07/2017	16	DUBARKO RD	INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT											02
CITY							WE		EAGLE CRK-SANDY HY	CN		STOP SIGN	N	DRY	ANGL		PRVTE	S -N									000		00
N							4P			04	0		N	DAY	INJ		PSNGR CAR		01	DRVR	INJB	40	M	OR-Y		000	000		00
N							45 23 22.76	-122 15 48.39	017200100S00															OR<25					
																02	NONE 0	STRGHT										
																	PRVTE	W -E									015		00
																	PSNGR CAR		01	DRVR	INJC	38	M	OR-Y		028	000		02
																								OR<25					
02958	N	N	N	N	N		07/21/2017	16	DUBARKO RD	INTER	CROSS	N	N	CLR	O-1 L-TURN	01	NONE 0	TURN-L											02
CITY							FR		EAGLE CRK-SANDY HY	CN		STOP SIGN	N	DRY	TURN		PRVTE	S -W									000		00
N							8P			01	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	28	M	OR-Y		028	000		02
N							45 23 22.76	-122 15 48.39	017200100S00															OR<25					
																02	NONE 0	STRGHT										
																	PRVTE	N -S									000		00
																	PSNGR CAR		01	DRVR	INJB	29	F	OR-Y		000	000		00
																								OR<25					

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.

SER# / INVEST / RD DPT / UNLOC?	S P E D	A L C	D R G S	M J U N V	S I H L	W C O R K	DATE / DAY / TIME / LAT	CLASS / DIST / FROM / LONG	CITY STREET / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X	LICNS RES	PED LOC	ERROR	ACT EVENT	CAUSE
00647	N	N	N	N	N	N	02/18/2017	16	DUBARKO RD	INTER	CROSS	N	N	RAIN	ANGL-OTH	01	NONE 9	STRGHT									03
CITY			SA						EAGLE CRK-SANDY HY	CN		STOP SIGN	N	WET	ANGL		N/A	W -E								000	00
N			7P							03	0		N	DLIT	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000	00
N			45 23 22.76					-122 15 48.39	017200100S00															UNK				
																02	NONE 9	STRGHT									
																	N/A	N -S								000	00
																	PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000	00
																								UNK				
03467	N	N	N	N	N	N	08/23/2017	16	DUBARKO RD	INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 9	STRGHT									02
CITY			WE						EAGLE CRK-SANDY HY	CN		STOP SIGN	N	DRY	ANGL		N/A	NE-SW								000	00
N			8A							01	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000	00
N			45 23 22.76					-122 15 48.39	017200100S00															UNK				
																02	NONE 9	STRGHT									
																	N/A	E -W								015	00
																	PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000	00
																								UNK				

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirement, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

CITY OF SANDY, CLACKAMAS COUNTY **DUBARKO RD at LANGENSAND RD, City of Sandy, Clackamas County, 01/01/2013 to 12/31/2017**

1 - 1 of 1 Crash records shown.

SER# / INVEST / RD DPT / UNLOC?	S P E D C	A L S	R U G N	J I N V	S C H L	W O R K	DATE / DAY / TIME / LAT	CLASS / DIST / FROM / LONG	CITY STREET / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE (MEDIAN) / LEGS (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	SPCL USE / TRLR QTY / OWNER / V# TYPE	MOVE / FROM / TO	P# TYPE	PRTC / INJ / SVRTY	A G E	S E X	LICNS / PED LOC	ERROR	ACT / EVENT	CAUSE
03066	N	N	N				06/09/2015	16	DUBARKO RD	INTER	CROSS	N	N	CLR	ANGL-OTH	01 NONE 0	STRGHT							083	02
NONE							TU	0	LANGENSAND RD	CN		STOP SIGN	N	DRY	ANGL	PRVTE	N -S							000	00
N							12P			03	0		N	DAY	PDO	PSNGR CAR		01 DRVR	NONE	23	M	OR-Y		000	00
N							45 23 23.89 -122 14 59.94																OR<25			
																02 NONE 0	STRGHT								
																PRVTE	W -E							015	00
																PSNGR CAR		01 DRVR	NONE	16	F	OR-Y	028	000 083	02
																						OR<25			

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: 2022 Background Plus Site Trips
Number of Major Street Lanes: 2 PM Peak Hour Volume 2243 (sum of both approaches)
Number of Minor Street Lanes 1 PM Peak Hour Volume 49 (highest-volume approach)[a]
Posted or 85th percentile speed > 40 mph: Yes
Isolated Population Less than 10,000: No

Warrant 1, Eight-Hour Vehicular Volume

Condition A - Minimum Vehicular Volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on minor street (total of both approaches)			
Major Street	Minor Street	100%	80%	70%	56%	100%	80%	70%	56%
1	1	500	400	350	280	150	120	105	84
2 or more	1	600	480	420	336	150	120	105	84
2 or more	2 or more	600	480	420	336	200	160	140	112
1	2 or more	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on minor street (total of both approaches)			
Major Street	Minor Street	100%	80%	70%	56%	100%	80%	70%	56%
1	1	750	600	525	420	75	60	53	42
2 or more	1	900	720	630	504	75	60	53	42
2 or more	2 or more	900	720	630	504	100	80	70	56
1	2 or more	750	600	525	420	100	80	70	56

Warrant Anaylsis Calculations	8th Highest Hour[b]	Minimum Volume	Warrant Satisfied?
Condition A - Minimum Vehicular Volume			
Major Street Volume	1267	420	
Minor Street Volume	28	105	**No**
Condition B - Interruption of Continuous Traffic			
Major Street Volume	1267	630	
Minor Street Volume	28	53	**No**
Combination Warrant[c]			
Major Street Volume	1267	504	
Minor Street Volume	28	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: 2022 Background Plus Site Trips
Number of Major Street Lanes: 2 PM Peak Hour Volume 2243 (sum of both approaches)
Number of Minor Street Lanes 1 PM Peak Hour Volume 13 (highest-volume approach)[a]
Posted or 85th percentile speed > 40 mph: Yes
Isolated Population Less than 10,000: No

Warrant 1, Eight-Hour Vehicular Volume

Condition A - Minimum Vehicular Volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on minor street (total of both approaches)			
Major Street	Minor Street	100%	80%	70%	56%	100%	80%	70%	56%
1	1	500	400	350	280	150	120	105	84
2 or more	1	600	480	420	336	150	120	105	84
2 or more	2 or more	600	480	420	336	200	160	140	112
1	2 or more	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on minor street (total of both approaches)			
Major Street	Minor Street	100%	80%	70%	56%	100%	80%	70%	56%
1	1	750	600	525	420	75	60	53	42
2 or more	1	900	720	630	504	75	60	53	42
2 or more	2 or more	900	720	630	504	100	80	70	56
1	2 or more	750	600	525	420	100	80	70	56

Warrant Anaylsis Calculations	8th Highest Hour[b]	Minimum Volume	Warrant Satisfied?
Condition A - Minimum Vehicular Volume			
Major Street Volume	1267	420	
Minor Street Volume	7	105	**No**
Condition B - Interruption of Continuous Traffic			
Major Street Volume	1267	630	
Minor Street Volume	7	53	**No**
Combination Warrant[c]			
Major Street Volume	1267	504	
Minor Street Volume	7	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: 2022 Background Plus Site Trips (30th-Highest Hour)
Number of Major Street Lanes: 1 PM Peak Hour Volume 644 (sum of both approaches)
Number of Minor Street Lanes 1 PM Peak Hour Volume 199 (highest-volume approach)[a]
Posted or 85th percentile speed > 40 mph: Yes
Isolated Population Less than 10,000: No

Warrant 1, Eight-Hour Vehicular Volume

Condition A - Minimum Vehicular Volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on minor street (total of both approaches)			
Major Street	Minor Street	100%	80%	70%	56%	100%	80%	70%	56%
1	1	500	400	350	280	150	120	105	84
2 or more	1	600	480	420	336	150	120	105	84
2 or more	2 or more	600	480	420	336	200	160	140	112
1	2 or more	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on minor street (total of both approaches)			
Major Street	Minor Street	100%	80%	70%	56%	100%	80%	70%	56%
1	1	750	600	525	420	75	60	53	42
2 or more	1	900	720	630	504	75	60	53	42
2 or more	2 or more	900	720	630	504	100	80	70	56
1	2 or more	750	600	525	420	100	80	70	56

Warrant Anaylsis Calculations	8th Highest Hour[b]	Minimum Volume	Warrant Satisfied?
Condition A - Minimum Vehicular Volume			
Major Street Volume	364	350	
Minor Street Volume	112	105	**Yes**
Condition B - Interruption of Continuous Traffic			
Major Street Volume	364	525	
Minor Street Volume	112	53	**No**
Combination Warrant[c]			
Major Street Volume	364	420	
Minor Street Volume	112	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: 2022 Background Plus Site Trips (30th-Highest Hour, with RIRO at Hwy 26)
Number of Major Street Lanes: 1 PM Peak Hour Volume 771 (sum of both approaches)
Number of Minor Street Lanes 1 PM Peak Hour Volume 83 (highest-volume approach)[a]
Posted or 85th percentile speed > 40 mph: Yes
Isolated Population Less than 10,000: No

Warrant 1, Eight-Hour Vehicular Volume

Condition A - Minimum Vehicular Volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on minor street (total of both approaches)			
Major Street	Minor Street	100%	80%	70%	56%	100%	80%	70%	56%
1	1	500	400	350	280	150	120	105	84
2 or more	1	600	480	420	336	150	120	105	84
2 or more	2 or more	600	480	420	336	200	160	140	112
1	2 or more	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on minor street (total of both approaches)			
Major Street	Minor Street	100%	80%	70%	56%	100%	80%	70%	56%
1	1	750	600	525	420	75	60	53	42
2 or more	1	900	720	630	504	75	60	53	42
2 or more	2 or more	900	720	630	504	100	80	70	56
1	2 or more	750	600	525	420	100	80	70	56

Warrant Anaylsis Calculations	8th Highest Hour[b]	Minimum Volume	Warrant Satisfied?
Condition A - Minimum Vehicular Volume			
Major Street Volume	436	350	
Minor Street Volume	47	105	**No**
Condition B - Interruption of Continuous Traffic			
Major Street Volume	436	525	
Minor Street Volume	47	53	**No**
Combination Warrant[c]			
Major Street Volume	436	420	
Minor Street Volume	47	84	**No**

[a] Minor-Street right turn volumes are reduced to account for the impact of right-turns on red.
[b] Eighth-highest hour volumes are calculated as 5.65 percent of the expected daily traffic volume.
[c] This warrant should be used only after adequate trial of other alternatives has failed to solve traffic problems.

Preliminary Traffic Signal Warrant Analysis

Project Name: Dubarko Road Development
Intersection: Dubarko Road at Langensand Road
Scenario: 2021 Background Plus Site Trips
Number of Major Street Lanes: 1 PM Peak Hour Volume 306 (sum of both approaches)
Number of Minor Street Lanes 1 PM Peak Hour Volume 74 (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 Anaylsis Calculations	8th Highest Hour[b]	Minimum Volume	Warrant Satisfied?
Condition A - Minimum Vehicular Volume			
Major Street Volume	173	500	
Minor Street Volume	42	150	**No**
Condition B - Interruption of Continuous Traffic			
Major Street Volume	173	750	
Minor Street Volume	42	75	**No**
Combination Warrant[c]			
Major Street Volume	173	600	
Minor Street Volume	42	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.

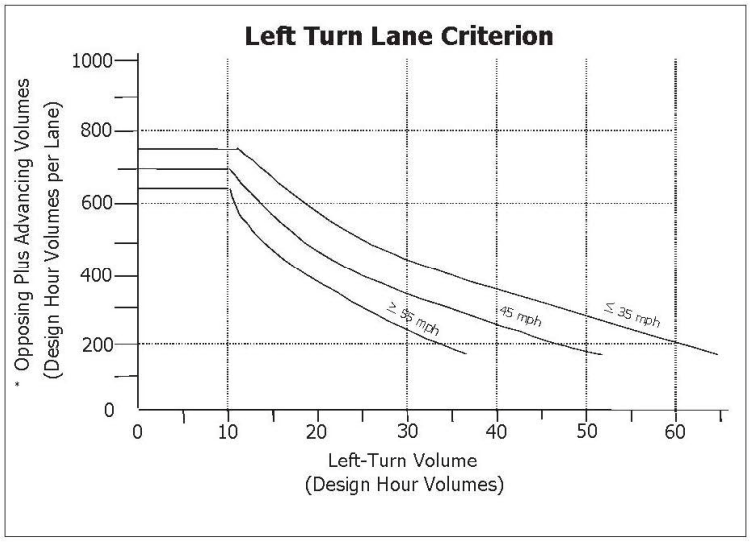
Left-Turn Lane Warrant Analysis (ODOT Methodology)

Project Name: Bull Run Terrace Subdivision
Approach: Highway 26 WB at Dubarko Road
Scenario: 2022 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:	1000	1100
Opposing Volume for Design Hour:	723	1146
Design Hour Volume Per Lane:	861.5	1123
Number of Left Turns per Hour:	57	118
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: 2022 Background Plus Site Trips

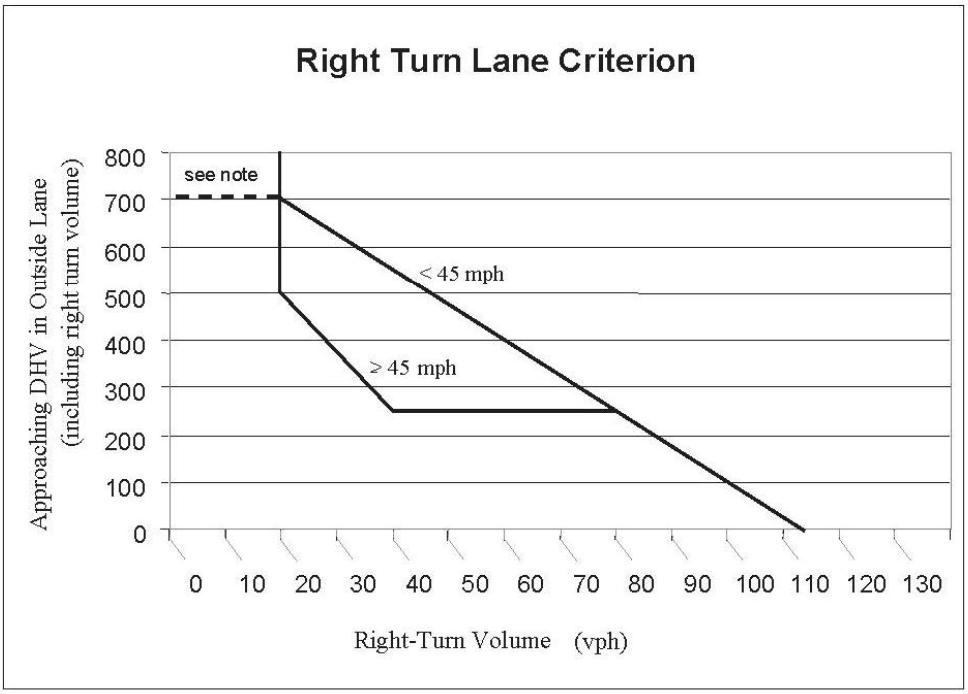
Major-Street Design Speed: 55 mph

	AM Volume	PM Volume
Number of Right Turns per Hour:	12	38
Approaching DVH in Outside Lane:	351	542
Calculated Turn Volume Threshold:	32	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.

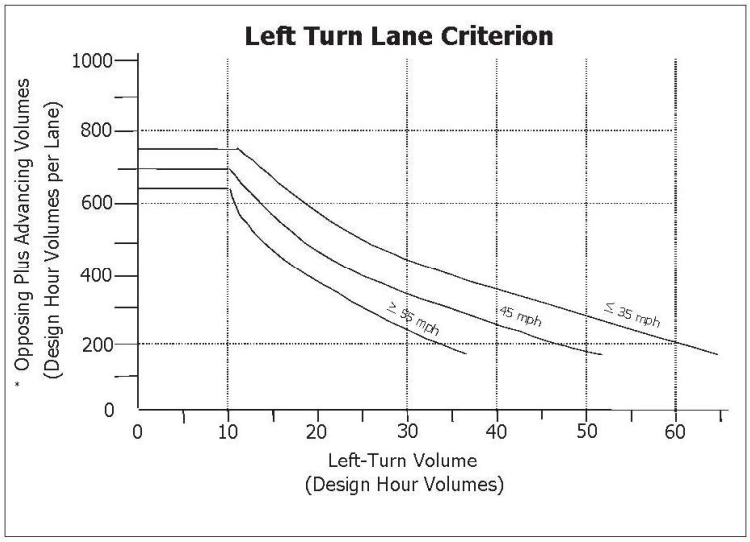
Left-Turn Lane Warrant Analysis (ODOT Methodology)

Project Name: Bull Run Terrace Subdivision
Approach: Highway 211 NB at Dubarko Road
Scenario: 2022 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:	354	408
Opposing Volume for Design Hour:	111	236
Design Hour Volume Per Lane:	465	644
Number of Left Turns per Hour:	45	61
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: 2019 Existing Conditions

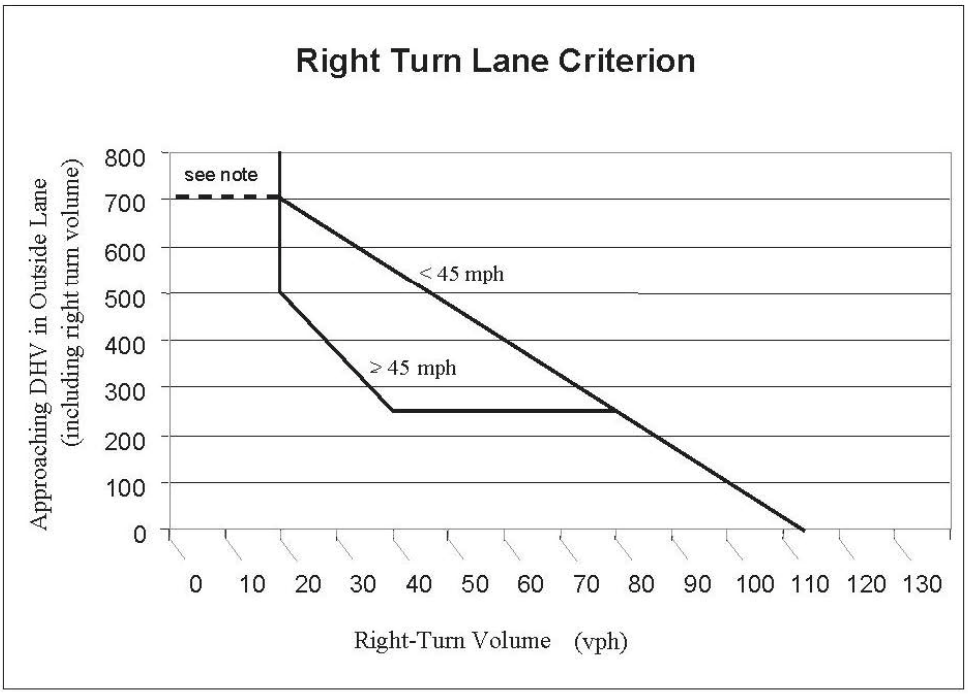
Major-Street Design Speed: 45 mph

	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.

Right-Turn Lane Warrant Analysis (ODOT Methodology)

Project Name: Bull Run Terrace Subdivision
Approach: Dubarko Road Westbound and Langensand Road
Scenario: 2022 Background Plus Site Trips (RIRO)

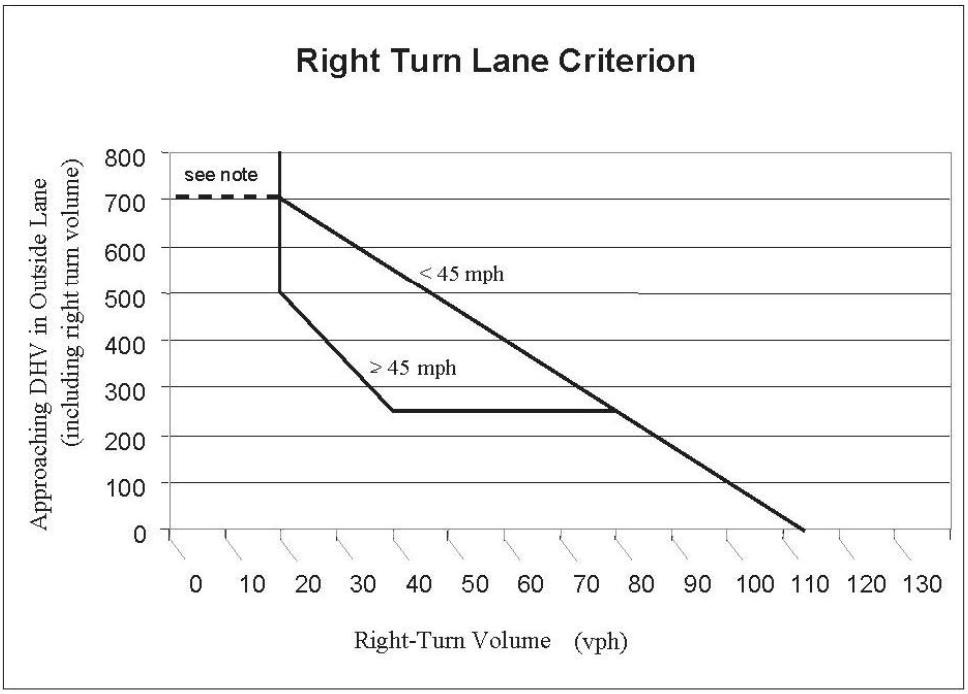
Major-Street Design Speed: 25 mph

	AM Volume	PM Volume
Number of Right Turns per Hour:	61	29
Approaching DVH in Outside Lane:	102	42
Calculated Turn Volume Threshold:	99	107
Right Turn Volume Exceeds Threshold?	**NO**	**NO**

Criterion 1: Vehicular Volume

The vehicular volume criterion is intended for application where the volume of intersecting traffic is the principal reason for considering installation of a right turn lane. The vehicular volume criteria are determined using the curve in Exhibit 7-2.

Exhibit 7-2 Right Turn Lane Criterion



Note: If there is no right turn lane, a shoulder needs to be provided. If this intersection is in a rural area and is a connection to a public street, a right turn lane is needed.

Intersection	
Intersection Delay, s/veh	13.7
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	9	34	132	43	34	45	191	118	4	107	2
Future Vol, veh/h	8	9	34	132	43	34	45	191	118	4	107	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	9	10	38	147	48	38	50	212	131	4	119	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	9.1	12.1	16.4	10.3
HCM LOS	A	B	C	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	13%	47%	0%	75%	0%	4%	0%
Vol Thru, %	54%	53%	0%	25%	0%	96%	0%
Vol Right, %	33%	0%	100%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	354	17	34	175	34	111	2
LT Vol	45	8	0	132	0	4	0
Through Vol	191	9	0	43	0	107	0
RT Vol	118	0	34	0	34	0	2
Lane Flow Rate	393	19	38	194	38	123	2
Geometry Grp	6	7	7	7	7	7	7
Degree of Util (X)	0.6	0.035	0.06	0.353	0.057	0.207	0.003
Departure Headway (Hd)	5.494	6.677	5.724	6.543	5.45	6.031	5.303
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	661	536	624	550	657	596	674
Service Time	3.494	4.423	3.469	4.279	3.186	3.766	3.038
HCM Lane V/C Ratio	0.595	0.035	0.061	0.353	0.058	0.206	0.003
HCM Control Delay	16.4	9.7	8.8	12.8	8.5	10.3	8.1
HCM Lane LOS	C	A	A	B	A	B	A
HCM 95th-tile Q	4	0.1	0.2	1.6	0.2	0.8	0

Intersection	
Intersection Delay, s/veh	18.2
Intersection LOS	C

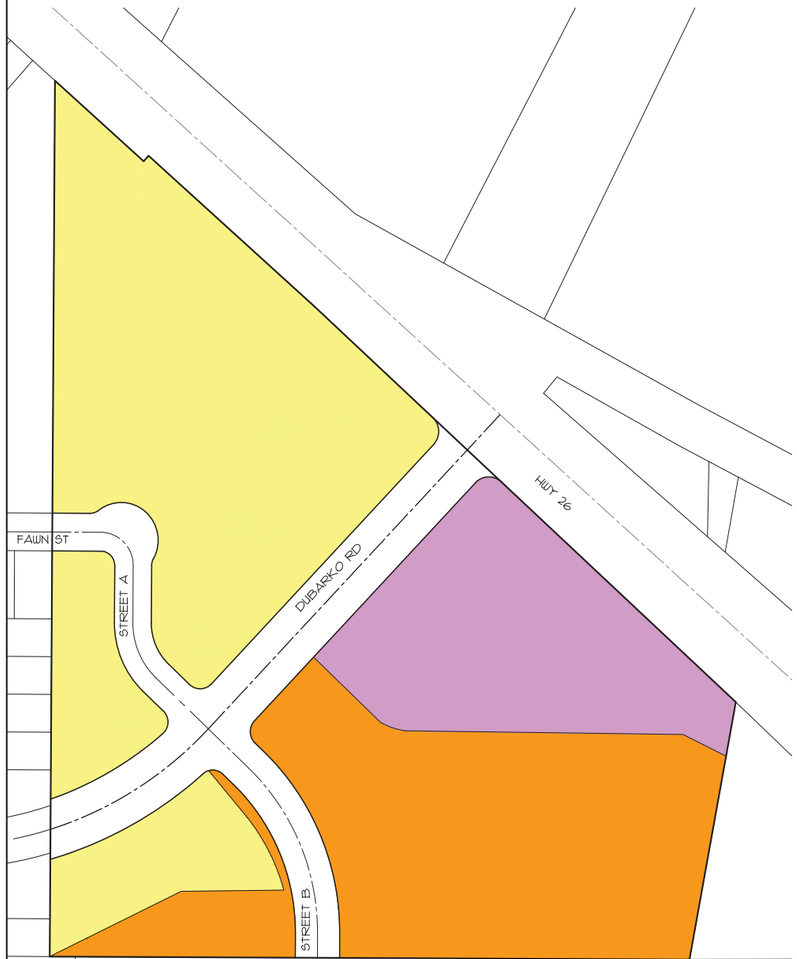
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	11	51	55	149	53	27	61	171	176	10	223	11
Future Vol, veh/h	11	51	55	149	53	27	61	171	176	10	223	11
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	1	1	1	5	5	5	2	2	2	5	5	5
Mvmt Flow	12	54	59	159	56	29	65	182	187	11	237	12
Number of Lanes	0	1	1	0	1	1	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	2
HCM Control Delay	10.7	15.1	24.1	14.7
HCM LOS	B	C	C	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	15%	18%	0%	74%	0%	4%	0%
Vol Thru, %	42%	82%	0%	26%	0%	96%	0%
Vol Right, %	43%	0%	100%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	408	62	55	202	27	233	11
LT Vol	61	11	0	149	0	10	0
Through Vol	171	51	0	53	0	223	0
RT Vol	176	0	55	0	27	0	11
Lane Flow Rate	434	66	59	215	29	248	12
Geometry Grp	6	7	7	7	7	7	7
Degree of Util (X)	0.731	0.136	0.108	0.443	0.051	0.46	0.019
Departure Headway (Hd)	6.176	7.426	6.615	7.428	6.333	6.681	5.945
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	590	484	544	488	568	540	604
Service Time	4.176	5.148	4.337	5.139	4.044	4.396	3.66
HCM Lane V/C Ratio	0.736	0.136	0.108	0.441	0.051	0.459	0.02
HCM Control Delay	24.1	11.3	10.1	15.9	9.4	15	8.8
HCM Lane LOS	C	B	B	C	A	B	A
HCM 95th-tile Q	6.2	0.5	0.4	2.2	0.2	2.4	0.1

EXISTING NET ZONING AREA

TOTAL SITE AREA	= 693,057 SF = 15.910 ACRES
R-1 SINGLE FAMILY	= 288,735 SF = 6.628 ACRES
R-2 MULTI-FAMILY	= 193,384 SF = 4.439 ACRES
C-3 COMMERCIAL	= 113,733 SF = 2.611 ACRES
PUBLIC ROW	= 97,205 SF = 2.232 ACRES



EXISTING ZONING

SCALE : 1" = 80'

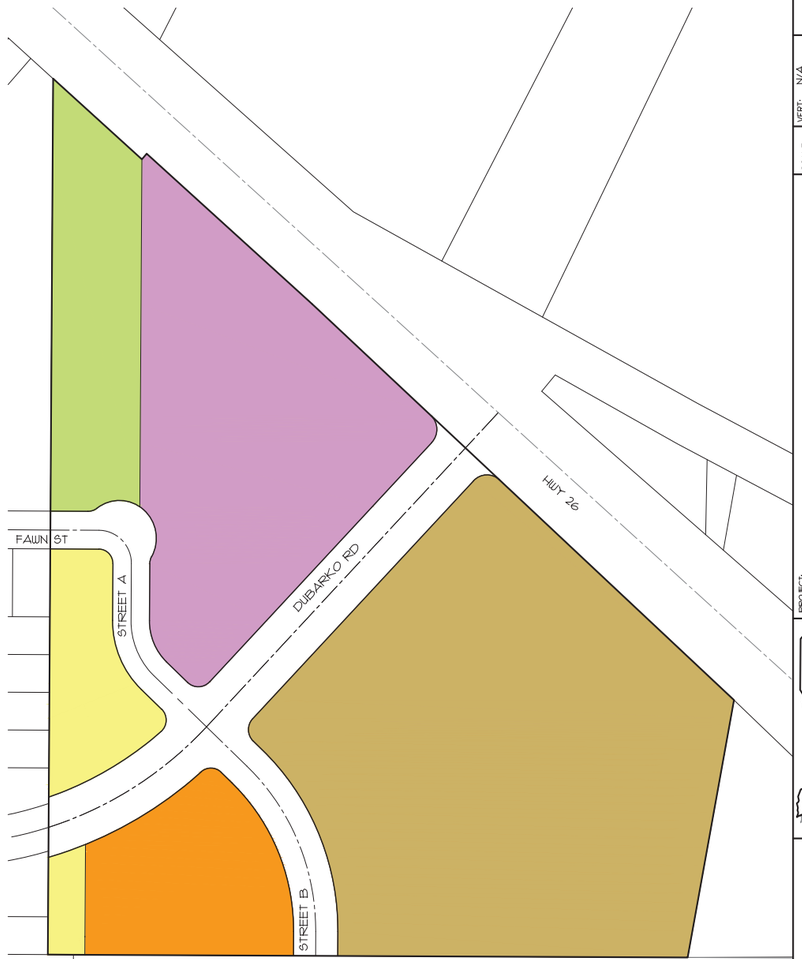
0' 40' 80' 160'

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	= 693,057 SF = 15.910 ACRES
PARKS AND OPEN SPACE	= 62,095 SF = 1.426 ACRES
R-1 SINGLE FAMILY	= 39,466 SF = 0.906 ACRES
R-2 MULTI-FAMILY	= 53,728 SF = 1.233 ACRES
R-3 MULTI-FAMILY	= 283,334 SF = 6.504 ACRES
C-3 COMMERCIAL	= 157,229 SF = 3.609 ACRES
PUBLIC ROW	= 97,205 SF = 2.232 ACRES



PROPOSED ZONING

SHEET 1 OF 1

DATE	NO.	REVISION	BY
-	-	-	-

DESIGNED: CTH
DRAWN: CTH
CHECKED: RLM
APPROVED: RLM

REGISTERED PROFESSIONAL ENGINEER
OREGON
RAY L. MOORE
RENEWAL DATE: 12/31/2020

SCALE VERT: N/A HORIZ: 1" = 80'
DATE: 07/26/2018
FILE:19-035-Planning.dwg

LEGAL		
SECTION	TWP.	RANGE
18	2S	5E

PROJECT: **BULL RUN TERRACE SUBDIVISION**

NET ZONING AREA EXHIBIT

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

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

DATE OF PLOT 09/18/2020

CLIENT: ROLL TIDE PROPERTIES CORPORATION
PO BOX 703
CORNELIUS, OR 97113

Agency Comments:

Click the exhibit to jump to the applicable page
(Note: links not operative in full agenda packet view)

S. City Engineer (February 20, 2020)
T. Sandy Fire District No. 72 (February 25, 2020)
U. PGE (February 25, 2020)
V. City of Sandy Transit (February 28, 2020)
W. City Transportation Engineer (February 28, 2020)
X. ODOT (March 20, 2020)
Y. City of Sandy Public Works (April 29, 2020)
Z. City Transportation Engineer (August 10, 2020)
AA. City Engineer (August 12, 2020)
BB. Sandy Fire District No. 72 (August 13, 2020)

EXHIBIT S

CURRAN-McLEOD, INC.
CONSULTING ENGINEERS
6655 S.W. HAMPTON STREET, SUITE 210
PORTLAND, OREGON 97223

February 20, 2020

Ms. Shelley Denison
City of Sandy
39250 Pioneer Blvd.
Sandy, OR 97055

RE: CITY OF SANDY
BULL RUN TERRACE SUBDIVISION
PRELIMINARY REVIEW (File No. 19- 050 CPA/ZC?SUB)

Dear Shelley:

We have reviewed the submittal preliminary plans and supporting documents for the above noted development and have the following comments:

1. All earthwork activities on the project site should be in compliance with the recommendations of the geotechnical report prepared by GeoPacific Engineering, Inc., dated August 16, 2005. The above noted report should be referenced on the construction plans and a copy provided to the Contractor's to ensure all grading activities have been performed in conformance with the contents of the report. The grading setbacks, drainage and terracing should comply with the Oregon Structural Specialty Code (OSSC) requirements and the geotechnical report recommendations and conclusions as indicated in the report.

2. The developer should retain appropriate professional geotechnical services for the grading activities. When the grading is completed, a final report should be submitted to the City by the Geotechnical Engineer stating that adequate inspections and testing have been performed and all work is in compliance with the above noted report and the IBC.

3. We have reviewed the preliminary stormwater calculations that was provided with this submittal. The calculations are found to meet the water quality/quantity criteria as stated in the City of Sandy Development Code (SDC) 13.18 Standards and the City of Portland Stormwater Management Manual (SWMM) Standards, that were adopted by reference into the Sandy Development Code. However, a detailed final report stamped by a licensed professional shall be submitted for review with the final construction plans.

4. The site frontage with Hwy 26 should be subject to the review process of Oregon Department of Transportation (ODOT) and Development Requirements. The traffic impact study prepared by ARD Engineering, dated December 18, 2019 recommends a

PHONE: (503) 684-3478 E-MAIL: cmi@curran-mcleod.com FAX: (503) 624-8247

northwest bound left-turn lane and a southeast bound right turn on Hwy 26 at the intersection with Dubarko Road.

5. Street A shall be constructed to local street standards (28-foot wide paved surface, curbs on both sides, 5-foot planter strips and 5-foot wide sidewalks) in compliance with the City of Sandy Transportation System Plan (TSP), figure 12. The proposed 50-foot right of way is adequate.

6. Street B shall be constructed to match the existing street width (36-foot wide paved surface, curbs on both sides, 5-foot planter strips and 6-foot wide sidewalks) in compliance with the City of Sandy Transportation System Plan (TSP), figure 12. The proposed 50-foot right of way is adequate.

7. Dubarko Road is classified by the City Transportation System Plan as a minor arterial. The proposed paved surface of 52 feet for the segment south of the intersection with Street A and Street B is adequate to include curbs on both sides, 5-foot planter strips, 6-foot wide sidewalks and 5-foot wide bike lanes.

8. Similarly, for Dubarko Road segment north of the intersection with Street A and Street B, the proposed paved surface of 54 feet is adequate. The left turn lane width should be increased to 12 feet and a median width be reduced to10 feet. The improvements shall include curbs on both sides, 5-foot planter strips, the sidewalks width should also be changed to 6-foot wide and 5-foot wide bike lanes. The traffic impact study prepared by ARD Engineering, dated December 18, 2019 restricts the turning movement from Hwy 26 to Dubarko Road to right-in only and for the turning movements from Dubarko Road to Hwy 26 to right-out only.

9. Sandy Development Code (SDC), section 17.84.50.H.5.b requires the intersection of all local streets with Dubarko Rd to have a minimum of 50 feet of straight tangent alignment perpendicular to the intersection. However, it is does not clearly state the "straight tangent" measurement limits. We suggest the "straight tangent" be measured from the face of the curb line and not at the intersection points.

10. The vertical design grade for landing at all the Tee intersections where controlled with "Stop" signs should be no greater than 8% for a minimum of 50 feet or two car lengths.

11. The intersection of Hwy 26 and Dubarko Rd should comply with the intersection sight distance standards. All other local street intersections should comply with the vision triangle standards.

12. The developer's engineer should provide a profile design for a minimum of 200 feet for Street B future extension past the project boundary to ensure future grades can be met.

13. All ADA ramps shall be designed, inspected by the design engineer and constructed by the contractor to meet the most current PROWAG requirements.

14. All public sanitary sewer, waterline mains to be a minimum of 8-inches in diameter and a minimum of 12-inches in diameter for storm drains and be extended to the plat boundaries where practical to provide future connections to adjoining properties.

15. The existing 8-inch waterline in Dubarko Rd, located between the south side of Hwy 26 and the easterly boundary line of Deer Pointe phase 1 Subdivision should be potholed and depth verified to assure acceptable cover is adequate from the new street grades.

We have no concerns about the proceedings with this project subject to the above stated comments.

Sincerely,

CURRAN-McLEOD, INC.

Hassan Ibrahim, PE

cc: Mr. Mike Walker, City of Sandy

SANDY OREGON

Shelley Denison <sdenison@ci.sandy.or.us>

Bull Run Terrace 19-050 CPA/ZC/SUB

2 messages

EXHIBIT T

Gary Boyles <fmboyles.sandyfire@gmail.com> Tue, Feb 25,
To: sdenison@ci.sandy.or.us, "p.schneider@sandyfire.org" <p.schneider@sandyfire.org>, d.patty3710@gmail.com

Hello Shelley,

It was nice to meet you today. As discussed, I am responding to you about the 7 lot subdivision that will extend Dubarko Rd and connect it to Hwy 26. Sandy Fire is supportive of the propose provided that fire department access and water supply requirements are in compliance with the adopted Oregon Fire Code. The only concern that Sandy Fire has is the proposed access from Hwy 26 and the unprotected left turns. I would be couriers what comments ODOT will have as well as other City staff.

If you have any questions for me, please let me know.
Gary Boyles
Fire Marshal

Sandy Fire District No. 72
PO Box 518
17460 SE Bruns Ave.
Sandy, Oregon 97055

Business line: 503-668-8093
Cell number: 503-891-7042

CONFIDENTIALITY NOTICE- This email, and any attachments may contain information that is privileged, confidential, or otherwise exempt from disclosure under applicable law. It is intende use of the person(s) names above. If you are not the intended recipient, you are hereby notified that any review, dissemination, distribution, or duplication of this communication is strictly proh not the intended recipient, please contact me by reply email and delete the message and any attachments from your system.

Shelley Denison <sdenison@ci.sandy.or.us> Wed, Feb 26, 2020 at 8:06 AM
To: Gary Boyles <fmboyles.sandyfire@gmail.com>
Cc: "p.schneider@sandyfire.org" <p.schneider@sandyfire.org>, d.patty3710@gmail.com

Thanks Gary!
[Quoted text hidden]
--
Shelley Denison
Associate Planner

City of Sandy
Development Services Department
39250 Pioneer Blvd
Sandy, OR 97055
503-783-2587
sdenison@ci.sandy.or.us

Meadow Ave
Buck St
Antler Ave
Fawn St
SE Vista Loop Dr
Mt Hood Hwy
SE 412th Ave
Meadow Ave & Dubarko Rd
17 min drive - home
Dubarko Rd
U.S. Hwy 26
M2369989
M2568399
1876
D2 5-18C
M2551400
742612
Van Fleet Ave
Gary St
Davis St
SE Langensand Rd
M1452244
M2781813
Buck St
Meadow Ave
M2616218 Priority
M1531932
Cassidy Ct
Becke Ct
Fawn St
Therese St
M2505418
M2467278
M1790096
M1776833
Dubarko Dr
Antler Ave
White Tail Ave
D2 5-19B
Timberline Ridge Park
Laurel St
M2182781
300ft
M2233629
EXHIBIT U

CITY OF SANDY, OREGON

Transit

EXHIBIT V

Memorandum

Date: February 28, 2020
To: Kelly O'Neill, Planning Director
Emily Meharg, Associate Planner
From: Andi Howell, Transit Director
Re: Transit Amenities
Bull Run Terrace Subdivision

The proposed development will require 2 concrete bus shelter pads and green benches (Fairweather model PL-3, powder-coated RAL6028). The required pad size is 7' x 9.5' and the amenities should be located on lot 1 and lot 5. Engineering specifications are available from the transit department.

If I can be of further assistance please contact me at 503-489-0925.

LOT 1
134,417 S.F.
105' CONSERVATION EASEMENT
EMERGENCY ACCESS
1' VNAR
8' PUE
TRACT B
1,062 S.F.
STREET A
DUBARKO RD
LOT 1
5,108 S.F.
LOT 2
5,191 S.F.
LOT 3
1,389 S.F.
LOT 4
6,611 S.F.
20' PRIVATE ACCESS EASEMENT
FULL ACCESS
BUILDING SETBACKS, TYP.
EMERGENCY ACCESS
LOT 5
52,667 S.F.
STREET B
8' PUE

EXHIBIT W

REPLINGER & ASSOCIATES LLC
TRANSPORTATION ENGINEERING

February 28, 2020

Ms. Shelley Denison
City of Sandy
39250 Pioneer Blvd.
Sandy, OR 97055

SUBJECT: REVIEW OF TRANSPORTATION IMPACT STUDY – BULL RUN TERRACE SUBDIVISION

Dear Shelley:

In response to your request, I have reviewed materials submitted in support of the Bull Run Terrace Subdivision on Dubarko Road in the east part of Sandy. The Transportation Impact Study (TIS), dated December 18, 2019 was prepared under the direction of Michael Ard, PE of Ard Engineering.

The site, with approximately 16 acres, is on the southwest side of US 26 and is bisected by Dubarko Road. TIS describes a proposal to subdivide the property and construct up to 220 apartments and 6 single-family homes. The development proposes extending Dubarko Road, currently a stub street, to connect with US 26 opposite SE Vista Loop (West). Rezoning of the project site is proposed.

Overall

I find the TIS addresses the city's requirements and provides an adequate basis to evaluate impacts of the proposed development.

Comments

1. ***Study Area.*** The study addresses the appropriate intersections. It includes analyses of:

   - US 26 at SE Ten Eyck Road;
   - US 26 at SE Langensand Road;
   - US 26 at SE Vista Loop Drive;
   - Highway 211 at Dubarko Road; and
   - Dubarko Road at SE Langensand Road.

2. ***Traffic Counts.*** The AM and PM peak hour traffic counts were conducted during March 2019. The engineer adjusted the traffic counts to account for seasonal variations. The

engineer used a combination approach to account for seasonal variation of recreational traffic and separately for commuter traffic on US 26. Volumes on Highway 211 were adjusted by a straight 8 percent. The methodology appears consistent with the procedures defined by the Oregon Department of Transportation (ODOT). The adjusted counts appear reasonable.

3. ***Trip Generation.*** The TIS uses trip generation for single-family dwellings and multi-family dwellings (land use code 210 and 220, respectively) from the Institute of Transportation Engineers' (ITE) *Trip Generation Manual*. The engineer calculates that the subdivision would produce 105 total AM peak hour trips; 125 total PM peak hour trips; and 1678 total daily trips. The calculation of trips generated by the development appears reasonable.

4. ***Trip Distribution.*** The TIS provided information about trip distribution from the site. The engineer assumed 65 percent of the traffic would travel to and from the northwest on US 26; 20 percent would travel to and from the southeast on US 26; and 15 percent would travel to and from the west on Dubarko Road. The trip distribution seems reasonable.

   The TIS also accounts for some diversion of existing traffic due to the new connection between US 26 and Dubarko Road. The engineer explains that some traffic from the east could use this route to get to the south part of the city and the reverse movement. Diversion predicted by the engineer are significant and contribute to traffic issues at the intersection of Highway 211 and Dubarko. This is discussed in #6 and #10, below.

5. ***Traffic Growth.*** The TIS uses a 1.93 percent annual increase for Highway 26 based on projected volumes at the west boundary of Sandy. For Highway 211, the TIS uses an annual growth rate of 3.16 percent. For other facilities it uses a 2.0 percent annual growth rate to account for background traffic growth. "The Views," a 166-unit development on the north side of US 26 on Vista Loop was also included as an in-process development. These assumptions account for future traffic and appear reasonable.

6. ***Analysis.*** Traffic volumes were calculated for the intersections cited in #1, above. Intersection level-of-service (LOS) and the volume-to-capacity (v/c) ratio were provided. The intersection of US 26 with SE Ten Eyck Road is signalized; the other intersections are stop-controlled. The analyses were conducted for existing 2019 conditions, 2021 background conditions, and 2021 with the development. Furthermore, the engineer evaluates traffic operations if the intersection of US 26 and Dubarko Road is restricted to, or operates as, right-in, right-out operation.

The engineer calculates that the signalized intersection of US 26 with Ten Eyck meets the v/c standards specified by ODOT under all scenarios. At the intersection of US 26 with Langensand Road, the v/c for both the mainline and minor street approaches are calculated to meet ODOT's v/c standard. However, long delays (the basis for LOS) are calculated to occur on the minor street approaches under existing and future conditions.

The intersection of Dubarko Road and Langensand Road is predicted to operate acceptably under all scenarios. The intersection will operate at LOS "B" or better, meeting city operational standards.

The engineer also predicts that the intersection of US 26 and Dubarko Road/Vista Loop (west) will meet ODOT's v/c standard, but that long delays will occur on the minor street approaches. This led the engineer to calculate what would happen if the Dubarko Road approach were restricted to right-in, right-out. Restricting this to right-in, right-out movements reduces approach volumes, reduces delays, and improves the v/c ratio for the intersection. Even if right-in, right-out restrictions were not in place, extraordinarily long delays encountered by motorists seeking to make left turns from northeast-bound Dubarko Road onto US 26 is likely to cause them to choose alternative routes.

The engineer calculated that the intersection of Highway 211 with Dubarko Road would also meet ODOT's v/c standards, but like the US 26 intersections, long delays can be expected on the minor street approaches. Traffic volumes on Dubarko Road at Highway 211 are influenced by whether the intersection of US 26 with Dubarko Road is restricted to right-in, right-out. Turn restrictions at US 26 that limit diversion of traffic to Dubarko Road reduce traffic volumes for the entire length of Dubarko Road. This also impacts when signal warrants may be met at the intersection of Highway 211 and Dubarko Road. The engineer also evaluated traffic operations at this intersection using a roundabout. He calculated operations would be improved but noted that topographic constraints – a steep grade - would complicate installation of a roundabout.

The engineer concluded that "the study intersections are projected to operate acceptably through year 2021 either with or without the addition of site trips from the proposed development and the diversion of through trips between US 26 and Highway 211 onto Dubarko Road." He also notes that, due to long delays, motorists will likely not choose to make left turns from northeast bound Dubarko Road to westbound US 26. I concur with the engineer's conclusions.

A queuing analysis was also undertaken to determine the appropriate queue storage for the intersection of US 26 and Dubarko Road. For left turns from northwest-bound US 26 to Dubarko Road, he calculated a 95th percentile queue length of 112 feet. For the

northeast-bound left-turn lane for Dubarko Road at US 26, he calculated a 95th percentile queue length of 129 feet.

7. ***Crash Information.*** The TIA provides information on crashes for the most recent available five-year period covering 2012 through 2016.

   At the intersection of US 26 and SE Ten Eyck Road, there were nine reported and a relatively low crash rate. At the intersection of US 26 and Langensand Road, there were four reported crashes and a low crash rate. At the intersection of Dubarko Road and Langensand Road, there was one reported crash. At US 26 and Vista Loop, there were no reported crashes.

   The intersection of Highway 211 and Dubarko Road has been a safety concern for years and has undergone safety improvements. During the five-year period, 28 crashes were reported. Crashes remain a problem following implementation of safety improvements that included realigning the Dubarko Road approaches and added striping on Highway 211. The engineer notes that the crash history indicates warrants are met for all-way stop control. He recommends ODOT consider installation of all-way stop control to address safety issues. I concur.

8. ***Site Plan and Access.*** The site plan provides for the extension of Dubarko Road. It will serve as the principal access to the development. Three intersections are proposed along Dubarko Road within the development. The proposed site plan includes a new four-leg intersection on Dubarko Road that will provide access both north and south of Dubarko Road. Additionally, the area on the northwest side of Dubarko Road will have a second access in the form of a connection to Fawn Street at the west side of the development. Homes on the southeast side of Dubarko Road will have a second access in the form of a T-intersection on Dubarko Road approximately 125 feet northeast of the four-leg intersection. The planned intersections within the project site on Dubarko Road provide distances of approximately 375 feet and 500 feet between the near sides of the intersections and the northeast-bound stop bar at US 26. These distances provide adequate separation to be appear appropriate.

9. ***Sight Distance.*** The engineer analyzed sight distance at the proposed intersection of US 26 and Dubarko Road. He concluded that sight distance exceeded 1200 feet in each direction, a distance appropriate for a 65-mph roadway. The engineer recommended no mitigation for sight distance. I concur.

10. ***Traffic Signal Warrants.*** The engineer conducted a thorough analysis of traffic signal warrants at the intersection of Highway 211 and Dubarko Road. He concluded that if a new intersection allowing all movements at US 26 and Dubarko Road is constructed; if

"The Views" development is constructed; and if this development is constructed, traffic signal warrants would be met for the 30th highest hour in 2021. With background traffic growth, traffic signal warrants would be met for average weekday conditions by 2024. If full movements are not provided at the intersection of US 26 and Dubarko Road, traffic volumes along the entire length of Dubarko Road are significantly reduced and traffic volume warrants at the intersection of Highway 211 and Dubarko Road are not met.

The engineer also analyzed warrants for all-way stop control at the intersection of Highway 211 and Dubarko Road. He concluded warrants for all-way stop control were met based on crash history and would be met for minimum traffic volumes with additional traffic diversion to Dubarko Road and from developments. He further analyzed traffic operations with all-way stop control and concluded that the intersection would operate at LOS "C" with a v/c of 0.71. He recommends that ODOT consider all-way stop control at the intersection.

11. ***Left-Turn Lane Warrants.*** The TIS indicates that left-turn lanes are provided on eastbound US 26 at Langensand Road. It indicates that the intersection of US 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 extension of Dubarko Road as proposed with this development.

    According to the engineer, 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. He further states that turn lane warrants would not be applicable and added lanes may not be needed if all-way stop control is installed at the intersection as recommended based on his safety analysis, or if a traffic signal is installed at the intersection.

    Turn lanes are not warranted at the intersection of Dubarko Road and Langensand Road. The engineer recommends consideration be given to reorienting the stop signs to favor Dubarko Road rather than Langensand Road if volumes increase on Dubarko Road.

12. ***Transportation Planning Rule Considerations.*** The TIS provides a detailed analysis of the individual requirements of the TPR. The engineer calculated trips based on the current zoning and on the proposed zoning. The subject property is currently zoned with a mix of 8.05 acres of R-1, 5.01 acres of R-2 and 2.84 acres of C-3 zoning. Under the proposed plan, the zoning will include, 1.95 acres will of POS (Parks & Open Space), 0.59 acres of R-1, and 11.00 acres of R-3. The remainder of the site area will be public right of way.

Under the current zoning, the engineer calculates full development would generate 98 AM peak hour trips; 184 PM peak hour trips; and 1788 weekday trips. Under the proposed zoning, the engineer calculates full development would generate 105 AM peak hour trips; 128 PM peak hour trips; and 1678 weekday trips. The difference in the AM peak hour is not significant; the PM and weekday trips are lower.

The engineer concludes that no changes to the city's street classification designation or standards are warranted by the rezoning and that the proposed rezoning does not have a significant effect on the transportation system and that mitigation is not necessary. He concludes the Transportation Planning Rule is satisfied. I concur with the engineer's conclusions.

13. Conclusions and Recommendations. The engineer concludes that the intersections will meet ODOT and city operational standards for the study area intersections either with or without the development.

With the completion of Dubarko Road and a new intersection with US 26, northeast-bound motorists on Dubarko Road can expect extraordinarily long delays. Motorists may choose alternative routes. The system has adequate capacity if the US 26/Dubarko Road intersection were restricted to, or effectively operated as right-in, right-out.

While most study area intersections are operating relatively safely, the intersection of Highway 211 and Dubarko Road suffers from a high number of crashes and a high crash rate. Recent safety improvements to not appear to have altered this trend. The proposed development and a new connection of Dubarko Road with US 26 can be expected to increase the traffic using the intersection of Highway 211 and Dubarko Road. The engineer recommends ODOT consider converting the intersection of Highway 211 and Dubarko Road to all-way stop control for safety reasons based on the historical data. He recommends no other mitigation to address safety issues.

The engineer concludes traffic signals will be warranted at the intersection of Highway 211 and Dubarko Road in the near future based on development and on the completion of Dubarko Road, which provides opportunities for rerouting of traffic that currently remains on US 26.

The engineer concludes that turn lanes will be warranted at the intersection of US 26 and Dubarko Road with the completion of Dubarko Road.

The engineer concludes that sight distance is adequate for the new intersection of US 26 and Dubarko Road.

The engineer concludes that the rezoning of the property will not produce a significant change in traffic volumes and will not have a significant effect on the transportation system. He concludes the Transportation Planning Rule is satisfied.

I concur with the engineer's conclusions.

Conclusion and Recommendations

Based on the information provided by the applicant, I find the TIS meets city requirements. The engineer used appropriate methods and documents his procedures and conclusions.

Because of its location, this development will implement a key project in the city's Transportation System Plan, namely Dubarko Road. Dubarko Road is classified as a minor arterial. Much of the systemwide impact of the development as describe in the TIS is a result of providing a new connection – a connection that will result in diversion of traffic from US 26 to Dubarko Road.

With its connection to US 26, Dubarko Road will become increasingly important to the transportation system. There are implications for operations at the intersection of Dubarko Road and Langensand Road and at the intersection of Highway 211 and Dubarko Road. For the former, it may be appropriate to reorient the stop signs to give priority to Dubarko Road when traffic volumes increase.

At the intersection of Highway 211 and Dubarko Road, the engineer recommends ODOT consider converting the intersection to all-way stop control as a possible safety measure to address historical crash issues. Traffic signal warrants may be met in the not-too-distant future due to traffic diversion on Dubarko Road and growth in the community.

It is important to recognize that trips generated by this development will have some impact on the transportation system, but that much of the predicted impact is from the implementation of Dubarko Road as specified in the city's Transportation System Plan. The construction of the missing segment of Dubarko Road adjacent to US 26 will also necessitate modification to the intersection of US 26/Vista Loop/Dubarko Road. The engineer has provided information about queue storage requirements and has warned of long delays for motorists on the minor street approaches.

It may be appropriate for this development to participate in some off-site improvements, such as intersection improvements at US 26 and Dubarko Road or Highway 211 and Dubarko Road. However, much of the impact described in the TIS is associated with the implementation of Dubarko Road, a project specified in the city's Transportation System Plan.

To the extent that the developer is required to implement projects or participate in projects involving facilities under the jurisdiction of ODOT, conditions of approval should be included requiring that the development comply with the requirements standards and procedures specified by ODOT. I recommend that that ODOT requirements and standards associated with frontage improvements where the development abuts US 26 be made conditions of approval for the development.

If you have any questions or need any further information concerning this review, please contact me at replinger-associates@comcast.net.

Sincerely,

John Replinger

John Replinger, PE
Principal

BullRunTerraceTIS022820

Oregon
Kate Brown, Governor

Department of Transportation
Region 1 Headquarters
123 NW Flanders Street
Portland, Oregon 97209
(503) 731.8200
FAX (503) 731.8259

EXHIBIT X

March 20, 2020 ODOT #10566

ODOT Response

Project Name: Bull Run Terrace	**Jurisdiction Case #:** 19-50 CPA/ZC/SUB
Jurisdiction: City of Sandy	**State Highway:** US 26 and OR 211
Site Address: No Situs: US 26 and Dubarko Road, Sandy, OR	

The site of this proposed land use action is for a 7 lot subdivision to be developed with single family detached dwellings and multi-family condos. Comp plan and zoning map amendment to change current designations from C3, R2 and R1 to a mix of R3, R1, parks, and open space. The development proposes to construct a new public road connection to US 26 at Dubarko Rd. US 26 and OR 211 are under ODOT jurisdiction. ODOT is currently working with the City of Sandy to transfer jurisdiction of OR 211 to the city. ODOT has permitting authority for these facilities and an interest in ensuring that this proposed land use is compatible with its safe and efficient operation. **Please direct the applicant to the District Contact indicated below to determine permit requirements and obtain application information.**

COMMENTS/FINDINGS

US 26 and Dubarko Rd Intersection and Access Control

It has been determined that the subject property's highway frontage is access controlled. ODOT has acquired and owns access rights along the subject property's frontage. The City of Sandy Transportation System Plan identifies a new public street connection of Dubarko Rd to US 26. Since Dubarko Road will be extended through the subject property to the highway as a public road and will provide additional properties access to the state highway through the local street system, the City will need to obtain a "Grant of Access" for a public approach. The City will need to document that the proposed road connection is identified in the Transportation System Plan and demonstrate a benefit to the highway. Grant of Access criteria and requirements can be found at OAR 731-051-2020 and Benefit to the Highway OAR 731-051-4030.

The Traffic Impact Study (TIS) prepared by Ard Engineering dated 12/18/19, shows that in 2021 the northeast bound approach on Dubarko Rd at US 26 is projected to operate with high delays. As mitigation, the study recommends that the new connection to the highway be restricted to right in/right out movements. ODOT is unlikely to support the restriction of turning movements at the intersection. Through the Grant of Access process, the City will be required to provide a 20 year traffic analysis which should recommend the intersection configuration at that time. The city will enter into an Intergovernmental Agreement to construct the project.

For information on the Grant of Access process, please contact Marcela Rodriguez, P.E. at 503-731-8494 or marcela.rodriguez@odot.state.or.us. *Note: It may take **6 months to a year** to process a Grant of Access.*

OR 211 and Dubarko Rd Intersection

The TIS submitted with the proposed development recommends that ODOT consider all way stop control to address safety issues and has indicated that traffic warrants are projected to be met in the near future. Since ODOT is currently working with the city to transfer jurisdiction of OR 211, we recommend the city consider these mitigations as part of the Transportation System Plan Update.

All alterations within the State highway right of way are subject to the ODOT Highway Design Manual (HDM) standards. Alterations along the State highway but outside of ODOT right-of-way may also be subject to ODOT review pending its potential impact to safe operation of the highway. If proposed alterations deviate from ODOT standards a Design Exception Request must be prepared by a licensed engineer for review by ODOT Technical Services. Preparation of a Design Exception request does not guarantee its ultimate approval. Until more detailed plans have been reviewed, ODOT cannot make a determination whether design elements will require a Design Exception.

Note: Design Exception Requests may take up to 3 months to process.

All ODOT permits and approvals must reach 100% plans before the District Contact will sign-off on a local jurisdiction building permit, or other necessary requirement prior to construction.

Comprehensive Plan and Zoning Map Amendments

ODOT concurs with the TIS finding that the proposed comprehensive plan and zoning map amendments would decrease the amount of site generated trips and therefore will not have a significant effect on state highway facilities per the Transportation Planning Rule OAR 660-012-0060.

ODOT RECOMMENDED LOCAL CONDITIONS OF APPROVAL

- ODOT recommends that the site layout and development be consistent with the approved and adopted Transportation System Plan, including:
    - The Dubarko Street extension to US 26, aligned with the westerly most SE Vista Loop Drive intersection (see additional comments under 'Dubarko Street Extension and Access Control').
    - 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. Note: the applicant only needs to accommodate and construct the collector on their property.
    - Curb, sidewalk, cross walk ramps, bikeways and road widening along US 26 constructed as necessary to be consistent with local, ODOT and ADA standards.

Please send a copy of the Notice of Decision including conditions of approval to:
ODOT_R1_DevRev@odot.state.or.us

Development Review Planner: Marah Danielson	503.731.8258, marah.b.danielson@odot.state.or.us
Traffic Contact: Avi Tayar, P.E.	503.731.8221 Abraham.tayar@odot.state.or.us
District Contact: Loretta Kieffer	503.667.7441 Loretta.L.KIEFFER@odot.state.or.us

EXHIBIT Y

M E M O R A N D U M

TO: SHELLEY DENISON, ASSOCIATE PLANNER
FROM: MIKE WALKER, PUBLIC WORKS DIRECTOR
RE: BULL RUN TERRACE – FILE NO. 19-050
DATE: APRIL 29, 2020

The following are Public Works' comments on the above-referenced application:

Transportation
The proposed street and utility plan depicts Dubarko Rd. between its current eastern terminus and proposed Street A with a 76 ft. wide right-of-way consisting of a 0.5 ft. monumentation strip, a six-foot sidewalk, a five-foot planter strip, a 0.5 ft. curb, a five-foot bike lane, a 17-foot travel lane and half of an 8 ft. median for a total half section equaling 38 feet and a full section equaling 76 feet. The standard section for an arterial street in the TSP consists of 11-foot travel lanes with 5-foot bike lanes. It is not clear why the proposed travel lanes are so wide.

The portion of Dubarko Rd. between Street A west 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 this portion of Dubarko Rd. with the public improvement plans for the project for City Engineer review and approval.

The traffic analysis makes several references to a right-in/right-out intersection at Dubarko Rd. and US 26. These references are in the context of analysis of the performance of other study intersections examined in the TIS 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 US 26 and Dubarko Rd. The intersection of US 26 and Dubarko Rd. shall be constructed as a full-access intersection in compliance with the TSP.

The alignment of Street B and Dubarko Rd. does not provide the minimum 100 ft. 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). The alignment of this intersection shall be revised to provide the minimum 100 ft. tangent section to comply with the Code.

The applicant shall provide a 40 ft. x 40 ft. right-of-way dedication or permanent traffic signal easement at the northeast corner of lot 7 to accommodate a future traffic signal.

The widening of Dubarko Rd. 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 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.

Any ODOT-required improvements on and adjacent to the US 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.

Utilities
WATER - The existing 8" diameter water line resides in an easement granted to the City of Sandy recorded at 2004-110340. This waterline must be replaced with an 8" diameter water line with no more than 42" or less than 36" of cover. 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 City's water master plan shows an 18" diameter water line in Dubarko Rd. south of US 26. The applicant shall install an 18" water line in Dubarko Rd. connected to the existing 18" water line at the west end of the site and the existing 12" line on US 26. Due to the elevation of the site relative to the existing water reservoirs on Vista Loop Dr. this line will be a low-pressure, high volume line and will be used for fire protection. The cost difference between a standard diameter water line and the required 18" water line is eligible for Water System Development Charge (SDC) credits. The amount of the credit provided will be based on the Water System Construction Cost Credit table in the Water System Development Charge Methodology adopted by City Council motion on September 5, 2017.

Section 17.84.60D SMC states: "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)". The applicant shall extend the existing 12" water main in US 26 east from the proposed intersection of Dubarko Rd. and US 26 to the east boundary of the site. The cost difference between a standard diameter (8") water line and the required 12" water line is eligible for Water System Development Charge (SDC) credits. The amount of the credit provided will be based on the Water System Construction Cost Credit table in the Water System Development Charge Methodology adopted by City Council motion on September 5, 2017.

STORMWATER - All site runoff (including new runoff from the widened surfaces of US 26) shall be detained such that post-development runoff does not exceed the pre-development 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).

SANITARY SEWER - Sanitary sewage from lots 1 through 6 will drain to the existing Southeast pump station. The recently adopted Wastewater System Facilities Plan (2019) identified a capacity deficiency in the Southeast pump station and force main as well as several conveyance lines downstream.

The City will adopt a Sanitary Sewer SDC surcharge on each Equivalent Residential Unit developed in the basin served by the Southeast pump station. The surcharge amount will be calculated by dividing the estimated cost of the required capacity improvements by the estimated number of dwelling units that can be built in the pump station drainage basin. The surcharge will be collected with each building permit issued in the basin.

General
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.

EXHIBIT Z

REPLINGER & ASSOCIATES LLC
TRANSPORTATION ENGINEERING

August 10, 2020

Ms. Shelley Denison
City of Sandy
39250 Pioneer Blvd.
Sandy, OR 97055

SUBJECT: REVIEW OF TRANSPORTATION IMPACT STUDY – BULL RUN TERRACE SUBDIVISION

Dear Shelley:

In response to your request, I have reviewed materials submitted in support of the Bull Run Terrace Subdivision on Dubarko Road in the east part of Sandy. The Transportation Impact Study (TIS), dated July 12, 2020, was prepared under the direction of Michael Ard, PE of Ard Engineering. A preliminary plot, dated 6/29/2020 was also provided.

The site, with approximately 16 acres, is on the southwest side of US 26 and is bisected by Dubarko Road. TIS describes a proposal to subdivide the property and construct up to 158 apartments and 4 single-family homes. A portion of the development is zoned for commercial uses but is not proposed to be developed at this time. The development proposes extending Dubarko Road, currently a stub street, to connect with US 26 opposite SE Vista Loop (West). Rezoning of the project site is proposed.

Overall

I find the TIS addresses the city's requirements and provides an adequate basis to evaluate impacts of the proposed development.

Comments

1. ***Study Area.*** The study addresses the appropriate intersections. It includes analyses of:

   - US 26 at SE Ten Eyck Road;
   - US 26 at SE Langensand Road;
   - US 26 at SE Vista Loop Drive;
   - Highway 211 at Dubarko Road; and
   - Dubarko Road at SE Langensand Road.

2. ***Traffic Counts.*** The AM and PM peak hour traffic counts were conducted during March 2019. The engineer adjusted the traffic counts to account for seasonal variations. The engineer used a combination approach to account for seasonal variation of recreational traffic and separately for commuter traffic on US 26. Volumes on Highway 211 were adjusted by a straight 8 percent. The methodology appears consistent with the procedures defined by the Oregon Department of Transportation (ODOT). The adjusted counts appear reasonable.

3. ***Trip Generation.*** The TIS uses trip generation for single-family dwellings and multi-family dwellings (land use code 210 and 220, respectively) from the Institute of Transportation Engineers' (ITE) *Trip Generation Manual*. The engineer calculates that the subdivision would produce 76 total AM peak hour trips; 92 total PM peak hour trips; and 1194 total daily trips. This calculation does not include potential trips associated with the future development of the commercially zoned land within the development area. The calculation of trips generated by the residential development appears reasonable.

4. ***Trip Distribution.*** The TIS provided information about trip distribution from the site. The engineer assumed 65 percent of the traffic would travel to and from the northwest on US 26; 20 percent would travel to and from the southeast on US 26; and 15 percent would travel to and from the west on Dubarko Road. The trip distribution seems reasonable.

   The TIS also accounts for some diversion of existing traffic due to the new connection between US 26 and Dubarko Road. The engineer explains that some traffic from the east could use this route to get to the south part of the city and the reverse movement. Diversion predicted by the engineer are significant and contribute to traffic issues at the intersection of Highway 211 and Dubarko. This is discussed in #6 and #10, below.

5. ***Traffic Growth.*** The TIS uses a 1.93 percent annual increase for Highway 26 based on projected volumes at the west boundary of Sandy. For Highway 211, the TIS uses an annual growth rate of 3.16 percent. For other facilities it uses a 2.0 percent annual growth rate to account for background traffic growth. "The Views," a 166-unit development on the north side of US 26 on Vista Loop was also included as an in-process development. These assumptions account for future traffic and appear reasonable.

6. ***Analysis.*** Traffic volumes were calculated for the intersections cited in #1, above. Intersection level-of-service (LOS) and the volume-to-capacity (v/c) ratio were provided. The intersection of US 26 with SE Ten Eyck Road is signalized; the other intersections are stop-controlled. The analyses were conducted for existing 2019 conditions, 2022

background conditions, and 2022 with the development. Furthermore, the engineer evaluates traffic operations if the intersection of US 26 and Dubarko Road is restricted to, or operates as, right-in, right-out operation.

The engineer calculates that the signalized intersection of US 26 with Ten Eyck meets the v/c standards specified by ODOT under all scenarios. At the intersection of US 26 with Langensand Road, the v/c for both the mainline and minor street approaches are calculated to meet ODOT's v/c standard. However, long delays (the basis for LOS) are calculated to occur on the minor street approaches under existing and future conditions.

The intersection of Dubarko Road and Langensand Road is predicted to operate acceptably under all scenarios. The intersection will operate at LOS "B" or better, meeting city operational standards.

The engineer also predicts that the intersection of US 26 and Dubarko Road/Vista Loop (west) will meet ODOT's v/c standard, but that long delays will occur on the minor street approaches. This led the engineer to calculate what would happen if the Dubarko Road approach were restricted to right-in, right-out. Restricting this to right-in, right-out movements reduces approach volumes, reduces delays, and improves the v/c ratio for the intersection. Even if right-in, right-out restrictions were not in place, extraordinarily long delays encountered by motorists seeking to make left turns from northeast-bound Dubarko Road onto US 26 is likely to cause them to choose alternative routes.

The engineer calculated that the intersection of Highway 211 with Dubarko Road would also meet ODOT's v/c standards, but like the US 26 intersections, long delays can be expected on the minor street approaches. Traffic volumes on Dubarko Road at Highway 211 are influenced by whether the intersection of US 26 with Dubarko Road is restricted to right-in, right-out. Turn restrictions at US 26 that limit diversion of traffic to Dubarko Road reduce traffic volumes for the entire length of Dubarko Road. This also impacts when signal warrants may be met at the intersection of Highway 211 and Dubarko Road. The engineer also evaluated traffic operations at this intersection using a roundabout. He calculated operations would be improved but noted that topographic constraints – a steep grade - would complicate installation of a roundabout.

The engineer concluded that "the study intersections are projected to operate acceptably through year 2021 either with or without the addition of site trips from the proposed development and the diversion of through trips between US 26 and Highway 211 onto Dubarko Road." He also notes that, due to long delays, motorists will likely not choose to make left turns from northeast bound Dubarko Road to westbound US 26. I concur with the engineer's conclusions.

A queuing analysis was also undertaken to determine the appropriate queue storage for the intersection of US 26 and Dubarko Road. For left turns from northwest-bound US 26 to Dubarko Road, he calculated a 95th percentile queue length of 112 feet. For the northeast-bound left-turn lane for Dubarko Road at US 26, he calculated a 95th percentile queue length of 80 feet. The engineer also notes that the queue for northeast-bound Dubarko Road at US 26 could extend to 277 feet.

7. ***Crash Information.*** The TIA provides information on crashes for the most recent available five-year period covering 2012 through 2016.

   At the intersection of US 26 and SE Ten Eyck Road, there were nine reported and a relatively low crash rate. At the intersection of US 26 and Langensand Road, there were four reported crashes and a low crash rate. At the intersection of Dubarko Road and Langensand Road, there was one reported crash. At US 26 and Vista Loop, there were no reported crashes.

   The intersection of Highway 211 and Dubarko Road has been a safety concern for years and has undergone safety improvements. During the five-year period, 28 crashes were reported. Crashes remain a problem following implementation of safety improvements that included realigning the Dubarko Road approaches and added striping on Highway 211. The engineer notes that the crash history indicates warrants are met for all-way stop control. He recommends ODOT consider installation of all-way stop control to address safety issues. I concur.

8. ***Site Plan and Access.*** The site plan provides for the extension of Dubarko Road. It will serve as the principal access to the development. Three intersections are proposed along Dubarko Road within the development. The proposed site plan includes a new four-leg intersection on Dubarko Road that will provide access both north and south of Dubarko Road. Additionally, the area on the northwest side of Dubarko Road will have a second access in the form of a connection to Fawn Street at the west side of the development. A stub street on the southeast side of Dubarko Road will provide for a connection to adjacent properties when they develop.

   The TIS states "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." The reason for this anticipated future access is not specified in the TIS, but this future access is presumably associated with future commercial development. I agree with the engineer's conclusion and recommendation. It will be

important to consider access to Dubarko Road in subsequent development applications. Limiting access to Dubarko Road, a minor arterial, should be minimized to protect its function and the capacity of this important facility. Private driveways serving individual parcels should be avoided.

9. ***Sight Distance.*** The engineer analyzed sight distance at the proposed intersection of US 26 and Dubarko Road. He concluded that sight distance exceeded 1200 feet in each direction, a distance appropriate for a 65-mph roadway. The engineer recommended no mitigation for sight distance. I concur.

10. ***Traffic Signal Warrants.*** The engineer conducted a preliminary traffic signal analysis warrants at several locations based on ODOT procedures.

    Traffic signal warrants were not met for the intersections of US 26 with Dubarko Road or US 26 at Langensand Road based on 2022 volumes with the development. Based on regional growth and the Sandy Transportation System Plan (TSP), the eventual need for a traffic signal at either location may be anticipated.

    The engineer also conducted an analysis of traffic signal warrants at the intersection of Highway 211 and Dubarko Road. He concluded that if a new intersection allowing all movements at US 26 and Dubarko Road is constructed; if "The Views" development is constructed; and if this development is constructed, traffic signal warrants would be met for the 30th highest hour in 2021. With background traffic growth, traffic signal warrants would be met for average weekday conditions by 2024. If full movements are not provided at the intersection of US 26 and Dubarko Road, traffic volumes along the entire length of Dubarko Road are significantly reduced and traffic volume warrants at the intersection of Highway 211 and Dubarko Road are not met.

    The engineer also analyzed warrants for all-way stop control at the intersection of Highway 211 and Dubarko Road. He concluded warrants for all-way stop control were met based on crash history and would be met for minimum traffic volumes with additional traffic diversion to Dubarko Road and from developments. He further analyzed traffic operations with all-way stop control and concluded that the intersection would operate at LOS "C" with a v/c of 0.74. He recommends that ODOT consider all-way stop control at the intersection.

11. ***Left-Turn Lane Warrants.*** The TIS indicates that left-turn lanes are provided on eastbound US 26 at Langensand Road. It indicates that the intersection of US 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 extension of Dubarko Road as proposed with this development.

According to the engineer, 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. He further states that turn lane warrants would not be applicable and added lanes may not be needed if all-way stop control is installed at the intersection as recommended based on his safety analysis, or if a traffic signal is installed at the intersection.

Turn lanes are not warranted at the intersection of Dubarko Road and Langensand Road. The engineer recommends consideration be given to reorienting the stop signs to favor Dubarko Road rather than Langensand Road if volumes increase on Dubarko Road.

12. Transportation Planning Rule Considerations. The TIS provides a detailed analysis of the individual requirements of the TPR. The engineer calculated trips based on the current zoning and on the proposed zoning. The subject property is currently zoned with a mix of 8.05 acres of R-1, 5.01 acres of R-2 and 2.84 acres of C-3 zoning. Under the proposed plan, the zoning will include, 1.43 acres will of POS (Parks & Open Space), 0.59 acres of R-1, 7.91acres of R-3, and 3.12 acres of C-3. The remainder of the site area will be public right of way.

Under the current zoning, the engineer calculates full development would generate 98 AM peak hour trips; 184 PM peak hour trips; and 1788 weekday trips. Under the proposed zoning, the engineer calculates full development would, after accounting for pass-by trips associated with the future commercial development, generate 99 AM peak hour trips; 180 PM peak hour trips; and 2064 weekday trips. The difference in the AM and PM peak hour is not significant; the weekday trips are higher by 274 trips. The engineer points to the Oregon Highway Plan Policy 1F5, which describes daily traffic volume increases less than 400 daily trips as a "small increase."

The engineer concludes that no changes to the city's street classification designation or standards are warranted by the rezoning and that the proposed rezoning does not have a significant effect on the transportation system and that mitigation is not necessary. He concludes the Transportation Planning Rule is satisfied. I concur with the engineer's conclusions.

13. Conclusions and Recommendations. The engineer concludes that the intersections will meet ODOT and city operational standards for the study area intersections either with or without the development.

With the completion of Dubarko Road and a new intersection with US 26, northeast-bound motorists on Dubarko Road can expect extraordinarily long delays. Motorists may choose alternative routes. The system has adequate capacity if the US 26/Dubarko Road intersection were restricted to, or effectively operated as right-in, right-out.

While most study area intersections are operating relatively safely, the intersection of Highway 211 and Dubarko Road suffers from a high number of crashes and a high crash rate. Recent safety improvements to not appear to have altered this trend. The proposed development and a new connection of Dubarko Road with US 26 can be expected to increase the traffic using the intersection of Highway 211 and Dubarko Road. The engineer recommends ODOT consider converting the intersection of Highway 211 and Dubarko Road to all-way stop control for safety reasons based on the historical data. He recommends no other mitigation to address safety issues.

The engineer concludes traffic signals will be warranted at the intersection of Highway 211 and Dubarko Road in the near future based on development and on the completion of Dubarko Road, which provides opportunities for rerouting of traffic that currently remains on US 26.

The engineer concludes that turn lanes (a northeast-bound left-turn lane on Dubarko Road, and a southeast-bound right-turn lane on US 26) will be warranted at the intersection of US 26 and Dubarko Road with the completion of Dubarko Road. The engineer notes that the northeast-bound left-turn lane would not be needed if the Dubarko Road approach were restricted to right-in, right-out. While this is true, failing to construct Dubarko Road to accommodate a northeast-bound left-turn lane would be short-sighted and would not be consistent with the Sandy TSP's designation of Dubarko Road as a minor arterial.

The engineer concludes that sight distance is adequate for the new intersection of US 26 and Dubarko Road.

The engineer concludes that the rezoning of the property will not produce a significant change in traffic volumes and will not have a significant effect on the transportation system. He concludes the Transportation Planning Rule is satisfied.

I concur with the engineer's conclusions.

Conclusion and Recommendations

Based on the information provided by the applicant, I find the TIS meets city requirements. The engineer used appropriate methods and documents his procedures and conclusions.

Because of its location, this development will implement a key project in the city's Transportation System Plan, namely Dubarko Road. Dubarko Road is classified as a minor arterial. Much of the systemwide impact of the development as describe in the TIS is a result of providing a new connection – a connection that will result in diversion of traffic from US 26 to Dubarko Road.

With its connection to US 26, Dubarko Road will become increasingly important to the transportation system. There are implications for operations at the intersection of Dubarko Road and Langensand Road and at the intersection of Highway 211 and Dubarko Road. For the former, it may be appropriate to reorient the stop signs to give priority to Dubarko Road when traffic volumes increase.

At the intersection of Highway 211 and Dubarko Road, the engineer recommends ODOT consider converting the intersection to all-way stop control as a possible safety measure to address historical crash issues. Traffic signal warrants may be met in the not-too-distant future due to traffic diversion on Dubarko Road and growth in the community.

It is important to recognize that trips generated by this development will have some impact on the transportation system, but that much of the predicted impact is from the implementation of Dubarko Road as specified in the city's Transportation System Plan. The construction of the missing segment of Dubarko Road adjacent to US 26 will also necessitate modification to the intersection of US 26/Vista Loop/Dubarko Road. The engineer has provided information about queue storage requirements and has warned of long delays for motorists on the minor street approaches.

It may be appropriate for this development to participate in some off-site improvements, such as intersection improvements at US 26 and Dubarko Road or Highway 211 and Dubarko Road. However, much of the impact described in the TIS is associated with the implementation of Dubarko Road, a project specified in the city's Transportation System Plan.

Dubarko Road should be developed to minor arterial standards through the subject property. The developer should be put on notice that any future land use actions, such as development of the C-3 property, will need to address traffic impacts and access. Limits on access involving access spacing and possible turn restrictions may be necessary to protect the function of Dubarko Road and to avoid unacceptable impacts on the operations and safety of the intersection of US 26 and Dubarko Road.

As noted in #6, above, the engineer predicts that the northeast-bound queue on Dubarko Road could extend to 277 feet. The preliminary plat suggests that Parcel 6, proposed to be

zoned R-3, would have full access to Dubarko Road. No details are provided about this access in either the TIS or the site plan. If the city chooses to allow direct access to Dubarko Road from Parcel 6 on the southeast side of Dubarko Road, access should be at least 277 feet southwest of US 26 to avoid interference with queues extending from the US 26/Dubarko Road intersection. Providing access to Parcel 6 from "B" Street would be preferable to protect the function of Dubarko Road.

To the extent that the developer is required to implement projects or participate in projects involving facilities under the jurisdiction of ODOT, conditions of approval should be included requiring that the development comply with the requirements standards and procedures specified by ODOT. I recommend that that ODOT requirements and standards associated with frontage improvements where the development abuts US 26 be made conditions of approval for the development.

If you have any questions or need any further information concerning this review, please contact me at replinger-associates@comcast.net.

Sincerely,

John Replinger

John Replinger, PE
Principal

BullRunTerraceTIS081020

EXHIBIT AA

CURRAN-McLEOD, INC.
CONSULTING ENGINEERS
6655 S.W. HAMPTON STREET, SUITE 210
PORTLAND, OREGON 97223

August 12, 2020

Mr. Marisol Martinez
& Ms. Shelley Denison
City of Sandy
39250 Pioneer Blvd.
Sandy, OR 97055

RE: CITY OF SANDY
BULL RUN TERRACE SUBDIVISION
PRELIMINARY REVIEW (File No. 19- 050 CPA/ZC/SUB) REVISED

Dear Marisol and Shelley:

We have reviewed the new preliminary submittal and supporting documents and compared them to the February 2020 submittal for the above noted development. We have modified our comments as shown below to reflect the new findings:

1. The previous preliminary stormwater calculations dated November 20, 2019 that was provided with the February 2020 submittal was found to meet the water quality/quantity criteria as stated in the City of Sandy Development Code (SDC) 13.18 Standards and the City of Portland Stormwater Management Manual (SWMM) Standards, that were adopted by reference into the Sandy Development Code. However, a detailed final report stamped by a licensed professional shall be submitted for review with the final construction plans.

2. The site frontage with Hwy 26 should be subject to the review process of Oregon Department of Transportation (ODOT) and Development Requirements. The traffic impact study prepared by ARD Engineering, dated July 12, 2020 recommends a northwest bound left-turn lane and a southeast bound right turn on Hwy 26 at the time Dubarko Road extends to Hwy 26. The northbound left-turn lane would not be needed at the time of the project completion if the intersection is limited to right-in, right-out only.

3. Street A shall be constructed to local street standards (28-foot wide paved surface, curbs on both sides, 5-foot planter strips and 5-foot wide sidewalks) in compliance with the City of Sandy Transportation System Plan (TSP), figure 12. The proposed 50-foot right of way is adequate.

4. Street B shall be constructed to match the existing street width (36-foot wide paved surface, curbs on both sides, 5-foot planter strips and 6-foot wide sidewalks) in compliance with the City of Sandy Transportation System Plan (TSP), figure 12. The proposed 50-foot right of way is adequate.

PHONE: (503) 684-3478 E-MAIL: cmi@curran-mcleod.com FAX: (503) 624-8247

5. Dubarko Road is classified by the City Transportation System Plan as a minor arterial. The proposed paved surface of 52 feet for the segment south of the intersection with Street A and Street B is adequate to include curbs on both sides, 5-foot planter strips, 6-foot wide sidewalks and 5-foot wide bike lanes.

6. Similarly, for Dubarko Road segment north of the intersection with Street A and Street B, the proposed paved surface of 54 feet is adequate. The left turn lane width should be increased to 12 feet and a median width be reduced to10 feet. The improvements shall include curbs on both sides, 5-foot planter strips, the sidewalks width should also be changed to 6-foot wide and 5-foot wide bike lanes. The traffic impact study prepared by ARD Engineering, dated July 12, 2020 restricts the turning movement from Hwy 26 to Dubarko Road to right-in only and for the turning movements from Dubarko Road to Hwy 26 to right-out only.

7. Sandy Development Code (SDC), section 17.84.50.H.5.b requires the intersection of all local streets with Dubarko Rd to have a minimum of 50 feet of straight tangent alignment perpendicular to the intersection. However, it is does not clearly state the "straight tangent" measurement limits. We suggest the "straight tangent" be measured from the face of the curb line and not at the intersection points.

8. The vertical design grade for landing at all the Tee intersections where controlled with "Stop" signs should be no greater than 8% for a minimum of 50 feet or two car lengths.

9. The intersection of Hwy 26 and Dubarko Rd should comply with the intersection sight distance standards. All other local street intersections should comply with the vision triangle standards.

10. The developer's engineer should provide a profile design for a minimum of 200 feet for Street B future extension past the project boundary to ensure future grades can be met.

11. All ADA ramps shall be designed, inspected by the design engineer and constructed by the contractor to meet the most current PROWAG requirements.

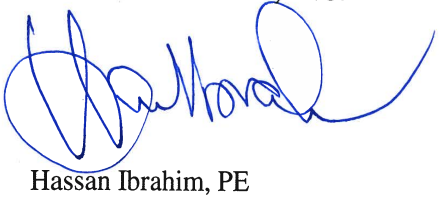
12. All public sanitary sewer, waterline mains to be a minimum of 8-inches in diameter and a minimum of 12-inches in diameter for storm drains and be extended to the plat boundaries where practical to provide future connections to adjoining properties.

13. The existing 8-inch waterline in Dubarko Rd, located between the south side of Hwy 26 and the easterly boundary line of Deer Pointe phase 1 Subdivision should be potholed and depth verified to assure acceptable cover is adequate from the new street grades.

We have no concerns about the proceedings with this project subject to the above stated comments.

Sincerely,

CURRAN-McLEOD, INC.



Hassan Ibrahim, PE

cc: Mr. Mike Walker, City of Sandy

SANDY FIRE DISTRICT NO. 72
Fire Prevention Division

EXHIBIT BB

E-mail Memorandum

To: Shelley Denison

From: Gary Boyles

Date: August 13, 2020

Re: Revised Submittals: 19-050 Bull Run Terrace 7-Lot Subdivision

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Review and comments are based upon the current version of the Oregon Fire Code (OFC) as adopted by the Oregon Office of State Fire Marshal. The scope of this review is typically limited to fire apparatus access and water supply, although the applicant shall comply with all applicable OFC requirements. When buildings are completely protected with an approved automatic fire sprinkler system, the requirements for fire apparatus access and water supply may be modified as approved by the fire code official. References, unless otherwise specified, include provisions found in the Metro Code Committee's Fire Code Applications Guide, OFC Chapter 5 and appendices B, C and D.

COMMENTS:

General

1. Construction documents detailing compliance with fire apparatus access and fire protection water supply requirements shall be provided to Sandy Fire District for review and approval.

2. Where fire apparatus access roads or a water supply for fire protection are required to be installed, such protection shall be installed and made serviceable prior to and during the time of construction except where approved alternative methods of protection are provided.

Fire Apparatus Access

1. Dead-end streets in excess of 150 ft., resulting from a phased project, are to be provided with an approved temporary turnaround. (Street B).

2. Not less than two approved means of fire apparatus access will be required for multiple-family residential projects having more than 100 dwelling units.

   Exception: Projects having up to 200 dwelling units will be approved with only one means of fire apparatus access where all buildings, including nonresidential occupancies, are equipped throughout with an approved automatic sprinkler system installed in accordance with OFC Section 903.3.1.1 or 903.3.1.2.

   If more than 200 dwelling units, not less than two approved means of fire apparatus access will be required.

3. Commercial and industrial buildings exceeding three stories or 30 feet in height shall have not fewer than two means of fire apparatus access for each building.

4. Commercial and industrial buildings having a gross building area of more than 62,000 square feet (124,000 square feet if equipped throughout with an approved automatic sprinkler systems) shall be provided with two separated and approved fire apparatus access roads.

5. Where two access roads are required, they shall be placed a distance apart equal to not less than one half of the length of the maximum overall diagonal dimension of the property or area to be served, measured in a straight line between accesses.

6. Fire apparatus access roadway grades shall not exceed 10 percent. Intersections and turnarounds shall be as level as possible and have a maximum of 5 percent grade with the exception of crowning for water run-off.

7. Fire apparatus access roads shall have an unobstructed driving surface width of not less than 20 feet (26 feet adjacent to a fire hydrant, exclusive of shoulders) and an unobstructed vertical clearance of 13 feet 6 inches.

8. Where fire apparatus roadways are not of sufficient width (Dubarko Rd. and Streeet B) to accommodate parked vehicles and 20 feet of unobstructed driving surface, "NO PARKING-FIRE LANE" signs shall be placed on one or both sides of the roadway and in turnarounds as needed.

9. Streets and roads shall be identified with approved signs. Temporary signs shall be installed at each street intersection when construction of new roadways allows passage by vehicles.

Firefighting Water Supplies

1. The minimum available fire-flow and flow duration for commercial and industrial buildings shall be as specified in OFC Appendix B. In no case shall the resulting fire-flow be less than 1,500 gpm at 20 psi residual.

2. The minimum available fire flow for one- and two-family dwellings served by a municipal water supply shall be 1,000 gpm at 20 psi residual provided the fire area of the dwelling(s) does not exceed 3,600 square feet. For dwellings that exceed 3,600 square feet, the required fire-flow shall be determined in accordance with OFC Appendix B, Table B105.1(2).

3. For one- and two-family dwellings served by a municipal water system, all portions of the dwellings shall be located within 600 feet from a fire hydrant on a fire apparatus access road, as measured in an approved route that is approved by the fire code official.

4. For commercial and industrial buildings served by a municipal water system where a portion of the building is more than 400 feet from a fire hydrant on a fire apparatus access road (600 feet for buildings equipped throughout with an approved automatic sprinkler system), as measured in an approved route around the exterior of the building, on-site fire hydrants and mains shall be provided.

5. If applicable, fire department connections (FDC) shall be remote from the structure they serve and located within 100 feet of a fire hydrant. All FDC's shall be permanently labeled with appropriate address in which it serves and shall be accessible and visible from the fire apparatus access road.

6. Prior to the start of combustible construction, required fire hydrants shall be operational and accessible.

7. Fire hydrants installed within the Sandy Fire District shall comply with the following requirements:
    a. Flow requirements and location of fire hydrants will be reviewed and approved by Sandy Fire upon building permit submittal.
    b. Each new fire hydrant installed shall be ordered in an OSHA safety red finish and have a 4-inch non-threaded metal faced hydrant connection with cap installed on the steamer port. If a new building, structure, or dwelling is already served by an existing hydrant, the existing hydrant shall also be OSHA safety red and have a 4-inch non-threaded metal faced hydrant connection with cap installed.

8. The minimum number and distribution of fire hydrants shall be in accordance with City of Sandy requirements and OFC Appendix C.

NOTE:

Sandy Fire District comments may not be all inclusive based on information provided. A more detailed review may be needed for future development to proceed.

Please do not hesitate to contact Fire Marshal Gary Boyles at 503-891-7042 or fmboyles.sandyfire@gmail.com should you have any questions or concerns.

Additional Documents from Staff:

Click the exhibit to jump to the applicable page
(Note: links not operative in full agenda packet view)

CC. Pre-application Notes from January 10, 2018, October 10, 2018
DD. Incompleteness Letter dated January 27, 2020
EE. Completeness Letter dated February 14, 2020

PRE-APPLICATION CONFERENCE NOTES

EXHIBIT CC

Project Name: Anna Estates
Pre-Application Conference Date: January 30, 2018
Applicant Name: Christopher M. Tews
Engineer Name: All County Surveyors and Planners
Staff: Thomas Fisher, Emily Meharg, Kelly O'Neill Jr., James A. Cramer & Mike Walker

PLANNING DEPARTMENT REVIEW

Sandy Development Code (SDC): Sandy Development Code (SDC) Sections 17.12 Procedures for Decision Making; 17.18 Processing Applications; 17.22 Notices; 17.26 Zoning Map Amendments; 17.30 Zoning Districts; 17.36 R-1 Low Density Residential Zoning District; 17.38 R-2 Medium Density Residential Zoning District; C-3 Village Commercial Zoning District; 17.66 Adjustments and Variances; 17.80 Additional Setbacks on Collectors; 17.82 Special Setbacks on Transit Streets; 17.84 Improvements Required with Development; 17.86 Parkland and Open Space; 17.90 Landscaping and Design Standards; 17.92 Landscaping and Screening; 17.98 Parking, Loading and Access Requirements; 17.100 Land Division; 17.102 Urban Forestry; and Chapter 15.30 Dark Sky.

Caveat: *This analysis includes a review of those code sections that may conflict with the proposed design as submitted. This review is not intended to be a comprehensive analysis of all applicable code sections.*

Amendments Needed for Proposal

- Comprehensive Map amendment
- Zoning Map amendment
- Transportation System Plan amendment
- Waterline Easement amendment/vacation

Parking Analysis

- No on-street parking will be permitted on Dubarko Road.
- Locations of the driveways should be identified for review (SDC 17.90.90.B.5).
- 2 off-street parking spaces per dwelling required (SDC 17.98.20), demonstrate compliance.
- On-street parking plan shall be submitted for review. One space required for every dwelling unit within 200 feet of each lot (SDC 17.98.200).

Access and Utilities

- The alignment of Dubarko Rd. does not match the Transportation System Plan (TSP) therefore an amendment to the TSP would have to occur to accommodate the existing proposal. Chapter 3, Table 8 Roadway Improvement Projects and Cost – Preferred Plan and Figure 15 Motor Vehicle System Plan details the TSP alignments.
- There is a Waterline Easement (Rec. No. 2004-110340) within the site which is designed to follow the TSP alignment of Dubako Rd. This would need to be vacated or amended.
- Frontage improvements along each proposed street frontage within the development is required per Public Works standards.
- Submit a traffic impact analysis (TIA). Need $1,500 for third party traffic consultant.
- Vision clearance areas must remain unobstructed (SDC 17.74.30).
- 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.
- The west adjacent development obtained Corps/DSL blessing to bury the intermittent stream on their site. The same stream traverses the subject property. It appears as an intermittent stream on our Locally Significant Wetlands map and is designated TCL on the map. Applicant responsible for researching and providing any communication from the appropriate agency regarding this element of the project.

Other Planning Items

- The proposed subdivision will require a Comprehensive Plan amendment as Village requires mixture of residential and non-residential. These requests go before the Planning Commission for recommendation and the City Council for review and approval/denial.
- The proposed subdivision will require a Zone Map amendment. This process goes before the Planning Commission for recommendation and City Council for review and approval/denial.
- "Density Calculations" appear accurate based on proposal and information provided.
- Site plan illustrates 31 SF lots while plans indicate 32 SF lots, clarification needed.
- Landscaping is required on Tract A (Landscape standards within SDC 17.92).
- Setback standards can be found in SDC 17.36.30 (R1), 17.38.30(R2) and 17.40.30 (R3).
- A variance would be required to allow a single stack housing development (the 4 lots on the south border of the development), two tier required per SDC 17.100.120 (Dubarko is identified as a Minor Arterial).
- Section 17.80.20 states any structure located on streets identified in the Transportation System Plan as an arterial shall have a minimum setback of 20 feet measured from the property line. This applies to applicable front, rear and side yards. (Dubarko is identified as a Minor Arterial).
- All buildings fronting Dubarko Road require a primary entrance oriented toward Dubarko (Special Setbacks on Transit Streets within SDC 17.82.20) or variance needed.
- Building Orientation standards set forth in SDC 17.82 must be upheld or variance needed.
- Blocks can't be greater than 400 feet unless justified by topographic, natural area, or other physical conditions. Blocks greater than 400 feet require a variance. Blocks greater than 600 feet require a pedestrian and bicycle access way (17.100.120.B). Additional detail needed to determine if the proposal is compliant with this section of the code.
- A geotechnical study will need to be done for any area at 25 percent slope or greater that is proposed to contain development.
- A wetland mitigation study will define restricted development areas on the site, which in turn will define tree retention requirements in those areas. Will need to define the top of bank for Tickle Creek.
- Submit an arborist report and tree plan for trees 8-inches DBH and greater (and trees 6-inches DBH and greater in the restricted development area). Tree retention at 3 trees per acre. Trees must be 11" DBH or greater and in good health. Identify on the plans which trees are to be removed as well as retained.

Parkland and Open Space

- Per SDC 17.86.10 Minimum Parkland Dedication Requirements the project would need to provide 1.6 acres for parks
  (60 x 3 x .0043 = .7740 rounded to .77 acres) SF, Zero Lot line & Duplex
  (96 x 2 x .0043 = .8256 rounded to .83 acres) Multi
- Because the subject property is adjacent to the Deer Pointe Subdivision which provided a parkland dedication and the location of the subdivision is underserved by parkland, the City has previously required dedication of parkland and Staff will uphold that requirement with the proposed subdivision. Section 17.86.40 details that Cash In-Lieu of Dedication is at the city's discretion.
- Land to be dedicated will need to be identified as Parks Open Space (POS) and go through a Zone Map Amendment process (can be done simultaneously with any proposed Zone Map Amendments needed for the project).
- Buildings and streets surrounding proposed parks would need to adhere to Section 17.86.20 design standards for layout.

Transit Amenity

- The proposed development will require a transit amenity on HWY 26. The amenity required is a 5' X 7.5' bus shelter, which includes a bench, mounted on a 7' X 9.5' pad. The shelter is to be located east of the zero lot line homes, adjacent to the planned duplex homes or 24 unit apartment building. ODOT would prefer to see the shelter on the "far side" south side of the new HWY 26/Dubarko Rd. intersection.

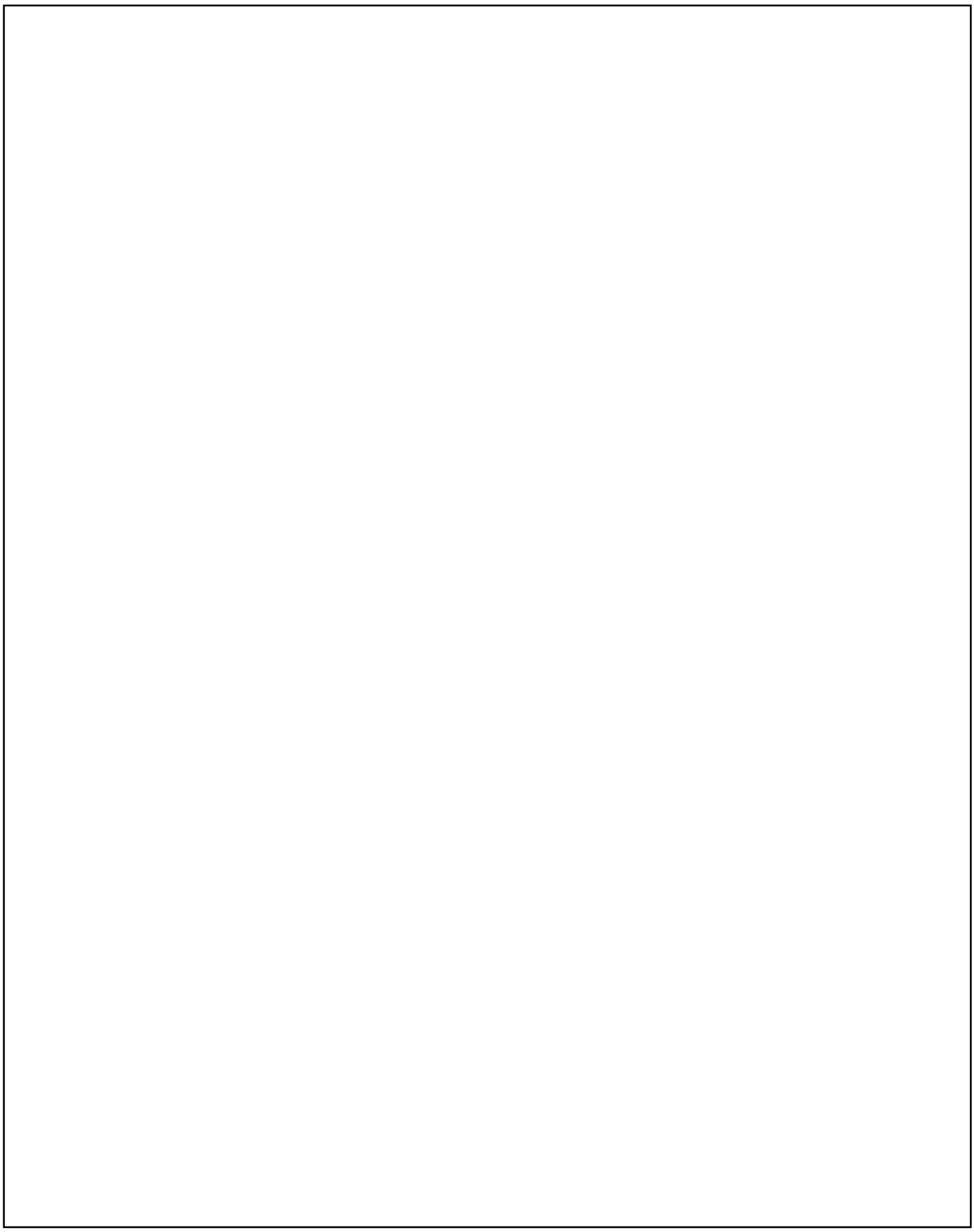
Application Process: Type IV Map Amendments, III SUB review with requested variances (most likely at least two-three variances), tree removal permit, FSH Overlay review. Need to determine process, cost, and scoping of TSP Modification.

Projected Processing Steps:

- Submittal Requirements: See requirements lists on City of Sandy website. https://www.ci.sandy.or.us/Planning-Requirements/

- Fees: $2,200 Zoning Map Amendment; $2,900 Comprehensive Plan Amendment; $2,900 Amendment to TSP (does not include third party review fees for TSP consultant); $3,000 for Type III subdivision review plus $80 per lot; $1,000 per variance; $700 for FSH Overlay review; $150 for Tree Removal review; $1,500 for Third Party traffic consultant.

- Staff review for completeness (30 days max.), if determined incomplete then the applicant submits additional information as required, staff then reviews for completeness again, if the application is deemed complete then the application is processed.



PRE-APPLICATION CONFERENCE NOTES

Project Name: 6-Lot Subdivision and 216-Unit Condominium Complex (3rd Meeting, 1st held 1/30/18, 2nd held 6/12/18)
Pre-Application Conference Date: October 10
Applicant Name: Christopher M. Tews (Roll Tide Properties)
Engineer Name: All County Surveyors and Planners
Staff: James Cramer, Kelly O'Neill Jr., Emily Meharg, Mike Walker, Thomas Fisher, Josh Brooking,

PLANNING DEPARTMENT REVIEW
Sandy Development Code (SDC): Sandy Development Code (SDC) Sections 17.12 Procedures for Decision Making; 17.18 Processing Applications; 17.22 Notices; 17.26 Zoning Map Amendments; 17.30 Zoning Districts; 17.36 R-1 Low Density Residential Zoning District; R-3 High Density Residential District; 17.80 Additional Setbacks on Collectors; 17.82 Special Setbacks on Transit Streets; 17.84 Improvements Required with Development; 17.86 Parkland and Open Space; 17.98 Parking, Loading and Access Requirements; 17.100 Land Division; 17.102 Urban Forestry; and Chapter 15.30 Dark Sky.

Caveat: *This analysis includes a review of those code sections that may conflict with the proposed design as submitted. This review is not intended to be a comprehensive analysis of all applicable code sections nor shall this review nullify code requirements that are determined necessary during land use review.*

Amendments Needed for Proposal
- Comprehensive Map Amendment (Village to Applicant's Proposal)
- Zoning Map Amendment (R-2 & C-3 to R-3)
- ODOT would require Transportation Planning Rule (TPR) findings for the zoning map amendments. ODOT explained the same requirements from the last meeting are applicable (see attached).

Parking Analysis
- No on-street parking will be permitted on Dubarko Road. On-street parking on the collector street heading south (Street A) will need to be discussed.
- Locations of the driveways for the six SF lots should be identified for review (SDC 17.90.90.B.5).
- 2 off-street parking spaces per dwelling required (SDC 17.98.20) for single family dwellings, demonstrate compliance.
- On-street parking plan shall be submitted for review. One space required for every dwelling unit within 200 feet of each lot (SDC 17.98.200). Demonstrate compliance.
- With regards to the proposed multi-family dwelling development the required number of parking spaces for Tract C should be 135 spaces and Tract D should be 225 based on the information provided. This will be evaluated in detail during land use approval.
- Design, Size and Access requirements for parking shall meet SDC 17.98.60 while on-site circulation shall meet 17.98.70.
- Handicapped parking spaces shall be 9 feet wide by 18 feet with access aisles (striped area on the passenger side). Accessible parking shall be provided for all uses in compliance with the requirements of the State of Oregon (ORS 447.233) and the Americans with Disabilities Act. Demonstrate compliance.

Access and Utilities
- There is a Waterline Easement (Rec. No. 2004-110340) within the site which is designed to follow the TSP alignment of Dubarko Rd.

- Frontage improvements along each proposed street frontage within the development is required per Public Works standards.
- Submit a traffic impact analysis (TIA). TIA should demonstrate that the maximum permitted density of the subject property can be accommodated including multi-family dwelling units. Will require $1,500 for third party traffic consultant.
- Vision clearance areas must remain unobstructed (SDC 17.74.30).
- Easements for public sanitary sewer, water, storm drainage, pedestrian and bicycle facilities shall be provided whenever these facilities are located outside a public right-of-way.
- The development to the west of the subject site has buried the intermittent stream on their site. The same stream traverses the subject property. It appears as an intermittent stream on our Locally Significant Wetlands map and is designated TCL on the map. Applicant is responsible for researching and providing any communication from the appropriate agency regarding this element of the project.
- VNAR required on Lots 4-6 as well as Tracts C and D to ensure there is no vehicular driveway on Dubarko Road.
- Ensure separation requirements between Street A and Meadow Avenue is met. 17.100.110(E) recommends spacing of 8-10 local streets per mile (528-660 feet).
- The City's TSP shows a placement of the proposed Street A further to the west, within submitted narrative provide justification for the proposed placement.
- A pedestrian connection should be included connecting Tracts C & E to the Dubarko Road right-of-way sidewalk.
- The ingress/egress points from Tracts D & E should align. The access points being staggered/offset like shown on the site plan does not work.
- HWY 26 will need improvements per ODOT. The City of Sandy will want street trees between the HWY 26 sidewalk and the curb which may require a Design Exception request through ODOT.
- Intersection of Dubarko Road and HWY 26 needs to have a width appropriate to accommodate a double left turn lane, median and bike lane. The proposed 76 feet of right-of-way may be adequate; however, additional analysis is required to confirm. SDC credit eligible for street larger than a local street segment.
- Collector Street (Street A, south of Dubarko only) shall be at least 60 feet in width to accommodate travel lanes, bike lanes, planter strips, 6 foot wide sidewalks, curbs, and monumentation areas. More right-of-way may need to be dedicated if on-street parking is required on Street A.
- There's only a single 6-inch water line, which is inadequate for the subdivision. You would need to complete a water model analysis for fire flow and domestic water.
- Conduit and vault infrastructure are required for all new developments. Please coordinate with SandyNet General Manager for infrastructure requirements and design standards.
- Applicant responsible for obtaining ODOT "Grant of Access" and complete "Approach Application" for the Dubarko/HWY 26 connection. See ODOT comments for additional details on process.
- A draft of the proposed easement language within Tracts C & E shall be submitted for review at time of initial application.

Other Planning Items

- The proposed subdivision will require a Comprehensive Plan amendment as Village requires a mixture of residential and non-residential uses. This plan amendment request goes before the Planning Commission for recommendation and the City Council for review and approval/denial.
- A Zone Map amendment is required to establish new boundaries for R-1 and R-3 rezone as well as Parks and Open Space (POS) with the parkland dedication. This zone change process goes before the Planning Commission for recommendation and City Council for review and approval/denial.

- Density Calculations on submitted plan sheet have been calculated per code requirements:
    - R-1: there is approximately .91 net acres therefore density shall be between 5-7 units (5-8 units/net acre)
    - R-3: there is approximately 11.08 net acres therefore density shall be between 111-222 units (10-20 units/net acre)
- Demonstrate Lot 3 meets the 50 foot Minimum Average Lot Width based on the Lot Width definition, *"Lot Width: The horizontal distance between the midpoints of the side lot lines".*
- Setback standards can be found in SDC 17.36.30 (R-1) and 17.40.30 (R-3).
- Section 17.80.20 states any structure located on streets identified in the Transportation System Plan as an arterial shall have a minimum setback of 20 feet measured from the property line. This applies to applicable front, rear and side yards. Dubarko is identified as a Minor Arterial, and HWY 26 is a Transit Street therefore Lots 4-6 and Tracts C, D & E must adhere to this standard.
- All buildings fronting Dubarko Road and/or HWY 26 require a primary entrance oriented toward Dubarko (Special Setbacks on Transit Streets within SDC 17.82.20) or variance needed. Building Orientation standards set forth in SDC 17.82 must be upheld or variance needed.
- The garages along HWY 26 need robust SandyStyle elements including items such as dormers, a mixture of siding types, etc. Subsection 17.90.160 Parking lots in multi-family developments shall not occupy more than 50% of the frontage of any public street abutting the lot or building.
- A geotechnical study will need to be done for any area at 25 percent slope or greater that is proposed to contain development.
- A wetland mitigation study will define restricted development areas on the site, which in turn will define tree retention requirements in those areas.
- Submit an arborist report and tree plan for trees 8-inches DBH and greater (and trees 6-inches DBH and greater in the restricted development area). Tree retention at 3 trees per acre. Trees must be 11" DBH or greater and in good health. Identify on the plans which trees are to be removed as well as retained. All significant trees (8-inches DBH and greater) should be preserved to the extent practicable.
- Multi-Family Dwelling proposal would need to be more detailed with site planning, proposed pedestrian connections, parking, design of buildings, landscaping, shared outdoor recreation, etc.
- Retaining walls proposed on the site? If so what are their heights, materials, etc.? We will want the walls to be textured and include details to remove monotonous planes.
- If the apartments are proposed to have a clubhouse building it will need to adhere to standards in 17.90.120 as we view the clubhouse building as a non-residential use in a residential zone for design standard purposes.

Parkland and Open Space

- Per SDC 17.86.10 Minimum Parkland Dedication Requirements the project would need to provide 1.94 acres (84,506 SF) for parks *(Formula: Required parkland dedication (acres) = (proposed units) x (persons/unit) x 0.0043 (per person park land dedication factor)*
    (6 x 3 x .0043 = .0774 rounded to .08 acres) SF
    (216 x 2 x .0043 = 1.8576 rounded to 1.86 acres) Multifamily
- 29,829 SF (.7 acres) deficiency in required Parkland Dedication.
- Because the subject property is adjacent to the Deer Pointe Subdivision which provided a parkland dedication and the location of the subdivision is underserved by parkland, the City has previously required dedication of parkland and staff will uphold that requirement with the proposed subdivision. Section 17.86.40 details that Cash In-Lieu of Dedication is at the city's discretion. Add the deficient parkland area or request the City consider a payment of $168,700 In-Lieu Fee of dedication for the difference.

- Land to be dedicated will need to be identified as Parks and Open Space (POS) and go through a Zone Map Amendment process (can be done simultaneously with any proposed Zone Map Amendments needed for the project).
- Buildings and streets surrounding proposed parks would need to adhere to Section 17.86.20 design standards for layout. Lot 1 shall be oriented with the front of the house facade facing Tract A (proposed parkland dedication). Additionally, consider redesigning the site plan of Tract C to relocate a building to border the land proposed to be dedicated for parkland.
- Per 17.86.20 a street shall abut the east side of the park or the applicant shall request a special variance. City would want an analysis on the number of street parking that would be eliminated if a variance were to be granted.

Transit Amenity

- The proposed development will require two complimentary bus shelter pads each with a green bench (Fairweather model PL-3, powder-coated RAL6028). The required pad size is 7' x 9.5'. One pad is to be located before Street A on the north side of Dubarko Road. The complimentary pad is to be located north of the fire access to Dubarko Rd. Exact locations and engineering specifications are available from the transit department.

Application Process: Type IV Comp Plan and Type IV Zoning Map Amendments, Type III SUB review with requested variances, tree removal permit, FSH Overlay review. *Type II Design Review needed for apartments or Type III Design review if deviations are requested.

Projected Processing Steps:

- Submittal Requirements: Land Use Application Form, Supplemental Land Use Application Form No. 1, Narrative, Detailed Site Plan, Tentative Plat, Utility Plan, Stormwater Analysis, Traffic Impact Study, Grading and Erosion Control Plan, Arborist Report & Tree Retention Plan, Photometric study with fixture cut sheets of the lights to be used, Easement Draft Language and Architectural elevations.

  See requirements lists on City of Sandy website.
  https://www.ci.sandy.or.us/Planning-Requirements/

- Grant of Access and Approach Application (see attached comments and email from ODOT)

- Fees: $2,350 Zoning Map Amendment; $3,100 Comprehensive Plan Amendment; $3,210 for Type III subdivision review plus $86 per lot ($946 11 lots including Tracts A-E); $320 - $1,070 per variance (dependent on type of request); $750 for FSH Overlay review; $160 for Tree Removal review; $1,500 for Third Party traffic consultant. Other fees may be identified.
  ** Does not include Design Review fees associated with Multi-Family Dwelling development.*

- Staff review for completeness (30 days max.), if determined incomplete then the applicant submits additional information as required, staff then reviews for completeness again, if the application is deemed complete then the application is processed.

SANDY
WHERE INNOVATION MEETS ELEVATION

EXHIBIT DD

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

January 27, 2020

Roll Tide Properties Corporation
ATTN: Dave Vandehey
PO Box 703
Cornelius, OR 97113

Tracy Brown Planning Consultants, LLC
ATTN: Tracy Brown
17075 Fir Drive
Sandy, OR 97055

All County Surveyors & Planners, Inc.
ATTN: Ray Moore
PO Box 955
Sandy, OR 97055

Johnson Economics
ATTN: Jerry Johnson
621 SE Alder, Ste. 605
Portland, OR 97205

RE: NOTICE REGARDING COMPLETION OF SUBMISSION
FILE NUMBER: 19-050 CPA/ZC/SUB
PROJECT NAME: Bull Run Terrace

☐ Application accepted as complete on: _____

☒ Application incomplete. The additional information necessary to consider your application is listed below. The application will be deemed complete upon submission of one of the following options:

1. All of the missing information;
2. Some of the missing information and written notice that no other information will be provided; or
3. Written notice that none of the missing information will be provided.

If one of the above listed options is not received by the city by the 180th day following submittal of your application, the application will be void per state law (ORS 227.178 (4)).

☐ Requested additional information filed on: _____

Following submission of your land use application (received on 12/30/2019), staff finds the application incomplete. Please submit the following:

- *$1,500 third party fee for traffic review*
- *$164 tree application review fee*
- *Clarification on narrative regarding Section 17.86.20 explaining if a variance is being requested and detailing how the future units will provide housing units 'fronting on the parkland'. I would suggest including an elevation of the apartments or something similar for Planning Commission and City Council to consider. While the apartments are not being reviewed as part of this application the subdivision layout is being reviewed and considerations for the east side of the park will need to be considered with this application.*
- *Clarification on the public needs analysis from Johnson Economics regarding if this analysis and conclusions were reviewed by the Department of Land Conservation and Development (DLCD). The application and more specifically the analysis from Johnson Economics will be reviewed by DLCD as part of the PAPA notice. As analyzed by Johnson Economics the City is processing another comprehensive plan and zoning map change on McCormick Drive. I want to allow the applicant to reach out to DLCD prior to deeming this application complete.*

- *Digital copy of all items*
- *8 additional copies of the plan set and narrative*
- *2 additional copies of all other plans and reports*

Please call me at (503) 489-2163 or email koneill@ci.sandy.or.us if you have any questions.

Sincerely,

Kelly O'Neill Jr.
Development Services Director

SANDY
WHERE INNOVATION MEETS ELEVATION

EXHIBIT EE

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

February 14, 2020

Roll Tide Properties Corporation
ATTN: Dave Vandehey
PO Box 703
Cornelius, OR 97113

Tracy Brown Planning Consultants, LLC
ATTN: Tracy Brown
17075 Fir Drive
Sandy, OR 97055

All County Surveyors & Planners, Inc.
ATTN: Ray Moore
PO Box 955
Sandy, OR 97055

Johnson Economics
ATTN: Jerry Johnson
621 SE Alder, Ste. 605
Portland, OR 97205

RE: NOTICE REGARDING COMPLETION OF SUBMISSION
FILE NUMBER: 19-050 CPA/ZC/SUB
PROJECT NAME: Bull Run Terrace

☒ Application accepted as complete on: **February 14, 2020**

☐ Application incomplete. The additional information necessary to consider your application is listed below. The application will be deemed complete upon submission of one of the following options:

1. All of the missing information;
2. Some of the missing information and written notice that no other information will be provided; or
3. Written notice that none of the missing information will be provided.

If one of the above listed options is not received by the city by the 180th day following submittal of your application, the application will be void per state law (ORS 227.178 (4)).

☐ Requested additional information filed on: _____

Following submission of your land use application (received on 12/30/2019) and additional materials received on 2/11/2020, staff finds the application complete for the purpose of beginning the "120-day clock." **At this time staff will begin reviewing the application.**

Please call me at (503) 783-2587 or email sdenison@ci.sandy.or.us if you have any questions.

Sincerely,

Shelley Denison
Associate Planner

Public Comments:

Click the exhibit to jump to the applicable page
(Note: links not operative in full agenda packet view)

FF. Amelia Williams Robinson (April 23, 2020)
GG. Miriam Chmykhalov (April 23, 2020)
HH. Tom and Linda Hunt (April 26, 2020)
II. Vincent and Lynn Mandina (April 28, 2020)
JJ. Vadim and Miriam Verbelchul (April 28, 2020)
KK. Nicola Skinner (April 30, 2020)
LL. Kathleen Walker (May 1, 2020)
MM. David and Nancy Allan (May 1, 2020)
NN. Izaac McKenzie (May 1, 2020)
OO. Ann Ruhl (May 1, 2020)
PP. Lesley Lowe (May 1, 2020)
QQ. Lonnie Stermon (May 1, 2020)
RR. Tom and Linda Hunt (May 5, 2020)
SS. Gary and Val Roche (May 5, 2020)
TT. Gary and Val Roche (May 6, 2020)
UU. Scott Ruehrdanz (May 7, 2020)
VV. Marion Gunderson (May 26, 2020)
WW. Christian Vedder (May 27, 2020)
XX. Ann Smith Vedder (May 27, 2020)
YY. Susan Dulley (June 2, 2020)
ZZ. Yoshi Hosaka and Itsuo Hosaka (July 28, 2020)
AAA. Gary and Val Roche (July 31, 2020)
BBB. David and Nancy Allan (July 30, 2020)
CCC. David and Nancy Allan (July 31, 2020)
DDD. Dennis Fetter (August 3, 2020)
EEE. Jessica Hutson (August 5, 2020)
FFF. Lee Grundmeyer (August 6, 2020)
GGG. Izaac McKenzie (August 7, 2020)
HHH. Marilyn E. (August 10, 2020)
III. Ryan Clifford (August 14, 2020)
JJJ. Ann Ruhl (August 17, 2020)
KKK. Cameron Strey (August 20, 2020)
LLL. Katie Smith (August 20, 2020)
MMM. Scott Ruehrdanz (August 20, 2020)
NNN. Eileen Suchanek (August 20, 2020)
OOO. Ann Vedder (August 20, 2020)
PPP. Ann Vedder (August 20, 2020)
QQQ. Kelly French (August 20, 2020)
RRR. Rachael Ruehrdanz (August 20, 2020)
SSS. Lori Pyles (August 21, 2020)
TTT. Cameron Zebroff (August 21, 2020)
UUU. Heather Fitch (August 22, 2020)

VVV. Lonnie Stermon (August 23, 2020)
WWW. Nicola A. Skinner (August 24, 2020)
XXX. Izaac McKenzie (August 24, 2020)
YYY. Liza Chatterton (August 24, 2020)
ZZZ. Dough Marshall (August 24, 2020)
AAAA. Zoey McKenzie (August 24, 2020)
BBBB. Makoto Lane (August 24, 2020)
CCCC. Kathleen Walker (August 24, 2020)
DDDD. Ann Ruhl (October 27, 2020)

Marisol Martinez <mmartinez@ci.sandy.or.us>

EXHIBIT FF

Roll Tide Properties Corp. request for development at Deer Point

'ame williams' via Planning <planning@ci.sandy.or.us> Thu, Apr 23, 2020 at 3:43 PM
Reply-To: ame williams <amewilliams0955@yahoo.com>
To: "planning@ci.sandy.or.us" <planning@ci.sandy.or.us>, "sdenison@ci.sandy.or.us" <sdenison@ci.sandy.or.us>
Cc: Kyle Robinson <kidder74@gmail.com>

Dear City of Sandy Planning Division, April 23, 2020

Thank you for your letter dated April 17, 2020 regarding the applicant Roll Tide Properties request for adding a development behind our homes. I am a resident at 18402 Antler Ave., one street West of Meadow and have read through the proposal and would like to take this opportunity to tell you a little about my home here and my philosophy about expansion.

I am incredibly happy that Sandy can expand in size and population, and that the applicant has the necessary means to provide space for families. The arrangement seems correct considering water lines and the space you will need for the additional traffic. Our home sits next to two corner homes with large families and all the vehicles for each driving member of the households, including trucks for work. It was the largest concern for me on deciding the purchase of our home. We have our narrow little entry into the driveway and up into the garage. It feels very claustrophobic and there are times I feel sick about it. However, the house is two stories and feels like a cozy treehouse inside because of the elevation of the property. I really love the house (Not including the parking issue). And, I love it for what we have in nature. Behind our home is a run of coniferous and deciduous trees that absolutely light up my day, every day. When I come home from my long drive from Portland and look out at the gorgeous trees, all the stress melts away. They are beautiful and add a dimension to our neighborhood that will be totally lost in our lifetimes, forever if they are removed. From Sunrises, to sunsets, to harvest moons and the seasons, the trees offer some of the most fantastic backdrops for light to play among the tops. And, if that is the case, can you say snowfall view? Again, priceless, and beautiful.

In reviewing the tree map on the back of the proposal, I cannot see that any of these trees are slated to be saved. Understandably, some need to be removed for all the various reasons in construction. How can Roll Tide reevaluate the tree situation? There must be a zone of 10 feet or so that would allow the trees to stand? I have not walked back there to see myself, but I am also not versed in building a neighborhood. I do however ask, please, if we could keep more of the trees along the back of Meadow Ave. They truly are a part of what makes this neighborhood feel like home, like a permanent home. Without the trees, my treehouse will look out beyond what I know is missing and I cannot imagine the view will be better. I could be reading the tree map incorrectly, but I do not think I am. I am grateful for the patch of trees on the North side of the plan, but it will not help our neighborhood with texture and warmth. If all the trees along that boundary are removed, we will look like any other neighborhood, in any other place in the US.

Thank you for your time. I am pessimistic that the chance of keeping more trees will be a primary request, but I am also hopeful, others in the neighborhood have the same concern. Please, please City of Sandy, ask about keeping the tree line safe. I state that I feel the application should be amended to include keeping the trees parallel to Meadow Ave.

If there is an update on the removal of the trees, please let us know. Also, this letter came to our home we lived in before we moved to Sandy. Please update our address to 18402 Antler Ave. 97055.

Sincerely,

Amelia Williams Robinson
817-320-9534
amewilliams0955@yahoo.com

Marisol Martinez <mmartinez@ci.sandy.or.us>

EXHIBIT GG

Disagreement on Proposal File # 19-050 CPA/ZC/SUB

1 message

'Miriam Chmykhalov' via Planning <planning@ci.sandy.or.us> Thu, Apr 23, 2020 at 5:25 PM
Reply-To: Miriam Chmykhalov <miriamchmykhalov@yahoo.com>
To: planning@ci.sandy.or.us, sdenison@ci.sandy.or.us

Dear City of Sandy,

My husband and I do not approve of this proposal. One of the reasons why we love this property that we moved into is the beautiful forest in our backyard. It would be heartbreaking to see the tall trees and nature that has been here so long destroyed. In addition to that, these trees give us the privacy we were looking for when purchasing this home. We do not want our privacy to be taken away from us.

If this proposal does get approved, we would like to keep a section of those trees that provide us the nature and privacy we need. If not, then replanting new trees along our properties to maintain that privacy.

Please consider our disagreement on this proposal, thank you.

FILE # 19-050 CPA/ZC/SUB

SANDY OREGON

Marisol Martinez <mmartinez@ci.sandy.or.us>

EXHIBIT HH

Proposed New Development

Linda Sue Hunt <lscedarview@msn.com> Sun, Apr 26, 2020 at 4:02 PM
To: "Planning@ci.sandy.or.us" <Planning@ci.sandy.or.us>, "sdenison@ci.sandy.or.us" <sdenison@ci.sandy.or.us>

Dear City of Sandy Planning Commission;

We bought our house on Meadow Ave. because we were told by both the builders that the grassy/trees area across the street was a Dog Park and would never change as designated by writen documents passed by the city. We do not want a rezoned high density housing area (220 apartments) so close, nearly across the road.
We have had family and friends that lived in Dumbarko apartments and it was a nightmare. Kids up all night in the parking lot, drug sales in the parking lot, and so much more worse including entering apartments without permission. These apartments are too far out for good police patroling. We already have a problem with homeless men. It is all a great concern.

Tom and Linda Hunt
541 220 7898
18199 Meadow Ave.
Sandy, OR 97055

EXHIBIT II

4/28/2020

Re: Comments On Proposed New Development – Bull Run Terrace (TYPE IV)
Reference File Number: 19-CPA/ZC/SUB

Comments Listed Below.

My wife and I have lived in the current Deer Point Subdivision since 2006.

Our concerns for the new subdivision are as follows:

1.) Apartments across from single family homes isn't conducive to our neighborhood.
2.) Apartments devalue a neighborhood. The residents of those apartments do not have any direct or long term ownership in the property the apartments are built on.
3.) Traffic into and out of our neighborhood will increase considerably. The proposed increase in traffic concerns the families in our neighborhood for the safety of our children.
4.) The size of the lots in our neighborhood are too small to say the least. We were promised a park 14 years ago for the children to play in and to date there hasn't been one spade of dirt turned and not one single piece of playground equipment constructed to fulfill that promise. Where are the children suppose to play? The streets have been the only option. My wife and I have already been the beneficiaries of having to repaint the side of one of our vehicles because the children don't have any where to play. These streets are also too narrow. Additional neighborhood concerns are can an emergency vehicle navigate down these streets safely if there are parked cars on both sides of a street.
5.) The average Oregon family owns 2- automobiles. With the proposed 210 apartments slated to be built that is 420 possible automobiles commuting in and out of this new subdivision daily. These streets were not constructed to carry that amount of automobile traffic.
6.) We don't have any concerns about the amount of trees the builder has asked to remove. We feel that living on the edge of a large amount of forest, removal of those trees would add a measure of safety should a fire arise in our nearby national forest. There is no shortage of trees in our area so we believe there will be no impact.
7.) Our last concern is how the additional burden the 210 apartments will impact our local schools. Homeowners in Sandy have already absorbed a huge tax levy in the not so recent past when the bill for the new high school was brought to the voters. Why add new congestion to our educational buildings? Our schools are just fine the way they are with the population of students they are presently carrying.

Vincent Mandina
Lynn Mandina

Vincent & Lynn K. Mandina
18351 Meadow Avenue
Sandy, OR 97055

EXHIBIT JJ

COMMENT SHEET for File No. 19-050 CPA/ZC/SUB:

Dear City of Sandy,
My husband and I do not approve of this proposal. One of the reasons why we love this property that we moved into is the beautiful forest in our backyard. It would be heart-breaking to see the tall trees and nature that has been here so long destroyed. In addition to that, these trees give us the privacy we were looking for when purchasing this home. We do not want our privacy to be taken away from us.

Please consider our disaggrement on this proposal, thank you.

Vadim + Miriam Verbetchuk (971)300-3944
Your Name Phone Number

19382 Meadow Ave, Sandy OR 97055
Address

APPLICABLE CRITERIA: Sandy Municipal Code: 17.12 Procedures for Decision Making; 17.18 Processing Applications; 17.20 Public Hearings; 17.22 Notices; 17.24 Comprehensive Plan Amendment Procedures; 17.26 Zoning District Amendments; 17.28 Appeals; 17.30 Zoning District Amendments; 17.32 Parks and Open Space (POS); 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); 17.80 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; and, 15.44 Erosion Control Regulations.

RECEIVED
APR 28 2020
City of Sandy

SANDY OREGON

EXHIBIT KK

Marisol Martinez <mmartinez@ci.sandy.or.us>

Fwd: 19-050 CPA/ZC/SUB

Shelley Denison <sdenison@ci.sandy.or.us> Thu, Apr 30, 2020 at 9:11 PM
To: Marisol Martinez <mmartinez@ci.sandy.or.us>

Hey Marisol,

Could you add this to the 19-050 folder? Thanks!

---------- Forwarded message ---------
From: **skinner.nuskin** <skinner.nuskin@yahoo.com>
Date: Thu, Apr 30, 2020 at 6:29 PM
Subject: 19-050 CPA/ZC/SUB
To: <sdenison@ci.sandy.or.us>

This is in regards to Bull Run Terrace file #19-050

Our neighborhood is a quiet one with many seniors that live here. No one wants someone to build behind them, but the existing plan is somewhat doable.
The ammendment changes this tremendously, especially from Village to R3 (Apartments). Along with 220 more households, comes approximately 400 or more vehicles to be coming and going in a neighborhood that can not accommodate the volume of traffic or parking issues as is. With only 2 exits/entrances that would only make this more problematic.

I have contacted several real estate companies who have verified that housing values would decline significantly if either proposal goes through, especially the amended proposal. It doesn't seem that current residents have to much of a say compared to the builders in all the developments that are springing up here in our town.

Another concern is almost all the trees being removed. The only ones being left are on hwy 26. Has someone addressed how this would affect the current residents 80 to 100 ft trees that are on the property lines? Would this compromise them? How would this affect the habitat of a breeding pair of red tail hawks that are here every year since I moved here 5 years ago? Or the owls and deer we see so often? Our neighborhood is called Deer Pointe.
I feel that it would be in the best interest of all, if this ammendment was denied and further studies done, regarding the habitat that will be eliminated.
Thank you for your consideration.
Nicola Skinner
18422 Meadow
Sandy, OR 97055
503-260-1517

Sent via the Samsung Galaxy S10+, an AT&T 5G Evolution capable smartphone

--
Shelley Denison
Associate Planner

City of Sandy
Development Services Department
39250 Pioneer Blvd
Sandy, OR 97055
503-783-2587
sdenison@ci.sandy.or.us

EXHIBIT LL

Kathleen Walker
15920 SE Bluff Rd.
Sandy, OR 97055

May 1, 2020

Dear Planning Commission:

The Bull Run Terrace proposed zone change will create a deficit in commercial land for the City of Sandy. Commercial zoning along Hwy 26 s virtually the best place for a successful business to be located in Sandy. Businesses off the highway struggle to stay in business. We have alreay depleted our supply of commercial business land and changed some of it to residential to meet developer's preferences for making a quick buck.

It is not the role of the planning commission to change the zone for a process that had extensive public input. The criteria for changing a zone speaks to the following criteria:

Responding to changing conditions: There are no changing conditions. In fact, the UGB boundary was expanded and rezoned to address the lack of commercial land among other things. The analysis was done by a consultant that this developer is using. There is no new conditions, that would overturn the work done in the 2017 UGB expansion planning process.

Responding to changing community attitudes: There has been no effort to assess or conclude that this zone change is supported by the community. I think you will find from public testimony, quite the opposite! The City has already zoned large sections of our town with high and medium denisty zoning. We do not support more high density zoning. We have an adequate supply to meet the demand.

Maintaining the integrity of the Comprehensive Plan: The Comp Plan as mentioned zoned a variety of residential densities and commercial zones. While the developer might make more money with high denisty, it is not the responsibility of the City, nor within the criteria to change zoning because they will make more money.

There is an identified public need is for the park and the extension of Dubarko Road. This can be done with existing zoning in place.

I recommend denial of this zone change. I am sure you will be hearing from other people. This proposal was not listed on the City website that I could find. Nor did I see it in the City PR news sheet sent out this week. I am glad to help get the word out.

Kind Regards,

Kathleen Walker

EXHIBIT MM

COMMENT SHEET for File No. 19-050 CPA/ZC/SUB:

We have no problem with low density development of the property. However we strongly oppose changing parts of the property to high density with the potential of 220 apartment units. This would have a severe detrimental affect on our quiet neighborhood. The vastly increased traffic as a result of 220 apartments would make our streets a dangerous place for children in the neighborhood as result of 2 new streets that connect with Hwy 26.

David & Nancy Allan 503-826-0282
Your Name Phone Number

18417 Meadow Ave, Sandy, OR
Address

APPLICABLE CRITERIA: Sandy Municipal Code: 17.12 Procedures for Decision Making; 17.18 Processing Applications; 17.20 Public Hearings; 17.22 Notices; 17.24 Comprehensive Plan Amendment Procedures; 17.26 Zoning District Amendments; 17.28 Appeals; 17.30 Zoning District Amendments; 17.32 Parks and Open Space (POS); 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); 17.80 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; and, 15.44 Erosion Control Regulations.

COMMENT SHEET for File No. 19-050 CPA/ZC/SUB: EXHIBIT NN

Please do not add apartsments to the proposed new development at 41010 HWY 26 property. Myself and my neighbers would love to see it become (R-1) low Density residential.

The Apartments will increase the traffic significanty and force the roads to become more packed with cars parking in front of our homes.

Izaac McKenzie 503-515-9920

Your Name Phone Number

18428 Meadow Ave. Sandy OR 97055

Address

APPLICABLE CRITERIA: Sandy Municipal Code: 17.12 Procedures for Decision Making; 17.18 Processing Applications; 17.20 Public Hearings; 17.22 Notices; 17.24 Comprehensive Plan Amendment Procedures; 17.26 Zoning District Amendments; 17.28 Appeals; 17.30 Zoning District Amendments; 17.32 Parks and Open Space (POS); 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); 17.80 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; and, 15.44 Erosion Control Regulations.

EXHIBIT OO

Marisol Martinez <mmartinez@ci.sandy.or.us>

File No. 19-050 CPA/ZA/SUB Bull Run Terrace Subdivision

Ann Ruhl <ARuhl@igainc.com> Fri, May 1, 2020 at 1:08 PM
To: "sdenison@ci.sandy.or.us" <sdenison@ci.sandy.or.us>
Cc: "planning@ci.sandy.or.us" <planning@ci.sandy.or.us>

To whom it may concern,

I would like to have it made known – I am against the proposed zoning change for the Bull Run Terrace Subdivision.

I live on Meadow Ave. and this subdivision will be built directly behind my home. While I am glad the proposal has houses planned directly behind me – I am not excited about high density for the rest of the subdivision. I do not want to see the higher traffic in the neighborhoods, the odds in an increase of crime that this number of apartments will bring.

From my understanding there are already plenty of other areas that are already zoned for apartments that developers can develop without a zone changes.

It is important to have commercial zoned land in desirable locations (off HWY 26) to encourage new businesses to be attracted to our town. When we allow this commercial area to be converted to apartments we lose the option for business in the long run. Sandy needs business to thrive. I believe there have been two other commercial zoned areas, with highway frontage that have been changed to apartment zoning. We are losing ground on attracting business in the future.

I believe our population is approaching 12,000 and by state law when a community hits 15,000 ,all new construction is required – to be multi-unit. Why do we need to start this now?

I know I/we cannot stop the growth in Sandy, and growth is necessary to have a thriving community, But I want the City code, policies and a City Council that is resident-friendly not developer-friendly. I see this proposal for changing the zoning to High Density as developer-friendly.

Thank you for your time and consideration.

Ann Ruhl

503-936-9208

18368 Meadow Ave

Sandy Or 97055

annruhl@hotmail.com

EXHIBIT PP

Marisol Martinez <mmartinez@ci.sandy.or.us>

Comments for File No. 19-050 CPA/ZC/SUB

Lesley Lowe <lesleydl09@gmail.com> Fri, May 1, 2020 at 9:29 PM
To: planning@ci.sandy.or.us, sdenison@ci.sandy.or.us

Dear Planning Commission:

The Bull Run Terrace proposed zone change will create a deficit in commercial land for the City of Sandy. Commercial zoning along Hwy 26 is virtually the best place for a successful business to be located in Sandy. Businesses off the highway struggle to stay in business. We have already depleted our supply of commercial business land and changed some of it to residential to meet developer's preferences for making a quick buck.

It is not the role of the planning commission to change the zone for a process that had extensive public input. The criteria for changing a zone speaks to the following criteria:

Responding to changing conditions: There are no changing conditions.

Responding to changing community attitudes: There has been no effort to assess or conclude that this zone change is supported by the community. I think you will find from public testimony, quite the opposite! The City has already zoned large sections of our town with high and medium density zoning. We do not support more high density zoning. We have an adequate supply to meet the demand.

Maintaining the integrity of the Comprehensive Plan: The Comp Plan as mentioned zoned a variety of residential densities and commercial zones. While the developer might make more money with high density, it is not the responsibility of the City, nor within the criteria to change zoning because they will make more money.

There is an identified public need is for the park and the extension of Dubarko Road. This can be done with existing zoning in place.

I recommend denial of this zone change as do several of my neighbors who did not receive the planning change notice. I am sure you will be hearing from my neighbors.

Lesley Lowe

EXHIBIT QQ

Marisol Martinez <mmartinez@ci.sandy.or.us>

Comments for File No. 19-050 CPA/ZC/SUB

Lonnie Stermon <Lstermon@hotmail.com> Fri, May 1, 2020 at 9:54 PM
To: "planning@ci.sandy.or.us" <planning@ci.sandy.or.us>, "sdenison@ci.sandy.or.us" <sdenison@ci.sandy.or.us>

Dear Planning Commission:

The Bull Run Terrace proposed zone change will create a deficit in commercial land for the City of Sandy. Commercial zoning along Hwy 26 is virtually the best place for a successful business to be located in Sandy. Businesses off the highway struggle to stay in business. We have already depleted our supply of commercial business land and changed some of it to residential to meet developer's preferences for making a quick buck.

It is not the role of the planning commission to change the zone for a process that had extensive public input. The criteria for changing a zone speaks to the following criteria:

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Maintaining the integrity of the Comprehensive Plan: The Comp Plan as mentioned zoned a variety of residential densities and commercial zones. While the developer might make more money with high density, it is not the responsibility of the City, nor within the criteria to change zoning because they will make more money.

There is an identified public need for the kids park which has been in planning for years along with the dog park, and the extension of Dubarko Road. This can be done with existing zoning in place.

I recommend denial of this zone change as do several of my neighbors who did not receive the planning change notice. I am sure you will be hearing from my neighbors.

We also feel the crime level may go up with high density like apartments and feel that businesses need the land more. Sandy is a small town and growing but we don't need to grow so much that we become closer to those other bigger cities. Let's value sandy where it is and love our town how it is.

Thank you for your time,
Lonnie Stermon
Deer point neighborhood

EXHIBIT RR

COMMENT SHEET for File No. 19-050 CPA/ZC/SUB:

We bought our house on Meadow because we were told by both of the builders the grassy/trees were a dog park and would never change as designated by a written document + past by the city. No we do not want a large group of apartments in high or medium dense living across the road. We've had friends + family who have lived in the Dumbarko apartments and it was a nightmare. Kids up all night in the parking lot, drug sales in parking lot, and so much more including entering apartments without permission. These apartments are too far out for good police patrolings. We already have a problem with homeless men. It is SLL a great concern.

Tom + Linda Hunt — 541-220-7898

Your Name — Phone Number

18199 Meadow Ave, Sandy, OR 97055

Address

APPLICABLE CRITERIA: Sandy Municipal Code: 17.12 Procedures for Decision Making; 17.18 Processing Applications; 17.20 Public Hearings; 17.22 Notices; 17.24 Comprehensive Plan Amendment Procedures; 17.26 Zoning District Amendments; 17.28 Appeals; 17.30 Zoning District Amendments; 17.32 Parks and Open Space (POS); 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); 17.80 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; and, 15.44 Erosion Control Regulations.

RECEIVED
MAY 05 2020
City of Sandy

EXHIBIT SS

Comments for File# 19-050-CPA/ZC/SUB

I have three concerns.
One is parking. I encourage the city to require the apartments to all have parking. We all know the problems created when apartments are built with inadequate parking. Tenants getting home late , finding no parking near their apartment, parks two blocks away in a residential neighborhood where parking is already at a premium.

Second is trees. It looks like 90% of the trees will be removed! Those trees provide noise abatement from noisy Hwy 26, and it is loud. From west bound big rigs slowing down using air brakes to east bound cars and motorcycles speeding up from the traffic light at Wolf Dr. Trees also absorb dust and wind and reduce glare and create an eye-soothing canopy of green. If as many trees can be spared as possible, especially the big ones, it will make the area more tolerable.

I would also like the city to install speed humps or traffic circles on Fawn and Dubarko streets to slow the inevitable vehicles exceeding the speed limit.

Gary and Val Roche
40494 Fawn St
Sandy OR 97055

RECEIVED
MAY 05 2020
City of Sandy

Marisol Martinez <mmartinez@ci.sandy.or.us>

Re: EXHIBIT TT

Kelly O'Neill Jr. <koneill@ci.sandy.or.us> Wed, May 6, 2020 at 12:29 PM
To: Marisol Martinez <mmartinez@ci.sandy.or.us>, Shelley Denison <sdenison@ci.sandy.or.us>

---------- Forwarded message ---------
From: **Gary Roche** <groche51@gmail.com>
Date: Wed, May 6, 2020 at 12:18 PM
Subject:
To: <Recorder@ci.sandy.or.us>, <koneill@ci.sandy.or.us>

Comments for File# 19-050 CPA/ZC/SUB Bull Run Terrace

I recently received in the mail a notice of the Bull Run Terrace zoning change. I can see no reason why the zoning on the property should be changed. The owner of the property knew when he bought it what the zoning was and it should not be changed so that the property owner can cram high density apartments on this land and make more money off the property. There is no good reason the city should approve this zoning change.

Land next to Hwy 26 should be reserved for commercial use. Building apartments on the land is a bad idea. Hwy 26 is a very loud highway and not suitable for high density apartments.

Some of the City of Sandy's criteria for changing a zone are:
1) Changing conditions. There are no changing conditions that I can see.
2) Changing community attitudes. No one in my community (Deer Pointe) wants high density apartments next to our single family homes.

I see no plan for a signal at Hwy26/Dubarko Rd. That will make this intersection very dangerous to cross as vehicles are going 55-60 on Hwy 26.

I recommend denial of this zoning change.

Gary and Val Roche

--
[Quoted text hidden]

Marisol Martinez <mmartinez@ci.sandy.or.us>

Fwd: Letter for Bull Run Terrace EXHIBIT UU

Jeff Aprati <japrati@ci.sandy.or.us> Thu, May 7, 2020 at 12:32 PM
To: Marisol Martinez <mmartinez@ci.sandy.or.us>, Shelley Denison <sdenison@ci.sandy.or.us>, Kelly O'Neill <koneill@ci.sandy.or.us>

FYI

Jeff Aprati
City Recorder / Management Analyst
City of Sandy
503-489-0938
japrati@ci.sandy.or.us

---------- Forwarded message ---------
From: **'RaynRoo Ruehrdanz' via City Recorder** <recorder@ci.sandy.or.us>
Date: Thu, May 7, 2020 at 12:20 PM
Subject: Letter for Bull Run Terrace
To: spulliam@cityofsandy.com <spulliam@cityofsandy.com>, Recorder@ci.sandy.or.us <Recorder@ci.sandy.or.us>, koneill@ci.sandy.or.us <koneill@ci.sandy.or.us>

Dear Planning Commission, City Planning Staff, and City Councilors:

I have lived in the Deer Pointe neighborhood for the past 9 years. I moved to the City of Sandy because of its' small town feel and the lower population compared to many other cities in the Urban Growth Boundary. I have seen what large, high density housing can do to a city. This city doesn't have a lot of high density housing, which is why this city is one of the top moveable cities in Oregon. We, as a community, have seen more and more cars and homeless people moving into the area. The traffic in this area has gotten severely worse over the last few years. There are times when you have to wait several minutes just to get onto 26. This is not acceptable and is only going to get worse when you add in more high density neighborhoods like the proposed zoning changes to conditions at the Bull Run Terrace. This will also create many lost opportunities for commercial businesses to want to come to Sandy and create a new business to thrive in. This city has had the same businesses for years and it would be welcomed to have new business move in to create a new sense of change instead of the same old businesses. I know for my family, we will often go to Gresham for things we need, instead of staying here and shopping local. We need more choices in the city so we can stay local. This is a huge problem that could be solved by keeping the commercial zoning and not changing it to high density housing. The City has already changed several commercial zoning areas to high density, such as the land over by Avamere. This was a commercial zone and a vote was taken to make it apartments. You all need to think about the ramifications on the residents that currently live here and not the ones that will be moving here. I have no problem with the city growing, but make sure it is done correctly. High density housing is not the answer. The overall quality of living will go down and our home prices will go down even faster when you add in apartments in the area. I have no problems with single family dwellings or low density housing.

I also find it hard to believe that you, as high ranking members of the city, would allow only a stop sign to be added to Dubarko Street if it is linked up with Highway 26. It is already hard enough to get out onto 26 safely. Many people go to the light by the post office, which creates major back-ups, which is going to get worse with the high density housing by Avamere. This is going to be a bad situation. The stop sign at Langensand is already a danger with the speed of the cars that are going well over 40mph speed limit. My wife has already been hit there. You are now going to create an even more dangerous intersection at Dubarko and 26 with only a stop sign. Please reconsider this and make it a light so it is safe for your people who live in the area who will be using that intersection. This area needs to start thinking more about safety and not about tax dollars, which are higher than most cities in the Urban Growth Boundary already. Please reconsider your views on wanting to change the Bull Run Terrace subdivision to high density. It was already voted on to keep it low density and commercial for a reason.

Thanks,

Scott Ruehrdanz

40498 Fawn Street

Sandy, Oregon

715-703-0839

Sent from Mail for Windows 10

File Number 19-050 (PA/ZC/Sub)

EXHIBIT VV

Rec'd
May 26, 2020

Sandy Planning Commission

My name is Marion "Jo An" Gunderson
18342 Antler Ave - Deer Park Subdivision
503-668-4386

Being the home owner and living at this address I am very concerned about the plans and lay out of Bull Run Terrace Subdivision. We already have enough Traffic Thru our Neighbor hood and cars parked on both sides of the streets which makes it one way Traffic to get Thru. The plans call for Dubarko to be one of the main roads in to this subdivision, by doing this it will become and express way. Also Fawn street will be a short cut Thru our Neighbor hood. Most of us Seniors go to the stop light by the post office which is always a Traffic Jam, your lucky if three cars get Thru, Taking Langensand to get on Hwy 26 west is a death ~~Trap~~ Trap for us.

If there is a subdivision put in next to ours please make their entrance and exit off Hwy 26 at a stoplight.

Marion "Jo An" Gunderson

May 27, 2020

EXHIBIT WW

Dear Planning Commission and City Planning Staff:

The Bull Run Terrace proposed zone change will create a deficit in commercial land for the City of Sandy. Commercial zoning along Hwy 26 is virtually the best place for a successful business to be located in Sandy. Businesses off the highway struggle to stay in business. We have already depleted our supply of commercial business land, and changed some of it to residential, to meet developer's preferences for making a quick buck.

It is not the role of the planning commission to change the zone for a process that had extensive public input. That is called spot zoning. The City's criteria for changing a zone speaks to the following criteria:

Responding to changing conditions: There are no changing conditions. In fact, the UGB boundary was expanded and rezoned recently, to address the lack of commercial land among other things. The analysis was done by a consultant that this developer is using. There are no new conditions that would overturn the work done in the 2017 UGB expansion planning process.

Responding to changing community attitudes: There has been no effort to assess or conclude that this zone change is supported by the community. I think you will find from public testimony, quite the opposite! The City has already zoned large sections of our town with high and medium density zoning. We do not support more high density zoning. We have an adequate supply to meet the demand.

Maintaining the integrity of the Comprehensive Plan: The Comp Plan as mentioned, zoned a variety of residential densities and commercial zones. While the developer might make more money with high density, it is not the responsibility of the City, nor within the criteria, to change zoning because they will make more money.

There is an identified public need for the park and the extension of Dubarko Road. This can and will be done with existing zoning in place.

I recommend denial of this zone change. I am sure you will be hearing from other people.

This proposal was not listed on the City website that I could find – and I know where to look. Nor did I see it in the City PR news sheet sent out this week. I am glad to help get the word out, however, I do not believe I should be responsible for doing that. So as annoyed as some of you may be, about the Sandy Residents for Responsible Growth Facebook Page, I found it critically important to let Sandy residents know what is going on. To hear folks say that folks did not show up to a meeting, or provide comments, when they had no idea about it, or if they got a legal notice, did not understand what that meant to them, was frustrating. My repeated pleas for the City to inform folks of zone and code changes and developments, in a short, simple to read explanation with clear maps, on at least the City Facebook page, in a transparent manner were ignored. I hope that can improve in the future. I know you all work hard and I appreciate everyone's efforts.

Christian Vedder
40493 Fawn St, Sandy OR 97055

May 27, 2020

EXHIBIT XX

Dear Planning Commission and City Planning Staff:

The Bull Run Terrace proposed zone change will create a deficit in commercial land for the City of Sandy. Commercial zoning along Hwy 26 is virtually the best place for a successful business to be located in Sandy. Businesses off the highway struggle to stay in business. We have already depleted our supply of commercial business land, and changed some of it to residential, to meet developer's preferences for making a quick buck.

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Sincerely,

Ann Smith Vedder
40493 Fawn St, Sandy OR 97055

EXHIBIT YY

COMMENT SHEET for File No. 19-050 CPA/ZC/SUB:

Re- Bull Run Terrace (proposed)

I own a home at 40625 SE Hwy 26.
I strongly oppose building a development with potentially 220 apartment units. The traffic on Hwy 26 going past my residence is at times intolerable. Not to mention the traffic going through Sandy to try to go to the grocery store or to a doctor's appointment.
Is there any proposal to solve the increased traffic? I bought the home 15 yrs ago because it was a small town. Do we really want to change the atmosphere of the ~~town~~ town any further? Don't we want to keep it unique with a small town feeling?

Susan Dudley 207-227-2320
Your Name Phone Number

18131 NE 38th St Ocala FL 34479
Address

APPLICABLE CRITERIA: Sandy Municipal Code: 17.12 Procedures for Decision Making; 17.18 Processing Applications; 17.20 Public Hearings; 17.22 Notices; 17.24 Comprehensive Plan Amendment Procedures; 17.26 Zoning District Amendments; 17.28 Appeals; 17.30 Zoning District Amendments; 17.32 Parks and Open Space (POS); 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); 17.80 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; and, 15.44 Erosion Control Regulations.

EXHIBIT ZZ

Marisol Martinez <mmartinez@ci.sandy.or.us>

RE: Comments for file# 19-050 CPA/ZC/SAP/SUB/TREE Bull Run Terrace Subdivision

Yoshi Hosaka <yoshihosaka@gmail.com> Tue, Jul 28, 2020 at 1:50 PM
To: planning@ci.sandy.or.us, sdenison@ci.sandy.or.us

Hello,

Application should not be approved.

I would like to see as part of the proposal better traffic transition and mitigation into Hwy26 of both Lagensand and what will now connect Dubarko to Hwy26. As this section of Hwy26 is designated a safety corridor, it implies there is poorly managed traffic risk for these arteries that are opened up to this dangerous stretch of hwy. With the increased density, Lagensand is already an unregulated feeder to hwy26 and now this proposal will add Dubarko.

It is irresponsible to incrementally add increased density and subsequent access to Hwy26 without proper traffic management.

Feel free to reach out via this e-mail address.

Thanks,
Yoshi Hosaka
(on behalf of Itsuo Hosaka)
35288 SE Kelso Rd
Boring, OR 97009

Marisol Martinez <mmartinez@ci.sandy.or.us>

(no subject) EXHIBIT AAA

Gary Roche <groche51@gmail.com> Fri, Jul 31, 2020 at 11:51 AM
To: planning@ci.sandy.or.us

Comments for 19-050 CPA/ZC/SAP/SUB/TREE Bull Run Terrace Subdivision:

It pleases me lot 7 has been changed to C-3. HWY 26 needs more commercial land available to develop. I'm also happy to see the developer saving 59 trees when he only has to save 43. Of course, more would be better, especially along the west side of lots 1-5. This would help with noise abatement.

I don't know how stressed the current sewage treatment plant is but maybe Sandy should put a moratorium on new residential construction until the new facility is on line. I'm afraid Sandy is becoming more like Gresham or Portland with all of the apartments being built.

I would like lots 5 and 6 to remain R-2 medium density. Townhouses, condos, etc would blend in with the existing residential neighborhood better than apartments. I would only be in favor of a yes vote for zoning change if there were no high-density building.

Gary and Val Roche
40494 Fawn St
503-341-3257

EXHIBIT BBB

COMMENT SHEET for File No. 19-050 CPA/ZC/SAP/SUB/TREE:

Unlike the original proposal, this proposal does not detail the number of units in the R3 High-Density Residential area. I hope this oversight was not intentional. We strongly oppose any high density building as the increased traffic would adversely affect our neighborhood. Also in extending Fawn street you would have to remove a huge old-growth evergreen tree. We support keeping the zoning as is limiting development to R-1 (Low Density) and R-2 (Medium-Density) building. We also question rather it is necessary to extend Fawn and cut down a beautiful tree.

Your Name: David & Nancy Allan

Phone Number: 503-826-0282

Address: 18417 Meadow Ave, Sandy, OR

APPLICABLE CRITERIA: Sandy Municipal Code: 17.12 Procedures for Decision Making; 17.18 Processing Applications; 17.20 Public Hearings; 17.22 Notices; 17.24 Comprehensive Plan Amendment Procedures; 17.26 Zoning District Amendments; 17.28 Appeals; 17.30 Zoning District Amendments; 17.32 Parks and Open Space (POS); 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); 17.54 Specific Area Plan Overlay; 17.80 Additional Setbacks on Collector and Arterial Streets; 17.82 Special Setbacks on Transit Streets; 17.84 Improvements Required with Development; 17.86 Parkland and Open Space; 17.92 Landscaping and Screening; 17.98 Parking, Loading, and Access Requirements; 17.100 Land Division; 17.102 Urban Forestry; 15.30 Dark Sky; and, 15.44 Erosion Control Regulations.

Marisol Martinez <mmartinez@ci.sandy.or.us>

(no subject)

EXHIBIT CCC

Gary Roche <groche51@gmail.com> Fri, Jul 31, 2020 at 11:51 AM
To: planning@ci.sandy.or.us

Comments for 19-050 CPA/ZC/SAP/SUB/TREE Bull Run Terrace Subdivision:

It pleases me lot 7 has been changed to C-3. HWY 26 needs more commercial land available to develop. I'm also happy to see the developer saving 59 trees when he only has to save 43. Of course, more would be better, especially along the west side of lots 1-5. This would help with noise abatement.

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I would like lots 5 and 6 to remain R-2 medium density. Townhouses, condos, etc would blend in with the existing residential neighborhood better than apartments. I would only be in favor of a yes vote for zoning change if there were no high-density building.

Gary and Val Roche
40494 Fawn St
503-341-3257

EXHIBIT DDD

COMMENT SHEET for File No. 19-050 CPA/ZC/SAP/SUB/TREE:

NO

NO

NO

Hell NO

Your Name: Dennis Fetter

Phone Number: 503-380-7948

Address: 18348 Antler

APPLICABLE CRITERIA: Sandy Municipal Code: 17.12 Procedures for Decision Making; 17.18 Processing Applications; 17.20 Public Hearings; 17.22 Notices; 17.24 Comprehensive Plan Amendment Procedures; 17.26 Zoning District Amendments; 17.28 Appeals; 17.30 Zoning District Amendments; 17.32 Parks and Open Space (POS); 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); 17.54 Specific Area Plan Overlay; 17.80 Additional Setbacks on Collector and Arterial Streets; 17.82 Special Setbacks on Transit Streets; 17.84 Improvements Required with Development; 17.86 Parkland and Open Space; 17.92 Landscaping and Screening; 17.98 Parking, Loading, and Access Requirements; 17.100 Land Division; 17.102 Urban Forestry; 15.30 Dark Sky; and, 15.44 Erosion Control Regulations.

EXHIBIT EEE

Marisol Martinez <mmartinez@ci.sandy.or.us>

Bull Run Terrace Subdivision Comments

Jessie Hutson <hutson.jessie@gmail.com> Wed, Aug 5, 2020 at 5:37 PM
To: planning@ci.sandy.or.us

Hello,

I currently live off Meadow & Dubarko.

My family and I are very concerned with the change in zoning to high density. The issues we are concerned about are the influx in traffic down Dubarko with cars going well over the speed limit as it is, we fear this will just add to the existing issue. We also are concerned about our property value going down, which comes with having apartments in close proximity. Lastly, we are concerned about the lack of parking available with the influx of all the tenants for the apartment complex. We know several neighbors who are very concerned with the proposed change in density as well. We hope that the zoning can remain the same with medium and low density.

Sincerely,

Jessica Hutson

Marisol Martinez <mmartinez@ci.sandy.or.us>

EXHIBIT FFF

Bull run development

1 message

Lee Grundmeyer <DurendConstructionLLC@outlook.com> Thu, Aug 6, 2020 at 4:26 PM
To: "planning@ci.sandy.or.us" <planning@ci.sandy.or.us>

Hello,

I currently live off Meadow & Dubarko.

My family and I are very concerned with the change in zoning to high density. The issues we are concerned about are the influx in traffic down Dubarko with cars going well over the speed limit as it is, we fear this will just add to the existing issue. We also are concerned about our property value going down, which comes with having apartments in close proximity. Lastly, we are concerned about the lack of parking available with the influx of all the tenants for the apartment complex. We know several neighbors who are very concerned with the proposed change in density as well. We hope that the zoning can remain the same with medium and low density.

Sincerely,

Lee Grundmeyer -Owner
503.799.8198
PO Box 595
Sandy, Or 97055
DUREND CONSTRUCTION LLC
CCB 198948 Licensed Bonded Insured since 1998
National Certified Tile Installer #1540
Certified Flooring Installer
National Tile Council of America - Member
WEDI Pro Installer #127

EXHIBIT GGG

Marisol Martinez <mmartinez@ci.sandy.or.us>

19-050 CPA/ZC/SAB/SUB/TREE

1 message

Izaac <mckenzi@eou.edu> Fri, Aug 7, 2020 at 10:34 AM
To: planning@ci.sandy.or.us, sdenison@ci.sandy.or.us

Hello,
My name is Izaac McKenzie and I live at 18428 Meadow Ave.
My neighbors and I are very concerned about the commercial and high density building that is purposed for the lot in question.
We are concerned that the physical impacts of new multistory development to adjacent residences will have negative effects on both ground-level activities, such as parking and services, and upper-story impacts affecting privacy, sunlight, and visual qualities
Our neighborhood streets are already full due to parking issues and the traffic related to the purposed plan will only increase this issue.
The commercial buildings will bring new concerns related to dumpsters and service areas, particularly if they contain food waste.
We understand that there are advantages to to current purposed plan but we believe the disadvantage outweigh them.
Residential and commercial owners and residents often clash, because they hold opposing interests and goals. This will not improve the neighborhood.
Living in close proximity of commercial uses may expose residents to disturbances such as noise, foul odors, bright lights, and similar quality of life nuisances. We are concerned that eliminating trees will have a negative effect on the mental health of the residents, especially with more people working from home due to the current situation.
We are concerned that removing trees for residential building will have an exponentially increasing impact on the community. Listed below are a couple examples from he Food and Agricultural Organization of the United States.
Trees play an important role in increasing urban biodiversity, providing plants and animals with a favourable habitat, food and protection.
A mature tree can absorb up to 150 kg of CO_2 per year. As a result, trees play an important role in climate change mitigation. Especially in cities with high levels of pollution, trees can improve air quality, making cities healthier places to live in.
Strategic placement of trees in cities can help to cool the air between 2 and 8 degrees Celsius, thus reducing the urban “heat island” effect, and helping urban communities to adapt to the effects of climate change.
Large trees are excellent filters for urban pollutants and fine particulates. They absorb pollutant gases (such as carbon monoxide, nitrogen oxides, ozone and sulfer oxides) and filter fine particulates such as dust, dirt or smoke out of the air by trapping them on leaves and bark.
Research shows that living in close proximity of urban green spaces and having access to them, can improve physical and mental health, for example by decreasing high blood pressure and stress. This, in turn, contributes to the well-being of urban communities.
Mature trees regulate water flow and play a key role in preventing floods and reducing the risk of natural disasters. A mature evergreen tree, for instance, can intercept more than 15 000 liters of water per year.
Trees also help to reduce carbon emissions by helping to conserve energy. For example, the correct placement of trees around buildings can reduce the need for air conditioning by 30 percent, and reduce winter heating bills by 20-50 percent.
Planning urban landscapes with trees can increase property value, by up to 20 percent, and attract tourism and business.
Thank you for taking the time to read our concerns with the current purposed plans.

Thank you
Izaac McKenzie

EXHIBIT HHH

COMMENT SHEET for File No. 19-050 CPA/ZC/SAP/SUB/TREE:

My husband & I are not happy about the multi-family units under consideration. When we bought our home 7½ years ago We were told the land you are inquiring about was to be single family homes + a park. If we knew multi-family units were to be built We would not have purchased it. We were planning on this being our retirement home. There has already been one neighbor has sold 2 others are considering selling as are we. Multi-family housing will change the dynamics of our neighborhood. We would like to be on record as highly against this decision on multi-family housing Due to covid + our age we will not be able to attend meeting

Marilyn Eulenstein — 503-964-1132
Your Name — Phone Number

40482 Buck Street
Address

APPLICABLE CRITERIA: Sandy Municipal Code: 17.12 Procedures for Decision Making; 17.18 Processing Applications; 17.20 Public Hearings; 17.22 Notices; 17.24 Comprehensive Plan Amendment Procedures; 17.26 Zoning District Amendments; 17.28 Appeals; 17.30 Zoning District Amendments; 17.32 Parks and Open Space (POS); 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); 17.54 Specific Area Plan Overlay; 17.80 Additional Setbacks on Collector and Arterial Streets; 17.82 Special Setbacks on Transit Streets; 17.84 Improvements Required with Development; 17.86 Parkland and Open Space; 17.92 Landscaping and Screening; 17.98 Parking, Loading, and Access Requirements; 17.100 Land Division; 17.102 Urban Forestry; 15.30 Dark Sky; and, 15.44 Erosion Control Regulations.

RECEIVED
AUG 10 2020
City of Sandy

EXHIBIT III

Marisol Martinez <mmartinez@ci.sandy.or.us>

Fwd: Comments for file no. 19-050 CPA/ZC/SAP/SUB/TREE

Shelley Denison <sdenison@ci.sandy.or.us> Tue, Aug 18, 2020 at 7:39 AM
To: Marisol Martinez <mmartinez@ci.sandy.or.us>

Heyyy,

Here's some comments for 19-050.

---------- Forwarded message ---------
From: **Ryan Clifford** <rcclifford@gmail.com>
Date: Fri, Aug 14, 2020 at 1:23 PM
Subject: Comments for file no. 19-050 CPA/ZC/SAP/SUB/TREE
To: <sdenison@ci.sandy.or.us>

Hello Shelley, comments on this project are below:

Comments for file no. 19-050 CPA/ZC/SAP/SUB/TREE:

"Tenants have commented that housing in this area is getting quite dense and there is a lack of parks or open spaces for children to play"

Applicable Address: 40488 Fawn St in Sandy, OR

Thank you,

Ryan Clifford
Clifford Enterprises
(509) 456-2530 Voice
(509) 570-0430 Fax

The information contained in this electronic communication, and any electronic attachment(s), is CONFIDENTIAL. Information that is transmitted for the conduction of business is also CONFIDENTIAL. It is intended only for the named recipient(s) above. If the reader of this message is not the intended recipient(s), you are hereby notified that any release of information or distribution of this communication is prohibited by law. If you have received this message in error, or are not the named recipient(s), please immediately notify the sender via reply email and delete this communication.

--
Shelley Denison
Associate Planner

City of Sandy
Development Services Department
39250 Pioneer Blvd
Sandy, OR 97055
503-783-2587
sdenison@ci.sandy.or.us

EXHIBIT JJJ

Marisol Martinez <mmartinez@ci.sandy.or.us>

File No. 19-050 CPA/ZA/SUB Bull Run Terrace Subdivision

Ann Ruhl <ARuhl@igainc.com> Mon, Aug 17, 2020 at 11:36 AM
To: "planning@ci.sandy.or.us" <planning@ci.sandy.or.us>, "sd.3077@spartannash.com" <sd.3077@spartannash.com>

To whom it may concern,

I would like to have it made known – I am still against the "revised" proposed zoning change for the Bull Run Terrace Subdivision.

I live on Meadow Ave. and this subdivision will be built directly behind my home. While I am glad the revised proposal has houses planned directly behind me – is now including commercial, am not excited about high density for the rest of the subdivision. I do not want to see the higher traffic in the neighborhoods, the odds in an increase of crime that this number of apartments will bring, and the possibility of lower property values due to that amount of apartments.

From my understanding, there are already plenty of other areas that are already zoned for apartments that developers can develop without zone changes.

I believe our population is approaching 12,000 and by state law when a community hits 15,000, all new construction is required – to be multi-unit. Why do we need to start this now?

I know I/we cannot stop the growth in Sandy, and growth is necessary to have a thriving community, But I want the City code, policies, and a City Council that is resident-friendly, not developer-friendly. I see this proposal for changing the zoning to High Density as developer-friendly. Leave it as approved.

Thank you for your time and consideration.

Ann Ruhl

503-936-9208

18368 Meadow Ave

Sandy Or 97055

annruhl@hotmail.com

Marisol Martinez <mmartinez@ci.sandy.or.us>

EXHIBIT KKK

Concerned citizen of deer point

cameron strey <camstrey@gmail.com> Thu, Aug 20, 2020 at 8:50 PM
To: recorder@ci.sandy.or.us, planning@ci.sandy.or.us

Dear Planning Commission and City Planning Staff:

The Bull Run Terrace developers propose both a change to the Sandy Comprehensive Plan and a Type IV Zone map amendment to create high density zoning to make more money, leaving Sandy residents to suffer the increased traffic, more crowded schools and increased pressure on our sewer, water and other services. LCDC's direction on Comp Plan updates say:

"Comp plan details guide elected and appointed officials in land use decisions, such as whether to allow a zone change or grant a conditional use permit. Because comprehensive plans are so vital in major land use decisions, the law requires an open, transparent process to create or amend them, including citizen and stakeholder input. Comp plans are not, however, engraved in stone. They eventually need change as community needs, goals and resources change. In fact, state rules encourage the periodic review and update of local comp plans."

This proposal, and more recent approved zone changes (for example, west of Avamere), are in affect "spot zoning". If the City wants to review and update our Comp plan and zoning designations for where and how much we have low, medium and high density, commercial and industrial lands, they need to enter into that holistic planning process. They should not continue to allow the planning commission and City Council to make piece meal zone changes as developers come to you saying "they can't make (enough!) money on the property!" It is not the role of the City to manage for developer's maximum profit. The developers should be doing their due diligence on development costs, markets, and demand prior to purchase. The City's criteria for changing a zone speaks to the following criteria:

Responding to changing conditions: There are no changing conditions. In fact, the UGB boundary was expanded and rezoned recently, to address the lack of commercial land among other things. The analysis was done by a consultant that this developer is using. There are no new conditions that would overturn the work done in the 2017 UGB expansion planning process. There is already high density allocations that can meet this need. Because the City has developed much of it's SFR with such small lot sizes, there is more of a deficit of the low density housing.

Responding to changing community attitudes: There has been no effort to assess or conclude that this zone change is supported by the community. I think you will find from public testimony, quite the opposite! The City has already zoned large sections of our town with high and medium density zoning. We do not support more more high density zoning. We have an adequate supply to meet the demand. The community attitude for one of the fastest growing cities in Oregon is, slow down! Upzoning this area to high density is the opposite of that.

Maintaining the integrity of the Comprehensive Plan: Pieemealing zoning decisions to meet individual property owners' whims destroys the integrity of the Comp Plan. The Comp Plan as mentioned, zoned a variety of residential densities and commercial zones to provide diversity and meet our needs. While the developer might make more money with high density, it is not the responsibility of the City, nor within the criteria, to change zoning because they will make more money. Individual

There is an identified public need for the park and the extension of Dubarko Road. This can be done with existing zoning in place. The City also has the option of purchasing park property. The City **should NOT** be piecemealing incremental zone changes on the Comp Plan so developers can make "enough" money.

I do not support increasing density on this parcel, and there by increasing traffic, school students, needed water and sewer capacity and the other effects of high density construction. I recommend denial of this zone and Comprehensive Plan change. I am sure you will be hearing from other people.

Sincerely

Cameron Strey

18197 Antler Ave
Sandy OR
97055

EXHIBIT LLL

Marisol Martinez <mmartinez@ci.sandy.or.us>

Fwd: Planning Commission and City Planning

Jeff Aprati <japrati@ci.sandy.or.us> Sat, Aug 22, 2020 at 8:56 AM
To: Kelly O'Neill <koneill@ci.sandy.or.us>, Marisol Martinez <mmartinez@ci.sandy.or.us>, Shelley Denison <sdenison@ci.sandy.or.us>

Jeff Aprati
City Recorder / Management Analyst
City of Sandy
503-489-0938
japrati@ci.sandy.or.us

---------- Forwarded message ---------
From: **katieannsmith1012** <katieannsmith1012@gmail.com>
Date: Thu, Aug 20, 2020 at 2:18 PM
Subject: Planning Commission and City Planning
To: <recorder@ci.sandy.or.us>, <planningl@ci.sandy.or.us>

Dear Planning Commission and City Planning Staff:

The Bull Run Terrace developers propose both a change to the Sandy Comprehensive Plan and a Type IV Zone map amendment to create high density zoning to make more money, leaving Sandy residents to suffer the increased traffic, more crowded schools and increased pressure on our sewer, water and other services. LCDC's direction on Comp Plan updates say:

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I do not support increasing density on this parcel, and there by increasing traffic, school students, needed water and sewer capacity and the other effects of high density construction. I recommend denial of this zone and Comprehensive Plan change. I am sure you will be hearing from other people.

Sincerely

Katie Smith

18197 Antler Ave
Sandy OR
97055

Sent via the Samsung Galaxy S10, an AT&T 5G Evolution capable smartphone

Marisol Martinez <mmartinez@ci.sandy.or.us>

EXHIBIT MMM

Fwd: letter for Bull Run Terrace

Jeff Aprati <japrati@ci.sandy.or.us> Sat, Aug 22, 2020 at 8:57 AM
To: Kelly O'Neill <koneill@ci.sandy.or.us>, Marisol Martinez <mmartinez@ci.sandy.or.us>, Shelley Denison <sdenison@ci.sandy.or.us>

Jeff Aprati
City Recorder / Management Analyst
City of Sandy
503-489-0938
japrati@ci.sandy.or.us

---------- Forwarded message ---------
From: **'RaynRoo Ruehrdanz' via City Recorder** <recorder@ci.sandy.or.us>
Date: Thu, Aug 20, 2020 at 6:54 PM
Subject: letter for Bull Run Terrace
To: planningl@ci.sandy.or.us <planningl@ci.sandy.or.us>, Recorder@ci.sandy.or.us <Recorder@ci.sandy.or.us>

Dear Planning Commission and City Planning Staff:

The Bull Run Terrace developers propose both a change to the Sandy Comprehensive Plan and a Type IV Zone map amendment to create high density zoning to make more money, leaving Sandy residents to suffer the increased traffic, more crowded schools and increased pressure on our sewer, water and other services. LCDC's direction on Comp Plan updates say:

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I do not support increasing density on this parcel, and there by increasing traffic, school students, needed water and sewer capacity and the other effects of high density construction. I recommend denial of this zone and Comprehensive Plan change. I am sure you will be hearing from other people.

Sincerely

Scott Ruehrdanz

40498 Fawn Street Sandy Oregon

Sent from Mail for Windows 10

EXHIBIT NNN

Marisol Martinez <mmartinez@ci.sandy.or.us>

Fwd: Supporting Sandy Residents

Jeff Aprati <japrati@ci.sandy.or.us> Sat, Aug 22, 2020 at 8:58 AM
To: Kelly O'Neill <koneill@ci.sandy.or.us>, Marisol Martinez <mmartinez@ci.sandy.or.us>, Shelley Denison <sdenison@ci.sandy.or.us>

Jeff Aprati
City Recorder / Management Analyst
City of Sandy
503-489-0938
japrati@ci.sandy.or.us

---------- Forwarded message ---------
From: **Eileen Suchanek** <emcsuch@gmail.com>
Date: Thu, Aug 20, 2020 at 7:50 PM
Subject: Supporting Sandy Residents
To: <recorder@ci.sandy.or.us>

August 20, 2020

Dear Planning Commission and City Planning Staff:

The Bull Run Terrace developers propose both a change to the Sandy Comprehensive Plan and a Type IV Zone map amendment to create high density zoning to make more money, leaving Sandy residents to suffer the increased traffic, more crowded schools and increased pressure on our sewer, water and other services. LCDC's direction on Comp Plan updates say:

> *"Comp plan details guide elected and appointed officials in land use decisions, such as whether to allow a zone change or grant a conditional use permit. Because comprehensive plans are so vital in major land use decisions, the law requires an open, transparent process to create or amend them, including citizen and stakeholder input. Comp plans are not, however, engraved in stone. They eventually need change as community needs, goals and resources change. In fact, state rules encourage the periodic review and update of local comp plans."*

This proposal, and more recent approved zone changes (for example, west of Avamere), are in affect "spot zoning". If the City wants to review and update our Comp plan and zoning designations for where and how much we have low, medium and high density, commercial and industrial lands, they need to enter into that holistic planning process. They should not continue to allow the planning commission and City Council to make piece meal zone changes as developers come to you saying "they can't make (enough!) money on the property!" It is not the role of the City to manage for developer's maximum profit. The developers should be doing their due diligence on development costs, markets, and demand prior to purchase. The City's criteria for changing a zone speaks to the following criteria:

Responding to changing conditions: There are no changing conditions. In fact, the UGB boundary was expanded and rezoned recently, to address the lack of commercial land among other things. The analysis was done by a consultant that this developer is using. There are no new conditions that would overturn the work done in the 2017 UGB expansion planning process. There is already high density allocations that can meet this need. Because the City has developed much of it's SFR with such small lot sizes, there is more of a deficit of the low density housing.

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Maintaining the integrity of the Comprehensive Plan: Putting together zoning decisions to meet individual property owners' whims destroys the integrity of the Comp Plan. The Comp Plan as mentioned, zoned a variety of residential densities and commercial zones to provide diversity and meet our needs. While the developer might make more money with high density, it is not the responsibility of the City, nor within the criteria, to change zoning because they will make more money. Individual

There is an identified public need for the park and the extension of Dubarko Road. This can be done with existing zoning in place. The City also has the option of purchasing park property. The City **should NOT** be putting together incremental zone changes on the Comp Plan so developers can make "enough" money.

I do not support increasing density on this parcel, and there by increasing traffic, school students, needed water and sewer capacity and the other effects of high density construction. I recommend denial of this zone and Comprehensive Plan change. I am sure you will be hearing from other people.

Sincerely

Eileen Suchanek

17795 Wolf Dr.
Sandy, OR. 97055

EXHIBIT OOO

Marisol Martinez <mmartinez@ci.sandy.or.us>

Fwd: Bull Run Terrace

Jeff Aprati <japrati@ci.sandy.or.us> Sat, Aug 22, 2020 at 8:58 AM
To: Kelly O'Neill <koneill@ci.sandy.or.us>, Marisol Martinez <mmartinez@ci.sandy.or.us>, Shelley Denison <sdenison@ci.sandy.or.us>

Jeff Aprati
City Recorder / Management Analyst
City of Sandy
503-489-0938
japrati@ci.sandy.or.us

---------- Forwarded message ---------
From: **'Ann' via City Recorder** <recorder@ci.sandy.or.us>
Date: Thu, Aug 20, 2020 at 9:03 PM
Subject: Bull Run Terrace
To: <Recorder@ci.sandy.or.us>

August 20, 2020
Dear Planning Commission and City Planning Staff:
The Bull Run Terrace developers propose both a change to the Sandy Comprehensive Plan and a Type IV Zone map amendment to create high density zoning to make more money, leaving Sandy residents to suffer the increased traffic, more crowded schools and increased pressure on our sewer, water and other services. LCDC's direction on Comp Plan updates say:

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Maintaining the integrity of the Comprehensive Plan: Pieemealing zoning decisions to meet individual property owners' whims destroys the integrity of the Comp Plan. The Comp Plan as mentioned, zoned a variety of residential densities and commercial zones to provide diversity and meet our needs. While the developer might make more money with high density, it is not the responsibility of the City, nor within the criteria, to change zoning because they will make more money. Individual

There is an identified public need for the park and the extension of Dubarko Road. This can be done with existing zoning in place. The City also has the option of purchasing park property. The City **should NOT** be piecemealing incremental zone changes on the Comp Plan so developers can make "enough" money.

I do not support increasing density on this parcel, and there by increasing traffic, school students, needed water and sewer capacity and the other effects of high density construction. I recommend denial of this zone and Comprehensive Plan change. I am sure you will be hearing from other people.

Sincerely,
Ann Vedder
40493 Fawn St
Sandy OR 97055

Sent from my iPhone

EXHIBIT PPP

Marisol Martinez <mmartinez@ci.sandy.or.us>

Fwd: Bull Run Terrace

Jeff Aprati <japrati@ci.sandy.or.us> Sat, Aug 22, 2020 at 8:59 AM
To: Kelly O'Neill <koneill@ci.sandy.or.us>, Marisol Martinez <mmartinez@ci.sandy.or.us>, Shelley Denison <sdenison@ci.sandy.or.us>

Jeff Aprati
City Recorder / Management Analyst
City of Sandy
503-489-0938
japrati@ci.sandy.or.us

---------- Forwarded message ---------
From: **'Ann' via City Recorder** <recorder@ci.sandy.or.us>
Date: Thu, Aug 20, 2020 at 9:10 PM
Subject: Fwd: Bull Run Terrace
To: <Recorder@ci.sandy.or.us>

To whom it may concern, I would also like to add that we live in a small town and we know growth is inevitable. However, when we bought our home we knew the plan was for more homes, NOT high density housing. We would not have bought in this particular location. It is not fair to the residence already here to change the approved plan. It will already change the neighborhood. We have small children that like to run and ride bikes and it will make our neighborhood the cut-through around hwy 26.
Sincerely,
Ann Vedder
40493 fawn st
Sandy OR

Sent from my iPhone

Begin forwarded message:

From: Ann <smitha789@aol.com>
Date: August 20, 2020 at 9:03:45 PM PDT
To: Recorder@ci.sandy.or.us
Subject: Bull Run Terrace

[Quoted text hidden]

Marisol Martinez <mmartinez@ci.sandy.or.us>

Bull Run Terrace

2 messages

EXHIBIT QQQ

'Kelly French' via Planning <planning@ci.sandy.or.us> Thu, Aug 20, 2020 at 1:57 PM
Reply-To: Kelly French <noslugno@yahoo.com>
To: recorder@ci.sandy.or.us
Cc: planning@ci.sandy.or.us

ugust 20, 2020

Dear Planning Commission and City Planning Staff:

The Bull Run Terrace developers propose both a change to the Sandy Comprehensive Plan and a Type IV Zone map amendment to create high density zoning to make more money, leaving Sandy residents to suffer the increased traffic, more crowded schools and increased pressure on our sewer, water and other services. LCDC's direction on Comp Plan updates say:

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I do not support increasing density on this parcel, and there by increasing traffic, school students, needed water and sewer capacity and the other effects of high density construction. I recommend denial of this zone and Comprehensive Plan change. I am sure you will be hearing from other people.

Sincerely
Kelly French
16771 SE Ten Eyck Rd.
Sandy Or 97055

Shelley Denison <sdenison@ci.sandy.or.us> Thu, Aug 20, 2020 at 1:59 PM
To: Marisol Martinez <mmartinez@ci.sandy.or.us>

Hey Marisol,

Here's a public comment for 19-050
[Quoted text hidden]

Marisol Martinez <mmartinez@ci.sandy.or.us>

Bull Run Terrace

1 message

EXHIBIT RRR

'RaynRoo Ruehrdanz' via Planning <planning@ci.sandy.or.us> Thu, Aug 20, 2020 at 6:57 PM
Reply-To: RaynRoo Ruehrdanz <raynroo@yahoo.com>
To: "Recorder@ci.sandy.or.us" <Recorder@ci.sandy.or.us>, "planning@ci.sandy.or.us" <planning@ci.sandy.or.us>

Dear Planning Commission and City Planning Staff:

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Sincerely

Rachel Ruehrdanz

40498 Fawn Street Sandy Oregon

Sent from Mail for Windows 10

Marisol Martinez <mmartinez@ci.sandy.or.us>

Fwd: The Bull Run Terrace

EXHIBIT SSS

Jeff Aprati <japrati@ci.sandy.or.us> Sat, Aug 22, 2020 at 8:59 AM
To: Kelly O'Neill <koneill@ci.sandy.or.us>, Marisol Martinez <mmartinez@ci.sandy.or.us>, Shelley Denison <sdenison@ci.sandy.or.us>

Jeff Aprati
City Recorder / Management Analyst
City of Sandy
503-489-0938
japrati@ci.sandy.or.us

---------- Forwarded message ---------
From: **'Lori Pyles' via City Recorder** <recorder@ci.sandy.or.us>
Date: Fri, Aug 21, 2020 at 5:19 AM
Subject: The Bull Run Terrace
To: <recorder@ci.sandy.or.us>, <planningl@ci.sandy.or.us>

Dear Planning Commission and City Planning Staff:
The Bull Run Terrace developers propose both a change to the Sandy Comprehensive Plan and a Type IV Zone map amendment to create high density zoning to make more money, leaving Sandy residents to suffer the increased traffic, more crowded schools and increased pressure on our sewer, water and other services. LCDC's direction on Comp Plan updates say:

"Comp plan details guide elected and appointed officials in land use decisions, such as whether to allow a zone change or grant a conditional use permit. Because comprehensive plans are so vital in major land use decisions, the law requires an open, transparent process to create or amend them, including citizen and stakeholder input. Comp plans are not, however, engraved in stone. They eventually need change as community needs, goals and resources change. In fact, state rules encourage the periodic review and update of local comp plans."

This proposal, and more recent approved zone changes(for example, west of Avamere), are in affect "spot zoning". If the City wants to review and update our Comp plan and zoning designations for where and how much we have low, medium and high density, commercial and industrial lands, they need to enter into that holistic planning process. They should not continue to allow the planning commission and City Council to make piece meal zone changes as developers come to you saying "they can't make (enough!) money on the property!" It is not the role of the City to manage for developer's maximum profit. The developers should be doing their due diligence on development costs, markets, and demand prior to purchase. The City's criteria for changing a zone speaks to the following criteria:

Responding to changing conditions: There are no changing conditions. In fact, the UGB boundary was expanded and rezoned recently, to address the lack of commercial land among other things. The analysis was done by a consultant that this developer is using. There are no new conditions that would overturn the work done in the 2017 UGB expansion planning process. There is already high density allocations that can meet this need. Because the City has developed much of it's SFR with such small lot sizes, there is more of a deficit of the low density housing.

Responding to changing community attitudes: There has been no effort to assess or conclude that this zone change is supported by the community. I think you will find from public testimony, quite the opposite! The City has already zoned large sections of our town with high and medium density zoning. We do not support more more high density zoning. We have an adequate supply to meet the demand. The community attitude for one of the fastest growing cities in Oregon is, slow down! Upzoning this area to high density is the opposite of that.

Maintaining the integrity of the Comprehensive Plan: Pieemealing zoning decisions to meet individual property owners' whims destroys the integrity of the Comp Plan. The Comp Plan as mentioned, zoned a variety of residential densities and commercial zones to provide diversity and meet our needs. While the developer might make more money with high density, it is not the responsibility of the City, nor within the criteria, to change zoning because they will make more money. Individual

There is an identified public need for the park and the extension of Dubarko Road. This can be done with existing zoning in place. The City also has the option of purchasing park property. The City **should NOT** be piecemealing incremental zone changes on the Comp Plan so developers can make "enough" money.

I do not support increasing density on this parcel, and there by increasing traffic, school students, needed water and sewer capacity and the other effects of high density construction. I recommend denial of this zone and Comprehensive Plan change. I am sure you will be hearing from other people.

Sincerely
Lori Pyles
19055 Barrington Ave, Sandy Oregon 97055

Sent from my iPhone

Marisol Martinez <mmartinez@ci.sandy.or.us>

Fwd: EXHIBIT TTT

Jeff Aprati <japrati@ci.sandy.or.us> Sat, Aug 22, 2020 at 9:00 AM
To: Kelly O'Neill <koneill@ci.sandy.or.us>, Marisol Martinez <mmartinez@ci.sandy.or.us>, Shelley Denison <sdenison@ci.sandy.or.us>

Jeff Aprati
City Recorder / Management Analyst
City of Sandy
503-489-0938
japrati@ci.sandy.or.us

---------- Forwarded message ---------
From: **Cameron Zebroff** <cameronzebroff@gmail.com>
Date: Fri, Aug 21, 2020 at 10:08 AM
Subject:
To: recorder@ci.sandy.or.us <recorder@ci.sandy.or.us>

August 20, 2020
Dear Planning Commission and City Planning Staff:
The Bull Run Terrace developers propose both a change to the Sandy Comprehensive Plan and a Type IV Zone map amendment to create high density zoning to make more money, leaving Sandy residents to suffer the increased traffic, more crowded schools and increased pressure on our sewer, water and other services. LCDC's direction on Comp Plan updates say:
"Comp plan details guide elected and appointed officials in land use decisions, such as whether to allow a zone change or grant a conditional use permit. Because comprehensive plans are so vital in major land use decisions, the law requires an open, transparent process to create or amend them, including citizen and stakeholder input. Comp plans are not, however, engraved in stone. They eventually need change as community needs, goals and resources change. In fact, state rules encourage the periodic review and update of local comp plans."
This proposal, and more recent approved zone changes (for example, west of Avamere), are in affect "spot zoning". If the City wants to review and update our Comp plan and zoning designations for where and how much we have low, medium and high density, commercial and industrial lands, they need to enter into that holistic planning process. They should not continue to allow the planning commission and City Council to make piece meal zone changes as developers come to you saying "they can't make (enough!) money on the property!" It is not the role of the City to manage for developer's maximum profit. The developers should be doing their due diligence on development costs, markets, and demand prior to purchase. The City's criteria for changing a zone speaks to the following criteria:
Responding to changing conditions: There are no changing conditions. In fact, the UGB boundary was expanded and rezoned recently, to address the lack of commercial land among other things. The analysis was done by a consultant that this developer is using. There are no new conditions that would overturn the work done in the 2017 UGB expansion planning process. There is already high density allocations that can meet this need. Because the City has developed much of it's SFR with such small lot sizes, there is more of a deficit of the low density housing.
Responding to changing community attitudes: There has been no effort to assess or conclude that this zone change is supported by the community. I think you will find from public testimony, quite the opposite! The City has already zoned large sections of our town with high and medium density zoning. We do not support more more high density zoning. We have an adequate supply to meet the demand. The community attitude for one of the fastest growing cities in Oregon is, slow down! Upzoning this area to high density is the opposite of that.
Maintaining the integrity of the Comprehensive Plan: Pieemealing zoning decisions to meet individual property owners' whims destroys the integrity of the Comp Plan. The Comp Plan as mentioned, zoned a variety of residential densities and commercial zones to provide diversity and meet our needs. While the developer might make more money with high density, it is not the responsibility of the City, nor within the criteria, to change zoning because they will make more money. Individual
There is an identified public need for the park and the extension of Dubarko Road. This can be done with existing zoning in place. The City also has the option of purchasing park property. The City should NOT be piecemealing incremental zone changes on the Comp Plan so developers can make "enough" money.
I do not support increasing density on this parcel, and there by increasing traffic, school students, needed water and sewer capacity and the other effects of high density construction. I recommend denial of this zone and Comprehensive

Plan change. I am sure you will be hearing from other people.

Sincerely
Cameron Zebroff
Sandy, OR Resident

Marisol Martinez <mmartinez@ci.sandy.or.us>

Fwd: Deer Point

EXHIBIT UUU

Jeff Aprati <japrati@ci.sandy.or.us> Sat, Aug 22, 2020 at 9:00 AM
To: Kelly O'Neill <koneill@ci.sandy.or.us>, Marisol Martinez <mmartinez@ci.sandy.or.us>, Shelley Denison <sdenison@ci.sandy.or.us>

Jeff Aprati
City Recorder / Management Analyst
City of Sandy
503-489-0938
japrati@ci.sandy.or.us

---------- Forwarded message ---------
From: **Heather Fitch** <heatherfitchphotography@gmail.com>
Date: Fri, Aug 21, 2020 at 9:23 AM
Subject: Deer Point
To: recorder@ci.sandy.or.us <recorder@ci.sandy.or.us>

August 20, 2020

Dear Planning Commission and City Planning Staff:

The Bull Run Terrace developers propose both a change to the Sandy Comprehensive Plan and a Type IV Zone map amendment to create high density zoning to make more money, leaving Sandy residents to suffer the increased traffic, more crowded schools and increased pressure on our sewer, water and other services.

LCDC's direction on Comp Plan updates say:
"Comp plan details guide elected and appointed officials in land use decisions, such as whether to allow a zone change or grant a conditional use permit. Because comprehensive plans are so vital in major land use decisions, the law requires an open, transparent process to create or amend them, including citizen and stakeholder input. Comp plans are not, however, engraved in stone. They eventually need change as community needs, goals and resources change. In fact, state rules encourage the periodic review and update of local comp plans."
This proposal, and more recent approved zone changes (for example, west of Avamere), are in affect "spot zoning". If the City wants to review and update our Comp plan and zoning designations for where and how much we have low, medium and high density, commercial and industrial lands, they need to enter into that holistic planning process. They should not continue to allow the planning commission and City Council to make piece meal zone changes as developers come to you saying "they can't make (enough!) money on the property!" It is not the role of the City to manage for developer's maximum profit. The developers should be doing their due diligence on development costs, markets, and demand prior to purchase.

The City's criteria for changing a zone speaks to the following criteria:

Responding to changing conditions: There are no changing conditions. In fact, the UGB boundary was expanded and rezoned recently, to address the lack of commercial land among other things. The analysis was done by a consultant that this developer is using. There are no new conditions that would overturn the work done in the 2017 UGB expansion planning process. There is already high density allocations that can meet this need. Because the City has developed much of it's SFR with such small lot sizes, there is more of a deficit of the low density housing.

Responding to changing community attitudes: There has been no effort to assess or conclude that this zone change is supported by the community. I think you will find from public testimony, quite the opposite! The City has already zoned large sections of our town with high and medium density zoning. We do not support more more high density zoning. We have an adequate supply to meet the demand. The community attitude for one of the fastest growing cities in Oregon is, slow down! Upzoning this area to high density is the opposite of that.
Maintaining the integrity of the Comprehensive Plan: Pieemealing zoning decisions to meet individual property owners' whims destroys the integrity of the Comp Plan. The Comp Plan as mentioned, zoned a variety of residential densities

and commercial zones to provide diversity and meet our needs. While the developer might make more money with high density, it is not the responsibility of the City, nor within the criteria, to change zoning because they will make more money. Individual
There is an identified public need for the park and the extension of Dubarko Road. This can be done with existing zoning in place. The City also has the option of purchasing park property. The City should NOT be piecemealing incremental zone changes on the Comp Plan so developers can make “enough” money.

I do not support increasing density on this parcel, and there by increasing traffic, school students, needed water and sewer capacity and the other effects of high density construction. Our schools are hurting so bad. They are beyond over crowded and this is going to make it worse. I live on the corner and the traffic is so heavy here my kids cannot play outside.

I recommend denial of this zone and Comprehensive Plan change. I am sure you will be hearing from other people.

Sincerely
Heather Fitch
40448 Therese St
Sandy or 97055

--
Excited!

Heather Fitch

{the website} www.heatherfitchphotography.com
{the facebook} HF Photography Facebook
{the email} HeatherFitchPhotography@gmail.com

{capturing moments.}

Marisol Martinez <mmartinez@ci.sandy.or.us>

EXHIBIT VVV

Fwd: Deer pointe neighborhood

Jeff Aprati <japrati@ci.sandy.or.us> Sun, Aug 23, 2020 at 6:13 PM
To: Kelly O'Neill <koneill@ci.sandy.or.us>, Marisol Martinez <mmartinez@ci.sandy.or.us>, Shelley Denison <sdenison@ci.sandy.or.us>

---------- Forwarded message ---------
From: **Lonnie Rogers** <sharpeilover2@hotmail.com>
Date: Sun, Aug 23, 2020 at 5:51 PM
Subject: Deer pointe neighborhood
To: planningl@ci.sandy.or.us <planningl@ci.sandy.or.us>, Recorder@ci.sandy.or.us <Recorder@ci.sandy.or.us>

August 23, 2020

Dear Planning Commission and City Planning Staff:

The Bull Run Terrace developers

propose both a change to the Sandy Comprehensive Plan and a Type IV Zone map amendment to create

high density zoning to make more money, leaving Sandy residents to suffer the increased traffic, more crowded schools and increased pressure on our sewer, water and other services. LCDC's

direction on Comp Plan updates say:

"Comp

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process to create or amend them, including citizen and stakeholder input. Comp

plans are not, however, engraved in stone. They eventually need change as community needs, goals and resources change. In fact, state rules encourage the periodic review and update of local comp plans."

This proposal, and more recent

approved zone changes(for example, west of Avamere), are in affect "spot zoning".

If the City wants to review and update our Comp plan and zoning designations for

where and how much we have low, medium and high density, commercial and industrial lands, they need to enter into that holistic

planning process. They should not continue to allow

the planning commission and City Council to make piece meal zone changes as

developers come to you saying "they can't make (enough!) money on the property!" It is not the role of the City to manage for developer's maximum profit. The developers should be

doing their due diligence on development costs, markets, and demand prior to purchase. The City's criteria

for changing a zone speaks to the following criteria:

Responding to changing conditions: There are no changing conditions. In

fact, the UGB boundary was expanded and rezoned recently, to address the lack of commercial land among other things. The analysis was done by a consultant that this developer is using. There are no new conditions that would overturn the work done in the

2017 UGB expansion planning process. There is already high density allocations that can meet this need. Because the City has developed much of it's SFR with such small

lot sizes, there is more of a deficit of the low density housing.

Responding to changing community attitudes: There has been no effort to

assess or conclude that this zone change is supported by the community. I think you will find from public testimony, quite the opposite! The City has already zoned large sections of our town with high and medium density zoning.

We do not support more more high density zoning. We have an adequate supply to meet

the demand. The community attitude for one of the fastest growing cities in Oregon is, slow down! Upzoning this area to high density is the opposite of that.

Maintaining the integrity of the Comprehensive Plan: Pieemealing

zoning decisions to meet individual property owners' whims destroys the integrity of the Comp Plan. The Comp Plan as mentioned, zoned a variety of residential densities

and commercial zones to provide diversity and meet our needs. While the developer

might make more money with high density, it is not the responsibility of the City,

nor within the criteria, to change zoning because they will make more money. Individual

There is an identified public need for the park and the extension of Dubarko Road. This can be done with existing zoning in place. The

City also has the option of purchasing park property. The City **should**

NOT be piecemealing incremental zone

changes on the Comp Plan so developers can make “enough” money.

I do not support increasing density on

this parcel, and there

by increasing traffic, school students, needed water and sewer capacity and

the other effects of high density construction. I

recommend denial of this zone and Comprehensive Plan change. I am sure you will be

hearing from other people. We do not think apartments is the way to go and bringing more volume of people to Sandy in which to lose our small town feel. We don’t want to be a big city. Keep the charm and local businesses the way it is.

Sincerely,

Lonnie Stermon

18051 Antler Ave Sandy, OR 97055

Sent from my iPhone

--
Jeff Aprati
City Recorder / Management Analyst
City of Sandy
503-489-0938
japrati@ci.sandy.or.us

Marisol Martinez <mmartinez@ci.sandy.or.us>

Fwd: Bull Run Terrace

EXHIBIT WWW

Jeff Aprati <japrati@ci.sandy.or.us> Mon, Aug 24, 2020 at 9:15 AM
To: Kelly O'Neill <koneill@ci.sandy.or.us>, Marisol Martinez <mmartinez@ci.sandy.or.us>, Shelley Denison <sdenison@ci.sandy.or.us>

Jeff Aprati
City Recorder / Management Analyst
City of Sandy
503-489-0938
japrati@ci.sandy.or.us

---------- Forwarded message ---------
From: **'skinner.nuskin' via City Recorder** <recorder@ci.sandy.or.us>
Date: Mon, Aug 24, 2020 at 9:12 AM
Subject: Bull Run Terrace
To: <Recorder@ci.sandy.or.us>

August 22, 2020
Dear Planning Commission and City Planning Staff:
The Bull Run Terrace developers propose both a change to the Sandy Comprehensive Plan and a Type IV Zone map amendment to create high density zoning to make more money, leaving Sandy residents to suffer the increased traffic, more crowded schools and increased pressure on our sewer, water and other services. LCDC's direction on Comp Plan updates say:
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This proposal, and more recent approved zone changes (for example, west of Avamere), are in affect "spot zoning". If the City wants to review and update our Comp plan and zoning designations for where and how much we have low, medium and high density, commercial and industrial lands, they need to enter into that holistic planning process. They should not continue to allow the planning commission and City Council to make piece meal zone changes as developers come to you saying "they can't make (enough!) money on the property!" It is not the role of the City to manage for developer's maximum profit. The developers should be doing their due diligence on development costs, markets, and demand prior to purchase. The City's criteria for changing a zone speaks to the following criteria:
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Responding to changing community attitudes: There has been no effort to assess or conclude that this zone change is supported by the community. I think you will find from public testimony, quite the opposite! The City has already zoned large sections of our town with high and medium density zoning. We do not support more more high density zoning. We have an adequate supply to meet the demand. The community attitude for one of the fastest growing cities in Oregon is, slow down! Upzoning this area to high density is the opposite of that.
Maintaining the integrity of the Comprehensive Plan: Pieemealing zoning decisions to meet individual property owners' whims destroys the integrity of the Comp Plan. The Comp Plan as mentioned, zoned a variety of residential densities and commercial zones to provide diversity and meet our needs. While the developer might make more money with high density, it is not the responsibility of the City, nor within the criteria, to change zoning because they will make more money. Individual
There is an identified public need for the park and the extension of Dubarko Road. This can be done with existing zoning in place. The City also has the option of purchasing park property. The City should NOT be piecemealing incremental zone changes on the Comp Plan so developers can make "enough" money.
I do not support increasing density on this parcel, and there by increasing traffic, school students, needed water and

sewer capacity and the other effects of high density construction. I recommend denial of this zone and Comprehensive Plan change. I am sure you will be hearing from other people.

Sincerely
Nicola A Skinner
18422 Meadow Ave
Sandy, OR 97055

Sent via the Samsung Galaxy S10+, an AT&T 5G Evolution capable smartphone

Marisol Martinez <mmartinez@ci.sandy.or.us>

The Bull Run Terrace EXHIBIT XXX

Izaac <mckenzi@eou.edu> Mon, Aug 24, 2020 at 1:21 PM
To: planning@ci.sandy.or.us, recorder@ci.sandy.or.us

Dear Planning Commission and City Planning Staff:
The Bull Run Terrace developers propose both a change to the Sandy Comprehensive Plan and a Type IV Zone map amendment to create high density zoning to make more money, leaving Sandy residents to suffer the increased traffic, more crowded schools and increased pressure on our sewer, water and other services. LCDC's direction on Comp Plan updates say:

> *"Comp plan details guide elected and appointed officials in land use decisions, such as whether to allow a zone change or grant a conditional use permit. Because comprehensive plans are so vital in major land use decisions, the law requires an open, transparent process to create or amend them, including citizen and stakeholder input. Comp plans are not, however, engraved in stone. They eventually need change as community needs, goals and resources change. In fact, state rules encourage the periodic review and update of local comp plans."*

This proposal, and more recent approved zone changes (for example, west of Avamere), are in affect "spot zoning". If the City wants to review and update our Comp plan and zoning designations for where and how much we have low, medium and high density, commercial and industrial lands, they need to enter into that holistic planning process. They should not continue to allow the planning commission and City Council to make piece meal zone changes as developers come to you saying "they can't make (enough!) money on the property!" It is not the role of the City to manage for developer's maximum profit. The developers should be doing their due diligence on development costs, markets, and demand prior to purchase. The City's criteria for changing a zone speaks to the following criteria:
Responding to changing conditions: There are no changing conditions. In fact, the UGB boundary was expanded and rezoned recently, to address the lack of commercial land among other things. The analysis was done by a consultant that this developer is using. There are no new conditions that would overturn the work done in the 2017 UGB expansion planning process. There is already high density allocations that can meet this need. Because the City has developed much of its SFR with such small lot sizes, there is more of a deficit of the low density housing.
Responding to changing community attitudes: There has been no effort to assess or conclude that this zone change is supported by the community. I think you will find from public testimony, quite the opposite! The City has already zoned large sections of our town with high and medium density zoning. We do not support more high density zoning. We have an adequate supply to meet the demand. The community attitude for one of the fastest growing cities in Oregon is, slow down! Up zoning this area to high density is the opposite of that.
Maintaining the integrity of the Comprehensive Plan: Pieemealing zoning decisions to meet individual property owners' whims destroys the integrity of the Comp Plan. The Comp Plan as mentioned, zoned a variety of residential densities and commercial zones to provide diversity and meet our needs. While the developer might make more money with high density, it is not the responsibility of the City, nor within the criteria, to change zoning because they will make more money. Individual
There is an identified public need for the park and the extension of Dubarko Road. This can be done with existing zoning in place. The City also has the option of purchasing park property. The City **should NOT** be piecemealing incremental zone changes on the Comp Plan so developers can make "enough" money.
I do not support increasing density on this parcel, and thereby increasing traffic, school students, needed water and sewer capacity and the other effects of high density construction. I recommend denial of this zone and Comprehensive Plan change. I am sure you will be hearing from other people.

Sincerely
Izaac McKenzie
18428 Meadow Ave.
Sandy, OR 97055

Sent from my iPhone

Marisol Martinez <mmartinez@ci.sandy.or.us>

Fwd: Bull Run Terrace development

EXHIBIT YYY

Jeff Aprati <japrati@ci.sandy.or.us> Mon, Aug 24, 2020 at 1:52 PM
To: Kelly O'Neill <koneill@ci.sandy.or.us>, Marisol Martinez <mmartinez@ci.sandy.or.us>, Shelley Denison <sdenison@ci.sandy.or.us>

Jeff Aprati
City Recorder / Management Analyst
City of Sandy
503-489-0938
japrati@ci.sandy.or.us

---------- Forwarded message ---------
From: **'Liza Chatterton' via City Recorder** <recorder@ci.sandy.or.us>
Date: Mon, Aug 24, 2020 at 1:49 PM
Subject: Bull Run Terrace development
To: <recorder@ci.sandy.or.us>

August 20, 2020
Dear Planning Commission and City Planning Staff:
The Bull Run Terrace developers propose both a change to the Sandy Comprehensive Plan and a Type IV Zone map amendment to create high density zoning to make more money, leaving Sandy residents to suffer the increased traffic, more crowded schools and increased pressure on our sewer, water and other services. LCDC's direction on Comp Plan updates say:
"Comp plan details guide elected and appointed officials in land use decisions, such as whether to allow a zone change or grant a conditional use permit. Because comprehensive plans are so vital in major land use decisions, the law requires an open, transparent process to create or amend them, including citizen and stakeholder input. Comp plans are not, however, engraved in stone. They eventually need change as community needs, goals and resources change. In fact, state rules encourage the periodic review and update of local comp plans."
This proposal, and more recent approved zone changes (for example, west of Avamere), are in affect "spot zoning". If the City wants to review and update our Comp plan and zoning designations for where and how much we have low, medium and high density, commercial and industrial lands, they need to enter into that holistic planning process. They should not continue to allow the planning commission and City Council to make piece meal zone changes as developers come to you saying "they can't make (enough!) money on the property!" It is not the role of the City to manage for developer's maximum profit. The developers should be doing their due diligence on development costs, markets, and demand prior to purchase. The City's criteria for changing a zone speaks to the following criteria:
Responding to changing conditions: There are no changing conditions. In fact, the UGB boundary was expanded and rezoned recently, to address the lack of commercial land among other things. The analysis was done by a consultant that this developer is using. There are no new conditions that would overturn the work done in the 2017 UGB expansion planning process. There is already high density allocations that can meet this need. Because the City has developed much of it's SFR with such small lot sizes, there is more of a deficit of the low density housing.
Responding to changing community attitudes: There has been no effort to assess or conclude that this zone change is supported by the community. I think you will find from public testimony, quite the opposite! The City has already zoned large sections of our town with high and medium density zoning. We do not support more more high density zoning. We have an adequate supply to meet the demand. The community attitude for one of the fastest growing cities in Oregon is, slow down! Upzoning this area to high density is the opposite of that.
Maintaining the integrity of the Comprehensive Plan: Pieemealing zoning decisions to meet individual property owners' whims destroys the integrity of the Comp Plan. The Comp Plan as mentioned, zoned a variety of residential densities and commercial zones to provide diversity and meet our needs. While the developer might make more money with high density, it is not the responsibility of the City, nor within the criteria, to change zoning because they will make more money. Individual
There is an identified public need for the park and the extension of Dubarko Road. This can be done with existing zoning in place. The City also has the option of purchasing park property. The City should NOT be piecemealing incremental zone changes on the Comp Plan so developers can make "enough" money.
I do not support increasing density on this parcel, and there by increasing traffic, school students, needed water and sewer capacity and the other effects of high density construction. I recommend denial of this zone and Comprehensive

Plan change. I am sure you will be hearing from other people.

Sincerely
Liza Chatterton for the Chatterton
38827 Haskins Street
Sandy, OR 97055

EXHIBIT ZZZ

Marisol Martinez <mmartinez@ci.sandy.or.us>

Comments on new development at 40808 and 41010 Highway 26

1 message

Douglas Marshall <dougceleste@msn.com> Mon, Aug 24, 2020 at 2:47 PM
To: "planning@ci.sandy.or.us" <planning@ci.sandy.or.us>
Cc: Douglas Marshall <dougceleste@msn.com>

I am writing to oppose the change to the Sandy Comprehensive Plan and the Type IV Zone map amendment that would allow The Bull Run Terrace developers to create high density zoning.

I live on Laurel Street maybe not within 500 feet of the proposed development but very close.

This proposal is an example is an example of "spot zoning" of the comprehensive plan rather than a thorough evaluation and amendment of the comprehensive plan. there are procedures in place for review and update of the comprehensive planning. those procedures should be followed.

I do not support high density zoning in this area. There has been no effort to assess or conclude that this zone change is supported by the community.

This piecemeal approach to zoning decisions destroys the integrity of the comprehensive plan. The comprehensive plan as written, provides for a variety of residential densities and commercial zones to provide diversity and meet our needs.

While there is an identified public need for the park and the extension of Dubarko Road this can be done with existing zoning in place.

I do not support increasing density on this parcel, and increasing traffic, school students, needed water and sewer capacity and the other effects of high density construction. I drive on Debarko Street daily to get to my house. The added traffic this construction would have on this street would cause me many additional problems.

I recommend denial of this zone and Comprehensive Plan change.

Doug Marshall
40204 Laurel Street
Sandy, Or 97055

Marisol Martinez <mmartinez@ci.sandy.or.us>

The Bull Run Terrace

EXHIBIT AAAA

Zoey Tuttle <tuttlez@eou.edu> Mon, Aug 24, 2020 at 3:17 PM
To: planning@ci.sandy.or.us, recorder@ci.sandy.or.us, sdenison@ci.sandy.or.us

Dear Planning Commission and City Planning Staff:

The Bull Run Terrace developers propose both a change to the Sandy Comprehensive Plan and a Type IV Zone map amendment to create high density zoning to make more money, leaving Sandy residents to suffer the increased traffic, more crowded schools and increased pressure on our sewer, water and other services. LCDC's direction on Comp Plan updates say:
"*Comp plan details guide elected and appointed officials in land use decisions, such as whether to allow a zone change or grant a conditional use permit. Because comprehensive plans are so vital in major land use decisions, the law requires an open, transparent process to create or amend them, including citizen and stakeholder input. Comp plans are not, however, engraved in stone. They eventually need change as community needs, goals and resources change. In fact, state rules encourage the periodic review and update of local comp plans."*
This proposal, and more recent approved zone changes (for example, west of Avamere), are in affect "spot zoning". If the City wants to review and update our Comp plan and zoning designations for where and how much we have low, medium and high density, commercial and industrial lands, they need to enter into that holistic planning process. They should not continue to allow the planning commission and City Council to make piece meal zone changes as developers come to you saying "they can't make (enough!) money on the property!" It is not the role of the City to manage for developer's maximum profit. The developers should be doing their due diligence on development costs, markets, and demand prior to purchase. The City's criteria for changing a zone speaks to the following criteria:

R**esponding to changing conditions:** There are no changing conditions. In fact, the UGB boundary was expanded and rezoned recently, to address the lack of commercial land among other things. The analysis was done by a consultant that this developer is using. There are no new conditions that would overturn the work done in the 2017 UGB expansion planning process. There is already high density allocations that can meet this need. Because the City has developed much of its SFR with such small lot sizes, there is more of a deficit of the low density housing.

R**esponding to changing community attitudes:** There has been no effort to assess or conclude that this zone change is supported by the community. I think you will find from public testimony, quite the opposite! The City has already zoned large sections of our town with high and medium density zoning. We do not support more high density zoning. We have an adequate supply to meet the demand. The community attitude for one of the fastest growing cities in Oregon is, slow down! Up zoning this area to high density is the opposite of that.

M**aintaining the integrity of the Comprehensive Plan:** Pieemealing zoning decisions to meet individual property owners' whims destroys the integrity of the Comp Plan. The Comp Plan as mentioned, zoned a variety of residential densities and commercial zones to provide diversity and meet our needs. While the developer might make more money with high density, it is not the responsibility of the City, nor within the criteria, to change zoning because they will make more money. Individual

There is an identified public need for the park and the extension of Dubarko Road. This can be done with existing zoning in place. The City also has the option of purchasing park property. The City **should NOT** be piecemealing incremental zone changes on the Comp Plan so developers can make "enough" money.

Ido not support increasing density on this parcel, and thereby increasing traffic, school students, needed water and sewer capacity and the other effects of high density construction. I recommend denial of this zone and Comprehensive Plan change. I am sure you will be hearing from other people.

Sincerely

Zoey McKenzie
[Quoted text hidden]

Marisol Martinez <mmartinez@ci.sandy.or.us>

Fwd: Bull Run Terrace rezoning

EXHIBIT BBBB

Jeff Aprati <japrati@ci.sandy.or.us> Mon, Aug 24, 2020 at 4:40 PM
To: Kelly O'Neill <koneill@ci.sandy.or.us>, Marisol Martinez <mmartinez@ci.sandy.or.us>, Shelley Denison <sdenison@ci.sandy.or.us>

Jeff Aprati
City Recorder / Management Analyst
City of Sandy
503-489-0938
japrati@ci.sandy.or.us

---------- Forwarded message ---------
From: **'Makoto Lane' via City Recorder** <recorder@ci.sandy.or.us>
Date: Mon, Aug 24, 2020 at 4:38 PM
Subject: Bull Run Terrace rezoning
To: recorder@ci.sandy.or.us <recorder@ci.sandy.or.us>, planningl@ci.sandy.or.us <planningl@ci.sandy.or.us>

Dear Planning Commission and City Planning Staff:

The Bull Run Terrace developers propose both a change to the Sandy Comprehensive Plan and a Type IV Zone map amendment to create high density zoning to make more money, leaving Sandy residents to suffer the increased traffic, more crowded schools and increased pressure on our sewer, water and other services. LCDC's direction on Comp Plan updates say:

> *"Comp plan details guide elected and appointed officials in land use decisions, such as whether to allow a zone change or grant a conditional use permit. Because comprehensive plans are so vital in major land use decisions, the law requires an open, transparent process to create or amend them, including citizen and stakeholder input. Comp plans are not, however, engraved in stone. They eventually need change as community needs, goals and resources change. In fact, state rules encourage the periodic review and update of local comp plans."*

This proposal, and more recent approved zone changes (for example, west of Avamere), are in affect "spot zoning". If the City wants to review and update our Comp plan and zoning designations for where and how much we have low, medium and high density, commercial and industrial lands, they need to enter into that holistic planning process. They should not continue to allow the planning commission and City Council to make piece meal zone changes as developers come to you saying "they can't make (enough!) money on the property!" It is not the role of the City to manage for developer's maximum profit. The developers should be doing their due diligence on development costs, markets, and demand prior to purchase. The City's criteria for changing a zone speaks to the following criteria:

Responding to changing conditions: There are no changing conditions. In fact, the UGB boundary was expanded and rezoned recently, to address the lack of commercial land among other things. The analysis was done by a consultant that this developer is using. There are no new conditions that would overturn the work done in the 2017 UGB expansion planning process. There is already high density allocations that can meet this need. Because the City has developed much of it's SFR with such small lot sizes, there is more of a deficit of the low density housing.

Responding to changing community attitudes: There has been no effort to assess or conclude that this zone change is supported by the community. I think you will find from public testimony, quite the opposite! The City has already zoned large sections of our town with high and medium density zoning. We do not support more more high density zoning. We have an adequate supply to meet the demand. The community attitude for one of the fastest growing cities in Oregon is, slow down! Upzoning this area to high density is the opposite of that.

Maintaining the integrity of the Comprehensive Plan: Pieemealing zoning decisions to meet individual property owners' whims destroys the integrity of the Comp Plan. The Comp Plan as mentioned, zoned a

variety of residential densities and commercial zones to provide diversity and meet our needs. While the developer might make more money with high density, it is not the responsibility of the City, nor within the criteria, to change zoning because they will make more money. Individual

There is an identified public need for the park and the extension of Dubarko Road. This can be done with existing zoning in place. The City also has the option of purchasing park property. The City **should NOT** be piecemealing incremental zone changes on the Comp Plan so developers can make “enough” money.

I do not support increasing density on this parcel, and there by increasing traffic, school students, needed water and sewer capacity and the other effects of high density construction. I recommend denial of this zone and Comprehensive Plan change. I am sure you will be hearing from other people.

Sincerely

Makoto Lane

37828 rachael dr.

Sandy, OR 97055

EXHIBIT CCCC

Dear Planning Commission: August 24, 2020

I am glad to hear that the City is working on the development code to close the large loop hole made by the Bailey Meadows developers, their high paid land use lawyer, and their paid consultants, including Mr. Mobley, our planning commissioner.

It is with extreme skepticism that I hear you have been working with the Bailey Meadows developer's traffic consultant to make changes to City Code. The intent of the Code changes are to ensure that developers pay for the roads (both local and their share of arterials) that are needed for their developments.

I find it incredulous that, after City residents call out the huge conflict of interest of having a planning commissioner who is most often having to recuse himself because he is working for developers, that you would rely on this particular traffic consultant to "fix" the problems with our City code that are benefitting developers and forcing City residents to pay for their roads. This appears to be a serious issue when we have developer consultants rewriting our code. You have plenty of traffic engineers who are not up to their stinky armpits in carrying water for the developers to use.

The changes recommended by Mr. Mobley highlighted in orange and should be tossed out completely. Please provide me with a copy of all changes made at his behest and any written comments he provided. If he wants to offer his comments on something, like any member of the public, he is welcome to do it. He should have no more influence than any other member of the public. It is totally inappropriate to have a developer's consultant rewriting our code! Our transportation code needs to be written to be resident friendly - not developer friendly. Our City lawyer should be working to ensure that the resident friendly policies can survive any land use lawyer wanting to drive a log truck through a loop hole.

There needs to be ADT standards for minor and major arterials, just like there are on the local streets. The lack of clear and objective standards, including ADT's for arterials leave the same loop hole as to when these upgrades be done, and who should be paying for them.

Regarding changes to the Plat approvement deadlines which were normally due within one year, with a possible extension of one more year. Now you are proposing they be due in two years, with a possible extension of a third year by the Planning Director and a fourth year by the Planning Commission! So we have gone from two to four years. This is bad because code changes, and developers are now able to get grandfathered in for four years after a code change that was done to help improve a development. Please eliminate this change entirely. You may still have discretionary review of extending a plat.

Section 7.100.100 should clarify the responsibility that developers must all local streets and arterial streets that are necessary to maintain ADT standards on local streets. They can do this with Local improvement districts or other ways. Residents should not be paying for these arterials. Further, there should not be the ability for them to earn "SDC credit" beyond what they have deposited, nor transfer it to other projects or other developers.

Please revise these standards to incorporate the resident friendly changes and leave out the standards that allow developers more lee way. As one of the fastest growing cities in Oregon, we can afford to slow our roll and make our development code work for residents first. If that costs developers, more

time or money, at least we, who will be stuck living with development, know that the City leaders took all possible effort to minimize the traffic and taxpayer cost impacts us as residents.

Kathleen Walker
15920 SE Bluff Road.

EXHIBIT DDDD

Marisol Martinez <mmartinez@ci.sandy.or.us>

Fwd: File # 19-050 CPA/ZC/SAP/SUB/TREE

1 message

Shelley Denison <sdenison@ci.sandy.or.us> Wed, Oct 28, 2020 at 8:43 AM
To: Marisol Martinez <mmartinez@ci.sandy.or.us>

Public comment for 19-050.

Thanks!

---------- Forwarded message ---------
From: **Ann Ruhl** <ARuhl@igainc.com>
Date: Tue, Oct 27, 2020 at 9:56 AM
Subject: File # 19-050 CPA/ZC/SAP/SUB/TREE
To: sdenison@ci.sandy.or.us <sdenison@ci.sandy.or.us>

Thank you,

Ann Ruhl

13868 Meadow Ave

Sandy, Or. 97055

503.936.9208

--
Shelley Denison
Associate Planner

City of Sandy
Development Services Department
39250 Pioneer Blvd
Sandy, OR 97055
503-783-2587
sdenison@ci.sandy.or.us

Sandy Com Info.pdf
2385K

Dear Planning Commissioners and City Planning Staff:

We are asking that you deny the proposed Bull Run Terrace Zone Change and Comprehensive Plan being proposed for Sandy. This proposed development does not meet any "public need" and violates State Planning Goals.

The developers want approval of significant zone changes and Comp Plan changes without disclosing to City staff, Planning Commission or residents, what they propose to develop. This violates Goal 1 of the Statewide Planning Goals that calls for extensive public involvement and two-way communication. Our questions about what is being developed in these large colored block allocations are not answered so the public cannot provide input with an incomplete application. We are being asked to approve large scale zone changes, but not allowed to know what will be developed. We suspect they know what they plan to build and have hinted at apartments over the commercial and high-density zone. Once they have this approval, the City must approve high density apartments on over ten acres of land if it meets the new zone's code, regardless of what the public wants at that point.

State Planning Goal #2 says "Cities and counties must build their comprehensive plans on a factual base, and follow their plan when making decisions on appropriate zoning. It also says "The comprehensive plan and zoning ordinances are the guiding documents for local government land use decisions. They help create **predictable outcomes for the people that live** and operate businesses in the community for development of homes, stores, and industries." We bought our house in this neighborhood based on the **predictable outcome** that there would be some low density closest to our homes, some medium density further away, and commercial zoning next to the highway. Please consider – what if this was in your neighborhood?

This proposal not only up zones nearly all the land allocations, it totally realigns their locations! Sandy already has considerable acreage zoned for high density and commercial areas. Now we are looking at living right next to a large commercial zone that the agenda packet says will also have apartments. And beyond that, are even more towering 3-4 story apartments in the high-density zone. This is not what we were promised when we purchased a home in this neighborhood! Instead of single-family homes and some possible townhomes, we are looking at the potential for over 200 apartments – far larger than the recently constructed Sandy Place Apartments that has 138 units.

Sandy Code 17.24.10 says that one of the criteria to consider a zone change is A. to "Respond to changing conditions and community attitudes." Most of Sandy's residents are not in favor of higher density growth. Many, if not most, would like to slow or stop growth. We know that growth cannot be stopped, but the Planning Commission's role is to listen to the residents and make decisions based on those attitudes. No conditions have changed that would indicate a need to approve this proposal. In fact, as the third fastest growing town in Oregon, Sandy appears to have plenty of interest and success developing under our existing Comp Plan and zoning allocations!

Sandy Code 17.24.70 has few criteria for evaluating significant zone changes and Comprehensive Plan Amendments. "A. The change is the best means of meeting the identified

public need." There is no public need identified for this zone change. City Resolution 2020-15 listing road projects showed extension of Dubarko Road to be benefitting new development 100%. There is no need or benefit to current residents. The developers have stated without evidence, that they require this zone change and Comp Plan amendment to pay for road developments. The zone change appears to be a ploy to get the maximum amount of profit from a development. There have been numerous commercial (Fred Meyer, Forestry Service office) and residential developments (Sandy Bluff, Bornstedt and Cascadia Village) that required the developer cover the costs for road construction and highway turn lanes. The developer wanting to quickly depart with more profit, is not a reason for the City to greatly increase housing density and commercial land that adversely affects its residents, especially those in the adjacent neighborhoods who bought their homes with existing zoning allocations and will live with any development for the foreseeable future.

The argument that this zone change is needed to bring more affordable housing to Sandy is also not backed by facts. The recently constructed Sandy Place Apartments on Sandy Heights and Bluff Road are charging $1,255 for a studio apartment, $1,400 for a one bedroom, $1,650 for a two bedroom and $1925 for a three-bedroom apartment. And of course, there are deposits, first and last months rent. These rental prices are comparable to paying a mortgage on a 3-bedroom home.

There is no compelling public need or interest in seeing our town slowly rezoned piecemeal by developers wanting to make the maximum profit. There is even more public doubt and skepticism when the developers refuse to reveal any details about their planned development before the zone and Comp Plan changes are finalized. If they really want to convince our Planning Commission, City Council and residents of their good intentions, they would be up front about the details of the proposal. We should deny this zone change and Comp Plan without further delay and encourage them to come back with a plan that fits within the existing zoning and City Codes. We understand that this parcel will develop, but it should develop under the existing zoning and codes.

Please use this information & send your concerns to the below email by today to sdenison@ci.sandy.or.us

also please join the Zoom call tonight at 700 PM.

https://sandy.civicweb.net/Portal/MeetingInformation.aspx?Org=Cal&Id=307

we need to stop this Requested Zone change.

Revised Agency Comments

Click the exhibit to jump to the applicable page
(Note: links not operative in full agenda packet view)

EEEE. City Engineer (October 9, 2020)
FFFF. ODOT (October 9, 2020)
GGGG. City Transportation Engineer (October 8, 2020)

EXHIBIT EEEE

CURRAN-McLEOD, INC.
CONSULTING ENGINEERS
6655 S.W. HAMPTON STREET, SUITE 210
PORTLAND, OREGON 97223

October 9, 2020

Ms. Marisol Martinez
& Ms. Shelley Denison
City of Sandy
39250 Pioneer Blvd.
Sandy, OR 97055

RE: CITY OF SANDY
BULL RUN TERRACE SUBDIVISION
PRELIMINARY REVIEW (File No. 19- 050 CPA/ZC/SUB) REVISED II

Dear Marisol and Shelley:

We have reviewed the new preliminary submittal and supporting documents and compared them to the February 2020 submittal for the above noted development. We have modified our comments as shown below to reflect the new findings:

1. The previous preliminary stormwater calculations dated November 20, 2019 that was provided with the February 2020 submittal was found to meet the water quality/quantity criteria as stated in the City of Sandy Development Code (SDC) 13.18 Standards and the City of Portland Stormwater Management Manual (SWMM) Standards, that were adopted by reference into the Sandy Development Code. However, a detailed final report stamped by a licensed professional shall be submitted for review with the final construction plans. The added new stormwater detention pond appears to be in compliance with City requirements and will be reviewed at the final design stage.

2. Street A shall be constructed to local street standards (28-foot wide paved surface, curbs on both sides, 5-foot planter strips and 5-foot wide sidewalks) in compliance with the City of Sandy Transportation System Plan (TSP), figure 12. The proposed 50-foot right of way is adequate.

3. Sandy Development Code (SDC), section 17.84.50.H.5.b requires the intersection of all local streets with Dubarko Rd to have a minimum of 50 feet of straight tangent alignment perpendicular to the intersection. However, it is does not clearly state the "straight tangent" measurement limits. We suggest the "straight tangent" be measured from the face of the curb line and not at the intersection points.

4. The vertical design grade for landing at all the Tee intersections where controlled with "Stop" signs should be no greater than 8% for a minimum of 50 feet or two car lengths.

5. The intersection of Hwy 26 and Dubarko Rd should comply with the intersection sight distance standards. All other local street intersections should comply with the vision triangle standards.

PHONE: (503) 684-3478 E-MAIL: cmi@curran-mcleod.com FAX: (503) 624-8247

6. The developer's engineer should provide a profile design for a minimum of 200 feet for Street B future extension past the project boundary to ensure future grades can be met.

7. All ADA ramps shall be designed, inspected by the design engineer and constructed by the contractor to meet the most current PROWAG requirements.

8. All public sanitary sewer, waterline mains to be a minimum of 8-inches in diameter and a minimum of 12-inches in diameter for storm drains and be extended to the plat boundaries where practical to provide future connections to adjoining properties. The preliminary noted changes to the street and utility plan seem to be reasonable and don't cause any concerns. We will review further at the design stage to ensure compliance with City requirements.

9. The existing 8-inch waterline in Dubarko Rd, located between the south side of Hwy 26 and the easterly boundary line of Deer Pointe phase 1 Subdivision should be potholed and depth verified to assure acceptable cover is adequate from the new street grades.

We have no concerns about the proceedings with this project subject to the above stated comments.

Sincerely,

CURRAN-McLEOD, INC.

Hassan Ibrahim, PE

cc: Mr. Mike Walker, City of Sandy

Oregon
Kate Brown, Governor

Department of Transportation
Region 1 Headquarters
123 NW Flanders Street
Portland, Oregon 97209
(503) 731.8200
FAX (503) 731.8259

EXHIBIT FFFF

October 9th, 2020 ODOT #10566

ODOT Response

Project Name: Bull Run Terrace	**State Highway:** US 26 and OR 211
Jurisdiction: City of Sandy	**Jurisdiction Case #:** 19-50 CPA/ZC/SUB
Site Address: No Situs: US 26 and Dubarko Road, Sandy, OR	

The site of this proposed land use action is adjacent to US 26 and in the vicinity of OR 211. US 26 and OR 211 are under ODOT jurisdiction. ODOT is currently working with the City of Sandy to transfer jurisdiction of OR 211 to the City. ODOT has permitting authority for these facilities and an interest in ensuring that this proposed land use is compatible with its safe and efficient operation. **Please direct the applicant to the District Contact indicated below to determine permit requirements and obtain application information.**

COMMENTS/FINDINGS

The land use proposal for the site has been modified from March 2020 land use notice. The proposed land use action is for a comprehensive plan amendment, zone change and subdivision. ODOT has reviewed the updated Traffic Impact Study (TIS) prepared by ARD Engineering dated September 28th, 2020.

The TIS makes the following conclusion relating to the analysis of the new Dubarko Rd connection to US 26:

> 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. The northbound left-turn lane would not be needed at the time of project completion if the intersection is limited to right-in, right-out only. No other turn lanes or traffic signals are recommended in conjunction with the proposed subdivision.

It is unclear why the TIS analyzed the new street connection to US 26 to limit movements at the intersection to right in/right out movements. ODOT provided direction to both the city and the applicant that a right in/right out would not be approved by ODOT. As explained below, the Dubarko Rd connection will require a "Grant of Access" and the configuration of the US 26/Dubarko Rd intersection will be determined through that process.

Transportation Planning Rule Findings

For zone changes and comprehensive plan amendments, local governments must make a finding that the proposed amendment complies with the Transportation Planning Rule (TPR), OAR 660-012-0060. There must be substantial evidence in the record to either make a finding of "no significant effect" on the transportation system, or if there is a significant effect, require assurance

that the land uses to be allowed are consistent with the identified function, capacity, and performance standard of the transportation facility.

The TIS has identified that 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. The study 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. ODOT is supportive of the proposed trip cap.

US 26 and Dubarko Rd Intersection

The proposed subdivision includes a new public road connection of Durbako Rd to US 26 consistent with the City of Sandy Transportation System Plan. The location for the proposed public road connection is access controlled. ODOT has acquired and owns access rights along the subject property's frontage. Therefore, in order to construct the new public road connection to US 26, the City is required to apply for and obtain a "Grant of Access" for the public approach (OAR 731-051-2020). As part of the application process, the City must address the criteria outlined in the rule including provide the following information:

1. Traffic Impact analysis for 20 years from the year of construction
2. Demonstrate a committed funding source for the US 26 improvements
3. Demonstrate a benefit to the highway (OAR 731-051-4030)
4. 100% Construction Plans for highway improvements

For information on the Grant of Access process, please contact Marcela Rodriguez, P.E. at 503-731-8494 or marcela.rodriguez@odot.state.or.us.

*Note: It may take **6 months to a year** to process a Grant of Access.*

Subdivision

The subdivision relies on the new Dubarko Rd connection to US 26 for access to the transportation system. Therefore, the subdivision should be conditioned to obtain the Grant of Access including the ODOT Permit to Occupy or Perform Operations upon a State Highway prior to the recording of the plat and the issuance of Building Permits. All improvements that are conditioned as part of the Grant of Access must be constructed and accepted by ODOT prior to the City issuing approval for Occupancy.

ODOT RECOMMENDED SUBDIVISION CONDITIONS OF APPROVAL

☒ The Dubarko Rd public road connection to US 26 shall be constructed. A Grant of Access (OAR 731-051-2020) shall be obtained from ODOT for the new public road connection to US 26 prior to recording the plan for the subdivision. Prior to issuance of Building Permits, the Grant of Access including the ODOT Permit to Occupy or Perform Operations Upon a State Highway for all improvements highway improvement shall be obtained. All improvements that are conditioned as part of the Grant of Access must be constructed and accepted by ODOT prior to the City issuing approval for Occupancy.

*Note: It may take **6 months to a year** to process a Grant of Access.*

☒ Curb, sidewalk, cross walk ramps, bikeways and road widening along the US 26 frontage shall constructed as necessary to be consistent with local, ODOT and ADA standards. ODOT Permit to Occupy or Perform Operations Upon a State Highway for all improvements highway improvement shall be obtained.

Please send a copy of the Notice of Decision including conditions of approval to:

ODOT Region 1 Planning
Development Review
123 NW Flanders St
Portland, OR 97209

ODOT_R1_DevRev@odot.state.or.us

Development Review Planner: Marah Danielson	503.731.8258, marah.b.danielson@odot.state.or.us
Traffic Contact: Avi Tayar, P.E.	503.731.8221 Abraham.tayar@odot.state.or.us
District Contact: Loretta Kieffer	503.667.7441 Loretta.L.KIEFFER@odot.state.or.us

EXHIBIT GGGG

REPLINGER & ASSOCIATES LLC
TRANSPORTATION ENGINEERING

October 8, 2020

Ms. Shelley Denison
City of Sandy
39250 Pioneer Blvd.
Sandy, OR 97055

SUBJECT: REVIEW OF TRANSPORTATION IMPACT STUDY – BULL RUN TERRACE SUBDIVISION

Dear Shelley:

In response to your request, I have reviewed materials submitted in support of the Bull Run Terrace Subdivision on Dubarko Road in the east part of Sandy. The Transportation Impact Study (TIS), dated September 28, 2020, was prepared under the direction of Michael Ard, PE of Ard Engineering. A preliminary plat, dated 7/26/2018, was also provided.

The site, with approximately 16 acres, is on the southwest side of US 26 and is bisected by Dubarko Road. TIS describes a proposal to subdivide the property and construct up to 147 apartments and 4 single-family homes. A portion of the development is zoned for commercial uses but is not proposed to be developed at this time. The development proposes extending Dubarko Road, currently a stub street, to connect with US 26 opposite SE Vista Loop (West). Rezoning of the project site is proposed.

Overall

I find the TIS addresses the city's requirements and provides an adequate basis to evaluate impacts of the proposed development.

Comments

1. ***Study Area.*** The study addresses the appropriate intersections. It includes analyses of:

   - US 26 at SE Ten Eyck Road;
   - US 26 at SE Langensand Road;
   - US 26 at SE Vista Loop Drive;
   - Highway 211 at Dubarko Road; and
   - Dubarko Road at SE Langensand Road.

2. ***Traffic Counts.*** The AM and PM peak hour traffic counts were conducted during March 2019. The engineer adjusted the traffic counts to account for seasonal variations. The engineer used a combination approach to account for seasonal variation of recreational traffic and separately for commuter traffic on US 26. Volumes on Highway 211 were adjusted by a straight 8 percent. The methodology appears consistent with the procedures defined by the Oregon Department of Transportation (ODOT). The adjusted counts appear reasonable.

3. ***Trip Generation.*** The TIS uses trip generation for single-family dwellings and multi-family dwellings (land use code 210 and 220, respectively) from the Institute of Transportation Engineers' (ITE) *Trip Generation Manual*. The engineer calculates that the subdivision would produce 71 total AM peak hour trips; 86 total PM peak hour trips; and 1114 total daily trips. This calculation does not include potential trips associated with the future development of the commercially zoned land within the development area. The TIS states that "a separate application and analysis will be prepared for the future commercial development." The calculation of trips generated by the residential development appears reasonable.

   The TIS also provides a trip generation calculation for a reasonable worst-case development scenario under current zoning and proposed zoning. This is discussed in point 12, below.

4. ***Trip Distribution.*** The TIS provided information about trip distribution from the site. The engineer assumed 65 percent of the traffic would travel to and from the northwest on US 26; 20 percent would travel to and from the southeast on US 26; and 15 percent would travel to and from the west on Dubarko Road. The trip distribution seems reasonable.

   The TIS also accounts for some diversion of existing traffic due to the new connection between US 26 and Dubarko Road. The engineer explains that some traffic from the east could use this route to get to the south part of the city and the reverse movement. Diversions predicted by the engineer are significant and contribute to traffic issues at the intersection of Highway 211 and Dubarko. This is discussed in #6 and #10, below.

5. ***Traffic Growth.*** The TIS uses a 1.93 percent annual increase for Highway 26 based on projected volumes at the west boundary of Sandy. For Highway 211, the TIS uses an annual growth rate of 3.16 percent. For other facilities it uses a 2.0 percent annual growth rate to account for background traffic growth. "The Views," a 166-unit development on the north side of US 26 on Vista Loop was also included as an in-process development. These assumptions account for future traffic and appear reasonable.

6. ***Analysis.*** Traffic volumes were calculated for the intersections cited in #1, above. Intersection level-of-service (LOS) and the volume-to-capacity (v/c) ratio were provided. The intersection of US 26 with SE Ten Eyck Road is signalized; the other intersections are stop-controlled. The analyses were conducted for existing 2020 conditions, 2022 background conditions, and 2022 with the development. Furthermore, the engineer evaluates traffic operations if the intersection of US 26 and Dubarko Road is restricted to, or operates as, right-in, right-out operation. This analysis was used to determine whether there is adequate capacity at other study area intersections as well as assessing the operational improvements at the intersection of US 26 and Dubarko Road.

   The engineer calculates that the signalized intersection of US 26 with Ten Eyck meets the v/c standards specified by ODOT under all scenarios. At the intersection of US 26 with Langensand Road, the v/c for both the mainline and minor street approaches are calculated to meet ODOT's v/c standard. However, long delays (the basis for LOS) are calculated to occur on the minor street approaches under existing and future conditions.

   The intersection of Dubarko Road and Langensand Road is predicted to operate acceptably under all scenarios. The intersection will operate at LOS "B" or better, meeting city operational standards.

   The engineer also predicts that the intersection of US 26 and Dubarko Road/Vista Loop (west) will meet ODOT's v/c standard, but that long delays will occur on the minor street approaches. This led the engineer to calculate what would happen if the Dubarko Road approach were restricted to right-in, right-out. Restricting this to right-in, right-out movements reduces approach volumes, reduces delays, and improves the v/c ratio for the intersection. Even if right-in, right-out restrictions were not in place, extraordinarily long delays encountered by motorists seeking to make left turns from northeast-bound Dubarko Road onto US 26 is likely to cause them to choose alternative routes.

   The engineer calculated that the intersection of Highway 211 with Dubarko Road would also meet ODOT's v/c standards, but like the US 26 intersections, long delays can be expected on the minor street approaches. Traffic volumes on Dubarko Road at Highway 211 are influenced by whether the intersection of US 26 with Dubarko Road is restricted to right-in, right-out. Turn restrictions at US 26 that limit diversion of traffic to Dubarko Road reduce traffic volumes for the entire length of Dubarko Road. This also impacts when signal warrants may be met at the intersection of Highway 211 and Dubarko Road. The engineer also evaluated traffic operations at this intersection using a

roundabout. He calculated operations would be improved but noted that topographic constraints – a steep grade - would complicate installation of a roundabout.

The engineer concluded that "the study intersections are projected to operate acceptably through year 2022 either with or without the addition of site trips from the proposed development." The engineer also predicts, due to long delays, some motorists will likely not choose to make left turns from northeast bound Dubarko Road to westbound US 26 but choose alternative routes instead. I concur with the engineer's conclusions.

A queuing analysis was also undertaken to determine the appropriate queue storage for the intersection of US 26 and Dubarko Road. For left turns from northwest-bound US 26 to Dubarko Road, he calculated a 95th percentile queue length of 80 feet during the PM peak hour and recommended designing for 100 feet of queue storage. The engineer also notes that the queue for northeast bound Dubarko Road at US 26 could extend to 277 feet.

7. ***Crash Information.*** The TIA provides information on crashes for the most recent available five-year period covering 2013 through 2017.

   At the intersection of US 26 and SE Ten Eyck Road, there were seven reported and a relatively low crash rate. At the intersection of US 26 and Langensand Road, there were six reported crashes and a low crash rate. At the intersection of Dubarko Road and Langensand Road, there was one reported crash. At US 26 and Vista Loop, there were no reported crashes.

   The intersection of Highway 211 and Dubarko Road has been a safety concern for years and has undergone safety improvements. During the five-year period, 27 crashes were reported. The crash rate is substantially above the 90th percentile crash rate for similar intersections. Crashes remain a problem following implementation of safety improvements that included realigning the Dubarko Road approaches and added striping on Highway 211. The engineer notes that the crash history indicates warrants are met for all-way stop control and the intersection is predicted to meet signal warrants in 2022. He recommends ODOT consider installation of all-way stop control to address safety issues. I concur.

8. ***Site Plan and Access.*** The site plan provides for the extension of Dubarko Road. It will serve as the principal access to the development. Three intersections are proposed along Dubarko Road within the development. The proposed site plan includes a new four-leg intersection on Dubarko Road that will provide access both north and south of Dubarko Road. Additionally, the area on the northwest side of Dubarko Road will have

a second access in the form of a connection to Fawn Street at the west side of the development. A stub street on the southeast side of Dubarko Road will provide for a connection to adjacent properties when they develop.

The TIS states "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." The reason for this anticipated future access is not specified in the TIS, but this future access is presumably associated with future commercial development. I agree with the engineer's conclusion and recommendation. It will be important to consider access to Dubarko Road in subsequent development applications. Limiting access to Dubarko Road, a minor arterial, should be minimized to protect its function and the capacity of this important facility. Private driveways serving individual parcels should be avoided.

9. ***Sight Distance.*** The engineer analyzed sight distance at the proposed intersection of US 26 and Dubarko Road. He concluded that sight distance exceeded 1200 feet in each direction, a distance appropriate for a 65-mph roadway. The engineer recommended no mitigation for sight distance. I concur.

10. ***Traffic Signal Warrants.*** The engineer conducted a preliminary traffic signal analysis warrants at several locations based on ODOT procedures.

    Traffic signal warrants were not met for the intersections of US 26 with Dubarko Road or US 26 at Langensand Road based on 2022 volumes with the development. Based on regional growth and the Sandy Transportation System Plan (TSP), the eventual need for a traffic signal at either location may be anticipated.

    The engineer also conducted an analysis of traffic signal warrants at the intersection of Highway 211 and Dubarko Road. He concluded that if a new intersection allowing all movements at US 26 and Dubarko Road is constructed; if "The Views" development is constructed; and if this development is constructed, traffic signal warrants would be met for the 30th highest hour in 2022. If full movements are not provided at the intersection of US 26 and Dubarko Road, traffic volumes along the entire length of Dubarko Road are significantly reduced and traffic volume warrants at the intersection of Highway 211 and Dubarko Road are not met. The engineer argues that "the triggering event that causes signal warrants to be marginally met at this intersection upon project completion is not the Bull Run Terrace Development." Instead, he indicates the need for a signal is "the completion of the city's planned connection of Dubarko Road to Highway 26." He further argues that "a request to construct a traffic

signal at this intersection would be disproportionate to the actual impacts of the proposed development." I concur with this conclusion since the development is predicted to add only 12 trips to the intersection during the AM peak hour and 14 trips during the PM peak hour.

The engineer also analyzed warrants for all-way stop control at the intersection of Highway 211 and Dubarko Road. He concluded warrants for all-way stop control were met based on crash history and would be met for minimum traffic volumes with additional traffic diversion to Dubarko Road and from developments. He further analyzed traffic operations with all-way stop control and concluded that the intersection would operate at LOS "C" with a v/c of 0.79. He recommends that ODOT consider all-way stop control at the intersection.

11. ***Left-Turn Lane Warrants.*** The TIS indicates that left-turn lanes are provided on eastbound US 26 at Langensand Road. It indicates that the intersection of US 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 extension of Dubarko Road as proposed with this development.

    According to the engineer, 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. He further states that turn lane warrants would not be applicable and added lanes may not be needed if all-way stop control is installed at the intersection as recommended based on his safety analysis, or if a traffic signal is installed at the intersection.

    Turn lanes are not warranted at the intersection of Dubarko Road and Langensand Road. The engineer recommends consideration be given to reorienting the stop signs to favor Dubarko Road rather than Langensand Road if volumes increase on Dubarko Road.

12. ***Transportation Planning Rule Considerations.*** The TIS provides a detailed analysis of the individual requirements of the TPR. The engineer calculated trips based on the current zoning and on the proposed zoning. The subject property is currently zoned with a mix of 8.05 acres of R-1, 5.01 acres of R-2 and 2.84 acres of C-3 zoning.

    The TIS makes the following assumptions for the two scenarios: "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, 3.609 acres will be zoned C-3, and 1.426 acres will be zoned POS (Parks & Open Space)." The TIS makes further explanations about the development assumptions including minimum lot size, lot coverage, and specific assumptions about commercial development with high intensity uses allowed under the Sandy development code. The assumptions appear reasonable for both the existing zoning and proposed zoning worst-case development scenarios.

Under the current zoning, the engineer calculates full development would generate 242 AM peak hour trips; 340 PM peak hour trips; and 3392 weekday trips. Under the proposed zoning, the engineer calculates full development would, after accounting for pass-by trips generate 273 AM peak hour trips; 402 PM peak hour trips; and 4370 weekday trips.

Due to the projected increase possible with a worst-case development scenario, the TIS recommends a trip cap to avoid causing traffic impacts from the rezoning. The TIS includes the following recommendation: "a trip cap of 340 net new PM peak hour site trips is recommended for the subject properties in conjunction with the proposed zone change."

The engineer concludes that no changes to the city's street classification designation or standards are warranted by the rezoning and that, with the trip cap, the proposed rezoning does not have a significant effect on the transportation system and that mitigation is not necessary. He concludes the Transportation Planning Rule is satisfied. Based on establishing a trip cap of 340 PM peak hour trips, I concur with the engineer's conclusions.

13. Conclusions and Recommendations. The engineer concludes that the intersections will meet ODOT and city operational standards for the study area intersections either with or without the development.

With the completion of Dubarko Road and a new intersection with US 26, northeast-bound motorists on Dubarko Road can expect extraordinarily long delays. Motorists may choose alternative routes. The system has adequate capacity if the US 26/Dubarko Road intersection were restricted to, or effectively operated as right-in, right-out.

While most study area intersections are operating relatively safely, the intersection of Highway 211 and Dubarko Road suffers from a high number of crashes and a high crash rate. It is substantially higher than the 90th percentile crash rate for comparable intersections. Recent safety improvements to not appear to have altered this trend. The proposed development and a new connection of Dubarko Road with US 26 can be expected to increase the traffic using the intersection of Highway 211 and Dubarko

Road. The engineer recommends ODOT consider converting the intersection of Highway 211 and Dubarko Road to all-way stop control for safety reasons based on the historical data. He recommends no other mitigation to address safety issues.

The engineer concludes traffic signals will be warranted at the intersection of Highway 211 and Dubarko Road in the near future based on development and on the completion of Dubarko Road, which provides opportunities for rerouting of traffic that currently remains on US 26.

The engineer concludes that turn lanes (a northeast-bound left-turn lane on Dubarko Road, and a southeast-bound right-turn lane on US 26) will be warranted at the intersection of US 26 and Dubarko Road with the completion of Dubarko Road. The engineer notes that the northeast-bound left-turn lane would not be needed if the Dubarko Road approach were restricted to right-in, right-out. While this is true, failing to construct Dubarko Road to accommodate a northeast-bound left-turn lane would be short-sighted and would not be consistent with the Sandy TSP's designation of Dubarko Road as a minor arterial.

The engineer concludes that sight distance is adequate for the new intersection of US 26 and Dubarko Road.

The engineer recommends establishment of a trip cap of 340 PM peak hour trips to ensure that the rezoning of the property will not produce a significant change in traffic volumes and will not have a significant effect on the transportation system. He concludes the Transportation Planning Rule is satisfied.

I concur with the engineer's conclusions.

Conclusion and Recommendations

Based on the information provided by the applicant, I find the TIS meets city requirements. The engineer used appropriate methods and documents his procedures and conclusions.

Because of its location, this development will implement a key project in the city's Transportation System Plan, namely Dubarko Road. Dubarko Road is classified as a minor arterial. Much of the systemwide impact of the development as describe in the TIS is a result of providing a new connection – a connection that will result in diversion of traffic from US 26 to Dubarko Road.

With its connection to US 26, Dubarko Road will become increasingly important to the transportation system. There are implications for operations at the intersection of Dubarko

Road and Langensand Road and at the intersection of Highway 211 and Dubarko Road. For the former, it may be appropriate to reorient the stop signs to give priority to Dubarko Road when traffic volumes increase.

At the intersection of Highway 211 and Dubarko Road, the engineer recommends ODOT consider converting the intersection to all-way stop control as a possible safety measure to address historical crash issues. Traffic signal warrants may be met in the not-too-distant future due to traffic diversion on Dubarko Road and growth in the community.

It is important to recognize that trips generated by this development will have some impact on the transportation system, but that much of the predicted impact is from the implementation of Dubarko Road as specified in the city's Transportation System Plan. The construction of the missing segment of Dubarko Road adjacent to US 26 will also necessitate modification to the intersection of US 26/Vista Loop/Dubarko Road. The engineer has provided information about queue storage requirements and has warned of long delays for motorists on the minor street approaches.

It may be appropriate for this development to participate in some off-site improvements, such as intersection improvements at US 26 and Dubarko Road or Highway 211 and Dubarko Road. However, much of the impact described in the TIS is associated with the implementation of Dubarko Road, a project specified in the city's Transportation System Plan.

Dubarko Road should be developed to minor arterial standards through the subject property. The developer should be put on notice that any future land use actions, such as development of the C-3 property, will need to address traffic impacts and access. Limits on access involving access spacing and possible turn restrictions may be necessary to protect the function of Dubarko Road and to avoid unacceptable impacts on the operations and safety of the intersection of US 26 and Dubarko Road.

As noted in #6, above, the engineer predicts that the northeast-bound queue on Dubarko Road could extend to 277 feet. The preliminary plat suggests that Parcel 6, proposed to be zoned R-3, would have full access to Dubarko Road. No details are provided about this access in either the TIS or the site plan. If the city chooses to allow direct access to Dubarko Road from Parcel 6 on the southeast side of Dubarko Road, access should be at least 277 feet southwest of US 26 to avoid interference with queues extending from the US 26/Dubarko Road intersection. Providing access to Parcel 6 from "B" Street would be preferable to protect the function of Dubarko Road.

To the extent that the developer is required to implement projects or participate in projects involving facilities under the jurisdiction of ODOT, conditions of approval should be

included requiring that the development comply with the requirements standards and procedures specified by ODOT. I recommend that that ODOT requirements and standards associated with frontage improvements where the development abuts US 26 be made conditions of approval for the development.

If you have any questions or need any further information concerning this review, please contact me at replinger-associates@comcast.net.

Sincerely,

John Replinger, PE
Principal

BullRunTerraceTIS081020

Additional Exhibits

Click the exhibit to jump to the applicable page
(Note: links not operative in full agenda packet view)

HHHH. Previous Staff Report (August 14, 2020)
IIII. Initial Power Point Presentation (August 24, 2020)
JJJJ. Memo from Tracy Brown (October 21, 2020)
KKKK. Email from Mike Robinson (October 26, 2020)
LLLL. Parks and Trails Advisory Board Minutes from June 10, 2020
MMMM. Parks and Trails Advisory Board Minutes from July 8, 2020
NNNN. Parks and Trails Advisory Board Recommendation (November 13, 2020)
OOOO. Revised Staff Report for Planning Commission (October 19, 2020)
PPPP. Second Power Point Presentation (October 26, 2020)

39250 Pioneer Blvd
Sandy, OR 97055
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WHERE INNOVATION MEETS ELEVATION

PLANNING COMMISSION STAFF REPORT
(DRAFT FINDINGS OF FACT and FINAL ORDER
TYPE IV DECISION)

DATE: August 14, 2020

FILE NO.: 19-050 CPA/ZC/SUB/SAP/TREE

PROJECT NAME: Bull Run Terrace

APPLICANT/OWNER: Roll Tide Properties Corp

LEGAL DESCRIPTION: T2 R5E Section 18CD, Tax Lots 900 and 1000

The above-referenced proposal was reviewed concurrently as a Type IV comprehensive plan amendment, zone change, subdivision, and specific area plan overlay with tree removal. The following Findings of Fact are adopted supporting approval of the plan in accordance with Chapter 17 of the Sandy Municipal Code.

EXHIBITS:

Applicant's Submittals:

A. Land Use Application
B. Project Narrative (revised July 2020)
C. Civil Plan Set
   - Sheet 1 – Cover Sheet, Preliminary Plat Map, and Future Street Plan
   - Sheet 2 – Preliminary Plat Map
   - Sheet 3 – Existing Conditions and Tree Retention Plan
   - Sheet 4 – Tree Tables
   - Sheet 5 – Master Street and Utility Plan
   - Sheet 6 – Street Sections
   - Sheet 7 – Street Tree Plan and Parking Analysis
   - Sheet 8 – Proposed Striping Plan
   - Sheet 9 – Preliminary Grading and Erosion Control Plan
   - Sheet 10 – Slope Analysis
D. Preliminary Storm Drainage Design and Calculations
E. Public Need Analysis
F. Traffic Impact Study
G. Arborist Report
H. Wetland Determination Report
I. Geotechnical Report

Agency Comments:

J. City Engineer (February 20, 2020)
K. Sandy Fire District No. 72 (February 25, 2020)
L. PGE (February 25, 2020)
M. City of Sandy Transit (February 28, 2020)
N. City Transportation Engineer (February 28, 2020)
O. ODOT (March 20, 2020)
P. City of Sandy Public Works (April 29, 2020)
Q. City Transportation Engineer (August 10, 2020)
R. City Engineer (August 12, 2020)
S. Sandy Fire District No. 72 (August 13, 2020)
T. ODOT *(placeholder)*
U. City of Sandy Public Works *(placeholder)*

Additional Documents from Staff:

V. Pre-application Notes from January 10, 2018, October 10, 2018
W. Incompleteness Letter dated January 27, 2020
X. Completeness Letter dated February 14, 2020

Public Comments:

Y. Amelia Williams Robinson (April 23, 2020)
Z. Miriam Chmykhalov (April 23, 2020)
AA. Tom and Linda Hunt (April 26, 2020)
BB. Vincent and Lynn Mandina (April 28, 2020)
CC. Vadim and Miriam Verbelchul (April 28, 2020)
DD. Nicola Skinner (April 30, 2020)
EE. Kathleen Walker (May 1, 2020)
FF. David and Nancy Allan (May 1, 2020)
GG. Izaac McKenzie (May 1, 2020)
HH. Ann Ruhl (May 1, 2020)
II. Lesley Lowe (May 1, 2020)
JJ. Lonnie Stermon (May 1, 2020)
KK. Tom and Linda Hunt (May 5, 2020)
LL. Gary and Val Roche (May 5, 2020)
MM. Gary and Val Roche (May 6, 2020)
NN. Scott Ruehrdanz (May 7, 2020)
OO. Marion Gunderson (May 26, 2020)
PP. Christian Vedder (May 27, 2020)
QQ. Ann Smith Vedder (May 27, 2020)
RR. Susan Dulley (June 2, 2020)
SS. Yoshi Hosaka and Itsuo Hosaka (July 28, 2020)
TT. Gary and Val Roche (July 31, 2020)
UU. David and Nancy Allan (July 30, 2020)
VV. David and Nancy Allan (July 31, 2020)
WW. Dennis Fetter (August 3, 2020)

XX. Jessica Hutson (August 5, 2020)
YY. Lee Grundmeyer (August 6, 2020)
ZZ. Izaac McKenzie (August 7, 2020)
AAA. Marilyn E. (August 10, 2020)

FINDINGS OF FACT

General

1. These findings are based on the applicant's submittals received on December 30, 2019, July 14, 2020, and other information as detailed in this document. Staff deemed the application incomplete on January 27, 2020. The applicant submitted additional materials on February 11, 2020. The application was deemed complete on February 14, 2020 and the original 120-day deadline was June 13, 2020. However, due to the unforeseen effects of COVID-19 affecting the timing of public hearings, the applicant agreed to a deadline extension of 30 days to July 13, 2020.

2. 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.

3. On May 13, 2020 the Development Services Director sent the applicant the following: "Instead of requesting 120-day extensions and going back and forth between the applicant and city staff we are going to invoke ORS 227.178 (10) to remove the 120-day clock provisions for the Bull Run Terrace application." Therefore, this application does not have a 120-day deadline as the proposal includes a comprehensive plan map amendment.

4. This report is based upon the exhibits listed in this document, as well as agency comments and public testimony.

5. The subject site is approximately 15.91 acres. The site is located at 40808 and 41010 Highway 26.

6. The parcel has a Comprehensive Plan Map designation of Village and a Zoning Map designation of R-1, Low Density Residential; R-2, Medium Density Residential; and C-3. Village Commercial.

7. This subject property was previously approved for an 88-lot subdivision known as Vista Loop South (File No. 05-029). Vista Loop South received a few tentative plat extensions and one plat reinstatement, but the subdivision was never constructed, and the approval expired in 2015.

8. The applicant, Roll Tide Properties Corp., requests a Type IV Zone Map Amendment, Comprehensive Plan Map Amendment, Specific Area Plan and development of a 7-lot subdivision for two parcels totaling approximately 15.91 acres. Four lots are proposed to have the R-1 zoning designation and are proposed to each contain a single family dwelling. Two lots are proposed to have the R-3 zoning designation. The exact number of multifamily

dwelling units will be determined with a subsequent design review application for these lots, but according to the applicant the maximum number of dwelling units on the R-3 land is 158 dwelling units. While the C-3 zoning district will have to contain some commercial development there is a decent chance the C-3 land will also contain some residential dwelling units. The development code allows for multi family residential in the C-3 zoning district so long as the dwelling units are above, beside, or behind a commercial business.

9. While this proposal will undoubtfully increase traffic on Dubarko Road the Average Daily Traffic (ADT) concerns that were recently 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 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 is Fawn Street/Street A. The four proposed single family homes 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. To alleviate potential traffic concerns and to deter trips from heading west on Fawn Street staff recommends that trip distribution is limited from Lot 7. **Staff recommends a condition that the exit on the driveway to Lot 7 on Street A is restricted to left-only turning movements (using a left turn only pork chop design and signage) to deter commercial patrons from entering the Deer Pointe subdivision when exiting Lot 7.**

10. Notification of the proposed application was mailed to affected agencies on February 14, 2020 and to affected property owners within 500 feet of the subject property on April 17, 2020. A correction to the notice was sent on May 5, 2020.

11. Due to concerns raised by City planning staff as well as by surrounding residents, the applicant requested additional time to modify the application for this proposed development. On May 21, 2020, a notification was mailed to affected property owners stating that the Planning Commission meeting was rescheduled to Monday, July 27, 2020 at 7:00 pm. The City Council meeting was rescheduled to Tuesday, September 8, 2020 at 7:00 pm.

12. After additional discussion, the applicant and City staff agreed to move the public hearing dates once more. A notice was sent on July 23, 2020 informing affected property owners that the Planning Commission meeting will be held on August 24, 2020 and the City Council meeting on October 19, 2020.

13. A legal notice was submitted to the newspaper on August 5, 2020 to be published on August 12, 2020 informing residents of the public hearings.

14. Agency comments were received from the City Transportation Engineer, City Engineer, Sandy Transit, Public Works, ODOT, Sandy Fire District No. 72, and PGE.

15. At publication of this staff report 29 written public comments were received. The main concerns expressed by residents include the following:

    A. The loss of trees, thus lowering the aesthetic quality of the area as well as privacy for existing homes.
    B. The capacity of the police to effectively patrol multi-family dwelling areas.
    C. The possibility of criminal activity at multi-family dwelling areas.
    D. Being previously told that the land would not be developed as residential.
    E. Acres of commercial land use being put into a deficit.
    F. Concerns about effects of multi-family housing on property values.

16. Staff is sympathetic to all concerns raised by the public but does not know of any research which shows that an increase in multi-family housing decreases property values for single family homes. There is certainly nothing within the Sandy municipal code which relates multi-family housing and property values, nor is there a way to evaluate this. Furthermore, 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 5.01 acres of R-2 designated land.

17.24 – Comprehensive Plan Amendment Procedures

17. Chapter 17.24, Comprehensive Plan Amendment Procedures, contains review criteria for Comprehensive Plan amendments. The comprehensive plan map change and zone map change proposes to add High Density Residential (R-3) and Parks and Open Space (POS), increase Village Commercial (C-3), remove Medium Density Residential (R-2), and reduce Low Density Residential (R-1). The Comprehensive Plan states that area and density increase within a village may be increased or decreased up to 20 percent. Changes greater than 20 percent will require a Plan Map amendment. The applicant's analysis shows that the maximum residential density with the existing zoning designations on the R-2 and R-1 lands is 101 dwelling units. The applicant's analysis shows that the maximum residential density with the proposed zoning designations on the R-3 and R-1 lands is 163 dwelling units. Therefore, the potential increase in residential density is 61.9 percent which exceeds the threshold as defined in the comprehensive plan. Therefore, a Plan Map amendment is required.

18. Section 17.24.70 (A) specifies the change being proposed is the best means of meeting the identified public need. The City Council adopted an updated Urbanization Study in February 2015 (Ordinance 2015-01). This study projected the land needs for the Urban Growth Boundary to the year 2034 and concluded there is expected to be a surplus of 13.9 acres of

high density residential land and a deficit of 51.8 acres of commercial land for the planning period. The proposed change would increase the commercial land supply by 0.77 acres and reduce the residential land supply by the same amount.

19. The applicant's original proposed modifications would have resulted in the following:

    Commercial = deficit of 1.71 acres (previously a surplus of 1.13 acres)
    Low Density Residential = surplus of 11.74 acres (previously a surplus of 19.2 acres)
    Medium Density Residential = surplus of 12.09 (previously a surplus of 17.1 acres)
    High Density Residential = surplus of 23.60 acres (previously a surplus of 12.6 acres)
    Industrial is not applicable to this application

20. Because the original proposal would have resulted in a deficit of the 20-year supply of commercial lands and created a Goal 9 violation, the applicant revised their proposal to include commercial land.

21. The applicant's new proposal will result in the following:

    Commercial = surplus of 1.90 acres (previously a surplus of 1.13 acres)
    Low Density Residential = surplus of 11.74 acres (previously a surplus of 19.2 acres)
    Medium Density Residential = surplus of 12.09 (previously a surplus of 17.1 acres)
    High Density Residential = surplus of 20.51 acres (previously a surplus of 12.6 acres)
    Industrial is not applicable to this application

    The applicant's surplus numbers on page 11 of their narrative are slightly different, but the above numbers are the correct numbers based on recent comprehensive plan map amendments.

22. Section 17.24.70(B) requires the change to conform to all applicable Statewide Planning Goals.

    Goal 1: Citizen Involvement
    The application is being reviewed through a Type IV process that requires two public hearings. A public notice was sent to adjoining property owners, a legal notice published in the Sandy Post, and a notice of the proposal was sent to the Department of Land Conservation and Development. The Planning Commission will review the application at a public hearing on August 24, 2020 and make a recommendation to City Council who will hold a public hearing on October 19, 2020. 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 G). 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. That said, staff finds that to adequately protect the required retention trees on Lot 7 the protection area shall be consistent with Chapter 17.92. **The applicant shall install tree protection fencing at the critical root zone of 1 foot per 1 inch DBH to protect the 59 retention trees 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 up to 1.426 acres of parkland to the City. This dedication helps expand the existing parkland that will eventually be developed as Deer Point Park. Expanding the Deer Point park is consistent with the goals of the Parks and Trails Advisory Board and the current revisions that are being considered for the Parks Master Plan. Staff finds that parkland dedication is preferable so long as the development to the east of the park is complementary to the parkland. As explained below, 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 or east of the parkland, but instead is proposing future commercial development. The applicant's narrative states, "in order to address the spirit of the requirement in this section, the applicant proposes constructing a widened sidewalk along the eastern park frontage adjacent to Lot 7". 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 commercial development (albeit mixed use or traditional commercial) having active storefronts or patios 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. Additionally, this kind of "active frontage" creates pedestrian interest and engagement. **Staff recommends that the design review approval for Lot 7 shall be conditioned to incorporate storefronts, patios 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. **Staff recommends that the applicant 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. Staff also recommends that the design review approval for Lot 7 incorporate a landscape buffer that provides visibility between Lot 7 and the parkland but provides a visually attractive separation.**

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 revised 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 modifications to the comprehensive plan increases the potential diversity in housing types by providing additional multi-family housing.

Goal 11: Public Facilities and Services
Not Applicable

Goal 12: Transportation
The applicant contracted with a Traffic Engineer to prepare a Traffic Impact Study (Exhibit F). With development of this project, Dubarko Road will be extended through the property to connect with Highway 26. The submitted traffic study evaluated five existing intersections to determine if they are expected to operate within capacity under year 2021 traffic conditions either with or without the addition of site trips from the proposed development. The study did not identify any required mitigation. According to the traffic study, the proposed development would produce 76 peak AM trips, 92 peak PM trips, and 1,194 total daily trips. The proposed zone change is projected to result in a negligible change to traffic volumes as measured under the "reasonable worst case" development scenarios and therefore will not have a significant effect on operation of area roadways and intersections at the planning horizon as defined by Oregon's Transportation Planning Rule. The City Transportation Engineer (Exhibit M) states that the development will implement a key project in the city's TSP, namely Dubarko Road. 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.**

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 shown in Finding 21, 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.

17.26 – Zoning District Amendments

23. The applicant is proposing a change in zoning districts as shown in the following table:

Zoning District	Existing Acres	Proposed Acres
R-1	8.05	0.59
R-2	5.01	0.00
R-3	0.00	7.91
C-3	2.84	3.61

24. Chapter 17.26 sets forth review criteria and procedural requirements for quasi-judicial and legislative zoning map amendments. The applicant is requesting a quasi-judicial zoning map amendment to modify the zoning district boundaries for the site.

25. Section 17.26.40 outlines the procedures for a quasi-judicial zoning map amendment.

26. 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 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.

27. 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.

28. 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.

17.30 – Zoning Districts

29. The total gross acreage for the entire property is 15.91 acres. After removal of the right-of-way and proposed parkland tract, the net site area (NSA) for the subject property is reduced to 11.59 net acres with three zoning districts. The area proposed to be zoned R-1 contains 0.59 net acres. The area proposed to be zoned R-3 contains 7.91 net acres. The area proposed to be zoned C-3 contains 3.61 net acres.

30. For the area zoned R-1, a minimum of 5 and a maximum of 8 units per acre are allowed. 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. The minimum density for the subject area is .59 net acres x 5 units/net acre = 2.95 rounded down to 2 units. The maximum density for the subject area is .59 net acres x 8 units/net acre = 4.72 rounded up to 5 units. The applicant is proposing 4 units which is within the density range.

31. For the area zoned R-3, a minimum of 10 and a maximum of 20 units per acre are allowed. The minimum density for the subject area is 7.91 net acres x 10 units/acre = 79 units. The maximum density for the subject area is 7.91 net acres x 20 units/acre = 158 units. The applicant has not identified the exact number of units which will be built in the subject area. **This will be reviewed in a future design review process.**

17.32 – Parks & Open Space (POS)

32. The applicant proposes dedicating some parkland and zoning the land as Parks and Open Space (POS).

33. Section 17.32.10 contains the permitted uses in the POS zoning district. The applicant proposes a park dedication consistent with parkland in the Parks Master Plan per Section 17.32.10 (A)(1).

17.36 – Low Density Residential (R-1)

34. The applicant proposes constructing four single-family dwellings as permitted in this zoning district. As shown in paragraph 19, the applicant is proposing an appropriate number of units given density requirements.

35. Section 17.36.30 contains the design standards for this zone. As shown on Sheet C2 of the plan set (Exhibit 2), 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 has frontage on Dubarko Road, but access is not permitted from this road. Access to this lot will be across an access easement on Lot 3. The proposed building footprints shown on Sheet C2 indicate that all lots are capable of complying with applicable setbacks in the zone. The details of these development standards will be reviewed with the submittal of building permits.

36. Section 17.36.40(A) requires that water service be connected to all dwellings in the proposed subdivision. Section 17.36.40(B) requires that all proposed dwelling units be connected to sanitary service if currently within 200 feet from the site, which it is. Section 17.36.40(C) requires that the location of any real improvements to the property must provide for a future street network to be developed. Section 17.36.40(D) requires that all dwelling units must have frontage or approved access to public streets. The applicant proposes to meet all of these requirements.

37. 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.

38. Staff questions the building potential of Lots 3 and 4. After making considerations for typical setbacks in the R-1 zoning district, the additional 20 foot setback along Dubarko Road as required by Chapter 17.80, the easement along the west side of Lot 4, and the easement along the north side of Lot 3 these lots will be left with reduced buildable lot area. **Staff recommends the applicant submit a building footprint plan for Lots 1-4 for staff to review and analyze prior to the City Council hearing on October 19, 2020.**

17. 40 – High Density Residential (R-3)

39. The applicant proposes dividing the R-3 portion into two lots allowing a maximum of 158 dwellings units. As noted above in this document, the exact number of units will be determined with a future design review application.

40. **The future design review application will include a review of development standards (17.40.30), minimum requirements (17.40.40) and additional requirements (17.40.50).**

17.46 – Village Commercial (C-3)

41. The applicant proposes 3.61 net acres of C-3 land. This is an increase in commercial land by 0.77 acres. While the C-3 zoning district will have to contain some commercial development there is a decent chance the C-3 land will also contain some residential dwelling units. The exact number of potential residential units is not known at this time. If residential units are proposed on the C-3 land the dwelling units will be assessed in a future design review.

42. **Any future development on the land zoned C-3 will require a design review in accordance with the development standards found in Section 17.46.30 and the Sandy Municipal Code.**

17.54 – Specific Area Plan Overlay

43. 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."

44. 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".

45. The applicant proposes shifting of zoning district boundaries 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. That said, staff finds that to adequately protect the required retention trees on Lot 7 the protection area shall be consistent with Chapter 17.92. **The applicant shall install tree protection fencing at the critical root zone of 1 foot per 1 inch DBH to protect the 59 retention trees on the subject property.** Additional 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 submit additional details defining locations for green street swales. If green streets are practicable the plan set shall be modified to detail additional right-of-way to accommodate the swales.**

46. 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 and zone map change proposes to add High Density Residential (R-3) and Parks and Open Space (POS), increase Village Commercial (C-3), remove Medium Density Residential (R-2), and reduce Low Density Residential (R-

1). The Comprehensive Plan states that area and density increase within a village may be increased or decreased up to 20 percent. Changes greater than 20 percent will require a Plan Map amendment. The applicant's analysis shows that the maximum residential density with the existing zoning designations on the R-2 and R-1 lands is 101 dwelling units. The applicant's analysis shows that the maximum residential density with the proposed zoning designations on the R-3 and R-1 lands is 163 dwelling units. Therefore, the potential increase in residential density is 61.9 percent which exceeds the threshold as defined in the comprehensive plan.

47. 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.

48. 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.

49. 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. The applicant's narrative elaborates on the objectives of their proposal and the desire to include a few single family dwellings, multi-family dwellings, and village commercial development. The narrative also elaborates on dedications, including 1.43 acres of parkland.

    B. Site and Context. A map of the site and existing context shall identify the project area. The applicant submitted a 10-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,

with the exception of Lot 7, which is the Village Commercial lot. The development of 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 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, Public Works Director, ODOT, Fire Marshal and the Transit Director 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 proposal includes increasing the amount of available commercial lands by 0.77 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.

17.56 – Hillside Development

50. The applicant submitted a Geotechnical and Slope Stability Investigation (Exhibit I) showing that the subject site contains a small area of slope exceeding 25 percent. **All recommendations in Section 6 of Exhibit I shall be conditions for development.** The Public Works Director stated the following: "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.**

17.74 –Accessory Development

51. 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.**

17.80 – Additional Setbacks on Collector and Arterial Streets

52. 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 Dubarko Road which is classified as a minor arterial and Street B which is classified as a collector. **The plan set shall be revised to detail 20 foot setbacks on Lots 3, 4, 5, 6, and 7 for Dubarko Road and Street B.**

17.82 – Special Setbacks on Transit Streets

53. 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. 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 Road and a new local street. **The dwellings on**

Lots 3 and 4 shall be designed to meet all of the requirements as specified in Chapter 17.82 and will be assessed in a future design review.

54. The applicant proposes that all single-family units will meet the requirements of Section 17.82.20(B), which requires that dwellings shall have a primary entrance connecting directly between the street and building interior and outlines requirements for the pedestrian route. **The adherence to this code section for the future multi-family units will be determined in a future design review process.**

55. The applicant proposes that all single-family units will meet the requirements of Section 17.82.20(C), which 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 adherence to this code section for the future multi-family units will be determined in a future design review process.**

56. 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 will be determined in a future design review process.**

17.84 – Improvements Required with Development

57. Section17.84.20(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.**

58. 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.

59. As required by Section 17.84.39(A)(2), 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 planter strips as required. As required by Section 17.84.39(A)(4), the applicant intends to construct all sidewalk improvements as required by this section.

60. No exceptions or modifications listed in Section 17.84.39(A)(3) are requested with the application.

61. In relation to Sections 17.84.39(B), 17.84.39(C), 17.84.39(D), and 17.84.39(E), no pedestrian or bicycle facilities other than sidewalks and on-street bicycle lanes have been identified or proposed in the application.

62. Section 17.84.40(A) requires that the developer construct adequate public transit facilities. **The proposed development will require 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 1 and Lot 5. Engineering specifications are available from the Transit Department.

63. Section 17.84.50 outlines the requirements for providing a traffic study. The applicant included a Traffic Impact Study with the application (Exhibit F). The study did not identify any required mitigation. According to the traffic study, the proposed development would produce 76 peak AM trips, 92 peak PM trips, and 1,194 total daily trips. The proposed zone change is projected to result in a negligible change to traffic volumes as measured under the "reasonable worst case" development scenarios and therefore will not have a significant effect on operation of area roadways and intersections at the planning horizon as defined by Oregon's Transportation Planning Rule. The City Transportation Engineer (Exhibit M) states that the development will implement a key project in the city's TSP, namely Dubarko Road. 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.**

64. The proposed street and utility plan depicts Dubarko Road between its current eastern terminus and proposed Street A with a 76 ft. wide right-of-way consisting of a 0.5 foot monumentation strip, a six-foot sidewalk, a five-foot planter strip, a 0.5 foot curb, a five foot bike lane, a 17-foot travel lane and half of an 8 foot median (i.e. 4 feet) for a total half section equaling 38 feet and a full street section equaling 76 feet. 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 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.**

65. 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. The City Transportation Engineer (Exhibit M) states that a traffic signal at Dubarko Road and Highway 26 will be needed in the near future based on future development but did not recommend a traffic signal at this time. **The applicant shall provide a 40 foot by 40 foot right-of-way dedication or permanent traffic signal easement at the northeast corner of**

Lot 7 to accommodate a future traffic signal. This right-of-way dedication could impact the tree retention area. **The applicant shall submit revised plans showing a 40 foot by 40 foot dedication on Lot 7 and detailing how that will impact the tree retention area. If the tree retention area is negatively impacted the applicant shall preserve additional trees.** 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).

66. 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). **The alignment of the intersection of Street B and Dubarko Road shall be revised to provide the minimum 100 feet of tangent section to comply with the Development Code.**

67. 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.**

68. Dubarko Road will contain a dedicate 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 constructed as necessary to be consistent with local, ODOT, and ADA standards.** As stated by the Public Works Director 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.

69. The proposed development does not include any long straight street segments or cul-de-sac streets and is thus not required to follow the standards in Section 17.84.50(C).

70. Section 17.84.50(D) requires that development sites shall be provided with access from a public street improved to City standards. 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. All new streets are proposed as full street improvements with the exception of improvements along Highway 26. No off-site improvements have been identified or are warranted with the construction of this subdivision. All streets are proposed as full streets; with no three-quarter streets being proposed.

71. 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.**

72. 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.

73. Proposed streets meet the requirements of 17.94.50(H). The future street plan (Exhibit C, Sheet 1) 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). No private streets are proposed in the development.

74. Section 17.84.60 outlines the requirements of public facility extensions. The applicant submitted a utility plan (Exhibit C, Sheet 5) 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.

75. Franchise utilities will be provided to all lots within the proposed subdivision as required in Section 17.84.80. The location of these utilities will be identified on construction plans and installed or guaranteed prior to final plat approval. The applicant does not anticipate extending franchise utilities beyond the site. All franchise utilities other than streetlights will be installed underground. The developer will make all necessary arrangements with franchise utility providers. The developer will install underground conduit for street lighting.

76. Section 17.84.90 outlines requirements for land for public purposes. A 15-foot public storm easement is proposed along the back of Lots 1-4 and a storm easement and sanitary sewer easement are identified in Tract A. 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.

77. 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.**

78. 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.

79. The intersection of Dubarko Road and Highway 26 requires a grant of access from ODOT. **Prior to final plat approval the applicant shall obtain a grant of access for the intersection of Dubarko Road and Highway 26 from ODOT.**

80. The City Transportation Engineer (Exhibit M) stated that conditions of approval should be included requiring the development comply with the standards and procedures specified by ODOT. He went on to say that ODOT requirements and standards associated with frontage improvements where the development abuts Highway 26 shall be made conditions of approval with the development.

17.86 – Parkland and Open Space

81. The applicant intends to dedicate parkland as outlined in the requirements of Section 17.86.

82. 17.86.10(2) contains the calculation requirements for parkland dedication. The formula is acres = proposed units x (persons/unit) x 0.0043. For the four single family homes, acres = 4 x 3 x 0.0043 = 0.05 acres. For the maximum development of 158 multifamily units, acres = 158 x 2 x 0.0043 = 1.36 acres. Combined, this totals 1.41 acres. The applicant proposes to dedicate 1.426 acres of parkland and is thus in compliance with this requirement.

83. 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 or east of the parkland, but instead are proposing future commercial development. The applicant's narrative states, "in order to address the spirit of the requirement of this requirement in this section, the applicant proposes constructing a widened sidewalk along the eastern park frontage adjacent to Lot 7". 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 commercial development (albeit mixed use or traditional commercial) having active storefronts or patios 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. **Staff recommends that the design review approval for Lot 7 shall be conditioned to incorporate storefronts, patios 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. **Staff recommends that the applicant 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. Staff also recommends that the design review approval for Lot 7 incorporate a**

landscape buffer that provides visibility between Lot 7 and the parkland but provides a visually attractive separation.

84. On June 10, 2020, the applicant brought the parkland dedication proposal to the Sandy Parks and Trails Advisory Board. At the meeting, the Board verbally agreed to provide the applicant SDC credits in exchange for development of the park. This verbal agreement is not a decision as the Parks and Trails Advisory Board cannot make financial decisions but can make recommendations to other hearing bodies. Staff supports the request from the applicant and the verbal agreement from the Parks and Trails Advisory Board. The City Council may consider this offer from the applicant and make a decision regarding the request for SDC credits in lieu of parkland development.

85. 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 applicant shall also provide a Phase I Environmental Assessment.**

86. 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.**

17.92 – Landscaping and Screening

87. Section 17.92.10 contains general provisions for landscaping. As required by Section 17.92.10 (C), trees over 25-inches circumference measured at a height of 4.5 feet above grade are considered significant and should be preserved to the greatest extent practicable and integrated into the design of a development. A 25-inch circumference tree measured at 4.5 feet above grade has roughly an eight-inch diameter at breast height (DBH). Based on the Planning Commission interpretation from May 15, 2019, Subsection 17.92.10(C) does not apply to residential subdivisions. Tree protection fencing and tree retention 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.**

88. Section 17.92.20 lists the requirements for minimum landscaping improvements. **The details of this section will be considered with submittal of a design review application for the proposed multi-family units and commercial property.**

89. 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 D, Sheet 7) does not show the distance between trees. **The applicant shall update the Street Tree Plan to show the distance between trees, and this distance shall be 30 feet on center.**

    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 either aerate the planter strip soil at the subdivision stage and install fencing around the planter strips to protect the soil from compaction or shall aerate the soil at the individual home construction phase.**

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).

90. 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.**

91. 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 specifies to City staff for review and approval concurrent with construction plan review.**

92. 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.**

93. 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.

17.98 – Parking, Loading, and Access Requirements

94. 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 7.

95. Section 17.98.20(A) requires that each single family dwelling unit is required to provide at least two off-street parking spaces. **Compliance with this requirement 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.**

96. Section 17.98.60 has specifications for parking lot design and size of parking spaces. No lots are proposed to gain access from an arterial or collector street (17.98.80).

97. Section 17.98.90 requires that all streets proposed will be improved to city standards.

98. 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. Staff has concerns with the proposed driveway on Lot 7 as it's within 150 feet of the intersection of Dubarko Road and Highway 26. **The applicant shall revise the driveway locations on Lots 5-7 during construction plan review and after receiving approval for revised locations from the City Public Works Director and City Engineer.**

99. Section 17.98.110 outlines the requirements for vision clearance. **The requirements of this section will 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.**

100. 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.**

101. 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 7 shows that 20 on-street parking spaces have been identified in compliance with this standard. No parking courts are proposed by the applicant.

17.100 – Land Division

102. 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.

103. Pre-application conferences were held with the City on January 10, 2018, June 12, 2018, and October 10, 2018 per 17.100.60(A).

104. As required by Section 17.100.60(E), the proposed subdivision is designed to be consistent with the density, setback, design standards, dimensional standards in the R-1 zoning district. **The details of the development in the R-3 district will be addressed with a future design review application.** As illustrated in Exhibit C, Sheet 1, the proposed street system is consistent with the City's Transportation System Plan and Comprehensive Plan. The City has indicated that all public facilities have capacity to serve the proposed subdivision. All improvements in the proposed development are designed in compliance with City standards. The applicant proposes developing the subdivision in a single phase.

105. Section 17.100.60(E)(1) requires subdivisions to be consistent with the density, setback, and dimensional standards of the base zoning district, unless modified by a Planned Development approval. The application for the subdivision is being processed through a Type IV procedure. The proposal is consistent with density and other dimensional standards of the base zoning district.

106. Section 17.100.60(E)(2) requires subdivisions to be consistent with the design standards set forth in this chapter. Consistency with design standards in this chapter are discussed under each subsection below. Conditions of approval can be adopted where necessary to bring the proposal into compliance with applicable standards.

107. 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 and extending Street B to the south.

108. Section 17.100.60(E)(4) requires that adequate public facilities are available or can be provided to serve the proposed subdivision. All public utilities including water, sewer and stormwater are available or will be constructed by the applicant to serve the subdivision. The applicant also intends to dedicate public parkland, the calculation of which can be found in the review of Chapter 17.86 in this document.

109. Section 17.100.60(E)(5) requires all proposed improvements to meet City standards through the completion of conditions as listed within this final order and as detailed within these findings. The detailed review of proposed improvements is contained in this report. Staff has identified a few aspects of the proposed subdivision improvements requiring additional information or modification by the applicant, but conditions of approval can be adopted to bring the proposal into compliance with City standards. In order to meet the standards as defined in the Sandy Development Code the applicant shall submit items for staff to analyze prior to the City Council hearing. The items shall include the following:

- **Submit a building footprint plan for Lots 1-4 for staff to review and analyze.**

- **Submit a proposal for removal of the trees adjacent to the retention trees for staff to review and analyze.**

- **Revise the plan set to detail to detail the following:**

  a) 20 foot setbacks on Lots 3, 4, 5, 6, and 7 for Dubarko Road and Street B;
  b) 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;
  c) A 15 foot wide pedestrian easement on the east side of Lot 6 or a tract to the east of Lot 6 with an 8 foot wide concrete walkway with light bollards and landscaping to connect Highway 26 to future development south of Lot 6.
  d) Fire turnaround easements on Lots 5 and 6 as approved by the Sandy Fire District Fire Marshal.
  e) Detail the exit on the driveway to Lot 7 on Street A restricted to left-only turning movements (using a left turn only pork chop design and signage) to deter commercial patrons from entering the Deer Pointe subdivision when exiting Lot 7.
  f) Detail the alignment of the intersection of Street B and Dubarko Road to provide the minimum 100 feet of tangent section.
  g) Detail a 40 foot by 40 foot right-of-way dedication or permanent traffic signal easement at the northeast corner of Lot 7 to accommodate a future traffic signal.
  h) Detail the retention trees along Highway 26 in a separate tree preservation tract.
  i) Modify the plat to include a vehicular easement on Lot 4 to accommodate maneuvering for vehicles on Lot 3.
  j) Define locations for green street swales. If green streets are practicable the plan set shall be modified to detail additional right-of-way to accommodate the swales.

- **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.**

110. 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. That said, the applicant is proposing that the design of the multi family dwellings occurs at a future date.

111. Section 17.100.80 provides standards for denial of a development application due to physical land constraints. The subject site does not contain any physical constraints that would make it unsuitable for the proposed subdivision.

112. The subject property abuts Highway 26 and notification of the proposal was sent to ODOT as required by Section 17.100.90.

113. As required by 17.100.100(A), a traffic impact study prepared in compliance with the City standards was submitted with the application (Exhibit F). With the exception of a revised striping plan and frontage improvements on the Highway 26 frontage, this study does not identify any issues requiring mitigation by the applicant.

114. None of the special traffic generators listed in section 17.100.100(B) are located near the subject site.

115. While 17.100.100(C) calls for a rectangular grid pattern, the proposed street layout is predominantly controlled by the alignment of Dubarko Road that will be extended through the site from the current terminus to connect with Highway 26. The future street plan details Street B extending south consistent with the TSP. The only other street in the subdivision is the extension of Street A into the property. The proposed intersection of Street A and Dubarko Road seems logical and appropriate considering the nearby intersection of Dubarko Road and Highway 26. Staff finds that the proposed street layout represents a logical street pattern.

116. A future street plan in compliance with the requirements of 17.100.100(D) is included in Exhibit C, Sheet 1.

117. Given the requirements in Section 17.100.100(E), the proposed street layout on the subject property is limited because of the alignment of Dubarko Road, Street B, and the location of Fawn Street extended into the property. In addition, because the development type includes two large lot multi family development sites, the street network is further limited. Given these facts, the proposed street layout represents a logical design.

118. 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. **Staff**

recommends that Lot 6 shall include a pedestrian easement on the east side of the property or a tract to the east of Lot 6 that is at least 15 feet wide with an 8 foot wide concrete walkway with light bollards and landscaping to connect Highway 26 to future development south of Lot 6.

119. 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. Finally, a public storm easement is proposed along the back of Lots 1, 2, and 4 and public and private utility easements are proposed across Tract A.

120. 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. **Staff recommends the applicant modify the plat to include a vehicular easement on Lot 4 to accommodate maneuvering for vehicles on Lot 3.**

121. 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.

122. All streets in the proposed subdivision have a minimum curve radius as required by Section 17.100.180(B).

123. 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.

124. 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).

125. 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.

126. 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 29 feet of frontage along a public street therefore meeting the requirements of Section 17.100.220(C).

127. 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).

128. 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 Public Works Director the existing 8 inch diameter water line resides in an easement granted to the City of Sandy recorded at 2004-110340. **The applicant shall replace the existing waterline with an 8 inch diameter water line with no more than 42 inches or less than 36 inches of cover.** 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 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 Rd. connected to the existing 18 inch water line at the west end of the site and the existing 12 inch line on Highway 26.** Due to the elevation of the site relative to the existing water reservoirs on Vista Loop Drive this line will be a low-pressure, high volume line and will be used for fire protection. The cost difference between a standard diameter water line and the required 18 inch water line is eligible for Water System Development Charge (SDC) credits. The amount of the credit provided will be based on the Water System Construction Cost Credit table in the Water System Development Charge Methodology adopted by City Council motion on September 5, 2017. Section 17.84.60D SMC states: "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)". **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 cost difference between a standard diameter (8 inch) water line and the required 12 inch water line is eligible for Water System Development Charge (SDC) credits. The amount of the credit provided will be based on the Water System Construction Cost Credit table in the Water System Development Charge Methodology adopted by City Council motion on September 5, 2017.

129. 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. According to the Public Works Director the recently adopted Wastewater System Facilities Plan (2019) identified a capacity deficiency in the Southeast pump station and force main as well as several conveyance lines downstream. The City will adopt a Sanitary Sewer SDC surcharge on each Equivalent Residential Unit developed in the basin served by the Southeast pump station. The surcharge amount will be calculated by dividing the estimated cost of the required capacity improvements by the estimated number of dwelling units that can be built in the pump station drainage basin. The surcharge will be collected with each building permit issued in the basin.

130. Section 17.100.250(A) details requirements for stormwater detention and treatment. A public stormwater quality and detention facility is proposed as Tract B to be located north of Lot 1 and south of the Fawn Street extension. This facility has been sized and located to accommodate the water quality and stormwater detention needs of all streets in addition to Lots 1-4. The water quality and detention needs of Lots 5-7 will be accommodated on each

of those lots and stormwater from Lots 5 and 6 will be routed to flow through Tract B. After onsite detention and water quality treatment, stormwater from Lot 7 will be piped and connected to the existing storm line in the park. **All site runoff (including new runoff from the widened surfaces of Highway 26) 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).**

131. 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.**

132. 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 7.

133. Grass seeding shall be completed as required by Section 17.100.300. The submitted preliminary Grading and Erosion Control Plan (Exhibit C, Sheer 9) provides additional details to address erosion control concerns. A separate Grading and Erosion Control Permit will be required prior to any site grading. Erosion control requirements are defined in greater detail in Chapter 15.44 of this document.

17.102 – Urban Forestry

134. Section 17.102.20 contains information on the applicability of Urban Forestry regulations. An Arborist Report is included as Exhibit G. 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. The inventory is included in Exhibit C, Sheet 4 and the proposed retention trees are shown in Exhibit C, Sheet 3.

135. The property contains 15.91 acres requiring retention of 48 trees, 11 inches and greater DBH (15.91 x 3 = 47.73). The submitted plan identifies 59 trees that will be retained. All of the trees proposed for retention are conifers, primarily Doug fir, at least 11 inches DBH, and in good condition as identified by the arborist.

136. A majority of the proposed retention trees are located along Highway 26 in Lot 7, which is proposed to be zoned C-3, Village Commercial. As indicated on the Preliminary Plat (Exhibit C, Sheet C-2), the applicant is proposing to place a conservation easement over an area that encompasses the retention trees along Highway 26, including their critical root zones. Staff believes there could be a future conflict between retention trees along the Highway and future commercial property visibility on Lot 7. Thus, staff recommends the retention trees be placed into a separate tree retention tract. **The applicant shall update the site plan to detail the retention trees along Highway 26 in a separate tree preservation tract.**

137. The Arborist Report (Exhibit G) provides recommendations for protection of retained trees including identification of the recommended tree protection zone for these trees. The requirements of 17.102.50(B) will be complied with prior to any grading or tree removal on the site. **The applicant shall install tree protection fencing at the critical root zone of 1 foot per 1 inch DBH to protect the 59 retention trees on the subject property as well as all trees on adjacent properties. 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) 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. 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.**

138. The Tree Preservation Plan (Exhibit C) 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 in a way that does not harm or damage adjacent trees. The applicant shall submit a proposal for removal of the trees adjacent to the retention trees for staff review and approval.** Staff recommends that the applicant not fully remove the trees adjacent to the retention trees but rather leave snags. **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.**

139. **To ensure protection of the required retention trees, the applicant shall record a tree protection covenant specifying protection of trees on the subject property and limiting removal without submittal of an Arborist's Report and City approval.**

15.30 – Dark Sky

140. 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.**

15.44 – Erosion Control

141. The applicant submitted a Geotechnical Engineering Report (Exhibit I) prepared by GeoPacific Engineering, Inc., dated August 16, 2005. The Public Works Director stated the following: "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.**

142. **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.**

143. 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.**

144. Recent development has sparked unintended rodent issues in surrounding neighborhoods. Prior to development of the site, **the applicant shall have a licensed pest control agent evaluate the site to determine if pest eradication is needed.**

RECOMMENDATION:

Staff recommends the Planning Commission **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 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) Extending Fawn Street to the east;

4) Expanding the Deer Point park consistent with the goals of the Parks and Trails Advisory Board and the current revisions that are being considered for the Parks Master Plan;
5) Creating available commercial land in the C-3 zoning district consistent with the 2040 Plan that was created in 1997;
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.

ADDITIONAL REVIEW NEEDED PRIOR TO THE CITY COUNCIL HEARING:

1. Submit a building footprint plan for Lots 1-4 for staff to review and analyze.

2. Submit a proposal for removal of the trees adjacent to the retention trees for staff to review and analyze.

3. Revise the plan set to detail to detail the following:
    a) 20 foot setbacks on Lots 3, 4, 5, 6, and 7 for Dubarko Road and Street B;
    b) 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;
    c) A 15 foot wide pedestrian easement on the east side of Lot 6 or a tract to the east of Lot 6 with an 8 foot wide concrete walkway with light bollards and landscaping to connect Highway 26 to future development south of Lot 6.
    d) Fire turnaround easements on Lots 5 and 6 as approved by the Sandy Fire District Fire Marshal.
    e) Detail the exit on the driveway to Lot 7 on Street A restricted to left-only turning movements (using a left turn only pork chop design and signage) to deter commercial patrons from entering the Deer Pointe subdivision when exiting Lot 7.
    f) Detail the alignment of the intersection of Street B and Dubarko Road to provide the minimum 100 feet of tangent section.
    g) Detail a 40 foot by 40 foot right-of-way dedication or permanent traffic signal easement at the northeast corner of Lot 7 to accommodate a future traffic signal.
    h) Detail the retention trees along Highway 26 in a separate tree preservation tract.
    i) Modify the plat to include a vehicular easement on Lot 4 to accommodate maneuvering for vehicles on Lot 3.
    j) Define locations for green street swales. If green streets are practicable the plan set shall be modified to detail additional right-of-way to accommodate the swales.

4. 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.

CONDITIONS:

A. The applicant shall submit a complete set of revised plans to the Planning Division.

B. 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 proof that a licensed pest control agent evaluated the site to determine if pest eradication is needed.

4. Install tree protection fencing at the critical root zone of 1 foot per 1 inch DBH to protect the 59 retention trees on the subject property as well as all trees on adjacent properties. 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) 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. 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. 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.

5. 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.

C. 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 Public Works 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. 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).

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 affect on-street parking spaces.

4. Revise the driveway locations on Lots 5-7 after receiving approval for revised locations from the City Public Works Director and City Engineer.

5. Submit a revised cross-section for the portion of Dubarko Road between the existing terminus and Street A.

6. Specify the locations of street lights on all streets being improved within and adjacent to the subdivision. Street lights shall be full cut-off, shall not exceed 4,150 Kelvins, and shall conform to the Dark Sky standards of Chapter 15.30. The locations of light fixtures shall be reviewed in detail with construction plans.

7. 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.

8. Submit additional details/confirmation on any proposed retaining walls, including heights meeting code requirements and an architectural finish.

9. 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.

10. Submit a revised utility plan to include broadband fiber locations as detailed by the SandyNet Manager.

11. Call PGE Service Coordination at 503-323-6700 when the developer is ready to start the project.

D. 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 plan review, inspection and permit fees as determined by the Public Works Director.

3. Pay addressing fees at $40 for the subdivision plus $5 per lot.

4. Obtain a grant of access for the intersection of Dubarko Road and Highway 26 from ODOT.

5. 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 15 foot wide pedestrian easement on the east side of Lot 6 or a tract to the east of Lot 6 with an 8 foot wide concrete walkway with light bollards and landscaping to connect Highway 26 to future development south of 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 1 and Lot 5. Engineering specifications are available from the Transit Department.
    d) Replace the existing waterline with an 8 inch diameter water line with no more than 42 inches or less than 36 inches of cover.
    e) An 18 inch water line in Dubarko Rd. connected to the existing 18 inch water line at the west end of the site and the existing 12 inch line on 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.

6. Clear, grade, and seed the proposed parkland as specified by the City in the construction plans. The applicant shall also provide a Phase I Environmental Assessment.

7. Aerate the planter strips to a depth of 3 feet prior to planting street trees. The applicant shall either aerate the planter strip soil at the subdivision stage and install fencing around the planter strips to protect the soil from compaction or shall aerate the soil at the individual home construction phase.

8. Record a tree protection covenant specifying protection of trees on the subject property and limiting removal without submittal of an Arborist's Report and City approval.

9. Submit a true and exact reproducible copy (Mylar) of the Final Plat for final review and signature.

E. Conditions related to future development of the lots:

1. Design review approval for Lot 7 shall incorporate storefronts, patios and usable windows facing the parkland.

2. Design review approval for Lot 7 shall incorporate a landscape buffer that provides visibility between Lot 7 and the parkland but provides a visually attractive separation.

4. The future design review application will include a review of development standards (17.40.30), minimum requirements (17.40.40) and additional requirements (17.40.50) for R-3 zoned development.

5. Any future development on the land zoned C-3 will require a design review in accordance to the development standards found in Section 17.46.30 and the Sandy Municipal Code.

7. The dwellings on Lots 3 and 4 shall be designed to meet all of the requirements as specified in Chapter 17.82 and will be assessed in a future design review.

8. Orientation of the future multi-family units that have frontage on both Highway 26 and Dubarko Road will be determined in a future design review process.

F. General Conditions of Approval:

1. The Final Plat shall be recorded as detailed in Section 17.100.60 (I).

2. 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.

3. If entry signs are desired, the applicant shall submit a detailed plan showing the location of such signage and a sign permit application.

4. All parking, driveway and maneuvering areas shall be constructed of asphalt, concrete, or other approved material.

5. 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.

6. 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).

7. All utilities shall be installed underground and in conformance with City standards. The applicant shall install utilities underground with individual service to each lot.

8. 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.

9. All public utility installations shall conform to the City's facilities master plans.

10. The intersection of Highway 26 and Dubarko Road shall be constructed as a full-access intersection in compliance with the TSP.

11. As required by Section 17.98.130, all parking, driveway and maneuvering areas shall be constructed of asphalt, concrete, or other approved material.

12. 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.

13. All new public sanitary sewer and waterlines shall be a minimum of 8 inches in diameter.

14. 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.

15. All site runoff (including new runoff from the widened surfaces of Highway 26) 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).

16. 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.

17. 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).

18. 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.

19. 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.

20. Successors-in-interest of the applicant shall comply with site development requirements prior to the issuance of building permits.

21. 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.

22. 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.

23. Comply with all other conditions or regulations imposed by the Sandy Fire District or state and federal agencies. Compliance is made a part of this approval and any violations of these conditions and/or regulations may result in the review of this approval and/or revocation of approval.

24. 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 constructed as necessary to be consistent with local, ODOT, and ADA standards.

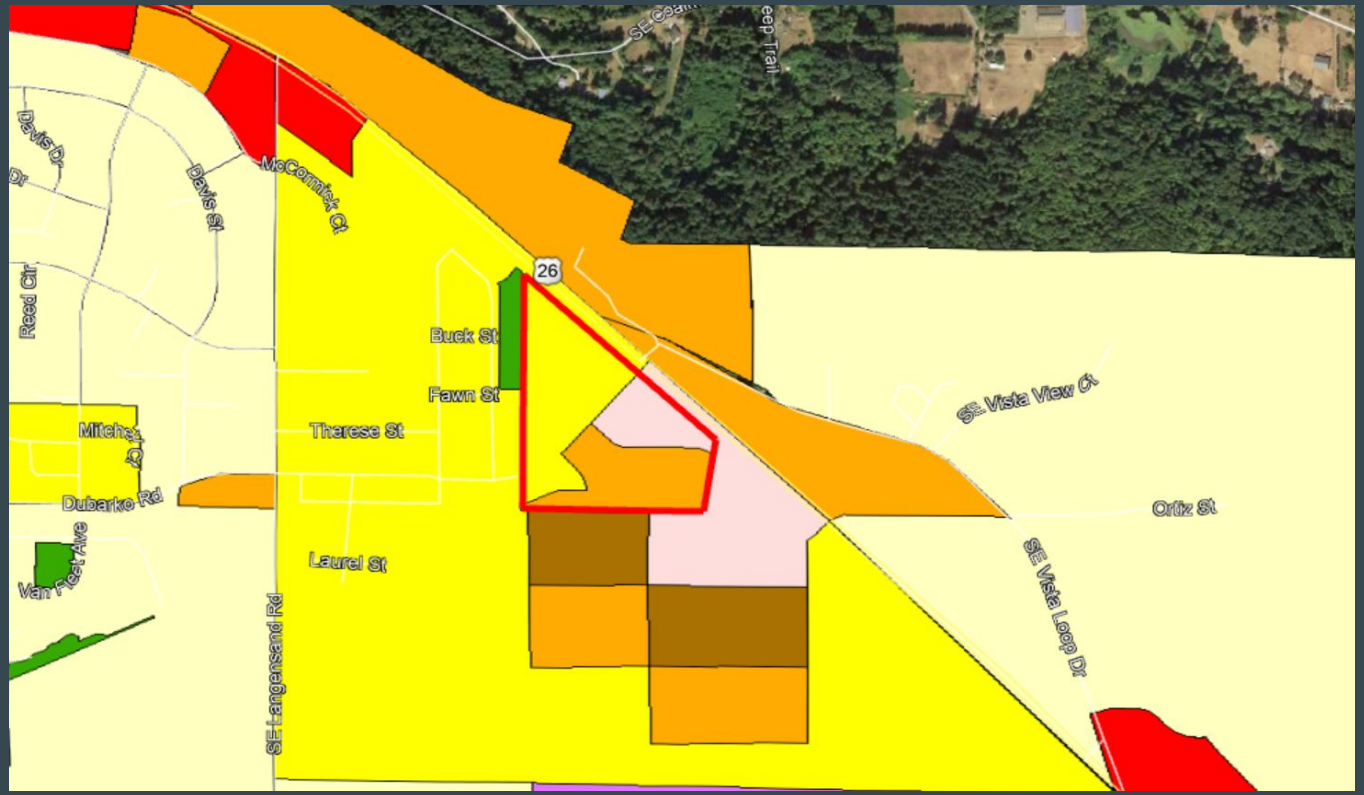
EXHIBIT IIII

Bull Run Terrace

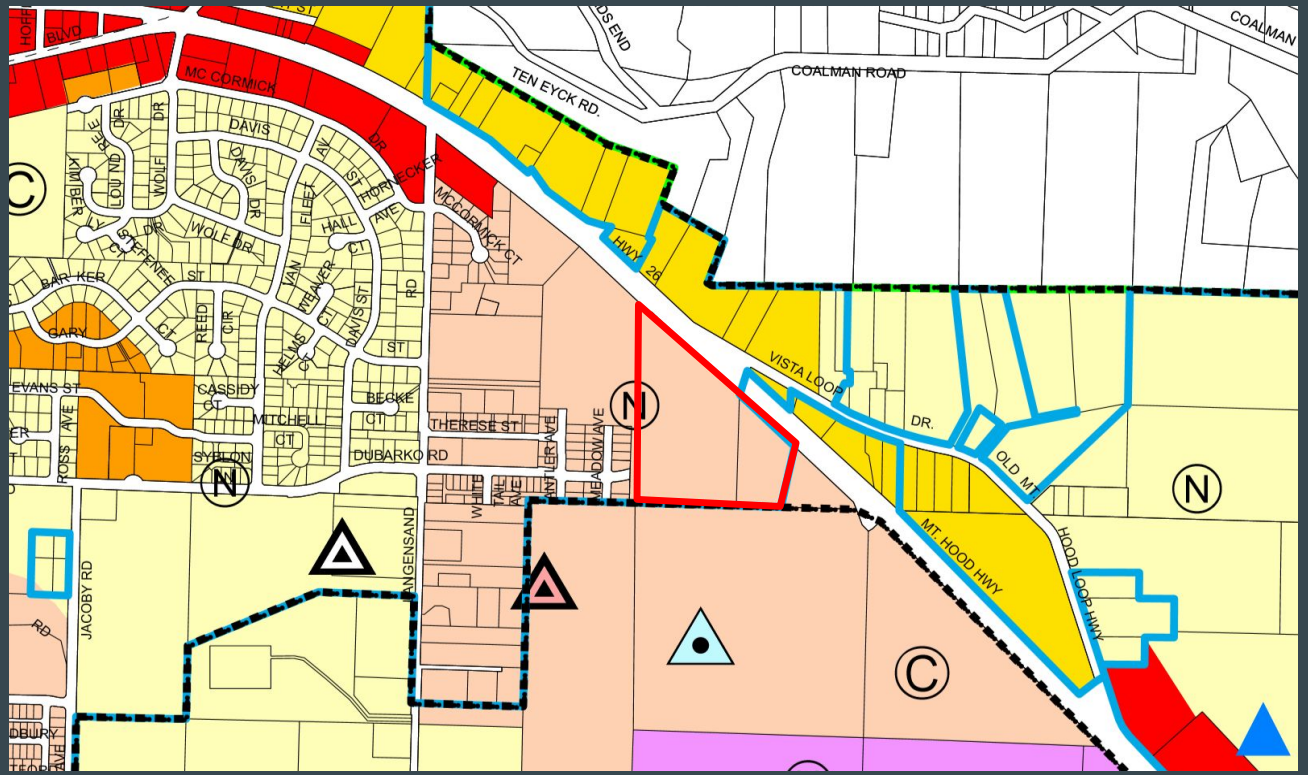
Planning Commission 8/24/2020

Vicinity Map

Zoning Map


Davis Dr
Davis St
McCormick Ct
Reed Cir
26
Buck St
Fawn St
Therese St
Mitchell Ct
Dubarko Rd
Van Fleet Ave
Laurel St
SE Tangensend Rd
SE Vista View Ct
Ortiz St
SE Vista Loop Dr
N

Comprehensive Plan Map



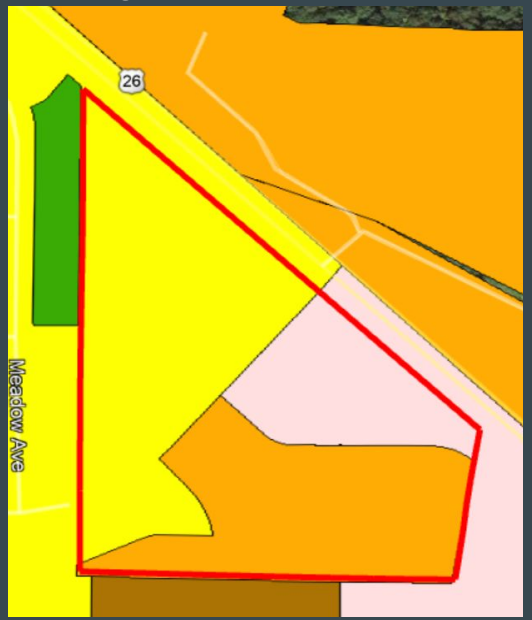
Request

The applicant is requesting the following:

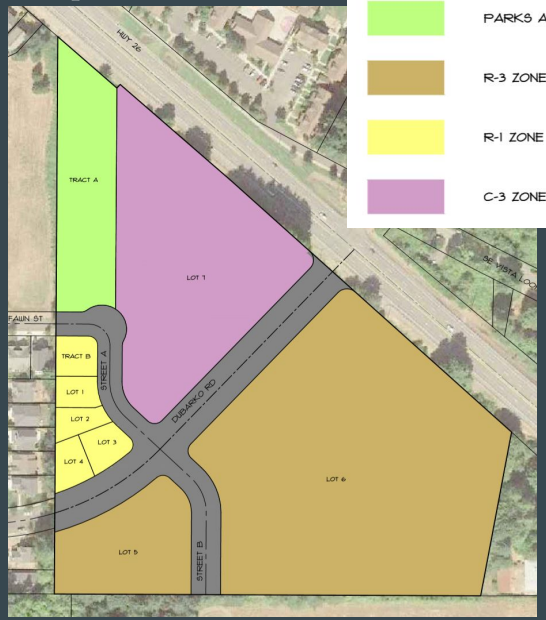
- Zone map amendment (Type IV)
- Comprehensive plan amendment (Type IV)
- Specific area plan (Type IV)
- Subdivision (Type II)
- Tree removal (Type II)

Zone Map Amendment

Existing



Proposed



Zone Map Amendment (cont.)

Zoning District	Existing Acres	Proposed Acres
R-1	8.05	0.59
R-2	5.01	0.00
R-3	0.00	7.91
C-3	2.84	3.61

Comprehensive Plan Map Amendment

- Required in Village area when maximum density changes by more than 20%.
- Will result in the following changes to UGB land inventory:

Land Type	Current Acre Surplus	Proposed Acre Surplus
Commercial	1.13	1.90
Low-Density Residential	19.20	11.74
Medium-Density Residential	17.10	12.09
High-Density Residential	12.60	20.51

Comprehensive Plan Map Amendment (cont.)

- Goal 1: Citizen Involvement
  - Notice and two public hearings
- Goal 2: Land Use Planning
  - Staff has reviewed this application against zoning district amendment and comprehensive plan amendment code requirements, and have notified relevant state agencies.
- Goal 5: Natural Resources
  - Staff recommends a condition to install fencing to protect the site's retention trees.
- Goal 8: Recreational Needs
  - Dedication of 1.426 acres of parkland to the City for Deer Point Park. Future design review will require that buildings on Lot 7 face the park.
- Goal 9: Economic Development
  - Requires adequate surplus of buildable commercial and industrial land. Proposed changes allow for this surplus.

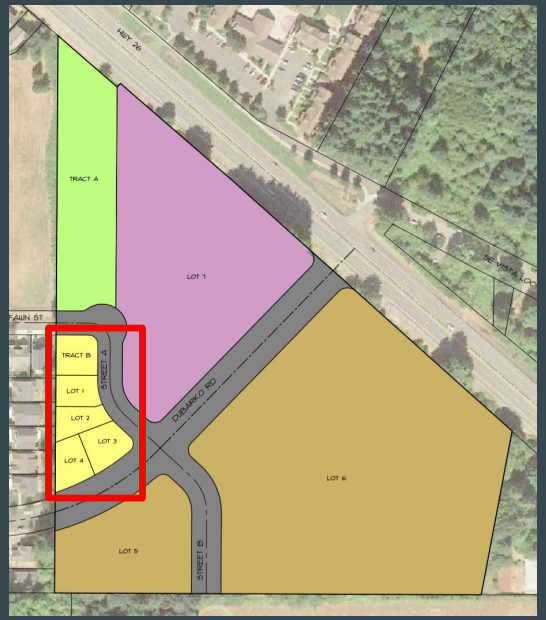
Comprehensive Plan Map Amendment (cont.)

- Goal 10: Housing
  - Providing mixed housing types, including multi-family, offers more options for residents.
- Goal 12: Transportation
  - The connection of Dubarko Road to Highway 26 is a goal in the TSP. Traffic impact study projects that the change in traffic is negligible compared to existing zoning.*
- Goal 13: Urbanization
  - The proposed development accommodates additional residential and commercial uses within the UGB.

* See 8/21/2020 ODOT comments.

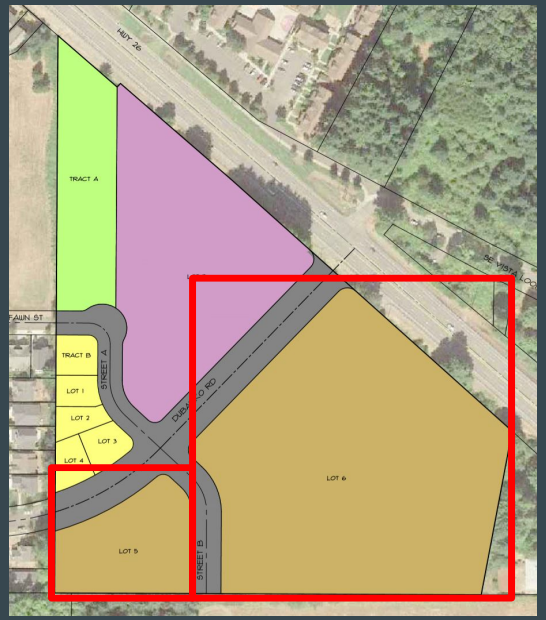
Low Density Residential (R-1)

- Lots 1-4
- Meets density requirements
- Staff questions to building potential on lots 3 and 4; these lots will have reduced buildable area as a result of required setbacks and easements. Staff has recommended that the applicant submit a building footprint plan prior to City Council hearing.



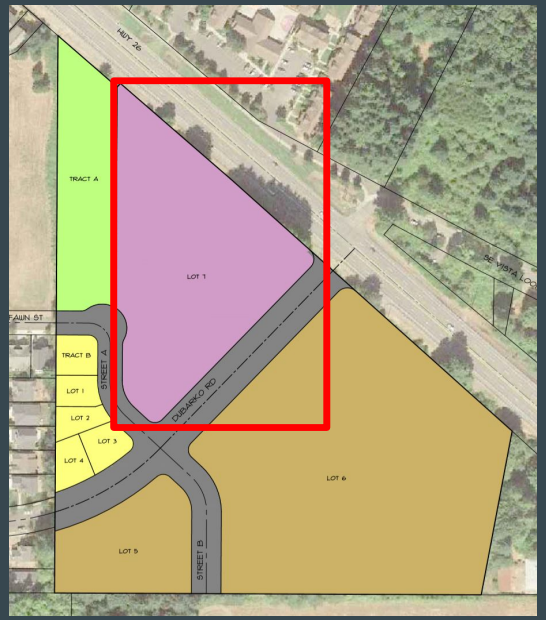
High Density Residential (R-3)

- Lots 5-6
- Density requirements allow for a maximum of 158 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
- The future design review application will include a review of development standards, minimum requirements, and additional requirements.

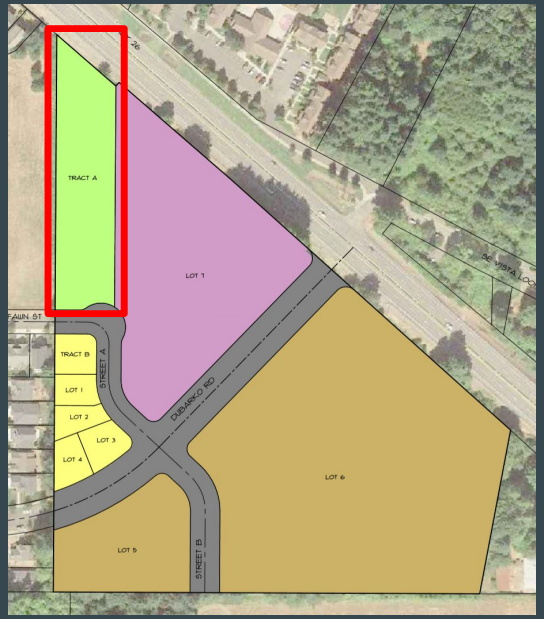


Specific Area Plan Overlay

“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....[Specific Area Plans] are intended to promote coordinated planning concepts and pedestrian-oriented mixed-use development.”

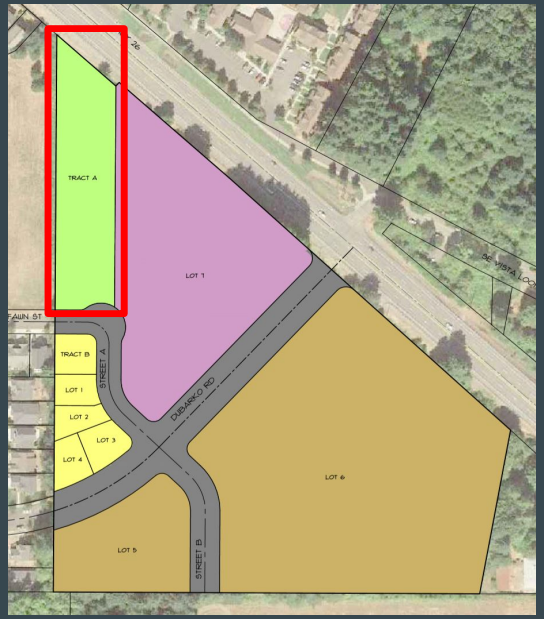
Park Dedication

- Requires 1.41 acres, and applicant is proposing 1.426 acres
- Staff recommends that the design review approval for Lot 7 shall include activated frontages facing the parkland
- Staff recommends that the applicant install a walkway along the east side of the park or west side of Lot 7 that connects Fawn St to the sidewalk along Highway 26.



Park Dedication (cont.)

- Staff recommends that the design review approval for Lot 7 incorporate a landscape buffer that provides visibility between Lot 7 and the parkland but provides a visually attractive separation.



ODOT Comments

- Applicant will require a Grant of Access through ODOT to connect Dubarko to Highway 26.
- Since a future year traffic analysis is necessary to make TPR findings as well as for the Grant of Access submittal, ODOT recommends that the applicant be required to provide an updated Traffic Impact Study to ODOT for review and comment prior to the October City Council Hearing and a decision is made on the land use action.

Public Comments

- Loss of trees, thus lowering the aesthetic quality of the area as well as privacy for existing homes.
- The capacity of the police to effectively patrol multi-family dwelling areas.
- The possibility of criminal activity at multi-family dwelling areas.
- Being previously told that the land would not develop as residential.
- Concerns about effects of multi-family housing on property values.
- Relevance to Comprehensive Plan and potential for “spot zoning.”

EXHIBIT JJJJ

Date: October 21, 2020
To: Shelley Denison and Kelly O'Neill, Sandy Planning Department
From: Tracy Brown, Tracy Brown Planning Consultants, LLC
Re: Bull Run Conditions - Revised Planning Commission Staff Report (10/19/20)

After reviewing the revised staff report and draft conditions we are requesting your consideration to recommend a revision to one of the Conditions.

Condition A.3 states, *"Modify the plat to include a vehicular easement on Lot 4 to accommodate maneuvering for vehicles on Lot 3."*

This Condition is written with the presumption that an easement will be needed on Lot 4 to allow vehicles on Lot 3 to maneuver. As shown on the Attachment 5, Single Family Footprint Exhibit submitted with our revised submittal, access and maneuvering for Lot 3 will be a considerable distance from Lot 4. With this in mind we request this condition be eliminated or in the alternative that it be modified as follows:

"Modify the plat to include a vehicular easement on Lot 4 **as necessary** to accommodate maneuvering for vehicles on Lot 3."

EXHIBIT KKKK

Marisol Martinez <mmartinez@ci.sandy.or.us>

Fwd: City of Sandy File No. 19-050 CPA/ZC/SAP/SUB/TREE; Testimony on Behalf of the Applicant Responding to Written and Oral Testimony by Ms. Kathleen Walker

Kelly O'Neill Jr. <koneill@ci.sandy.or.us> Mon, Oct 26, 2020 at 5:01 PM
To: Planning Commission <planningcommission@ci.sandy.or.us>

Additional information from the applicant's attorney, Mike Robinson, is in this email thread. See you in one hour.

---------- Forwarded message ---------
From: **Robinson, Michael C.** <MRobinson@schwabe.com>
Date: Mon, Oct 26, 2020, 4:26 PM
Subject: City of Sandy File No. 19-050 CPA/ZC/SAP/SUB/TREE; Testimony on Behalf of the Applicant Responding to Written and Oral Testimony by Ms. Kathleen Walker
To: Shelley Denison <sdenison@ci.sandy.or.us>, Kelly O'Neill Jr. <koneill@ci.sandy.or.us>, David Doughman <david@gov-law.com>
Cc: Dave Vandehey <Dave.Vandehey@accessmax.com>, Tracy Brown <tbrownplan@gmail.com>, Ray Moore <raym@allcountysurveyors.com>, Robinson, Michael C. <MRobinson@schwabe.com>

Dear Ms. Denison, please pace this email before the Sandy Planning Commisison prior to the commencement of tonight's continued public hearing. Thank you.

Dear Chair Crosby and Planning Commisison members.

This Office represents the Applicant. I am writing to respond to Ms. Kathleen Walker's written testimony submitted to the Sandy Planning Commisison(the "Planning Commission")on August 24. 2020, the date of the initial evidentiary hearing. Ms. Walker repeated these arguments in her oral testimony during the public hearing. This submittal contains no new evidence and includes part of the Applicant's oral rebuttal offered at the conclusion of the August 24, 2020 public hearing.

The Planning Commmsison should find that Ms. Walker's testimony is not a reason to recommend denial of the Application to the Sandy Planning Council for the following reasons.

1. Department of Land Conservation and Development ("DLCD") Statement on Comprehensive Plan Updates.

Ms. Walker's testimony is taken directly from the DLCD website on the link entitled "Plan Amendments(PAPA)". However, this very general statement is not a relevant approval criterion and the Planning Commisison is not bound to follow it. Sandy Development Code("SDC") Chapters 17.24 and 17.25 apply to amendments to the Sandy Comprehensive Plan(the "Plan")and the Sandy Zoning Ordinance, respectively, and the approval criteria in SDC 17.24.70 and 17.26.40 contain the approval criteria to be considered by the Planning Commission. Therefore, her very general arguments are not a basis for the Planning Commisison's consideration of these approval criteria and its recommendation. Moreover, even if the DLCD website information were something to be considered, it actually supports the Application since it notes that Plans are not "engraved in stone". Were Plans unable to be amended, then the City would be unable to meet new development needs. *See* SDC 17.26.10(noting that it may be necessary to amend the zoning map from time to time).

2. **"Spot Zoning".**

Oregon land use law long ago dispensed with the outmoded concept of "spot zoning". Since zoning must implement a Plan designation, zoning that implements the Plan is appropriate in any location. *See* SDC 17.26.10(the Zoning Map is consistent with the Plan map). *NWDA v City of Portland, 47 Or LUBA 553,571(2004), aff'd in part and rem'd in part on other grounds, 198 Or App 286, 108 P3d 589, rev den, 338 Or 681(2005).*

3. Changing Conditions, Changing Community Attitudes and Integrity of the Plan.

Ms. Walker argue that these factors are relevant to the Planning Commisison's recommendation to the City Council. These factors are found in SDC 17.24.10, "Intent", the SDC Chapter on Plan amendments. The intent section is not an approval standard; in fact, SDC 17.24.10 states, in part, that Chapter 17.24 sets forth "review criteria and procedural requirements" in order to implement the Intent section. The approval criteria and other provisions of SDC Chapter 17.24 do just that, so the Intent section is fully implemented by Chapter 17.24. Further, the factors are not listed as approval criteria in SDC 17.24.70. Where an intent section such as this is not indicated as an approval criterion, it is not treated as such. The reason that the SDC has clearly identified approval criteria for Plan and zoning map amendments is to guide the decision making process and avoid addressing other factors that are not relevant approval criteria.

4. Statewide Planning Goals(the "Goals").

None of Ms. Walker's arguments regarding the respective Goals shown below are relevant to the actual Goal requirements. Therefore, they cannot be a basis for the Planning Commisison's recommendation to the Sandy City Council. Both the Application and the staff report to the Planning Commission explain that the relevant Goals are fully satisfied by the Application.

A. Goal 1, "Citizen Involvement". Ms. Walker's argument is unrelated to the requirements of Goal 1. The City has an acknowledged Goal 1 citizen involvement process and has followed that process for this application. There is nothing incremental about this Plan amendment since the SDC does not prohibit Plan amendments.

B. Goal 2, "Land Use Planning". Goal 2 simply requires that there be an adequate factual base for a land use decision and that the application be coordinated with affected governmental agencies and service providers. The City has coordinated the application with affected governmental agencies and service providers and the record before the Planning Commisison constitutes an adequate factual base for the Planning Commisison to recommend approval of this Application to the Sandy City Council.

C. Goal 8, "Recreational Needs". Goal 8 says very little about local park needs. Most of the Goal has to do with "destination resorts". The only part of Goal 8 that is relevant to the City is its direction that local governments plan for recreational needs. Because the City's Plan is "acknowledged" as being consistent with Goal 8 and because the Goal 8 requirement is implemented through the Plan and SDC 17.86, "Parkland & Open Space", Goal 8 is satisfied by the Application because it addresses these provisions. *See* Plan Goal 8, "Parks and Recreation".

D. Goal 12, "Transportation". Goal 12 is implemented through the Transportation Planning Rule(the "TPR")for quasi-judicial applications such as this in OAR 660-012-0060(1)-(3). Both Goal 12's requirement for "safe and efficient" transportation system and the TPR's requirements are satisfied by the Application's substantial evidence, including the Transportation Impact Analysis(the "TIA") prepared by Mr. Ard. Neither the City's Transportation Engineer nor the Oregon Department of Transportation("ODOT")have disputed Mr. Ard's TIA. The record does not contain a contrary transportation report and Ms. Walker offers no substantial evidence to undermine the Applicant's TIA.

5. Conclusion.

The Planning Commmsison can reject Ms. Walker's arguments because they are not supported by substantial evidence and are contrary to the language of the relevant approval criteria and because the Applicant has supported its Application with substantial evidence, which it is required to so. The staff report recommends approval of the Application based on the Applicant's record.

The Applicant respectfully requests that the Planning Commmsison follow the staff report recommendation and recommend approval of the Application to the Sandy City Council.

Michael C. Robinson

Shareholder

Direct: 503-796-3756

Mobile: 503-407-2578

mrobinson@schwabe.com

Schwabe Williamson & Wyatt

Please visit our COVID-19 Resource page

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EXHIBIT LLLL

MINUTES
Parks & Trails Advisory Board Meeting
Wednesday, June 10, 2020 Zoom Meeting
7:00 PM

BOARD MEMBERS PRESENT: Kathleen Walker, Board Member, Don Robertson, Board Member, Michael Weinberg, Board Member, Susan Drew, Board Member, Makoto Lane, Board Member, and Sam Schroyer, Board Member

BOARD MEMBERS ABSENT:

STAFF PRESENT: Laurie Smallwood, Councilor and Sarah Richardson, Community Services

MEDIA PRESENT:

1. Roll Call

2. Public Comment

3. Meeting Format Notice

The Parks and Trails Advisory Board will conduct this meeting electronically using the Zoom video conference platform. Members of the public may listen, view, and/or participate in this meeting using Zoom.
Using Zoom is free of charge. See the instructions below:

- To login to the electronic meeting online using your computer, click the link below:

Link to join Webinar
https://us02web.zoom.us/j/84702046723:

Note: using this option may require you to download the Zoom app to your device. Downloading Zoom is free of charge.

- If you would rather access the meeting via telephone, dial 1-669-900-6833. When prompted, enter the following meeting number: 847 0204 6723.
- If you do not have access to a computer or telephone and would like to take part in the meeting, please contact the Community Center by Wednesday, June 3rd at noon and arrangements will be made to facilitate your participation.

4. Consent Agenda

Kathleen Walker requested a change to the meeting minutes. Page 7 of 19. Not sure

Draft

the Master Plan has identified need for more open space. Needs to be rephrased - Master Plan Technical Advisory Committee has discussed the supply and demand for open space.

4.1. Meeting Minutes

Moved by Michael Weinberg, seconded by Don Robertson

Moved by Michael Weinberg and seconded by Don Robertson to approve the meeting minutes as amended.

CARRIED. 5-0

5. Changes to the Agenda

6. New Business

6.1. Bull Run Terrace - Tracy Brown

Tracy Brown and Alex Reverman attended to discuss the development plan for Bull Run Terrace, and in particular the park plan. Wanted to bring plan to the board and answer any questions.

Tracy Brown shared a visual of the plan proposal (see agenda packet) and provided an overview of the project to date. Tracy shared the history of the project and discussed the challenges in developing this parcel.

The new developer, because of the financial challenges in developing this land, is proposing a higher density project that includes some C3 zoning. Developer wants to keep the C3 zoning to preserve the build-able land inventory to prevent a deficit in C3 in the city.

Parkland dedication is included in the current plan and Tracy asked some questions about the draft Parks Master Plan. Kathleen Walker explained that the draft had been corrected to include the intent for additional parkland adjacent to the Deerpointe Neighborhood. It was the plan all along to have the additional parkland when the property was developed. Tracy reviewed the parkland development/Fee in Lieu formula. Developer is not opposed to dedicating parkland. Tracy discussed System Development Charges (SDC) and how they are assessed. The developer had two questions for the board. Will the city require the parkland dedication? Would the city/park board be interested in having the developer build out the park? Interested in SDC credits for some construction of areas of the park. Understands the council will ultimately make the decision/agreement, but knows the Parks Board can also

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make a recommendation to council.

Tracy asked if the board had questions and asked if the Parks Board would consider recommending that the city engage with the developer to help build the park? Don Robertson asked if we were to accept the donation what would the total acreage be? Tracy Brown explained it will depend on the number of units, but roughly it would be around 1.5-1.8 acres. Don noted we would then have about a 3 acre park. Don Robertson clarified that the developer is asking that the board recommend the city accept the land donation and the developers offer to participate in the park development. This would be in exchange for SDC credits to the developer. Don Robertson shared that the city wide Master Plan update will include two site plans and this park area is included in that contract. Don clarified that the developers participation would be limited to the amount of SDC credits applied. Tracy Brown believes it would be in the $450,000-500,000 range of SDC credits. Don Robertson noted this would be a good start but not cover the full park development.

Kathleen Walker noted the original zoning and clarified that they are going to be asking for a zone change. Tracy Brown explained they will have a revised submission. Noted the more units the greater the park requirement. Alex Reverman expressed how difficult is has been to make this site work from all angles with different zoning and park needs. Kathleen noted that when the land in Deerpointe was acquired they were trying to get away from the highway frontage. Noted it is not ideal.

The commercial zoning was discussed.

Tracy Brown described the vision for the development. Kathleen asked if they had more detailed drawings for the development. Noted it would be helpful to have more specifics. Tracy Brown explained that they don't want to spend the money for a design until zoning has been determined. Assuming there is an approval, the developer would then go through the design review process which would determine the number of units before the subdivision is platted. At that time they should know what the park land dedication could be. They want to be sure they are dedicating park land based on the final number of units. Tracy Brown asking if the board is willing to support the city entering into an agreement to help build the park. Kathleen Walker noted that this type of agreement has worked before. Concerned that what ends up there should reflect the desire of the neighbors. Timing is likely ok, as a site plan should be completed soon. Kathleen asked the rest of the board for input. Susan Drew asked for clarification about the park parcels being one parcel vs. two different parks. Tracy Brown notes it would be ideal if the design of the park included

Draft

both parcels so the development could be seamless. Makoto Lane asked for some clarification on the design. Kathleen Walker noted it helps for the board to see how the park land would be incorporated into the development. This is unique in that the parks board is getting to weigh in earlier in the process.

Kathleen Walker asked the board to weigh in on the proposed boundaries and shape of the proposed park land dedication. Don Robertson said there are things they can do to mitigate the highway noise. Notes it is an expensive piece to do. Don Robertson would be comfortable supporting entering into an agreement with the developer but would like more information before definitively making a recommendation to do so. Feels it is worth discussing. Alex Reverman notes he was told when talking to previous developers the plan was to take the Deerpointe park land and just flip it over, but believes they can reduce the freeway frontage. Kathleen Walker suggested the southern end wider, and the highway end narrower. Michael Weinberg concurs with Kathleen Walker and is also concerned about the highway frontage. Also concerned about frontage on the commercial area without knowing what it will be. Agrees trading SDC credits is something the board could consider recommending.

Kathleen Walker asked about the timeline for construction. Alex Reverman said they want to get going as soon as they can sort out the zoning and park piece. Tracy Brown believes next summer might be feasible. Alex Reverman said they could get more park detail outlined. Don Robertson confirmed it would be hard to go forward without more information. Don Robertson asked what the board needs to accomplish tonight. Kathleen noted they are looking for a recommendation for park dedication rather then fee in lieu, and secondly, getting an idea of whether the board would consider recommending credits for SDCs in exchange for park development and agrees it is premature to decide on a recommendation. Asked for any additional feedback from the board. Alex Reverman shared his desire to work with the board. Don Robertson is comfortable moving forward but not comfortable sending a recommendation until there is a tighter concept on what it is going to look like.

Kathleen noted that there will be continued work under the Master Plan update to engage the neighbors in the park design. Seems to be a good economical option to work with the developer if an agreement can be reached at some point.

Kathleen Walker noted some examples of where developers helped build parks in Sandy.

Draft

Don Robertson asked if other board members had anything to add.

Kathleen asked Tracy Brown if they can bring more information to the next Parks Board meeting. Tracy Brown noted it will likely be months before they know the specific number of units etc. but the goal is to work with the Parks Board and Planning Commission to come up with a win/win for residents, the developer and the city. Don Robertson noted that is the spirit of his motion.

Tracy Brown asked to be kept in the loop on the progress of the Master Plan Update with regard to the park design in this area.

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Moved by Don Robertson, seconded by Susan Drew

Move the board continue discussions with developer on this potential park property in the Bull Run Terrace Development.

CARRIED. 6-0

6.2. Board Elections

Elections were held for officers of the Parks and Trails Advisory Board

Moved by Michael Weinberg, seconded by Kathleen Walker

Move to nominate Don Robertson for Board Chair.
Don Robertson accepts the nomination.

CARRIED. 6-0

Moved by Sam Schroyer, seconded by Kathleen Walker

Move to nominate Michael Weinberg for Board Secretary.
Michael Weinberg accepts the nomination.

CARRIED. 6-0

Moved by Don Robertson, seconded by Susan Drew

Move to nominate Makoto Lane for Vice Chair.
Makoto Lane accepts the nomination.

CARRIED. 6-0

7. STAFF UPDATES

7.1. Community Garden

Sarah Richardson shared with the board the challenges the Ant Farm was having completing the repairs at the Community Garden. They are recommending that all the beds be rebuilt and think they can do it for the same amount of money as outlined in the repair estimate. They will follow up to confirm that and hope to work on it in the fall.

7.2. Parks Maintenace Policy

Sarah Richardson shared that she was working with Parks Maintenance to draft a document that fully describes city policy and procedures for spraying in the park and will have something for the board to review and to forward to council if they choose.

7.3. Master Plan Update

Kathleen Walker shared progress on the Parks Master Plan and reviewed the documents attached to the agenda.

Don Robertson noted there was another meeting of the Technical Advisory Committee scheduled for June 16th.

Kathleen Walker discussed the importance of distinguishing between open space and developed park land. The numbers are preliminary and will change as the plan is refined.
Reviewed Trail inventory and will also be refining what gets counted and what does not.
Requested that the board review the documents and help us identify what might need to be changed.
Reviewed Level of Service. How much do we have compared to a standard level of service. Talked about the SCORP report (State Comprehensive Outdoor Recreation Plan) and how it interacts with the Parks Master Plan process and outcome. We want to meet and in some areas exceed the SCORP recommendations.
Reviewed what is being identified as future needs.

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Reviewed existing inventory for parks and trails. Still in the process of refining the maps. Requests the board take a look and help to refine the maps. Neighborhood Parks are designed to serve a zone from a 1/4 to 1/2 mile radius, and you can see where there are gaps in the NE area of town. Don Robertson noted that the plan also looks at the Urban Reserve.
Reviewed proposed inventory. Discussion about proposed trails.
Requests the board review the documents and give input.

8. Adjourn

Draft

EXHIBIT MMMM

MINUTES
Parks & Trails Advisory Board Meeting
Wednesday, July 8, 2020 Virtual Zoom Meeting 2:00 PM

BOARD MEMBERS PRESENT: Kathleen Walker, Board Member, Don Robertson, Board Member, Michael Weinberg, Board Member, Susan Drew, Board Member, Makoto Lane, Board Member, and Sam Schroyer, Board Member

BOARD MEMBERS ABSENT:

STAFF PRESENT: Sarah Richardson, Community Services

MEDIA PRESENT:

1. Roll Call

2. Public Comment

2.1. The Parks and Trails Advisory Board will conduct this meeting electronically using the Zoom video conference platform. Members of the public may listen, view, and/or participate in this meeting using Zoom. Using Zoom is free of charge. See the instructions below:

- To login to the electronic meeting online using your computer, click this link: https://us02web.zoom.us/j/83310191950
- If you would rather access the meeting via telephone, dial 1-669-900-6833. When prompted, enter the following meeting number: 833 1019 1950
- If you do not have access to a computer or telephone and would like to take part in the meeting, please contact the Sandy Community Center (503-668-5569) by Monday, July 6th and arrangements will be made to facilitate your participation.

3. Consent Agenda

3.1. Meeting Minutes

Moved by Michael Weinberg, seconded by Makoto Lane

Motion to approve meeting Minutes from June.

Draft

CARRIED. 6-0

4. Changes to the Agenda

5. New Business

5.1. Bull Run Terrace Development - Park Dedication

Tracy Brown attended to discuss the Bull Run Terrace Development. Shared the latest Plat with changes from the last meeting. This is the proposal they will go forward with. Proposing slightly more parkland dedication than what is required by the code. Reduced the highway frontage and considered the other comments and seeks the boards support. Will offer to make the park improvements in exchange for SDC fees.

Susan Drew asked about the utility easement and if it was underground. Tracy Brown noted it is underground. Precluded from some development over the top.

Some discussion about the existing drainage on the Deerpointe side.

Discussion about the preservation of existing trees. Will ultimately be determined by the Park Design.

Kathleen Walker asking about what acreage is required for a development of high density vs Single Family Residences. Tracy Brown noted the max units will be 163 units in the current proposal. The commercial zoning changes the original number of units built. Current calculation is 1.43 acres of parkland dedication.

Discussion of the village overlay requirements and how it affects this property. Alex Reverman explained the challenges with the property with regard to the overlay. Their intent is to submit this proposal as shared here. Wanted to eliminate the commercial piece but can't because of the commercial inventory needs within the city. They would prefer to take out the commercial piece but can't. Kathleen Walker noted that housing can be included in the commercial zone. It can be added above, below or beside. This could affect the total number of units and the parkland dedication.

Discussion of ODOT and the build out of Dubarko and the challenges it adds to the project.

Kathleen Walker feels the board cannot support the project until more is

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known about the commercial area and the zoning is resolved. Need to know the total number of residences, need certainty.

Alex Reverman asked what are the thoughts about putting a hotel/motel in the commercial area of the development?

Don Robertson asked if they will be submitting for Pre-App?
Tracy Brown said it will be a revised application. Pre-App has already been done.

Don Robertson shared that the concept of working together to develop the park is all good. However, there needs to be a more definitive answer to what the total number of residences would be, what the Fee in Lieu and the SDCs and park acreage would total, need hard numbers before saying yes.

Best at this point is to say we agree with the concept but not ready to move into an agreement until there is more definitive information.

Alex Reverman understand the concerns of the park board. They have some of the same concerns about the final details of the development.

Makoto Lane agrees that the board needs to do things in order and would like to see more solid information and not as many question marks.

Michael Weinberg thinks the park configuration is an improvement and is positive, but agrees we need more hard numbers.

Sam Schroyer asked if the work to develop would include the Deer Pointe piece. Yes, that would be the intent. Sam Schroyer on the commercial -is there anyway to put a parameter on it. If over X number of residences more park area would be added? Tracy Brown explained the process. Would be appropriate to consider if the number of units requires it. Alex Reverman asked Tracy Brown - if we hit the threshold of units how much park would be added? For every 10 Multi Family units it is about .09 acres added to the park.

Don Robertson - the board is agreeable to the concept but can't give 100% endorsement for the SDC credits etc. until more information is available and the numbers are final.

Tracy Brown noted they are moving forward and appreciate the time.

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Discussion about the zoning with regard to the Parks and Open Space Zone.

6. Old Business

6.1. Overlook Update

Signs are in and telescopes will be installed very soon.

6.2. Parks Update - phase guidelines

Discussion about what is and is not open in the parks during Phase I.
Don Robertson outlined the phases and asked that we open up per the guidelines. Respect the guidelines because if we don't it can have adverse affects.

Sarah Richardson, staff liaison, noted that so far we are following the guidelines, but preparing for when we can enter Phase II. Only planning to do so at the appropriate time.

Michael Weinberg agrees and feels we should come down strongly on the side of the law.

Discussion about the fact the playgrounds are being used and the challenges of enforcement.
Don Robertson noted that most communities are struggling with the enforcement issue.

Don Robertson noted that we are not moving to Phase II soon.
Discussion about Movies in the Park.

7. STAFF UPDATES

8. Adjourn

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Staff Report
City of Sandy
39250 Pioneer Blvd.,
Sandy, OR 97055

EXHIBIT NNNN

To: City of Sandy, Mayor and City Council

Date: November 13, 2020

From: Don Robertson, Chair Sandy Parks and Trails Advisory Board

Subject: Bull Run Terrace Development

Attachments: None

I am sending this communication on behalf of the Sandy Parks and Trails Advisory Board at their direction.

At our regularly scheduled meeting on November 12, 2020, we continued our discussion of the Bull Run Terrace Development. We understand that the Council will be taking up discussion on this topic at a meeting in the near future and wanted to register our recommendation with you.

Our recommendation comes in several parts.

1. A Development agreement be prepared between the City and the Developer.
2. Allow the developer to donate property adjacent to the current Deer Point property as identified in Tract A.
3. Allow the developer to make initial improvements to the newly configured Deer Point Park in place of paying Systems Development Charges. These improvements must have a total value of what the developers would have been obligated to pay in SDC's for Parks.
4. Improvements should include half street improvements that would have been the parks responsibilities, grading of the park in accordance with a developed Deer Point Park site plan.
5. The city should agree to complete the park plan in a reasonable amount of time to not inhibit the developer.
6. In the event the developer adds housing units in the identified commercial area beyond 13 units, the developer will add additional parkland or pay a Fee in Lieu according to the formula outlined in city code.

We believe that these recommendations will provide a usable park space for the neighborhood in a more timely fashion than we could provide, provide the developer certainty as they move forward with their plans, and protect the city and developer by establishing the perimeters and expectations of the two parties in advance.

We thank you for your consideration in this matter.

Staff Contact:
Sarah Richardson
503-489-2150
srichardson@cityofsandy.com

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

WHERE INNOVATION MEETS ELEVATION

REVISED PLANNING COMMISSION STAFF REPORT
(DRAFT FINDINGS OF FACT and FINAL ORDER
TYPE IV DECISION)

Note on edits: This revised staff report contains edits since the staff report that was published for the August 24, 2020 Planning Commission hearing regarding Bull Run Terrace. Additions are identified with dark red text and deletions are identified with ~~blue strikethrough~~ text.

DATE: October 19, 2020

FILE NO.: 19-050 CPA/ZC/SUB/SAP/TREE

PROJECT NAME: Bull Run Terrace

APPLICANT/OWNER: Roll Tide Properties Corp

LEGAL DESCRIPTION: T2 R5E Section 18CD, Tax Lots 900 and 1000

The above-referenced proposal was reviewed concurrently as a Type IV comprehensive plan amendment, zone change, subdivision, and specific area plan overlay with tree removal. The following Findings of Fact are adopted supporting approval of the plan in accordance with Chapter 17 of the Sandy Municipal Code.

EXHIBITS:

Applicant's Submittals:

A. Land Use Application
B. Project Narrative (revised July 2020)
C. Civil Plan Set
   - Sheet 1 – Cover Sheet, Preliminary Plat Map, and Future Street Plan
   - Sheet 2 – Preliminary Plat Map
   - Sheet 3 – Existing Conditions and Tree Retention Plan
   - Sheet 4 – Tree Tables
   - Sheet 5 – Master Street and Utility Plan
   - Sheet 6 – Street Sections
   - Sheet 7 – Street Tree Plan and Parking Analysis
   - Sheet 8 – Proposed Striping Plan
   - Sheet 9 – Preliminary Grading and Erosion Control Plan
   - Sheet 10 – Slope Analysis
D. Preliminary Storm Drainage Design and Calculations
E. Public Need Analysis
F. Traffic Impact Study

G. Arborist Report
H. Wetland Determination Report
I. Geotechnical Report
J. Revised Preliminary Plat
K. Revised Existing Conditions
L. Revised Tree Tables
M. Revised Master Street and Utility Plan
N. Building Footprint Plan for Lots 1-4
O. Revised Arborist Report: Tree Retention
P. Tree Removal Plan
Q. Screening Concept Plan
R. Revised Traffic Analysis

Agency Comments:
S. City Engineer (February 20, 2020)
T. Sandy Fire District No. 72 (February 25, 2020)
U. PGE (February 25, 2020)
V. City of Sandy Transit (February 28, 2020)
W. City Transportation Engineer (February 28, 2020)
X. ODOT (March 20, 2020)
Y. City of Sandy Public Works (April 29, 2020)
Z. City Transportation Engineer (August 10, 2020)
AA. City Engineer (August 12, 2020)
BB. Sandy Fire District No. 72 (August 13, 2020)

Additional Documents from Staff:
CC. Pre-application Notes from January 10, 2018, October 10, 2018
DD. Incompleteness Letter dated January 27, 2020
EE. Completeness Letter dated February 14, 2020

Public Comments:
FF. Amelia Williams Robinson (April 23, 2020)
GG. Miriam Chmykhalov (April 23, 2020)
HH. Tom and Linda Hunt (April 26, 2020)
II. Vincent and Lynn Mandina (April 28, 2020)
JJ. Vadim and Miriam Verbelchul (April 28, 2020)
KK. Nicola Skinner (April 30, 2020)
LL. Kathleen Walker (May 1, 2020)
MM. David and Nancy Allan (May 1, 2020)
NN. Izaac McKenzie (May 1, 2020)
OO. Ann Ruhl (May 1, 2020)
PP. Lesley Lowe (May 1, 2020)
QQ. Lonnie Stermon (May 1, 2020)
RR. Tom and Linda Hunt (May 5, 2020)
SS. Gary and Val Roche (May 5, 2020)
TT. Gary and Val Roche (May 6, 2020)

UU. Scott Ruehrdanz (May 7, 2020)
VV. Marion Gunderson (May 26, 2020)
WW. Christian Vedder (May 27, 2020)
XX. Ann Smith Vedder (May 27, 2020)
YY. Susan Dulley (June 2, 2020)
ZZ. Yoshi Hosaka and Itsuo Hosaka (July 28, 2020)
AAA. Gary and Val Roche (July 31, 2020)
BBB. David and Nancy Allan (July 30, 2020)
CCC. David and Nancy Allan (July 31, 2020)
DDD. Dennis Fetter (August 3, 2020)
EEE. Jessica Hutson (August 5, 2020)
FFF. Lee Grundmeyer (August 6, 2020)
GGG. Izaac McKenzie (August 7, 2020)
HHH. Marilyn E. (August 10, 2020)
III. Ryan Clifford (August 14, 2020)
JJJ. Ann Ruhl (August 17, 2020)
KKK. Cameron Strey (August 20, 2020)
LLL. Katie Smith (August 20, 2020)
MMM. Scott Ruehrdanz (August 20, 2020)
NNN. Eileen Suchanek (August 20, 2020)
OOO. Ann Vedder (August 20, 2020)
PPP. Ann Vedder (August 20, 2020)
QQQ. Kelly French (August 20, 2020)
RRR. Rachael Ruehrdanz (August 20, 2020)
SSS. Lori Pyles (August 21, 2020)
TTT. Cameron Zebroff (August 21, 2020)
UUU. Heather Fitch (August 22, 2020)
VVV. Lonnie Stermon (August 23, 2020)
WWW. Nicola A. Skinner (August 24, 2020)
XXX. Izaac McKenzie (August 24, 2020)
YYY. Liza Chatterton (August 24, 2020)
ZZZ. Dough Marshall (August 24, 2020)
AAAA. Zoey McKenzie (August 24, 2020)
BBBB. Makoto Lane (August 24, 2020)
CCCC. Kathleen Walker (August 24, 2020)

Revised Agency Comments
DDDD. City Engineer (October 9, 2020)
EEEE. ODOT (October 9, 2020)

Additional Exhibits
FFFF. Previous Staff Report (August 14, 2020)
GGGG. Initial Power Point Presentation (August 24, 2020)

FINDINGS OF FACT

General

1. These findings are based on the applicant's submittals received on December 30, 2019, July 14, 2020, September 29, 2020, and other information as detailed in this document. Staff deemed the application incomplete on January 27, 2020. The applicant submitted additional materials on February 11, 2020. The application was deemed complete on February 14, 2020 and the original 120-day deadline was June 13, 2020. However, due to the unforeseen effects of COVID-19 affecting the timing of public hearings, the applicant agreed to a deadline extension of 30 days to July 13, 2020.

2. 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.

3. On May 13, 2020 the Development Services Director sent the applicant the following: "Instead of requesting 120-day extensions and going back and forth between the applicant and city staff we are going to invoke ORS 227.178 (10) to remove the 120-day clock provisions for the Bull Run Terrace application." Therefore, this application does not have a 120-day deadline as the proposal includes a comprehensive plan map amendment.

4. This report is based upon the exhibits listed in this document, as well as agency comments and public testimony.

5. The subject site is approximately 15.91 acres. The site is located at 40808 and 41010 Highway 26.

6. The parcel has a Comprehensive Plan Map designation of Village and a Zoning Map designation of R-1, Low Density Residential; R-2, Medium Density Residential; and C-3. Village Commercial.

7. This subject property was previously approved for an 88-lot subdivision known as Vista Loop South (File No. 05-029). Vista Loop South received a few tentative plat extensions and one plat reinstatement, but the subdivision was never constructed, and the approval expired in 2015.

8. The applicant, Roll Tide Properties Corp., requests a Type IV Zone Map Amendment, Comprehensive Plan Map Amendment, Specific Area Plan and development of a 7-lot subdivision for two parcels totaling approximately 15.91 acres. Four lots are proposed to have the R-1 zoning designation and are proposed to each contain a single family dwelling. ~~Two lots are~~ One lot is proposed to have the R-3 zoning designation. One lot is proposed to have the R-2 zoning designation. The exact number of multifamily dwelling units will be determined with a subsequent design review application for these lots, but according to the applicant the maximum number of dwelling units on the R-3 land is 130 ~~158 dwelling~~ units and the maximum number of dwelling units on the R-2 land is 17 units for a total of 147 dwelling units. While the C-3 zoning district will have to contain some commercial

development there is a decent chance the C-3 land will also contain some residential dwelling units. The development code allows for multi-family residential in the C-3 zoning district so long as the dwelling units are above, beside or behind a commercial business.

9. On September 29, 2020 the applicant submitted additional information as requested by staff and the Planning Commission. The additional information is included as Exhibits J through R, and include the following modifications:

    A. Revised Plan Sheets, including revised sheets for the Preliminary Plan (Exhibit J), Existing Conditions (Exhibit K), Tree Tables (Exhibit L), and the Master Street and Utility Plan (Exhibit M). These sheets include the following changes:

        a) The zoning designation proposed for Lot 5 has been modified from R-3 to a combination of R-2 and R-1. With this change the maximum allowed density on this lot is reduced by seven dwelling units from 24 units to 17 units.
        b) A 20-foot setback line is shown on all lots adjacent to Highway 26, Dubarko Road, and Street B.
        c) A 40 foot by 40 foot easement is shown at the Northeast corner of Lot 7 to accommodate a future traffic signal.
        d) The stormwater system is redesigned to eliminate the need for a stormwater easement and utility line along the west property line of Lots 1, 2, and 4. This modification to the stormwater system allows for five existing trees along the west lot line of the subdivision to be retained.
        e) An additional public stormwater facility has been added as Tract C to the west of Lot 5. New flow control and water quality manholes will also be installed to discharge stormwater into the existing storm system in Dubarko Road from this facility.
        f) The alignment of "Street B" is modified to provide a 300-foot centerline radius for this street per City of Sandy requirements.
        g) An additional Storm and Sanitary manhole are added in "Street B" to accommodate the new street geometry for this street.
        h) A meandering walkway is shown along the east side of the proposed park.
        i) Five additional trees located on Lots 2 and 4 are proposed to be retained.

    B. A building footprint plan (Exhibit N) for Lots 1 through 4 is included and details that each lot can accommodate a dwelling.

    C. A Revised Arborist Report (Exhibit O) is included detailing five additional retention trees on Lots 2 and 4. Retention of these trees was determined possible with the removal of the stormwater utility line.

    D. A Tree Removal Plan (Exhibit P) is included to describe how tree removal adjacent to the proposed tree preservation easement on Lot 7 will be accomplished.

    E. A Screening Concept Plan (Exhibit Q) is included detailing additional landscape plantings along the west property line of Lots 1, 2, and 4 and along Tracts B and C

that are intended to partially screen this area of the proposed development from existing residences to the west.

F. A Revised Traffic Analysis (Exhibit R) is included to address ODOT comments.

10. While this proposal will undoubtfully increase traffic on Dubarko Road the Average Daily Traffic (ADT) concerns that were recently 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 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 is Fawn Street/Street A. The four proposed single family homes 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. To alleviate potential traffic concerns and to deter trips from heading west on Fawn Street staff recommends that trip distribution is limited from Lot 7. **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.** ~~**Staff recommends a condition that the exit on the driveway to Lot 7 on Street A is restricted to left-only turning movements (using a left turn only pork chop design and signage) to deter commercial patrons from entering the Deer Pointe subdivision when exiting Lot 7.**~~

11. Notification of the proposed application was mailed to affected agencies on February 14, 2020 and to affected property owners within 500 feet of the subject property on April 17, 2020. A correction to the notice was sent on May 5, 2020.

12. Due to concerns raised by City planning staff as well as by surrounding residents, the applicant requested additional time to modify the application for this proposed development. On May 21, 2020, a notification was mailed to affected property owners stating that the Planning Commission meeting was rescheduled to Monday, July 27, 2020 at 7:00 pm. The City Council meeting was rescheduled to Tuesday, September 8, 2020 at 7:00 pm.

13. After additional discussion, the applicant and City staff agreed to move the public hearing dates once more. A notice was sent on July 23, 2020 informing affected property owners that the Planning Commission meeting will be held on August 24, 2020 and the City Council meeting on October 19, 2020.

14. A legal notice was submitted to the newspaper on August 5, 2020 to be published on August 12, 2020 informing residents of the public hearings.

15. During the Planning Commission meeting on August 24, the Commission granted a continuance of the public hearing. An additional Planning Commission hearing was scheduled for October 26, 2020.

16. Agency comments were received from the City Transportation Engineer, City Engineer, Sandy Transit, Public Works, ODOT, Sandy Fire District No. 72, and PGE. Revised comments were received from the City Engineer and ODOT (Exhibits KKK and LLL).

17. At publication of this staff report 29 written public comments were received. The main concerns expressed by residents include the following:

    A. The loss of trees, thus lowering the aesthetic quality of the area as well as privacy for existing homes.
    B. The capacity of the police to effectively patrol multi-family dwelling areas.
    C. The possibility of criminal activity at multi-family dwelling areas.
    D. Being previously told that the land would not be developed as residential.
    E. Acres of commercial land use being put into a deficit.
    F. Concerns about effects of multi-family housing on property values.

18. Staff is sympathetic to all concerns raised by the public but does not know of any research which shows that an increase in multi-family housing decreases property values for single family homes. There is certainly nothing within the Sandy municipal code which relates multi-family housing and property values, nor is there a way to evaluate this. Furthermore, 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 5.01 acres of R-2 designated land.

17.24 – Comprehensive Plan Amendment Procedures

19. Chapter 17.24, Comprehensive Plan Amendment Procedures, contains review criteria for Comprehensive Plan amendments. The comprehensive plan map change and zone map change proposes to add High Density Residential (R-3) and Parks and Open Space (POS), increase Village Commercial (C-3), ~~remove~~ reduce Medium Density Residential (R-2), and reduce Low Density Residential (R-1). The Comprehensive Plan states that area and density increase within a village may be increased or decreased up to 20 percent. Changes greater than 20 percent will require a Plan Map amendment. The applicant's analysis shows that the maximum residential density with the existing zoning designations on the R-2 and R-1 lands is 101 dwelling units. The applicant's analysis shows that the maximum residential density with the proposed zoning designations on the R-3, R-2, and R-1 lands is 152~~163~~ dwelling units. It should be noted that this doesn't include the potential dwelling units on the C-3 land. Therefore, the potential increase in residential density is ~~61.9~~ 38.2 percent which exceeds the

threshold as defined in the comprehensive plan. Therefore, a Plan Map amendment is required.

20. Section 17.24.70 (A) specifies the change being proposed is the best means of meeting the identified public need. The City Council adopted an updated Urbanization Study in February 2015 (Ordinance 2015-01). This study projected the land needs for the Urban Growth Boundary to the year 2034 and concluded there is expected to be a surplus of 13.9 acres of high density residential land and a deficit of 51.8 acres of commercial land for the planning period. The proposed change would increase the commercial land supply by 0.77 acres and reduce the residential land supply by the same amount.

21. The applicant's original proposed modifications would have resulted in the following:

    Commercial = deficit of 1.71 acres (previously a surplus of 1.13 acres)
    Low Density Residential = surplus of 11.74 acres (previously a surplus of 19.2 acres)
    Medium Density Residential = surplus of 12.09 (previously a surplus of 17.1 acres)
    High Density Residential = surplus of 23.60 acres (previously a surplus of 12.6 acres)
    Industrial is not applicable to this application

22. Because the original proposal would have resulted in a deficit of the 20-year supply of commercial lands and created a Goal 9 violation, the applicant revised their proposal to include commercial land. Additionally, the applicant further revised their application to include R-2 land.

23. The applicant's new proposal will result in the following:

    Commercial = surplus of 1.90 acres (previously a surplus of 1.13 acres)
    Low Density Residential = surplus of 11.74 acres (previously a surplus of 19.2 acres)
    Medium Density Residential = surplus of 13.32 ~~12.09~~ (previously a surplus of 17.1 acres)
    High Density Residential = surplus of 19.28 ~~20.51~~ acres (previously a surplus of 12.6 acres)
    Industrial is not applicable to this application

    The applicant's surplus numbers on page 11 of their narrative are slightly different, but the above numbers are the correct numbers based on recent comprehensive plan map amendments.

24. Section 17.24.70(B) requires the change to conform to all applicable Statewide Planning Goals.

    Goal 1: Citizen Involvement
    The application is being reviewed through a Type IV process that requires two public hearings. A public notice was sent to adjoining property owners, a legal notice published in the Sandy Post, and a notice of the proposal was sent to the Department of Land Conservation and Development. The Planning Commission will review the application at a public hearing on August 24, 2020 and make a recommendation to City Council who

will hold a public hearing on October 19, 2020. 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 G). 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. That said, staff finds that to adequately protect the required retention trees on Lot 7 the protection area shall be consistent with Chapter 17.92. **The applicant shall install tree protection fencing at the critical root zone of 1 foot per 1 inch DBH to protect the 64 ~~59~~ retention trees 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 up to 1.426 acres of parkland to the City. 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 current revisions that are being considered for the Parks Master Plan. Staff finds that parkland dedication is preferable so long as the development to the east of the park is complementary to the parkland. As explained below, 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 or east of the parkland, but instead is proposing future commercial development. The applicant's narrative states, "in order to address the spirit of the requirement in this section, the applicant proposes constructing a widened sidewalk along the eastern park frontage adjacent to Lot 7". 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 commercial development (albeit mixed use or traditional commercial) having active storefronts or patios 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. Additionally, this kind of "active frontage" creates pedestrian interest and engagement. **Staff recommends that the design review approval for Lot 7 shall be conditioned to incorporate storefronts, patios 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 M) 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. **Staff recommends that the applicant 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. Staff also recommends that the design review approval for Lot 7 incorporate a landscape buffer that provides visibility between Lot 7 and the parkland but provides a visually attractive separation.**

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 revised 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 modifications to the comprehensive plan increases the potential diversity in housing types by providing additional multi-family housing.

Goal 11: Public Facilities and Services
Not Applicable

Goal 12: Transportation
The applicant contracted with a Traffic Engineer to prepare a Traffic Impact Study (Exhibit F). With development of this project, Dubarko Road will be extended through the property to connect with Highway 26. The submitted traffic study evaluated five existing intersections to determine if they are expected to operate within capacity under year 2021 traffic conditions either with or without the addition of site trips from the

proposed development. The study did not identify any required mitigation. According to the traffic study, the proposed development would produce 7176 ~~76~~ peak AM trips, 8692 ~~92~~ peak PM trips, and 1,1141,194 ~~1,194~~ total daily trips. The proposed zone change is projected to result in a significant ~~negligible~~ change to traffic volumes as measured under the "reasonable worst case" development scenarios and therefore will ~~not~~ have a significant effect on operation of area roadways and intersections at the planning horizon as defined by Oregon's Transportation Planning Rule. Accordingly, some form of mitigation is necessary to meet the requirements of Oregon's TPR. The City Transportation Engineer (Exhibits AA and DDDD~~M~~) states that the development will implement a key project in the city's TSP, namely Dubarko Road. 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.**

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 shown in Finding 21, 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.

17.26 – Zoning District Amendments

25. The applicant is proposing a change in zoning districts as shown in the following table:

Zoning District	Existing Acres	Proposed Acres
R-1	8.05	0.59
R-2	5.01	1.23 ~~0.00~~
R-3	0.00	6.50 ~~7.91~~
C-3	2.84	3.61

26. Chapter 17.26 sets forth review criteria and procedural requirements for quasi-judicial and legislative zoning map amendments. The applicant is requesting a quasi-judicial zoning map amendment to modify the zoning district boundaries for the site.

27. Section 17.26.40 outlines the procedures for a quasi-judicial zoning map amendment.

28. 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 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.

29. 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.

30. 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.

17.30 – Zoning Districts

31. The total gross acreage for the entire property is 15.91 acres. After removal of the right-of-way and proposed parkland tract, the net site area (NSA) for the subject property is reduced to 11.59 net acres with four ~~three~~ zoning districts. The area proposed to be zoned R-1 contains 0.59 net acres. The area proposed to be zoned R-2 contains 1.23 net acres. The area proposed to be zoned R-3 contains 6.50 ~~7.91~~ net acres. The area proposed to be zoned C-3 contains 3.61 net acres.

32. For the area zoned R-1, a minimum of 5 and a maximum of 8 units per acre are allowed. 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. The minimum density for the subject area is .59 net acres x 5 units/net acre = 2.95 rounded down to 2 units. The maximum density for the subject area is .59 net acres x 8 units/net acre = 4.72 rounded up to 5 units. The applicant is proposing 4 units which is within the density range.

33. For the area zoned R-2, a minimum of 8 and a maximum of 14 units per acre are allowed. The minimum density for the subject area is 1.23 net acres x 8 units/net acre = 9.84 rounded up to 10 units. The maximum density for the subject area is 1.23 net acres x 14 units/net acre

= 17.22 rounded down to 17 units. The applicant has not identified the exact number of units which will be built in the subject area. **This will be reviewed in a future design review process.**

34. For the area zoned R-3, a minimum of 10 and a maximum of 20 units per acre are allowed. The minimum density for the subject area is 6.5 ~~7.91~~ net acres x 10 units/acre = 65~~79~~ units. The maximum density for the subject area is 6.5 ~~7.91~~ net acres x 20 units/acre = 130~~158~~ units. The applicant has not identified the exact number of units which will be built in the subject area. **This will be reviewed in a future design review process.**

17.32 – Parks & Open Space (POS)

35. The applicant proposes dedicating some parkland and zoning the land as Parks and Open Space (POS).

36. Section 17.32.10 contains the permitted uses in the POS zoning district. The applicant proposes a park dedication consistent with parkland in the Parks Master Plan per Section 17.32.10 (A)(1).

17.36 – Low Density Residential (R-1)

37. The applicant proposes constructing four single-family dwellings as permitted in this zoning district. As shown in paragraph 19, the applicant is proposing an appropriate number of units given density requirements.

38. Section 17.36.30 contains the design standards for this zone. As shown on Sheet C2 of the plan set (Exhibit 2), 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 has frontage on Dubarko Road, but access is not permitted from this road. Access to this lot will be across an access easement on Lot 3. The proposed building footprints shown on Sheet C2 indicate that all lots are capable of complying with applicable setbacks in the zone. The details of these development standards will be reviewed with the submittal of building permits.

39. Section 17.36.40(A) requires that water service be connected to all dwellings in the proposed subdivision. Section 17.36.40(B) requires that all proposed dwelling units be connected to sanitary service if currently within 200 feet from the site, which it is. Section 17.36.40(C) requires that the location of any real improvements to the property must provide for a future street network to be developed. Section 17.36.40(D) requires that all dwelling units must have frontage or approved access to public streets. The applicant proposes to meet all of these requirements.

40. 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.

41. Staff questioned~~s~~ the building potential of Lots 3 and 4 on the original applicant submission. Since the previous hearing, the applicant provided more information about these lots'

buildable areas and staff's concerns have been satisfied. ~~After making Considerations for typical setbacks in the R-1 zoning district, the additional 20 foot setback along Dubarko Road as required by Chapter 17.80, the easement along the west side of Lot 4, and the easement along the north side of Lot 3 these lots will be left with reduced buildable lot area. Staff recommends the applicant submit a building footprint plan for Lots 1-4 for staff to review and analyze prior to the City Council hearing on October 19, 2020.~~

17.38 – Medium Density Residential (R-2)

42. The applicant is proposing 1.23 net acres of R-2 land. As noted in Finding 33, the applicant will be allowed to develop between 10 and 17 dwelling units on the subject property.

43. **The future design review application will include a review of development standards and requirements.**

17.40 – High Density Residential (R-3)

44. ~~The applicant proposes dividing the R-3 portion into two lots allowing a maximum of 158 dwellings units.~~ The applicant is proposing 6.5 net acres of R-3 land on one lot. ~~As noted above in this document~~ As noted in Finding 34, the applicant will be allowed to develop between 65 and 130 dwelling units on the subject property.~~, the~~ The exact number of units in this zoning district will be determined with a future design review application.

45. **The future design review application will include a review of development standards and requirements. ~~(17.40.30), minimum requirements (17.40.40) and additional requirements (17.40.50).~~**

17.46 – Village Commercial (C-3)

46. The applicant proposes 3.61 net acres of C-3 land. This is an increase in commercial land by 0.77 acres. While the C-3 zoning district will have to contain some commercial development there is a decent chance the C-3 land will also contain some residential dwelling units. The exact number of potential residential units is not known at this time. If residential units are proposed on the C-3 land the dwelling units will be assessed in a future design review.

47. **Any future development on the land zoned C-3 will require a design review in accordance with the development standards found in Section 17.46.30 and the Sandy Municipal Code.**

17.54 – Specific Area Plan Overlay

48. 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."

49. 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".

50. The applicant proposes shifting of zoning district boundaries 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. That said, staff finds that to adequately protect the required retention trees on Lot 7 the protection area shall be consistent with Chapter 17.92. **The applicant shall install tree protection fencing at the critical root zone of 1 foot per 1 inch DBH to protect the 64 ~~59~~ retention trees on the subject property.** Additional 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 the plan set shall be modified to detail additional right-of-way to accommodate the swales.** ~~**The applicant shall submit additional details defining locations for green street swales. If green streets are practicable the plan set shall be modified to detail additional right-of-way to accommodate the swales.**~~

51. 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 and zone map change proposes to add High Density Residential (R-3) and Parks and Open Space (POS), increase Village Commercial (C-3), remove Medium Density Residential (R-2), and reduce Low Density Residential (R-1). The Comprehensive Plan states that area and density increase within a village may be increased or decreased up to 20 percent. Changes greater than 20 percent will require a Plan Map amendment. The applicant's analysis shows that the maximum residential density with the existing zoning designations on the R-2 and R-1 lands is 101 dwelling units. The applicant's analysis shows that the maximum residential density with the proposed zoning designations on the R-3 and R-1 lands is 163 dwelling units. Therefore, the potential increase in residential density is 61.9 percent which exceeds the threshold as defined in the comprehensive plan.

52. 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.

53. 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.

54. 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. The applicant's narrative elaborates on the objectives of their proposal and the desire to include a few single family dwellings, multi-family dwellings, and village commercial development. The narrative also elaborates on dedications, including 1.43 acres of parkland.

    B. Site and Context. A map of the site and existing context shall identify the project area. The applicant submitted a 10-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, with the exception of Lot 7, which is the Village Commercial lot. The development of 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 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, Public Works Director, ODOT, Fire Marshal and the Transit Director 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 proposal includes increasing the amount of available commercial lands by 0.77 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.

17.56 – Hillside Development

55. The applicant submitted a Geotechnical and Slope Stability Investigation (Exhibit I) 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 I) shall be conditions for development.** The Public Works Director stated the following: "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.**

17.74 –Accessory Development

56. 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.**

17.80 – Additional Setbacks on Collector and Arterial Streets

57. 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 J) details the 20-foot setbacks to Highway 26, Dubarko Road, and Street B. ~~**The plan set shall be revised to detail 20 foot setbacks on Lots 3, 4, 5, 6, and 7 for Dubarko Road and Street B.**~~

17.82 – Special Setbacks on Transit Streets

58. 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. 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 Road and a new local street. **The dwellings on Lots 3 and 4 shall be designed to meet all of the requirements as specified in Chapter 17.82 and will be assessed in a future design review.**

59. The applicant proposes that all single-family units will meet the requirements of Section 17.82.20(B), which requires that dwellings shall have a primary entrance connecting directly between the street and building interior and outlines requirements for the pedestrian route. **The adherence to this code section for the future multi-family units will be determined in a future design review process.**

60. The applicant proposes that all single-family units will meet the requirements of Section 17.82.20(C), which 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 adherence to this code section for the future multi-family units will be determined in a future design review process.**

61. 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 will be determined in a future design review process.**

17.84 – Improvements Required with Development

62. Section17.84.20(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.**

63. 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.

64. As required by Section 17.84.39(A)(2), 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 planter strips as required. As required by Section 17.84.39(A)(4), the applicant intends to construct all sidewalk improvements as required by this section.

65. No exceptions or modifications listed in Section 17.84.39(A)(3) are requested with the application.

66. In relation to Sections 17.84.39(B), 17.84.39(C), 17.84.39(D), and 17.84.39(E), no pedestrian or bicycle facilities other than sidewalks and on-street bicycle lanes have been identified or proposed in the application.

67. Section 17.84.40(A) requires that the developer construct adequate public transit facilities. **The proposed development will require 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 1 and Lot 5. Engineering specifications are available from the Transit Department.**

68. Section 17.84.50 outlines the requirements for providing a traffic study. The applicant included a Traffic Impact Study with the application (Exhibits F and R). The study did ~~not~~ identify some ~~any~~ required mitigation. According to the revised traffic study, the proposed residential development (not including the commercial lot) would produce 71 ~~76~~ peak AM trips, 86 ~~92~~ peak PM trips, and 1,114 ~~1,194~~ total daily trips. The proposed zone change is projected to potentially result in ~~a negligible change to~~ a significant increase in traffic volumes as measured under the "reasonable worst case" development scenarios and therefore may ~~will not~~ have a significant effect on operation of area roadways and intersections at the planning horizon as defined by Oregon's Transportation Planning Rule. Accordingly, some form of mitigation is necessary to meet the requirements of Oregon's TPR. The City Transportation Engineer (Exhibit M) states that the development will implement a key project in the city's TSP, namely Dubarko Road. 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.**

69. The proposed street and utility plan depicts Dubarko Road between its current eastern terminus and proposed Street A with a 76 ft. wide right-of-way consisting of a 0.5 foot monumentation strip, a six-foot sidewalk, a five-foot planter strip, a 0.5 foot curb, a five foot bike lane, a 17-foot travel lane and half of an 8 foot median (i.e. 4 feet) for a total half section equaling 38 feet and a full street section equaling 76 feet. 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 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.**

70. 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. The City Transportation Engineer (Exhibit M) states that a traffic signal at Dubarko Road and Highway 26 will be needed in the near future based on future development but did not recommend a traffic signal at this time. The revised Preliminary Plat (Exhibit J) details a 40 foot by 40 foot traffic signal easement. ~~**The applicant shall provide a 40 foot by 40 foot right-of-way dedication or permanent traffic signal easement at the northeast corner of**~~

~~**Lot 7 to accommodate a future traffic signal.** This right-of-way dedication~~ The traffic signal easement could impact the tree retention area. **The applicant shall submit revised plans ~~showing a 40 foot by 40 foot dedication on Lot 7 and~~ detailing how the traffic signal easement ~~that~~ will impact the tree retention area. If the tree retention area is negatively impacted the applicant shall preserve additional trees.** 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).

71. 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). **The alignment of the intersection of Street B and Dubarko Road shall be revised to provide the minimum 100 feet of tangent section to comply with the Development Code or as otherwise approved by the City Engineer.**

72. 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.**

73. Dubarko Road will contain a dedicate 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 Public Works Director 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.

74. The proposed development does not include any long straight street segments or cul-de-sac streets and is thus not required to follow the standards in Section 17.84.50(C).

75. Section 17.84.50(D) requires that development sites shall be provided with access from a public street improved to City standards. 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. All new streets are proposed as full street improvements with the exception of improvements along Highway 26. No off-site improvements have been identified or are warranted with the construction of this subdivision. All streets are proposed as full streets; with no three-quarter streets being proposed.

76. 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.**

77. 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.

78. Proposed streets meet the requirements of 17.94.50(H). The future street plan (Exhibit C, Sheet 1) 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). No private streets are proposed in the development.

79. Section 17.84.60 outlines the requirements of public facility extensions. The applicant submitted a utility plan (Exhibit C, Sheet 5) 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.

80. Franchise utilities will be provided to all lots within the proposed subdivision as required in Section 17.84.80. The location of these utilities will be identified on construction plans and installed or guaranteed prior to final plat approval. The applicant does not anticipate extending franchise utilities beyond the site. All franchise utilities other than streetlights will be installed underground. The developer will make all necessary arrangements with franchise utility providers. The developer will install underground conduit for street lighting.

81. Section 17.84.90 outlines requirements for land for public purposes. ~~A 15-foot public storm easement is proposed along the back of Lots 1-4 and a storm easement and sanitary sewer easement are identified in Tract A.~~ 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.

82. 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.**

83. 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.

84. The intersection of Dubarko Road and Highway 26 requires a grant of access from ODOT. **Prior to final plat approval the applicant shall obtain a grant of access or other necessary approval from ODOT for access to Highway 26 at Dubarko Road. ~~for the intersection of Dubarko Road and Highway 26 from ODOT.~~**

85. The City Transportation Engineer (Exhibit M) stated that conditions of approval should be included requiring the development comply with the standards and procedures specified by ODOT. He went on to say that ODOT requirements and standards associated with frontage improvements where the development abuts Highway 26 shall be made conditions of approval with the development.

17.86 – Parkland and Open Space

86. The applicant intends to dedicate parkland as outlined in the requirements of Section 17.86.

87. 17.86.10(2) contains the calculation requirements for parkland dedication. The formula is acres = proposed units x (persons/unit) x 0.0043. For the four single family homes, acres = 4 x 3 x 0.0043 = 0.05 acres. For the maximum development of 147~~158~~ multifamily units, acres = 147~~158~~ x 2 x 0.0043 = 1.26~~1.36~~ acres. Combined, this totals 1.31~~1.41~~ acres. The applicant proposes to dedicate 1.426 acres of parkland and is thus in compliance with this requirement.

88. If the applicant proposes multifamily dwellings as part of the development of Lot 7 which is proposed to be zoned C-3 the applicant is eligible for parks fee in-lieu credit up to 0.11 acres (the rounded difference between the required amount of parkland dedication and the proposed amount of parkland dedication). **The applicant can propose up to 13 multifamily units (13 x 2 x 0.0043 = 0.11 acres) prior to incurring parks fee in-lieu charges. Anything beyond 13 multifamily units on Lot 7 will incur parks fee in-lieu fees per the calculations as defined in the Sandy Development Code. However, if the applicant does not propose any multifamily units on Lot 7 the applicant will not be owed a monetary credit.**

89. 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 or east of the parkland, but instead are proposing future commercial development. The applicant's narrative states, "in order to address the spirit of the requirement of this requirement in this section, the applicant proposes

constructing a widened sidewalk along the eastern park frontage adjacent to Lot 7". 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 commercial development (albeit mixed use or traditional commercial) having active storefronts or patios 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. **Staff recommends that the design review approval for Lot 7 shall be conditioned to incorporate storefronts, patios 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 M) 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. **Staff recommends that the applicant 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. Staff also recommends that the design review approval for Lot 7 incorporate a landscape buffer that provides visibility between Lot 7 and the parkland but provides a visually attractive separation.**

90. On June 10, 2020, the applicant brought the parkland dedication proposal to the Sandy Parks and Trails Advisory Board. At the meeting, the Board verbally agreed to provide the applicant SDC credits in exchange for development of the park. This verbal agreement is not a decision as the Parks and Trails Advisory Board cannot make financial decisions but can make recommendations to other hearing bodies. Staff supports the request from the applicant and the verbal agreement from the Parks and Trails Advisory Board. The City Council may consider this offer from the applicant and make a decision regarding the request for SDC credits in lieu of parkland development.

91. 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 applicant shall also provide a Phase I Environmental Assessment.**

92. 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.**

17.92 – Landscaping and Screening

93. Section 17.92.10 contains general provisions for landscaping. As required by Section 17.92.10 (C), trees over 25-inches circumference measured at a height of 4.5 feet above grade are considered significant and should be preserved to the greatest extent practicable and integrated into the design of a development. A 25-inch circumference tree measured at 4.5 feet above grade has roughly an eight-inch diameter at breast height (DBH). Based on the Planning Commission interpretation from May 15, 2019, Subsection 17.92.10(C) does not

apply to residential subdivisions. Tree protection fencing and tree retention 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.**

94. Section 17.92.20 lists the requirements for minimum landscaping improvements. **The details of this section will be considered with submittal of a design review application for the proposed multi-family units and commercial property.**

95. 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 D, Sheet 7) does not show the distance between trees. **The applicant shall update the Street Tree Plan to show the distance between trees, and this distance shall be 30 feet on center.**

    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 either aerate the planter strip soil at the subdivision stage and install fencing around the planter strips to protect the soil from compaction or shall aerate the soil at the individual home construction phase.**

    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).

96. 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.**

97. 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 specifies to City staff for review and approval concurrent with construction plan review.**

98. 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.**

99. 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 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 are now proposing some additional landscaping along the common property line with the Deer Pointe subdivision (Exhibit Q). The applicant is proposing to retain five additional conifers (Exhibit O), 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 Q) along Lots 1, 2, 4, and Tracts B and C. Deciduous trees shall be at least 1.5 inches at planting and the cedars shall be at least 6 to 8 feet in height at planting.**

100. 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.**

17.98 – Parking, Loading, and Access Requirements

101. 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 7.

102. Section 17.98.20(A) requires that each single family dwelling unit is required to provide at least two off-street parking spaces. **Compliance with this requirement 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.**

103. Section 17.98.60 has specifications for parking lot design and size of parking spaces. No lots are proposed to gain access from an arterial or collector street (17.98.80).

104. Section 17.98.90 requires that all streets proposed will be improved to city standards.

105. 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. Staff has concerns with the proposed driveway on Lot 7 as it's within 150 feet of the intersection of Dubarko Road and Highway 26. **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 applicant shall revise the driveway locations on Lots 5-7 during construction plan review and after receiving approval for revised locations from the City Public Works Director and City Engineer.**~~

106. Section 17.98.110 outlines the requirements for vision clearance. **The requirements of this section will 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.**

107. 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.**

108. 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 7 shows that 20 on-street parking spaces have been identified in compliance with this standard. No parking courts are proposed by the applicant.

17.100 – Land Division

109. 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.**

110. Pre-application conferences were held with the City on January 10, 2018, June 12, 2018, and October 10, 2018 per 17.100.60(A).

111. As required by Section 17.100.60(E), the proposed subdivision is designed to be consistent with the density, setback, design standards, dimensional standards in the R-1 zoning district. **The details of the development in the R-3 and R-2 districts will be addressed with a future design review application.** As illustrated in Exhibit C, Sheet 1, the proposed street system is consistent with the City's Transportation System Plan and Comprehensive Plan.

The City has indicated that all public facilities have capacity to serve the proposed subdivision. All improvements in the proposed development are designed in compliance with City standards. The applicant proposes developing the subdivision in a single phase.

112. Section 17.100.60(E)(1) requires subdivisions to be consistent with the density, setback, and dimensional standards of the base zoning district, unless modified by a Planned Development approval. The application for the subdivision is being processed through a Type IV procedure. The proposal is consistent with density and other dimensional standards of the base zoning district.

113. Section 17.100.60(E)(2) requires subdivisions to be consistent with the design standards set forth in this chapter. Consistency with design standards in this chapter are discussed under each subsection below. Conditions of approval can be adopted where necessary to bring the proposal into compliance with applicable standards.

114. 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 and extending Street B to the south.

115. Section 17.100.60(E)(4) requires that adequate public facilities are available or can be provided to serve the proposed subdivision. All public utilities including water, sewer and stormwater are available or will be constructed by the applicant to serve the subdivision. The applicant also intends to dedicate public parkland, the calculation of which can be found in the review of Chapter 17.86 in this document.

116. Section 17.100.60(E)(5) requires all proposed improvements to meet City standards through the completion of conditions as listed within this final order and as detailed within these findings. The detailed review of proposed improvements is contained in this report. Staff has identified a few aspects of the proposed subdivision improvements requiring additional information or modification by the applicant, but conditions of approval can be adopted to bring the proposal into compliance with City standards. In order to meet the standards as defined in the Sandy Development Code the applicant shall submit items for staff to analyze prior to earthwork, grading, excavation, or construction. As described in this staff report, the following list was either satisfied since the August Planning Commission hearing or has been moved to the conditions list at the end of this document. ~~prior to the City Council hearing. The items shall include the following:~~

- ~~**Submit a building footprint plan for Lots 1-4 for staff to review and analyze.**~~
- ~~**Submit a proposal for removal of the trees adjacent to the retention trees for staff to review and analyze.**~~
- ~~**Revise the plan set to detail to detail the following:**~~

  ~~**a) 20 foot setbacks on Lots 3, 4, 5, 6, and 7 for Dubarko Road and Street B;**~~

~~b) 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;~~
~~c) A 15 foot wide pedestrian easement on the east side of Lot 6 or a tract to the east of Lot 6 with an 8 foot wide concrete walkway with light bollards and landscaping to connect Highway 26 to future development south of Lot 6.~~
~~d) Fire turnaround easements on Lots 5 and 6 as approved by the Sandy Fire District Fire Marshal.~~
~~e) Detail the exit on the driveway to Lot 7 on Street A restricted to left-only turning movements (using a left turn only pork chop design and signage) to deter commercial patrons from entering the Deer Pointe subdivision when exiting Lot 7.~~
~~f) Detail the alignment of the intersection of Street B and Dubarko Road to provide the minimum 100 feet of tangent section.~~
~~g) Detail a 40 foot by 40 foot right-of-way dedication or permanent traffic signal easement at the northeast corner of Lot 7 to accommodate a future traffic signal.~~
~~h) Detail the retention trees along Highway 26 in a separate tree preservation tract.~~
~~i) Modify the plat to include a vehicular easement on Lot 4 to accommodate maneuvering for vehicles on Lot 3.~~
~~j) Define locations for green street swales. If green streets are practicable the plan set shall be modified to detail additional right-of-way to accommodate the swales.~~

- ~~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.~~

117. 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. That said, the applicant is proposing that the design of the multi family dwellings occurs at a future date.

118. Section 17.100.80 provides standards for denial of a development application due to physical land constraints. The subject site does not contain any physical constraints that would make it unsuitable for the proposed subdivision.

119. The subject property abuts Highway 26 and notification of the proposal was sent to ODOT as required by Section 17.100.90.

120. As required by 17.100.100(A), a traffic impact study prepared in compliance with the City standards was submitted with the application (Exhibit F). With the exception of a revised striping plan and frontage improvements on the Highway 26 frontage, this study does not identify any issues requiring mitigation by the applicant.

121. None of the special traffic generators listed in section 17.100.100(B) are located near the subject site.

122. While 17.100.100(C) calls for a rectangular grid pattern, the proposed street layout is predominantly controlled by the alignment of Dubarko Road that will be extended through the site from the current terminus to connect with Highway 26. The future street plan details Street B extending south consistent with the TSP. The only other street in the subdivision is the extension of Street A into the property. The proposed intersection of Street A and Dubarko Road seems logical and appropriate considering the nearby intersection of Dubarko Road and Highway 26. Staff finds that the proposed street layout represents a logical street pattern.

123. A future street plan in compliance with the requirements of 17.100.100(D) is included in Exhibit C, Sheet 1.

124. Given the requirements in Section 17.100.100(E), the proposed street layout on the subject property is limited because of the alignment of Dubarko Road, Street B, and the location of Fawn Street extended into the property. In addition, because the development type includes two large lot multi family development sites, the street network is further limited. Given these facts, the proposed street layout represents a logical design.

125. 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. **Staff recommends the applicant 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.** ~~**Staff recommends that Lot 6 shall include a pedestrian easement on the east side of the property or a tract to the east of Lot 6 that is at least 15 feet wide with an 8 foot wide concrete walkway with light bollards and landscaping to connect Highway 26 to future development south of Lot 6.**~~

126. 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 J) details a 40 foot by 40 foot traffic signal easement. ~~Finally, a public storm easement is proposed along the back of Lots 1, 2, and 4 and public and private utility easements are proposed across Tract A.~~

127. 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. **Staff recommends the applicant modify the plat to include a vehicular easement on Lot 4 to accommodate maneuvering for vehicles on Lot 3.**

128. 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.

129. All streets in the proposed subdivision have a minimum curve radius as required by Section 17.100.180(B).

130. 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.

131. 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).

132. 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.

133. 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 29 feet of frontage along a public street therefore meeting the requirements of Section 17.100.220(C).

134. 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).

135. 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 Public Works Director the existing 8-inch diameter water line resides in an easement granted to the City of Sandy recorded at 2004-110340. **The applicant shall replace the**

existing waterline with an 8-inch diameter water line at a depth approved by the City Engineer. ~~with no more than 42 inches or less than 36 inches of cover.~~ 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 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 Rd. connected to the existing 18-inch water line at the west end of the site and the existing 12-inch line on Highway 26.** Due to the elevation of the site relative to the existing water reservoirs on Vista Loop Drive this line will be a low-pressure, high volume line and will be used for fire protection. The cost difference between a standard diameter water line and the required 18-inch water line is eligible for Water System Development Charge (SDC) credits. The amount of the credit provided will be based on the Water System Construction Cost Credit table in the Water System Development Charge Methodology adopted by City Council motion on September 5, 2017. Section 17.84.60D SMC states: "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)". **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 cost difference between a standard diameter (8 inch) water line and the required 12-inch water line is eligible for Water System Development Charge (SDC) credits. The amount of the credit provided will be based on the Water System Construction Cost Credit table in the Water System Development Charge Methodology adopted by City Council motion on September 5, 2017.

136. 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. According to the Public Works Director the recently adopted Wastewater System Facilities Plan (2019) identified a capacity deficiency in the Southeast pump station and force main as well as several conveyance lines downstream. The City will adopt a Sanitary Sewer SDC surcharge on each Equivalent Residential Unit developed in the basin served by the Southeast pump station. The surcharge amount will be calculated by dividing the estimated cost of the required capacity improvements by the estimated number of dwelling units that can be built in the pump station drainage basin. The surcharge will be collected with each building permit issued in the basin.

137. Section 17.100.250(A) details requirements for stormwater detention and treatment. A public stormwater quality and detention facility is proposed as Tract B to be located north of Lot 1 and south of the Fawn Street extension. This facility has been sized and located to accommodate the water quality and stormwater detention needs of all streets in addition to Lots 1-4. The applicant submitted a revised utility plan (Exhibit M) detailing a second stormwater facility identified as Tract C in the SW corner of the property. The revised utility plan also removed the 15 foot wide public stormwater easement and utilities along the west lot line of Lots 1, 2, and 4. The water quality and detention needs of Lots 5-7 will be accommodated on each of those lots and stormwater from Lots 5 and 6 will be routed to

flow through Tract B. After onsite detention and water quality treatment, stormwater from Lot 7 will be piped and connected to the existing storm line in the park. **All site runoff ~~(including new runoff from the widened surfaces of Highway 26)~~ 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).**

138. 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.**

139. 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 7.

140. Grass seeding shall be completed as required by Section 17.100.300. The submitted preliminary Grading and Erosion Control Plan (Exhibit C, Sheer 9) provides additional details to address erosion control concerns. A separate Grading and Erosion Control Permit will be required prior to any site grading. Erosion control requirements are defined in greater detail in Chapter 15.44 of this document.

17.102 – Urban Forestry

141. Section 17.102.20 contains information on the applicability of Urban Forestry regulations. An Arborist Report is included as Exhibit G. 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. The inventory is included in Exhibit C, Sheet 4 and the proposed retention trees are shown in Exhibit C, Sheet 3.

142. The property contains 15.91 acres requiring retention of 48 trees, 11 inches and greater DBH (15.91 x 3 = 47.73). The applicant is proposing to retain an additional five trees on Lots 2 and 4 (Tree Nos. 13439, 13440, 13441, 13421, and 13423). The revised submitted plan (Exhibit O) identifies 64 ~~59~~ trees that will be retained. All of the trees proposed for retention are conifers, primarily Doug fir, at least 11 inches DBH, and in good condition as identified by the arborist.

143. A majority of the proposed retention trees are located along Highway 26 in Lot 7, which is proposed to be zoned C-3, Village Commercial. As indicated on the Preliminary Plat (Exhibit C, Sheet C-2), the applicant is proposing to place a conservation easement over an area that encompasses the retention trees along Highway 26, including their critical root zones. Staff believes there could be a future conflict between retention trees along the Highway and future commercial property visibility on Lot 7. ~~Thus, staff recommends the retention trees be placed into a separate tree retention tract.~~ **~~The applicant shall update the site plan to detail the retention trees along Highway 26 in a separate tree preservation tract.~~**

144. The Arborist Report (Exhibit G) provides recommendations for protection of retained trees including identification of the recommended tree protection zone for these trees. The requirements of 17.102.50(B) will be complied with prior to any grading or tree removal on the site. **The applicant shall install tree protection fencing at the critical root zone of 1 foot per 1 inch DBH to protect the 64 ~~59~~ retention trees on the subject property as well as all trees on adjacent properties. 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) 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. 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.**

145. The Tree Preservation Plan (Exhibit C) 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 in a way that does not harm or damage adjacent trees.** The applicant submitted a Tree Removal Plan (Exhibit P) 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. ~~**The applicant shall submit a proposal for removal of the trees adjacent to the retention trees for staff review and approval.**~~ Staff recommends that the applicant not fully remove all the trees adjacent to the retention trees but rather leave snags. **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.**

146. **To ensure protection of the required retention trees, the applicant shall record a tree protection covenant specifying protection of trees on the subject property and limiting removal without submittal of an Arborist's Report and City approval.**

15.30 – Dark Sky

147. 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.

15.44 – Erosion Control

148. The applicant submitted a Geotechnical Engineering Report (Exhibit I) prepared by GeoPacific Engineering, Inc., dated August 16, 2005. The Public Works Director stated the following: "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.**

149. **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.**

150. 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.**

151. Recent development has sparked unintended rodent issues in surrounding neighborhoods. Prior to development of the site, **the applicant shall have a licensed pest control agent evaluate the site to determine if pest eradication is needed.**

RECOMMENDATION:

Staff recommends the Planning Commission **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 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) Extending Fawn Street to the east;
4) Expanding the Deer Pointe park consistent with the goals of the Parks and Trails Advisory Board and the current revisions that are being considered for the Parks Master Plan;
5) Creating available commercial land in the C-3 zoning district consistent with the 2040 Plan that was created in 1997;
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.

Note: As described in this staff report, the following list was either satisfied since the August Planning Commission hearing or has been moved to the conditions list at the end of this document.

~~**ADDITIONAL REVIEW NEEDED PRIOR TO THE CITY COUNCIL HEARING:**~~

~~1. Submit a building footprint plan for Lots 1-4 for staff to review and analyze.~~

~~2. Submit a proposal for removal of the trees adjacent to the retention trees for staff to review and analyze.~~

~~3. Revise the plan set to detail to detail the following:~~

~~a) 20 foot setbacks on Lots 3, 4, 5, 6, and 7 for Dubarko Road and Street B;~~
~~b) 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;~~
~~c) A 15 foot wide pedestrian easement on the east side of Lot 6 or a tract to the east of Lot 6 with an 8 foot wide concrete walkway with light bollards and landscaping to connect Highway 26 to future development south of Lot 6.~~
~~d) Fire turnaround easements on Lots 5 and 6 as approved by the Sandy Fire District Fire Marshal.~~
~~e) Detail the exit on the driveway to Lot 7 on Street A restricted to left only turning movements (using a left turn only pork chop design and signage) to deter commercial patrons from entering the Deer Pointe subdivision when exiting Lot 7.~~
~~f) Detail the alignment of the intersection of Street B and Dubarko Road to provide the minimum 100 feet of tangent section.~~
~~g) Detail a 40 foot by 40 foot right-of-way dedication or permanent traffic signal easement at the northeast corner of Lot 7 to accommodate a future traffic signal.~~
~~h) Detail the retention trees along Highway 26 in a separate tree preservation tract.~~
~~i) Modify the plat to include a vehicular easement on Lot 4 to accommodate maneuvering for vehicles on Lot 3.~~

~~j) Define locations for green street swales. If green streets are practicable the plan set shall be modified to detail additional right-of-way to accommodate the swales.~~

~~4. 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.~~

CONDITIONS:

A. The applicant shall submit a complete set of revised plans to the Planning Division with the following revisions:

1. Fire turnaround easements on Lots 5 and 6 as approved by the Sandy Fire District Fire Marshal.

2. Detail the alignment of the intersection of Street B and Dubarko Road to provide the minimum 100 feet of tangent section or as otherwise approved by the City Engineer.

3. Modify the plat to include a vehicular easement on Lot 4 to accommodate maneuvering for vehicles on Lot 3.

B. 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 is needed.

5. Submit revised plans detailing how the traffic signal easement will impact the tree retention area.

6. Install tree protection fencing at the critical root zone of 1 foot per 1 inch DBH to protect the 64 ~~59~~ retention trees on the subject property as well as all trees on adjacent properties. 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) 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. 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. 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.

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.

C. 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 Public Works 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. 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).

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 affect on-street parking spaces.

~~4. Revise the driveway locations on Lots 5-7 after receiving approval for revised locations from the City Public Works Director and City Engineer.~~

4. Submit a revised cross-section for the portion of Dubarko Road between the existing terminus and Street A.

5. Specify the locations of street lights on all streets being improved within and adjacent to the subdivision. Street lights shall be full cut-off, shall not exceed 4,150 Kelvins, and shall conform to the Dark Sky standards of Chapter 15.30. The locations of light fixtures shall be reviewed in detail with construction plans.

6. 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.

7. Submit additional details/confirmation on any proposed retaining walls, including heights meeting code requirements and an architectural finish.

8. 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.

9. Submit a revised utility plan to include broadband fiber locations as detailed by the SandyNet Manager.

10. Call PGE Service Coordination at 503-323-6700 when the developer is ready to start the project.

11. Explore locations for green street swales. If green streets are practicable the plan set shall be modified to detail additional right-of-way to accommodate the swales.

12. 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.

D. 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 plan review, inspection and permit fees as determined by the Public Works Director.

3. Pay addressing fees at $40 for the subdivision plus $5 per lot.

4. Obtain a grant of access or other necessary approval from ODOT for access to Highway 26 at Dubarko Road. ~~for the intersection of Dubarko Road and Highway 26 from ODOT.~~

5. 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 15 foot wide pedestrian easement on the east side of Lot 6 or a tract to the east of Lot 6 with an 8 foot wide concrete walkway with light bollards and landscaping to connect Highway 26 to future development south of Lot 6.~~
    b) 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 1 and Lot 5. Engineering specifications are available from the Transit Department.
    c) Replace the existing waterline with an 8 inch diameter water line at a depth approved by the City Engineer. ~~with no more than 42 inches or less than 36 inches of cover.~~
    d) An 18 inch water line in Dubarko Rd. connected to the existing 18 inch water line at the west end of the site and the existing 12 inch line on Highway 26.
    e) 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.

6. Clear, grade, and seed the proposed parkland as specified by the City in the construction plans. The applicant shall also provide a Phase I Environmental Assessment.

7. 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 Q) along Lots 1, 2, 4, and Tracts B and C. Deciduous trees shall be at least 1.5 inches at planting and the cedars shall be at least 6 to 8 feet in height at planting.

8. Aerate the planter strips to a depth of 3 feet prior to planting street trees. The applicant shall either aerate the planter strip soil at the subdivision stage and install fencing around the planter strips to protect the soil from compaction or shall aerate the soil at the individual home construction phase.

9. Record a tree protection covenant specifying protection of trees on the subject property and limiting removal without submittal of an Arborist's Report and City approval.

10. Submit a true and exact reproducible copy (Mylar) of the Final Plat for final review and signature.

E. Conditions related to future development of the lots:

1. Design review approval for Lot 7 shall incorporate storefronts, patios and usable windows facing the parkland.

2. Design review approval for Lot 7 shall incorporate a landscape buffer that provides visibility between Lot 7 and the parkland but provides a visually attractive separation.

3. Any future design review application on Lot 5 will include a review of development standards (17.38.30), minimum requirements (17.38.40) and additional requirements (17.38.50) for R-2 zoned development.

4. ~~The~~ Any future design review application on Lot 6 will include a review of development standards (17.40.30), minimum requirements (17.40.40) and additional requirements (17.40.50) for R-3 zoned development.

5. Any future development on the land zoned C-3 (Lot 7) will require a design review in accordance to the development standards found in Section 17.46.30 and the Sandy Municipal Code.

6. If the applicant proposes multifamily dwellings as part of the development of Lot 7 which is proposed to be zoned C-3 the applicant is eligible for parks fee in-lieu credit up to 0.11 acres (the rounded difference between the required amount of parkland dedication and the proposed amount of parkland dedication). The applicant can propose up to 13 multifamily units (13 x 2 x 0.0043 = 0.11 acres) prior to incurring parks fee in-lieu charges. Anything beyond 13 multifamily units on Lot 7 will incur parks fee in-lieu fees per the calculations as defined in the Sandy Development Code. However, if the applicant does not propose any multifamily units on Lot 7 the applicant will not be owed a monetary credit.

7. The dwellings on Lots 3 and 4 shall be designed to meet all of the requirements as specified in Chapter 17.82 and will be assessed in a future design review.

8. Orientation of the future multi-family units that have frontage on both Highway 26 and Dubarko Road will be determined in a future design review process.

9. 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.

10. 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.

11. 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.

F. General Conditions of Approval:

1. The Final Plat shall be recorded as detailed in Section 17.100.60 (I).

2. 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.

3. If entry signs are desired, the applicant shall submit a detailed plan showing the location of such signage and a sign permit application.

4. All parking, driveway and maneuvering areas shall be constructed of asphalt, concrete, or other approved material.

5. 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.

6. 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).

7. All recommendations in Section 6 of the submitted Geotechnical and Slope Stability Investigation (Exhibit I) shall be conditions for development.

8. All utilities shall be installed underground and in conformance with City standards. The applicant shall install utilities underground with individual service to each lot.

9. 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.

10. All public utility installations shall conform to the City's facilities master plans.

11. The intersection of Highway 26 and Dubarko Road shall be constructed as a full-access intersection in compliance with the TSP.

12. As required by Section 17.98.130, all parking, driveway and maneuvering areas shall be constructed of asphalt, concrete, or other approved material.

13. 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.

14. All new public sanitary sewer and waterlines shall be a minimum of 8 inches in diameter.

15. 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.

16. All site runoff ~~(including new runoff from the widened surfaces of Highway 26)~~ 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).

17. 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.

18. 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).

19. 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.

20. 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.

21. Successors-in-interest of the applicant shall comply with site development requirements prior to the issuance of building permits.

22. 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.

23. 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.

24. Comply with all other conditions or regulations imposed by the Sandy Fire District or state and federal agencies. Compliance is made a part of this approval and any violations of these conditions and/or regulations may result in the review of this approval and/or revocation of approval.

25. 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.

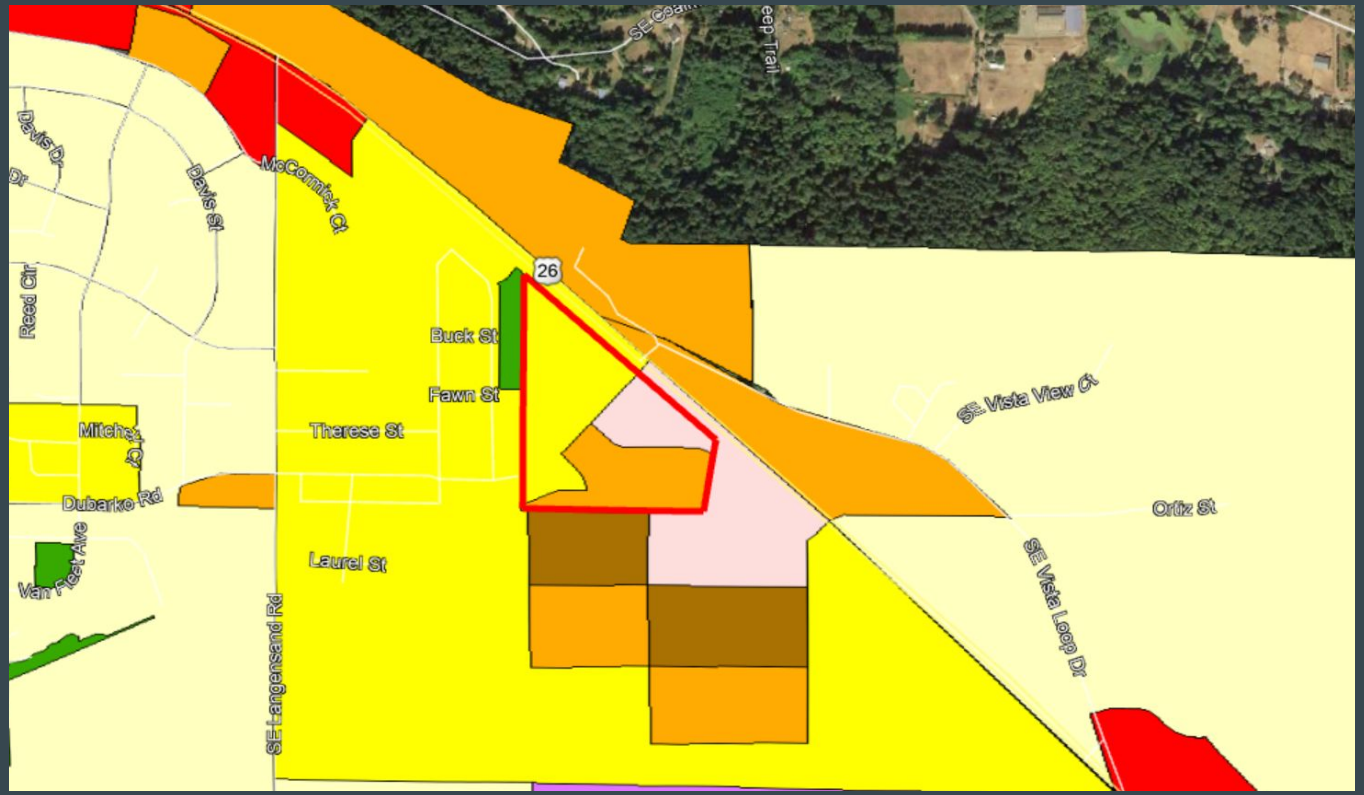
EXHIBIT PPPP

Bull Run Terrace

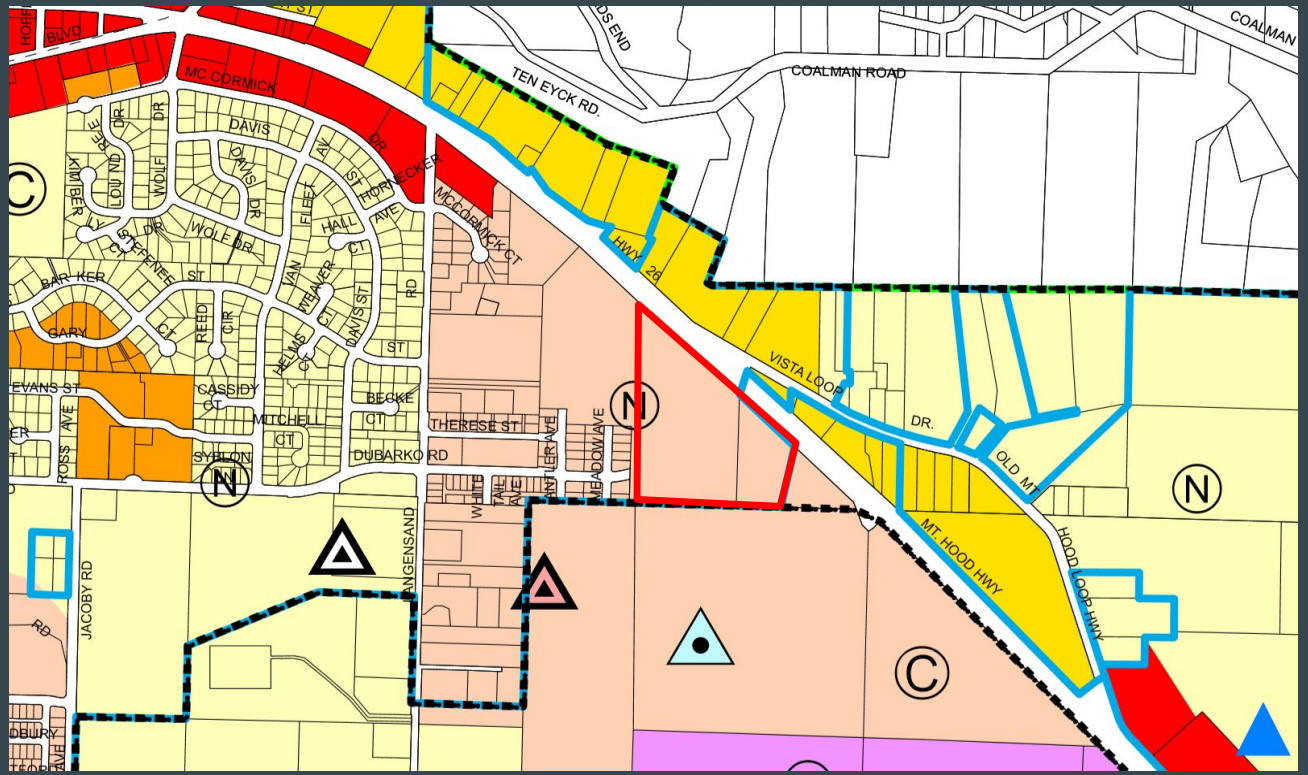
Planning Commission 10/26/2020

Vicinity Map

Zoning Map


Davis Dr
Davis St
McCormick Ct
Reed Cir
26
Buck St
Fawn St
Therese St
Mitchell Ct
Dubarko Rd
Van Fleet Ave
Laurel St
SE Tangensend Rd
SE Vista View Ct
Ortiz St
SE Vista Loop Dr
N

Comprehensive Plan Map



Request

The applicant is requesting the following:

- Zone map amendment (Type IV)
- Comprehensive plan amendment (Type IV)
- Specific area plan (Type IV)
- Subdivision (Type II)
- Tree removal (Type II)

History

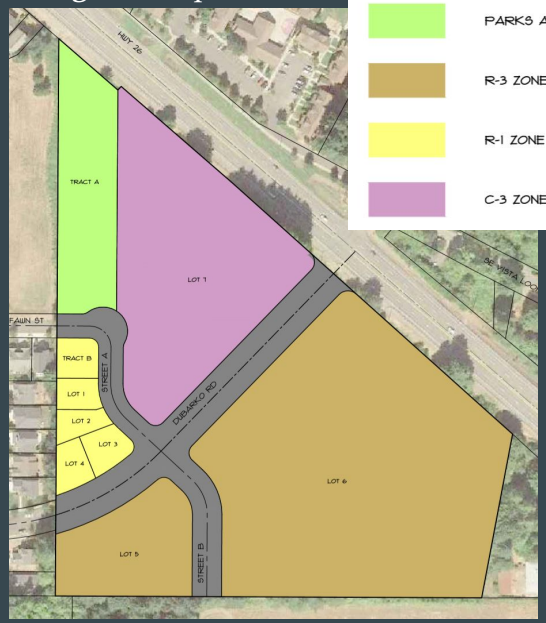
- Originally presented to Planning Commission on August 24, 2020, at which time Commission granted a continuance.
- Received updated application materials on September 29, 2020.

Highlighted Updates to Application

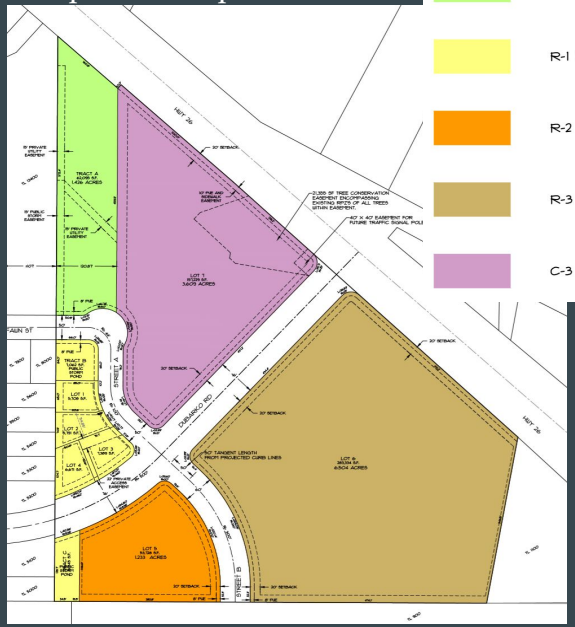
- Inclusion of medium density residential (R-2) lot.
- Removal of stormwater easement, allowing for additional tree retention.
- An easement at the proposed intersection of Dubarko Road and Highway 26 to allow for a traffic signal.
- Meandering walkway along east side of dedicated parkland.

Zone Map Amendment

Original Proposal



Updated Proposal



Zone Map Amendment (cont.)

Zoning District	Existing Acres	Proposed Acres
R-1	8.05	0.59
R-2	5.01	1.23
R-3	0.00	6.50
C-3	2.84	3.61

Comprehensive Plan Map Amendment

- Required in Village area when maximum density changes by more than 20%.
- Will result in the following changes to UGB land inventory:

Land Type	Current Acre Surplus	Proposed Acre Surplus
Commercial	1.13	1.90
Low-Density Residential	19.20	11.74
Medium-Density Residential	17.10	13.32
High-Density Residential	12.60	19.28

Comprehensive Plan Map Amendment (cont.)

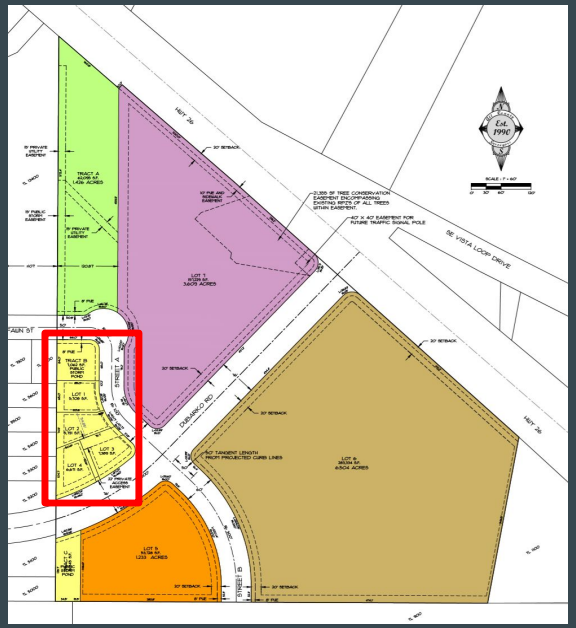
- Goal 1: Citizen Involvement
  - Notice and public hearings
- Goal 2: Land Use Planning
  - Staff has reviewed this application against zoning district amendment and comprehensive plan amendment code requirements, and have notified relevant state agencies.
- Goal 5: Natural Resources
  - Staff recommends a condition to install fencing to protect the site's retention trees.
- Goal 8: Recreational Needs
  - Dedication of 1.426 acres of parkland to the City for Deer Point Park. Future design review will require that buildings on Lot 7 face the park. The modified proposal includes a meandering walkway in the park.
- Goal 9: Economic Development
  - Requires adequate surplus of buildable commercial and industrial land. Proposed changes allow for this surplus.

Comprehensive Plan Map Amendment (cont.)

- Goal 10: Housing
  - Providing mixed housing types, including multi-family, offers more options for residents.
- Goal 12: Transportation
  - The connection of Dubarko Road to Highway 26 is a goal in the TSP.
- Goal 13: Urbanization
  - The proposed development accommodates additional residential and commercial uses within the UGB.

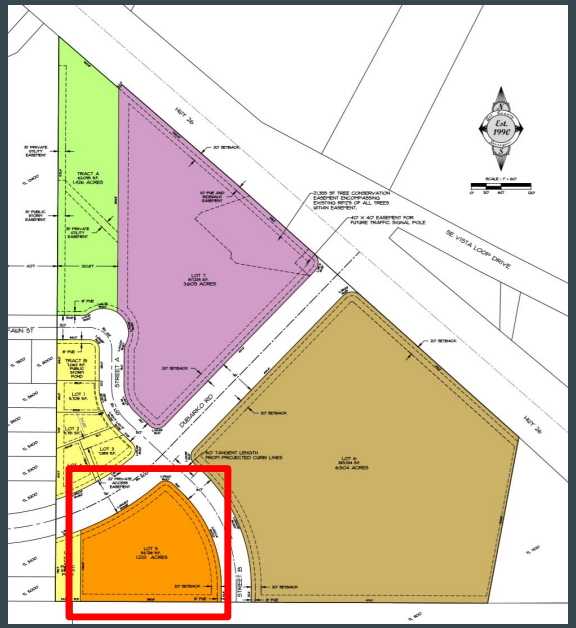
Low Density Residential (R-1)

- Lots 1-4
- Meets density requirements (one detached single family home per lot)



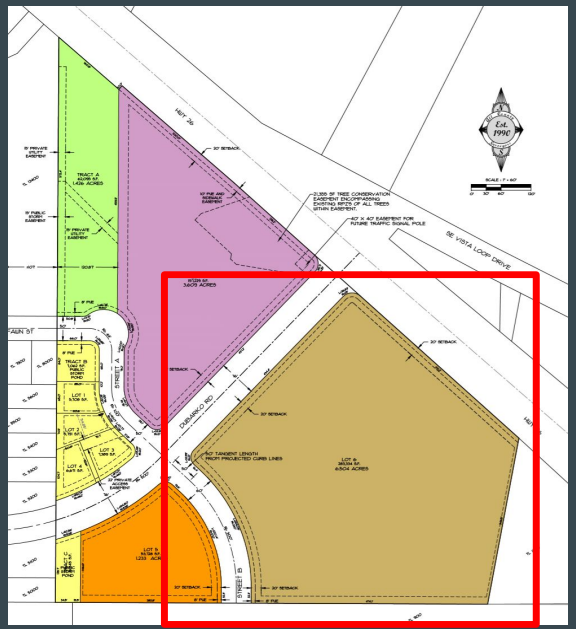
Medium Density Residential (R-2)

- Lot 5
- Density requirements allow for a maximum of 14 units
- The future design review application will include a review of development standards, minimum requirements, and additional requirements.



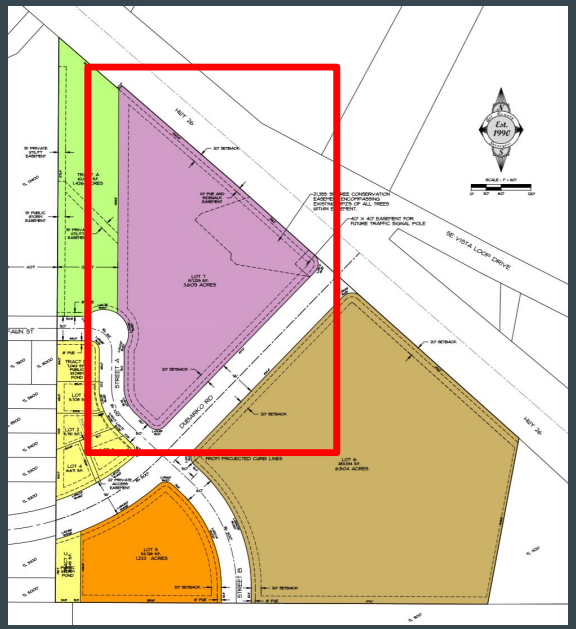
High Density Residential (R-3)

- Lot 6
- Density requirements allow for a maximum of 130 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
- The future design review application will include a review of development standards, minimum requirements, and additional requirements.

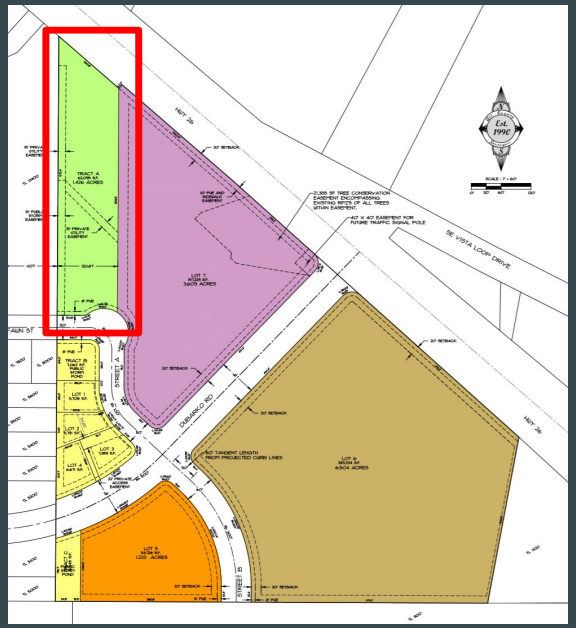


Specific Area Plan Overlay

“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....[Specific Area Plans] are intended to promote coordinated planning concepts and pedestrian-oriented mixed-use development.”

Park Dedication

- Requires 1.31 acres, and applicant is proposing 1.426 acres
- Staff recommends that the design review approval for Lot 7 shall include activated frontages facing the parkland
- Updated proposal includes walkway through park



Public Comments

- **Correction to Finding 17: 50 public comments have been received**
- Loss of trees, thus lowering the aesthetic quality of the area as well as privacy for existing homes.
- The capacity of the police to effectively patrol multi-family dwelling areas.
- The possibility of criminal activity at multi-family dwelling areas.
- Being previously told that the land would not develop as residential.
- Concerns about effects of multi-family housing on property values.
- Relevance to Comprehensive Plan and potential for “spot zoning.”

NO. 2020-25

AN ORDINANCE APPROVING A ZONE MAP AMENDEMENT, COMPREHENSIVE PLAN MAP AMENDEMENT, A SPECIFIC AREA PLAN AND A TENTATIVE SUBDIVISION PLAN AND IMPOSING CONDITIONS OF APPROVAL.

WHEREAS, the applicant, Roll Tide Properties Corp., submitted a Type IV application (19-050 CPA/ZC/SAP/SUB/TREE) to develop property identified as T2 R5E Section 18CD, Tax Lots 900 and 1000. The application consists of: (1) a request to change the Comprehensive Plan designation on the property; (2) a request to change the zoning designations on the property; (3) a request to place a specific area plan designation on the property; and (4) a request to approve a tentative subdivision plan on the property; and

WHEREAS, the applicant desires to change the Comprehensive Plan Map designation to add Parks and Open Space (POS) and increase density within a village by greater than 20 percent. In this instance the approved increase of 101 dwelling units to 152 dwelling units is a 38.2 percent increase which exceeds the 20 percent threshold; and

WHEREAS, the applicant desires to change the Zoning Map designations for the identified property from Low Density Residential (R-1), Medium Density Residential (R-2), and Village Commercial (C-3) to 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); and

WHEREAS, the applicant requests to add an 'S' for Specific Area Plan to the zoning map; and

WHEREAS, the applicant requests approval of a seven (7) lot subdivision on the property; and

WHEREAS, the City of Sandy sent notice to the Department of Land Conservation and Development (DLCD) on February 13, 2020 in anticipation of public hearings before the Planning Commission and City Council; and

WHEREAS, the City of Sandy sent notices to all property owners within 500 feet of the site on May 21, 2020, July 23, 2020, and November 9, 2020 describing the proposal and the applicable hearing dates before the City Planning Commission and City Council; and

WHEREAS, the Planning Commission held a public hearing to review the application on October 26, 2020 and forwarded a recommendation by a vote of 6:0 to the City Council to approve the application; and

WHEREAS, the City Council held a public hearing to review the application on November 30, 2020.

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

Section 1. The Council approves the Comprehensive Plan Map amendment for a property identified as T2 R5E Section 18CD, Tax Lots 900 and 1000. The Comprehensive Plan Map designation will be changed from Village to a combination of Village and Parks and Open Space. The plan amendments are shown on the map attached as Exhibit A, incorporated into this ordinance by reference.

Section 2. The Council approves the Zoning Map amendment for a property identified as T2 R5E Section 18CD, Tax Lots 900 and 1000. The Zoning Map designation will be changed from Low Density Residential (R-1), Medium Density Residential (R-2), and Village Commercial (C-3) to 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). The zone amendments are shown on the map attached as Exhibit B, incorporated into this ordinance by reference.

Section 3. The Council approves the Specific Area Plan for the proposed development project.

Section 4. The Council approves the tentative plan for the proposed seven (7) lot subdivision, subject to the conditions of approval contained in the November 23, 2020 staff report for File No. 19-050. Those conditions are incorporated by reference into this ordinance.

Section 5. The City Council adopts and incorporates by reference the findings contained in the November 23, 2020 staff report for File No. 19-050 as its own findings in support of the approvals granted in this ordinance.

Section 6. Staff is directed to take all additional actions that are necessary to implement the adoption of this ordinance, including providing DLCD a copy of this ordinance and other documentation as may be required by law.

This ordinance is adopted by the Common Council of the City of Sandy and approved by the Mayor this 30 day of November 2020

_____

Stan Pulliam, Mayor

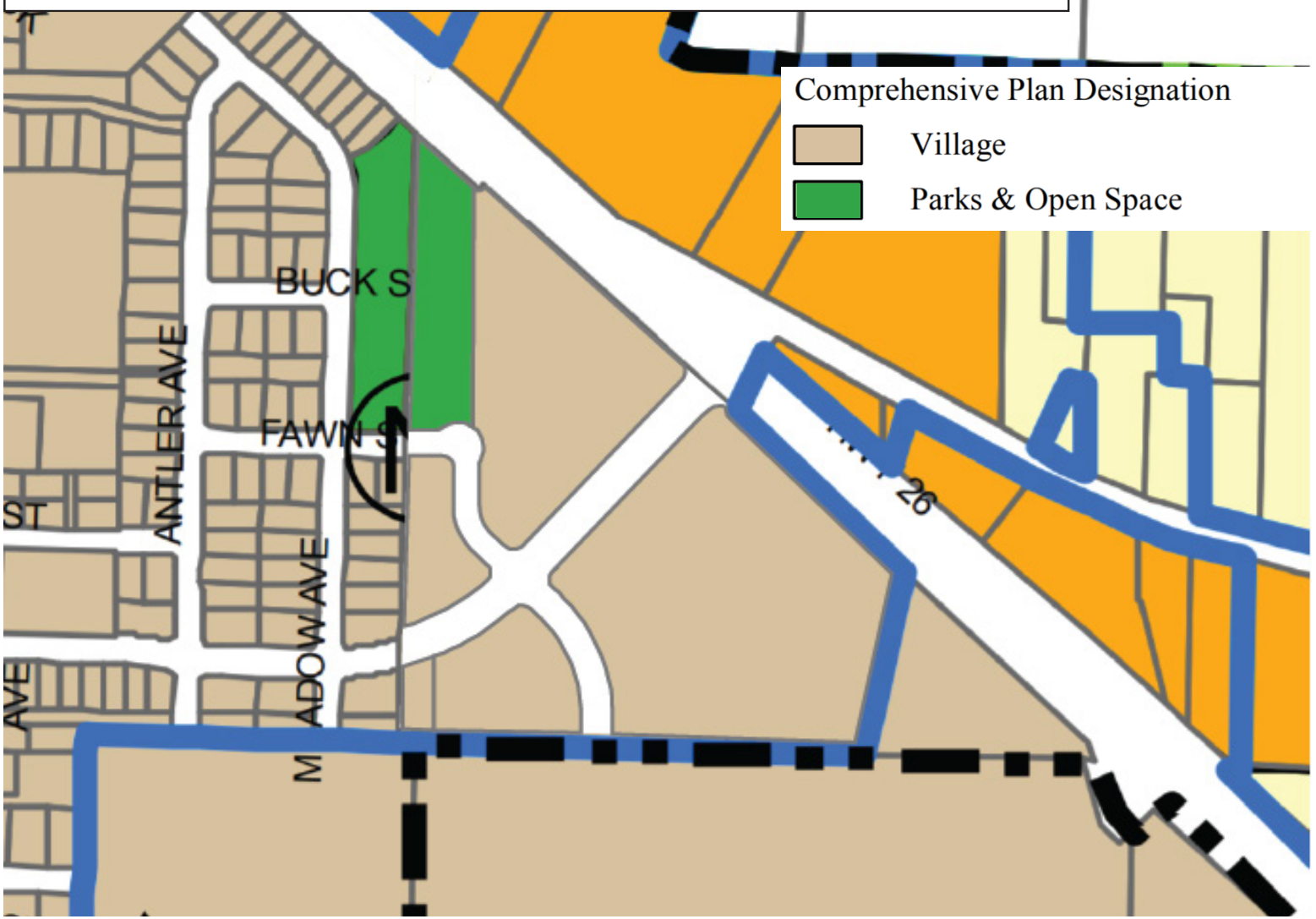
ATTEST:

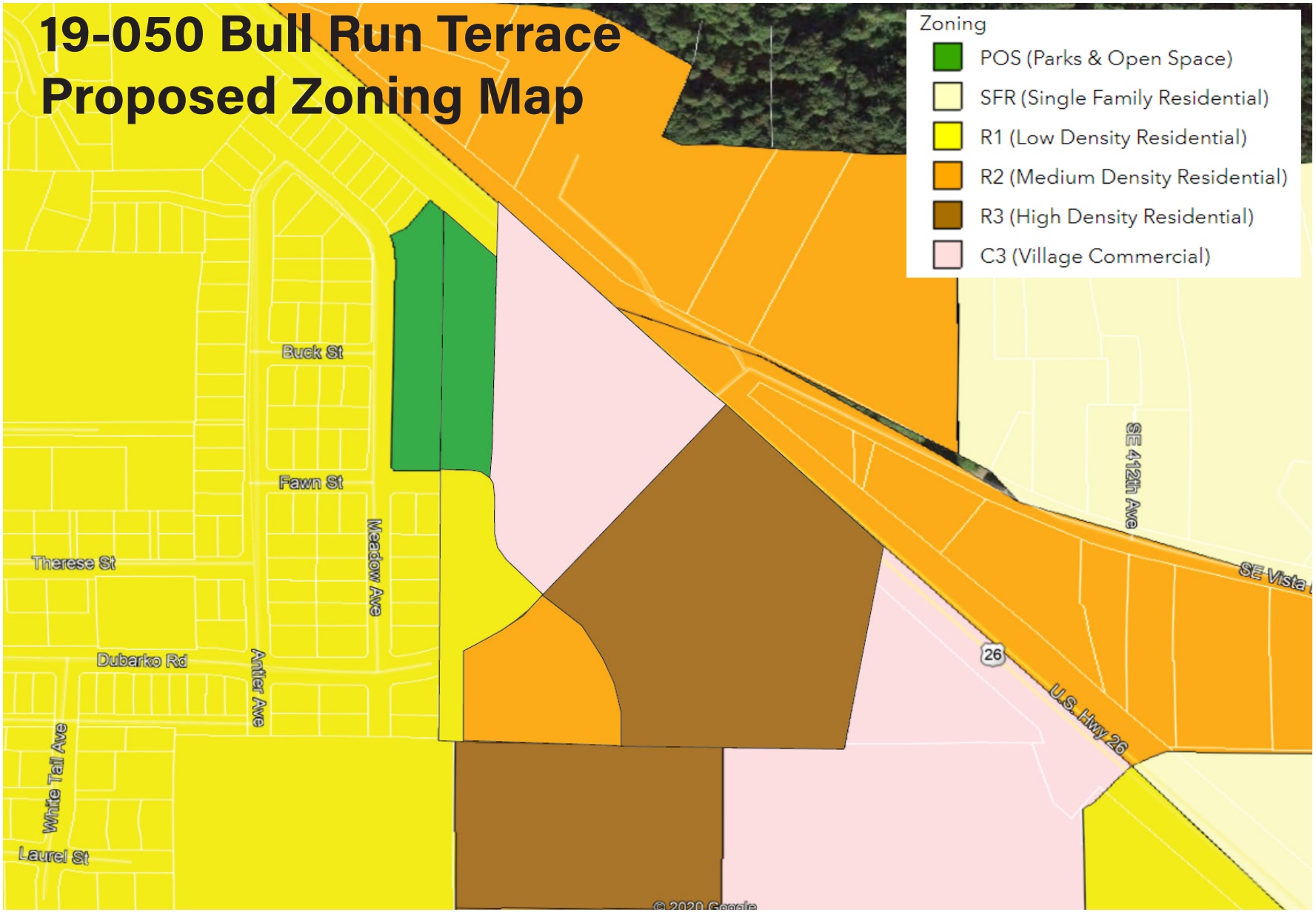
#2020-25

_____
Jeff Aprati, City Recorder

#2020-25

19-050 Bull Run Terrace
Proposed Comprehensive Plan Map




19-050 Bull Run Terrace
Proposed Zoning Map
Zoning
POS (Parks & Open Space)
SFR (Single Family Residential)
R1 (Low Density Residential)
R2 (Medium Density Residential)
R3 (High Density Residential)
C3 (Village Commercial)
Buck St
Fawn St
Meadow Ave
Therese St
Dubarko Rd
Antler Ave
White Tail Ave
Laurel St
SE 412th Ave
SE Vista
26
U.S. Hwy 26
© 2020 Google

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

WHERE INNOVATION MEETS ELEVATION

CITY COUNCIL STAFF REPORT
(DRAFT FINDINGS OF FACT and FINAL ORDER
TYPE IV DECISION)

DATE: November 23, 2020

FILE NO.: 19-050 CPA/ZC/SUB/SAP/TREE

PROJECT NAME: Bull Run Terrace

APPLICANT/OWNER: Roll Tide Properties Corp

LEGAL DESCRIPTION: T2 R5E Section 18CD, Tax Lots 900 and 1000

The above-referenced proposal was reviewed concurrently as a Type IV comprehensive plan amendment, zone change, subdivision, and specific area plan overlay with tree removal. The following Findings of Fact are adopted supporting approval of the plan in accordance with Chapter 17 of the Sandy Municipal Code.

EXHIBITS:

Applicant's Submittals:

A. Land Use Application
B. Project Narrative (Revised July 2020)
C. Civil Plan Set (Originally submitted July 2020)
   - Sheet 1 – Cover Sheet, Preliminary Plat Map, and Future Street Plan
   - Sheet 2 – Preliminary Plat Map
   - Sheet 3 – Existing Conditions and Tree Retention Plan
   - Sheet 4 – Tree Tables
   - Sheet 5 – Master Street and Utility Plan
   - Sheet 6 – Street Sections
   - Sheet 7 – Street Tree Plan and Parking Analysis
   - Sheet 8 – Proposed Striping Plan
   - Sheet 9 – Preliminary Grading and Erosion Control Plan
   - Sheet 10 – Slope Analysis
D. Preliminary Storm Drainage Design and Calculations
E. Public Need Analysis
F. Traffic Impact Study
G. Arborist Report
H. Wetland Determination Report
I. Geotechnical Report

J. Revised Preliminary Plat (Revised September 29, 2020)
K. Revised Existing Conditions (Revised September 29, 2020)
L. Revised Tree Tables (Revised September 29, 2020)
M. Revised Master Street and Utility Plan (Revised September 29, 2020)
N. Building Footprint Plan for Lots 1-4 (Revised September 29, 2020)
O. Revised Arborist Report: Tree Retention (Revised September 29, 2020)
P. Tree Removal Plan
Q. Screening Concept Plan
R. Revised Traffic Analysis (Revised September 29, 2020)

Agency Comments:
S. City Engineer (February 20, 2020)
T. Sandy Fire District No. 72 (February 25, 2020)
U. PGE (February 25, 2020)
V. City of Sandy Transit (February 28, 2020)
W. City Transportation Engineer (February 28, 2020)
X. ODOT (March 20, 2020)
Y. City of Sandy Public Works (April 29, 2020)
Z. City Transportation Engineer (August 10, 2020)
AA. City Engineer (August 12, 2020)
BB. Sandy Fire District No. 72 (August 13, 2020)

Additional Documents from Staff:
CC. Pre-application Notes from January 10, 2018, October 10, 2018
DD. Incompleteness Letter dated January 27, 2020
EE. Completeness Letter dated February 14, 2020

Public Comments:
FF. Amelia Williams Robinson (April 23, 2020)
GG. Miriam Chmykhalov (April 23, 2020)
HH. Tom and Linda Hunt (April 26, 2020)
II. Vincent and Lynn Mandina (April 28, 2020)
JJ. Vadim and Miriam Verbelchul (April 28, 2020)
KK. Nicola Skinner (April 30, 2020)
LL. Kathleen Walker (May 1, 2020)
MM. David and Nancy Allan (May 1, 2020)
NN. Izaac McKenzie (May 1, 2020)
OO. Ann Ruhl (May 1, 2020)
PP. Lesley Lowe (May 1, 2020)
QQ. Lonnie Stermon (May 1, 2020)
RR. Tom and Linda Hunt (May 5, 2020)
SS. Gary and Val Roche (May 5, 2020)
TT. Gary and Val Roche (May 6, 2020)
UU. Scott Ruehrdanz (May 7, 2020)
VV. Marion Gunderson (May 26, 2020)
WW. Christian Vedder (May 27, 2020)

XX. Ann Smith Vedder (May 27, 2020)
YY. Susan Dulley (June 2, 2020)
ZZ. Yoshi Hosaka and Itsuo Hosaka (July 28, 2020)
AAA. Gary and Val Roche (July 31, 2020)
BBB. David and Nancy Allan (July 30, 2020)
CCC. David and Nancy Allan (July 31, 2020)
DDD. Dennis Fetter (August 3, 2020)
EEE. Jessica Hutson (August 5, 2020)
FFF. Lee Grundmeyer (August 6, 2020)
GGG. Izaac McKenzie (August 7, 2020)
HHH. Marilyn E. (August 10, 2020)
III. Ryan Clifford (August 14, 2020)
JJJ. Ann Ruhl (August 17, 2020)
KKK. Cameron Strey (August 20, 2020)
LLL. Katie Smith (August 20, 2020)
MMM. Scott Ruehrdanz (August 20, 2020)
NNN. Eileen Suchanek (August 20, 2020)
OOO. Ann Vedder (August 20, 2020)
PPP. Ann Vedder (August 20, 2020)
QQQ. Kelly French (August 20, 2020)
RRR. Rachael Ruehrdanz (August 20, 2020)
SSS. Lori Pyles (August 21, 2020)
TTT. Cameron Zebroff (August 21, 2020)
UUU. Heather Fitch (August 22, 2020)
VVV. Lonnie Stermon (August 23, 2020)
WWW. Nicola A. Skinner (August 24, 2020)
XXX. Izaac McKenzie (August 24, 2020)
YYY. Liza Chatterton (August 24, 2020)
ZZZ. Dough Marshall (August 24, 2020)
AAAA. Zoey McKenzie (August 24, 2020)
BBBB. Makoto Lane (August 24, 2020)
CCCC. Kathleen Walker (August 24, 2020)
DDDD. Ann Ruhl (October 27, 2020)

Revised Agency Comments
EEEE. City Engineer (October 9, 2020)
FFFF. ODOT (October 9, 2020)
GGGG. City Transportation Engineer (October 8, 2020)

Additional Exhibits
HHHH. Previous Staff Report (August 14, 2020)
IIII. Initial Power Point Presentation (August 24, 2020)
JJJJ. Memo from Tracy Brown (October 21, 2020)
KKKK. Email from Mike Robinson (October 26, 2020)
LLLL. Parks and Trails Advisory Board Minutes from June 10, 2020
MMMM. Parks and Trails Advisory Board Minutes from July 8, 2020

NNNN. Parks and Trails Advisory Board Recommendation (November 13, 2020)
OOOO. Revised Staff Report for Planning Commission (October 19, 2020)
PPPP. Second Power Point Presentation (October 26, 2020)

FINDINGS OF FACT

General

1. These findings are based on the applicant's submittals received on December 30, 2019, July 14, 2020, September 29, 2020, and other information as detailed in this document. Staff deemed the application incomplete on January 27, 2020. The applicant submitted additional materials on February 11, 2020. The application was deemed complete on February 14, 2020 and the original 120-day deadline was June 13, 2020. However, due to the unforeseen effects of COVID-19 affecting the timing of public hearings, the applicant agreed to a deadline extension of 30 days to July 13, 2020.

2. 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.

3. On May 13, 2020 the Development Services Director sent the applicant the following: "Instead of requesting 120-day extensions and going back and forth between the applicant and city staff we are going to invoke ORS 227.178 (10) to remove the 120-day clock provisions for the Bull Run Terrace application." Therefore, this application does not have a 120-day deadline as the proposal includes a comprehensive plan map amendment.

4. This report is based upon the exhibits listed in this document, as well as agency comments and public testimony.

5. The subject site is approximately 15.91 acres. The site is located at 40808 and 41010 Highway 26.

6. The parcel has a Comprehensive Plan Map designation of Village and a Zoning Map designation of R-1, Low Density Residential; R-2, Medium Density Residential; and C-3. Village Commercial.

7. This subject property was previously approved for an 88-lot subdivision known as Vista Loop South (File No. 05-029). Vista Loop South received a few tentative plat extensions and one plat reinstatement, but the subdivision was never constructed, and the approval expired in 2015.

8. The applicant, Roll Tide Properties Corp., requests a Type IV Zone Map Amendment, Comprehensive Plan Map Amendment, Specific Area Plan and development of a 7-lot subdivision for two parcels totaling approximately 15.91 acres. Four lots are proposed to have the R-1 zoning designation and are proposed to each contain a single family dwelling. One lot is proposed to have the R-3 zoning designation. One lot is proposed to have the R-2

zoning designation. The exact number of multifamily dwelling units will be determined with a subsequent design review application for these lots, but according to the applicant the maximum number of dwelling units on the R-3 land is 130 units and the maximum number of dwelling units on the R-2 land is 17 units for a total of 147 dwelling units. While the C-3 zoning district will have to contain some commercial development there is a decent chance the C-3 land will also contain some residential dwelling units. The development code allows for multi-family residential in the C-3 zoning district so long as the dwelling units are above, beside or behind a commercial business.

9. On September 29, 2020 the applicant submitted additional information as requested by staff and the Planning Commission. The additional information is included as Exhibits J through R, and include the following modifications:

    A. Revised Plan Sheets, including revised sheets for the Preliminary Plan (Exhibit J), Existing Conditions (Exhibit K), Tree Tables (Exhibit L), and the Master Street and Utility Plan (Exhibit M). These sheets include the following changes:

        a) The zoning designation proposed for Lot 5 has been modified from R-3 to a combination of R-2 and R-1. With this change the maximum allowed density on this lot is reduced by seven dwelling units from 24 units to 17 units.
        b) A 20-foot setback line is shown on all lots adjacent to Highway 26, Dubarko Road, and Street B.
        c) A 40 foot by 40 foot easement is shown at the Northeast corner of Lot 7 to accommodate a future traffic signal.
        d) The stormwater system is redesigned to eliminate the need for a stormwater easement and utility line along the west property line of Lots 1, 2, and 4. This modification to the stormwater system allows for five existing trees along the west lot line of the subdivision to be retained.
        e) An additional public stormwater facility has been added as Tract C to the west of Lot 5. New flow control and water quality manholes will also be installed to discharge stormwater into the existing storm system in Dubarko Road from this facility.
        f) The alignment of "Street B" is modified to provide a 300-foot centerline radius for this street per City of Sandy requirements.
        g) An additional Storm and Sanitary manhole are added in "Street B" to accommodate the new street geometry for this street.
        h) A meandering walkway is shown along the east side of the proposed park.
        i) Five additional trees located on Lots 2 and 4 are proposed to be retained.

    B. A building footprint plan (Exhibit N) for Lots 1 through 4 is included and details that each lot can accommodate a dwelling.

    C. A Revised Arborist Report (Exhibit O) is included detailing five additional retention trees on Lots 2 and 4. Retention of these trees was determined possible with the removal of the stormwater utility line.

D. A Tree Removal Plan (Exhibit P) is included to describe how tree removal adjacent to the proposed tree preservation easement on Lot 7 will be accomplished.

E. A Screening Concept Plan (Exhibit Q) is included detailing additional landscape plantings along the west property line of Lots 1, 2, and 4 and along Tracts B and C that are intended to partially screen this area of the proposed development from existing residences to the west.

F. A Revised Traffic Analysis (Exhibit R) is included to address ODOT comments.

10. While this proposal will undoubtfully increase traffic on Dubarko Road the Average Daily Traffic (ADT) concerns that were recently 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 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 is Fawn Street/Street A. The four proposed single family homes 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. To alleviate potential traffic concerns and to deter trips from heading west on Fawn Street staff recommends that trip distribution is limited from Lot 7. **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.**

11. Notification of the proposed application was mailed to affected agencies on February 14, 2020 and to affected property owners within 500 feet of the subject property on April 17, 2020. A correction to the notice was sent on May 5, 2020.

12. Due to concerns raised by City planning staff as well as by surrounding residents, the applicant requested additional time to modify the application for this proposed development. On May 21, 2020, a notification was mailed to affected property owners stating that the Planning Commission meeting was rescheduled to Monday, July 27, 2020 at 7:00 pm. The City Council meeting was rescheduled to Tuesday, September 8, 2020 at 7:00 pm.

13. After additional discussion, the applicant and City staff agreed to move the public hearing dates once more. A notice was sent on July 23, 2020 informing affected property owners that

the Planning Commission meeting will be held on August 24, 2020 and the City Council meeting on October 19, 2020.

14. A legal notice was submitted to the newspaper on August 5, 2020 to be published on August 12, 2020 informing residents of the public hearings.

15. During the Planning Commission meeting on August 24, 2020 the Commission granted a continuance of the public hearing. An additional Planning Commission hearing was scheduled for October 26, 2020.

16. On October 26, 2020 the Planning Commission reconvened to continue the public hearing for Bull Run Terrace. After hearing additional input from staff, the applicant, and the public the Planning Commission made the following motion:

    Motion: Motion to recommend to the City Council approval of the application per the staff report, with an additional condition of approval to implement a trip cap per the transportation analysis.
    Moved By: Commissioner Mobley
    Seconded By: Commissioner Maclean-Wenzel
    Yes votes: Carlton, Lesowski, Maclean-Wenzel, Logan, Mobley and Mayton
    No votes: None
    Abstentions: None

17. Agency comments were received from the City Transportation Engineer, City Engineer, Sandy Transit, Public Works, ODOT, Sandy Fire District No. 72, and PGE. Revised comments were received from the City Engineer, ODOT, and the City Transportation Engineer (Exhibits, EEEE, FFFF, and GGGG).

18. At publication of this staff report 59 written public comments were received. The main concerns expressed by residents include the following:

    A. The loss of trees, thus lowering the aesthetic quality of the area as well as privacy for existing homes.
    B. The capacity of the police to effectively patrol multi-family dwelling areas.
    C. The possibility of criminal activity at multi-family dwelling areas.
    D. Being previously told that the land would not be developed as residential.
    E. Acres of commercial land use being put into a deficit.
    F. Concerns about effects of multi-family housing on property values.
    G. Requests for developers to pay the full cost of development-related infrastructure improvements.
    H. The development not being aligned with the city's Comprehensive Plan.
    I. Concerns about the zoning change not meeting the intent of SDC Chapter 17.26.

19. Staff is sympathetic to all concerns raised by the public but does not know of any research which shows that an increase in multi-family housing decreases property values for single family homes. There is certainly nothing within the Sandy municipal code which relates

multi-family housing and property values, nor is there a way to evaluate this. Furthermore, 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 5.01 acres of R-2 designated land.

17.24 – Comprehensive Plan Amendment Procedures

20. Chapter 17.24, Comprehensive Plan Amendment Procedures, contains review criteria for Comprehensive Plan amendments. The comprehensive plan map change and 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). The Comprehensive Plan states that area and density increase within a village may be increased or decreased up to 20 percent. Changes greater than 20 percent will require a Plan Map amendment. The applicant's analysis shows that the maximum residential density with the existing zoning designations on the R-2 and R-1 lands is 101 dwelling units. The applicant's analysis shows that the maximum residential density with the proposed zoning designations on the R-3, R-2, and R-1 lands is 152 dwelling units. It should be noted that this doesn't include the potential dwelling units on the C-3 land. Therefore, the potential increase in residential density is 38.2 percent which exceeds the threshold as defined in the comprehensive plan. Therefore, a Plan Map amendment is required.

21. Section 17.24.70 (A) specifies the change being proposed is the best means of meeting the identified public need. This proposal achieves some major goals consistent with long range planning objectives in the City of Sandy, including but not limited to the following:
    A. Extending Dubarko Road to intersect with Highway 26 consistent with the Transportation System Plan that was adopted in 2011;
    B. Installing Street B to the south consistent with the Transportation System Plan that was adopted in 2011;
    C. Extending Fawn Street to the east;
    D. Expanding the Deer Pointe park consistent with the goals of the Parks and Trails Advisory Board and the current revisions that are being considered for the Parks and Trails Master Plan;
    E. Creating available commercial land in the C-3 zoning district consistent with the 2040 Plan that was created in 1997;
    F. Fulfilling housing needs as defined in the Urbanization Study that was adopted in 2015; and,
    G. Providing a mixture of housing types consistent with the goals of the 2040 Plan that was created in 1997.

22. The City Council adopted an updated Urbanization Study in February 2015 (Ordinance 2015-01). This study projected the land needs for the Urban Growth Boundary to the year 2034 and concluded there is expected to be a surplus of 13.9 acres of high density residential land and a deficit of 51.8 acres of commercial land for the planning period. The proposed change

would increase the commercial land supply by 0.77 acres and reduce the residential land supply by the same amount.

23. The applicant's original proposed modifications would have resulted in the following:

    Commercial = deficit of 1.71 acres (previously a surplus of 1.13 acres)
    Low Density Residential = surplus of 11.74 acres (previously a surplus of 19.2 acres)
    Medium Density Residential = surplus of 12.09 (previously a surplus of 17.1 acres)
    High Density Residential = surplus of 23.60 acres (previously a surplus of 12.6 acres)
    Industrial is not applicable to this application

24. Because the original proposal would have resulted in a deficit of the 20-year supply of commercial lands and created a Goal 9 violation, the applicant revised their proposal to include commercial land. Additionally, the applicant further revised their application to include R-2 land.

25. The applicant's revised proposal will result in the following:

    Commercial = surplus of 1.90 acres (previously a surplus of 1.13 acres)
    Low Density Residential = surplus of 11.74 acres (previously a surplus of 19.2 acres)
    Medium Density Residential = surplus of 13.32 (previously a surplus of 17.1 acres)
    High Density Residential = surplus of 19.28 acres (previously a surplus of 12.6 acres)
    Industrial is not applicable to this application

    The applicant's surplus numbers on page 11 of their narrative are slightly different, but the above numbers are the correct numbers based on recent comprehensive plan map amendments.

26. Section 17.24.70(B) requires the change to conform to all applicable Statewide Planning Goals.

    Goal 1: Citizen Involvement
    The application is being reviewed through a Type IV process that requires at least two public hearings. A public notice was sent to adjoining property owners, a legal notice published in the Sandy Post, and a notice of the proposal was sent to the Department of Land Conservation and Development. The Planning Commission reviewed the application at a public hearing on August 24, 2020 and continued the hearing to October 26, 2020. On October 26, 2020 the Planning Commission made a recommendation to approve the request. On November 30, 2020 the City Council will hold a public hearing to most likely make a decision 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 G). 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. That said, staff finds that to adequately protect the required retention trees on Lot 7 the protection area shall be consistent with Chapter 17.92. **The applicant shall install tree protection fencing at the critical root zone of 1 foot per 1 inch DBH to protect the 64 retention trees 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 up to 1.426 acres of parkland to the City. 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 current revisions that are being considered for the Parks Master Plan. Staff finds that parkland dedication is preferable so long as the development to the east of the park is complementary to the parkland. As explained below, 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 or east of the parkland, but instead is proposing future commercial development. The applicant's narrative states, "in order to address the spirit of the requirement in this section, the applicant proposes constructing a widened sidewalk along the eastern park frontage adjacent to Lot 7". 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 commercial development (albeit mixed use or traditional commercial) having active

storefronts or patios 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. Additionally, this kind of "active frontage" creates pedestrian interest and engagement. **Staff recommends that the design review approval for Lot 7 shall be conditioned to incorporate storefronts, patios 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 M) 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. **Staff recommends that the applicant 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. Staff also recommends that the design review approval for Lot 7 incorporate a landscape buffer that provides visibility between Lot 7 and the parkland but provides a visually attractive separation.**

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 revised 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 modifications to the comprehensive plan increases the potential diversity in housing types by providing additional multi-family housing.

Goal 11: Public Facilities and Services
Not Applicable

Goal 12: Transportation
The applicant contracted with a Traffic Engineer to prepare a Traffic Impact Study (Exhibit F). With development of this project, Dubarko Road will be extended through the property to connect with Highway 26. The submitted traffic study evaluated five existing intersections to determine if they are expected to operate within capacity under year 2021 traffic conditions either with or without the addition of site trips from the proposed development. The study did not identify any required mitigation. According to the traffic study, the proposed development would produce 71 peak AM trips, 86 peak PM trips, and 1,114 total daily trips. The proposed zone change is projected to result in a significant change to traffic volumes as measured under the "reasonable worst case" development scenarios and therefore will have a significant effect on operation of area roadways and intersections at the planning horizon as defined by Oregon's Transportation Planning Rule. Accordingly, some form of mitigation is necessary to meet

the requirements of Oregon's TPR. The City Transportation Engineer (Exhibits AA and GGGG) states that the development will implement a key project in the city's TSP, namely Dubarko Road. 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.** ODOT states (Exhibit FFFF), "The TIS has identified that 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. The study 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. ODOT is supportive of the proposed trip cap." The City Transportation Engineer (Exhibit GGGG) 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.**

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 shown in Finding 21, 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.

17.26 – Zoning District Amendments

27. The applicant is proposing a change in zoning districts as shown in the following table:

Zoning District	Existing Acres	Proposed Acres
R-1	8.05	0.59
R-2	5.01	1.23
R-3	0.00	6.50
C-3	2.84	3.61

28. Chapter 17.26 sets forth review criteria and procedural requirements for quasi-judicial and legislative zoning map amendments. The applicant is requesting a quasi-judicial zoning map amendment to modify the zoning district boundaries for the site.

29. Section 17.26.40 outlines the procedures for a quasi-judicial zoning map amendment.

30. 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 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.

31. 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.

32. 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.

17.30 – Zoning Districts

33. The total gross acreage for the entire property is 15.91 acres. After removal of the right-of-way and proposed parkland tract, the net site area (NSA) for the subject property is reduced to 11.59 net acres with four zoning districts. The area proposed to be zoned R-1 contains 0.59 net acres. The area proposed to be zoned R-2 contains 1.23 net acres. The area proposed to be zoned R-3 contains 6.50 net acres. The area proposed to be zoned C-3 contains 3.61 net acres.

34. For the area zoned R-1, a minimum of 5 and a maximum of 8 units per acre are allowed. 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. The minimum density for the subject area is .59 net acres x 5 units/net acre = 2.95 rounded down to 2 units. The maximum density for the subject area is .59 net acres x 8 units/net acre = 4.72 rounded up to 5 units. The applicant is proposing 4 units which is within the density range.

35. For the area zoned R-2, a minimum of 8 and a maximum of 14 units per acre are allowed. The minimum density for the subject area is 1.23 net acres x 8 units/net acre = 9.84 rounded up to 10 units. The maximum density for the subject area is 1.23 net acres x 14 units/net acre = 17.22 rounded down to 17 units. The applicant has not identified the exact number of units which will be built in the subject area. **This will be reviewed in a future design review process.**

36. For the area zoned R-3, a minimum of 10 and a maximum of 20 units per acre are allowed. The minimum density for the subject area is 6.5 net acres x 10 units/acre = 65 units. The maximum density for the subject area is 6.5 net acres x 20 units/acre = 130 units. The applicant has not identified the exact number of units which will be built in the subject area. **This will be reviewed in a future design review process.**

17.32 – Parks & Open Space (POS)

37. The applicant proposes dedicating some parkland and zoning the land as Parks and Open Space (POS).

38. Section 17.32.10 contains the permitted uses in the POS zoning district. The applicant proposes a park dedication consistent with parkland in the Parks Master Plan per Section 17.32.10 (A)(1).

17.36 – Low Density Residential (R-1)

39. The applicant proposes constructing four single-family dwellings as permitted in this zoning district. As shown in paragraph 19, the applicant is proposing an appropriate number of units given density requirements.

40. Section 17.36.30 contains the design standards for this zone. As shown on Sheet C2 of the plan set (Exhibit C), all lots in the proposed subdivision contain at least 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 this road. Access to this lot will be across an access easement on Lot 3. The proposed building footprints shown on Sheet C2 indicate that all lots are capable of complying with applicable setbacks in the zone. The details of these development standards will be reviewed with the submittal of building permits.

41. Section 17.36.40(A) requires that water service be connected to all dwellings in the proposed subdivision. Section 17.36.40(B) requires that all proposed dwelling units be connected to sanitary service if currently within 200 feet from the site, which it is. Section 17.36.40(C) requires that the location of any real improvements to the property must provide for a future street network to be developed. Section 17.36.40(D) requires that all dwelling units must have frontage or approved access to public streets. The applicant proposes to meet all of these requirements.

42. 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.

43. Staff questioned the building potential of Lots 3 and 4 on the original applicant submission. Since the previous hearing, the applicant provided more information about these lots' buildable areas and staff's concerns have been satisfied.

17.38 – Medium Density Residential (R-2)

44. The applicant is proposing 1.23 net acres of R-2 land. As noted in Finding 33, the applicant will be allowed to develop between 10 and 17 dwelling units on the subject property.

45. **The future design review application will include a review of development standards and requirements.**

17.40 – High Density Residential (R-3)

46. The applicant is proposing 6.5 net acres of R-3 land on one lot. As noted in Finding 34, the applicant will be allowed to develop between 65 and 130 dwelling units on the subject property. The exact number of units in this zoning district will be determined with a future design review application.

47. **The future design review application will include a review of development standards and requirements.**

17.46 – Village Commercial (C-3)

48. The applicant proposes 3.61 net acres of C-3 land. This is an increase in commercial land by 0.77 acres. While the C-3 zoning district will have to contain some commercial development there is a decent chance the C-3 land will also contain some residential dwelling units. The exact number of potential residential units is not known at this time. If residential units are proposed on the C-3 land the dwelling units will be assessed in a future design review.

49. **Any future development on the land zoned C-3 will require a design review in accordance with the development standards found in Section 17.46.30 and the Sandy Municipal Code.**

17.54 – Specific Area Plan Overlay

50. 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."

51. 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".

52. The applicant proposes shifting of zoning district boundaries 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. That said, staff finds that to adequately protect the required retention trees on Lot 7 the protection area shall be consistent with Chapter 17.92. **The applicant shall install tree protection fencing at the critical root zone of 1 foot per 1 inch DBH to protect the 64 retention trees on the subject property.** Additional 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 the plan set shall be modified to detail additional right-of-way to accommodate the swales.**

53. 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 and zone map change proposes to add High Density Residential (R-3) and Parks and Open Space (POS), increase Village Commercial (C-3), remove Medium Density Residential (R-2), and reduce Low Density Residential (R-1). The Comprehensive Plan states that area and density increase within a village may be increased or decreased up to 20 percent. Changes greater than 20 percent will require a Plan Map amendment. The applicant's analysis shows that the maximum residential density with the existing zoning designations on the R-2 and R-1 lands is 101 dwelling units. The applicant's analysis shows that the maximum residential density with the proposed zoning designations on the R-3 and R-1 lands is 163 dwelling units. Therefore, the potential increase in residential density is 61.9 percent which exceeds the threshold as defined in the comprehensive plan.

54. 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.

55. 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.

56. 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. The applicant's narrative elaborates on the objectives of their proposal and the desire to include a few single family dwellings, multi-family dwellings, and village commercial development. The narrative also elaborates on dedications, including 1.43 acres of parkland.

    B. Site and Context. A map of the site and existing context shall identify the project area. The applicant submitted a 10-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, with the exception of Lot 7, which is the Village Commercial lot. The development of 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 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, Public Works Director, ODOT, Fire Marshal and the Transit Director 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 proposal includes increasing the amount of available commercial lands by 0.77 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.

17.56 – Hillside Development

57. The applicant submitted a Geotechnical and Slope Stability Investigation (Exhibit I) 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 I) shall be conditions for development.** The Public Works Director

stated the following: "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.**

17.74 –Accessory Development

58. 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.**

17.80 – Additional Setbacks on Collector and Arterial Streets

59. 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 J) details the 20-foot setbacks to Highway 26, Dubarko Road, and Street B.

17.82 – Special Setbacks on Transit Streets

60. 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. 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 Road and a new local street. **The dwellings on Lots 3 and 4 shall be designed to meet all of the requirements as specified in Chapter 17.82 and will be assessed in a future design review.**

61. The applicant proposes that all single-family units will meet the requirements of Section 17.82.20(B), which requires that dwellings shall have a primary entrance connecting directly between the street and building interior and outlines requirements for the pedestrian route. **The adherence to this code section for the future multi-family units will be determined in a future design review process.**

62. The applicant proposes that all single-family units will meet the requirements of Section 17.82.20(C), which 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 adherence to this code section for the future multi-family units will be determined in a future design review process.**

63. 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 will be determined in a future design review process.**

17.84 – Improvements Required with Development

64. Section17.84.20(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.**

65. 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.

66. As required by Section 17.84.39(A)(2), 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 planter strips as required. As required by Section 17.84.39(A)(4), the applicant intends to construct all sidewalk improvements as required by this section.

67. No exceptions or modifications listed in Section 17.84.39(A)(3) are requested with the application.

68. In relation to Sections 17.84.39(B), 17.84.39(C), 17.84.39(D), and 17.84.39(E), no pedestrian or bicycle facilities other than sidewalks and on-street bicycle lanes have been identified or proposed in the application.

69. Section 17.84.40(A) requires that the developer construct adequate public transit facilities. **The proposed development will require 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 1 and Lot 5. Engineering specifications are available from the Transit Department.**

70. Section 17.84.50 outlines the requirements for providing a traffic study. The applicant included a Traffic Impact Study with the application (Exhibits F and R). The study did identify some required mitigation. According to the revised traffic study, the proposed residential development (not including the commercial lot) would produce 71 peak AM trips, 86 peak PM trips, and 1,114 total daily trips. The proposed zone change is projected to potentially result in a significant increase in traffic volumes as measured under the "reasonable worst case" development scenarios and therefore may have a significant effect on operation of area roadways and intersections at the planning horizon as defined by

Oregon's Transportation Planning Rule. Accordingly, some form of mitigation is necessary to meet the requirements of Oregon's TPR. The City Transportation Engineer (Exhibit M) states that the development will implement a key project in the city's TSP, namely Dubarko Road. 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.** ODOT states (Exhibit FFFF), "The TIS has identified that 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. The study 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. ODOT is supportive of the proposed trip cap." The City Transportation Engineer (Exhibit FFFF) 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.**

71. The proposed street and utility plan depicts Dubarko Road between its current eastern terminus and proposed Street A with a 76 ft. wide right-of-way consisting of a 0.5 foot monumentation strip, a six-foot sidewalk, a five-foot planter strip, a 0.5 foot curb, a five foot bike lane, a 17-foot travel lane and half of an 8 foot median (i.e. 4 feet) for a total half section equaling 38 feet and a full street section equaling 76 feet. 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 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.**

72. 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. The City Transportation Engineer (Exhibit M) states that a traffic signal at Dubarko Road and Highway 26 will be needed in the near future based on future development but did not recommend a traffic signal at this time. The revised Preliminary Plat (Exhibit J) details a 40 foot by 40 foot traffic signal easement. 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. 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).

73. 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). **The alignment of the intersection of Street B and Dubarko Road shall be revised to provide the minimum 100 feet of tangent section to comply with the Development Code or as otherwise approved by the City Engineer.**

74. 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.**

75. Dubarko Road will contain a dedicate 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 Public Works Director 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.

76. The proposed development does not include any long straight street segments or cul-de-sac streets and is thus not required to follow the standards in Section 17.84.50(C).

77. Section 17.84.50(D) requires that development sites shall be provided with access from a public street improved to City standards. 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. All new streets are proposed as full street improvements with the exception of improvements along Highway 26. No off-site improvements have been identified or are warranted with the construction of this subdivision. All streets are proposed as full streets; with no three-quarter streets being proposed.

78. 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.**

79. 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.

80. Proposed streets meet the requirements of 17.94.50(H). The future street plan (Exhibit C, Sheet 1) 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). No private streets are proposed in the development.

81. Section 17.84.60 outlines the requirements of public facility extensions. The applicant submitted a utility plan (Exhibit C, Sheet 5) 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.

82. Franchise utilities will be provided to all lots within the proposed subdivision as required in Section 17.84.80. The location of these utilities will be identified on construction plans and installed or guaranteed prior to final plat approval. The applicant does not anticipate extending franchise utilities beyond the site. All franchise utilities other than streetlights will be installed underground. The developer will make all necessary arrangements with franchise utility providers. The developer will install underground conduit for street lighting.

83. 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.

84. Section 17.84.100 outlines the requirements for mail delivery facilities. **The location and type of mail delivery facilities shall be coordinated with the City Engineer and the Post Office as part of the construction plan process.**

85. 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.

86. The intersection of Dubarko Road and Highway 26 requires a grant of access from ODOT. **Prior to final plat approval the applicant shall obtain a grant of access or other necessary approval from ODOT for access to Highway 26 at Dubarko Road.**

87. The City Transportation Engineer (Exhibit M) stated that conditions of approval should be included requiring the development comply with the standards and procedures specified by ODOT. He went on to say that ODOT requirements and standards associated with frontage improvements where the development abuts Highway 26 shall be made conditions of approval with the development.

17.86 – Parkland and Open Space

88. The applicant intends to dedicate parkland as outlined in the requirements of Section 17.86.

89. 17.86.10(2) contains the calculation requirements for parkland dedication. The formula is acres = proposed units x (persons/unit) x 0.0043. For the four single family homes, acres = 4 x 3 x 0.0043 = 0.05 acres. For the maximum development of 147 multifamily units, acres = 147 x 2 x 0.0043 = 1.26 acres. Combined, this totals 1.31 acres. The applicant proposes to dedicate 1.426 acres of parkland and is thus in compliance with this requirement.

90. If the applicant proposes multifamily dwellings as part of the development of Lot 7 which is proposed to be zoned C-3 the applicant is eligible for parks fee in-lieu credit up to 0.11 acres (the rounded difference between the required amount of parkland dedication and the proposed amount of parkland dedication). **The applicant can propose up to 13 multifamily units (13 x 2 x 0.0043 = 0.11 acres) prior to incurring parks fee in-lieu charges. Anything beyond 13 multifamily units on Lot 7 will incur parks fee in-lieu fees per the calculations as defined in the Sandy Development Code. However, if the applicant does not propose any multifamily units on Lot 7 the applicant will not be owed a monetary credit.**

91. 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 or east of the parkland, but instead are proposing future commercial development. The applicant's narrative states, "in order to address the spirit of the requirement of this requirement in this section, the applicant proposes constructing a widened sidewalk along the eastern park frontage adjacent to Lot 7". 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 commercial development (albeit mixed use or traditional commercial) having active storefronts or patios 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. **Staff recommends that the design review approval for Lot 7 shall**

be conditioned to incorporate storefronts, patios 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 M) 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. **Staff recommends that the applicant 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. Staff also recommends that the design review approval for Lot 7 incorporate a landscape buffer that provides visibility between Lot 7 and the parkland but provides a visually attractive separation.**

92. On June 10, 2020, the applicant brought the parkland dedication proposal to the Sandy Parks and Trails Advisory Board. At the meeting, the Board verbally agreed to provide the applicant SDC credits in exchange for development of the park.

93. The Parks and Trail Advisory Board provided a set of recommendations (exhibit NNNN) which contains a recommendation for the City to pursue a development agreement with the developer to include the following: Allow the developer to make initial improvements to the newly configured Deer Pointe Park in place 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 prior to final plat approval or as otherwise established in a development agreement.**

94. 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 applicant shall also provide a Phase I Environmental Assessment.**

95. 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.**

17.92 – Landscaping and Screening

96. Section 17.92.10 contains general provisions for landscaping. As required by Section 17.92.10 (C), trees over 25-inches circumference measured at a height of 4.5 feet above grade are considered significant and should be preserved to the greatest extent practicable and integrated into the design of a development. A 25-inch circumference tree measured at 4.5 feet above grade has roughly an eight-inch diameter at breast height (DBH). Based on the Planning Commission interpretation from May 15, 2019, Subsection 17.92.10(C) does not apply to residential subdivisions. Tree protection fencing and tree retention 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.

97. Section 17.92.20 lists the requirements for minimum landscaping improvements. **The details of this section will be considered with submittal of a design review application for the proposed multi-family units and commercial property.**

98. 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 D, Sheet 7) does not show the distance between trees. **The applicant shall update the Street Tree Plan to show the distance between trees, and this distance shall be 30 feet on center.**

    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 either aerate the planter strip soil at the subdivision stage and install fencing around the planter strips to protect the soil from compaction or shall aerate the soil at the individual home construction phase.**

    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).

99. 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.**

100. 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 specifies to City staff for review and approval concurrent with construction plan review.**

101. 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.**

102. 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 Q). The applicant is proposing to retain five additional conifers (Exhibit O), 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 Q) along Lots 1, 2, 4, and Tracts B and C. Deciduous trees shall be at least 1.5 inches at planting and the cedars shall be at least 6 to 8 feet in height at planting.**

103. 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.**

17.98 – Parking, Loading, and Access Requirements

104. 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 7.

105. Section 17.98.20(A) requires that each single family dwelling unit is required to provide at least two off-street parking spaces. **Compliance with this requirement 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.**

106. Section 17.98.60 has specifications for parking lot design and size of parking spaces. No lots are proposed to gain access from an arterial or collector street (17.98.80).

107. Section 17.98.90 requires that all streets proposed will be improved to city standards.

108. 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. Staff has concerns with the proposed driveway on Lot 7 as it's within 150 feet of the intersection of Dubarko Road and Highway 26. **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.**

109. Section 17.98.110 outlines the requirements for vision clearance. **The requirements of this section will 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.**

110. 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.**

111. 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 7 shows that 20 on-street parking spaces have been identified in compliance with this standard. No parking courts are proposed by the applicant.

17.100 – Land Division

112. 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.**

113. Pre-application conferences were held with the City on January 10, 2018, June 12, 2018, and October 10, 2018 per 17.100.60(A).

114. As required by Section 17.100.60(E), the proposed subdivision is designed to be consistent with the density, setback, design standards, dimensional standards in the R-1 zoning district. **The details of the development in the R-3 and R-2 districts will be addressed with a future design review application.** As illustrated in Exhibit C, Sheet 1, the proposed street system is consistent with the City's Transportation System Plan and Comprehensive Plan. The City has indicated that all public facilities have capacity to serve the proposed subdivision. All improvements in the proposed development are designed in compliance with City standards. The applicant proposes developing the subdivision in a single phase.

115. Section 17.100.60(E)(1) requires subdivisions to be consistent with the density, setback, and dimensional standards of the base zoning district, unless modified by a Planned Development approval. The application for the subdivision is being processed through a Type IV procedure. The proposal is consistent with density and other dimensional standards of the base zoning district.

116. Section 17.100.60(E)(2) requires subdivisions to be consistent with the design standards set forth in this chapter. Consistency with design standards in this chapter are discussed under each subsection below. Conditions of approval can be adopted where necessary to bring the proposal into compliance with applicable standards.

117. 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 and extending Street B to the south.

118. Section 17.100.60(E)(4) requires that adequate public facilities are available or can be provided to serve the proposed subdivision. All public utilities including water, sewer and stormwater are available or will be constructed by the applicant to serve the subdivision. The applicant also intends to dedicate public parkland, the calculation of which can be found in the review of Chapter 17.86 in this document.

119. Section 17.100.60(E)(5) requires all proposed improvements to meet City standards through the completion of conditions as listed within this final order and as detailed within these findings. The detailed review of proposed improvements is contained in this report. Staff has identified a few aspects of the proposed subdivision improvements requiring additional information or modification by the applicant, but conditions of approval can be adopted to bring the proposal into compliance with City standards. In order to meet the standards as defined in the Sandy Development Code the applicant shall submit items for staff to analyze prior to earthwork, grading, excavation, or construction.

120. 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. That said, the applicant is proposing that the design of the multi family dwellings occurs at a future date.

121. Section 17.100.80 provides standards for denial of a development application due to physical land constraints. The subject site does not contain any physical constraints that would make it unsuitable for the proposed subdivision.

122. The subject property abuts Highway 26 and notification of the proposal was sent to ODOT as required by Section 17.100.90.

123. As required by 17.100.100(A), a traffic impact study prepared in compliance with the City standards was submitted with the application (Exhibit F). With the exception of a revised

striping plan, frontage improvements on the Highway 26 frontage, and applying a trip cap to the subject property, this study does not identify any issues requiring mitigation by the applicant.

124. None of the special traffic generators listed in section 17.100.100(B) are located near the subject site.

125. While 17.100.100(C) calls for a rectangular grid pattern, the proposed street layout is predominantly controlled by the alignment of Dubarko Road that will be extended through the site from the current terminus to connect with Highway 26. The future street plan details Street B extending south consistent with the TSP. The only other street in the subdivision is the extension of Street A into the property. The proposed intersection of Street A and Dubarko Road seems logical and appropriate considering the nearby intersection of Dubarko Road and Highway 26. Staff finds that the proposed street layout represents a logical street pattern.

126. A future street plan in compliance with the requirements of 17.100.100(D) is included in Exhibit C, Sheet 1.

127. Given the requirements in Section 17.100.100(E), the proposed street layout on the subject property is limited because of the alignment of Dubarko Road, Street B, and the location of Fawn Street extended into the property. In addition, because the development type includes two large lot multi family development sites, the street network is further limited. Given these facts, the proposed street layout represents a logical design.

128. 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. **Staff recommends the applicant 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.**

129. 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 J) details a 40 foot by 40 foot traffic signal easement.

130. 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. **Staff recommends the applicant modify the plat to include a vehicular easement on Lot 4 as necessary to accommodate maneuvering for vehicles on Lot 3.**

131. 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.

132. All streets in the proposed subdivision have a minimum curve radius as required by Section 17.100.180(B).

133. 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.

134. 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).

135. 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.

136. 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 29 feet of frontage along a public street therefore meeting the requirements of Section 17.100.220(C).

137. 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).

138. 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 Public Works Director the existing 8-inch diameter water line resides in an easement granted to the City of Sandy recorded at 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 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 Rd. connected to the existing 18-inch water line at the west end of the site and the existing 12-inch line on Highway 26.** Due to the elevation of the site relative to the existing water reservoirs on Vista Loop Drive this line will be a low-pressure, high volume line and will be used for fire protection. The cost difference between a standard diameter water line and the required 18-inch water line is eligible for Water System Development Charge (SDC) credits. The amount of the credit provided will be based on the Water System Construction Cost Credit table in the Water System Development Charge Methodology adopted by City Council motion on September 5, 2017. Section 17.84.60D SMC states: "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)". **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 cost difference between a standard diameter (8 inch) water line and the required 12-inch water line is eligible for Water System Development Charge (SDC) credits. The amount of the credit provided will be based on the Water System Construction Cost Credit table in the Water System Development Charge Methodology adopted by City Council motion on September 5, 2017.

139. 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. According to the Public Works Director the recently adopted Wastewater System Facilities Plan (2019) identified a capacity deficiency in the Southeast pump station and force main as well as several conveyance lines downstream. The City will adopt a Sanitary Sewer SDC surcharge on each Equivalent Residential Unit developed in the basin served by the Southeast pump station. The surcharge amount will be calculated by dividing the estimated cost of the required capacity improvements by the estimated number of dwelling units that can be built in the pump station drainage basin. The surcharge will be collected with each building permit issued in the basin.

140. Section 17.100.250(A) details requirements for stormwater detention and treatment. A public stormwater quality and detention facility is proposed as Tract B to be located north of Lot 1 and south of the Fawn Street extension. This facility has been sized and located to accommodate the water quality and stormwater detention needs of all streets in addition to Lots 1-4. The applicant submitted a revised utility plan (Exhibit M) detailing a second stormwater facility identified as Tract C in the SW corner of the property. The revised utility plan also removed the 15 foot wide public stormwater easement and utilities along the west lot line of Lots 1, 2, and 4. The water quality and detention needs of Lots 5-7 will be accommodated on each of those lots and stormwater from Lots 5 and 6 will be routed to flow through Tract B. After onsite detention and water quality treatment, stormwater from Lot 7 will be piped and connected to the existing storm line in the park. **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).

141. 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.**

142. 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 7.

143. Grass seeding shall be completed as required by Section 17.100.300. The submitted preliminary Grading and Erosion Control Plan (Exhibit C, Sheer 9) provides additional details to address erosion control concerns. A separate Grading and Erosion Control Permit will be required prior to any site grading. Erosion control requirements are defined in greater detail in Chapter 15.44 of this document.

17.102 – Urban Forestry

144. Section 17.102.20 contains information on the applicability of Urban Forestry regulations. An Arborist Report is included as Exhibit G. 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. The inventory is included in Exhibit C, Sheet 4 and the proposed retention trees are shown in Exhibit C, Sheet 3.

145. The property contains 15.91 acres requiring retention of 48 trees, 11 inches and greater DBH (15.91 x 3 = 47.73). The applicant is proposing to retain an additional five trees on Lots 2 and 4 (Tree Nos. 13439, 13440, 13441, 13421, and 13423). The revised submitted plan (Exhibit O) identifies 64 trees that will be retained. All of the trees proposed for retention are conifers, primarily Doug fir, at least 11 inches DBH, and in good condition as identified by the arborist.

146. A majority of the proposed retention trees are located along Highway 26 in Lot 7, which is proposed to be zoned C-3, Village Commercial. As indicated on the Preliminary Plat (Exhibit C, Sheet C-2), the applicant is proposing to place a conservation easement over an area that encompasses the retention trees along Highway 26, including their critical root zones. Staff believes there could be a future conflict between retention trees along the Highway and future commercial property visibility on Lot 7.

147. The Arborist Report (Exhibit G) provides recommendations for protection of retained trees including identification of the recommended tree protection zone for these trees. The requirements of 17.102.50(B) will be complied with prior to any grading or tree removal on the site. **The applicant shall install tree protection fencing at the critical root zone of 1 foot per 1 inch DBH to protect the 64 retention trees on the subject property as well as all trees on adjacent properties. 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) 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. 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.

148. The Tree Preservation Plan (Exhibit C) 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 in a way that does not harm or damage adjacent trees.** The applicant submitted a Tree Removal Plan (Exhibit P) 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. Staff recommends that the applicant not fully remove all the trees adjacent to the retention trees but rather leave snags. **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.**

149. **To ensure protection of the required retention trees, the applicant shall record a tree protection covenant specifying protection of trees on the subject property and limiting removal without submittal of an Arborist's Report and City approval.**

15.30 – Dark Sky

150. 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.**

15.44 – Erosion Control

151. The applicant submitted a Geotechnical Engineering Report (Exhibit I) prepared by GeoPacific Engineering, Inc., dated August 16, 2005. The Public Works Director stated the following: "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.**

152. **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.**

153. 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.**

154. Recent development has sparked unintended rodent issues in surrounding neighborhoods. Prior to development of the site, **the applicant shall have a licensed pest control agent evaluate the site to determine if pest eradication is needed.**

RECOMMENDATION:

The Planning Commission 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 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) Extending Fawn Street to the east;
4) Expanding the Deer Pointe park consistent with the goals of the Parks and Trails Advisory Board and the current revisions that are being considered for the Parks and Trails Master Plan;
5) Creating available commercial land in the C-3 zoning district consistent with the 2040 Plan that was created in 1997;
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.

CONDITIONS:

A. The applicant shall submit a complete set of revised plans to the Planning Division with the following revisions:

1. Fire turnaround easements on Lots 5 and 6 as approved by the Sandy Fire District Fire Marshal.

2. Detail the alignment of the intersection of Street B and Dubarko Road to provide the minimum 100 feet of tangent section or as otherwise approved by the City Engineer.

3. Modify the plat to include a vehicular easement on Lot 4 as necessary to accommodate maneuvering for vehicles on Lot 3.

B. 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 is needed.

5. Submit revised plans detailing how the traffic signal easement will impact the tree retention area.

6. Install tree protection fencing at the critical root zone of 1 foot per 1 inch DBH to protect the 64 retention trees on the subject property as well as all trees on adjacent properties. 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) 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. 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. 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.

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.

C. 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 Public Works 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.

3. 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).

4. 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 affect on-street parking spaces.

5. Submit a revised cross-section for the portion of Dubarko Road between the existing terminus and Street A.

6. Specify the locations of street lights on all streets being improved within and adjacent to the subdivision. Street lights shall be full cut-off, shall not exceed 4,150 Kelvins, and

shall conform to the Dark Sky standards of Chapter 15.30. The locations of light fixtures shall be reviewed in detail with construction plans.

7. 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.

8. Submit additional details/confirmation on any proposed retaining walls, including heights meeting code requirements and an architectural finish.

9. 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.

10. Submit a revised utility plan to include broadband fiber locations as detailed by the SandyNet Manager.

11. Call PGE Service Coordination at 503-323-6700 when the developer is ready to start the project.

12. Explore locations for green street swales. If green streets are practicable the plan set shall be modified to detail additional right-of-way to accommodate the swales.

13. 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.

D. 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 plan review, inspection and permit fees as determined by the Public Works Director.

3. Pay addressing fees at $40 for the subdivision plus $5 per lot.

4. Obtain a grant of access or other necessary approval from ODOT for access to Highway 26 at Dubarko Road.

5. 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) 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 1 and Lot 5. Engineering specifications are available from the Transit Department.
c) Replace the existing waterline with an 8 inch diameter water line at a depth approved by the City Engineer.
d) An 18 inch water line in Dubarko Rd. connected to the existing 18 inch water line at the west end of the site and the existing 12 inch line on Highway 26.
e) 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.

6. Clear, grade, and seed the proposed parkland as specified by the City in the construction plans. The applicant shall also provide a Phase I Environmental Assessment. 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.

7. 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 Q) along Lots 1, 2, 4, and Tracts B and C. Deciduous trees shall be at least 1.5 inches at planting and the cedars shall be at least 6 to 8 feet in height at planting.

8. Aerate the planter strips to a depth of 3 feet prior to planting street trees. The applicant shall either aerate the planter strip soil at the subdivision stage and install fencing around the planter strips to protect the soil from compaction or shall aerate the soil at the individual home construction phase.

9. Record a tree protection covenant specifying protection of trees on the subject property and limiting removal without submittal of an Arborist's Report and City approval.

10. Submit a true and exact reproducible copy (Mylar) of the Final Plat for final review and signature.

E. Conditions related to future development of the lots:

1. Design review approval for Lot 7 shall incorporate storefronts, patios and usable windows facing the parkland.

2. Design review approval for Lot 7 shall incorporate a landscape buffer that provides visibility between Lot 7 and the parkland but provides a visually attractive separation.

3. Any future design review application on Lot 5 will include a review of development standards (17.38.30), minimum requirements (17.38.40) and additional requirements (17.38.50) for R-2 zoned development.

4. Any future design review application on Lot 6 will include a review of development standards (17.40.30), minimum requirements (17.40.40) and additional requirements (17.40.50) for R-3 zoned development.

5. Any future development on the land zoned C-3 (Lot 7) will require a design review in accordance to the development standards found in Section 17.46.30 and the Sandy Municipal Code.

6. If the applicant proposes multifamily dwellings as part of the development of Lot 7 which is proposed to be zoned C-3 the applicant is eligible for parks fee in-lieu credit up to 0.11 acres (the rounded difference between the required amount of parkland dedication and the proposed amount of parkland dedication). The applicant can propose up to 13 multifamily units (13 x 2 x 0.0043 = 0.11 acres) prior to incurring parks fee in-lieu charges. Anything beyond 13 multifamily units on Lot 7 will incur parks fee in-lieu fees per the calculations as defined in the Sandy Development Code. However, if the applicant does not propose any multifamily units on Lot 7 the applicant will not be owed a monetary credit.

7. The dwellings on Lots 3 and 4 shall be designed to meet all of the requirements as specified in Chapter 17.82 and will be assessed in a future design review.

8. Orientation of the future multi-family units that have frontage on both Highway 26 and Dubarko Road will be determined in a future design review process.

9. 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.

10. 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.

11. 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.

F. General Conditions of Approval:

1. The Final Plat shall be recorded as detailed in Section 17.100.60 (I).

2. 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.

3. The subject property shall be subject to a trip cap of 340 PM net new peak hour trips.

4. If entry signs are desired, the applicant shall submit a detailed plan showing the location of such signage and a sign permit application.

5. All parking, driveway and maneuvering areas shall be constructed of asphalt, concrete, or other approved material.

6. 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.

7. 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).

8. All recommendations in Section 6 of the submitted Geotechnical and Slope Stability Investigation (Exhibit I) shall be conditions for development.

9. All utilities shall be installed underground and in conformance with City standards. The applicant shall install utilities underground with individual service to each lot.

10. 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.

11. All public utility installations shall conform to the City's facilities master plans.

12. The intersection of Highway 26 and Dubarko Road shall be constructed as a full-access intersection in compliance with the TSP.

13. As required by Section 17.98.130, all parking, driveway and maneuvering areas shall be constructed of asphalt, concrete, or other approved material.

14. 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.

15. All new public sanitary sewer and waterlines shall be a minimum of 8 inches in diameter.

16. 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.

17. 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).

18. If the applicant chooses to postpone street tree and/or landscaping installation, the applicant shall post a performance bond equal to 120 percent of the cost of the 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.

19. 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).

20. 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.

21. 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.

22. Successors-in-interest of the applicant shall comply with site development requirements prior to the issuance of building permits.

23. 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.

24. 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.

25. Comply with all other conditions or regulations imposed by the Sandy Fire District or state and federal agencies. Compliance is made a part of this approval and any violations of these conditions and/or regulations may result in the review of this approval and/or revocation of approval.

26. 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.