

Exhibit B



THE PAD
MULTI-FAMILY RESIDENTIAL DEVELOPMENT
Design Review Application

JULY 16, 2021

PREPARED FOR:
MILES ROSTH
SITE ADDRESS:
17650 Meinig Avenue
Sandy, OR 97055

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SECTION I – INTRODUCTION TO DEVELOPMENT PROJECT

General Information

Applicant:	Steven Maguire, AIA AXIS Design Group Architecture & Engineering, Inc. 11104 S.E. Stark Street Portland, OR 97216
Phone:	503-284-0988
Email:	stevenm@axisdesigngroup.com
Owner:	Miles Rusth P.O. Box 19914 Portland, OR 97280
Phone:	503-702-2151
Project Name:	The Pad 17650 Meinig Avenue Sandy, OR 97055
Application Type:	Type II Design Review Type II Tree Removal Type II Adjustment Type II Variance
Parcel Number:	00663758
PropertyTax ID:	24E13DB01500
County:	Clackamas
Site Size:	25,869 S.F. (0.59 Acres)
Use:	Residential (Existing – No Change)
Zoning:	R3 – High Density Residential

SECTION II
EXHIBIT A – PROJECT NARRATIVE

**PROJECT NARRATIVE
FOR
THE PAD
TOWNHOME APARTMENTS**



July 2021

I. General Project Description

Miles Rusth is seeking design review approval to construct a 10-unit multi-family townhome project. The project site is located at 17650 Meinig Avenue in Sandy and is legally known as 24E 13DB tax lot 1500.

The entire property contains approximately 0.59 acres and is vacant. The property is zoned R-3, High Density Residential. The property borders Meinig Park along its southern boundary, Meinig Park and a city-owned parking lot along its eastern boundary, an access drive and the Veteran's Memorial along its northern boundary, and Highway 211 along its western boundary. The topography of the site slopes from north to south with about 32 feet of elevation difference between the northwest corner of the site and the southeast corner.

The applicant proposes constructing 10 townhouse style multi-family units in two buildings: Building A located in the northern portion of the site will contain four units and Building B located in the southern portion of the site includes six units. The development site will be accessed by a single driveway from Highway 211 and frontage improvements along this street will be completed as part of the project. The enclosed civil and architectural plans illustrate the details of the proposed project.

II. Application Approval Requests

The applicant requests the following approvals with this application:

- Type II design review per the requirements of Section 17.90.160;
- Type II tree removal;
- Type II adjustment to Section 17.90.160(D);
- Type II variance to the front yard setback required by Section 17.80.20

III. Items Submitted With This Application

- Land Use Application
- Notification List and Mailing Labels
- Exhibit A - Project Narrative (Tracy Brown Planning Consultants, LLC)
- Exhibit B - Civil Plans (Kurahashi and Associates)
 - Sheet C1 - Existing Conditions
 - Sheet C2 - Civil Site Design
 - Sheet C3 - Utility Plan
 - Sheet C4 - Grading and Erosion Control Plan
 - Sheet C5 - Tree Preservation Plan
- Exhibit C - Landscape Plans
 - Sheet L1.0 - Planting Plan
- Exhibit D - Architectural Plans (Axis Design Group)
 - Sheet A101 - Site Plan - Existing/Demo
 - Sheet A102 - Site Plan - Proposed
 - Sheet A201 - Floor Plans
 - Sheet A221 - Exterior Elevations Building A

- Sheet A222 - Exterior Elevations Building B
- Exhibit E - Lighting Plan/Photometric Analysis
- Exhibit F - Materials Selections
 - Paint colors, siding, and roofing
- Exhibit G - Preliminary Stormwater Report (Kurahashi and Associates)
- Exhibit H - Traffic Impact Study (Ard Engineering)
- Exhibit I - Initial Arborist Report (Portland Tree Consultancy)

IV. Review of Applicable Approval Criteria

Development applications are required to meet development standards set forth in the Sandy Development Code, codified as Title 17 of the Municipal Code. The following section addresses all applicable review criteria. Pertinent code provisions are cited below followed by a response in *italics* identifying how the proposal complies with this standard. The following code chapters have been reviewed in this narrative:

<u>Chapter</u>	<u>Title</u>
17.30	Zoning District
17.40	High Density Residential (R-3)
17.60	Flood and Slope Hazard Overlay
17.66	Adjustments & Variances
17.80	Additional Setbacks on Collector and Arterial Streets
17.84	Improvements Required with Development
17.86	Parkland and Open Space
17.90	Design Standards
17.92	Landscaping and Screening
17.98	Parking, Loading, and Access Requirements
17.102	Urban Forestry
15.30	Dark Sky Ordinance

17.30.00 ZONING DISTRICT DESIGNATIONS

Response: The subject property is identified on the City of Sandy Zoning Map to be zoned R-3, High Density Residential.

17.30.20 RESIDENTIAL DENSITY CALCULATION PROCEDURE

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

Response: *The applicant proposes a single development site and the proposed development site contains a gross site area of 0.59 acres. The entire property is zoned R-3, High Density Residential. There are no roadway dedications or public tracts, so the net site area is the same as the gross area. The R-3 zone requires a minimum of 10 and allows a maximum of 20 units per net acre. The minimum density is calculated by multiplying the net site area x the required minimum density (0.59 acres x 10 = 5.9 units*

rounded up to 6 units). The maximum density is determined by multiplying the net site area x the maximum density (0.59 x 20 = 11.8 rounded up to 12 units).

As a result of these calculations the density range for the subject property is a minimum of 6 units and a maximum of 12 units. The applicant proposes 10 units which falls within the required density range.

CHAPTER 17.40 - HIGH DENSITY RESIDENTIAL (R-3)

17.34.00 - 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 reviewed above the applicant is proposing 10 units in compliance with the density range required by the R-3 zone for this property.

17.40.10 - PERMITTED USES

A. Primary Uses Permitted Outright:

6. Multi-family dwellings.

Response: The applicant proposes constructing a multi-family dwelling which is a permitted outright use in this zoning district.

17.40.30 - DEVELOPMENT STANDARDS

Type	Standard	Proposed
Minimum Average Lot Width - Single detached dwelling - Detached zero lot line - Attached zero lot line - Other permitted uses	40 ft. 30 ft. 20 ft. No minimum	A multi-family project is proposed
Minimum Lot Frontage	20 ft. except as allowed by Section 17.100.160	The subject property contains about 235 feet of frontage in compliance with this standard.
Minimum Average Lot Depth	No minimum	No minimum is required
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 20 ft. for front vehicle access	The building closet to the front is 10ft 7in from this property line (complies) 15-feet (complies) 5-feet south, 11ft 5in north N/A N/A
Projections into Required Setbacks	See Chapter 17.74	The requirements of the section will be reviewed with submittal of building plans.

Accessory Structures in Required Setbacks	See Chapter 17.74	The requirements of the section will be reviewed with submittal of building plans.
Multi-family - Landscaping Setbacks	25% See Section 17.90.230	33% of the site will be landscaped. The reference in this section should be 17.90.160. This section is reviewed below.
Structure Height	35 ft. maximum	Approximately 22 feet
Building Site Coverage	No minimum	No minimum is required
Landscaping	See Chapter 17.92	Addressed below.
Off-Street Parking	See Chapter 17.98	Addressed below.

Response: For the purposes of determining setbacks, the Highway 211/Meinig Avenue frontage of the property is considered the front lot line, the sides are the northern and southern property lines and the eastern line is the rear lot line. As shown in the table above, the proposal complies with all Development Standards in this section.

17.40.40 - MINIMUM REQUIREMENTS

A. Must connect to municipal water.

Response: The proposed project will be connected to City water.

B. Must connect to municipal sewer.

Response: The project 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: Because of the location of the subject property, no street connections are anticipated.

D. Must have frontage or approved access to public streets.

Response: The subject property will be developed as a single parcel. This parcel has frontage on Highway 211/Meinig Avenue as required. A single access is proposed.

17.40.50 - ADDITIONAL REQUIREMENTS

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

Response: The multi-family design standards in Section 17.90.160, are applicable to residential developments. The requirements of this section are 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: The subject property contains more than 40 feet of frontage. All units will be access by a single private driveway.

CHAPTER 17.60 - FLOOD AND SLOPE HAZARD (FSH) OVERLAY

17.60.10 - INTERPRETATION AND MAPPING

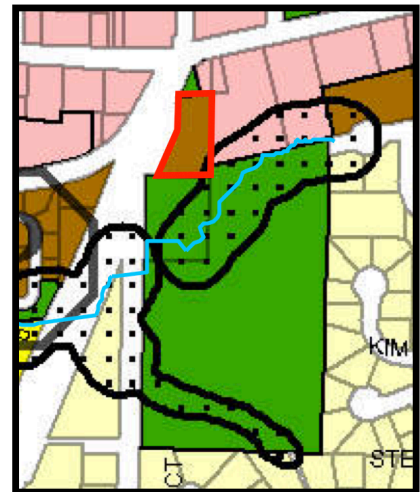
The Director has the ultimate responsibility for maintaining the FSH Overlay District on the City of Sandy Zoning Map, determining on-site measuring methods, and otherwise interpreting the provisions of this chapter. Technical terms used in this chapter are defined in Chapter 17.10, Definitions. This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

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

Response: *The city's Zoning Map dated July 17, 2020 shows a very small portion of FSH Overlay associated with No Name Creek mapped at the southeast corner of the subject property.*

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

Response: *As shown on submitted plans, a small portion of the south east corner of Building B is proposed within the FSH Overlay.*



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

1. The name, location and dimensions of affected streams or rivers, and the tops of their respective banks.

Response: *All of this information is provided.*

2. 100-year floodplain and floodway boundaries and elevations as determined by the June 17, 2008 FIS for Clackamas County and Incorporated Areas.

Response: *The 100-year floodplain or floodway boundaries have not been identified for this portion of No Name Creek and does not affect the subject property.*

3. The City of Sandy FSH overlay district boundary as depicted on the City of Sandy FSH Map.
4. The water quality and slope setback area(s) as defined in Section 17.60.30.

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

Response: The applicant has shown the FSH Overlay on the plan set.

17.60.20 - PERMITTED USES AND ACTIVITIES

A. Restricted Development Areas. Restricted development areas within the FSH overlay district as shown on the City of Sandy Zoning Map include:

1. Slopes of 25% or greater that (a) encompass at least 1,000 square feet and (b) have an elevation differential of at least 10 feet.
2. Protected water features, including locally significant wetlands, wetland mitigation areas approved by the Division of State Lands, and perennial streams.
3. Required setback areas as defined in section 17.60.30.

Response: Although development is proposed within the FSH Overlay, no development is proposed within a restricted development area.

B. Permitted Uses. Permitted uses within restricted development areas are limited to the following:

1. Open space and trails provided they are constructed consistent with standards on file in the Planning Department.
3. Planting of native vegetation species included on a list maintained by the Director.
4. Removal of non-native / invasive vegetation, dead or dying trees or vegetation that is hazardous to the public.
5. Removal of up to two trees of 6 inches or greater dbh in a calendar year, provided that each tree removed is replaced with two native trees, each of which must be 1.5 inches or greater caliper and placed within the restricted development area of the site.
6. Construction or expansion of public facilities or private roads necessary to support permitted development.

Response: This section is not applicable because no development is proposed within a restricted development area.

17.60.30 - REQUIRED SETBACK AREAS

A. Required Setbacks. The required special setback(s) shall be:

1. 70 feet from the top of bank of Tickle Creek;
2. 50 feet from top of bank along other perennial streams, except for “No Name Creek” east of Towle Drive, as provided in Section 17.60.30.C.2 below.
3. 25 feet around the edge of any mapped locally significant wetland; and
4. 25 feet from the top of any 25% slope break where the slope break occurs within the FSH overlay district as mapped by the city.

Response: This section is not applicable because no development is proposed within 50 feet of “No Name Creek” or within 25 feet of any 25% slope within the FSH.

- B. Minimize Impacts. Natural vegetation shall be preserved and enhanced and excavation minimized within required water quality setback areas.

Response: No development is proposed within a restricted development area.

17.60.40 - REVIEW PROCEDURES

Review of development requests within the FSH Overlay District shall occur subject to the following procedures. Unless otherwise indicated below, the Director may approve Type I permits over the counter or following a field check. Type II and III development applications shall be reviewed to ensure consistency with Section 17.60.60-70. Section 17.60.50 special reports shall also be required, unless specifically exempted by the Director.

Response: No special reports have been requested by the city with this application.

17.60.50 - SPECIAL REPORTS

Where development is proposed on restricted development areas within the FSH overlay district as defined in Section 17.60.20.A, the Director shall require submission of the following special reports. These reports shall be in addition to other information required for specific types of development, and shall be prepared by professionals in their respective fields.

The Director may require one or more of these reports where necessary to address potential adverse impacts from development on buildable land within the FSH overlay district. The Director may exempt Type II permit applications from one or more of these reports where impacts are minimal and the exemption is consistent with the purpose of the FSH overlay zone as stated in Section 17.60.00.

- A. Hydrology and Soils Report.
- B. Grading Plan.
- C. Native Vegetation Report.

Response: No special reports have been requested by the city with this application.

CHAPTER 17.66 - ADJUSTMENTS AND VARIANCES

As reviewed in this narrative the proposal complies with all relevant code criteria with the exception of the following:

- Section 17.90.160(D); and,
- Section 17.80.20

For this reason the applicant is requesting a Type II Adjustment to Section 17.90.160(D) and a Type II Variance to Section 17.80.20.

17.66.40. - TYPE I AND II ADJUSTMENT CRITERIA

The applicant is requesting a Type II adjustment to Section 17.90.160(D) requiring the vertical face of a structure facing a public street, pedestrian way, or an abutting residential use to provide an eight foot offset every 20 feet. As shown on submitted plans, the design features an eight foot recessed entry every 24 feet. As such, the applicant is requesting a Type II adjustment (20%) to exceed the 20 foot standard by four feet.

- A. The proposed development will not be contrary to the purposes of this chapter, policies of the Comprehensive Plan, and any other applicable policies and standards adopted by the City;

Response: Approval of a four foot increase in this standard will not affect the functioning or aesthetics of the proposed design or any other adopted policy or standard.

- B. The proposed development will not substantially reduce the amount of privacy enjoyed by users of nearby structures when compared to the same development located as specified by this Code;

Response: Approval of this request to widen the building facade by four feet without an offset will have not affect on the amount of privacy enjoyed by users of nearby structures.

- C. The proposed development will not adversely affect existing physical systems and natural systems, such as traffic, drainage, dramatic land forms, or parks; and

Response: Approval of this request to widen the building facade by four feet without an offset will have not adversely affect traffic, drainage, land forms, or parks.

- D. Architectural features of the proposed development will be compatible to the design character of existing structures on adjoining properties and on the proposed development site.

Response: The subject property is not adjoining any existing structures and the site is currently vacant. The nearest structures are Joe's Donuts, City Hall, and a building located across Meinig Avenue at 39150 Pioneer Blvd. All of these older structures are different from each other and are not designed according to current standards. The proposed building is designed in compliance with adopted design standards with this exception of the requested standard. The requested adjustment will not affect the aesthetic quality of the proposed design and the proposal complies with this criteria.

17.66.70 TYPE II VARIANCE CRITERIA

The authority to grant a variance does not include authority to approve a development that is designed, arranged or intended for a use not otherwise approvable in the location. The criteria are as follows:

Request: The applicant requests a Type II variance to Section 17.80.20 requiring any structure located on an arterial or collector street identified on the TSP to provide a 20

foot minimum setback. The subject property abuts Highway 211, a major arterial requiring a 20 foot setback. The applicant requests a Variance to reduce the front setback along this frontage to 10 feet 7-inches for Building A and 13 feet 11-inches for Building B. This variance has been requested to allow the property to more efficiently be developed and to utilize the extra wide right-of-way abutting the site's frontage. With the increased right-of-way width adjacent to the site, Building A will be located about 30 feet and Building B about 50 feet from the curb line along this frontage.

- A. The circumstances necessitating the variance are not of the applicant's making.
Response: *The proposed variance to Section 17.80.20 has been requested to allow the subject property to more efficiently be developed and to use the unique attributes of the site. The subject property contains 0.59 acres and is bordered by Highway 211/Meinig Road on its western boundary and by city owned property on the other three sides. The site contains a considerable slope down from north to south requiring construction of a retaining wall and Building B to be constructed with a large crawl space. The applicant considered the option of requesting a variance to the rear yard setback instead of the front setback, however, due to the location of existing trees along the rear property line and the extra wide right-of-way in front of the property (western property line), the submitted variance request is the preferred option.*
- B. The hardship does not arise from a violation of this Code, and approval will not allow otherwise prohibited uses in the district in which the property is located.
Response: *The intent of Chapter 17.80, Additional Setbacks on Arterial and Collector Streets as stated in Section 17.80.10, is to "provide better light, air and vision on more heavily traveled streets". The requested variance to reduce the front yard setback is due to site specific conditions including the existing slope of the property, access limitations, the site's proximity to city owned properties, and the location of existing trees along the eastern line of the site. In addition, the proposed unit count falls within the middle of the allowed density range and the applicant determine this count cannot be reduced and still have an economically feasible project. As proposed, with the additional right-of-way existing in front of the property all structures will exceed the 20 foot setback required by Chapter 17.80.*
- C. Granting of the variance will not adversely affect implementation of the Comprehensive Plan.
Response: *Approval of the requested variance will not adversely affect implementation of the Comprehensive Plan. On the contrary, approval of this variance ensures the subject property is developed in accordance with the goals and policies of the Plan.*
- D. The variance authorized will not be materially detrimental to the public welfare or materially injurious to other property in the vicinity.
Response: *Approval of the variance will not be materially detrimental to the public welfare or injurious to other property in the vicinity of the subject property. In fact, because of the location and site specific conditions, approval of the requested variance will not affect any property in the vicinity of the subject property. As*

noted above, all units will be located greater than the required minimum 20 foot setback to the Highway 211/Meinig Avenue.

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

Response: Approval of the variance will allow the subject property to be developed in an efficient manner as is anticipated by the City's Comprehensive Plan and Zoning Map. All units will be located greater than 20 feet from Highway 211/Meinig Avenue as desired by Chapter 17.80. Approval of the requested variance will allow the property to be developed in a similar manner as other properties permitted under the Code.

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

Response: The subject property contains special circumstances in that the property is located along Highway 211/Meinig Avenue and is surrounded by city owned property and Meinig Park on three sides. The extra wide right-of-way abutting the western boundary of the property is also a condition that is not typical of other properties. This feature provides the added setback and buffer distance desired by Section 17.80.20 to ensure livability of the developed units is protected. As shown on the Site Plan, Building A will be located about 10 feet further from this road than is required (30 feet) and Building B about 20 feet further (50 feet) than is required by this section.

CHAPTER 17.80 - ADDITIONAL SETBACKS ON COLLECTOR AND ARTERIAL STREETS

17.80.10 - APPLICABILITY

These regulations apply to all collector and arterial streets as identified in the latest adopted Sandy Transportation System Plan (TSP). The Central Business District (C-1) is exempt from Chapter 17.80 regulations.

Response: The subject property is zoned High Density Residential (R-3) and abuts Highway 211, a major arterial street classified in the TSP.

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: This section requires a 20-foot setback to any structure along the front yard of this property. *As shown on submitted plans, due to site specific constraints, the applicant is proposing to place a portion of Building A, 10 feet 7-inches and Building B, 13 feet 11-inches from the front property line. A Variance to this section has been requested as detailed in Chapter 17.66 above.*

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: *A land division is not proposed.*
 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: *The applicant intends to install all required public and franchise utilities prior to occupancy.*
- 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 section is not applicable.*

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: *This section is not applicable.*
 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: *A nine-foot wide sidewalk is proposed to be constructed along the Highway 211 Road frontage.*
 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.*

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.*

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 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, none of these 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: *This section is not applicable.*

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

- 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. This section is not applicable.

- 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 those noted above 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 proposed project contains 10 units. No transit facilities are proposed or warranted.*

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 project 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 prepared by Ard Engineering is included with this application as requested by the City. This study recommends a center median in Highway 211 be constructed or in the alternative site access be restricted to right-in, right-out only through the installation of a pork-chop diverter.*

B. Location of new arterial streets shall conform to the Transportation System Plan in accordance with the following:

1. Arterial streets should generally be spaced in one-mile intervals.
2. Traffic signals should generally not be spaced closer than 1500 ft. for reasonable traffic progression.

Response: *No new arterial streets are required as part of this project.*

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

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

Response: *These sections are not applicable.*

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: *This section is not applicable.*

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: *A single access drive from Highway 211 Road is proposed.*

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: *The applicant plans to construct sidewalk improvements along the Highway 211 frontage.*

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 project.*

17.84.60 - PUBLIC FACILITY EXTENSIONS

A. All development sites shall be provided with public water, sanitary sewer, broadband (fiber), and storm drainage.

Response: The submitted Utility Plan shows the location of water, sanitary sewer, and stormwater drainage facilities. All facilities on the site are anticipated to be private. Broadband fiber service will be detailed on building plans.

B. Where necessary to serve property as specified in “A” above, required public facility installations shall be constructed concurrent with development.

Response: All utilities identified above will be constructed concurrent with the proposed 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: No public facilities are required to be extended through the site to the edge of adjacent properties.

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

Response: All facilities onsite will be private.

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: This section is not applicable.

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

Response: The applicant does not anticipate extending franchise utilities beyond the site.

C. The developer shall have the option of choosing whether or not to provide natural gas or cable television service to the development site, providing all of the following conditions exist:

1. Extension of franchise utilities through the site is not necessary for the future orderly development of adjacent property(ies);
2. The development site remains in one ownership and land division does not occur (with the exception of land divisions that may occur under the provisions of 17.84.50 F above); and
3. The development is non-residential.

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

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

Response: *This section is not applicable.*

E. All franchise utility distribution facilities installed to serve new development shall be placed underground except as provided below. The following facilities may be installed aboveground:

1. Poles for street lights and traffic signals, pedestals for police and fire system communications and alarms, pad mounted transformers, pedestals, pedestal mounted terminal boxes and meter cabinets, concealed ducts, substations, or facilities used to carry voltage higher than 35,000 volts;
2. Overhead utility distribution lines may be permitted upon approval of the City Engineer when unusual terrain, soil, or other conditions make underground installation impracticable. Location of such overhead utilities shall follow rear or side lot lines wherever feasible.

Response: *All franchise utilities will be installed underground in compliance with 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 as necessary.

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: No easements are required with this development.

- 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: This section is not applicable.

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

Response: 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: This section is not applicable.

- 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: This section is not applicable. No dedications have been identified.

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

Response: This section is not applicable.

17.84.100 - MAIL DELIVERY FACILITIES

Response: The location and type of mail delivery facilities will be coordinated with the City and the Post Office as part of the building permit process.

CHAPTER 17.86 PARKLAND AND OPEN SPACE

17.86.10 MINIMUM PARKLAND DEDICATION REQUIREMENTS

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 10 unit multi-family project results in the following calculation: 10 units x 2 persons/unit x 0.0043 (per person parkland factor) = 0.086 rounded to the nearest 1/100 = 0.09 acres. Based on the current parkland fee in lieu amount in the City's fee resolution of \$241,000/acre, a payment of \$21,690 (0.09 x \$241,000 = \$21,690) is required to be paid prior with issuance of the building permit.

CHAPTER 17.90 DESIGN STANDARDS

17.90.160 ADDITIONAL REQUIREMENTS - MULTI-FAMILY DEVELOPMENTS

Multi-family residential developments shall comply with the requirements of this chapter as listed above and the following additional requirements:

Response: Both buildings proposed in the project contain similar design elements. Building A is proposed to contain four units and Building B will contain six units.

A. Roofs. Roofs shall meet the following additional requirement:

1. Roofs shall be gabled or hip type roofs (minimum pitch 3:1) with at least a 30-inch overhang and using shingles or similar roofing materials. Alternatives may be approved where the developer can demonstrate that abutting structures or the majority of structures within 300 feet have roofs similar to what is proposed.

Response: The proposed structures features a both 6:12 and 8:12 roof pitches exceeding the minimum 3:12 roof pitch standard. This section also requires roofs to contain at least a 30-inch overhang. The proposed roof overhangs 30-inches measured to the outside edge of the gutter. The proposal complies with this section.

2. Offsets or breaks in roof elevation shall be at least 3 or more feet in height.

Response: This section requires offset or break if they are provided to be at least three feet or more in height. As shown on the submitted Building Elevations, neither building includes a designed roof offset. Due to site elevation differences Building B is designed as two halves with the elevation of the western half approximately 18-inches higher than the eastern half.

B. Entries.

1. Entries shall be sheltered with an overhang, portico or recessed entry or otherwise articulated with an architecturally detailed entry.
2. Primary dwelling entries shall face a public street or designated pedestrian way and be visible from the street whenever feasible.
3. Multiple units: Ground floor units shall face a public street or designated pedestrian way and be visible from the street whenever feasible and shall avoid out-of-direction travel. Upper story units may share entries.
4. Secondary entries may face parking lots or loading areas.

Response: *The entry door for all units will face the access drive and pedestrian walkway and are covered by an awning.*

- C. Building facades shall be articulated with windows, entries, balconies and/or bays. Towers or other special vertical elements may be used in a limited fashion to focus views to the area from surrounding streets.

Response: *The front facade of all buildings are articulated by a recessed entry with covered awning, and projecting gable end with a considerable number of windows.*

- D. Along the vertical face of a structure, when facing a public street, pedestrian way or an abutting residential use, offsets shall occur at a minimum of every 20 feet by providing any two of the following:

1. Recesses (decks, patios, entrances, floor area, etc.) of a minimum depth of 8 feet.
2. Extensions (decks, patios, entrances, floor area, etc.) at a minimum depth of 8 feet, with maximum length of an overhang not to exceed 25 feet.
3. If a partially enclosed covered porch is proposed, this can meet one of the offset requirements provided the porch is 8 feet deep and at least 125 sq. ft. in area.

Response: *As shown on submitted plans the front door of each unit is recessed eight feet and there are 24-feet of vertical face between recesses. The proposed designed exceeds this standard by 4-feet and a Type II Adjustment has been requested.*

- E. Private Outdoor Areas.

1. A separate outdoor area of not less than 48 square feet shall be attached to each ground level dwelling unit. These areas shall be separated from common outdoor areas in a manner, which enables the resident to control access from separate to common areas with elements such as walls, fences or shrubs.
2. A separate outdoor area of not less than forty-eight (48) square feet in the form of balconies, terraces or porches shall be provided for each dwelling unit located above the ground level.

Response: *Each unit features a 50 square foot outdoor patio area or deck in compliance with this section.*

- F. Parking Lots. Parking lots in multi-family developments shall not occupy more than 50% of the frontage of any public street abutting the lot or building.

Response: *The proposed parking and maneuvering area occupies only 25% of the Highway 211 street frontage in compliance with this section.*

- G. Individual Storage Areas. Enclosed storage areas shall be required and may be attached to the exterior of each dwelling unit to accommodate garden equipment, patio furniture, barbecues, bicycles, etc. Storage areas may be provided within garages if the required storage area is in addition to the required parking area required.

Size of Dwelling	Minimum Square Feet	Minimum Height
Studio	24	6
1 Bedroom	24	6
2 Bedroom	36	6
3+ Bedroom	48	6

Response: Each unit includes a 38 square foot individual storage area in compliance with this section.

- H. Carports and Garages. If carport and garages are provided, the form, materials, color and construction shall be compatible with the complex they serve.

Response: No garages or carport are proposed.

- I. Shared Outdoor Recreation Areas. Multi-family residential development shall provide usable recreation areas for developments containing more than 5 dwelling units at the rate of 200 square feet per dwelling unit. Such areas shall be counted as part of the required landscaping. Examples include, but are not limited to, playgrounds, exercise trails, swimming pools, etc. Usable recreation area may also include slopes, wetlands, FSH setback areas, and other natural site features, however, at least 50% of the recreation area must be located outside the boundaries of such areas and slopes may not exceed 15% in the 50% usable recreation area. Gazebos and other outdoor covered spaces are encouraged and qualify as 1.25 square feet for every one square foot of required shared recreation area. The shared outdoor recreation area shall be located and designed in a manner which:

1. Provides approximately the same accessibility to the maximum number of dwelling units possible.
2. Windows shall be located to encourage watching over entry areas, shared recreational areas, laundry areas, walkways and parking areas from windows in at least two adjacent dwelling units. These windows must be located in kitchen, living room, dining room or other activity rooms (bedrooms or bathrooms are not included).
3. Provides a separation from parking and driveway areas with a landscaped transition area measuring a minimum of ten feet wide;
4. Controls access to shared outdoor areas from off-site as well as from on-site parking and entrance areas with features such as fencing, walls and landscaping;
5. Provides a usable surface material such as lawn, decks, wood chips, sand and hard surface materials (concrete/asphalt).

Response: The proposed 10 unit project requires 2,000 square feet of shared outdoor recreation area $10 \times 200 = 2,000$. As shown on the Site Plan, approximately 2,430 square feet of shared outdoor area is proposed. This area includes two spaces; one located in the center of the complex with a play structure and benches and a second area to the west of Building B with tables. The proposal complies with this standard.

- J. Safety and Security.

1. Provide an outdoor lighting system which facilitates police observation and resident observation through strategic location, orientation and brightness without being obtrusive by shining into residential units or adjacent residential developments.
2. Establish a directory for apartment complexes of four or more units, which clearly orients visitors and emergency service providers as to the location of residential units. Where possible, this system should be evident from the primary vehicle entryway.

Response: A Lighting Plan is included with the plan set in compliance with this section.

K. Service, Delivery and Screening.

1. Locate postal delivery areas in a convenient location efficiently designed for residents and mail delivery personnel and in accordance with U.S. Postal Service requirements.
2. Provide pedestrian access from unit entries to postal delivery areas, garbage and recycling collection areas, shared activity areas and parking areas. Elements such as, but not limited to, concrete paths, striped walkways or raised walkways through vehicular areas or gravel trails will meet this requirement.
3. Provide garbage collection and recycling areas in convenient locations for the service provider and residents.
4. Garbage collection areas shall have a concrete floor surface and shall have a gate on the truck-loading side and a separate pedestrian access.
5. Outdoor storage areas, garbage containers and recycling bins shall be screened from view in one of the following manners:
 - a. A solid sight obscuring wall or fence not less than six feet in height and constructed of durable materials compatible with the primary structure(s) shall surround these areas.
 - b. Evergreen plant materials which will retain their screening ability and will reach the height of six feet within three years from time of planting. An overlap of three inches is required of the evergreen plant screening. The material shall completely screen the area from the public view.

Response: A garbage enclosure is included along the rear property line. A mail box is included on the north side of the entrance drive.

L. Electrical and Mechanical Equipment. On- and above-grade electrical and mechanical equipment such as transformers, heat pumps and central air conditioner units shall be screened with sight obscuring fences, walls or landscaping.

Response: All electrical and mechanical equipment are either within an enclosed structure or will be screened using landscape materials as required.

CHAPTER 17.92 - LANDSCAPING AND SCREENING GENERAL STANDARDS - ALL ZONES

Response: The C-1 zoning district requires residential development not above commercial development to contain 20 percent landscaping. A Landscape Plan identifying that 36 percent of the site is proposed to be landscaped in compliance with this standard and the requirements of Chapter 17.92 is provided with this application.

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.

Response: *A Landscape Plan containing the details of proposed landscape plantings is included. The applicant understands that all required landscaping shall be completed or financially guaranteed prior to the issuance of a Certificate of Occupancy.*

- B. Appropriate care and maintenance of landscaping on-site 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.

Response: *All required landscape materials will be cared for the duration as required.*

- 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 proposal preserves trees to the greatest extent practicable to allow development of the site for the proposed use. All preserved trees will be protected by tree protection fencing as required.*

- D. Planter and boundary areas used for required plantings shall have a minimum diameter of 5-ft. (2-1/2 ft. radius, inside dimensions). Where the curb or the edge of these areas are used as a tire stop for parking, the planter or boundary plantings shall be a minimum width of 7-1/2 ft.

Response: *All planter areas contain a minimum depth of five feet. All vehicle parking adjacent to landscape planters and sidewalks are provided with wheel stops.*

- E. In no case shall shrubs, conifer trees, or other screening be permitted within vision clearance areas of street, alley, or driveway intersections, or where the City Engineer otherwise deems such plantings would endanger pedestrians and vehicles.

Response: *The Landscape Plan will be modified as required to address vision clearance requirements necessary.*

- F. Landscaped planters and other landscaping features shall be used to define, soften or screen the appearance of off-street parking areas and other activity from the public street. Up to 35 percent of the total required landscaped area may be developed into pedestrian amenities, including, but not limited to sidewalk cafes, seating, water features, and plazas, as approved by the Director or Planning Commission.

Response: Landscape planters at the end of parking bays help to define and soften the appearance of these areas.

- G. Required landscaping/open space shall be designed and arranged to offer the maximum benefits to the occupants of the development as well as provide visual appeal and building separation.

Response: As noted above, 33 percent of the site is proposed to contain landscaping. All landscaped areas are designed to enhance the appearance of the site to provide visual appeal and interest.

- H. Balconies required for entrances and exits shall not be considered as open space except where such exits and entrances are for the sole use of the unit.

- I. Roofed structures shall not be included as open space except for open unenclosed public patios, balconies, gazebos, or other similar structures or spaces.

Response: These sections are not applicable.

- J. Driveways and parking areas shall not be included as open space.

Response: None of these areas are included in site landscaping calculations.

- K. All areas not occupied by paved roadways, walkways, patios, or buildings shall be landscaped.

Response: As shown on the Landscape Plan all areas not occupied by buildings and paved surfaces will be landscaped.

- L. All landscaping shall be continually maintained, including necessary watering, weeding, pruning and replacing.

Response: All landscaping is intended to be maintained as required.

17.92.20 MINIMUM IMPROVEMENTS - LANDSCAPING AND SCREENING

The minimum landscaping area of a site to be retained in landscaping shall be as follows:
R-3 - 25%

Response: As shown on the Landscape Plan, 33 percent of the site is proposed to be landscaped exceeding the minimum 25 percent landscaping required.

17.92.30 REQUIRED TREE PLANTINGS

Planting of trees is required for all parking lots with 4 or more parking spaces, public street frontages, and along private drives more than 150 feet long. Trees shall be planted outside the street right-of-way except where there is a designated planting strip or City adopted street tree plan.

The City maintains a list of appropriate trees for street tree and parking lot planting situations. Selection of species should be made from the city-approved list. Alternate selections may be approved by the Director following written request. The type of tree used shall determine frequency of trees in planting areas. Trees in parking areas shall be dispersed throughout the lot to provide a canopy for shade and visual relief.

Response: The Landscape Plan indicates that both sides of common parking areas will be bordered with a landscape planter to contain a mix of trees, shrubs and ground covers.

17.92.40 IRRIGATION

Landscaping shall be irrigated, either with a manual or automatic system, to sustain viable plant life.

Response: All landscape areas will be irrigated with either a manual or automatic system. The details of this system will be submitted with building plans.

17.92.50 TYPES AND SIZES OF PLANT MATERIALS

A. At least 75% of the required landscaping area shall be planted with a suitable combination of trees, shrubs, or evergreen ground cover except as otherwise authorized by Chapter 17.92.10 F.

D. Deciduous trees shall be balled and burlapped, be a minimum of 7 feet in overall height or 1 1/2 inches in caliper measured 6 inches above the ground, immediately after planting. Bare root trees will be acceptable to plant during their dormant season.

F. Shrubs shall be a minimum of 1 gallon in size or 2 feet in height when measured immediately after planting.

G. Hedges, where required to screen and buffer off-street parking from adjoining properties shall be planted with an evergreen species maintained so as to form a continuous, solid visual screen within 2 years after planting.

H. Vines for screening purposes shall be a minimum of 1 gallon in size or 30 inches in height immediate after planting and may be used in conjunction with fences, screens, or walls to meet physical barrier requirements as specified.

I. Groundcovers shall be fully rooted and shall be well branched or leafed. If used in lieu of turf in whole or in part, ground covers shall be planted in such a manner as to provide complete coverage in one year.

J. Turf areas shall be planted in species normally grown as permanent lawns in western Oregon. Either sod or seed are acceptable. Acceptable varieties include improved perennial ryegrasses and fescues used within the local landscape industry.

K. Landscaped areas may include architectural features or artificial ground covers such as sculptures, benches, masonry or stone walls, fences, rock groupings, bark dust, decorative hard paving and gravel areas, interspersed with planted areas. The exposed area developed with such features shall not exceed 25% of the required landscaped area. Artificial plants are prohibited in any required landscape area.

Response: The submitted Landscape Plan has been designed in accordance with the standards of this section.

17.92.70 LANDSCAPING BETWEEN PUBLIC RIGHT-OF-WAY AND PROPERTY LINES

Except for portions allowed for parking, loading, or traffic maneuvering, a required setback area abutting a public street and open area between the property line and the roadway in the public street shall be landscaped. That portion of the landscaping within the street right-of-way shall not count as part of the lot area percentage to be landscaped.

Response: As shown on the Landscape Plan, the area between the buildings and Highway 211 will be landscaped as required.

17.92.80 BUFFER PLANTING - PARKING, LOADING AND MANEUVERING AREAS

Buffer plantings are used to reduce building scale, provide transition between contrasting architectural styles, and generally mitigate incompatible or undesirable views. They are used to soften rather than block viewing. Where required, a mix of plant materials shall be used to achieve the desired buffering effect. Buffering is required in conjunction with issuance of construction permits for parking areas containing 4 or more spaces, loading areas, and vehicle maneuvering areas.

Boundary plantings shall be used to buffer these uses from adjacent properties and the public right-of-way. On-site plantings shall be used between parking bays, as well as between parking bays and vehicle maneuvering areas. A balance of low-lying ground cover and shrubs, and vertical shrubs and trees shall be used to buffer the view of these facilities. Decorative walls and fences may be used in conjunction with plantings, but may not be used by themselves to comply with buffering requirements. Exception: truck parking lots are exempt from parking bay buffer planting requirements.

Response: The submitted Landscape Plan has been designed in accordance with these standards.

CHAPTER 17.98 - PARKING, LOADING, AND ACCESS REQUIREMENTS

17.98.20 OFF-STREET PARKING REQUIREMENTS

Vehicle parking for multi-family dwellings requires the following: 2.0 per 2 bedroom. In addition, one bicycle space is required for each unit.

Response: The 10 2-bedroom units require a total of 20 vehicle parking spaces (10 x 2 = 20). As shown on the Site Plan, 21 parking spaces including one van accessible ADA space are provided in compliance with this section. As noted on the submitted Site Plan, each unit's individual storage will be fitted with a hanging rack to accommodate a bicycle as required. In addition, a two bike rack is provided near the northwest corner of Building B. The proposal complies with this standard.

17.98.50 SETBACKS

- A. Parking areas, which abut a residential zoning district, shall meet the setback of the most restrictive adjoining residential zoning district.
- B. Required parking shall not be located in a required front or side yard setback area abutting a public street except in industrial districts. For single family and two-family dwellings, required off-street parking may be located in a driveway.
- C. Parking areas shall be setback from a lot line adjoining a street the same distance as the required building setbacks. Regardless of other provisions, a minimum setback of 5 feet shall be provided along the property fronting on a public street. The setback area shall be landscaped as provided in this code.

Response: The property abuts property zoned POS to the south and a portion of the northern boundary and C-1 to the east and a portion of the north. All parking will be shielded from view by buildings and screened by proposed landscaped.

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.

A. Parking Lot Design. All areas for required parking and maneuvering of vehicles shall have a durable hard surface such as concrete or asphalt.

Response: All parking and maneuvering areas will be constructed using either asphalt or concrete as required.

B. Size of Space.

1. A standard parking space shall be 9 feet by 18 feet.
2. A compact parking space shall be 8 feet by 16 feet.
3. Handicapped parking spaces shall be 13 feet by 18 feet. 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.
4. Parallel parking spaces shall be a length of 22 feet.
5. No more than 35 percent of the parking stalls shall be compact spaces.

Response: All parking spaces comply with these standards. No compact parking spaces are proposed.

C. Aisle Width

This section requires the aisle width for single-sided, two-way traffic, 90 degree angle parking lots to be a minimum of 22 feet.

Response: The submitted site plan proposes a 22-foot wide aisle behind all parking spaces as required.

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.

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

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: The site plan indicates that a 22-foot wide driveway is proposed to access the project in compliance with this section.

17.98.120 LANDSCAPING AND SCREENING

A. Screening of all parking areas containing 4 or more spaces and all parking areas in conjunction with an off-street loading facility shall be required in accordance with zoning district requirements and Chapter 17.98. Where not otherwise specified by district requirement, screening along a public right-of-way shall include a minimum 5-ft. depth of buffer plantings adjacent to the right-of-way.

B. When parking in a commercial or industrial district adjoins a residential zoning district, a sight-obscuring screen that is at least 80% opaque when viewed horizontally from between 2 and 8 feet above the average ground level shall be required. The

screening shall be composed of materials that are an adequate size so as to achieve the required degree of screening within 3 years after installation.

- C. Except for a residential development which has landscaped yards, parking facilities shall include landscaping to cover not less than 10% of the area devoted to parking facilities. The landscaping shall be uniformly distributed throughout the parking area and may consist of trees, shrubs, and ground covers.
- D. Parking areas shall be divided into bays of not more than 20 spaces in parking areas with 20 or more spaces. Between, and at the end of each parking bay, there shall be planters that have a minimum width of 5 feet and a minimum length of 17 feet for a single depth bay and 34 feet for a double bay. Each planter shall contain one major structural tree and ground cover. Truck parking and loading areas are exempt from this requirement.
- E. Parking area setbacks shall be landscaped with major trees, shrubs, and ground cover as specified in Chapter 17.92.
- F. Wheel stops, bumper guards, or other methods to protect landscaped areas shall be provided. No vehicle may project over a property line or a public right-of-way. Parking may project over an internal sidewalk, but a minimum clearance of 5 feet for safe pedestrian circulation is required.

Response: All vehicle parking spaces will be screened from public view by buildings and landscaping. All of these spaces are divided into bays containing less than 20 spaces as required. Parking bays are broken up with a landscape planter at the end and along the largest parking bay. Wheel stops are proposed for all parking spaces to protect landscaping and sidewalks.

17.98.130 PAVING

- A. Parking areas, driveways, aisles and turnarounds shall be paved with concrete, asphalt or comparable surfacing, constructed to city standards for off-street vehicle areas.
- B. Gravel surfacing shall be permitted only for areas designated for non-motorized trailer or equipment storage, propane or electrically powered vehicles, or storage of tracked vehicles.

Response: Concrete is proposed for the entrance drive as shown. All other areas of the access drive and all parking spaces will be paved using either regular asphalt or concrete as required.

17.98.140 DRAINAGE

Parking areas, aisles and turnarounds shall have adequate provisions made for the on-site collection of drainage waters to eliminate sheet flow of such waters onto sidewalks, public rights-of-way and abutting private property.

Response: A preliminary stormwater management plan is provided as part of the application submittal. This plan has been designed in accordance with the City of Sandy Stormwater Management requirements.

17.98.150 LIGHTING

Artificial lighting shall be provided in all required off-street parking areas. Lighting shall be directed into the site and shall be arranged to not produce direct glare on adjacent properties. Light elements shall be shielded and shall not be visible from abutting residential properties. Lighting shall be provided in all bicycle parking areas so that all

facilities are thoroughly illuminated and visible from adjacent sidewalks or vehicle parking lots during all hours of use.

Response: As noted above, a Lighting Plan is included with the submittal package.

17.98.160 BICYCLE PARKING FACILITIES

Multi-family developments, industrial, commercial and community service uses, transit transfer stations, and park and ride lots shall meet the following standards for bicycle parking facilities. The intent of this section is to provide secure bicycle parking that is visible from a building's primary entrance and convenient to bicyclists.

A. Location.

1. Bicycle parking shall be located on-site, convenient to primary building entrances, and have direct access to both the public right-of-way and to the main entrance of the principal structure.
2. Bicycle parking areas shall be visible from building interiors where possible.
3. For facilities with multiple buildings or parking lots, bicycle parking shall be located in areas of greatest use and convenience to bicyclists.
4. If the bicycle parking area is located within the vehicle parking area, the bicycle facilities shall be separated from vehicular maneuvering areas by curbing or other barrier to prevent damage to parked bicycles.
5. Curb cuts shall be installed to provide safe, convenient access to bicycle parking areas.

Response: As noted above, the storage space of each dwelling unit will be fitted with a bike hanging rack. In addition, a two bicycle rack will be installed at the northwest of Building B.

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 0.58 acres and the standards of this chapter are not applicable to the proposed development.

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)

Response: A photometric analysis is included with the submittal package as required.

V. Conclusion

The applicant requests design review approval to construct a 10 unit townhome style multi-family project on property zoned R-3, High Density Residential. With this application, the applicant is also requesting a Type II Adjustment to Section 17.90.160(D) and a Type II Variance to Section 17.80.20. As demonstrated with this submittal, the proposal complies with or exceeds all relevant code standards and the applicant respectfully requests the application be approved.

SECTION III – APPLICATION DRAWINGS

EXHIBITS B,C,D,E

(REDUCED – NOT TO SCALE)

THE PAD - MULTI-FAMILY RESIDENTIAL

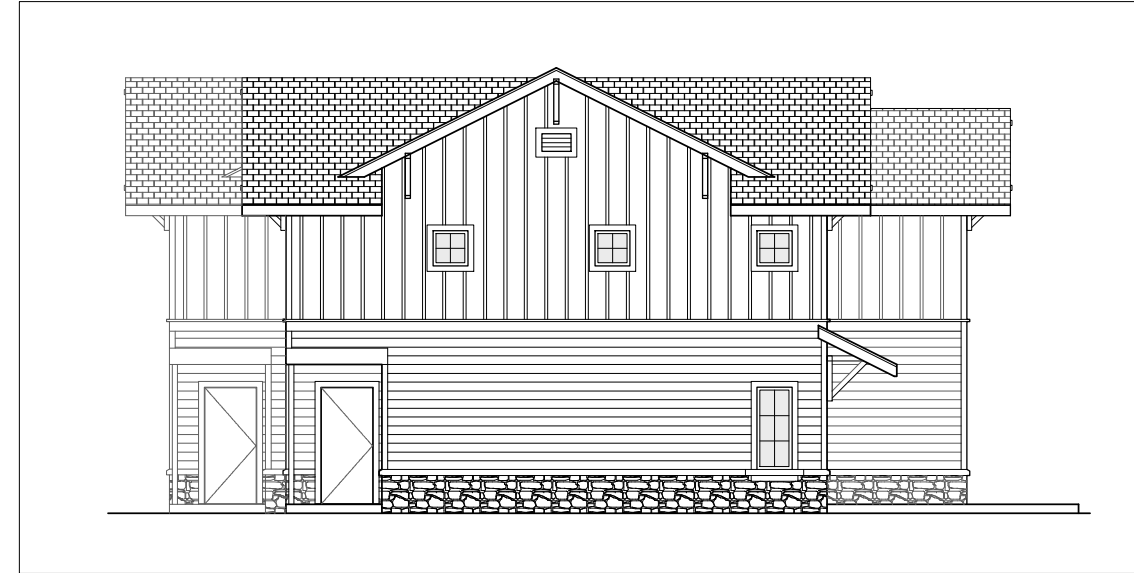
MULTI-FAMILY RESIDENTIAL | SANDY, OREGON



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REPRESENTATIONAL IMAGE. IMAGE SHOWN MAY NOT BE AN EXACT REPRESENTATION OF ACTUAL DESIGN AND CONSTRUCTION.



REPRESENTATIONAL IMAGE. IMAGE SHOWN MAY NOT BE AN EXACT REPRESENTATION OF ACTUAL DESIGN AND CONSTRUCTION.

PROJECT DESCRIPTION

REDEVELOPMENT OF AN EXISTING LOT INTO A MULTI-FAMILY COMPLEX CONSISTING OF TEN 2-STORY UNITS OCCUPYING 2 BUILDINGS. OUTDOOR RECREATIONAL AREAS AS WELL AS PARKING, AND VEHICLE AND PEDESTRIAN CIRCULATION SYSTEMS WILL ALSO BE INSTALLED.

SITE INFORMATION

ADDRESS: 17650 MEING ACENUE
 SANDY, OR 97055
 PARCEL NUMBER: 00663758
 TAX LOT NUMBER: 24E13DB01500
 COUNTY: CLACKAMAS COUNTY
 JURISDICTION: CITY OF SANDY
 FIRE DISTRICT: SANDY FIRE DISTRICT NO. 72
 ZONING: R3 - HIGH DENSITY RESIDENTIAL
 DESCRIPTION OF USE: MULTI-FAMILY RESIDENTIAL
 AREA (APPROX.): PROPERTY: 25,869 S.F. (0.59 ACRES)

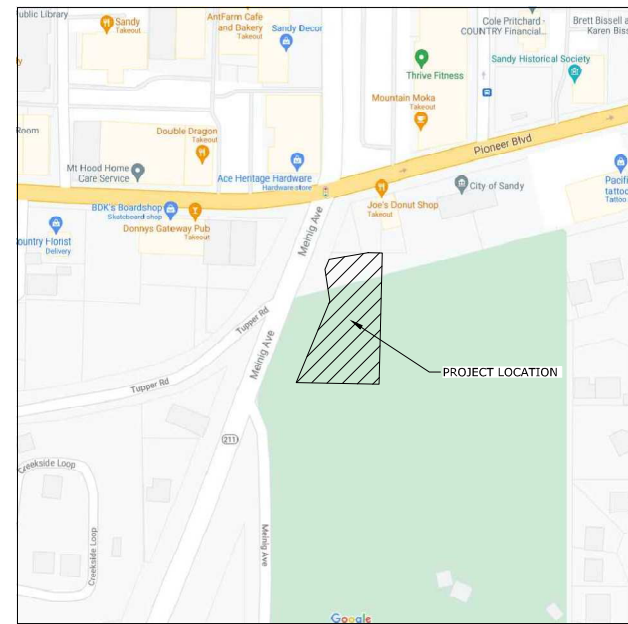
PROJECT TEAM

OWNER: OWNER NAME
 STREET ADDRESS
 CITY, STATE ZIP CODE
 PHONE: (###) ###-####
 CONTACT: FIRST LAST NAME
 ARCHITECT: AXIS DESIGN GROUP
 ARCHITECTURE & ENGINEERING, INC.
 11104 S.E. STARK STREET
 PORTLAND, OR 97216
 PHONE: (503) 284-0988
 CONTACT: FIRST LAST NAME
 CIVIL: KURAHASHI & ASSOCIATES
 4470 SW HALL BLVD.
 SUITE C
 BEAVERTON, OR 97005
 PHONE: (503) 267-8434
 CONTACT: GREG KURAHASHI
 LANDSCAPE: JOYCE JACKSON - LANDSCAPE ARCHITECT
 1940 SYLVAN WAY
 WEST Linn, OR 97068
 PHONE: (503) 703-8607
 CONTACT: JOYCE JACKSON

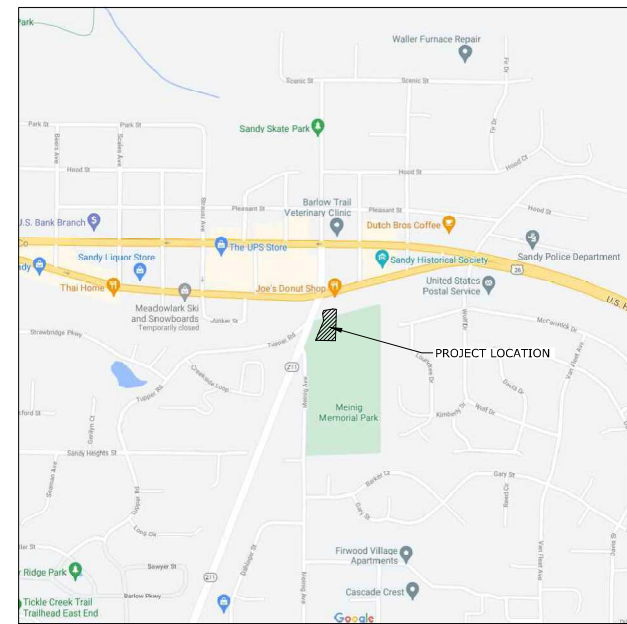
SHEET INDEX

SHEET NUMBER	SHEET TITLE	DESIGN REVIEW	MILESTONE 2
GENERAL			
G-000	COVER SHEET, SITE INFO, SHEET INDEX	X	
CIVIL			
C-1	EXISTING CONDITIONS	X	
C-2	CIVIL SITE PLAN	X	
C-3	UTILITY PLAN	X	
C-4	GRADING PLAN	X	
C-5	TREE PRESERVATION PLAN	X	
LANDSCAPE			
L-1	PLANTING PLAN	X	
L-2	LANDSCAPE NOTES AND DETAILS	X	
ARCHITECTURAL			
A-101	SITE PLAN - EXISTING/DEMO	X	
A-102	SITE PLAN - PROPOSED	X	
A-201	FIRST AND SECOND FLOOR PLANS - PROPOSED	X	
A-221	EXTERIOR ELEVATIONS - BUILDING "A" - PROPOSED	X	
A-222	EXTERIOR ELEVATIONS - BUILDING "B" - PROPOSED	X	
SITE LIGHTING			
LT-1	SITE PHOTOMETRIC PLAN	X	

LEGEND:
 X = ISSUED AS PART OF SET
 O = NOT PART OF ISSUED SET
 * = ISSUED FOR INFORMATION ONLY



VICINITY MAP
 SCALE: NTS



PROJECT LOCATION MAP
 SCALE: NTS

THE PAD
 TOWNHOME APARTMENTS
 17650 MEING AVENUE
 SANDY, OR 97055

REVISIONS

No.	Description	Date

DRAWN BY: SJM

CHECKED BY: DH

JOB NO: 20-004

DATE: 07/16/2021

ISSUED FOR: DESIGN REVIEW

SHEET TITLE

SHEET INDEX,

PROJECT DESCRIPTION,

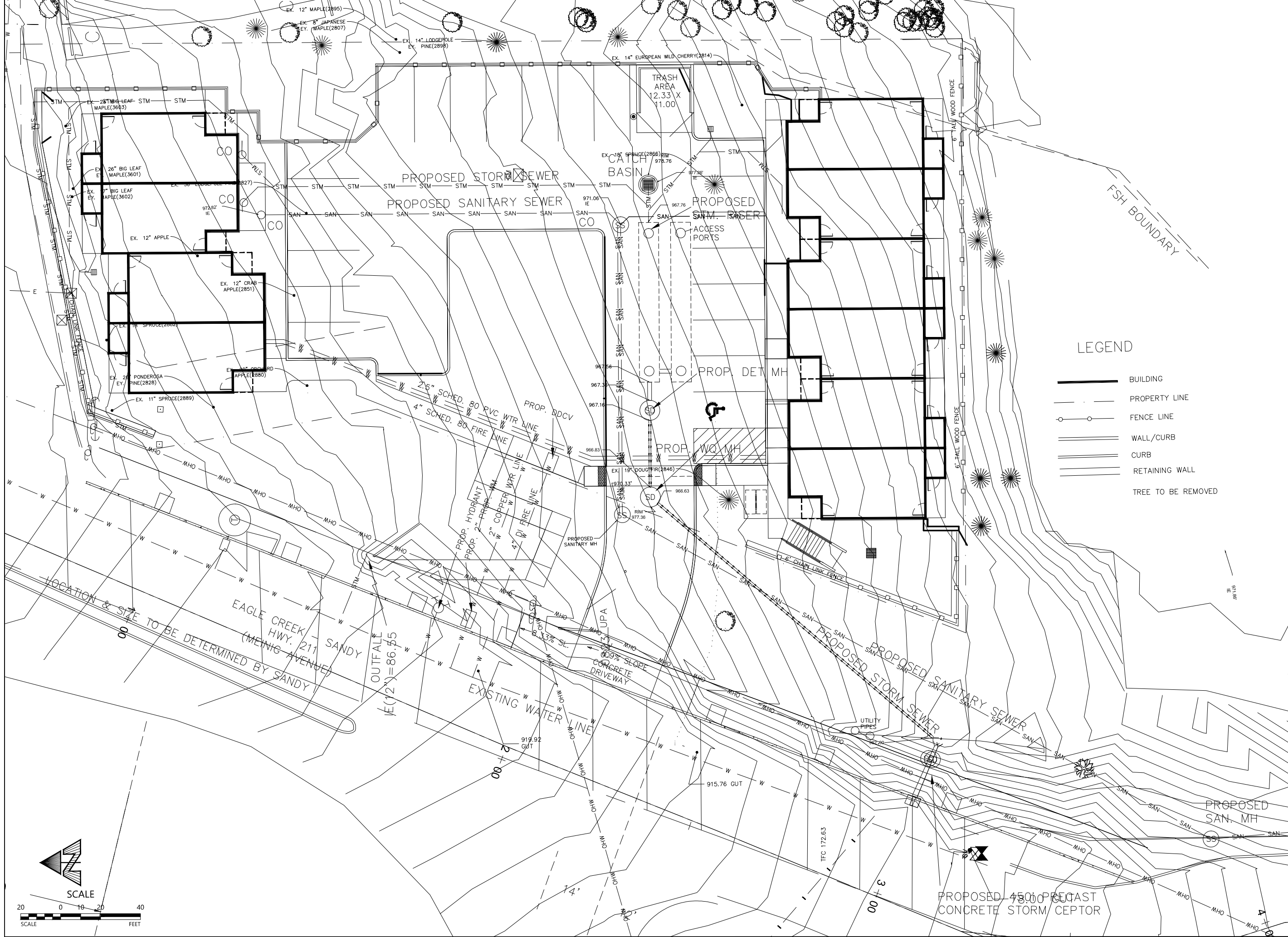
SITE INFORMATION, AND

PROJECT TEAM

SHEET NO.

G-000

C:\Users\Drafter\Desktop\KURAHASHI_JOBS\2804 THE PAD PRELIMINARY PLANS 20210510 DRIVEWAY CHANGE.dwg © Plot Date: Jun 10 21 @ Time: 6:01 PM



LEGEND

- BUILDING
- PROPERTY LINE
- FENCE LINE
- WALL/CURB
- CURB
- RETAINING WALL
- TREE TO BE REMOVED

REGISTERED PROFESSIONAL ENGINEER 10,053
 OREGON
 FEB 29, 1979
 GREGORY KURAHASHI
 EXPIRES 6/30/2021
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KURAHASHI & ASSOCIATES, INC.
 Civil Engineering, Water Resources, Landscape Design, Planning, Environmental, Surveying
 4470 SW Hall Blvd, Suite C
 Beaverton, Oregon 97005
 phone: (503)267-8434
 fax: (503)644-9731

THE PAD TOWNHOME APARTMENTS
 17650 MENNIG AVENUE
 SANDY, OR 97055

REVISIONS

No.	Description	Date

DRAWN BY: GTK
 CHECKED BY: GTK
 JOB NO: 20-004
 DATE: 6/10/2021
 ISSUED FOR: DESIGN REVIEW
 SHEET TITLE
 UTILITY PLAN
 SHEET NO.



REVISIONS

No.	Description	Date

DRAWN BY: JJ
CHECKED BY: JJ
JOB NO: 20-004

DATE: 07/7/2021
ISSUED FOR: DESIGN REVIEW
SHEET TITLE: PLANTING PLAN

SHEET NO.

PLANT LIST

TREES

SYM	QUAN	BOTANICAL NAME/Common Name	SIZE	COMMENT
(Symbol)	12	ACER BUERGERIANUM - TRIDENT MAPLE	1-1/2" CAL B&B	AS SHOWN
(Symbol)	8	CALOCEDRUS DECURRENS - INCENSE CEDAR	6' HT MIN.	REMOVE LOWEST BRANCHES
(Symbol)	1	QUERCUS FRAINETTO 'FOREST GREEN' FOREST GREEN OAK	2" CAL B&B	AS SHOWN
(Symbol)	5	RHAMNUS PURSHIANA	1-1/2" CAL B&B	AS SHOWN

SHRUBS

SYM	QUAN	BOTANICAL NAME	COMMON NAME	SIZE	COMMENT
(Symbol)	18	EUONYMUS FORTUNEI 'EMERALD GAIEITY'	EMERALD GAIEITY EUONYMUS	2 GAL	SPACE AS SHOWN
(Symbol)	4	ILEX GLABRA 'SHAMROCK'	SHAMROCK INKBERRY	3 GAL	SPACE 42" O.C.
(Symbol)	1	JUNIPERUS VIRGINIANA 'BLUE ARROW'	BLUE ARROW JUNIPER	48" HT. B&B	AS SHOWN
(Symbol)	51	MAHONIA AQUIFOLIUM	OREGON GRAPE	2 GAL	FULLY BRANCHED
(Symbol)	1	NANDINA DOMESTICA 'WOODS DWARF'	WOOD'S DWARF HEAVENLY BAMBOO	2 GAL	SPACE AS SHOWN
(Symbol)	30	PHILADELPHUS LEWISII	MOCKORANGE	2 GAL	SPACE AS SHOWN
(Symbol)	38	ROSA GYMNOCARPA	BALDHIP ROSE	2 GAL	AS SHOWN
(Symbol)	20	SYMPHORICARPOS ALBUS	COMMON SNOWBERRY	2 GAL	AS SHOWN
(Symbol)	6	SPIRAEA X BUMALDA 'GOLDMOUND'	GOLDMOUND BUMALD SPIREA	2 GAL	AS SHOWN
(Symbol)	2	VIBURNUM DAVIDII	DAVID VIBURNUM	3 GAL	AS SHOWN
(Symbol)	23	VIBURNUM TINUS	LAURUSTINUS	5 GAL	SPACE 48" O.C.
(Symbol)	37	VACCINIUM OVATUM	EVERGREEN HUCKLEBERRY	3 GAL	AS SHOWN

GROUNDCOVER

(Symbol)	8	HELICHTOTRICHON SEMPERVIRENS - BLUE OAT GRASS	1 GAL - SPACE AS SHOWN	
(Symbol)	47	POLYSTICHUM MUNITUM - WESTERN SWORD FERN	1 GAL - SPACE AS SHOWN	
(Symbol)	74	ARCTOSTAPHYLOS UVA-URSI - KINNICKINICK	1 GAL - SPACE 2" O.C.	
(Symbol)	23	MAHONIA REPENS - CREPING MAHONIA	1 GAL - SPACE 30" O.C.	
(Symbol)	2340 SF	PT 301- WATER SMARTER TALL FESCUE BLEND TURFWAY TALL FESCUE - FESTUCA ARUNDINACEA 'TURFWAY' HOUNDDOG 8 TALL FESCUE - FESTUCA ARUNDINACEA 'HOUNDDOG 8' BLOODHOUND TALL FESCUE - FESTUCA ARUNDINACEA 'BLOODHOUND'		7 LBS / 1000 S.F.
(Symbol)	4635 SF	PT 702 - NATIVE URBAN MEADOW		4 OZ / 1000 S.F.

LEGEND

- (Symbol) EXISTING TREE TO REMAIN
- (Symbol) BENCH
- (Symbol) GRAVEL EDGING - SEE SHEET L2 FOR DETAILS
- (Symbol) 5' BLACK VINYL CLAD CHAIN LINK FENCING AROUND PLAY AREA

KEY NOTES

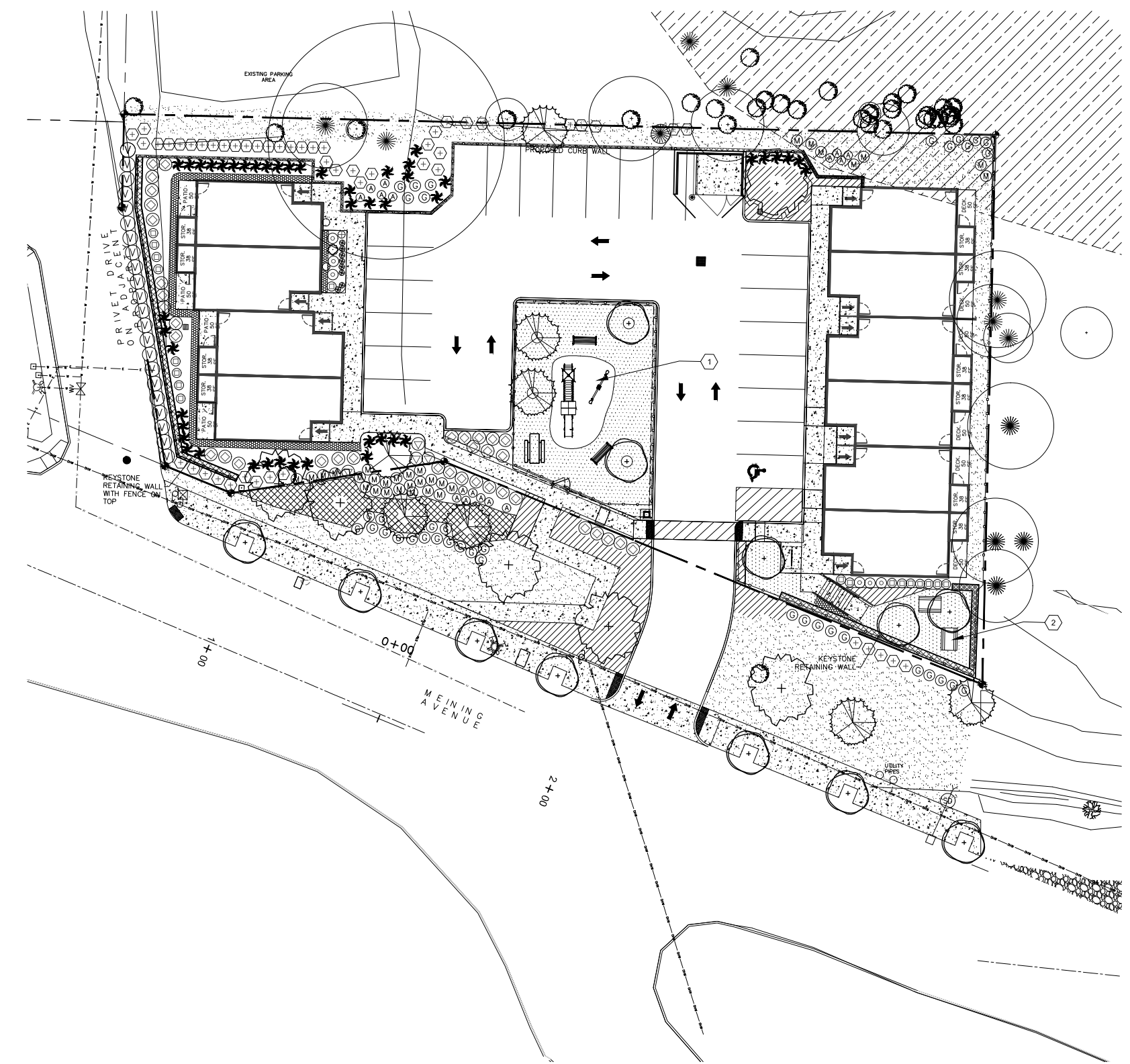
- 1 RECREATIONAL PLAY AREA - SPECIFIC PLAY EQUIPMENT TO BE DETERMINED LATER
- 2 PICNIC AREA- PICNIC TABLES

GENERAL NOTES

- ALL LANDSCAPE AREAS TO BE IRRIGATED WITH AN AUTOMATIC UNDERGROUND IRRIGATION SYSTEM. SYSTEM SHALL USE DRIP IRRIGATION AND WATER CONSERVATION ROTOR IRRIGATION HEADS. NATIVE PLANTING AREAS SHALL HAVE TEMPORARY IRRIGATION THAT WILL BE REDUCED EACH YEAR UNTIL PLANTS ARE FULLY ESTABLISHED.
- QUANTITIES ARE INTENDED TO ASSIST THE CONTRACTOR IN EVALUATING THEIR OWN TAKEOFFS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR BID QUANTITIES AS SHOWN AND REQUIRED BY THE PLANS.
- CONTRACTOR SHALL PROVIDE TOPSOIL, SOIL AMENDMENTS, AND COMPOST IN REQUIRED QUANTITIES TO CREATE THE PLANTING SOIL FOR PLANTED AND SEEDED AREAS IN ACCORDANCE WITH THE DETAILS AND SPECIFICATIONS.
- CONTRACTOR SHALL VERIFY THE LOCATIONS OF UTILITIES PRIOR TO BEGINNING EXCAVATION.
- IF PLANT MATERIAL CONFLICTS WITH NEW OR EXISTING UTILITIES TO REMAIN, THE CONTRACTOR SHALL ADJUST THE PLANTING LOCATIONS IN COORDINATION WITH THE OWNER'S REPRESENTATIVE.
- PROVIDE 3" OF BARK MULCH AROUND PLANTING.
- RESTORE PUBLIC RIGHT IF AREA DISTURBED BY UTILITY INSTALLATION AND SEED AREA WITH NATIVE URBAN MEADOW MIX.
- SEE SHEET L2 FOR PLANTING DETAILS AND NOTES.

SITE DATA

TOTAL SITE AREA =	25,869 S.F.
REQUIRED LANDSCAPE AREA =	25% OF SITE AREA = 6,467.25 S.F.
TOTAL LANDSCAPE AREA PROVIDED =	32.98 % = 8,522.83 S.F.
RECREATION REQUIRED =	2000 S.F.
RECREATIONAL AREA PROVIDED	
PICNIC AREA =	651.8 S.F.
CHILDREN PLAY AREA =	2,054.1 S.F.
TOTAL RECREATION AREA =	2,705.9 S.F.



REVISIONS

No.	Description	Date

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CHECKED BY:
BY:
JOB NO: 20-004

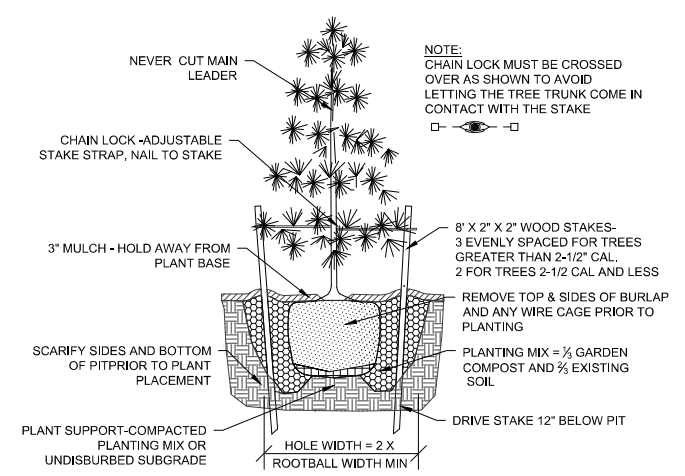
DATE: 07/7/2021
ISSUED FOR: DESIGN REVIEW

SHEET TITLE: LANDSCAPE NOTES AND DETAILS

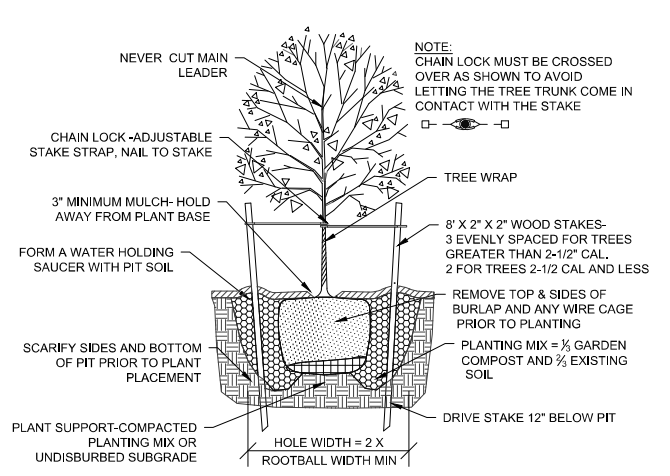
SHEET NO.

NOTES

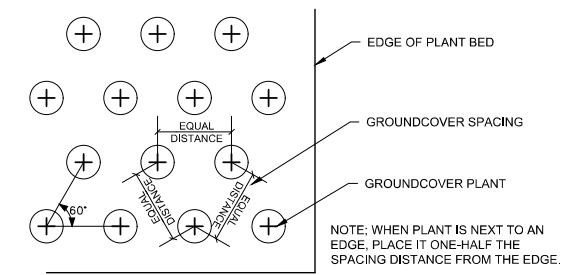
- PROVIDE ONE PERSON WHO WILL BE PRESENT AT ALL TIMES DURING THE WORK WHO IS FAMILIAR WITH PLANT MATERIALS AND IS KNOWLEDGEABLE OF GOOD HORTICULTURAL PRACTICE.
- CONTRACTOR SHALL REMOVE EXISTING VEGETATION THAT INTERFERES WITH ACCESS TO THE NEW PLANTING LOT. RECENTLY PLANTED MATERIAL SHALL BE STOCKPILED AND BE RE-PLANTED IN NEW LOCATIONS INDICATED ON THE PLANTING PLAN.
- NOTIFY THE OWNER'S REPRESENTATIVE, 48 HOURS IN ADVANCE OF WORK FOR SITE INSPECTION OF PLANT MATERIALS. THE LANDSCAPE ARCHITECT RETAINS THE RIGHT TO REJECT ANY MATERIALS WHICH DO NOT MEET MINIMUM SIZE REQUIREMENTS, OR WHICH DO NOT APPEAR HEALTHY AND WELL FORMED. REMOVE UNACCEPTABLE PLANT MATERIALS FROM WORK AREA IMMEDIATELY.
- VERIFY ALL QUANTITIES AND REPORT DISCREPANCIES TO OWNER'S REPRESENTATIVE FOR CLARIFICATION.
- CONTACT A UTILITY LOCATES COMPANY BEFORE STARTING EXCAVATIONS.
- FINAL GRADING SHALL PROVIDE DRAINAGE OF LANDSCAPE AREAS. PLANTING AREAS SHALL SLOPE AWAY FROM BUILDINGS WITH A 2% SLOPE MINIMUM. SHRUB BEDS AND LAWNS SHALL BE CROWNED WITH A 2% SLOPE UNLESS INDICATED OTHERWISE. FINAL GRADES SHALL BE 2 INCHES BELOW ADJACENT WALKS AND CURBS FOR MULCH APPLICATIONS AND 1 INCH BELOW FOR SOD INSTALLATION.
- ALL PLANTS SHALL BE HEALTHY, WELL BRANCHED, ROOTED, TRUE TO SPECIES AND VARIETY, FREE FROM DISEASE, INSECTS, PESTS AND WEEDS. THEY SHALL HAVE GOOD GROWTH HABIT FREE OF PHYSICAL DISFIGURATION, INJURY, ABRASIONS OR SUN SCALDS. PLANTS SHALL EQUAL OR EXCEED MEASUREMENTS IN THE PLANT LIST.
- PLANTS WILL CONFORM TO CURRENT REQUIREMENTS OF 'AMERICAN STANDARDS FOR NURSERY STOCK' BY THE AMERICAN ASSOCIATION OF NURSERYMEN.
- PLANTS SHALL BE GROWN FOR THIS GENERAL LATITUDE AND ELEVATION OR SHALL BE ADEQUATELY CLIMATIZED.
- PROTECT PLANTS AT ALL TIMES DURING SHIPPING, HANDLING, STORAGE AND PLANTING FROM BREAKAGE, DESICCATION, WINDBURN, SUN DAMAGE AND WEATHER EXTREMES. STORE PLANTS IN AN UPRIGHT POSITION AND ALLOW SUFFICIENT VENTILATION. PROVIDE IRRIGATION. DO NOT PICK UP CONTAINERIZED OR BALLED PLANTS BY STEMS OR TRUCKS.
- ALL PLANTS WILL BE WELL FORMED AND POSSESS TOP AND ROOT GROWTH TYPICAL TO THE VARIETY AND IN HEALTHY PROPORTIONS TO EACH OTHER.
- CONTAINER GROWN MATERIAL SHALL HAVE ENOUGH FIBROUS ROOT MASS TO HOLD TOGETHER WHEN REMOVED FROM THE CONTAINER. ROOT BOUND MATERIAL IS UNACCEPTABLE.
- PLANTING PITS SHALL BE BACKFILLED WITH TWO-THIRDS EXISTING SOIL AND ONE-THIRD ORGANIC AMENDING MATERIAL APPROPRIATE FOR EACH SPECIES. CLEAN EXISTING SOIL OF ROOTS, PLANTS, SOD, STONES, CLODS, POCKETS OF COARSE SAND, CONCRETE SLURRY, CONCRETE LAYERS OR CHUNKS, CEMENT, ASPHALT, PLASTER, BUILDING DEBRIS, AND OTHER EXTRANEIOUS MATERIALS HARMFUL TO PLANT GROWTH. BACK FILL MATERIAL SHALL BE THOROUGHLY MIXED. NOTIFY LANDSCAPE ARCHITECT IMMEDIATELY IF AN UNUSUAL CONDITION WHICH APPEARS DETRIMENTAL TO THE NEW PLANTING IS ENCOUNTERED. PLANTING BEDS SHALL BE 4 INCHES OF AMENDING MATERIAL AND 8 INCHES EXISTING SOIL OR IF EXISTING SOIL IS INAPPROPRIATE, REMOVE IT AND REPLACE IT WITH 8 INCHES OF IMPORTED TOP SOIL AND 4 INCHES OF AMENDING MATERIAL.
- AMENDING MATERIAL SHALL BE COMPOST MATERIAL, COMPOST SHALL BE FROM A PROVIDER THAT COMPLIES WITH THE US COMPOSTING COUNCIL STANDARDS FOR COMPOST PRODUCTION. THE COMPOST SHALL BE FREE OF NOXIOUS WEED SEED OR OTHER DELETERIOUS MATERIAL. IT SHALL HAVE A P.H. BETWEEN 6 AND 7.2.
- TEST PLANTING SOIL TO DETERMINE FERTILIZER REQUIREMENTS PRIOR TO INSTALLING PLANTS. ADD FERTILIZER TO PLANTING SOIL AT THE RATES RECOMMENDED BY CERTIFIED SOIL LAB. DO NOT ADD FERTILIZER TO STORM WATER PLANTING AREAS.
- INSTALL OR REPAIR IRRIGATION SYSTEMS PRIOR TO PLANT MATERIAL INSTALLATION.
- INSTALL PLANT MATERIAL WHEN CONDITIONS ARE APPROPRIATE. DO NOT INSTALL PLANT MATERIAL DURING THE FOLLOWING CONDITIONS:
 - EXTENDED HOT WINDY WEATHER, GREATER THAN 90 DEGREES FAHRENHEIT.
 - WINDY WEATHER WITH VELOCITY GREATER THAN 20 MPH.
 - WHEN THE GROUND IS FROZEN AND COLDER THAN 32 DEGREES FAHRENHEIT.
- FIELD PLACE TREES AND SHRUBS IN LOCATIONS SHOWN ON DRAWINGS. PREPARE DEPTH OF PLANTING PIT EQUAL TO THE SIZE OF THE ROOT BALL WITH THE ROOTBALL FLUSH TO GRADE AND 1-2 INCHES HIGHER IN SLOWING DRAINING SOIL. WIDTH OF THE PLANTING PITS SHALL BE AT LEAST TWICE AS WIDE AS THE SIZE OF THE ROOT BALL.
- AFTER SETTING BALLED PLANTS COMPLETELY REMOVE TWINE OR WIRE BINDING AND FOLD BACK BURLAP FROM AT LEAST ONE THIRD OF THE ROOT BALL. NON BIODEGRADABLE WRAPPING SHALL BE REMOVED. DO NOT PLANT IF THE ROOTBALL IS BROKEN OR CRACKED.
- WHEN SETTING CONTAINERIZED PLANTS, LOOSEN ANY CIRCLED OR BOUND ROOTS TO INSURE STRAIGHT ROOT GROWTH INTO PLANT PIT OR BED SOIL. SEVERELY COILED AND ROOT BOUND PLANTS ARE UNACCEPTABLE.
- AFTER BACKFILLING 2/3 OF THE SOIL MIX THOROUGHLY WATER-IN EACH PLANT. IF RECOMMENDED PLACE FERTILIZER SLOW RELEASE TABLETS IN THE SOIL SO THEY DO NOT TOUCH THE PLANT ROOTS. TAMP IN REMAINING BACKFILL TO FINISHED GRADE AND CREATE LOW BERM WITH PLANTING SOIL AROUND PLANT TO RETAIN WATER. HOSE PLANT WITH A FINE MIST TO CLEANSE LEAVES OF DEBRIS AND REMOVE TAGS.
- APPLY A COMMERCIAL GRADE, MEDIUM GRIND, NATURALLY COLORED SOFTWOOD MULCH UNIFORMLY OVER THE PLANTING AREA A MINIMUM OF TWO INCHES (2") THICK. MULCH SHALL NOT COVER THE ROOT CROWN OR BE PLACED OVER GROUND COVER PLANTINGS.
- AMEND LAWN WITH A 4 INCH MINIMUM OF COMPOSTED GARDEN MULCH. ADD FERTILIZER AT RATES RECOMMENDED BY SOIL TESTING LABS. INCORPORATE AMENDING MATERIAL IN THE TOP 8 INCHES OF EXISTING SOIL AND THOROUGHLY BLEND. AFTER THE SOIL HAS BEEN PREPARED, APPLY PRILLED LIME AT A RATE DETERMINED BY TESTING, AND RAKE INTO SOIL SURFACE. FLOAT AND ROLL LAWN AREAS TO ENSURE A SMOOTH, FIRM, AND MOWABLE LAWN SURFACE.
- ONLY STAKE TREES IF ADDITIONAL SUPPORT IS NECESSARY AS IN THE FOLLOWING CONDITIONS: ROOT BALLS CONTAIN VERY SANDY SOIL OR VERY WET CLAY OR TREES ARE LOCATED IN A PLACE OF EXTREMELY WINDY CONDITIONS. IF STAKING IS DETERMINED NECESSARY, STAKE SHALL BE 2" X 2" WHPA NO.2 GRADE DOUGLAS FIR, EIGHT FEET LONG. TREE TIES SHALL BE POLY CHAIN LOCK MATERIAL AND LEAVE SLACK IN THE TIE. STAKES SHOULD NOT CONTACT THE TREE ROOTS OR ROOTBALL AND SHOULD BE EMBEDDED 12" BELOW THE PLANT PIT. REMOVE THE TREE TIES AND STAKES AFTER ONE YEAR.
- IRRIGATE WHEN NECESSARY TO AVOID DRYING OUT OF MATERIAL AND TO PROMOTE HEALTHY GROWTH UNTIL FINAL APPROVAL.
- AT JOB COMPLETION, ALL DEBRIS, EXTRA MATERIALS, SUPPLIES AND EQUIPMENT SHALL BE REMOVED FROM THE SITE. ALL SURFACES SHALL BE SWEEP CLEAN AND MULCH AREAS CLEARED OF SOIL. ALL AREAS OF THE PROJECT SHALL BE CLEAN, ORDERLY AND COMPLETE.



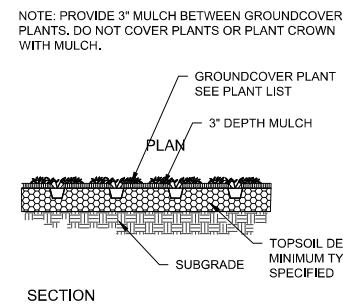
1 EVERGREEN TREE PLANTING DETAIL
L2 NOT TO SCALE



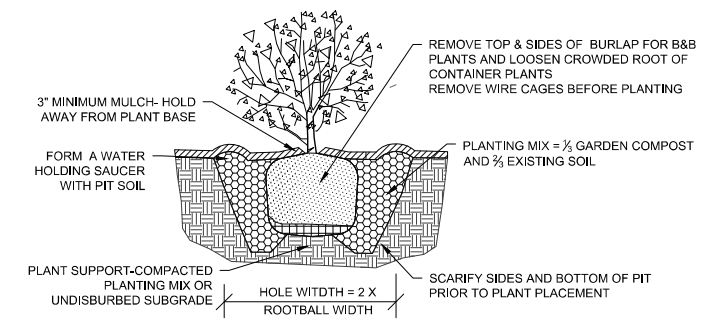
2 DECIDUOUS TREE PLANTING DETAIL
L2 NOT TO SCALE



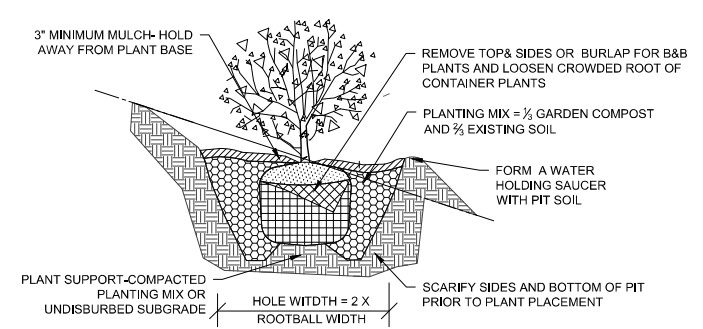
3 GROUNDCOVER PLANTING DETAIL
L2 NOT TO SCALE



4 PEA GRAVEL EDGING DETAIL
L2 NOT TO SCALE



5 SHRUB PLANTING DETAIL
L2 NOT TO SCALE



6 SLOPE PLANTING DETAIL
L2 NOT TO SCALE



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11104 S.E. STARK STREET
 PORTLAND, OR 97216
 T: 503.284.0988 | F: 503.546.9276

THE PAD
TOWNHOME APARTMENTS
 17650 MEINIG AVENUE
 SANDY, OR 97055

REVISIONS

No.	Description	Date

DRAWN BY: SJM
 CHECKED BY: DH
 JOB NO: 20-004

DATE: 07/16/2021
 ISSUED FOR: DESIGN REVIEW

SHEET TITLE
 SITE PLAN - EXISTING / DEMO

SHEET NO.

A-101

SITE STATISTICS - EXISTING (ON SITE)

TOTAL SITE AREA (AS SURVEYED):	25,869 SF	100%
(0.59 ACRES)		
IMPERVIOUS AREA:		
BUILDING FOOTPRINT (EXISTING):	0 SF	
HARDSCAPE (EXISTING):	0 SF	
EXISTING IMPERVIOUS AREA:	0 SF	0%
PERVIOUS AREA (GRAVEL):	1,620 SF	(6%)
PERVIOUS AREA (LANDSCAPE):	24,249 SF	(94%)
EXISTING PERVIOUS AREA:	25,869 SF	100%

EXISTING VEHICLE PARKING COUNTS:
 SITE IS UNDEVELOPED AND NO VEHICLE PARKING EXISTS

EXISTING BICYCLE PARKING:
 SITE IS UNDEVELOPED AND NO BICYCLE PARKING EXISTS

SITE STATISTICS - EXISTING (OFF SITE)

IMPERVIOUS AREA:		
EXISTING TOTAL PERVIOUS AREA:	2,156 SF	
ASPHALT SIDEWALK (DEMO):	<2,022 SF>	
CONC. CURB RAMP (DEMO):	<134 SF>	
EXISTING IMPERVIOUS TO REMAIN:	0 SF	

PERVIOUS AREA:		
EXISTING TOTAL PERVIOUS AREA:	8,243 SF	
GRAVEL (DEMO):	<1,882 SF>	
LANDSCAPE (DEMO):	<2,690 SF>	
EXISTING LANDSCAPE TO REMAIN:	3,671 SF	

NOTE: TOTAL ADJACENT OFF-SITE AREA IS ALSO REDUCED DUE TO RELOCATION OF THE STREET CURB AS A RESULT OF WIDENING THE ROAD.

SITE PLAN LEGEND

	(E) CONCRETE
	(E) ASPHALT
	(E) LANDSCAPE
	(E) GRAVEL
	(E) FLOOD SLOPE HAZARD ZONE
	(E) DRAINAGE DITCH
	DEMO AREA
	(E) PROPERTY LINE
	(E) FENCE LINE
	(E) BUILDING FOOTPRINT
	(E) CONTOUR LINE - SEE CIVIL
	(E) SIGN
	(E) TREE - EVERGREEN
	(E) TREE - DECIDUOUS
	(E) SHRUBBERY
	(E) STORMWATER INLET
	(E) FIRE HYDRANT - OR - FDC
	(E) GAS METER
	VEHICLE CIRCULATION
	BUILDING ENTRY/EXIT



SITE PLAN KEY NOTES
 NOTE: COORDINATE DEMOLITION EXTENTS WITH NEW SITE PLAN AND CIVIL DRAWINGS

1	(E) UTILITY BOX/Vault
2	(E) CONCRETE CURB - TYP
3	(E) CONCRETE PAVED AREA - TYP
4	(E) LANDSCAPE AREA - TYP
5	(E) SHRUBS/BUSHES
6	(E) TREE - TYP
7	(E) FIRE HYDRANT
8	(E) UTILITY POLE
9	DEMO (E) ASPHALT PAVED AREA
10	DEMO (E) CONCRETE CURB
11	DEMO (E) CONCRETE PAVED AREA
12	DEMO (E) LANDSCAPE AREA
13	DEMO (E) GRAVEL AREA
14	DEMO (E) TREE - TYP
15	DEMO (E) FENCE
16	DEMO (E) LANDSCAPE AND PREP FOR NEW RETAINING WALL
17	VERIFY CONDITION OF (E) GAS METER AND SUPPLY LINE

1 SITE PLAN - EXISTING / DEMO
 SCALE: 1" = 10'-0"



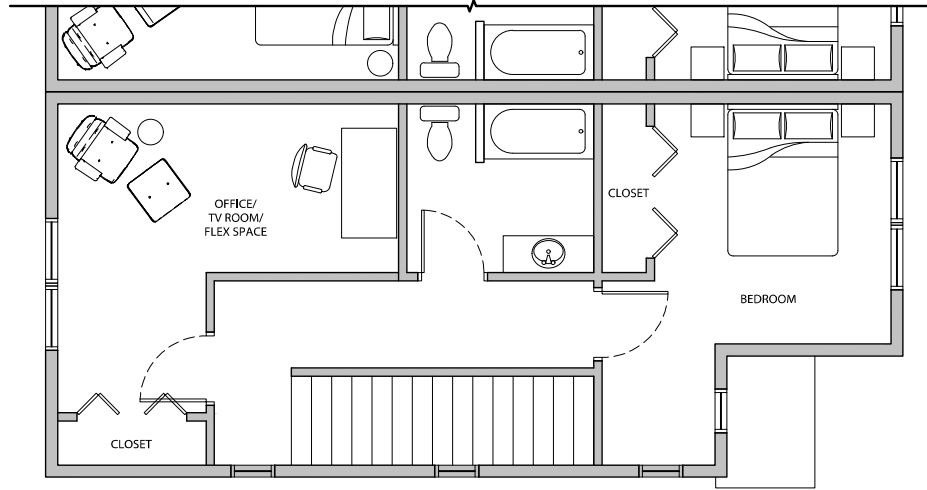
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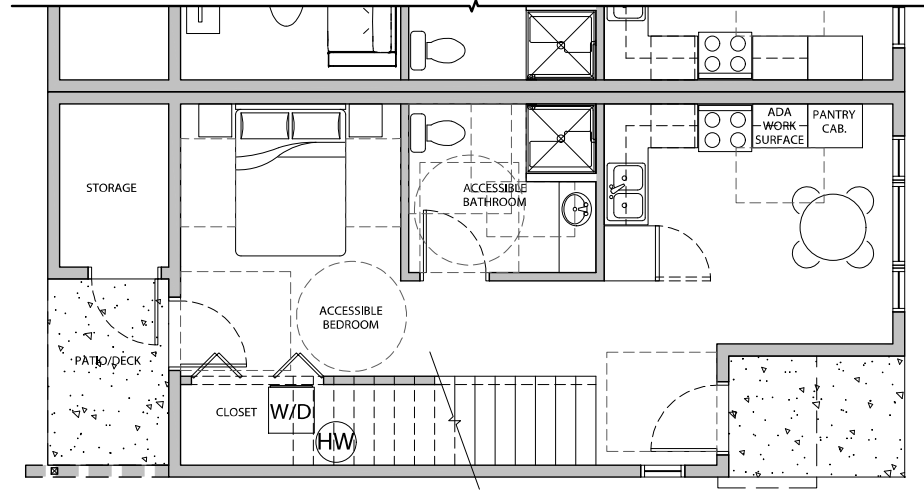
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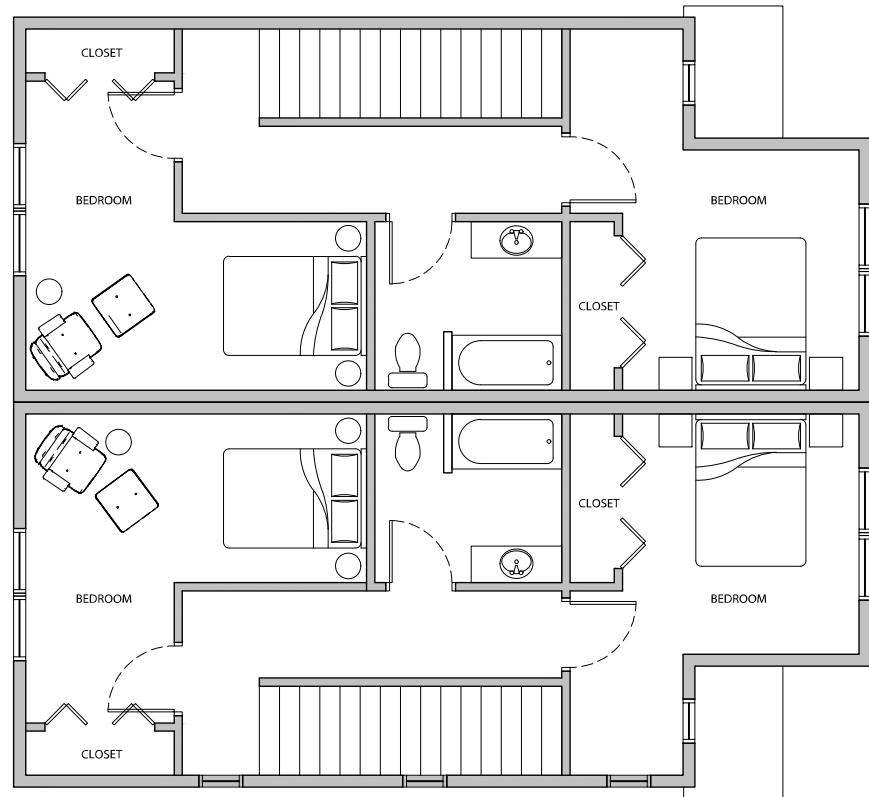
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 SANDY, OR 97055



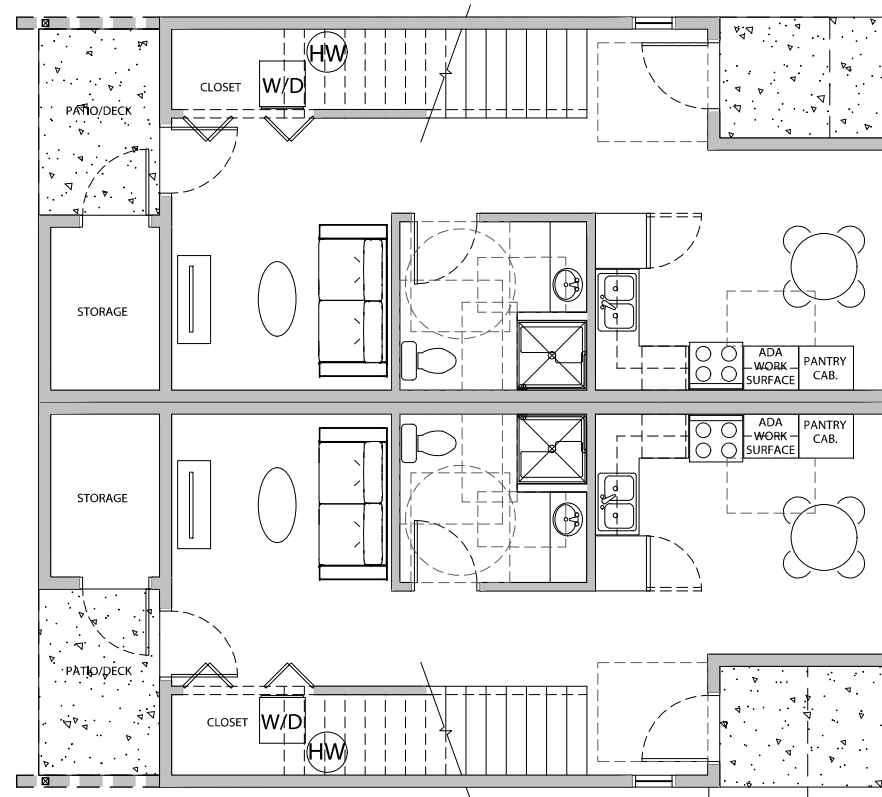
4 SECOND FLOOR PLAN - ACCESSIBLE UNIT
 SCALE: 1/4" = 1'-0"



3 FIRST FLOOR PLAN - ACCESSIBLE UNIT
 SCALE: 1/4" = 1'-0"



2 SECOND FLOOR PLAN - STANDARD UNIT
 SCALE: 1/4" = 1'-0"



1 FIRST FLOOR PLAN - STANDARD UNIT
 SCALE: 1/4" = 1'-0"

REVISIONS

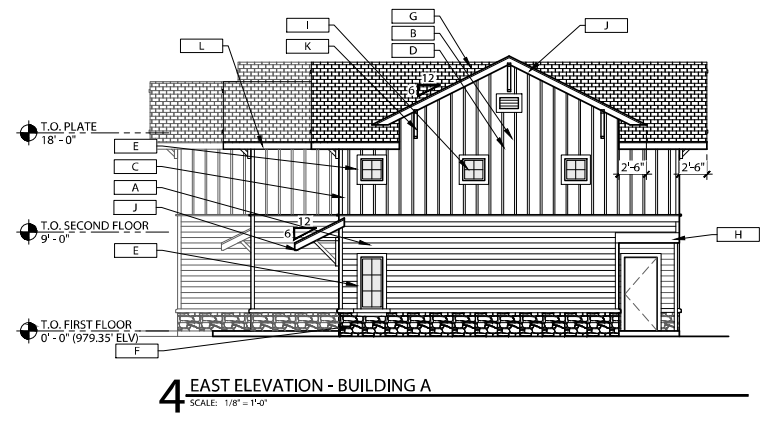
No.	Description	Date

DRAWN BY: SJM
 CHECKED BY: DH
 JOB NO: 20-004
 DATE: 07/16/2021
 ISSUED FOR: DESIGN REVIEW

SHEET TITLE
 FIRST AND SECOND FLOOR PLANS
 PROPOSED

SHEET NO.
A-201

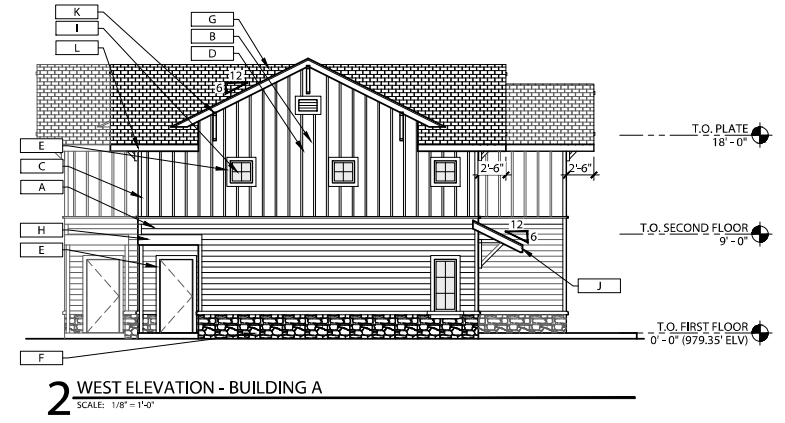
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4 EAST ELEVATION - BUILDING A
 SCALE: 1/8" = 1'-0"



3 NORTH ELEVATION - BUILDING A
 SCALE: 1/8" = 1'-0"



2 WEST ELEVATION - BUILDING A
 SCALE: 1/8" = 1'-0"



1 SOUTH ELEVATION - BUILDING A
 SCALE: 1/8" = 1'-0"

EXTERIOR FINISH MATERIAL LEGEND						
CODE	MATERIAL	MFG	DESCRIPTION			ADDITIONAL INFO
			PRODUCT	COLOR	DIM.	
A	LAP SIDING	JAMES HARDIE	SELECT CEDAR MILL	WARM WHISKY	8 1/4" (7" EXPOSURE)	
B	HARDIE PANEL	JAMES HARDIE	SELECT CEDAR MILL	COBBLE STONE	PANEL	
C	HARDIE TRIM	JAMES HARDIE	3/4" ROUGH SAWN	ARCTIC WHITE	5.5"	
D	HARDIE TRIM	JAMES HARDIE	1/2" RUSTIC GRAIN BATTEN BOARDS	COBBLE STONE	2.5"	
E	HARDIE TRIM	JAMES HARDIE	3/4" ROUGH SAWN	ARCTIC WHITE	3.5"	
F	CULTURED STONE	MUTUAL MATERIALS	COUNTRY LEDGE STONE	SKYLINE	VARIES	
G	ASPHALT SHINGLES	OWENS CORNING	OAKRIDGE	BROWNWOOD		
H	HARDIE TRIM	JAMES HARDIE	3/4" ROUGH SAWN	ARCTIC WHITE	11.25"	
I	VINYL WINDOWS	TBD	TBD	WHITE	VARIES	LOW-E, INSULATED GLASS

EXTERIOR FINISH MATERIAL LEGEND						
CODE	MATERIAL	MFG	DESCRIPTION			ADDITIONAL INFO
			PRODUCT	COLOR	DIM.	
J	WOOD RAKE	N/A	RAKE BOARD	ARCTIC WHITE	2 X 8	DIMENSIONAL LUMBER
K	WOOD BRACKET	EKENA MILLWORK	WOOD BRACKET	ARCTIC WHITE	32" X 32"	4"X4" ROUGH SAWN LUMBER - WRC OR DF
L	WOOD FASCIA	N/A	WOOD FASCIA	ARCTIC WHITE	2 X 8	DIMENSIONAL LUMBER

ELEVATIONS GENERAL NOTES

- MATERIAL MANUFACTURERS AND FINISH TO BE DETERMINED.
- COLORS SHALL BE IN MUTED EARTH TONE PALETTE AS SUGGESTED BY SANDY STYLE DEVELOPMENT CODE - SEE COLOR RENDERERS INCLUDED WITH THIS SUBMISSION

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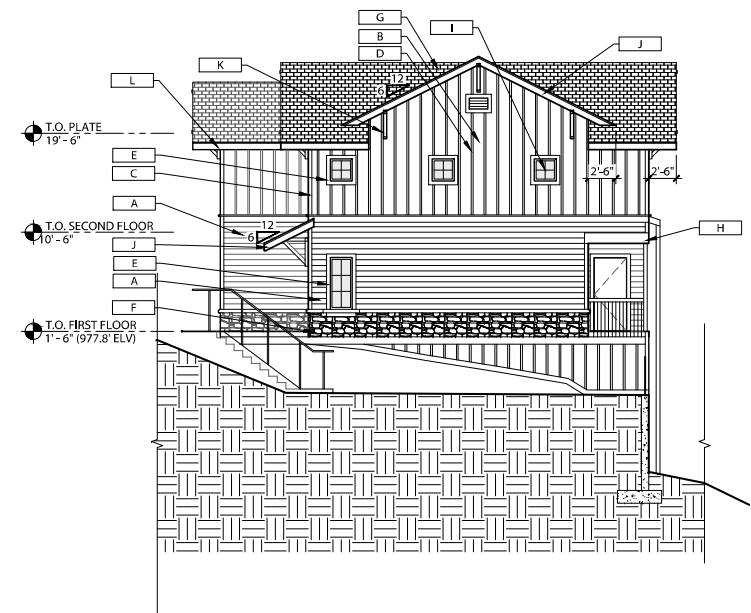
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No.	Description	Date

DRAWN BY: SJM
 CHECKED BY: DH
 JOB NO: 20-004

DATE: 07/16/2021
 ISSUED FOR: DESIGN REVIEW

SHEET TITLE
 EXTERIOR ELEVATIONS
 PROPOSED NORTH BUILDING "A"

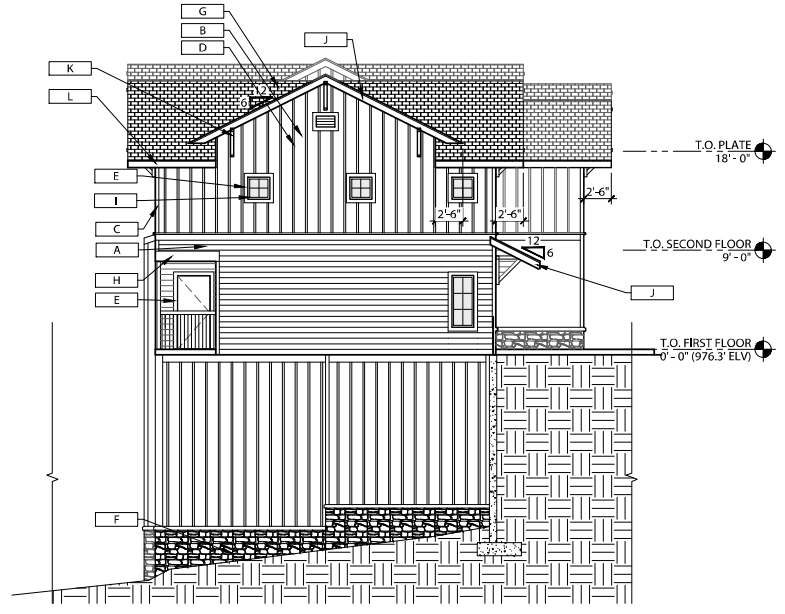
SHEET NO.



4 WEST ELEVATION - BUILDING B
SCALE: 1/8" = 1'-0"



3 SOUTH ELEVATION - BUILDING B
SCALE: 1/8" = 1'-0"



2 EAST ELEVATION - BUILDING B
SCALE: 1/8" = 1'-0"



1 NORTH ELEVATION - BUILDING B
SCALE: 1/8" = 1'-0"

EXTERIOR FINISH MATERIAL LEGEND						
CODE	MATERIAL	MFG	PRODUCT	COLOR	DIM.	ADDITIONAL INFO
A	LAP SIDING	JAMES HARDIE	SELECT CEDAR MILL	WARM WHISKY	8 1/2" (7" EXPOSURE)	
B	HARDIE PANEL	JAMES HARDIE	SELECT CEDAR MILL	COBBLE STONE	PANEL	
C	HARDIE TRIM	JAMES HARDIE	3/4" ROUGH SAWN	ARCTIC WHITE	5.5"	
D	HARDIE TRIM	JAMES HARDIE	3/4" RUSTIC GRAIN BATTEN BOARDS	COBBLE STONE	2.5"	
E	HARDIE TRIM	JAMES HARDIE	3/4" ROUGH SAWN	ARCTIC WHITE	3.5"	
F	CULTURED STONE	MUTUAL MATERIALS	COUNTRY LEDGE STONE	SKYLINE	VARIES	
G	ASPHALT SHINGLES	OWENS CORNING	OAKRIDGE	BROWNWOOD		
H	HARDIE TRIM	JAMES HARDIE	3/4" ROUGH SAWN	ARCTIC WHITE	11.25"	
I	VINYL WINDOWS	TBD	TBD	WHITE	VARIES	LOW-E, INSULATED GLASS

EXTERIOR FINISH MATERIAL LEGEND						
CODE	MATERIAL	MFG	PRODUCT	COLOR	DIM.	ADDITIONAL INFO
J	WOOD RAKE	N/A	RAKE BOARD	ARCTIC WHITE	2 X 8	DIMENSIONAL LUMBER
K	WOOD BRACKET	EKENA MILLWORK	WOOD BRACKET	ARCTIC WHITE	32" X 32"	4"X4" ROUGH SAWN LUMBER - WRC OR DF
L	WOOD FASCIA	N/A	WOOD FASCIA	ARCTIC WHITE	2 X 8	DIMENSIONAL LUMBER

ELEVATIONS GENERAL NOTES

- MATERIAL MANUFACTURERS AND FINISH TO BE DETERMINED.
- COLORS SHALL BE IN MUTED EARTH TONE PALETTE AS SUGGESTED BY SANDY STYLE DEVELOPMENT CODE - SEE COLOR RENDERERS INCLUDED WITH THIS SUBMISSION

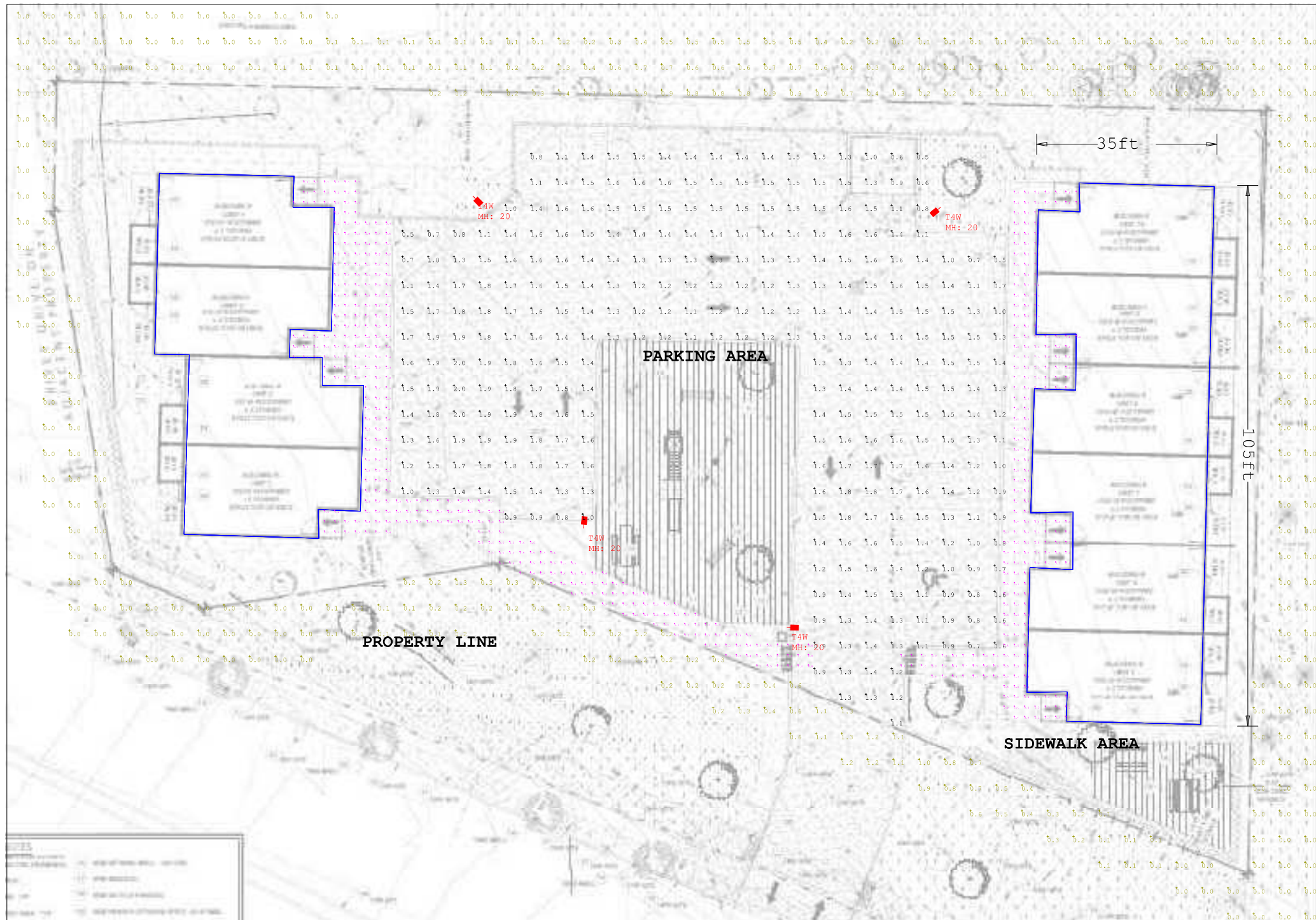
REVISIONS		
No.	Description	Date

DRAWN BY: SJM
CHECKED BY: DH
JOB NO: 20-004

DATE: 07/16/2021
ISSUED FOR: DESIGN REVIEW

SHEET TITLE
EXTERIOR ELEVATIONS
PROPOSED SOUTH BUILDING "B"

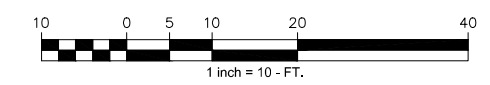
SHEET NO.



Luminaire Schedule							
Symbol	Label	Qty	Lum. Watts	Lum. Lumens	LLF	Arrangement	Description
	T4W	4	49.8	6245	0.850	SINGLE	RAR1-80L-50-4K7-4W

Note:
 Calculation Grid (5ft x 5ft) @ Ground Level.
 SidewalkGrid (2ft x 2ft) @ Ground Level.
 Luminaire mounting heights are noted on each Luminaire Label.

Calculation Summary							
Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
Parking area	Illuminance	Fc	1.37	2.0	0.5	2.74	4.00
Property line	Illuminance	Fc	0.16	1.3	0.0	N.A.	N.A.
Sidewalk area	Illuminance	Fc	0.58	1.5	0.0	N.A.	N.A.



LT-1

PHOTOMETRIC PLAN

The Pad Townhouses Sandy OR

REVISED FROM DRAWING NUMBERS:			DN BY:	DATE:	CHK BY:
20-26577	20-26577R1		Harish	05-27-2021	
		Hubbell Lighting, Inc. 701 MILLENNIUM BLVD. GREENWILE, SC 29607	REV. BY:	DATE:	SCALE:
			N/A		AS NOTED
			QUOTE:	DRAWING / DESIGN NO.:	
					20-26577R2

1. THIS LIGHTING DESIGN IS BASED ON LIMITED INFORMATION SUPPLIED BY OTHERS TO HUBBELL LIGHTING. SITE DETAILS PROVIDED HEREON ARE REPRODUCED ONLY AS A VISUALIZATION AD. FIELD DEVIATIONS MAY SIGNIFICANTLY AFFECT PREDICTED PERFORMANCE. PRIOR TO INSTALLATION, CRITICAL SITE INFORMATION (POLE LOCATIONS, ORIENTATION, MOUNTING HEIGHT, ETC.) SHOULD BE COORDINATED WITH THE CONTRACTOR AND/OR SPECIFIER RESPONSIBLE FOR THE PROJECT.

2. LUMINAIRE DATA IS TESTED TO INDUSTRY STANDARDS UNDER LABORATORY CONDITIONS. OPERATING VOLTAGE AND NORMAL MANUFACTURING TOLERANCES OF LAMP, BALLAST, AND LUMINAIRE MAY AFFECT FIELD RESULTS.

3. CONFORMANCE TO FACILITY CODE AND OTHER LOCAL REQUIREMENTS IS THE RESPONSIBILITY OF THE OWNER AND/OR THE OWNER'S REPRESENTATIVE.

SECTION IV – APPENDIX ITEMS
EXHIBIT F – MATERIALS SELECTION/
LIGHTING FIXTURE CUT SHEETS

THE PAD - RESIDENTIAL DEVELOPMENT

EXTERIOR FINISHES - MATERIAL SAMPLE BOARD

MATERIAL "A" - LAP SIDING

MANUFACTURER: JAMES HARDIE
STYLE: HARDIEPLANK SELECT CEDARMILL
THICKNESS: 5/16"
WIDTH: 8.25" (7" EXPOSURE)
COLOR: WARM WHISKY (PRE-FINISHED)



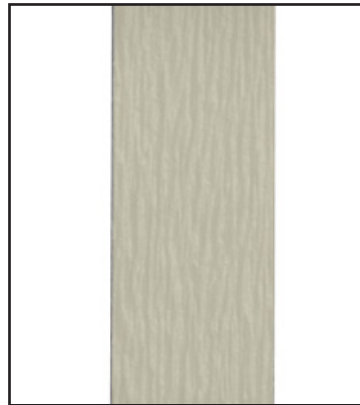
MATERIAL "B" - BOARD AND BATTEN SIDING

MANUFACTURER: JAMES HARDIE
STYLE: HARDIE PANEL SELECT CEDARMILL
THICKNESS: 5/16"
COLOR: COBBLE STONE (PRE-FINISHED)



MATERIAL "D" - BOARD AND BATTEN SIDING

MANUFACTURER: JAMES HARDIE
STYLE: HARDIE TRIM BATTENS SELECT CEDARMILL
THICKNESS: 5/16"
WIDTH: 2.5"
COLOR: COBBLE STONE (PRE-FINISHED)



MATERIAL "C" / "E" / "H" - TRIM BAORDS

MANUFACTURER: JAMES HARDIE
STYLE: HARDIE TRIM ROUGH SAWN
THICKNESS: 5/4"
WIDTH: VARIES - SEE ELEVATION DRAWINGS
COLOR: ARCTIC WHITE (PRE-FINISHED)
NOTE: ROOF RAKE AND FASCIA TO BE 2 x 8 DIMENSIONAL
LUMBER PAINTED TO MATCH ARCTIC WHITE



MATERIAL "F" - CULTURED STONE

MANUFACTURER: MUTUAL MATERIALS OR EQ.
STYLE: COUNTRY LEDGESTONE
THICKNESS: VARIES
WIDTH: VARIES
COLOR: SKYLINE



MATERIAL "G" - ASPHALT SHINGLES

MANUFACTURER: OWENS CORNING OR EQ.
STYLE: OAKRIDGE
COLOR: BROWNWOOD



MATERIAL "K" - WOOD BRACKET

MANUFACTURER: EKENA MILLWORKK OR EQ.
STYLE: 4 x 4 ROUGH SAWN CEDAR OR DOUG FIR
DIMENSIONS: 32' x 32"
COLOR: PAINT TO MATCH ARCTIC WHITE



RATIO Series

AREA/SITE LIGHTER

T4W - SITE LIGHTING FIXTURE

FEATURES

- Low profile LED area/site luminaire with a variety of IES distributions for lighting applications such as retail, commercial and campus parking lots
- Featuring Micro Strike Optics which maximizes target zone illumination with minimal losses at the house-side, reducing light trespass issues
- Visual comfort standard
- Compact and lightweight design with low EPA
- 3G rated for high vibration applications including bridges and overpasses
- Control options including photo control, occupancy sensing, NX Distributed Intelligence™ and 7-Pin with networked controls
- Best in class surge protection available



RELATED PRODUCTS

- ⌘ [Airo](#)
- ⌘ [Cimarron LED](#)
- ⌘ [Ratio Family](#)

CONTROL TECHNOLOGY



SPECIFICATIONS

CONSTRUCTION

- Rectilinear form mimics the traditional shoebox form factor keeping a similar but updated style and appearance, ideal for retrofit applications
- Die-cast housing with hidden vertical heat fins that are optimal for heat dissipation while keeping a clean smooth outer surface
- Corrosion resistant, die-cast aluminum housing with powder coat paint finish

OPTICS

- Entire optical aperture illuminates to create a larger luminous surface area resulting in a low glare appearance without sacrificing optical performance
- 80, 160, 320 or 480 midpower LEDs
- 3000K, 4000K or 5000K (70 CRI) CCT
- Zero uplight at 0 degrees of tilt
- Field rotatable optics

INSTALLATION

- Standard square arm mount, compatible with B3 drill pattern
- Optional universal mounting block for ease of installation during retrofit applications. Available as an option or accessory for square and round poles.
- Knuckle arm fitter option available for 2-3/8" OD tenon. Max tilt of 60 degrees with 4 degree adjustable increments. (Restrictions apply for 7-pin options)

ELECTRICAL

- Universal 120-277 VAC or 347-480 VAC input voltage, 50/60 Hz
- Ambient operating temperature -40°C to 40°C
- Drivers have greater than 90% power factor and less than 20% THD
- LED drivers have output power over-voltage, over-current protection and short circuit protection with auto recovery
- Field replaceable surge protection device provides 20kA protection meeting ANSI/IEEE C62.41.2 Category C High and Surge Location Category C3; Automatically takes fixture off-line for protection when device is compromised

CONTROLS

- Photo control, occupancy sensor and wireless available for complete on/off and dimming control
- 7-pin ANSI C136.41-2013 photocontrol receptacle option available for twist lock photocontrols or wireless control modules (control accessories sold separately)
- 0-10V dimming leads available for use with control devices (provided by others, must specify lead length)
- SiteSync™ wireless control system is available via 7-pin See ordering information and details at: www.hubbellighting.com/sitesync
- NX Distributed Intelligence™ available with in fixture wireless control module, features dimming and occupancy sensor

CONTROLS (CONT'D)

- wiSCAPE® available with in fixture wireless control module, features dimming and occupancy sensor via 7-pin

CERTIFICATIONS

- DLC® (DesignLights Consortium Qualified), with some Premium Qualified configurations. Please refer to the DLC website for specific product qualifications at www.designlights.org
- Listed to UL1598 and CSA C22.2#250.0-24 for wet locations and 40°C ambient temperatures
- 3G rated for ANSI C136.31 high vibration applications
- Fixture is IP66 rated
- Meets IDA recommendations using 3K CCT configuration at 0 degrees of tilt

WARRANTY

- 5 year limited warranty
- See [HLI Standard Warranty](#) for additional information

KEY DATA	
Lumen Range	3,000–48,000
Wattage Range	25–340
Efficacy Range (LPW)	118–155
Fixture Projected Life (Hours)	L70>60K
Weights lbs. (kg)	13.5–24 (6.1–10.9)

RATIO SERIES

AREA/SITE LIGHTER

ORDERING GUIDE

Example: RAR1-80L-25-3K7-2-UNV-ASQ-BL-NXWE-BC

CATALOG #

ORDERING INFORMATION

Series	# LEDs - Wattage	CCT/CRI	Distribution	Optics Rotation	Voltage
RAR1 Ratio Area Size 1	80L-25 25W - 3,000 Lumens	3K7 3000K, 70 CRI	2 IES TYPE II	Blank for no rotation	UNV Universal 120-277V
	80L-39 39W - 5,200 Lumens	4K7 4000K, 70 CRI	3 IES TYPE III	L Optic rotation left	120 120V
	80L-50 50W - 6,000 Lumens	5K7 5000K, 70 CRI	4W IES TYPE IV	R Optic rotation right	208 208V
	160L-70 70W - 9,000 Lumens		5QW IES TYPE V		240 240V
	160L-100 100W - 12,000 Lumens				277 277V
	160L-115 115W - 15,000 Lumens				347 347V
	160L-135 135W - 18,000 Lumens				480 480V
RAR2 Ratio Area Size 2	320L-110 110W - 15,000 Lumens				
	320L-140 140W - 18,000 Lumens				
	320L-165 165W - 21,000 Lumens				
	480L-185 185W - 24,000 Lumens				
	480L-210 210W - 27,000 Lumens				
	480L-240 240W - 30,000 Lumens				
	480L-255 255W - 36,000 Lumens				
	480L-295 295W - 42,000 Lumens				
	480L-340 340W - 48,000 Lumens				

Mounting	Color	Control Options Network	Options
ASQ Arm mount for square pole/flat surface	BLT Black Matte Textured	NXWE NX Wireless Enabled (module + radio)	BC Backlight control
ASQU Universal arm mount for square pole/flat surface	BLS Black Gloss Smooth	NXSPW_F NX Wireless, PIR Occ. Sensor, Daylight Harvesting ²	CD Continuous dimming
Mounting Round Poles		NXSP_F NX, PIR Occ. Sensor, Daylight Harvesting ²	F Fusing (must specify voltage)
A_ Arm mount for round pole ¹	GTT Graphite Matte Textured	Control Options Other	
A_U Universal arm mount for round pole ¹	LGS Light Grey Gloss Smooth	SCP-40F Programmable occupancy sensor ³	TB Terminal block
Mounting Other		7PR 7-Pin twist lock receptacle	2PF 2 power feed with 2 drivers ³
WB Wall bracket	PSS Platinum Silver Smooth	7PR-SC 7-Pin receptacle with shorting cap	
MAF Mast arm fitter for 2-3/8" OD horizontal arm	WHT White Matte Textured	7PR-MD40F Low voltage sensor for 7PR	
K Knuckle	WHS White Gloss Smooth	7PR-TL 7-Pin PCR with photocontrol	
	VGT Verde Green Textured		
	Color Option		
	CC Custom Color		

- Notes:
- 1 Replace "_" with "3" for 3.5"-4.13" OD pole, "4" for 4.18"-5.25" OD pole, "5" for 5.5"-6.5" OD pole
 - 2 Replace "_" with "14" for up to 14' mounting height, "30F" for 15-30' mounting height
 - 3 Not available with 25, 50, 255, 295 & 340W configurations
 - 4 At least one SCPREMOTE required to program SCP motion sensor

STOCK ORDERING INFORMATION

Catalog Number	Lumens	Wattage	LED Count	CCT/CRI	Voltage	Distribution	Mounting	Finish
RAR1-100-4K-3	12,000	100W	160L	4000K/70CRI	120-277V	Type 3	Square Arm	Bronze
RAR1-100-4K-4W	12,000	100W	160L	4000K/70CRI	120-277V	Type 4W	Square Arm	Bronze
RAR1-135-4K-3	18,000	135W	160L	4000K/70CRI	120-277V	Type 3	Square Arm	Bronze
RAR1-135-4K-4W	18,000	135W	160L	4000K/70CRI	120-277V	Type 4W	Square Arm	Bronze
RAR2-165-4K-3	21,000	165W	320L	4000K/70CRI	120-277V	Type 3	Square Arm	Bronze
RAR2-165-4K-4W	21,000	165W	320L	4000K/70CRI	120-277V	Type 4W	Square Arm	Bronze

RATIO SERIES

AREA/SITE LIGHTER

OPTIONS AND ACCESSORIES - STOCK (ORDERED SEPARATELY)

Catalog Number	Description
<input type="checkbox"/> RARRPA3DB	Round pole adapter 3.5" to 4.13" for ASQ arm, 3.5" to 4.13" OD pole, dark bronze finish
<input type="checkbox"/> RARA3UDB	Universal mount for square pole or round pole 3.5" to 4.13", dark bronze finish
<input type="checkbox"/> RARBC80L	Ratio blacklight control 80L
<input type="checkbox"/> RARBC160L	Ratio blacklight control 160L
<input type="checkbox"/> RARBC320L	Ratio blacklight control 320L
<input type="checkbox"/> RARBC480L	Ratio blacklight control 480L

ACCESSORIES AND REPLACEMENT PARTS - MADE TO ORDER

Catalog Number	Description
<input type="checkbox"/> RAR-ASQU-XX	Universal arm mount for square pole/flat surface ²
<input type="checkbox"/> RAR-A_U-XX	Universal arm mount for round poles ^{1,2}
<input type="checkbox"/> RAR-RPA_-XX	Round pole adapter ^{1,2}
<input type="checkbox"/> SETAVP-XX	4" square pole top tenon adapter, 2 3/8" OD slipfitter ²
<input type="checkbox"/> RETAVP-XX	4" round pole top tenon adapter; 2 3/8" OD slipfitter for max. Four fixtures (90o); order 4" round pole adapters separately ²
<input type="checkbox"/> BIRD-SPIKE-3	Ratio size 1 bird deterrent/spikes
<input type="checkbox"/> BIRD-SPIKE-4	Ratio size 2 bird deterrent/spikes
<input type="checkbox"/> RARWB-XX	Wall bracket - use with Mast Arm Fitter or Knuckle ²

1 Replace "-" with "3" for 3.5"-4.13" OD pole, "4" for 4.18"-5.25" OD pole, "5" for 5.5"-6.5" OD pole

2 Replace "XX" with desired color/paint finish

CONTROLS

Control Options

Standalone

SW7PR	SiteSync™ on fixture module via 7PR
SWUSB	SiteSync™ Software on USB
SWTAB	SiteSync™ Windows Tablet
SWBRG	SiteSync™ Wireless Bridge Node
SWFC	SiteSync™ Field Commission Serve
SCPREMOTE	Order at least one per project location to program and control

Networked – Wireless

WIR-RME-L	wiSCAPE External Fixture Module ^{1,2}
------------------	--

NX Networked – Wireless

NXOFM-1R1D-UNV	NX Wireless, Daylight Harvesting, BLE, 7 pin twisted lock
-----------------------	---

Notes:

- 1 Works with external networked photosensor
- 2 wiSCAPE Gateway required for system programming

RATIO SERIES

AREA/SITE LIGHTER

PERFORMANCE DATA

Description	Nominal Wattage	System Watts	Dist. Type	5K (5000K NOMINAL 70 CRI)					4K (4000K NOMINAL 70 CRI)					3K (3000K NOMINAL 80 CRI)				
				Lumens	LPW	B	U	G	Lumens	LPW	B	U	G	Lumens	LPW	B	U	G
RAR1	25	25.4	2	3438	135	1	0	1	3445	136	1	0	1	3240	128	1	0	1
			3	3460	136	1	0	1	3467	136	1	0	1	3260	128	1	0	1
			4W	3406	134	1	0	1	3412	134	1	0	1	3209	126	1	0	1
			5QW	3483	137	2	0	1	3490	137	2	0	1	3282	129	2	0	1
	39	39	2	5263	139	1	0	2	5273	139	1	0	2	4960	131	1	0	2
			3	5297	139	1	0	2	5308	140	1	0	2	4991	131	1	0	2
			4W	5200	137	1	0	2	5210	137	1	0	2	4900	129	1	0	2
			5QW	5333	140	3	0	1	5344	141	3	0	1	5025	132	3	0	1
	50	49.8	2	6310	127	1	0	2	6323	127	1	0	2	5946	120	1	0	2
			3	6349	128	1	0	2	6362	128	1	0	2	5983	120	1	0	2
			4W	6233	125	1	0	2	6245	126	1	0	2	5873	118	1	0	2
			5QW	6392	129	3	0	1	6405	129	3	0	1	6023	121	3	0	1
	70	68.4	2	9486	139	1	0	2	9505	139	1	0	2	8938	131	1	0	2
			3	9544	140	1	0	2	9563	140	1	0	2	8993	131	1	0	2
			4W	9395	137	1	0	2	9414	138	1	0	2	8853	129	1	0	2
			5QW	9608	140	4	0	2	9628	141	4	0	2	9054	132	4	0	2
	100	90.0	2	11976	133	2	0	2	12000	133	2	0	2	11285	125	2	0	2
			3	12050	134	2	0	2	12074	134	2	0	2	11354	126	2	0	2
			4W	11861	132	2	0	2	11885	132	2	0	2	11177	124	2	0	2
			5QW	12131	135	4	0	2	12155	135	4	0	2	11431	127	4	0	2
	115	109.7	2	15572	142	2	0	2	15494	141	2	0	2	14871	136	2	0	2
			3	15833	144	2	0	2	15754	144	2	0	2	15121	138	2	0	2
			4W	15281	139	2	0	3	15205	139	2	0	3	14623	133	2	0	3
			5QW	15732	143	4	0	2	15653	143	4	0	2	15024	137	4	0	2
	135	133.3	2	17971	135	3	0	3	17881	134	3	0	3	17163	129	3	0	3
			3	18272	137	2	0	2	18181	136	2	0	2	17450	131	2	0	2
			4W	17635	132	2	0	3	17547	132	2	0	3	16876	127	2	0	3
			5QW	18156	136	4	0	2	18065	136	4	0	2	17339	130	4	0	2

RAR2 Performance Data on next page

* Lumen values are from photometric test performed in accordance with IESNA LM-79-08. Data is considered to be representative of the configurations shown. Actual performance may differ as a result of end-user environment and application.

RATIO SERIES

AREA/SITE LIGHTER

PERFORMANCE DATA

Description	Nominal Wattage	System Watts	Dist. Type	5K (5000K NOMINAL 70 CRI)					4K (4000K NOMINAL 70 CRI)					3K (3000K NOMINAL 80 CRI)				
				Lumens	LPW	B	U	G	Lumens	LPW	B	U	G	Lumens	LPW	B	U	G
RAR2	110	100.3	2	15326	153	2	0	3	15357	153	2	0	3	14442	144	2	0	3
			3	15421	154	2	0	3	15452	154	2	0	3	14531	145	2	0	3
			4W	15180	151	2	0	2	15210	152	2	0	2	14304	143	2	0	2
			5QW	15525	155	4	0	2	15556	155	4	0	2	14629	146	4	0	2
	140	133.2	2	19395	146	2	0	3	19434	146	2	0	3	18276	137	2	0	3
			3	19515	147	2	0	3	19554	147	2	0	3	18389	138	2	0	3
			4W	19210	144	2	0	3	19248	145	2	0	3	18101	136	2	0	3
			5QW	19647	148	5	0	3	19686	148	5	0	3	18513	139	5	0	3
	165	153.6	2	21651	141	3	0	3	21695	141	3	0	3	20402	133	3	0	3
			3	21785	142	3	0	3	21828	142	3	0	3	20527	134	3	0	3
			4W	21444	140	3	0	3	21487	140	3	0	3	20206	132	3	0	3
			5QW	21932	143	5	0	3	21976	143	5	0	3	20666	135	5	0	3
	185	174.5	2	26046	149	3	0	3	26098	150	3	0	3	24543	141	3	0	3
			3	26207	150	3	0	3	26259	150	3	0	3	24694	142	3	0	3
			4W	25797	148	3	0	4	25849	148	3	0	4	24308	139	3	0	4
			5QW	26384	151	5	0	3	26437	152	5	0	3	24861	143	5	0	3
	210	198.2	2	28848	145	3	0	4	28906	146	3	0	4	27184	137	3	0	4
			3	29027	146	3	0	4	29085	147	3	0	4	27351	138	3	0	4
			4W	28572	144	3	0	4	28630	144	3	0	4	26924	136	3	0	4
			5QW	29222	147	5	0	4	29281	148	5	0	4	27536	139	5	0	4
	240	226.9	2	32087	141	3	0	4	32151	142	3	0	4	30235	133	3	0	4
			3	32285	142	3	0	4	32350	143	3	0	4	30422	134	3	0	4
			4W	31780	140	3	0	4	31844	140	3	0	4	29946	132	3	0	4
			5QW	32503	143	5	0	4	32568	144	5	0	4	30627	135	5	0	4
	255	257.0	2	37040	144	3	0	4	36854	143	3	0	4	35373	138	3	0	4
			3	37660	147	3	0	4	37472	146	3	0	4	35966	140	3	0	4
			4W	36347	141	3	0	5	36166	140	3	0	5	34782	135	3	0	5
			5QW	37420	146	5	0	4	37233	145	5	0	4	35736	139	5	0	4
	295	294.0	2	41733	142	3	0	4	41524	141	3	0	4	39855	136	3	0	4
			3	42432	144	3	0	4	42220	144	3	0	4	40523	138	3	0	4
			4W	40953	139	3	0	5	40748	139	3	0	5	39190	133	3	0	5
			5QW	42162	143	5	0	4	41951	143	5	0	4	40264	137	5	0	4
	340	347.1	2	48392	139	4	0	5	48150	139	4	0	5	46215	133	4	0	5
			3	49203	142	3	0	4	48957	141	3	0	4	46989	135	3	0	4
			4W	47488	137	4	0	5	47261	136	4	0	5	45443	131	4	0	5
			5QW	48889	141	5	0	5	48645	140	5	0	5	46689	135	5	0	5

* Lumen values are from photometric test performed in accordance with IESNA LM-79-08. Data is considered to be representative of the configurations shown. Actual performance may differ as a result of end-user environment and application.

RATIO SERIES

AREA/SITE LIGHTER

ELECTRICAL DATA

# OF LEDS	Nominal Wattage	Input Voltage	Oper. Current (Amps)	System Power (Watts)
RAR1	25	120	0.21	25.4
		208	0.12	
		240	0.11	
		277	0.09	
	39	120	0.32	38.0
		208	0.18	
		240	0.16	
		277	0.14	
		347	0.11	
		480	0.08	
	50	120	0.42	49.8
		208	0.24	
		240	0.21	
		277	0.18	
	70	120	0.57	68.4
		208	0.33	
		240	0.29	
		277	0.25	
	100	120	0.75	90.0
		208	0.43	
		240	0.38	
		277	0.32	
	115	120	0.91	109.7
		208	0.53	
		240	0.46	
		277	0.40	
		347	0.32	
		480	0.23	
135	120	1.11	133.3	
	208	0.64		
	240	0.56		
	277	0.48		
	347	0.38		
		480	0.28	

# OF LEDS	Nominal Wattage	Input Voltage	Oper. Current (Amps)	System Power (Watts)
RAR2	110	120	0.84	100.3
		208	0.48	
		240	0.42	
		277	0.36	
	140	120	1.11	133.2
		208	0.64	
		240	0.56	
		277	0.48	
	165	120	1.28	153.6
		208	0.74	
		240	0.64	
	185	120	1.45	174.5
		208	0.84	
		240	0.73	
	210	120	1.65	198.3
		208	0.95	
		240	0.83	
		277	0.72	
	240	120	1.89	226.9
		208	1.09	
		240	0.95	
		277	0.82	
	255	120	2.14	257.0
		208	1.24	
		240	1.07	
		277	0.93	
		347	0.74	
	295	120	2.45	294.0
		208	1.41	
		240	1.23	
		277	1.06	
		347	0.85	
		480	0.61	
	340	120	2.89	347.1
		208	1.67	
		240	1.45	
277		1.25		
347		1.00		
480		0.72		

LUMINAIRE AMBIENT TEMPERATURE FACTOR (LATF)

Ambient Temperature		Lumen Multiplier
0° C	32° F	1.03
10° C	50° F	1.01
20° C	68° F	1.00
25° C	77° F	1.00
30° C	86° F	0.99
40° C	104° F	0.98
50° C	122° F	0.97

Use these factors to determine relative lumen output for average ambient temperatures from 0-40°C (32-104°F).

PROJECTED LUMEN MAINTENANCE

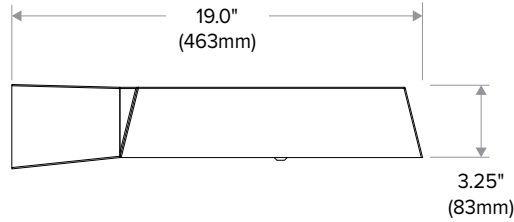
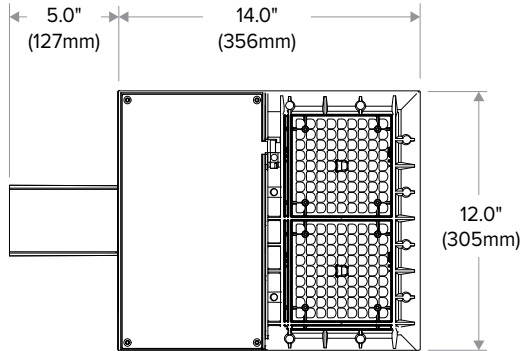
Ambient Temperature	OPERATING HOURS					
	0	25,000	TM-21-11 L90 36,000	50,000	100,000	L70 (Hours)
25°C / 77°F	1.00	0.97	0.95	0.93	0.86	238,000
40°C / 104°F	0.99	0.96	0.95	0.93	0.85	225,000

RATIO SERIES

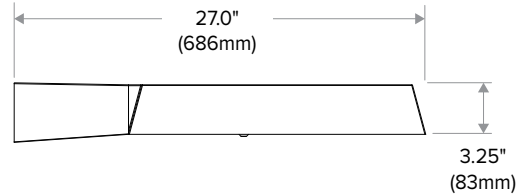
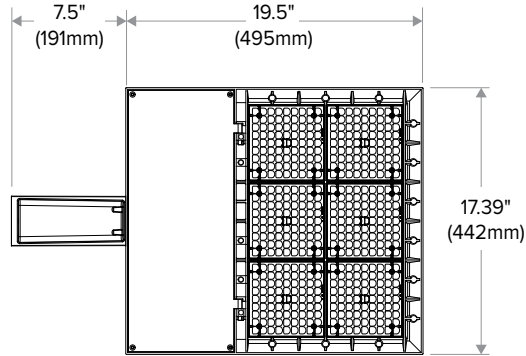
AREA/SITE LIGHTER

DIMENSIONS

RAR1

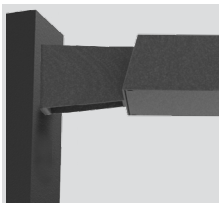


RAR2



ADDITIONAL INFORMATION

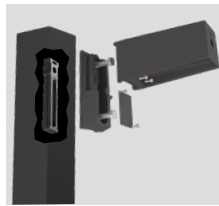
MOUNTING



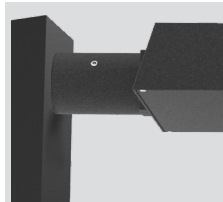
Arm Mount – Fixture ships with integral arm for ease of installation. Compatible with Hubbell Outdoor B3 drill pattern.



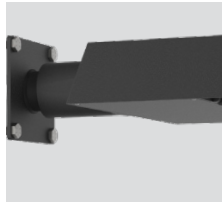
Knuckle – Knuckle mount 15° aiming angle increments for precise aiming and control, fits 2-3/8" tenons or pipes.



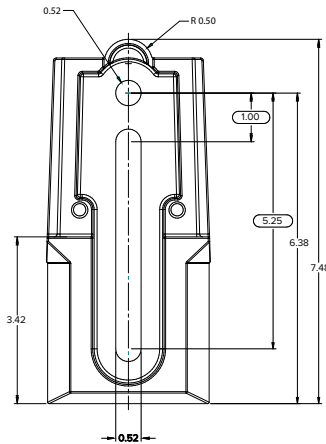
Universal Mounting – Universal mounting block for ease of installation. Compatible with drill patterns from 2.5" to 4.5"



MAF – Fits 2-3/8" OD arms Roadway applications.



Wall Mount – Wall mount bracket designed for building mount applications.



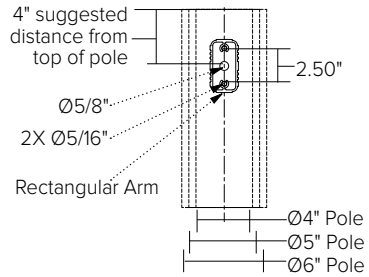
RATIO SERIES

AREA/SITE LIGHTER

ADDITIONAL INFORMATION (CONT'D)

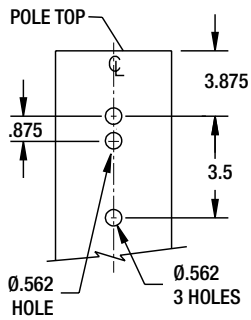
ARM MOUNT (ASQ)

Compatible with Pole drill pattern B3



UNIVERSAL MOUNTING (ASQU)

Compatible with pole drill pattern S2



SITESYNC 7-PIN MODULE



SW7PR



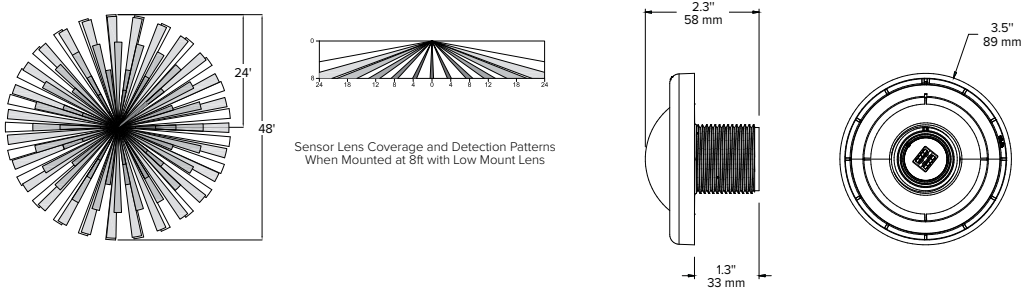
- SiteSync features in a new form
- Available as an accessory for new construction or retrofit applications (with existing 7-Pin receptacle)

RATIO SERIES

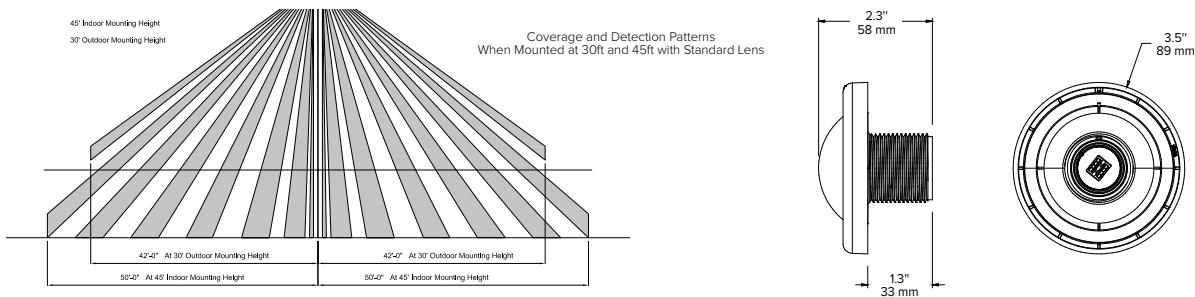
AREA/SITE LIGHTER

ADDITIONAL INFORMATION (CONT'D)

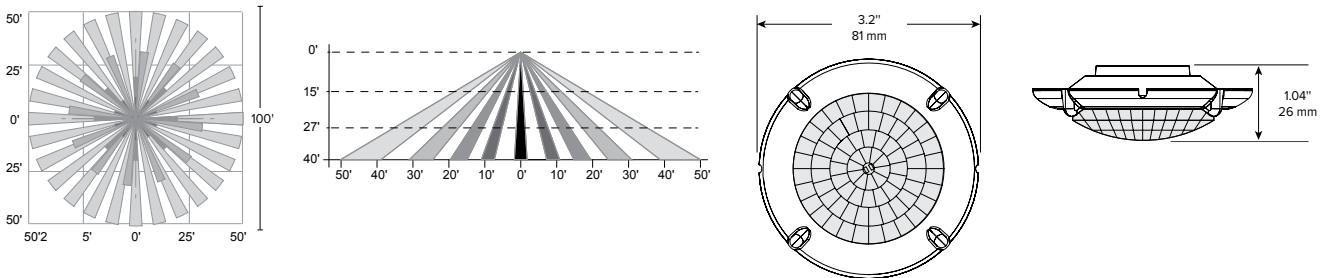
NXSP-14F



NXSP-30F



SCP-40F



RAR1 EPA

RAR-1	
EPA at 0°	EPA at 30°
.45ft. ² .13m ²	.56ft. ² .17m ²

RAR2 EPA

RAR-2	
EPA at 0°	EPA at 30°
.55ft. ² .17m ²	1.48ft. ² .45m ²

SHIPPING

Catalog Number	G.W(kg)/CTN	Carton Dimensions		
		Length Inch (cm)	Width Inch (cm)	Height Inch (cm)
RAR1	15 (6.8)	20.75 (52.7)	15.125 (38.4)	6.9375 (17.6)
RAR2	19 (8.6)	25 (63.5)	15.125 (38.4)	6.9375 (17.6)

USE OF TRADEMARKS AND TRADE NAMES

All product and company names, logos and product identifies are trademarks™ or registered trademarks® of Hubbell Lighting, Inc. or their respective owners. Use of them does not necessarily imply any affiliation with or endorsement by such respective owners.



LOCATION	FRONT AND REAR PORCHES	DATE
PREPARED BY		QUANTITY
COMMENTS		FIXTURE TYPE
CATALOG NUMBER		

Edmund LED Outdoor Sconce EDDW Series

Features

This outdoor LED light is ideal for security and general lighting. Up illumination (1-Light) or Up/down-light illumination (2-Light) for outdoor or indoor residential, commercial, and hospitality applications. Fixture mounts to a standard junction box (not included).

Construction

Die-cast aluminum construction. Standard mounting holes and hardware are included. Power supply connections must be made inside a junction box (not included).

Finish

Black powder coated finish.

Diffuser

Solid acrylic diffuser.

Electrical

Input 120-277 VAC / 60 Hz.
Minimum starting temp -4° F/ -20°C.

LED

Integrated LED modules capable of producing:
1-LIGHT - 14W = 800 source lumens, 480 delivered lumens
2-LIGHT - 26W = 1600 source lumens, 960 delivered lumens
Adjustable Choice 3000K, 3500K, 4000K (CCT).
Rated for 50,000 Hrs. 90 CRI.

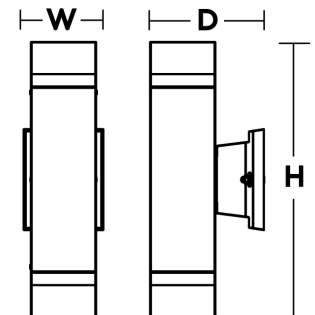
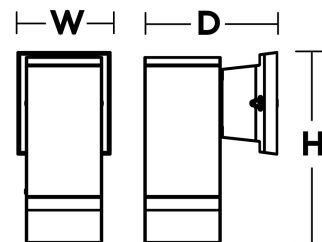
Certification

All fixtures are cETLus listed for wet locations.
Title 24/JA8 Compliant (outdoor only).

Warranty

Limited warranty: This fixture is free from defects in materials and workmanship for a period of 5 years from date of purchase.

**Specifications and dimensions
subject to change without notice.**



Ordering Information:

Black	LED	Source Lumens	Delivered Lumens	Adjustable CCT	H	W	D
EDDW0608LAJMV BK (1-LIGHT)	14W	800	480	3000K/3500K/4000K	8"	3-1/2"	6-1/4"
EDDW0612LAJMV BK (2-LIGHT)	26W	1600	960	3000K/3500K/4000K	11-7/8"	3-1/2"	6-1/4"

EXHIBIT G – PRELIMINARY
STORMWATER REPORT

SITE HYDRAULICS REPORT

“THE PAD” DRAINAGE REPORT

FOR “THE PAD” DEVELOPMENT

SANDY, OREGON

JULY 6, 2020

Prepared By
Kurahashi and Associates Company
4470 SW Hall Blvd. Suite C
Beaverton, Oregon 97005
503 267 8434

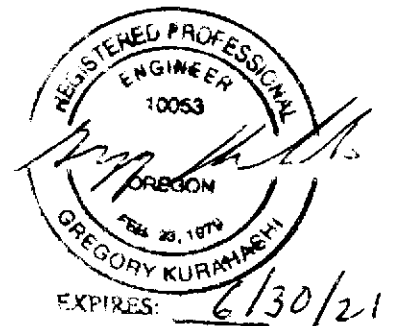


TABLE OF CONTENTS

1 Introduction

2 Existing Stormwater System

3 Proposed Stormwater System

4 Storm Water Analysis

5 Appendix

INTRODUCTION

1.1 Project Overview

This report contains the hydrologic and hydraulic design parameters for the “THE PAD” Sandy Development Project at tax lot 1500; Assessor Map 2S-24E-13DB-01500, with the total area is approximately 0.478 acres. The property is situated at 17650 Meinig Avenue in Sandy, Oregon. This report reviews and confirms the information necessary to design on-site conveyance systems as well as water quality treatment facilities for “THE PAD” Sandy Development Project and the retention system on the site which will be located in the south driveway of the development.

Please note that the methodology used to analyze the storm water conveyance system uses a computer program (Hydraflow 2002 by inteliSOLV) that uses SCS unit hydrograph as the method for calculating the Storm Flow. The land for the development required the use of a Contech storm filter system for treatment. The plan includes 1 Contech manhole storm filter that is shown on the C3 Utility Plan attached in the appendix.

1.2 Existing Conditions

The site originally had a home, shed and yard that encompassed the central portion of the property. The structures are no longer present.

1.3 Proposed Improvements

The proposed development will include a 10 unit 2 story townhouse apartments. 6 units will be on the south end while 4 will be on the north end of the development. 1 handicap parking space and 20 regular parking spaces will be provided. Six 9’x18’ parking spaces will be on the north end while seven 9’x19’ parking spaces will be on the east side and seven 9’x18’ parking spaces the south side along with the 9’x18’ handicap space and 9’x18’ handicap loading zone. The southwest corner of the development will have mail boxes, picnic tables and a grassy recreation area. The East side of the lot will have a trash/recycling enclosure at the southern end. The site will have a grassy recreation area with trees and a gazebo bordered by the south, east and north portions of the development as well as the west property line. The building and parking rain water collection system will be directed to the SE area of the parking lot in front of the trash/recycling enclosure. The storm water after detention and treatment will accommodate the 1yr, 2yr, 5yr, 10yr and 25yr storms using City of Sandy 24 hour rainfall. It will be metered out to retain the flow to reduce the storms to be stored and discharged at the same rate that the project discharged at existing conditions. The discharges will no longer be overland to City and Park District property but directed to the ditch along Meinig Ave. Storm drainage will be

detained in a system of two 40' pipes 5' in diameter pipes. The project is in a location that does not allow for significant infiltration and this could be dangerous to downstream areas.

Existing Stormwater System

The existing system discharged storm drainage was discharge from the original house roof to daylight on to the ground and then be discharged overland to the city property and to the Park southeasterly from the property this water has no direct discharge to a channel. Continuing the discharge in pipes or overland would require approval of the Park district and require DSL and Corps approval to discharge with pipes to the street. By directing the flow to the existing storm drainage system of pipes we would not require approval because it enters a City pipes system after discharging to a ditch along Meinig Ave.

Storm Water Analysis

4.1 Design Solution:

The proposed storm water design on property includes: One catch basin, 2 5' diameter 40' long detention pipes, one detention manhole, and a water quality manhole.

4.2 Design Assumptions and Parameters of Detention

City of Sandy Rainfall in Inches per 24 hour period: 3.5 (2 year), 4.5 (5 year), 4.8 (10 year), 5.5 (25 year),
6.5 (100 year)

Impervious Area of Roof, Driveway Sidewalks and Patio

Prior to Development.: 0.0 Acres

CN# used for Impervious areas: 98

Length N/A

Time interval of analysis: N/A

Unit Hydrograph: N/A

Storm Distribution: Type 1A

Area of Site Prior to Development.: 0.65 Acres (Including Large Right of Way)

CN# used for Pervious areas: 77

Slope: 15%

Length: 125 Feet

Time interval of analysis: 1 minute

Unit Hydrograph: Lag

Storm Distribution: Type 1A

Impervious Area of Roof, Driveway, Sidewalks and Deck

after Development: 0.478 Acres

CN# used for Impervious areas: 98

Slope: 2%

Length: 100 Feet

Time interval of analysis: 1 minute

Unit Hydrograph: Lag

Storm Distribution: Type 1A

Area of Landscaping after Development: 0.21 Acres

CN# used for Pervious areas: 77

Slope: 15%

Length: 125 Feet

Time interval of analysis: 1 minute

Unit Hydrograph: Lag

Storm Distribution: Type 1A

4.3 Reservoir Analysis:

Please note the proposed Detention utilizes no percolation.

The storage was developed using detention pipes to modify the discharge to pre-development levels.

The pipe system uses 80 lineal feet of 5 foot diameter N12 PVC conduits.

Most of the storm water collection system backwaters into the detention pipes.

Attached in the Appendix is the Reservoir Stage Storage Discharge Table (Reservoir Report)

The report analyzes a 2.4 inch orifice at the bottom of the pipe storage a 2.8 inch orifice at 2.5 feet and a 2 inch orifice at 4.15 feet which was never reached. The Final Analysis will refine the preliminary design and may change to Storm Tech Chambers.

This utilizes 1,288 cubic feet of storage of the 1571 cubic feet of pipe storage available.

4.4 Design Flow Analysis:

The values of discharge for each storm are tabulated. On the tables provided for each return interval in the Appendix. Below are the comparisons of peak discharge or each return interval.

Return Interval	Existing (CFS)	Proposed (CFS)
2 Year	0.19	0.19
5 Year	0.32	0.32
10 Year	0.36	0.36
25 Year	0.43	0.43

24 hour Statistical Storm Data:

Storm Inches Peak Flow (cfs)

Year in 24

	Hours	Impervious	Pervious	Combined	Existing	Detention
2	3.5"	0.37	0.06	0.43	0.19	0.19
5	4.5"	0.48	0.10	0.58	0.32	0.32
10	4.8"	0.52	0.12	0.63	0.36	0.36
25	5.5"	0.59	0.15	0.74	0.46	0.43
100	6.5"					

The allowable discharge that was the limit for Developed Discharge.

4.5 CONCLUSION:

Based on the analysis and findings above, the proposed stormwater drainage system complies with the requirements of the City of Sandy.

Appendix

	PAGE
THE PAD Development UTILITY PLAN	1
THE PAD Development Original Site Conditions	2
Runoff Curve Numbers	3
RESERVOIR REPORT	4
FLOW SUMMARY REPORTS (.5 YEAR HYDO MOD. WQ), 2,5,10,25 YR. RET. PER.	5-8

Table 2.2
Runoff Curve Numbers for Selected Agricultural, Suburban, and Urban Areas

(Sources: TR 55, 1986, and Stormwater Management Manual, 1992. See Section 2.1.1 for explanation)

Cover type and hydrologic condition.	CNs for hydrologic soil group			
	A	B	C	D
Curve Numbers for Pre-Development Conditions				
Pasture, grassland, or range-continuous forage for grazing:				
Fair condition (ground cover 50% to 75% and not heavily grazed).	49	69	79	84
Good condition (ground cover >75% and lightly or only occasionally grazed)	39	61	74	80
Woods:				
Fair (Woods are grazed but not burned, and some forest litter covers the soil).	36	60	73	79
Good (Woods are protected from grazing, and litter and brush adequately cover the soil).	30	55	70	77
Curve Numbers for Post-Development Conditions				
Open space (lawns, parks, golf courses, cemeteries, landscaping, etc.)¹				
Fair condition (grass cover on 50% - 75% of the area).	77	85	90	92
Good condition (grass cover on >75% of the area)	68	80	86	90
Impervious areas:				
Open water bodies: lakes, wetlands, ponds etc.	100	100	100	100
Paved parking lots, roofs ² , driveways, etc. (excluding right-of-way)	98	98	98	98
Permeable Pavement (See Appendix C to decide which condition below to use)				
Landscaped area	77	85	90	92
50% landscaped area/50% impervious	87	91	94	96
100% impervious area	98	98	98	98
Paved	98	98	98	98
Gravel (including right-of-way)	76	85	89	91
Dirt (including right-of-way)	72	82	87	89
Pasture, grassland, or range-continuous forage for grazing:				
Poor condition (ground cover <50% or heavily grazed with no mulch).	68	79	86	89
Fair condition (ground cover 50% to 75% and not heavily grazed).	49	69	79	84
Good condition (ground cover >75% and lightly or only occasionally grazed)	39	61	74	80
Woods:				
Poor (Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning).	45	66	77	83
Fair (Woods are grazed but not burned, and some forest litter covers the soil).	36	60	73	79
Good (Woods are protected from grazing, and litter and brush adequately cover the soil).	30	55	70	77
Single family residential³:	Should only be used for subdivisions > 50 acres	Average Percent impervious area ^{3,4}		
Dwelling Unit/Gross Acre				
1.0 DU/GA		15	Separate curve number	
1.5 DU/GA		20	shall be selected for	
2.0 DU/GA		25	pervious & impervious	
2.5 DU/GA		30	portions of the site or	
3.0 DU/GA		34	basin	
3.5 DU/GA		38		
4.0 DU/GA		42		
4.5 DU/GA		46		
5.0 DU/GA		48		
5.5 DU/GA		50		
6.0 DU/GA		52		
6.5 DU/GA		54		
7.0 DU/GA		56		
7.5 DU/GA		58		
PUD's, condos, apartments, commercial businesses, industrial areas & subdivisions < 50 acres	%impervious must be computed	Separate curve numbers shall be selected for pervious and impervious portions of the site		

For a more detailed and complete description of land use curve numbers refer to chapter two (2) of the Soil Conservation Service's Technical Release No. 55, (210-VI-TR-55, Second Ed., June 1986).

¹ Composite CN's may be computed for other combinations of open space cover type.

² Where roof runoff and driveway runoff are infiltrated or dispersed according to the requirements in Chapter 3, the average percent impervious area may be adjusted in accordance with the procedure described under "Flow Credit for Roof Downspout Infiltration" (Section 3.1.1), and "Flow Credit for Roof Downspout Dispersion" (Section 3.1.2).

³ Assumes roof and driveway runoff is directed into street/storm system.

⁴ All the remaining pervious area (lawn) are considered to be in good condition for these curve numbers.

Reservoir Report

Reservoir No. 1 - Detention Pipe

Pond Data

Pipe diameter = 5.00 ft Pipe length = 160.0 ft Pipe slope = 0.00 % Invert elev. = 100.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	00	0	0
0.25	100.25	00	29	29
0.50	100.50	00	52	82
0.75	100.75	00	66	148
1.00	101.00	00	76	224
1.25	101.25	00	84	307
1.50	101.50	00	89	397
1.75	101.75	00	94	490
2.00	102.00	00	96	587
2.25	102.25	00	99	686
2.50	102.50	00	100	786
2.75	102.75	00	100	885
3.00	103.00	00	99	985
3.25	103.25	00	97	1,081
3.50	103.50	00	93	1,175
3.75	103.75	00	89	1,264
4.00	104.00	00	84	1,348
4.25	104.25	00	76	1,423
4.50	104.50	00	66	1,489
4.75	104.75	00	52	1,542
5.00	105.00	00	29	1,571

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise in	= 2.4	2.8	2.0	0.0
Span in	= 2.4	2.8	2.0	0.0
No. Barrels	= 1	1	1	0
Invert El. ft	= 100.00	102.50	104.15	0.00
Length ft	= 10.0	10.0	10.0	0.0
Slope %	= 1.00	1.00	1.00	0.00
N-Value	= .013	.013	.013	.000
Orif. Coeff.	= 0.60	0.60	0.60	0.00
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len ft	= 0.00	0.00	0.00	0.00
Crest El. ft	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 0.00	0.00	0.00	0.00
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfiltration Rate = 0.00 in/hr/sqft Tailwater Elev. = 0.00 ft

Note: All outflows have been analyzed under inlet and outlet control.

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Civ A cfs	Civ B cfs	Civ C cfs	Civ D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
0.00	0	100.00	0.00	0.00	0.00	---	---	---	---	---	---	0.00
0.25	29	100.25	0.05	0.00	0.00	---	---	---	---	---	---	0.05
0.50	82	100.50	0.08	0.00	0.00	---	---	---	---	---	---	0.08
0.75	148	100.75	0.10	0.00	0.00	---	---	---	---	---	---	0.10
1.00	224	101.00	0.12	0.00	0.00	---	---	---	---	---	---	0.12
1.25	307	101.25	0.13	0.00	0.00	---	---	---	---	---	---	0.13
1.50	397	101.50	0.15	0.00	0.00	---	---	---	---	---	---	0.15
1.75	490	101.75	0.16	0.00	0.00	---	---	---	---	---	---	0.16
2.00	587	102.00	0.17	0.00	0.00	---	---	---	---	---	---	0.17
2.25	686	102.25	0.18	0.00	0.00	---	---	---	---	---	---	0.18
2.50	786	102.50	0.19	0.00	0.00	---	---	---	---	---	---	0.19
2.75	885	102.75	0.20	0.06	0.00	---	---	---	---	---	---	0.26
3.00	985	103.00	0.21	0.10	0.00	---	---	---	---	---	---	0.32
3.25	1,081	103.25	0.22	0.14	0.00	---	---	---	---	---	---	0.36
3.50	1,175	103.50	0.23	0.16	0.00	---	---	---	---	---	---	0.39
3.75	1,264	103.75	0.24	0.18	0.00	---	---	---	---	---	---	0.42
4.00	1,348	104.00	0.24	0.20	0.00	---	---	---	---	---	---	0.45
4.25	1,423	104.25	0.25	0.22	0.02	---	---	---	---	---	---	0.49
4.50	1,489	104.50	0.26	0.24	0.04	---	---	---	---	---	---	0.54
4.75	1,542	104.75	0.27	0.25	0.06	---	---	---	---	---	---	0.58
5.00	1,571	105.00	0.27	0.26	0.07	---	---	---	---	---	---	0.61

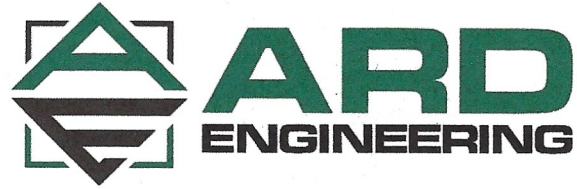
Hyd. No.	Hydrograph type	Peak flow	Time interval	Time to peak	Volume	Inflow hyd(s)	Maximum elevation	Maximum storage	Hydrograph description
	(origin)	(cfs)	(min)	(min)	(cuft)		(ft)	(cuft)	
1	SCS Runoff	0.37	1	469.00	5,309				Pad Impervious
2	SCS Runoff	0.06	1	477.00	1,021				The Pad Pervious
3	Combine	0.43	1	470.00	6,330	1, 2			Combined Site
4	SCS Runoff	0.19	1	477.00	3,160				Existing Conditions
5	Reservoir	0.19	1	500.00	6,309	3	102.33	718	Detention Pipe
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Hyd. No.	Hydrograph type	Peak flow	Time interval	Time to peak	Volume	Inflow hyd(s)	Maximum elevation	Maximum storage	Hydrograph description
	(origin)	(cfs)	(min)	(min)	(cuft)		(ft)	(cuft)	
1	SCS Runoff	0.48	1	469.00	6,931				Pad Impervious
2	SCS Runoff	0.10	1	475.00	1,578				The Pad Pervious
3	Combine	0.58	1	470.00	8,509	1, 2			Combined Site
4	SCS Runoff	0.32	1	475.00	4,884				Existing Conditions
5	Reservoir	0.32	1	489.00	8,475	3	103.03	998	Detention Pipe
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Hyd. No.	Hydrograph type	Peak flow	Time interval	Time to peak	Volume	Inflow hyd(s)	Maximum elevation	Maximum storage	Hydrograph description
	(origin)	(cfs)	(min)	(min)	(cuft)		(ft)	(cuft)	
1	SCS Runoff	0.52	1	469.00	7,418				Pad Impervious
2	SCS Runoff	0.12	1	475.00	1,754				The Pad Pervious
3	Combine	0.63	1	470.00	9,171	1, 2			Combined Site
4	SCS Runoff	0.36	1	475.00	5,428				Existing Conditions
5	Reservoir	0.36	1	488.00	9,131	3	103.25	1,081	Detention Pipe
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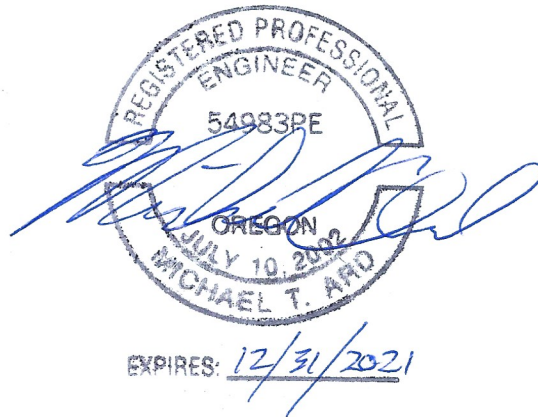
Hyd. No.	Hydrograph type	Peak flow	Time interval	Time to peak	Volume	Inflow hyd(s)	Maximum elevation	Maximum storage	Hydrograph description
	(origin)	(cfs)	(min)	(min)	(cuft)		(ft)	(cuft)	
1	SCS Runoff	0.59	1	469.00	8,554				Pad Impervious
2	SCS Runoff	0.15	1	474.00	2,175				The Pad Pervious
3	Combine	0.74	1	470.00	10,729	1, 2			Combined Site
4	SCS Runoff	0.46	1	474.00	6,731				Existing Conditions
5	Reservoir	0.43	1	487.00	10,673	3	103.82	1,288	Detention Pipe
6									
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EXHIBIT H – TRAFFIC IMPACT STUDY



THE PAD TRAFFIC IMPACT STUDY

SANDY, OREGON



PREPARED FOR:
Ryan Bigbee

PREPARED BY:
Michael Ard, PE
Ard Engineering

DATE:
August 25, 2020



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Project Description & Location	4
Existing Conditions	5
Site Trips.....	10
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EXECUTIVE SUMMARY

1. A residential development is proposed on the east side of Highway 211 opposite Tupper Road in Sandy, Oregon. The proposed development will consist of 12 townhome dwelling units. As currently proposed, the site will take access via a new driveway on Highway 211 opposite Tupper Road.
2. Upon completion of proposed development, the subject property is projected to generate 6 new site trips during the morning peak hour, 7 trips during the evening peak hour, and 88 new daily site trips.
3. Based on the operational analysis, the study intersections currently operate acceptably and are projected to continue to operate acceptably under year 2022 traffic conditions either with or without the addition of site trips from the proposed development.
4. Based on the queuing analysis, the northbound 95th percentile queues on Highway 211 approaching Pioneer Boulevard are projected to extend beyond the Tupper Road/site access intersection during the peak hours. If sufficient width can be made available to accommodate a raised center median within Highway 211, it is recommended that the median be installed in conjunction with the proposed development. If a center median cannot be constructed within Highway 211, it is recommended that the site access be limited to right-in, right-out only through the installation of a “pork-chop” diverter within the new driveway approach.
5. Based on the crash data, the study intersections are currently operating acceptably with respect to safety.
6. Based on the detailed warrant analysis, no new traffic signals or turn lanes are recommended in conjunction with the proposed development.
7. At the request of ODOT staff, three potential site access alternatives were examined. Based on the analysis, it is recommended that site access be provided to Highway 211 directly opposite Tupper Road.



PROJECT DESCRIPTION & LOCATION

INTRODUCTION

A 12-unit residential townhome development is proposed for a property located on the east side of Highway 211 opposite Tupper Road in Sandy, Oregon.

As currently proposed, the site would take access via a new driveway intersecting Highway 211 directly opposite Tupper Road. At the request of the Oregon Department of Transportation, two alternative access scenarios are also considered within this study. Under the first alternative, access would be shared with the existing City Hall/Joe's Donuts access driveway on Highway 211 approximately 75 feet south of the near-side crosswalk at the signalized intersection of Highway 26 at Highway 211. Under the second alternative, a new driveway would be constructed at the north end of the subject property immediately adjacent to the existing City Hall/Joe's Donuts access. All three potential access scenarios are discussed, with information regarding safety and operation at the time of project opening and farther into the future.

This report addresses the impacts of the proposed development on the surrounding street system. 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 subject property has a total area of 0.59 acres and is zoned R-3 (High-Density Residential). The site is currently undeveloped, and the proposed development is permitted within the R-3 zone. The subject property is surrounded by existing commercial and institutional uses within the Central Business District zone to the west, north and east, and by parks property to the south.

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 40 mph in the site vicinity.

Pioneer Boulevard forms the eastbound travel lanes of US Highway 26 (Mt. Hood Highway) in the site vicinity. The highway is classified by the Oregon Department of Transportation as a Statewide Highway and a Freight Route within a Special Transportation Area. It generally has two eastbound travel lanes plus a bike lane, with on-street parking and sidewalks in place on both sides of the roadway. It has a posted speed limit of 25 mph.

Tupper Road is classified by the City of Sandy as a collector street and is striped to prohibit passing. On the south side of the roadway existing curbs and sidewalks are in place in the site vicinity, while the north side has a narrow gravel shoulder.



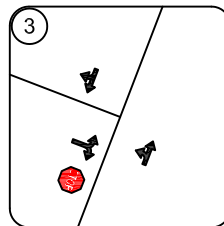
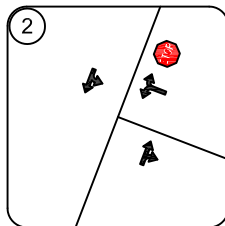
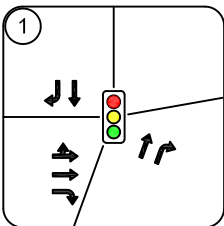
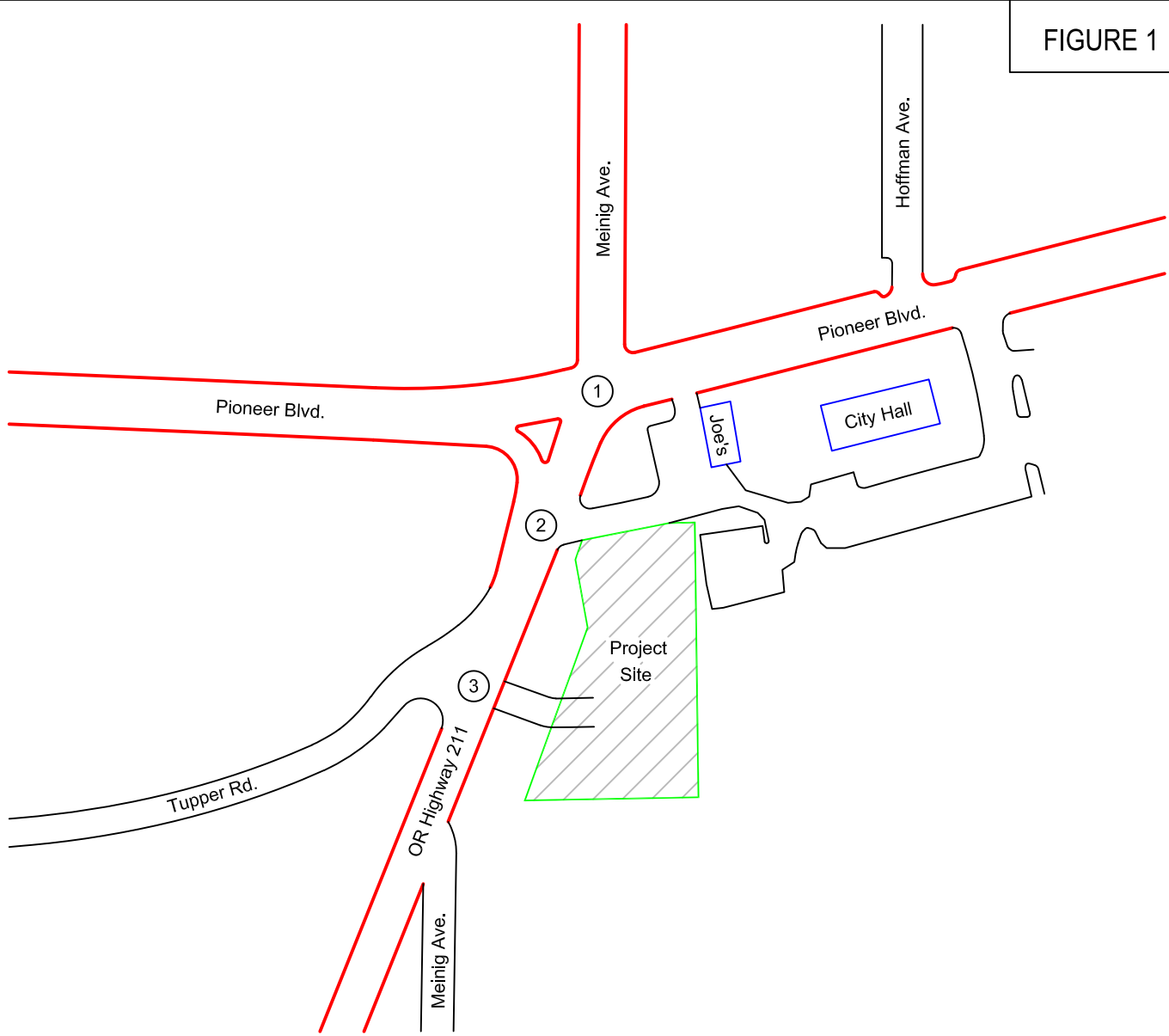
EXISTING CONDITIONS

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

The intersection of Highway 211 at Tupper Road is currently a T-intersection controlled by a stop sign on the eastbound Tupper Road approach. Through traffic traveling along Highway 211 does not stop. Each approach has a single, shared lane for all turning movements.

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

FIGURE 1



LEGEND

- # Study Intersection
- Traffic Signal
- STOP Stop Control





TRAFFIC COUNT DATA

Due to the current COVID-19 crisis, traffic volumes in the site vicinity are not representative of typical conditions. In order to provide count data that more conservatively reflects expectations regarding future traffic volumes, historical count data was used in conjunction with modeling data and intersection observations to develop estimates of the traffic volumes that would be expected absent the impacts of the current pandemic.

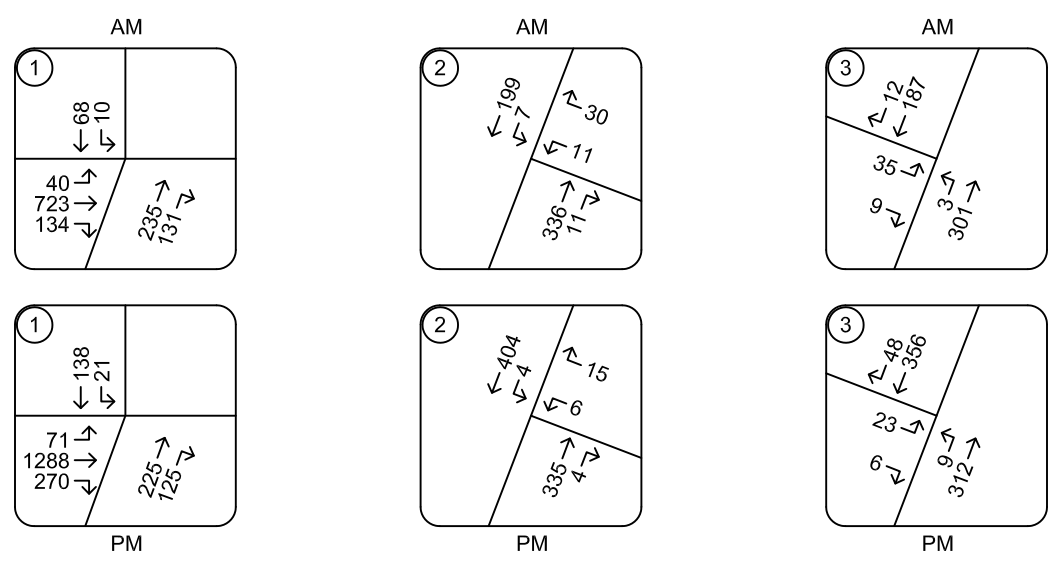
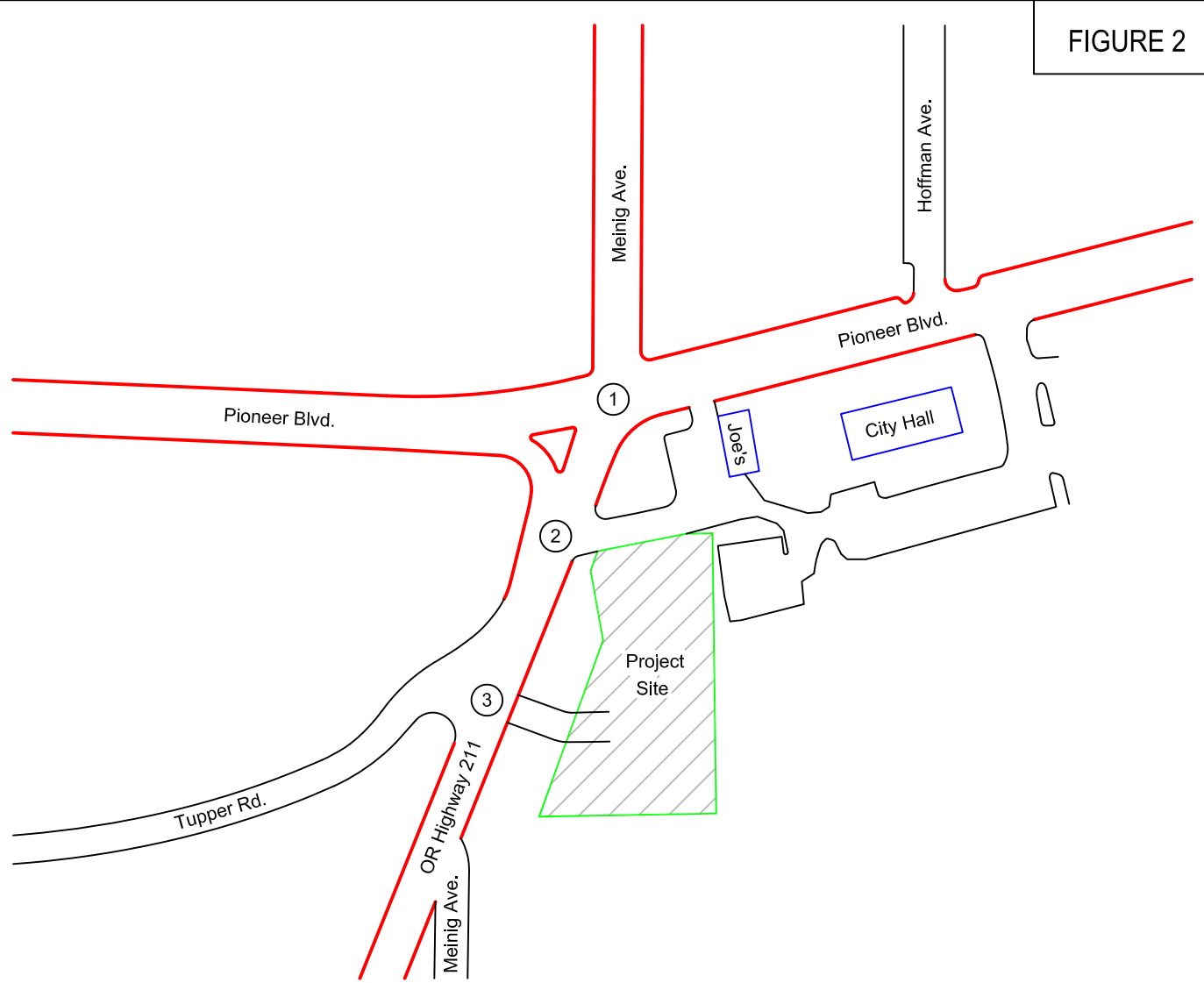
The data sources used include recent count data collected at the nearby intersections of Highway 211 at Dubarko Road and Highway 26 at Ten Eyck Road/Wolf Drive to determine through traffic volumes along the respective highways, along with seasonal data, growth data and planning model data from ODOT to determine how those volumes change over distance and time, as well as direct observation of the relative volumes for different turning movements at the intersections of Highway 26 at Highway 211 and Highway 211 at Tupper Road.

The historical count data for the intersections of Highway 211 at Dubarko Road and Highway 26 at Ten Eyck Road/Wolf Drive 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. The resulting data was adjusted to reflect the projected 30th-highest hour volumes for year 2020 traffic conditions as part of the traffic impact study prepared for the Bull Run Terrace Subdivision project. These adjusted future volumes were used to determine the expected through traffic volumes along Highway 26 and Highway 211 in the site vicinity. A diagram excerpted from the Bull Run Terrace TIS showing the year 2020 traffic volumes is included in the attached technical appendix.

In addition to determination of the expected through traffic volumes, it was necessary to determine the turning movement volumes at the study intersections for year 2020 traffic conditions absent the pandemic. Turning movements were estimated based on direct observation of the relative volumes of traffic making each turning movement at the intersections. After calculating the through movement volumes, the percentage of traffic observed making turning movements was applied to determine the remaining hourly volumes.

Figure 2 on page 8 shows the existing 2020 30th-highest hour traffic volumes for the morning and evening peak hours at the study intersections.

FIGURE 2





OPERATIONAL ANALYSIS

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

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

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

A summary of the existing conditions operational analysis is provided in Table 1 below. For the signalized intersection of Highway 26 at Highway 211, the reported delays, levels of service and volume-to capacity ratios represent the overall operation of the intersection. For the two unsignalized study intersections, the reported delays and levels-of-service represent the approach lane which experiences the highest delays, while the reported v/c ratios represent the highest ratio for the major-street and minor-street movements.

The Oregon Department of Transportation requires that the study intersections operate with a volume-to-capacity ratio (v/c) of 0.90 or less.

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

Table 1 - Operational Analysis Summary: 2020 Existing 30th-Highest Hour Conditions

Intersection	AM Peak Hour			PM Peak Hour		
	Delay	LOS	v/c	Delay	LOS	v/c
Highway 26 at Highway 211	18.2	B	0.53	20.7	C	0.71
Highway 211 at City Hall Access	11.6	B	0.22	12	B	0.25
Highway 211 at Tupper Road	12.3	B	0.19	14.7	B	0.25



SITE TRIPS

Proposed Development

The proposed new development will consist of 12 townhome dwelling units. To estimate the number of trips that will be generated by the proposed development, trip rates from the *TRIP GENERATION MANUAL, 10th EDITION* were used. Data from land-use code 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 Total
	In	Out	Total	In	Out	Total	
12 Multi-Family Dwelling Units	1	5	6	4	3	7	88

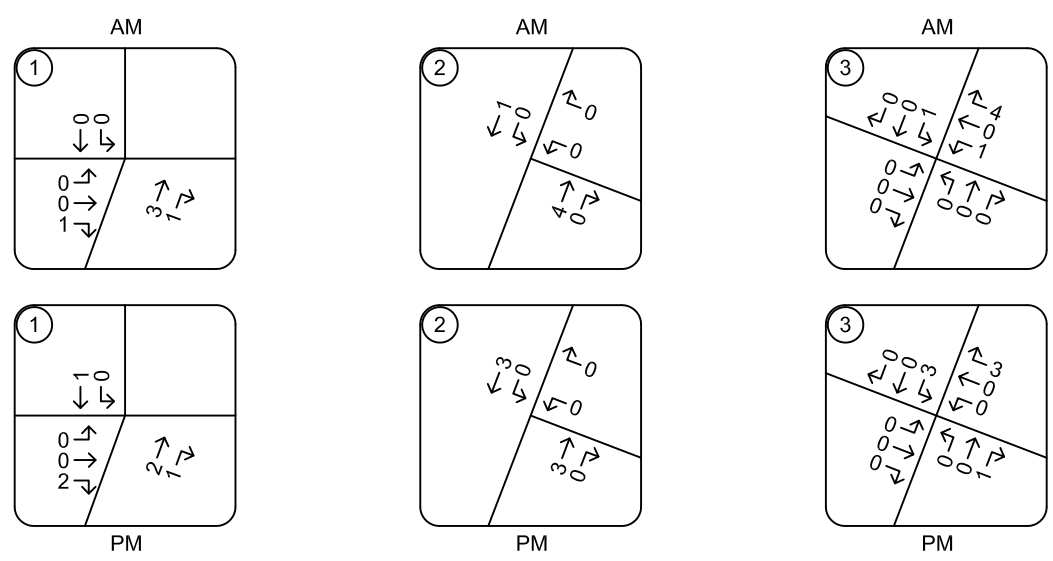
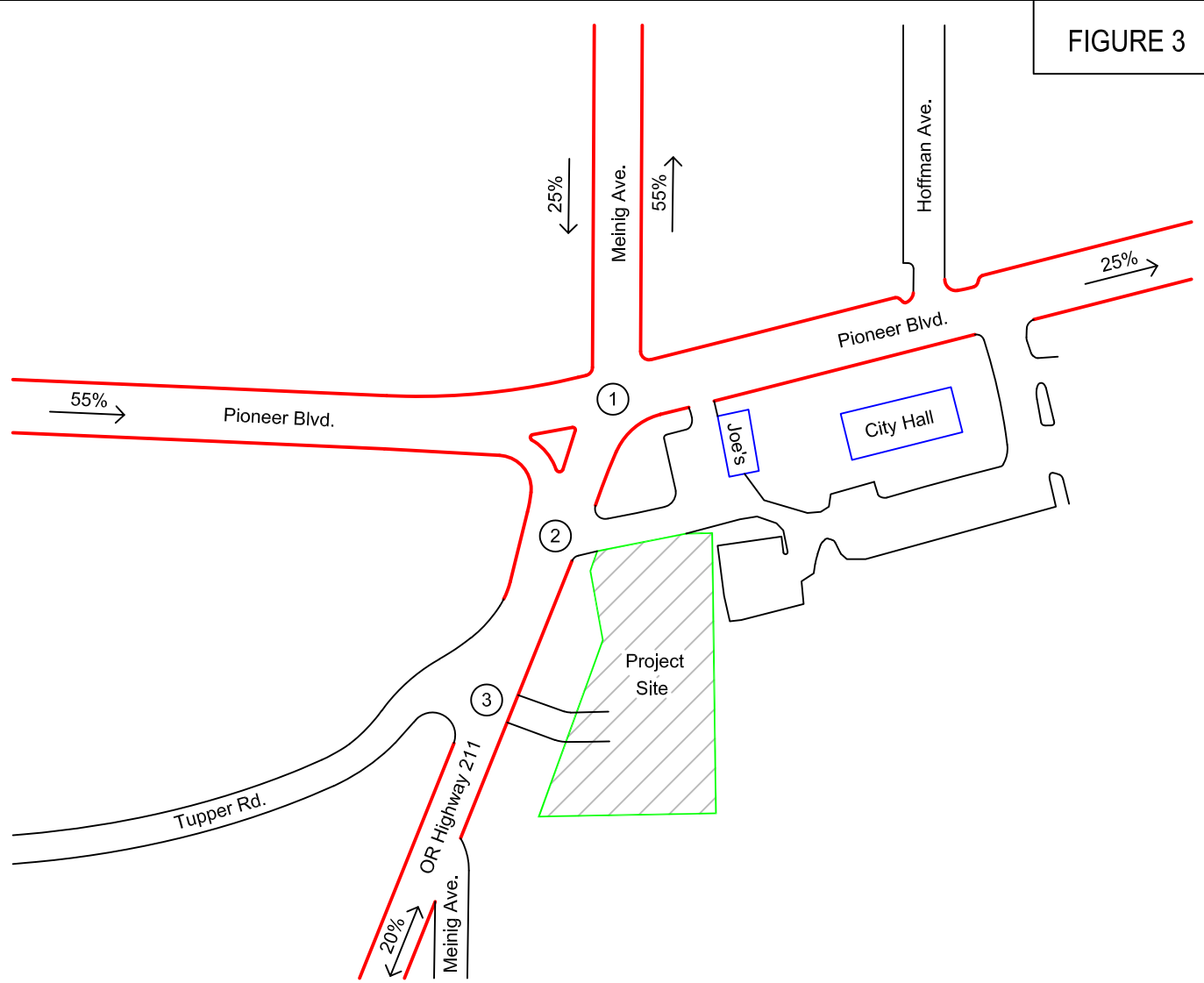
TRIP DISTRIBUTION

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, 55 percent of the anticipated site trips are projected to travel to and from the west on Highway 26, 25 percent are projected to travel to and from the east on Highway 26, and 20 percent are projected to travel to and from the south on Highway 211.

Since it is anticipated that any future site access to Highway 211 will be restricted to right-in, right-out movements only, drivers entering from the north will need to pass the site access and turn around prior to lawfully entering the project site. Similarly, drivers exiting the site intending to travel to the south will need to turn right then turn around to reach their intended destination. Accordingly, these trips may pass through the study intersections more than once. The additional trips resulting from vehicles turning around are included in the trip assignment diagram.

The trip distribution percentages and trip assignment for the proposed development are shown in Figure 3 on page 11.

FIGURE 3





FUTURE CONDITIONS ANALYSIS

BACKGROUND VOLUMES

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

Similar to the existing year 2020 conditions analysis, the year 2022 traffic volumes were determined using data from the Bull Run Terrace Subdivision TIS as well as ODOT data resources and the direct observations of turning movement volumes at the study area intersections to determine the likely traffic volumes during the peak hours absent the current COVID-19 pandemic.

Since the data used was drawn from the year 2022 background traffic volume for the Bull Run Terrace Subdivision, the projected volumes already account for future site trips from development within the in-process developments considered in that report as well as the anticipated background growth rates for highway volumes in the site vicinity. Site trips from the Bull Run Terrace Subdivision were not directly included in the analysis since completion of the Bull Run Terrace project will result in diversion of trips to the new Dubarko Road connection between Highway 211 and Highway 26 at the east side of the City of Sandy. Accordingly, the 2022 background conditions analysis represents the highest traffic volumes which may reasonably occur in association with the proposed development.

Figure 4 on page 13 shows the projected year 2022 background traffic volumes at the study intersections during the morning and evening peak hours, including anticipated future traffic from in-process developments.

BACKGROUND VOLUMES PLUS SITE TRIPS

Peak hour trips calculated to be generated by the proposed development were added to the projected year 2022 background traffic volumes to obtain the year 2022 total traffic volumes following completion of the proposed residential development. The resulting total traffic volumes are shown in figure 5 on page 14.

Based on discussions with ODOT staff, it is anticipated that the study intersections along Highway 211 south of Pioneer Boulevard may be restricted to right-in, right-out operation only in conjunction with the proposed development in order to reduce concerns associated with limited access spacing and queues. An additional diagram showing the year 2022 background plus site trips volumes with traffic diversions resulting from right-in, right-out restriction of these intersections is provided in Figure 6 on page 15.

FIGURE 4

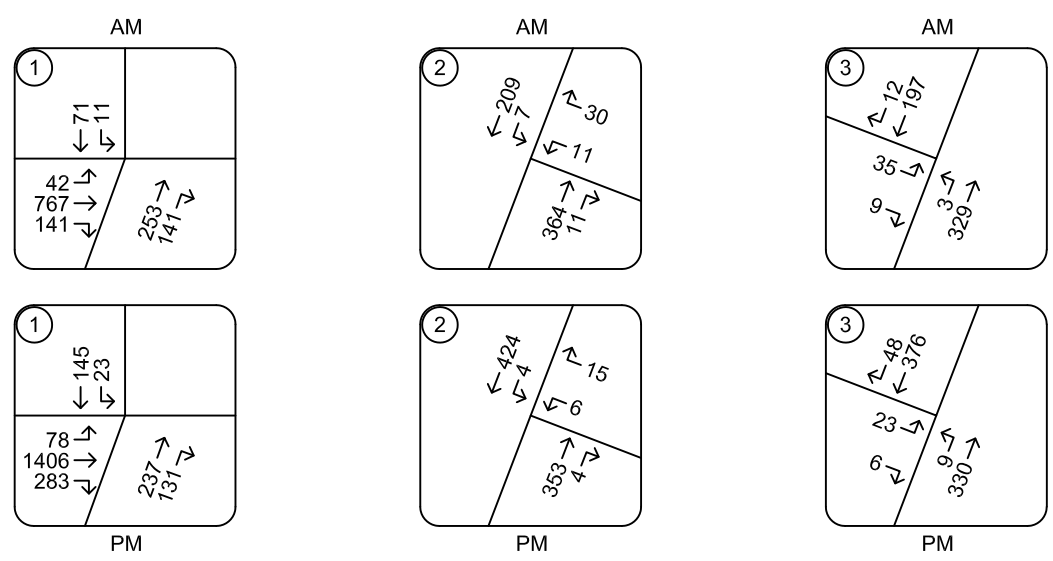
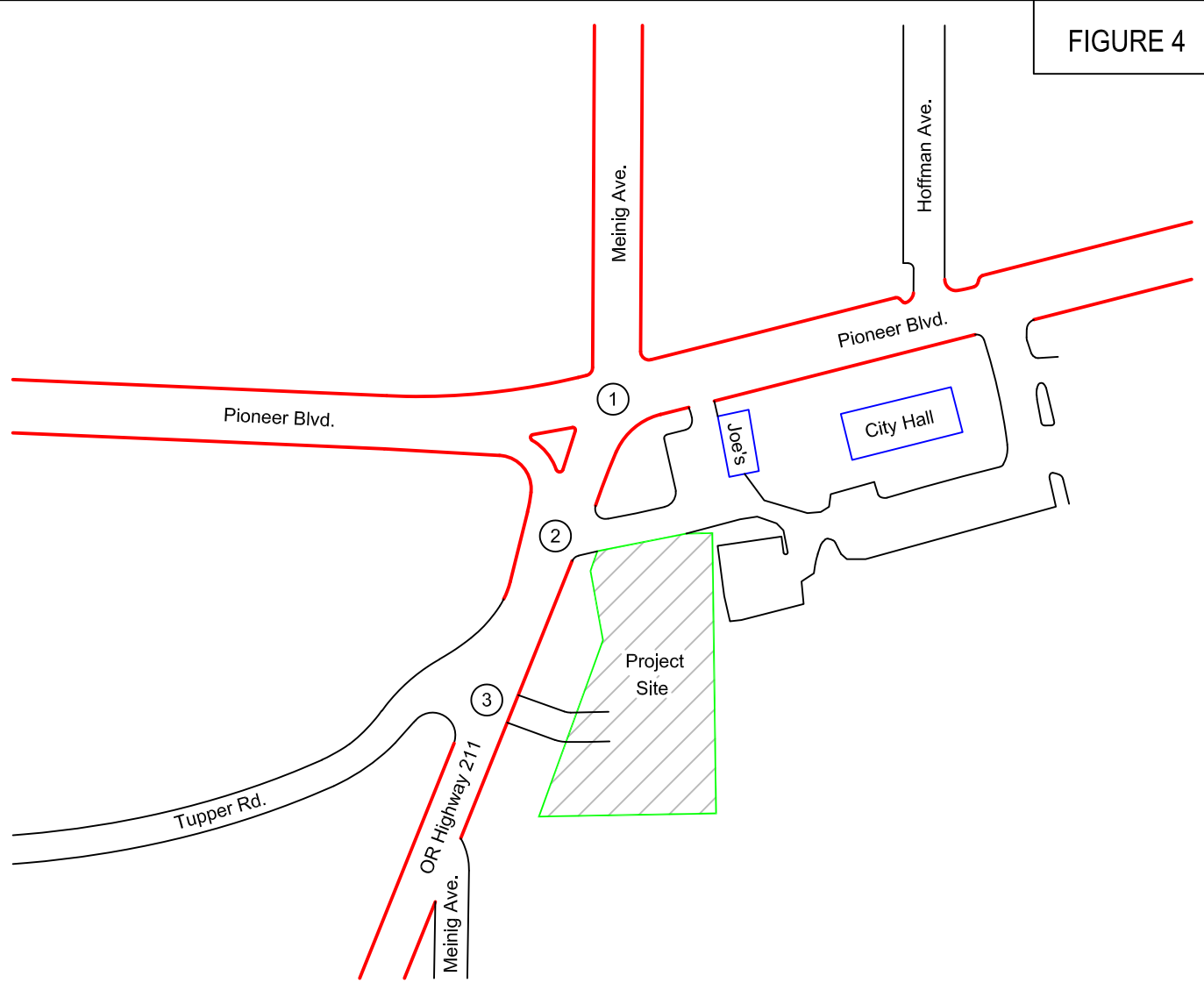


FIGURE 5

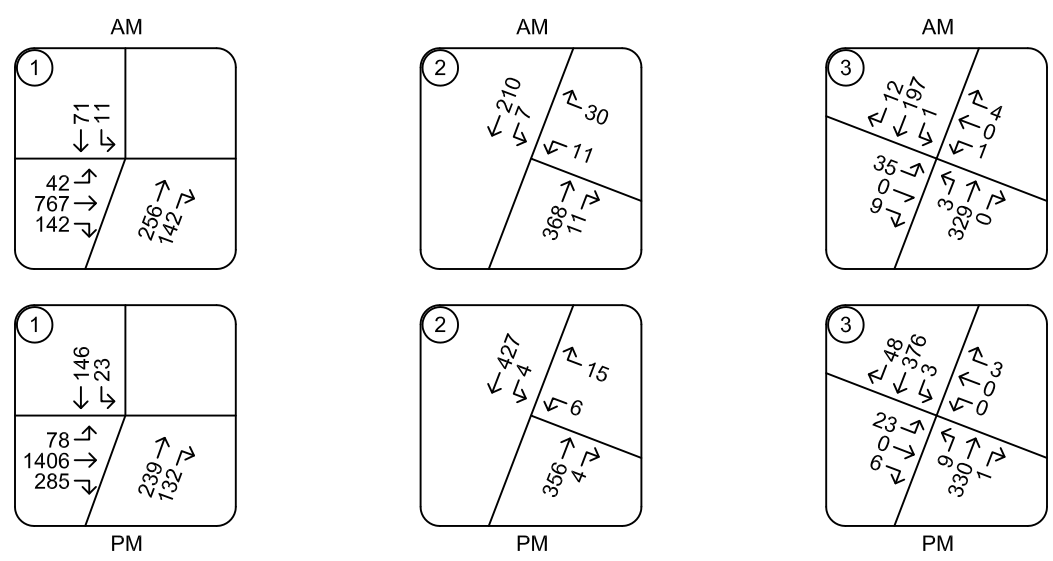
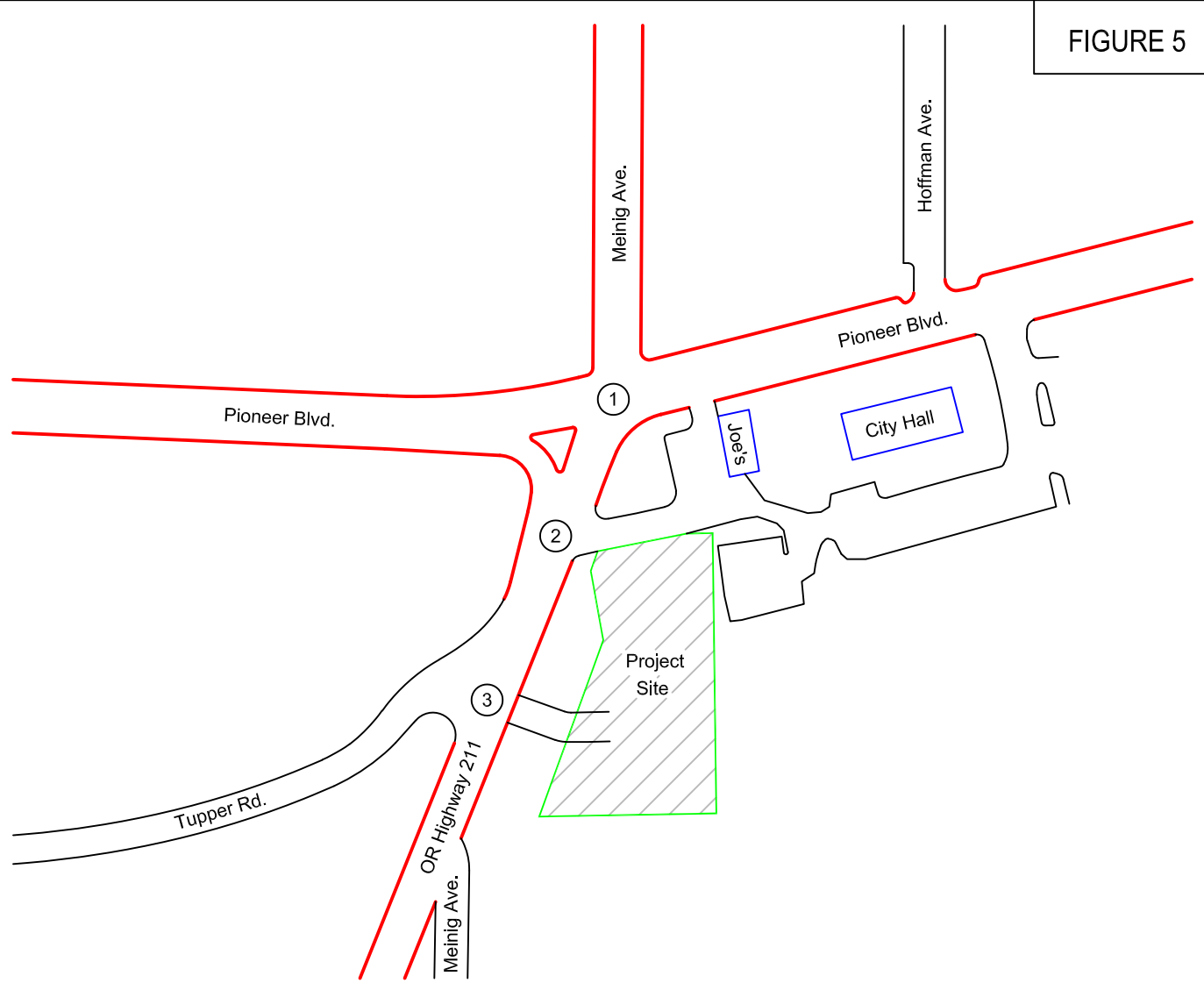
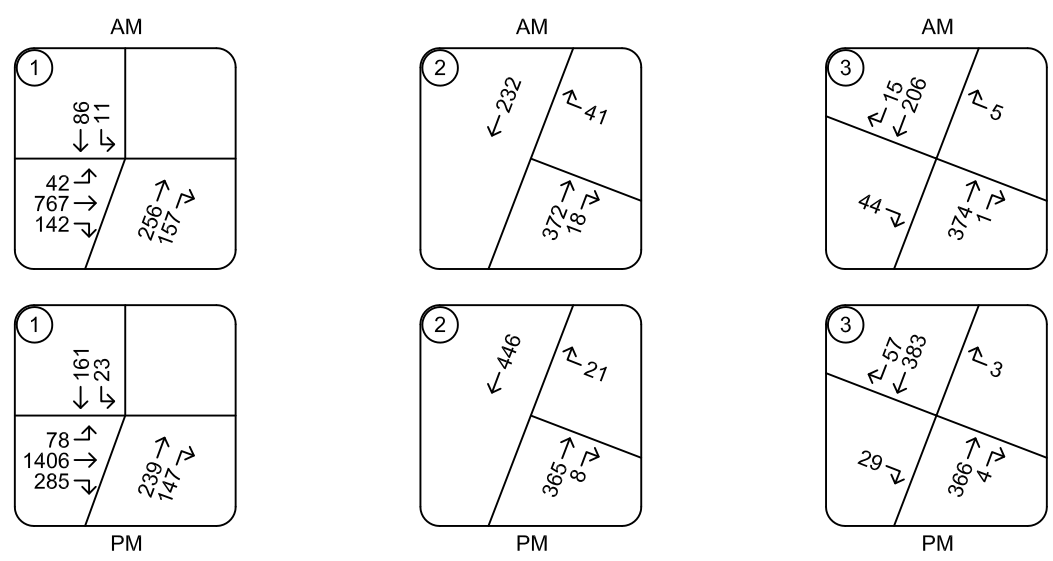
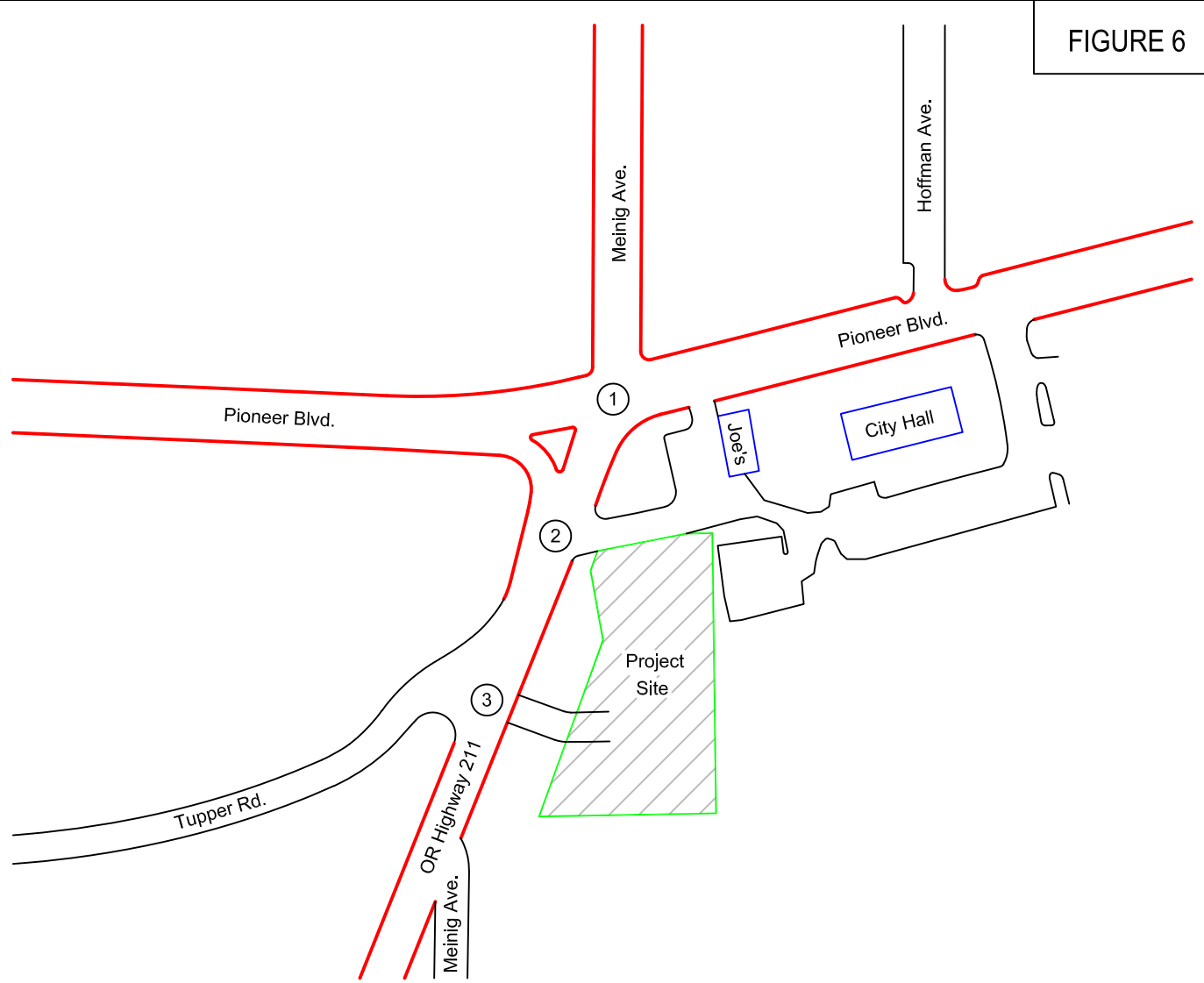


FIGURE 6





OPERATIONAL ANALYSIS

The operational analysis for future traffic conditions was again conducted using Synchro analysis software, with outputs based on the analysis methodologies contained in the *HIGHWAY CAPACITY MANUAL, 6th Edition*. The analysis was prepared for the intersections’ morning and evening peak hours.

The results of the operational analysis are summarized in Table 3 below. Detailed analysis worksheets are also included in the technical appendix.

Table 3 - Operational Analysis Summary: Year 2022 Future Conditions

Intersection	AM Peak Hour			PM Peak Hour		
	Delay	LOS	v/c	Delay	LOS	v/c
Pioneer Blvd. at Highway 211						
2022 Background Conditions	18.6	B	0.56	22.6	C	0.77
2022 Background plus Site	18.7	B	0.57	22.7	C	0.77
2022 Bkgd plus Site (w/ Median Barrier)	19.1	B	0.57	23.1	C	0.77
Highway 211 at City Hall Driveway						
2022 Background Conditions	11.9	B	0.23	12.3	B	0.26
2022 Background Plus Site	12.0	B	0.24	12.4	B	0.26
2022 Bkgd Plus Site (w/ Median Barrier)	11.2	B	0.24	10.8	B	0.27
Highway 211 at Tupper Road						
2022 Background Conditions	15.2	C	0.21	15.2	C	0.26
2022 Background plus Site	13.8	B	0.21	17.1	C	0.26
2022 Bkgd plus Site (w/ Median Barrier)	10.6	B	0.23	11.2	B	0.27

Based on the results of the operational analysis, the study intersections are projected to operate acceptably per ODOT standards either with or without the addition of site trips from the proposed development, and with or without conversion of the stop-controlled minor-street approaches to right-in, right-out only. No operational mitigations are necessary or recommended in conjunction with the proposed development.



QUEUING ANALYSIS

In addition to the operational analysis, a queuing analysis was conducted to determine whether northbound queues on Highway 211 may extend to the proposed site access driveway during the peak hours. The queuing analysis was prepared using SimTraffic simulation software with model calibrations as required per ODOT's Analysis Procedures Manual. The results of the analysis are reported as 95th percentile queues, which represent the queue length that is exceeded during less than 5 percent of the peak hour. Queue lengths in excess of the 95th percentile do not occur with sufficient frequency to allow for cost-effective design.

Based on the analysis, the projected 95th percentile queue lengths for the northbound Highway 211 approach to Pioneer Boulevard were determined to be 263 feet during the morning peak hour and 308 feet during the evening peak hour. (The average queue lengths during these analysis periods were projected to be 145 feet and 177 feet, respectively.)

The intersection of Highway 211 at the existing City Hall/Joe's Donuts driveway is centered approximately 70 feet south of the northbound stop bar on Highway 211 at Pioneer Boulevard. Accordingly, the average peak-hour queues projected during the peak hours will extend beyond this driveway.

The intersection of Highway 211 at Tupper Road is centered approximately 225 feet south of the northbound stop bar on Highway 211 at Pioneer Boulevard. Accordingly, this intersection is within the 95th percentile queue length during the morning and evening peak hours, although it is outside the average projected queue lengths during the peak hours.

Based on the queuing analysis, both unsignalized study intersections are within the 95th percentile queue lengths for northbound traffic approaching Pioneer Boulevard along Highway 211. Accordingly, it is appropriate to consider some form of turning movement restriction in order to avoid having vehicles make potentially unsafe left-turn maneuvers through stopped vehicle queues and to avoid congestion within the through travel lanes which may occur when vehicles stop within an otherwise free-flowing travel lane to wait to make left turns across these queues.

Typically, the most effective mechanism for restricting turning movements is the installation of a raised median within the major street. A raised median provides a physical barrier resulting in high compliance with the intended turning movement restriction. Where it is not possible to install a raised median within the major street, the side-street approaches may have "pork-chop" diverters installed which also physically direct vehicles toward the permitted turning movements only.

If sufficient width can be made available to accommodate a raised center median within Highway 211, it is recommended that the median be installed in conjunction with the proposed development. If a center median cannot be constructed within Highway 211, it is recommended that the site access be limited to right-in, right-out only through the installation of a "pork-chop" diverter within the new driveway approach.



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. In addition to examination of the crash data, crash rates are calculated for the intersections. Crash rates allow for comparison of relative risk by accounting for both the number of crashes and the number of vehicles travelling through the intersection. Crash rates are reported as the number of crashes per million entering vehicles.

The intersection of Pioneer Boulevard at OR Highway 211/Meinig Road had a total of 10 reported crashes during the 5-year analysis period. These included 6 rear-end collisions, 2 angle collisions, 1 sideswipe-overtaking collision and one fixed-object collision. The crashes resulted in one non-incapacitating injury and 4 reports of a “possible injury/complaint of pain.” The crash rate for the intersection was calculated to be 0.256 crashes per million entering vehicles. This is roughly the median crash rate for urban 3-way signalized intersections in Oregon (0.252 crashes per million entering vehicles), indicating that the intersection is operating similar to average intersections in Oregon with respect to safety.

The other study intersections had no reported crashes during the five-year analysis period.

Based on the detailed examination of crash data, no significant safety concerns were identified and no specific safety mitigations are recommended.

WARRANT ANALYSIS

Traffic signal and turn-lane warrants were examined for the study intersections.

Based on the projected side-street traffic volumes, traffic signal warrants are not projected to be met at either of the unsignalized study intersections under any of the analysis scenarios. Accordingly, no new traffic signals are recommended in conjunction with the proposed development.

Left-turn lane warrants were 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 left-turn lane warrant analysis methodology utilizes the number of travel lanes in conjunction with the volume of advancing and opposing traffic to determine the minimum number of left-turning vehicles which would result in a meaningful safety benefit. This threshold left-turn volume may be as low as 10 vehicles per hour. Notably, fewer than 10 left-turn movements are projected for all unsignalized major-street approaches during each of the peak hours. Accordingly, by inspection left-turn lane warrants will not be met. No new left-turn lanes are recommended in conjunction with the proposed development.

Right-turn lane warrants were also examined for the major-street approaches to the unsignalized study intersections. Right-turn lanes reduce the likelihood of rear-end collisions as vehicles slow or



stop to turn right from a free-flowing through travel lane. Generally, right-turn lane warrants are not met where the hourly right-turn volume is 20 vehicles or fewer. However, if the total approach volume in the outside lane is in excess of 700 vehicles per hour, a shoulder or right-turn lane treatment may be appropriate even if the right-turn volume is fewer than 20 vehicles. Examining the study intersections shows that none of the highway through lanes carries more than 700 vehicles per hour under any of the analysis scenarios. Accordingly, right-turn lane warrants will not be met for any intersections with fewer than 20 right-turning vehicles per hour.

Only one unsignalized major-street right-turn movement carries more than 20 vehicles per hour. This movement is the southbound right-turn movement from Highway 211 onto Tupper Road. Accordingly, a detailed right-turn lane warrant analysis was prepared for this intersection approach. Based on the analysis, right turn lane warrants would not be met under year 2022 background conditions or year 2022 background plus site trips conditions. With conversion of the intersection to right-in, right-out only and assuming that all northbound left-turning traffic diverts by passing Tupper Road northbound, turning around, then returning southbound, right-turn lane warrants would be marginally met. However, since some left-turning drivers would be expected to divert by turning left onto Dubarko Road prior to reaching Tupper Road, the actual volume of southbound right-turning traffic is expected to be below the threshold that would trigger the need for a right-turn lane. Additionally, no site trips from the proposed development would make this turning movement. Accordingly, installation of a new southbound right-turn lane serving Tupper Road is not recommended in conjunction with the proposed development.

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

INTERSECTION SIGHT DISTANCE

Based on the posted speed limit of 40 mph, a minimum of 445 feet of intersection sight distance is required to the south of the proposed site access on Highway 211. Vehicles approaching from the north are within a 25-mph speed zone on SE Meinig Avenue, requiring a minimum of 280 feet of intersection sight distance to the north.

In accordance with the procedures described in *A Policy On Geometric Design of Highways and Streets*, published by the American Association of State Highway and Transportation Officials, intersection sight distance was measured from a driver's eye position within the proposed driveway 15 feet behind the edge of the traveled way and 3.5 feet above the driveway surface. The available intersection sight distances in each direction were measured to the oncoming driver's eye position within the oncoming travel lane 3.5 feet above the roadway surface.

Intersection sight distance was measured to be in excess of 600 feet to the south from the proposed site access location. Sight distance to the north is restricted by a crest vertical curve where Highway 211 meets Pioneer Boulevard. The available intersection sight distance in this direction was measured to be 330 feet.

In addition to evaluation of intersection sight distance for the northbound and southbound approaches along Highway 211/SE Meinig Avenue, it is appropriate to evaluate whether adequate



stopping sight distance is available for vehicles turning from Highway 26 onto Highway 211 to stop if necessary to avoid a collision.

Vehicles turning from Highway 26 would be expected to turn at speeds of up to approximately 20 mph. Based on this design speed and the 6 percent downhill grade on the approach, the minimum required stopping sight distance for this approach speed was calculated to be 120 feet. The available intersection sight distance for vehicles approaching from this direction was measured to be 203 feet. Accordingly, the access can operate safely with respect to vehicles approaching from Highway 26.

Based on the sight distance analysis, adequate sight lines can be attained for safe and efficient operation at the proposed site access location on Highway 211.

SITE ACCESS ALTERNATIVES ANALYSIS

At the direction of ODOT staff, three total site access scenarios were examined. The potential site access options include:

- 1) Shared site access to Highway 211 at the existing City Hall/Joe's Donuts Driveway;
- 2) A new site access driveway on Highway 211 immediately south of the existing City Hall/Joes' Donuts driveway; and
- 3) A new site access driveway on Highway 211 directly opposite Tupper Road.

These potential site access scenarios were evaluated in order to determine the relative merits of each. It should be noted that given the low delays, high levels of service and low v/c ratios projected in the operational analysis portion of this report, it is anticipated that any of the three site access scenarios would result in acceptable operation per ODOT standards. However, the access scenarios differ significantly in near-term and long-term access spacing and safety, as well as viability.

Access Scenario 1

A shared access to Highway 211 at the existing City Hall/Joe's Donuts Driveway would result in increasing traffic volumes at an intersection in very close proximity to the traffic signal at Pioneer Boulevard. Based on the queueing analysis, this existing driveway is well within the average queue length for northbound vehicles approaching the signal during both the morning and evening peak hours. Conflicts between turning vehicles and through traffic would remain frequent, and the increased traffic volumes using the driveway would exacerbate existing problems at this driveway.

In addition to the operational concerns associated with shared access at the existing City Hall/Joe's Donuts driveway, sharing this access would require approval from the City of Sandy for sharing the access. This approval was previously formally requested of the Sandy City Council and was denied. City staff are also unsupportive of a shared access. As such, this option was determined to be infeasible.

Access Scenario 2

Although the subject property cannot share access with the existing city driveway, it would be possible to construct a new driveway immediately south of and adjacent to the City Hall/Joe's



Donuts driveway within the subject property. The idea would be to align the driveway at the north end of the property and provide an easement for future use by the city. Given such an easement, at any time that the city and/or Joe's makes substantive changes to their sites the existing driveway could be closed and consolidated with the driveway serving the subject property. In the long term, this would result in (marginally) increased access spacing between the driveway and Pioneer Boulevard as well as a reduction in the number of points of access to Highway 211.

This access alternative also has some substantial weaknesses.

First, since near-term operation would require that both the existing city driveway and the proposed site access operate simultaneously. Since drivers turning right onto Highway 211 primarily focus on conflicts approaching along the highway, they may begin turns only to find they are obstructed by a vehicle that has entered Highway 211 from the adjacent driveway. This may lead to both operational and safety concerns.

Second, since the new driveway would need to be located at the extreme north end of the subject property, it would be placed at the location providing the least possible access spacing between the new driveway and the traffic signal at Pioneer Boulevard. Again, this driveway would be located well within the average northbound queue length during the morning and evening peak hours.

Third, this scenario would result in an immediate degradation to access spacing and safety in the site vicinity which would continue indefinitely until such time as the City of Sandy could be forced to move their access to a shared alignment with the proposed development. Since no improvements are currently planned within the City Hall or Joe's Donuts sites, it is expected that this degradation would continue well into the future.

Fourth, providing exclusive site access to The Pad at the north end of the subject property would result in a permanent driveway which cannot be either closed or relocated at any point in the future. Since Joe's Donuts and the Sandy City Hall currently also have access to Highway 26 (two driveways), it may be possible to close their existing driveway at some point in the future. However, if site access for the Pad is placed at the north end of the subject property, it will not be possible to remove that access in the future.

Fifth, the subject property is located on a slope, with the north end of the site forming the highest point of the subject property. If access is taken at the north end of the site, it will be necessary to provide a long driveway carrying site traffic to the lower elevation from which vehicles will access parking spaces within the site. This will result in a meaningful reduction in the development potential of the subject property.

Based on the analysis, selection of site access at the north end of the site is not recommended.

Access Scenario 3

Under the third access scenario, a new driveway would be constructed intersecting Highway 211 directly opposite Tupper Road.



Since there is an existing intersection at this location, construction of the driveway would result in no change to the existing access spacing on Highway 211. Although access spacing between the site access and the City Hall/Joe's Donuts access would only be approximately 150 feet, this would be considerably in excess of the access spacing that results from implementation of Access Scenario 2, with ample room for drivers simultaneously exiting the two driveways to anticipate and avoid collisions with each other.

Although the site access would be located within the 95th percentile queue length for northbound traffic on Highway 211, it would be well outside the average queue length during the peak hours. This indicates that although there may be some obstruction of the site access by through traffic, the standing queues would be expected to clear during each signal cycle, allowing for safe and efficient access to and from the site in conjunction with the proposed right-in, right-out restriction.

Although this site access would also be permanent (similar to Access Scenario 2), it may be possible to remove the City Hall/Joe's Donuts access in the future since alternative access is available for these uses. Accordingly, selection of this access alternative results not only in maximizing access spacing in the near term, but in the potential for maximizing access spacing in the long term as well.

Since Tupper Road intersects Highway 211 near the middle of the subject property, this access scenario also results in the most efficient site plan, since vehicles entering the site from the middle of the property can easily access dwelling units on the north and south sides of the site without the need for significant changes in elevation.

Based on the detailed analysis of the three site access scenarios, it is recommended that site access be taken to Highway 211 directly opposite Tupper Road.



CONCLUSIONS

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

Based on the queuing analysis, the northbound 95th percentile queues on Highway 211 approaching Pioneer Boulevard are projected to extend beyond the Tupper Road/site access intersection during the peak hours. If sufficient width can be made available to accommodate a raised center median within Highway 211, it is recommended that the median be installed in conjunction with the proposed development. If a center median cannot be constructed within Highway 211, it is recommended that the site access be limited to right-in, right-out only through the installation of a “pork-chop” diverter within the new driveway approach.

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

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

At the request of ODOT staff, three potential site access alternatives were examined. Based on the analysis, it is recommended that site access be provided to Highway 211 directly opposite Tupper Road.

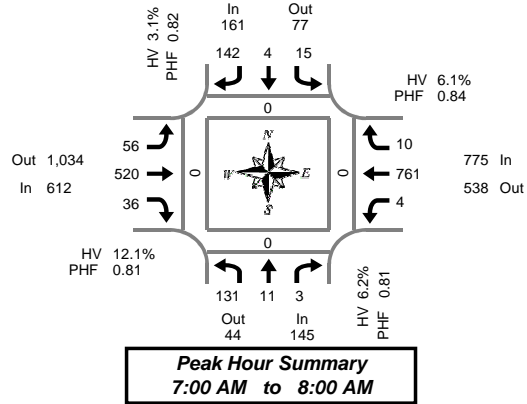


APPENDIX

Total Vehicle Summary



Clay Carney
(503) 833-2740



SE Ten Eyck Rd & Hwy 26

Wednesday, March 20, 2019

7:00 AM to 9:00 AM

5-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	16	0	0	0	0	0	17	0	5	26	2	0	0	74	0	0	140	0	0	0	0
7:05 AM	10	0	1	0	1	0	10	0	2	18	3	0	1	65	2	0	113	0	0	0	0
7:10 AM	17	1	0	0	2	0	11	0	7	36	2	0	2	74	1	0	153	0	0	0	0
7:15 AM	12	0	0	0	1	2	9	0	9	40	2	0	1	84	1	0	161	0	0	0	0
7:20 AM	15	0	0	0	3	0	11	0	3	40	1	0	0	68	0	0	141	0	0	0	0
7:25 AM	14	1	0	0	1	1	16	0	2	40	4	0	0	70	1	0	150	0	0	0	0
7:30 AM	7	1	1	0	0	0	16	0	8	43	2	0	0	67	0	0	145	0	0	0	0
7:35 AM	12	2	0	0	3	0	12	0	0	56	5	0	0	57	1	0	148	0	0	0	0
7:40 AM	8	2	0	0	0	0	11	0	4	59	3	0	0	53	0	0	140	0	0	0	0
7:45 AM	12	1	1	0	2	0	11	0	4	53	3	0	0	45	2	0	134	0	0	0	0
7:50 AM	4	2	0	0	1	0	10	0	9	47	4	0	0	62	0	0	139	0	0	0	0
7:55 AM	4	1	0	0	1	1	8	0	3	62	5	0	0	42	2	0	129	0	0	0	0
8:00 AM	5	0	1	0	2	1	13	0	2	46	2	0	0	41	0	0	113	0	0	0	0
8:05 AM	6	0	0	0	1	1	5	0	8	50	2	0	0	42	2	0	117	0	0	0	0
8:10 AM	3	0	0	0	2	1	10	0	5	45	4	0	0	53	1	0	124	0	0	0	1
8:15 AM	12	0	0	0	2	0	7	0	3	38	1	0	0	34	1	0	98	0	0	0	0
8:20 AM	6	2	0	0	2	0	9	0	5	38	1	0	1	49	0	0	113	0	0	0	0
8:25 AM	8	0	0	0	1	0	11	0	4	44	3	0	0	39	2	0	112	0	0	0	1
8:30 AM	5	0	0	0	2	1	10	0	4	66	2	0	0	47	0	0	137	1	0	0	0
8:35 AM	10	0	0	0	3	0	13	0	6	59	5	0	0	45	1	0	142	0	0	0	0
8:40 AM	7	0	0	0	5	1	15	0	10	62	3	0	1	43	1	0	148	0	0	0	0
8:45 AM	5	0	0	0	1	0	12	0	5	69	5	0	0	63	0	0	160	0	0	0	0
8:50 AM	9	2	0	0	3	0	12	0	7	56	8	0	1	46	1	0	145	0	0	0	0
8:55 AM	8	1	0	0	2	0	13	0	6	51	8	0	2	44	1	0	136	0	0	0	0
Total Survey	215	16	4	0	41	9	272	0	121	1,144	80	0	9	1,307	20	0	3,238	1	0	0	2

15-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	43	1	1	0	3	0	38	0	14	80	7	0	3	213	3	0	406	0	0	0	0
7:15 AM	41	1	0	0	5	3	36	0	14	120	7	0	1	222	2	0	452	0	0	0	0
7:30 AM	27	5	1	0	3	0	39	0	12	158	10	0	0	177	1	0	433	0	0	0	0
7:45 AM	20	4	1	0	4	1	29	0	16	162	12	0	0	149	4	0	402	0	0	0	0
8:00 AM	14	0	1	0	5	3	28	0	15	141	8	0	0	136	3	0	354	0	0	0	1
8:15 AM	26	2	0	0	5	0	27	0	12	120	5	0	1	122	3	0	323	0	0	0	1
8:30 AM	22	0	0	0	10	2	38	0	20	187	10	0	1	135	2	0	427	1	0	0	0
8:45 AM	22	3	0	0	6	0	37	0	18	176	21	0	3	153	2	0	441	0	0	0	0
Total Survey	215	16	4	0	41	9	272	0	121	1,144	80	0	9	1,307	20	0	3,238	1	0	0	2

Peak Hour Summary

7:00 AM to 8:00 AM

By Approach	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	145	44	189	0	161	77	238	0	612	1,034	1,646	0	775	538	1,313	0	1,693	0	0	0	0
%HV	6.2%				3.1%				12.1%				6.1%				8.0%				
PHF	0.81				0.82				0.81				0.84				0.93				

By Movement	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	131	11	3	145	15	4	142	161	56	520	36	612	4	761	10	775	1,693
%HV	6.9%	0.0%	0.0%	6.2%	13.3%	25.0%	1.4%	3.1%	8.9%	12.7%	8.3%	12.1%	75.0%	5.5%	20.0%	6.1%	8.0%
PHF	0.74	0.55	0.75	0.81	0.63	0.33	0.81	0.82	0.74	0.77	0.75	0.81	0.25	0.84	0.63	0.84	0.93

Rolling Hour Summary

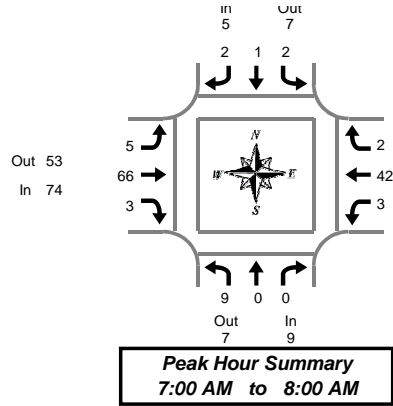
7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	131	11	3	0	15	4	142	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

Heavy Vehicle 5-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	1	0	0	1	0	0	0	0	1	6	1	8	0	6	0	6	15
7:05 AM	0	0	0	0	0	0	0	0	0	5	0	5	0	5	0	5	10
7:10 AM	3	0	0	3	0	0	0	0	0	3	0	3	2	2	1	5	11
7:15 AM	1	0	0	1	0	1	0	1	2	6	0	8	1	1	0	2	12
7:20 AM	2	0	0	2	1	0	0	1	0	5	0	5	0	1	0	1	9
7:25 AM	0	0	0	0	0	0	0	0	0	6	1	7	0	1	0	1	8
7:30 AM	0	0	0	0	0	0	0	0	0	7	0	7	0	7	0	7	14
7:35 AM	0	0	0	0	1	0	0	1	0	7	0	7	0	6	0	6	14
7:40 AM	0	0	0	0	0	0	0	0	1	8	0	9	0	1	0	1	10
7:45 AM	0	0	0	0	0	0	1	1	0	6	0	6	0	4	0	4	11
7:50 AM	0	0	0	0	0	0	1	1	0	3	0	3	0	7	0	7	11
7:55 AM	2	0	0	2	0	0	0	0	1	4	1	6	0	1	1	2	10
8:00 AM	1	0	0	1	0	0	1	1	0	10	1	11	0	2	0	2	15
8:05 AM	0	0	0	0	1	0	1	2	0	9	0	9	0	7	1	8	19
8:10 AM	0	0	0	0	0	0	0	0	0	2	0	2	0	6	0	6	8
8:15 AM	0	0	0	0	0	0	0	0	0	4	0	4	0	3	0	3	7
8:20 AM	0	0	0	0	0	0	1	1	0	5	0	5	1	2	0	3	9
8:25 AM	0	0	0	0	0	0	0	0	0	6	1	7	0	3	0	3	10
8:30 AM	0	0	0	0	1	0	0	1	2	6	0	8	0	3	0	3	12
8:35 AM	0	0	0	0	0	0	0	0	1	5	0	6	0	8	0	8	14
8:40 AM	0	0	0	0	0	0	1	1	0	5	0	5	0	1	0	1	7
8:45 AM	0	0	0	0	0	0	0	0	0	9	0	9	0	3	0	3	12
8:50 AM	0	0	0	0	0	0	0	0	1	4	0	5	1	8	0	9	14
8:55 AM	0	0	0	0	0	0	3	3	0	0	2	2	0	3	0	3	8
Total Survey	10	0	0	10	4	1	9	14	9	131	7	147	5	91	3	99	270

Heavy Vehicle 15-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	4	0	0	4	0	0	0	0	1	14	1	16	2	13	1	16	36
7:15 AM	3	0	0	3	1	1	0	2	2	17	1	20	1	3	0	4	29
7:30 AM	0	0	0	0	1	0	0	1	1	22	0	23	0	14	0	14	38
7:45 AM	2	0	0	2	0	0	2	2	1	13	1	15	0	12	1	13	32
8:00 AM	1	0	0	1	1	0	2	3	0	21	1	22	0	15	1	16	42
8:15 AM	0	0	0	0	0	0	1	1	0	15	1	16	1	8	0	9	26
8:30 AM	0	0	0	0	1	0	1	2	3	16	0	19	0	12	0	12	33
8:45 AM	0	0	0	0	0	0	3	3	1	13	2	16	1	14	0	15	34
Total Survey	10	0	0	10	4	1	9	14	9	131	7	147	5	91	3	99	270

Heavy Vehicle Peak Hour Summary

7:00 AM to 8:00 AM

By Approach	Northbound SE Ten Eyck Rd			Southbound SE Ten Eyck Rd			Eastbound Hwy 26			Westbound Hwy 26			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	9	7	16	5	7	12	74	53	127	47	68	115	135
PHF	0.38			0.63			0.80			0.73			0.89

By Movement	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	9	0	0	9	2	1	2	5	5	66	3	74	3	42	2	47	135
PHF	0.38	0.00	0.00	0.38	0.50	0.25	0.25	0.63	0.63	0.75	0.75	0.80	0.25	0.75	0.50	0.73	0.89

Heavy Vehicle Rolling Hour Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	9	0	0	9	2	1	2	5	5	66	3	74	3	42	2	47	135
7:15 AM	6	0	0	6	3	1	4	8	4	73	3	80	1	44	2	47	141
7:30 AM	3	0	0	3	2	0	5	7	2	71	3	76	1	49	2	52	138
7:45 AM	3	0	0	3	2	0	6	8	4	65	3	72	1	47	2	50	133
8:00 AM	1	0	0	1	2	0	7	9	4	65	4	73	2	49	1	52	135

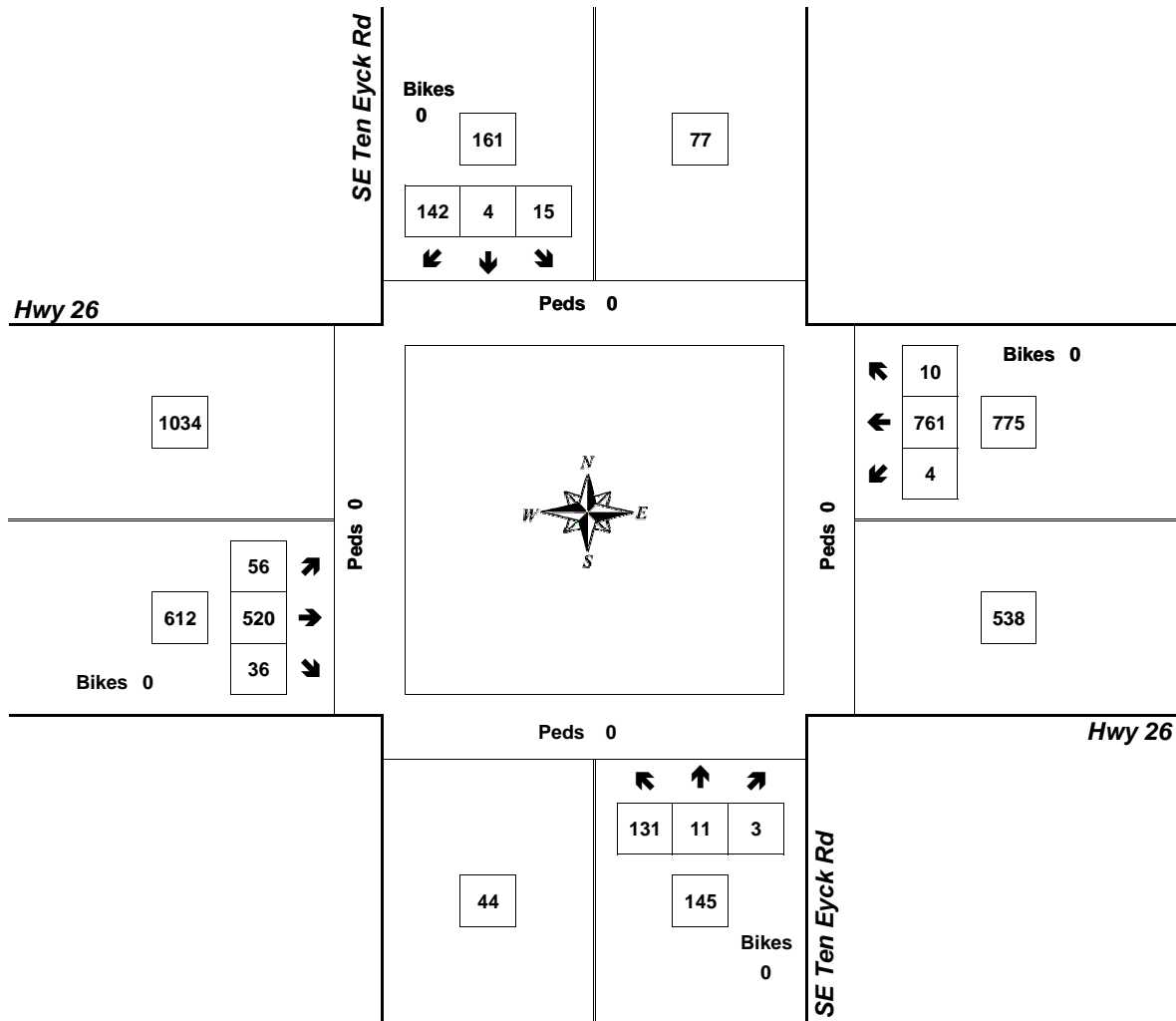
Peak Hour Summary



Clay Carney
(503) 833-2740

SE Ten Eyck Rd & Hwy 26

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



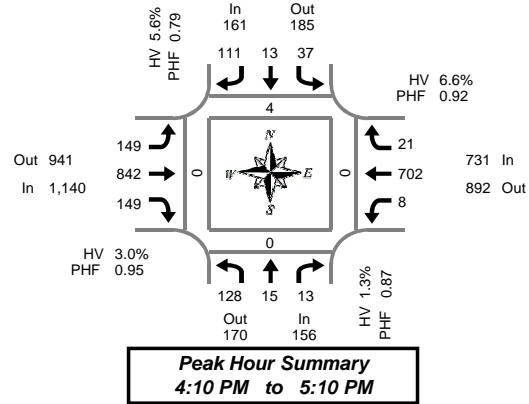
Approach	PHF	HV%	Volume
EB	0.81	12.1%	612
WB	0.84	6.1%	775
NB	0.81	6.2%	145
SB	0.82	3.1%	161
Intersection	0.93	8.0%	1,693

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

Total Vehicle Summary



Clay Carney
(503) 833-2740



SE Ten Eyck Rd & Hwy 26

Tuesday, March 19, 2019

4:00 PM to 6:00 PM

5-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Ten Eyck Rd				Southbound SE Ten Eyck Rd				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	4	0	2	0	4	3	11	0	8	58	12	0	1	49	2	0	154	0	1	0	0
4:05 PM	10	1	0	0	7	1	5	0	12	63	8	0	1	53	3	0	164	0	0	0	0
4:10 PM	7	2	3	0	1	0	17	0	12	76	11	0	0	65	1	0	195	0	0	0	0
4:15 PM	14	0	1	0	7	1	9	0	18	71	15	0	0	62	1	0	199	0	0	0	0
4:20 PM	9	0	1	0	4	1	11	0	9	75	10	0	0	62	7	0	189	0	0	0	0
4:25 PM	12	2	0	0	5	0	10	0	12	61	14	0	0	52	0	0	168	0	0	0	0
4:30 PM	11	1	4	0	3	2	12	0	17	87	16	1	1	58	1	0	213	0	0	0	0
4:35 PM	15	0	0	0	2	2	6	0	6	59	14	0	0	65	3	0	172	0	0	0	0
4:40 PM	7	1	1	0	3	0	7	0	7	54	9	0	1	57	0	0	147	1	0	0	0
4:45 PM	8	1	0	0	4	1	3	0	13	71	15	1	3	51	3	0	173	0	0	0	0
4:50 PM	13	2	1	0	1	1	6	0	19	74	8	0	0	56	0	0	181	0	0	0	0
4:55 PM	7	1	0	0	1	0	12	0	10	67	14	0	3	57	1	0	173	1	0	0	0
5:00 PM	13	3	1	0	2	2	14	0	12	81	12	0	0	49	1	0	190	2	0	0	0
5:05 PM	12	2	1	0	4	3	4	0	14	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

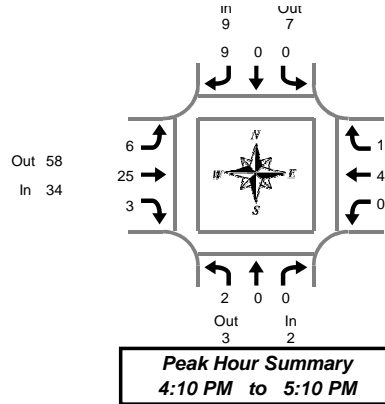
4:00 PM to 6:00 PM

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



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

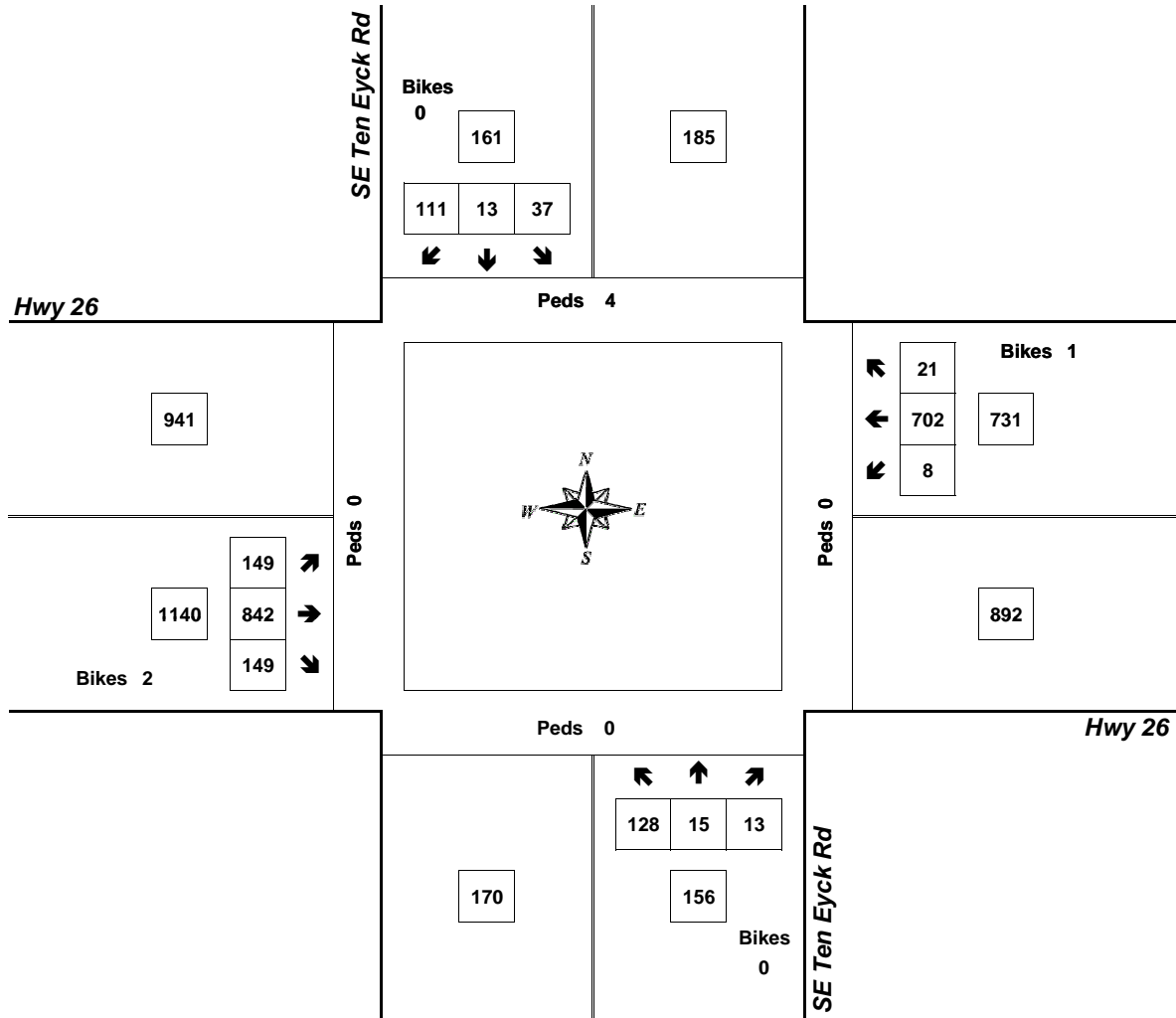
Peak Hour Summary



Clay Carney
(503) 833-2740

SE Ten Eyck Rd & Hwy 26

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



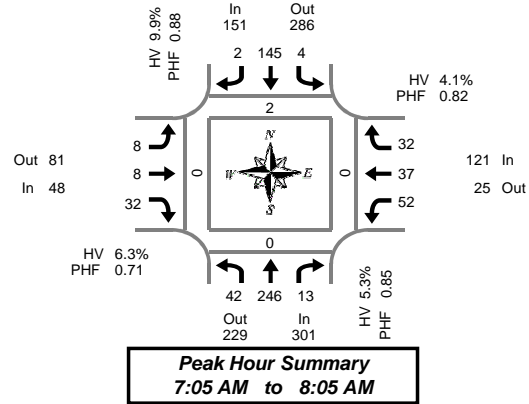
Approach	PHF	HV%	Volume
EB	0.95	3.0%	1,140
WB	0.92	6.6%	731
NB	0.87	1.3%	156
SB	0.79	5.6%	161
Intersection	0.94	4.3%	2,188

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

Total Vehicle Summary



Clay Carney
(503) 833-2740



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

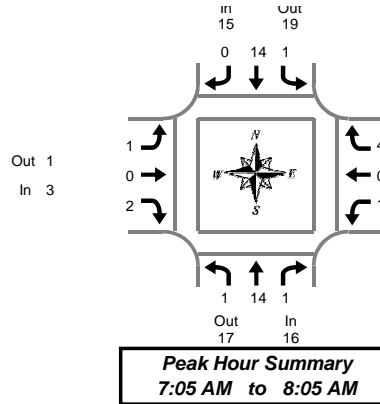
7:00 AM to 9:00 AM

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



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	0	0	0	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

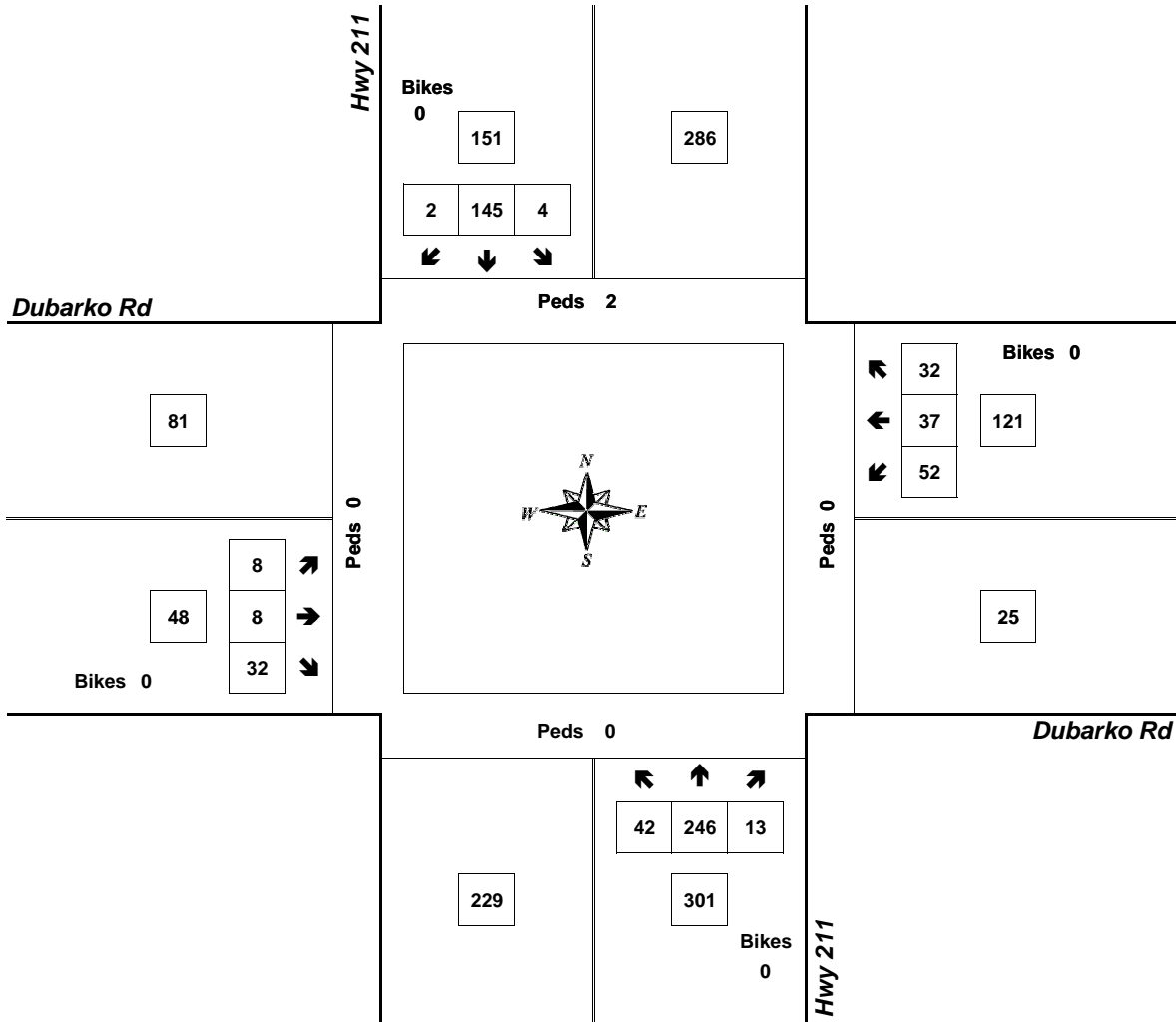
Peak Hour Summary



Clay Carney
(503) 833-2740

Hwy 211 & Dubarko Rd

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



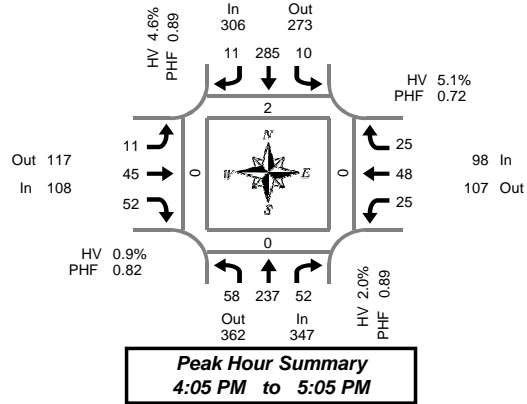
Approach	PHF	HV%	Volume
EB	0.71	6.3%	48
WB	0.82	4.1%	121
NB	0.85	5.3%	301
SB	0.88	9.9%	151
Intersection	0.90	6.3%	621

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

Total Vehicle Summary



Clay Carney
(503) 833-2740



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

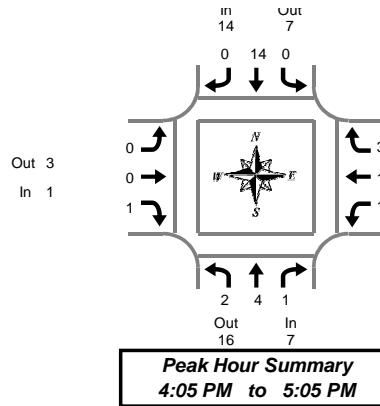
4:00 PM to 6:00 PM

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

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	0	1	7
4:05 PM	0	0	0	0	0	1	0	1	0	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	0	1	1	3
4:15 PM	0	1	0	1	0	4	0	4	0	0	0	0	0	0	0	0	0	5
4:20 PM	0	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	0	2
4:30 PM	0	0	0	0	0	2	0	2	0	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	0	1	1	3
4:40 PM	0	0	0	0	0	1	0	1	0	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	0	1
4:50 PM	0	1	0	1	0	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	0	2
5:00 PM	0	1	0	1	0	2	0	2	0	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	0	1
5:10 PM	0	0	0	0	0	1	0	1	0	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	0	1
5:20 PM	0	0	1	1	0	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	0	2
5:30 PM	0	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	0	1
5:40 PM	0	1	0	1	0	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	0
5:50 PM	0	0	0	0	0	1	0	1	0	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	1	0	0	1	4
Total Survey	3	9	2	14	0	23	0	23	0	0	3	3	3	1	3	7	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	2	2	0	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	7	47

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

By Approach	Northbound Hwy 211			Southbound Hwy 211			Eastbound Dubarko Rd			Westbound Dubarko Rd			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	7	16	23	14	7	21	1	3	4	5	1	6	27
PHF	0.58			0.58			0.25			0.42			0.68

By Movement	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	2	4	1	7	0	14	0	14	0	0	1	1	1	1	3	5	27
PHF	0.25	0.50	0.25	0.58	0.00	0.58	0.00	0.58	0.00	0.00	0.25	0.25	0.25	0.25	0.38	0.42	0.68

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

Interval Start Time	Northbound Hwy 211				Southbound Hwy 211				Eastbound Dubarko Rd				Westbound Dubarko Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	2	4	1	7	0	16	0	16	0	0	2	2	2	1	3	6	31
4:15 PM	0	5	1	6	0	14	0	14	0	0	1	1	1	1	2	4	25
4:30 PM	1	6	2	9	0	8	0	8	0	0	1	1	0	0	2	2	20
4:45 PM	1	6	2	9	0	5	0	5	0	0	1	1	0	0	0	0	15
5:00 PM	1	5	1	7	0	7	0	7	0	0	1	1	1	0	0	1	16

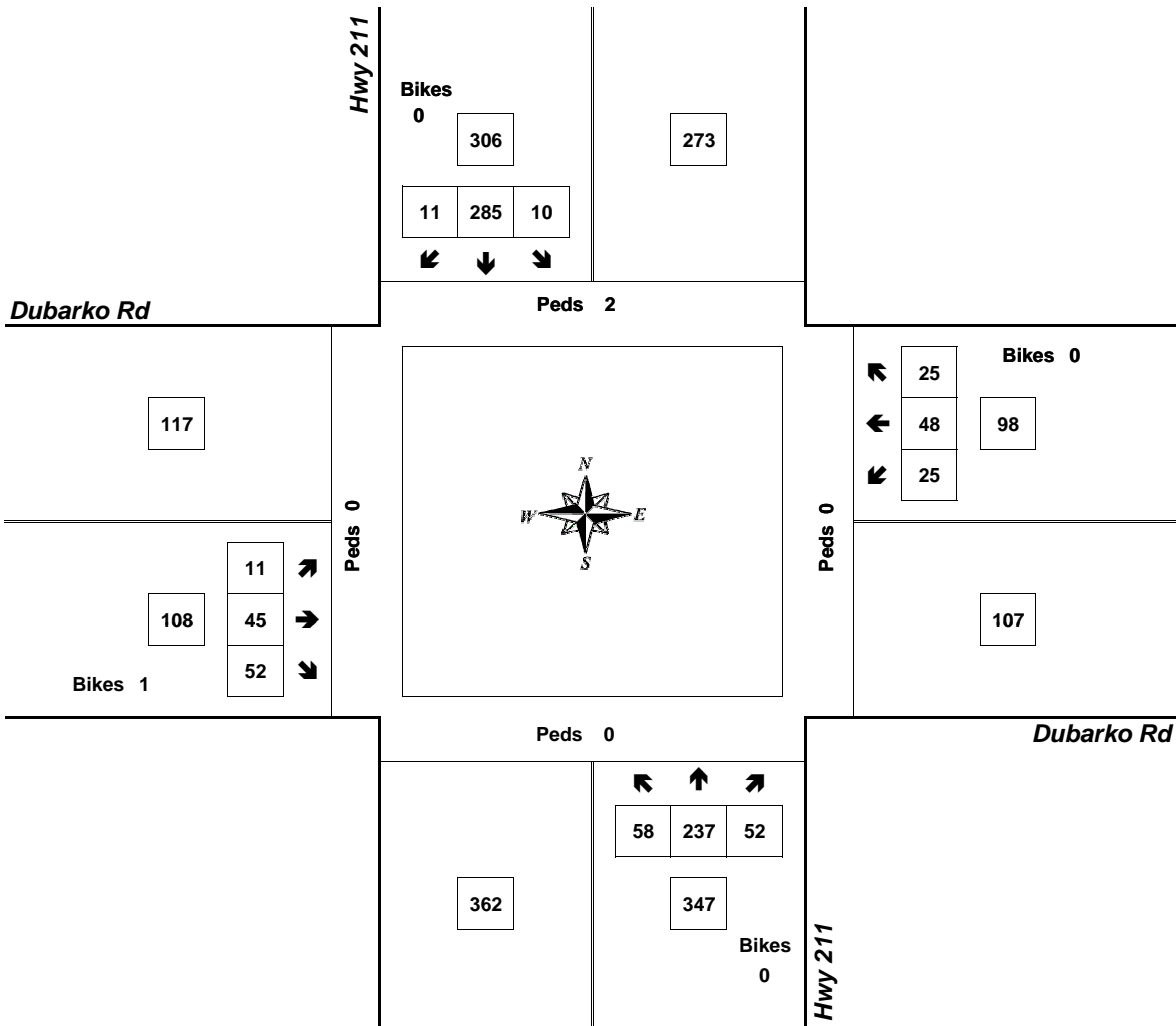
Peak Hour Summary



Clay Carney
(503) 833-2740

Hwy 211 & Dubarko Rd

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



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

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

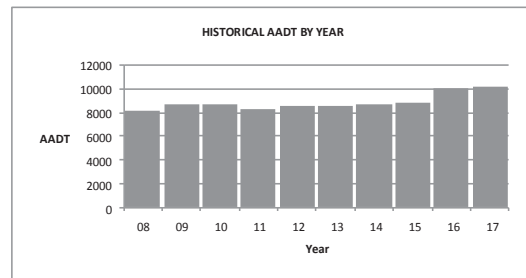
HWY	MP	DIR	HS	Location	2014	2015	2016	2036	RSQ
026	22.72	1		0.02 mile northwest of S.E. 362nd Drive, west city limits of Sandy		29500		41400	MODEL
026	23.85	1		0.02 mile west of Bluff Road		30100		42600	MODEL
026	23.89	1		0.02 mile east of Bluff Road		15100		21600	MODEL
026	24.02	1		0.02 mile west of 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

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

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



2017 TRAFFIC DATA

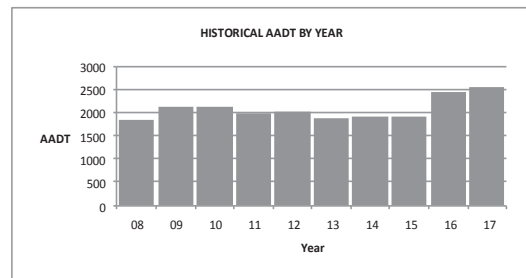
	Average Weekday Traffic	Percent of AADT	Average Daily Traffic	Percent of AADT
January	6744	66	9080	89
February	6533	64	9496	93
March	6763	66	9337	91
April	6166	60	8675	85
May	7675	75	9598	94
June	8568	84	10695	105
July	11291	110	13874	136
August	11738	115	13623	133
September	11300	111	12734	125
October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

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

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

HISTORICAL TRAFFIC DATA

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



2017 TRAFFIC DATA

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

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

FIGURE 2

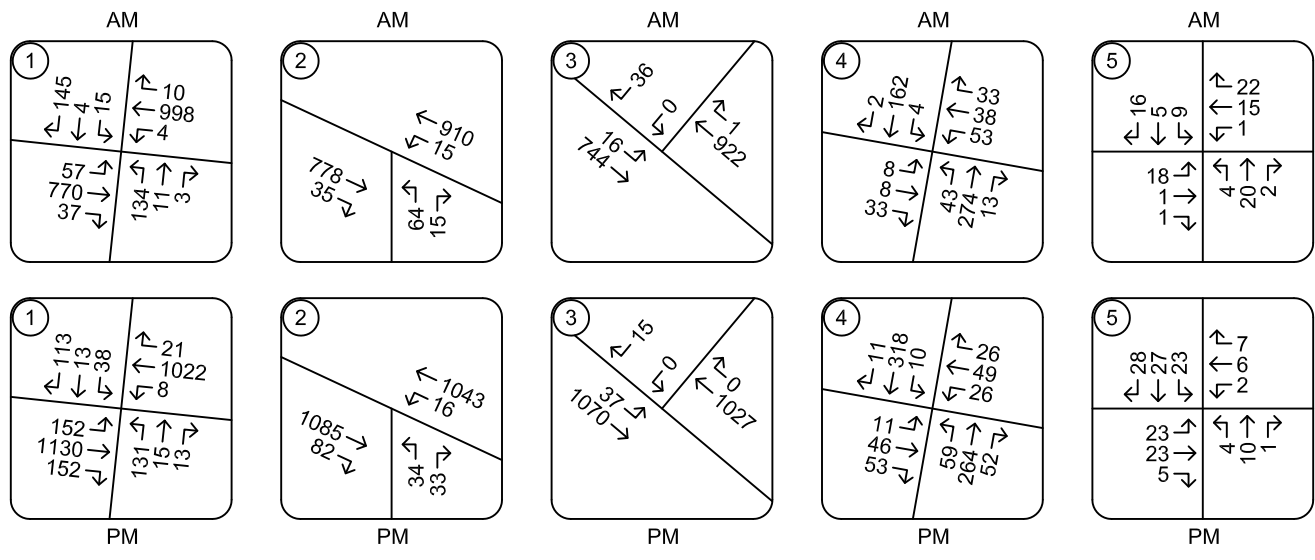
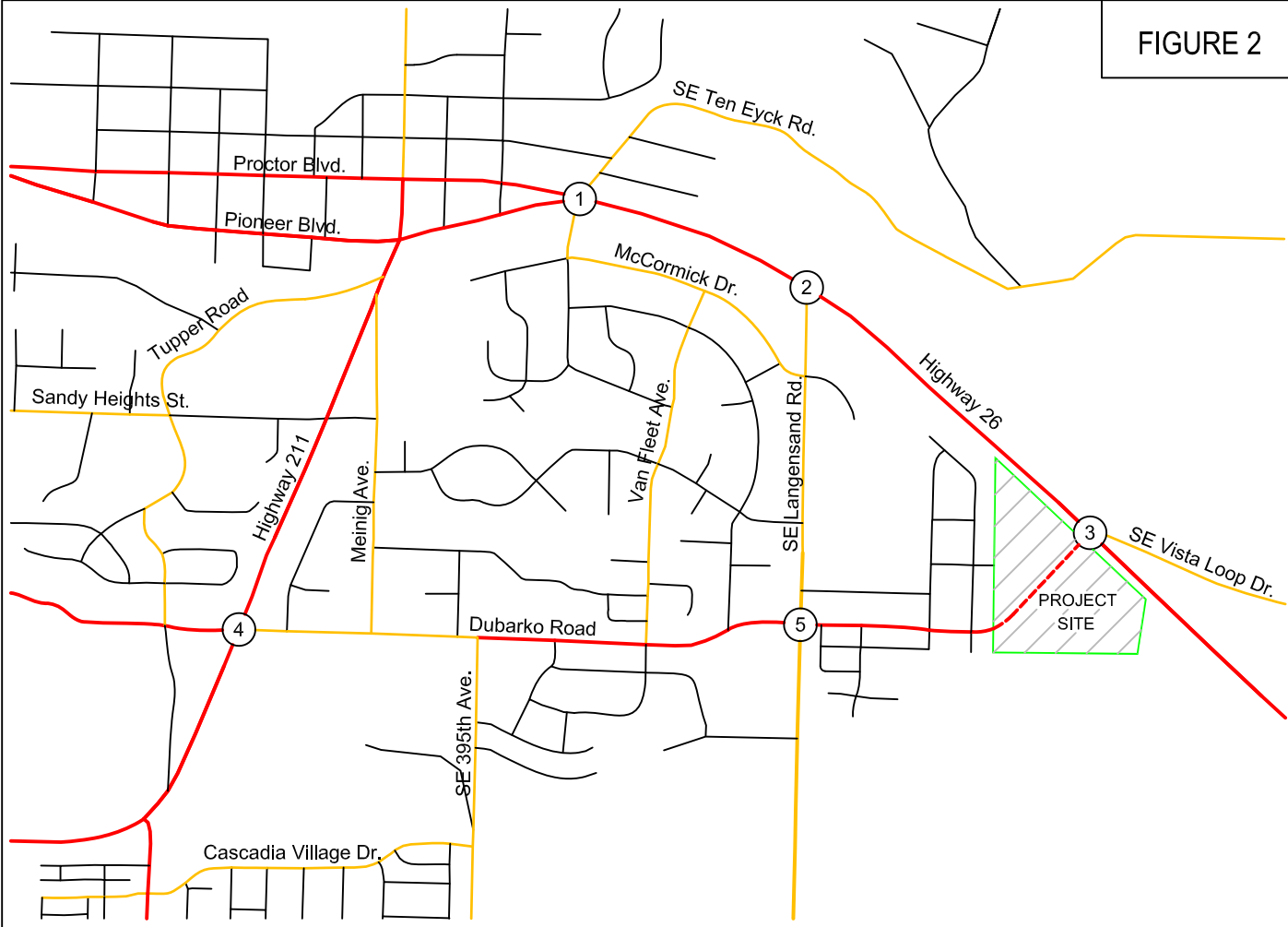
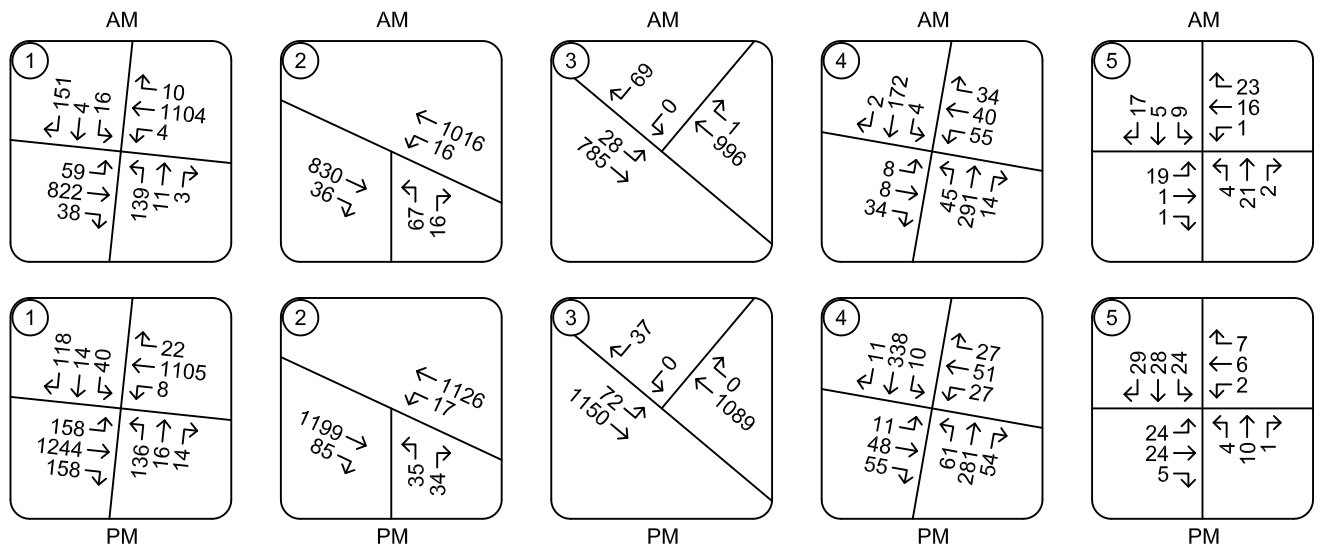
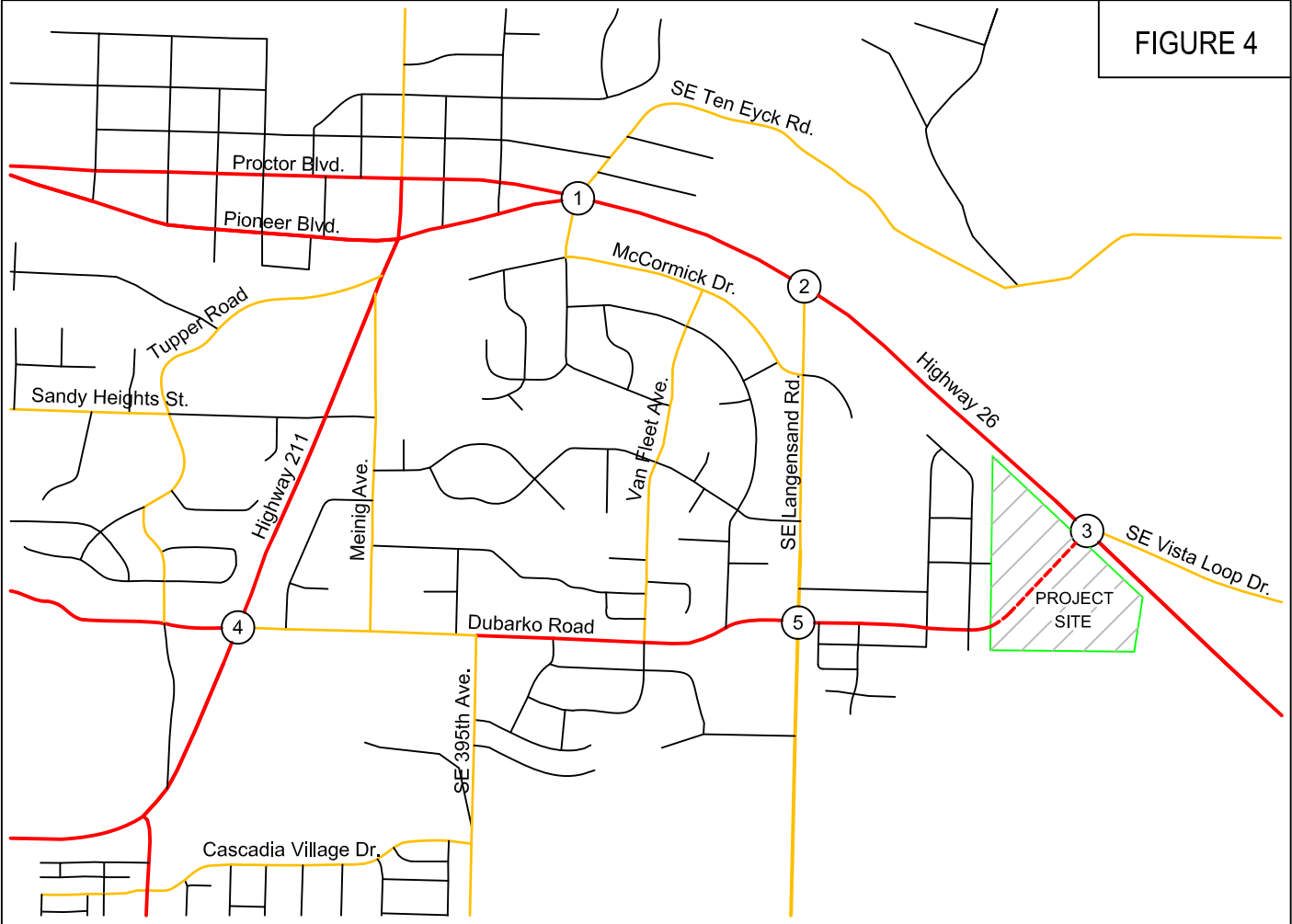
























FIGURE 4



HCM Signalized Intersection Capacity Analysis

1: Highway 211/Meinig Ave & Pioneer Blvd

08/11/2020

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		 							 	 	 		
Traffic Volume (vph)	40	723	134	0	0	0	0	235	131	10	68	0	
Future Volume (vph)	40	723	134	0	0	0	0	235	131	10	68	0	
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		
Lane Util. Factor		0.95	1.00					1.00	1.00	1.00	1.00		
Frbp, ped/bikes		1.00	0.97					1.00	0.98	1.00	1.00		
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00		
Frt		1.00	0.85					1.00	0.85	1.00	1.00		
Flt Protected		1.00	1.00					1.00	1.00	0.95	1.00		
Satd. Flow (prot)		2664	1154					1500	1245	1354	1432		
Flt Permitted		1.00	1.00					1.00	1.00	0.40	1.00		
Satd. Flow (perm)		2664	1154					1500	1245	573	1432		
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	
Adj. Flow (vph)	43	777	144	0	0	0	0	253	141	11	73	0	
RTOR Reduction (vph)	0	0	39	0	0	0	0	0	109	0	0	0	
Lane Group Flow (vph)	0	820	105	0	0	0	0	253	32	11	73	0	
Confl. Peds. (#/hr)	3		6						8	5			
Heavy Vehicles (%)	12%	12%	12%	2%	2%	2%	5%	5%	5%	10%	10%	10%	
Turn Type	Perm	NA	Perm					NA	Perm	Perm	NA		
Protected Phases		2						4			8		
Permitted Phases	2		2						4	8			
Actuated Green, G (s)		60.4	60.4					20.6	20.6	20.6	20.6		
Effective Green, g (s)		60.4	60.4					20.6	20.6	20.6	20.6		
Actuated g/C Ratio		0.67	0.67					0.23	0.23	0.23	0.23		
Clearance Time (s)		4.5	4.5					4.5	4.5	4.5	4.5		
Vehicle Extension (s)		3.0	3.0					3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)		1787	774					343	284	131	327		
v/s Ratio Prot								c0.17			0.05		
v/s Ratio Perm		0.31	0.09						0.03	0.02			
v/c Ratio		0.46	0.14					0.74	0.11	0.08	0.22		
Uniform Delay, d1		7.0	5.4					32.2	27.5	27.3	28.2		
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00		
Incremental Delay, d2		0.9	0.4					8.0	0.2	0.3	0.3		
Delay (s)		7.9	5.7					40.2	27.7	27.6	28.5		
Level of Service		A	A					D	C	C	C		
Approach Delay (s)		7.6			0.0			35.7			28.4		
Approach LOS		A			A			D			C		
Intersection Summary													
HCM 2000 Control Delay			16.5									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.53										
Actuated Cycle Length (s)			90.0									Sum of lost time (s)	9.0
Intersection Capacity Utilization			52.6%									ICU Level of Service	A
Analysis Period (min)			15										

c Critical Lane Group

HCM 6th Signalized Intersection Summary

1: Highway 211/Meinig Ave & Pioneer Blvd

08/11/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↑	↗					↑	↗	↘	↑	
Traffic Volume (veh/h)	40	723	134	0	0	0	0	235	131	10	68	0
Future Volume (veh/h)	40	723	134	0	0	0	0	235	131	10	68	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.98	0.99		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1428	1428	1428				0	1514	1514	1452	1452	0
Adj Flow Rate, veh/h	43	777	0				0	253	141	11	73	0
Peak Hour Factor	0.93	0.93	0.93				0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	12	12	12				0	5	5	10	10	0
Cap, veh/h	97	1845					0	303	252	110	291	0
Arrive On Green	0.70	0.70	0.00				0.00	0.20	0.20	0.20	0.20	0.00
Sat Flow, veh/h	139	2638	1210				0	1514	1257	763	1452	0
Grp Volume(v), veh/h	439	381	0				0	253	141	11	73	0
Grp Sat Flow(s),veh/h/ln	1421	1356	1210				0	1514	1257	763	1452	0
Q Serve(g_s), s	12.1	10.6	0.0				0.0	14.4	9.1	1.3	3.8	0.0
Cycle Q Clear(g_c), s	12.1	10.6	0.0				0.0	14.4	9.1	15.7	3.8	0.0
Prop In Lane	0.10		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	994	949					0	303	252	110	291	0
V/C Ratio(X)	0.44	0.40					0.00	0.83	0.56	0.10	0.25	0.00
Avail Cap(c_a), veh/h	994	949					0	530	440	225	508	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	5.9	5.6	0.0				0.0	34.6	32.4	42.1	30.3	0.0
Incr Delay (d2), s/veh	1.4	1.3	0.0				0.0	6.0	1.9	0.4	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	2.9	0.0				0.0	5.6	2.8	0.3	1.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.3	6.9	0.0				0.0	40.5	34.4	42.5	30.7	0.0
LnGrp LOS	A	A					A	D	C	D	C	A
Approach Vol, veh/h		820	A					394			84	
Approach Delay, s/veh		7.1						38.3			32.3	
Approach LOS		A						D			C	
Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		67.5		22.5				22.5				
Change Period (Y+Rc), s		4.5		4.5				4.5				
Max Green Setting (Gmax), s		49.5		31.5				31.5				
Max Q Clear Time (g_c+I1), s		14.1		16.4				17.7				
Green Ext Time (p_c), s		6.5		1.6				0.3				

Intersection Summary

HCM 6th Ctrl Delay	18.2
HCM 6th LOS	B

Notes

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

HCM 6th TWSC
2: Highway 211 & City Hall Driveway

08/11/2020

Intersection						
Int Delay, s/veh	0.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		T			T
Traffic Vol, veh/h	11	30	336	11	7	199
Future Vol, veh/h	11	30	336	11	7	199
Conflicting Peds, #/hr	3	3	0	3	3	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	5	2	2	10
Mvmt Flow	12	33	365	12	8	216

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	609	377	0	0	380
Stage 1	374	-	-	-	-
Stage 2	235	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	458	670	-	-	1178
Stage 1	696	-	-	-	-
Stage 2	804	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	452	666	-	-	1175
Mov Cap-2 Maneuver	452	-	-	-	-
Stage 1	694	-	-	-	-
Stage 2	795	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.6	0	0.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	591	1175
HCM Lane V/C Ratio	-	-	0.075	0.006
HCM Control Delay (s)	-	-	11.6	8.1
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.2	0

HCM 6th TWSC
3: Highway 211 & Tupper Road

08/11/2020

Intersection						
Int Delay, s/veh	1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	35	9	3	301	187	12
Future Vol, veh/h	35	9	3	301	187	12
Conflicting Peds, #/hr	2	2	2	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	10	5	2
Mvmt Flow	38	10	3	327	203	13

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	547	214	218	0	-	0
Stage 1	212	-	-	-	-	-
Stage 2	335	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	498	826	1352	-	-	-
Stage 1	823	-	-	-	-	-
Stage 2	725	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	495	823	1349	-	-	-
Mov Cap-2 Maneuver	495	-	-	-	-	-
Stage 1	819	-	-	-	-	-
Stage 2	724	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.3	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1349	-	539	-	-
HCM Lane V/C Ratio	0.002	-	0.089	-	-
HCM Control Delay (s)	7.7	0	12.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

HCM Signalized Intersection Capacity Analysis

1: Highway 211/Meinig Ave & Pioneer Blvd

08/11/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕↕	↗					↕	↗	↘	↕		
Traffic Volume (vph)	71	1288	270	0	0	0	0	225	125	21	138	0	
Future Volume (vph)	71	1288	270	0	0	0	0	225	125	21	138	0	
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		
Lane Util. Factor		0.95	1.00					1.00	1.00	1.00	1.00		
Frbp, ped/bikes		1.00	0.96					1.00	0.97	1.00	1.00		
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00		
Frt		1.00	0.85					1.00	0.85	1.00	1.00		
Flt Protected		1.00	1.00					1.00	1.00	0.95	1.00		
Satd. Flow (prot)		2896	1250					1544	1278	1418	1500		
Flt Permitted		1.00	1.00					1.00	1.00	0.36	1.00		
Satd. Flow (perm)		2896	1250					1544	1278	537	1500		
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)	76	1370	287	0	0	0	0	239	133	22	147	0	
RTOR Reduction (vph)	0	0	41	0	0	0	0	0	53	0	0	0	
Lane Group Flow (vph)	0	1446	246	0	0	0	0	239	80	22	147	0	
Confl. Peds. (#/hr)	3		6						8	5			
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	5%	5%	5%	
Turn Type	Perm	NA	Perm					NA	Perm	Perm	NA		
Protected Phases		2						4			8		
Permitted Phases	2		2						4	8			
Actuated Green, G (s)		79.1	79.1					21.9	21.9	21.9	21.9		
Effective Green, g (s)		79.1	79.1					21.9	21.9	21.9	21.9		
Actuated g/C Ratio		0.72	0.72					0.20	0.20	0.20	0.20		
Clearance Time (s)		4.5	4.5					4.5	4.5	4.5	4.5		
Vehicle Extension (s)		3.0	3.0					3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)		2082	898					307	254	106	298		
v/s Ratio Prot								c0.15			0.10		
v/s Ratio Perm		0.50	0.20						0.06	0.04			
v/c Ratio		0.69	0.27					0.78	0.32	0.21	0.49		
Uniform Delay, d1		8.7	5.4					41.8	37.6	36.8	39.1		
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00		
Incremental Delay, d2		1.9	0.8					11.8	0.7	1.0	1.3		
Delay (s)		10.6	6.2					53.5	38.4	37.8	40.4		
Level of Service		B	A					D	D	D	D		
Approach Delay (s)		9.9			0.0			48.1			40.1		
Approach LOS		A			A			D			D		
Intersection Summary													
HCM 2000 Control Delay			18.4		HCM 2000 Level of Service						B		
HCM 2000 Volume to Capacity ratio			0.71										
Actuated Cycle Length (s)			110.0		Sum of lost time (s)						9.0		
Intersection Capacity Utilization			74.0%		ICU Level of Service						D		
Analysis Period (min)			15										

c Critical Lane Group

HCM 6th Signalized Intersection Summary

1: Highway 211/Meinig Ave & Pioneer Blvd

08/11/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕	↗					↕	↗	↘	↕	
Traffic Volume (veh/h)	71	1288	270	0	0	0	0	225	125	21	138	0
Future Volume (veh/h)	71	1288	270	0	0	0	0	225	125	21	138	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1538	1538	1538				0	1550	1550	1514	1514	0
Adj Flow Rate, veh/h	76	1370	0				0	239	133	22	147	0
Peak Hour Factor	0.94	0.94	0.94				0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	3	3	3				0	2	2	5	5	0
Cap, veh/h	109	2053					0	303	252	105	296	0
Arrive On Green	0.72	0.72	0.00				0.00	0.20	0.20	0.20	0.20	0.00
Sat Flow, veh/h	150	2842	1304				0	1550	1287	815	1514	0
Grp Volume(v), veh/h	774	672	0				0	239	133	22	147	0
Grp Sat Flow(s),veh/h/ln	1531	1461	1304				0	1550	1287	815	1514	0
Q Serve(g_s), s	31.2	26.0	0.0				0.0	16.1	10.2	2.9	9.5	0.0
Cycle Q Clear(g_c), s	31.2	26.0	0.0				0.0	16.1	10.2	19.0	9.5	0.0
Prop In Lane	0.10		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1106	1056					0	303	252	105	296	0
V/C Ratio(X)	0.70	0.64					0.00	0.79	0.53	0.21	0.50	0.00
Avail Cap(c_a), veh/h	1106	1056					0	402	333	157	392	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	8.6	7.8	0.0				0.0	42.1	39.7	51.1	39.4	0.0
Incr Delay (d2), s/veh	3.7	2.9	0.0				0.0	7.5	1.7	1.0	1.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.3	8.1	0.0				0.0	6.6	3.3	0.6	3.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.3	10.8	0.0				0.0	49.6	41.4	52.1	40.7	0.0
LnGrp LOS	B	B					A	D	D	D	D	A
Approach Vol, veh/h		1446	A					372			169	
Approach Delay, s/veh		11.6						46.6			42.2	
Approach LOS		B						D			D	
Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		84.0		26.0				26.0				
Change Period (Y+Rc), s		4.5		4.5				4.5				
Max Green Setting (Gmax), s		72.5		28.5				28.5				
Max Q Clear Time (g_c+I1), s		33.2		18.1				21.0				
Green Ext Time (p_c), s		15.4		1.2				0.5				

Intersection Summary

HCM 6th Ctrl Delay	20.7
HCM 6th LOS	C

Notes

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

HCM 6th TWSC
2: Highway 211 & City Hall Driveway

08/11/2020

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	T	T	T	T
Traffic Vol, veh/h	6	15	335	4	4	404
Future Vol, veh/h	6	15	335	4	4	404
Conflicting Peds, #/hr	3	3	0	3	3	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	5
Mvmt Flow	6	16	356	4	4	430

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	802	364	0	0	363	0
Stage 1	361	-	-	-	-	-
Stage 2	441	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	353	681	-	-	1196	-
Stage 1	705	-	-	-	-	-
Stage 2	648	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	349	677	-	-	1193	-
Mov Cap-2 Maneuver	349	-	-	-	-	-
Stage 1	703	-	-	-	-	-
Stage 2	643	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	534	1193
HCM Lane V/C Ratio	-	-	0.042	0.004
HCM Control Delay (s)	-	-	12	8
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.1	0

HCM 6th TWSC
3: Highway 211 & Tupper Road

08/11/2020

Intersection						
Int Delay, s/veh	0.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	23	6	9	312	356	48
Future Vol, veh/h	23	6	9	312	356	48
Conflicting Peds, #/hr	2	2	2	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	10	5	2
Mvmt Flow	24	6	10	332	379	51

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	761	409	432	0	-	0
Stage 1	407	-	-	-	-	-
Stage 2	354	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	373	642	1128	-	-	-
Stage 1	672	-	-	-	-	-
Stage 2	710	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	367	640	1126	-	-	-
Mov Cap-2 Maneuver	367	-	-	-	-	-
Stage 1	663	-	-	-	-	-
Stage 2	709	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.7	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1126	-	403	-	-
HCM Lane V/C Ratio	0.009	-	0.077	-	-
HCM Control Delay (s)	8.2	0	14.7	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Trip Generation Calculation Worksheet



Land Use Description: Multi-Family Housing (Low-Rise)

ITE Land Use Code: 220

Independent Variable: Dwelling Units

Quantity: 12 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

12 Dwelling Units

	Entering	Exiting	Total
AM Peak Hour	1	5	6
PM Peak Hour	4	3	7
Weekday	44	44	88

HCM Signalized Intersection Capacity Analysis

1: Highway 211/Meinig Ave & Pioneer Blvd

08/11/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕↕	↗					↕	↗	↘	↕		
Traffic Volume (vph)	42	767	141	0	0	0	0	253	141	11	71	0	
Future Volume (vph)	42	767	141	0	0	0	0	253	141	11	71	0	
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		
Lane Util. Factor		0.95	1.00					1.00	1.00	1.00	1.00		
Frbp, ped/bikes		1.00	0.97					1.00	0.98	1.00	1.00		
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00		
Frt		1.00	0.85					1.00	0.85	1.00	1.00		
Flt Protected		1.00	1.00					1.00	1.00	0.95	1.00		
Satd. Flow (prot)		2664	1154					1500	1245	1355	1432		
Flt Permitted		1.00	1.00					1.00	1.00	0.38	1.00		
Satd. Flow (perm)		2664	1154					1500	1245	548	1432		
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	
Adj. Flow (vph)	45	825	152	0	0	0	0	272	152	12	76	0	
RTOR Reduction (vph)	0	0	39	0	0	0	0	0	107	0	0	0	
Lane Group Flow (vph)	0	870	113	0	0	0	0	272	45	12	76	0	
Confl. Peds. (#/hr)	3		6						8	5			
Heavy Vehicles (%)	12%	12%	12%	2%	2%	2%	5%	5%	5%	10%	10%	10%	
Turn Type	Perm	NA	Perm					NA	Perm	Perm	NA		
Protected Phases		2						4				8	
Permitted Phases	2		2						4	8			
Actuated Green, G (s)		59.2	59.2					21.8	21.8	21.8	21.8		
Effective Green, g (s)		59.2	59.2					21.8	21.8	21.8	21.8		
Actuated g/C Ratio		0.66	0.66					0.24	0.24	0.24	0.24		
Clearance Time (s)		4.5	4.5					4.5	4.5	4.5	4.5		
Vehicle Extension (s)		3.0	3.0					3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)		1752	759					363	301	132	346		
v/s Ratio Prot								c0.18			0.05		
v/s Ratio Perm		0.33	0.10						0.04	0.02			
v/c Ratio		0.50	0.15					0.75	0.15	0.09	0.22		
Uniform Delay, d1		7.8	5.8					31.6	26.8	26.4	27.3		
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00		
Incremental Delay, d2		1.0	0.4					8.2	0.2	0.3	0.3		
Delay (s)		8.8	6.3					39.8	27.0	26.7	27.6		
Level of Service		A	A					D	C	C	C		
Approach Delay (s)		8.5			0.0			35.2			27.5		
Approach LOS		A			A			D			C		
Intersection Summary													
HCM 2000 Control Delay			16.9		HCM 2000 Level of Service						B		
HCM 2000 Volume to Capacity ratio			0.56										
Actuated Cycle Length (s)			90.0		Sum of lost time (s)					9.0			
Intersection Capacity Utilization			54.7%		ICU Level of Service					A			
Analysis Period (min)			15										

c Critical Lane Group

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

08/11/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↑	↗					↑	↗	↘	↑	
Traffic Volume (veh/h)	42	767	141	0	0	0	0	253	141	11	71	0
Future Volume (veh/h)	42	767	141	0	0	0	0	253	141	11	71	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1428	1428	1428				0	1514	1514	1452	1452	0
Adj Flow Rate, veh/h	45	825	0				0	272	152	12	76	0
Peak Hour Factor	0.93	0.93	0.93				0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	12	12	12				0	5	5	10	10	0
Cap, veh/h	94	1812					0	323	269	111	310	0
Arrive On Green	0.69	0.69	0.00				0.00	0.21	0.21	0.21	0.21	0.00
Sat Flow, veh/h	137	2640	1210				0	1514	1259	745	1452	0
Grp Volume(v), veh/h	466	404	0				0	272	152	12	76	0
Grp Sat Flow(s),veh/h/ln	1421	1356	1210				0	1514	1259	745	1452	0
Q Serve(g_s), s	13.8	12.0	0.0				0.0	15.5	9.7	1.4	3.9	0.0
Cycle Q Clear(g_c), s	13.8	12.0	0.0				0.0	15.5	9.7	16.9	3.9	0.0
Prop In Lane	0.10		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	975	931					0	323	269	111	310	0
V/C Ratio(X)	0.48	0.43					0.00	0.84	0.57	0.11	0.24	0.00
Avail Cap(c_a), veh/h	975	931					0	547	455	221	524	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	6.6	6.3	0.0				0.0	33.9	31.6	42.0	29.4	0.0
Incr Delay (d2), s/veh	1.7	1.5	0.0				0.0	5.9	1.9	0.4	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	3.4	0.0				0.0	5.9	3.0	0.3	1.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.3	7.8	0.0				0.0	39.8	33.5	42.5	29.8	0.0
LnGrp LOS	A	A					A	D	C	D	C	A
Approach Vol, veh/h		870	A					424			88	
Approach Delay, s/veh		8.0						37.5			31.5	
Approach LOS		A						D			C	
Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		66.3		23.7				23.7				
Change Period (Y+Rc), s		4.5		4.5				4.5				
Max Green Setting (Gmax), s		48.5		32.5				32.5				
Max Q Clear Time (g_c+I1), s		15.8		17.5				18.9				
Green Ext Time (p_c), s		6.9		1.7				0.3				

Intersection Summary

HCM 6th Ctrl Delay	18.6
HCM 6th LOS	B

Notes

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

HCM 6th TWSC
2: Highway 211 & City Hall Driveway

08/11/2020

Intersection						
Int Delay, s/veh	0.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	11	30	364	11	7	209
Future Vol, veh/h	11	30	364	11	7	209
Conflicting Peds, #/hr	3	3	0	3	3	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	5	2	2	10
Mvmt Flow	12	33	396	12	8	227

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	651	408	0	0	411
Stage 1	405	-	-	-	-
Stage 2	246	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	433	643	-	-	1148
Stage 1	673	-	-	-	-
Stage 2	795	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	427	639	-	-	1145
Mov Cap-2 Maneuver	427	-	-	-	-
Stage 1	671	-	-	-	-
Stage 2	786	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.9	0	0.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	564	1145
HCM Lane V/C Ratio	-	-	0.079	0.007
HCM Control Delay (s)	-	-	11.9	8.2
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.3	0

HCM 6th TWSC
 3: Highway 211 & Tupper Road

08/11/2020

Intersection						
Int Delay, s/veh	1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	35	9	3	329	197	12
Future Vol, veh/h	35	9	3	329	197	12
Conflicting Peds, #/hr	2	2	2	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	10	5	2
Mvmt Flow	38	10	3	358	214	13

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	589	225	229	0	-	0
Stage 1	223	-	-	-	-	-
Stage 2	366	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	471	814	1339	-	-	-
Stage 1	814	-	-	-	-	-
Stage 2	702	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	468	811	1336	-	-	-
Mov Cap-2 Maneuver	468	-	-	-	-	-
Stage 1	810	-	-	-	-	-
Stage 2	701	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.8	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1336	-	512	-	-
HCM Lane V/C Ratio	0.002	-	0.093	-	-
HCM Control Delay (s)	7.7	0	12.8	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

HCM Signalized Intersection Capacity Analysis

1: Highway 211/Meinig Ave & Pioneer Blvd

08/11/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕↕	↗					↕	↗	↘	↕		
Traffic Volume (vph)	78	1406	283	0	0	0	0	237	131	23	145	0	
Future Volume (vph)	78	1406	283	0	0	0	0	237	131	23	145	0	
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		
Lane Util. Factor		0.95	1.00					1.00	1.00	1.00	1.00		
Frbp, ped/bikes		1.00	0.96					1.00	0.97	1.00	1.00		
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00		
Frt		1.00	0.85					1.00	0.85	1.00	1.00		
Flt Protected		1.00	1.00					1.00	1.00	0.95	1.00		
Satd. Flow (prot)		2896	1250					1544	1278	1418	1500		
Flt Permitted		1.00	1.00					1.00	1.00	0.34	1.00		
Satd. Flow (perm)		2896	1250					1544	1278	505	1500		
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)	83	1496	301	0	0	0	0	252	139	24	154	0	
RTOR Reduction (vph)	0	0	41	0	0	0	0	0	42	0	0	0	
Lane Group Flow (vph)	0	1579	260	0	0	0	0	252	97	24	154	0	
Confl. Peds. (#/hr)	3		6						8	5			
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	5%	5%	5%	
Turn Type	Perm	NA	Perm					NA	Perm	Perm	NA		
Protected Phases		2						4			8		
Permitted Phases	2		2						4	8			
Actuated Green, G (s)		78.7	78.7					22.3	22.3	22.3	22.3		
Effective Green, g (s)		78.7	78.7					22.3	22.3	22.3	22.3		
Actuated g/C Ratio		0.72	0.72					0.20	0.20	0.20	0.20		
Clearance Time (s)		4.5	4.5					4.5	4.5	4.5	4.5		
Vehicle Extension (s)		3.0	3.0					3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)		2071	894					313	259	102	304		
v/s Ratio Prot								c0.16			0.10		
v/s Ratio Perm		0.55	0.21						0.08	0.05			
v/c Ratio		0.76	0.29					0.81	0.37	0.24	0.51		
Uniform Delay, d1		9.8	5.6					41.8	37.8	36.7	39.0		
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00		
Incremental Delay, d2		2.7	0.8					13.9	0.9	1.2	1.3		
Delay (s)		12.5	6.4					55.7	38.7	37.9	40.3		
Level of Service		B	A					E	D	D	D		
Approach Delay (s)		11.5			0.0			49.7			40.0		
Approach LOS		B			A			D			D		
Intersection Summary													
HCM 2000 Control Delay			19.7		HCM 2000 Level of Service					B			
HCM 2000 Volume to Capacity ratio			0.77										
Actuated Cycle Length (s)			110.0		Sum of lost time (s)					9.0			
Intersection Capacity Utilization			80.1%		ICU Level of Service					D			
Analysis Period (min)			15										

c Critical Lane Group

HCM 6th Signalized Intersection Summary

1: Highway 211/Meinig Ave & Pioneer Blvd

08/11/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕	↗					↕	↗	↘	↕	
Traffic Volume (veh/h)	78	1406	283	0	0	0	0	237	131	23	145	0
Future Volume (veh/h)	78	1406	283	0	0	0	0	237	131	23	145	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1538	1538	1538				0	1550	1550	1514	1514	0
Adj Flow Rate, veh/h	83	1496	0				0	252	139	24	154	0
Peak Hour Factor	0.94	0.94	0.94				0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	3	3	3				0	2	2	5	5	0
Cap, veh/h	107	2026					0	318	265	106	311	0
Arrive On Green	0.71	0.71	0.00				0.00	0.21	0.21	0.21	0.21	0.00
Sat Flow, veh/h	150	2842	1304				0	1550	1288	802	1514	0
Grp Volume(v), veh/h	846	733	0				0	252	139	24	154	0
Grp Sat Flow(s),veh/h/ln	1531	1461	1304				0	1550	1288	802	1514	0
Q Serve(g_s), s	39.0	31.8	0.0				0.0	17.0	10.6	3.2	9.9	0.0
Cycle Q Clear(g_c), s	39.0	31.8	0.0				0.0	17.0	10.6	20.2	9.9	0.0
Prop In Lane	0.10		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1091	1042					0	318	265	106	311	0
V/C Ratio(X)	0.78	0.70					0.00	0.79	0.53	0.23	0.50	0.00
Avail Cap(c_a), veh/h	1091	1042					0	388	322	142	378	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	10.1	9.1	0.0				0.0	41.5	38.9	51.1	38.7	0.0
Incr Delay (d2), s/veh	5.4	4.0	0.0				0.0	8.9	1.6	1.1	1.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.2	10.1	0.0				0.0	7.1	3.4	0.7	3.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.5	13.1	0.0				0.0	50.3	40.5	52.1	39.9	0.0
LnGrp LOS	B	B					A	D	D	D	D	A
Approach Vol, veh/h		1579	A					391			178	
Approach Delay, s/veh		14.4						46.9			41.5	
Approach LOS		B						D			D	
Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		82.9		27.1				27.1				
Change Period (Y+Rc), s		4.5		4.5				4.5				
Max Green Setting (Gmax), s		73.5		27.5				27.5				
Max Q Clear Time (g_c+I1), s		41.0		19.0				22.2				
Green Ext Time (p_c), s		16.4		1.2				0.4				

Intersection Summary

HCM 6th Ctrl Delay	22.6
HCM 6th LOS	C

Notes

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

HCM 6th TWSC
2: Highway 211 & City Hall Driveway

08/11/2020

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	R	T	R	L	T
Traffic Vol, veh/h	6	15	353	4	4	424
Future Vol, veh/h	6	15	353	4	4	424
Conflicting Peds, #/hr	3	3	0	3	3	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	5
Mvmt Flow	6	16	376	4	4	451

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	843	384	0	0	383
Stage 1	381	-	-	-	-
Stage 2	462	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	334	664	-	-	1175
Stage 1	691	-	-	-	-
Stage 2	634	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	330	660	-	-	1172
Mov Cap-2 Maneuver	330	-	-	-	-
Stage 1	689	-	-	-	-
Stage 2	629	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.3	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	513	1172
HCM Lane V/C Ratio	-	-	0.044	0.004
HCM Control Delay (s)	-	-	12.3	8.1
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.1	0

HCM 6th TWSC
3: Highway 211 & Tupper Road

08/11/2020

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T		T
Traffic Vol, veh/h	23	6	9	330	376	48
Future Vol, veh/h	23	6	9	330	376	48
Conflicting Peds, #/hr	2	2	2	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	10	5	2
Mvmt Flow	24	6	10	351	400	51

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	801	430	453	0	-	0
Stage 1	428	-	-	-	-	-
Stage 2	373	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	354	625	1108	-	-	-
Stage 1	657	-	-	-	-	-
Stage 2	696	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	349	623	1106	-	-	-
Mov Cap-2 Maneuver	349	-	-	-	-	-
Stage 1	648	-	-	-	-	-
Stage 2	695	-	-	-	-	-























Approach	EB	NB	SB
HCM Control Delay, s	15.2	0.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1106	-	384	-	-
HCM Lane V/C Ratio	0.009	-	0.08	-	-
HCM Control Delay (s)	8.3	0	15.2	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

HCM Signalized Intersection Capacity Analysis

1: Highway 211/Meinig Ave & Pioneer Blvd

08/11/2020

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		 							 	 			
Traffic Volume (vph)	42	767	142	0	0	0	0	256	142	11	71	0	
Future Volume (vph)	42	767	142	0	0	0	0	256	142	11	71	0	
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		
Lane Util. Factor		0.95	1.00					1.00	1.00	1.00	1.00		
Frbp, ped/bikes		1.00	0.97					1.00	0.98	1.00	1.00		
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00		
Frt		1.00	0.85					1.00	0.85	1.00	1.00		
Flt Protected		1.00	1.00					1.00	1.00	0.95	1.00		
Satd. Flow (prot)		2664	1154					1500	1245	1355	1432		
Flt Permitted		1.00	1.00					1.00	1.00	0.38	1.00		
Satd. Flow (perm)		2664	1154					1500	1245	545	1432		
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	
Adj. Flow (vph)	45	825	153	0	0	0	0	275	153	12	76	0	
RTOR Reduction (vph)	0	0	40	0	0	0	0	0	107	0	0	0	
Lane Group Flow (vph)	0	870	113	0	0	0	0	275	46	12	76	0	
Confl. Peds. (#/hr)	3		6						8	5			
Heavy Vehicles (%)	12%	12%	12%	2%	2%	2%	5%	5%	5%	10%	10%	10%	
Turn Type	Perm	NA	Perm					NA	Perm	Perm	NA		
Protected Phases		2						4			8		
Permitted Phases	2		2						4	8			
Actuated Green, G (s)		59.0	59.0					22.0	22.0	22.0	22.0		
Effective Green, g (s)		59.0	59.0					22.0	22.0	22.0	22.0		
Actuated g/C Ratio		0.66	0.66					0.24	0.24	0.24	0.24		
Clearance Time (s)		4.5	4.5					4.5	4.5	4.5	4.5		
Vehicle Extension (s)		3.0	3.0					3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)		1746	756					366	304	133	350		
v/s Ratio Prot								c0.18			0.05		
v/s Ratio Perm		0.33	0.10						0.04	0.02			
v/c Ratio		0.50	0.15					0.75	0.15	0.09	0.22		
Uniform Delay, d1		7.9	5.9					31.5	26.7	26.3	27.1		
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00		
Incremental Delay, d2		1.0	0.4					8.4	0.2	0.3	0.3		
Delay (s)		8.9	6.3					39.9	26.9	26.6	27.4		
Level of Service		A	A					D	C	C	C		
Approach Delay (s)		8.6			0.0			35.3			27.3		
Approach LOS		A			A			D			C		
Intersection Summary													
HCM 2000 Control Delay			17.1									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.57										
Actuated Cycle Length (s)			90.0									Sum of lost time (s)	9.0
Intersection Capacity Utilization			54.7%									ICU Level of Service	A
Analysis Period (min)			15										

c Critical Lane Group

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

08/11/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔	↗					↑	↗	↘	↑	
Traffic Volume (veh/h)	42	767	142	0	0	0	0	256	142	11	71	0
Future Volume (veh/h)	42	767	142	0	0	0	0	256	142	11	71	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1428	1428	1428				0	1514	1514	1452	1452	0
Adj Flow Rate, veh/h	45	825	0				0	275	153	12	76	0
Peak Hour Factor	0.93	0.93	0.93				0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	12	12	12				0	5	5	10	10	0
Cap, veh/h	94	1806					0	326	271	111	313	0
Arrive On Green	0.68	0.68	0.00				0.00	0.22	0.22	0.22	0.22	0.00
Sat Flow, veh/h	137	2640	1210				0	1514	1259	742	1452	0
Grp Volume(v), veh/h	466	404	0				0	275	153	12	76	0
Grp Sat Flow(s),veh/h/ln	1421	1356	1210				0	1514	1259	742	1452	0
Q Serve(g_s), s	13.8	12.1	0.0				0.0	15.7	9.8	1.4	3.9	0.0
Cycle Q Clear(g_c), s	13.8	12.1	0.0				0.0	15.7	9.8	17.1	3.9	0.0
Prop In Lane	0.10		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	972	928					0	326	271	111	313	0
V/C Ratio(X)	0.48	0.44					0.00	0.84	0.56	0.11	0.24	0.00
Avail Cap(c_a), veh/h	972	928					0	547	455	219	524	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	6.7	6.4	0.0				0.0	33.8	31.5	42.0	29.2	0.0
Incr Delay (d2), s/veh	1.7	1.5	0.0				0.0	6.0	1.8	0.4	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	3.4	0.0				0.0	6.0	3.0	0.3	1.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.4	7.9	0.0				0.0	39.8	33.3	42.4	29.6	0.0
LnGrp LOS	A	A					A	D	C	D	C	A
Approach Vol, veh/h		870	A					428			88	
Approach Delay, s/veh		8.1						37.5			31.4	
Approach LOS		A						D			C	
Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		66.1		23.9				23.9				
Change Period (Y+Rc), s		4.5		4.5				4.5				
Max Green Setting (Gmax), s		48.5		32.5				32.5				
Max Q Clear Time (g_c+I1), s		15.8		17.7				19.1				
Green Ext Time (p_c), s		6.9		1.7				0.3				

Intersection Summary

HCM 6th Ctrl Delay	18.7
HCM 6th LOS	B

Notes

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

HCM 6th TWSC
2: Highway 211 & City Hall Driveway

08/11/2020

Intersection						
Int Delay, s/veh	0.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	T	T	T	T
Traffic Vol, veh/h	11	30	368	11	7	210
Future Vol, veh/h	11	30	368	11	7	210
Conflicting Peds, #/hr	3	3	0	3	3	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	5	2	2	10
Mvmt Flow	12	33	400	12	8	228

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	656	412	0	0	415	0
Stage 1	409	-	-	-	-	-
Stage 2	247	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	430	640	-	-	1144	-
Stage 1	671	-	-	-	-	-
Stage 2	794	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	424	636	-	-	1141	-
Mov Cap-2 Maneuver	424	-	-	-	-	-
Stage 1	669	-	-	-	-	-
Stage 2	785	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12	0	0.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	561	1141
HCM Lane V/C Ratio	-	-	0.079	0.007
HCM Control Delay (s)	-	-	12	8.2
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.3	0

HCM 6th TWSC
 3: Highway 211 & Tupper Road/Site Access

08/11/2020

Intersection												
Int Delay, s/veh	1.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	35	0	9	1	0	4	3	329	0	1	197	12
Future Vol, veh/h	35	0	9	1	0	4	3	329	0	1	197	12
Conflicting Peds, #/hr	2	0	2	0	0	0	2	0	0	0	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	10	2	2	5	2
Mvmt Flow	38	0	10	1	0	4	3	358	0	1	214	13

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	593	589	225	594	595	360	229	0	0	358	0	0
Stage 1	225	225	-	364	364	-	-	-	-	-	-	-
Stage 2	368	364	-	230	231	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
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	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	417	421	814	417	417	684	1339	-	-	1201	-	-
Stage 1	778	718	-	655	624	-	-	-	-	-	-	-
Stage 2	652	624	-	773	713	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	412	418	811	410	414	683	1336	-	-	1201	-	-
Mov Cap-2 Maneuver	412	418	-	410	414	-	-	-	-	-	-	-
Stage 1	774	716	-	653	622	-	-	-	-	-	-	-
Stage 2	645	622	-	761	711	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.8	11	0.1	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1336	-	-	458	603	1201	-	-
HCM Lane V/C Ratio	0.002	-	-	0.104	0.009	0.001	-	-
HCM Control Delay (s)	7.7	0	-	13.8	11	8	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0	0	-	-

HCM Signalized Intersection Capacity Analysis

1: Highway 211/Meinig Ave & Pioneer Blvd

08/11/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕↕	↗					↕	↗	↘	↕		
Traffic Volume (vph)	78	1406	285	0	0	0	0	239	132	23	146	0	
Future Volume (vph)	78	1406	285	0	0	0	0	239	132	23	146	0	
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		
Lane Util. Factor		0.95	1.00					1.00	1.00	1.00	1.00		
Frbp, ped/bikes		1.00	0.96					1.00	0.97	1.00	1.00		
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00		
Frt		1.00	0.85					1.00	0.85	1.00	1.00		
Flt Protected		1.00	1.00					1.00	1.00	0.95	1.00		
Satd. Flow (prot)		2896	1250					1544	1278	1418	1500		
Flt Permitted		1.00	1.00					1.00	1.00	0.34	1.00		
Satd. Flow (perm)		2896	1250					1544	1278	502	1500		
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)	83	1496	303	0	0	0	0	254	140	24	155	0	
RTOR Reduction (vph)	0	0	41	0	0	0	0	0	42	0	0	0	
Lane Group Flow (vph)	0	1579	262	0	0	0	0	254	98	24	155	0	
Confl. Peds. (#/hr)	3		6						8	5			
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	5%	5%	5%	
Turn Type	Perm	NA	Perm					NA	Perm	Perm	NA		
Protected Phases		2						4			8		
Permitted Phases	2		2						4	8			
Actuated Green, G (s)		78.6	78.6					22.4	22.4	22.4	22.4		
Effective Green, g (s)		78.6	78.6					22.4	22.4	22.4	22.4		
Actuated g/C Ratio		0.71	0.71					0.20	0.20	0.20	0.20		
Clearance Time (s)		4.5	4.5					4.5	4.5	4.5	4.5		
Vehicle Extension (s)		3.0	3.0					3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)		2069	893					314	260	102	305		
v/s Ratio Prot								c0.16			0.10		
v/s Ratio Perm		0.55	0.21						0.08	0.05			
v/c Ratio		0.76	0.29					0.81	0.38	0.24	0.51		
Uniform Delay, d1		9.9	5.7					41.8	37.8	36.6	38.9		
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00		
Incremental Delay, d2		2.7	0.8					14.2	0.9	1.2	1.3		
Delay (s)		12.6	6.5					55.9	38.7	37.8	40.2		
Level of Service		B	A					E	D	D	D		
Approach Delay (s)		11.6			0.0			49.8			39.9		
Approach LOS		B			A			D			D		
Intersection Summary													
HCM 2000 Control Delay			19.8		HCM 2000 Level of Service						B		
HCM 2000 Volume to Capacity ratio			0.77										
Actuated Cycle Length (s)			110.0		Sum of lost time (s)					9.0			
Intersection Capacity Utilization			80.2%		ICU Level of Service					D			
Analysis Period (min)			15										

c Critical Lane Group

HCM 6th Signalized Intersection Summary

1: Highway 211/Meinig Ave & Pioneer Blvd

08/11/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕	↗					↕	↗	↘	↕	
Traffic Volume (veh/h)	78	1406	285	0	0	0	0	239	132	23	146	0
Future Volume (veh/h)	78	1406	285	0	0	0	0	239	132	23	146	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1538	1538	1538				0	1550	1550	1514	1514	0
Adj Flow Rate, veh/h	83	1496	0				0	254	140	24	155	0
Peak Hour Factor	0.94	0.94	0.94				0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	3	3	3				0	2	2	5	5	0
Cap, veh/h	107	2022					0	320	266	106	313	0
Arrive On Green	0.71	0.71	0.00				0.00	0.21	0.21	0.21	0.21	0.00
Sat Flow, veh/h	150	2842	1304				0	1550	1288	800	1514	0
Grp Volume(v), veh/h	846	733	0				0	254	140	24	155	0
Grp Sat Flow(s),veh/h/ln	1531	1461	1304				0	1550	1288	800	1514	0
Q Serve(g_s), s	39.2	32.0	0.0				0.0	17.1	10.6	3.2	10.0	0.0
Cycle Q Clear(g_c), s	39.2	32.0	0.0				0.0	17.1	10.6	20.3	10.0	0.0
Prop In Lane	0.10		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1089	1040					0	320	266	106	313	0
V/C Ratio(X)	0.78	0.71					0.00	0.79	0.53	0.23	0.50	0.00
Avail Cap(c_a), veh/h	1089	1040					0	388	322	141	378	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	10.2	9.2	0.0				0.0	41.4	38.8	51.1	38.6	0.0
Incr Delay (d2), s/veh	5.4	4.0	0.0				0.0	9.0	1.6	1.1	1.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.3	10.2	0.0				0.0	7.2	3.4	0.7	3.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.7	13.2	0.0				0.0	50.4	40.5	52.1	39.8	0.0
LnGrp LOS	B	B					A	D	D	D	D	A
Approach Vol, veh/h		1579	A					394			179	
Approach Delay, s/veh		14.5						46.9			41.4	
Approach LOS		B						D			D	
Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		82.8		27.2				27.2				
Change Period (Y+Rc), s		4.5		4.5				4.5				
Max Green Setting (Gmax), s		73.5		27.5				27.5				
Max Q Clear Time (g_c+I1), s		41.2		19.1				22.3				
Green Ext Time (p_c), s		16.3		1.2				0.4				

Intersection Summary

HCM 6th Ctrl Delay	22.7
HCM 6th LOS	C

Notes

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

HCM 6th TWSC
2: Highway 211 & City Hall Driveway

08/11/2020

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	R	T	R	L	T
Traffic Vol, veh/h	6	15	356	4	4	427
Future Vol, veh/h	6	15	356	4	4	427
Conflicting Peds, #/hr	3	3	0	3	3	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	5
Mvmt Flow	6	16	379	4	4	454

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	849	387	0	0	386
Stage 1	384	-	-	-	-
Stage 2	465	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	331	661	-	-	1172
Stage 1	688	-	-	-	-
Stage 2	632	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	327	657	-	-	1169
Mov Cap-2 Maneuver	327	-	-	-	-
Stage 1	686	-	-	-	-
Stage 2	627	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.4	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	510	1169
HCM Lane V/C Ratio	-	-	0.044	0.004
HCM Control Delay (s)	-	-	12.4	8.1
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.1	0

HCM 6th TWSC
 3: Highway 211 & Tupper Road/Site Access

08/11/2020

Intersection												
Int Delay, s/veh	0.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	23	0	6	0	0	3	9	330	1	3	376	48
Future Vol, veh/h	23	0	6	0	0	3	9	330	1	3	376	48
Conflicting Peds, #/hr	2	0	2	0	0	0	2	0	0	0	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	92	94	92	92	92	94	94	92	92	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	10	2	2	5	2
Mvmt Flow	24	0	6	0	0	3	10	351	1	3	400	51

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	809	806	430	809	831	354	453	0	0	352	0	0
Stage 1	434	434	-	372	372	-	-	-	-	-	-	-
Stage 2	375	372	-	437	459	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
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	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	299	316	625	299	305	690	1108	-	-	1207	-	-
Stage 1	600	581	-	648	619	-	-	-	-	-	-	-
Stage 2	646	619	-	598	566	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	293	311	623	292	300	689	1106	-	-	1207	-	-
Mov Cap-2 Maneuver	293	311	-	292	300	-	-	-	-	-	-	-
Stage 1	592	578	-	641	612	-	-	-	-	-	-	-
Stage 2	635	612	-	589	563	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	17.1		10.3		0.2		0.1	
HCM LOS	C		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1106	-	-	329	689	1207	-	-
HCM Lane V/C Ratio	0.009	-	-	0.094	0.005	0.003	-	-
HCM Control Delay (s)	8.3	0	-	17.1	10.3	8	0	-
HCM Lane LOS	A	A	-	C	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0	0	-	-

HCM Signalized Intersection Capacity Analysis

1: Highway 211/Meinig Ave & Pioneer Blvd

08/11/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕↕	↗					↕	↗	↘	↕		
Traffic Volume (vph)	42	767	142	0	0	0	0	256	157	11	86	0	
Future Volume (vph)	42	767	142	0	0	0	0	256	157	11	86	0	
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		
Lane Util. Factor		0.95	1.00					1.00	1.00	1.00	1.00		
Frbp, ped/bikes		1.00	0.97					1.00	0.98	1.00	1.00		
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00		
Frt		1.00	0.85					1.00	0.85	1.00	1.00		
Flt Protected		1.00	1.00					1.00	1.00	0.95	1.00		
Satd. Flow (prot)		2664	1154					1500	1245	1355	1432		
Flt Permitted		1.00	1.00					1.00	1.00	0.38	1.00		
Satd. Flow (perm)		2664	1154					1500	1245	547	1432		
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	
Adj. Flow (vph)	45	825	153	0	0	0	0	275	169	12	92	0	
RTOR Reduction (vph)	0	0	40	0	0	0	0	0	106	0	0	0	
Lane Group Flow (vph)	0	870	113	0	0	0	0	275	63	12	92	0	
Confl. Peds. (#/hr)	3		6						8	5			
Heavy Vehicles (%)	12%	12%	12%	2%	2%	2%	5%	5%	5%	10%	10%	10%	
Turn Type	Perm	NA	Perm					NA	Perm	Perm	NA		
Protected Phases		2						4			8		
Permitted Phases	2		2						4	8			
Actuated Green, G (s)		58.9	58.9					22.1	22.1	22.1	22.1		
Effective Green, g (s)		58.9	58.9					22.1	22.1	22.1	22.1		
Actuated g/C Ratio		0.65	0.65					0.25	0.25	0.25	0.25		
Clearance Time (s)		4.5	4.5					4.5	4.5	4.5	4.5		
Vehicle Extension (s)		3.0	3.0					3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)		1743	755					368	305	134	351		
v/s Ratio Prot								c0.18			0.06		
v/s Ratio Perm		0.33	0.10						0.05	0.02			
v/c Ratio		0.50	0.15					0.75	0.21	0.09	0.26		
Uniform Delay, d1		8.0	6.0					31.4	27.0	26.2	27.4		
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00		
Incremental Delay, d2		1.0	0.4					8.1	0.3	0.3	0.4		
Delay (s)		9.0	6.4					39.4	27.3	26.5	27.8		
Level of Service		A	A					D	C	C	C		
Approach Delay (s)		8.6			0.0			34.8			27.6		
Approach LOS		A			A			C			C		
Intersection Summary													
HCM 2000 Control Delay			17.3		HCM 2000 Level of Service						B		
HCM 2000 Volume to Capacity ratio			0.57										
Actuated Cycle Length (s)			90.0		Sum of lost time (s)						9.0		
Intersection Capacity Utilization			55.6%		ICU Level of Service						B		
Analysis Period (min)			15										

c Critical Lane Group

HCM 6th Signalized Intersection Summary

1: Highway 211/Meinig Ave & Pioneer Blvd

08/11/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↑	↗					↑	↗	↘	↑	
Traffic Volume (veh/h)	42	767	142	0	0	0	0	256	157	11	86	0
Future Volume (veh/h)	42	767	142	0	0	0	0	256	157	11	86	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1428	1428	1428				0	1514	1514	1452	1452	0
Adj Flow Rate, veh/h	45	825	0				0	275	169	12	92	0
Peak Hour Factor	0.93	0.93	0.93				0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	12	12	12				0	5	5	10	10	0
Cap, veh/h	94	1804					0	328	273	111	314	0
Arrive On Green	0.68	0.68	0.00				0.00	0.22	0.22	0.22	0.22	0.00
Sat Flow, veh/h	137	2640	1210				0	1514	1259	731	1452	0
Grp Volume(v), veh/h	466	404	0				0	275	169	12	92	0
Grp Sat Flow(s),veh/h/ln	1421	1356	1210				0	1514	1259	731	1452	0
Q Serve(g_s), s	13.9	12.1	0.0				0.0	15.7	10.9	1.4	4.8	0.0
Cycle Q Clear(g_c), s	13.9	12.1	0.0				0.0	15.7	10.9	17.1	4.8	0.0
Prop In Lane	0.10		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	971	927					0	328	273	111	314	0
V/C Ratio(X)	0.48	0.44					0.00	0.84	0.62	0.11	0.29	0.00
Avail Cap(c_a), veh/h	971	927					0	547	455	217	524	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	6.7	6.4	0.0				0.0	33.8	31.9	41.9	29.5	0.0
Incr Delay (d2), s/veh	1.7	1.5	0.0				0.0	5.9	2.3	0.4	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	3.4	0.0				0.0	6.0	3.3	0.3	1.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.4	7.9	0.0				0.0	39.6	34.2	42.4	30.0	0.0
LnGrp LOS	A	A					A	D	C	D	C	A
Approach Vol, veh/h		870	A					444			104	
Approach Delay, s/veh		8.2						37.6			31.4	
Approach LOS		A						D			C	
Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		66.0		24.0				24.0				
Change Period (Y+Rc), s		4.5		4.5				4.5				
Max Green Setting (Gmax), s		48.5		32.5				32.5				
Max Q Clear Time (g_c+I1), s		15.9		17.7				19.1				
Green Ext Time (p_c), s		6.9		1.8				0.4				

Intersection Summary

HCM 6th Ctrl Delay	19.1
HCM 6th LOS	B

Notes

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

HCM 6th TWSC
2: Highway 211 & City Hall Driveway

08/11/2020

Intersection						
Int Delay, s/veh	0.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↖			↗
Traffic Vol, veh/h	0	41	372	18	0	232
Future Vol, veh/h	0	41	372	18	0	232
Conflicting Peds, #/hr	0	3	0	3	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	5	2	2	10
Mvmt Flow	0	45	404	20	0	252

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	-	420	0	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-
Pot Cap-1 Maneuver	0	633	-	-	0
Stage 1	0	-	-	-	0
Stage 2	0	-	-	-	0
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	-	629	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.2	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	-	629
HCM Lane V/C Ratio	-	-	0.071
HCM Control Delay (s)	-	-	11.2
HCM Lane LOS	-	-	B
HCM 95th %tile Q(veh)	-	-	0.2

HCM 6th TWSC
 3: Highway 211 & Tupper Road/Site Access

08/11/2020

Intersection												
Int Delay, s/veh	0.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗			↗		↘			↘	
Traffic Vol, veh/h	0	0	44	0	0	5	0	374	1	0	206	15
Future Vol, veh/h	0	0	44	0	0	5	0	374	1	0	206	15
Conflicting Peds, #/hr	2	0	2	0	0	0	2	0	0	0	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	10	2	2	5	2
Mvmt Flow	0	0	48	0	0	5	0	407	1	0	224	16

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	-	-	236	-	-	408	-	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.22	-	-	6.22	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.318	-	-	3.318	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	803	0	0	643	0	-	-	0	-	-
Stage 1	0	0	-	0	0	-	0	-	-	0	-	-
Stage 2	0	0	-	0	0	-	0	-	-	0	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	800	-	-	643	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	9.8		10.6		0		0	
HCM LOS	A		B					

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	-	800	643	-	-
HCM Lane V/C Ratio	-	-	0.06	0.008	-	-
HCM Control Delay (s)	-	-	9.8	10.6	-	-
HCM Lane LOS	-	-	A	B	-	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-	-

HCM Signalized Intersection Capacity Analysis

1: Highway 211/Meinig Ave & Pioneer Blvd

08/11/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕↕	↗					↕	↗	↘	↕		
Traffic Volume (vph)	78	1406	285	0	0	0	0	239	147	23	161	0	
Future Volume (vph)	78	1406	285	0	0	0	0	239	147	23	161	0	
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		
Lane Util. Factor		0.95	1.00					1.00	1.00	1.00	1.00		
Frbp, ped/bikes		1.00	0.96					1.00	0.97	1.00	1.00		
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00		
Frt		1.00	0.85					1.00	0.85	1.00	1.00		
Flt Protected		1.00	1.00					1.00	1.00	0.95	1.00		
Satd. Flow (prot)		2896	1250					1544	1278	1418	1500		
Flt Permitted		1.00	1.00					1.00	1.00	0.34	1.00		
Satd. Flow (perm)		2896	1250					1544	1278	502	1500		
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)	83	1496	303	0	0	0	0	254	156	24	171	0	
RTOR Reduction (vph)	0	0	41	0	0	0	0	0	42	0	0	0	
Lane Group Flow (vph)	0	1579	262	0	0	0	0	254	114	24	171	0	
Confl. Peds. (#/hr)	3		6						8	5			
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	5%	5%	5%	
Turn Type	Perm	NA	Perm					NA	Perm	Perm	NA		
Protected Phases		2						4			8		
Permitted Phases	2		2						4	8			
Actuated Green, G (s)		78.6	78.6					22.4	22.4	22.4	22.4		
Effective Green, g (s)		78.6	78.6					22.4	22.4	22.4	22.4		
Actuated g/C Ratio		0.71	0.71					0.20	0.20	0.20	0.20		
Clearance Time (s)		4.5	4.5					4.5	4.5	4.5	4.5		
Vehicle Extension (s)		3.0	3.0					3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)		2069	893					314	260	102	305		
v/s Ratio Prot								c0.16			0.11		
v/s Ratio Perm		0.55	0.21						0.09	0.05			
v/c Ratio		0.76	0.29					0.81	0.44	0.24	0.56		
Uniform Delay, d1		9.9	5.7					41.8	38.3	36.6	39.4		
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00		
Incremental Delay, d2		2.7	0.8					14.2	1.2	1.2	2.4		
Delay (s)		12.6	6.5					55.9	39.5	37.8	41.7		
Level of Service		B	A					E	D	D	D		
Approach Delay (s)		11.6			0.0			49.7			41.2		
Approach LOS		B			A			D			D		
Intersection Summary													
HCM 2000 Control Delay			20.2		HCM 2000 Level of Service					C			
HCM 2000 Volume to Capacity ratio			0.77										
Actuated Cycle Length (s)			110.0		Sum of lost time (s)				9.0				
Intersection Capacity Utilization			80.2%		ICU Level of Service				D				
Analysis Period (min)			15										

c Critical Lane Group

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

08/11/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕	↗					↕	↗	↘	↕	
Traffic Volume (veh/h)	78	1406	285	0	0	0	0	239	147	23	161	0
Future Volume (veh/h)	78	1406	285	0	0	0	0	239	147	23	161	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1538	1538	1538				0	1550	1550	1514	1514	0
Adj Flow Rate, veh/h	83	1496	0				0	254	156	24	171	0
Peak Hour Factor	0.94	0.94	0.94				0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	3	3	3				0	2	2	5	5	0
Cap, veh/h	107	2020					0	321	267	106	314	0
Arrive On Green	0.71	0.71	0.00				0.00	0.21	0.21	0.21	0.21	0.00
Sat Flow, veh/h	150	2842	1304				0	1550	1289	789	1514	0
Grp Volume(v), veh/h	846	733	0				0	254	156	24	171	0
Grp Sat Flow(s),veh/h/ln	1531	1461	1304				0	1550	1289	789	1514	0
Q Serve(g_s), s	39.3	32.0	0.0				0.0	17.1	12.0	3.3	11.1	0.0
Cycle Q Clear(g_c), s	39.3	32.0	0.0				0.0	17.1	12.0	20.4	11.1	0.0
Prop In Lane	0.10		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1088	1039					0	321	267	106	314	0
V/C Ratio(X)	0.78	0.71					0.00	0.79	0.58	0.23	0.55	0.00
Avail Cap(c_a), veh/h	1088	1039					0	388	322	140	378	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	10.3	9.2	0.0				0.0	41.3	39.3	51.0	39.0	0.0
Incr Delay (d2), s/veh	5.5	4.0	0.0				0.0	8.9	2.0	1.1	1.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.4	10.3	0.0				0.0	7.1	3.9	0.7	4.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.7	13.3	0.0				0.0	50.2	41.3	52.0	40.4	0.0
LnGrp LOS	B	B					A	D	D	D	D	A
Approach Vol, veh/h		1579	A					410			195	
Approach Delay, s/veh		14.6						46.8			41.9	
Approach LOS		B						D			D	
Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		82.7		27.3				27.3				
Change Period (Y+Rc), s		4.5		4.5				4.5				
Max Green Setting (Gmax), s		73.5		27.5				27.5				
Max Q Clear Time (g_c+I1), s		41.3		19.1				22.4				
Green Ext Time (p_c), s		16.3		1.2				0.4				

Intersection Summary

HCM 6th Ctrl Delay	23.1
HCM 6th LOS	C

Notes

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

HCM 6th TWSC
2: Highway 211 & City Hall Driveway

08/11/2020

Intersection						
Int Delay, s/veh	0.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↘			↑
Traffic Vol, veh/h	0	21	365	8	0	446
Future Vol, veh/h	0	21	365	8	0	446
Conflicting Peds, #/hr	3	3	0	3	3	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	5
Mvmt Flow	0	22	388	9	0	474

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	-	399	0	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-
Pot Cap-1 Maneuver	0	651	-	-	0
Stage 1	0	-	-	-	0
Stage 2	0	-	-	-	0
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	-	647	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.8	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	-	647
HCM Lane V/C Ratio	-	-	0.035
HCM Control Delay (s)	-	-	10.8
HCM Lane LOS	-	-	B
HCM 95th %tile Q(veh)	-	-	0.1

HCM 6th TWSC
 3: Highway 211 & Tupper Road/Site Access

08/11/2020

Intersection												
Int Delay, s/veh	0.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗			↗		↘			↘	
Traffic Vol, veh/h	0	0	29	0	0	3	0	366	4	0	383	57
Future Vol, veh/h	0	0	29	0	0	3	0	366	4	0	383	57
Conflicting Peds, #/hr	2	0	2	0	0	0	2	0	0	0	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	92	94	92	92	92	94	94	92	92	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	10	2	2	5	2
Mvmt Flow	0	0	31	0	0	3	0	389	4	0	407	61

Major/Minor	Minor2		Minor1		Major1		Major2	
Conflicting Flow All	-	-	442	-	-	391	-	0
Stage 1	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.22	-	-	6.22	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.318	-	-	3.318	-	-
Pot Cap-1 Maneuver	0	0	615	0	0	658	0	-
Stage 1	0	0	-	0	0	-	0	-
Stage 2	0	0	-	0	0	-	0	-
Platoon blocked, %	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	613	-	-	658	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	11.2		10.5		0		0	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	-	613	658	-	-
HCM Lane V/C Ratio	-	-	0.05	0.005	-	-
HCM Control Delay (s)	-	-	11.2	10.5	-	-
HCM Lane LOS	-	-	B	B	-	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-	-

Queuing and Blocking Report
 2022 Background Plus Site AM Peak Hour

08/12/2020

Intersection: 1: Highway 211/Meinig Ave & Pioneer Blvd

Movement	EB	EB	EB	NB	NB	SB	SB
Directions Served	LT	T	R	T	R	L	T
Maximum Queue (ft)	322	286	100	310	125	59	155
Average Queue (ft)	153	104	32	145	62	11	48
95th Queue (ft)	273	225	102	263	138	39	112
Link Distance (ft)	612	612		310			343
Upstream Blk Time (%)				0			
Queuing Penalty (veh)				1			
Storage Bay Dist (ft)			75		100	100	
Storage Blk Time (%)		7	0	17	0	0	2
Queuing Penalty (veh)		9	1	24	1	0	0

Intersection: 2: Highway 211 & City Hall Driveway

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	48	44	44
Average Queue (ft)	26	3	3
95th Queue (ft)	52	24	21
Link Distance (ft)	182	193	310
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Highway 211 & Tupper Road/Site Access

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	62	35	12	13
Average Queue (ft)	29	4	1	0
95th Queue (ft)	57	23	9	6
Link Distance (ft)	276	224	171	193
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 37

Intersection: 1: Highway 211/Meinig Ave & Pioneer Blvd

Movement	EB	EB	EB	NB	NB	SB	SB
Directions Served	LT	T	R	T	R	L	T
Maximum Queue (ft)	616	600	100	307	125	108	254
Average Queue (ft)	304	272	59	177	90	28	108
95th Queue (ft)	505	497	134	308	162	82	200
Link Distance (ft)	612	612		310			343
Upstream Blk Time (%)	1	1		1			0
Queuing Penalty (veh)	0	0		3			0
Storage Bay Dist (ft)			75		100	100	
Storage Blk Time (%)		17	1	28	2	1	15
Queuing Penalty (veh)		49	6	37	4	1	3

Intersection: 2: Highway 211 & City Hall Driveway

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	44	69	48
Average Queue (ft)	15	5	3
95th Queue (ft)	42	36	25
Link Distance (ft)	182	193	310
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Highway 211 & Tupper Road/Site Access

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	50	34	83	36
Average Queue (ft)	23	3	7	1
95th Queue (ft)	52	20	41	13
Link Distance (ft)	276	224	171	193
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 103

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

PIONEER BLVD at MEINIG AVE, City of Sandy, Clackamas County, 01/01/2014 to 05/31/2018
1 - 5 of 10 Crash records shown.

CITY OF SANDY, CLACKAMAS COUNTY

SER#	P R J S W DATE	CLASS	CITY STREET	INT-TYPE	INT-REL	OFFRD	WTHR	CRASH	SPCL USE	TRLR QTY	OWNER	MOVE	PH TYPE	SVRTY	E X RES	LOC	ERROR	ACT EVENT	CAUSE	
INVEST	E A U I C O DAY	DIST	FIRST STREET	(MEDIAN)	INT-REL	RD CHAR	RD CHAR	COLL	TRAF- LESS	TRAF- (LANES)	CONTL	DRVWY	LIGHT	SVRTY	VH TYPE	01 NONE	0	STRGHT		
RD DPT	E L G N H R TIME	FROM	SECOND STREET	LESS	TRAF-	LOCIN	LOCIN	DRVWY	DRVWY	DRVWY	DRVWY	DRVWY	DRVWY	DRVWY	DRVWY	DRVWY	DRVWY	DRVWY	DRVWY	DRVWY
UNLOC?	D C S V L K LAT	LONG	LONG	LONG	LONG	LONG	LONG	LONG	LONG	LONG	LONG	LONG	LONG	LONG	LONG	LONG	LONG	LONG	LONG	LONG
02013	N N N	05/02/2015	16	MEINIG AVE	CROSS	N	TRF SIGNAL	N	RAIN	S-1STOP	01 NONE	0	STRGHT							29
NONE	SA			PIONEER BLVD		N	TRF SIGNAL	N	WET	REAR	UNKN	N-S								00
N	3P	45 23 46.73	-122 15	017200100500	0				DAY	PDO	UNKNOWN		01 DRVR	NONE	00	Unk	UNK			026
N		35.13																		000
00025	N N N	01/03/2014	16	MEINIG AVE	CROSS	N	TRF SIGNAL	N	CLR	S-STRGHT	01 NONE	0	STRGHT							13
NONE	FR			PIONEER BLVD		S	TRF SIGNAL	N	DRY	SS-O	PRVTE	S-N								00
N	10A	45 23 46.73	-122 15	017200100500	0				DAY	PDO	PSNGR CAR		01 DRVR	NONE	68	M	OR-Y			045
N		35.125776																		000
03127	N N N	08/03/2015	16	MEINIG AVE	CROSS	N	TRF SIGNAL	N	CLR	S-1STOP	01 NONE	0	STRGHT							29
NONE	HO			PIONEER BLVD		S	TRF SIGNAL	N	DRY	REAR	PRVTE	S-N								00
N	12P	45 23 46.73	-122 15	017200100500	0				DAY	INJ	PSNGR CAR		01 DRVR	NONE	24	M	OR-Y			026
N		35.13																		000
04757	N Y N	10/14/2016	16	MEINIG AVE	CROSS	N	TRF SIGNAL	N	UNK	FIX OBJ	01 NONE	9	TURN-R							100
CITY	FR			PIONEER BLVD		S	TRF SIGNAL	N	WET	FIX	N/A	W-S								000
N	11P	45 23 45.91	-122 15	017200100500	1				DARK	PDO	PSNGR CAR		01 DRVR	NONE	00	Unk	UNK			000
N		35.58																		000
02544	N N N	06/27/2017	14	MEINIG AVE	CROSS	N	TRF SIGNAL	N	CLR	S-1STOP	01 NONE	9	STRGHT							29
NONE	TU			PIONEER BLVD		SW	YIELD	N	DRY	REAR	N/A	NW-SE								000
N	2P	45 23 46.73	-122 15	002600100500	1				DAY	PDO	PSNGR CAR		01 DRVR	NONE	00	Unk	UNK			000
N		35.13																		000
																				011
																				000
																				000
																				000

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

PIONEER BLVD at MEINIG AVE, City of Sandy, Clackamas County, 01/01/2014 to 05/31/2018
6 - 9 of 10 Crash records shown.

CITY OF SANDY, CLACKAMAS COUNTY

SER#	P R J S W DATE	CLASS	CITY STREET	INT-TYPE	INT-REL	OFFRD	WTHR	CRASH	SPL USE	TRLR QTY	OWNER	MOVE	PH TYPE	SVRTY	E X RES	LOC	ERROR	ACT EVENT	CAUSE	
INVEST	E A U I C O DAY	DIST	FIRST STREET	(MEDIAN)	INT-REL	RNDBT	SURF	COLL	SPNGR CAR	PSNGR CAR	PSNGR CAR	FROM	PH TYPE	SVRTY	E X RES	LOC	ERROR	ACT EVENT	CAUSE	
RD DFT	E L G N H R TIME	FROM	SECOND STREET	LESS	TRAF-	DRVMY	LIGHT	SVRTY	01 NONE	9	STRGHT	TO	PH TYPE	SVRTY	E X RES	LOC	ERROR	ACT EVENT	CAUSE	
UNLOC#	D C S V L K LAT	LONG	LR	(#LANES)	CONTL	N	UNK	S-1STOP	01 NONE	9	STRGHT	TO	PH TYPE	SVRTY	E X RES	LOC	ERROR	ACT EVENT	CAUSE	
04274	N N N	10/10/2017	14	MEINIG AVE	CROSS	N	YIELD	N	0	0	0	STRGHT	01	DRVR	NONE	00	UNK	UNK	00	00
NONE	TU			PIONEER BLVD	SW			REAR	N/A			NW-SE	01	DRVR	NONE	00	UNK	UNK	000	00
N	4P				09	1		PDO	PSNGR CAR										000	00
N	45 23 46.73	-122.15	35.13		(02)				02 NONE	9	STOP								011	00
									N/A		NW-SE								000	00
									PSNGR CAR				01	DRVR	NONE	00	UNK	UNK	000	00
02787	N N N	07/11/2015	14	MEINIG AVE	CROSS	N		S-1STOP	01 NONE	0	STRGHT								000	00
CITY	SA			PIONEER BLVD	W			REAR	PRVTE			W-E							000	00
N	6P				06	1		INJ	PSNGR CAR				01	DRVR	NONE	68	M	UNK	026	000
N	45 23 46.73	-122.15	35.13						02 NONE	0	STOP								011	00
									PRVTE		W-E								000	00
									PSNGR CAR				01	DRVR	INJC	32	M	OR-Y	000	00
01847	N N N	04/22/2016	14	MEINIG AVE	CROSS	N		S-1STOP	01 NONE	0	STRGHT								000	00
CITY	FR			PIONEER BLVD	W			REAR	PRVTE			W-E							000	00
N	5P				05	0		INJ	PSNGR CAR				01	DRVR	NONE	45	M	OR-Y	026	000
N	45 23 46.73	-122.15	35.13						02 NONE	0	STOP								011	00
									PRVTE		W-E								000	00
									PSNGR CAR				01	DRVR	INJC	22	M	OR-Y	000	00
04316	N N N	10/20/2015	14	MEINIG AVE	CROSS	N		ANGL-OTH	01 NONE	0	STRGHT								000	00
CITY	TU			PIONEER BLVD	CN			ANGL	PRVTE			N-S							000	00
N	9P				03	0		INJ	PSNGR CAR				01	DRVR	NONE	44	M	OR-Y	097	000
N	45 23 46.73	-122.15	35.13						01 NONE	0	STRGHT								000	00
									PRVTE		N-S								000	00
									PSNGR CAR				02	PSNG	INJC	13	F		000	00
									02 NONE	0	STRGHT								000	00
									PRVTE		W-E								000	00
									PSNGR CAR				01	DRVR	NONE	44	F	OR-Y	000	00
03085	N N N	07/08/2016	14	MEINIG AVE	CROSS	N		ANGL-OTH	01 NONE	0	STRGHT								000	00
CITY	FR			PIONEER BLVD	CN			ANGL	PRVTE			W-E							000	00
N	8A				01	0		INJ	PSNGR CAR				01	DRVR	NONE	51	F	OR-Y	000	00
N	45 23 46.73	-122.15	35.13						02 NONE	0	STRGHT								000	00
									PRVTE		W-E								000	00
									PSNGR CAR				01	DRVR	NONE	44	F	OR-Y	000	00

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CDS380
08/11/2020

OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT

URBAN NON-SYSTEM CRASH LISTING
PIONEER BLVD at MEINIG AVE, City of Sandy, Clackamas County, 01/01/2014 to 05/31/2018
10 - 10 of 10 Crash records shown.

CITY OF SANDY, CLACKAMAS COUNTY

SER#	INVEST	RD DPT	UNLOC?	D C S V L K LAT	CLASS	CITY STREET	RD CHAR	INT-TYPE	INT-REL	OFFRD	WTHR	CRASH	SPCL USE	TRLR QTY	MOVE	PH TYPE	INJ	SVRTY	E X RES	LOC	ERROR	ACT EVENT	CAUSE
					DIST	FIRST STREET		(MEDIAN)				CRASH			FROM								
					FROM	SECOND STREET	DIRECT	LESS	TRAF-	RNDBT	SURF	COLL	OWNER										
					LONG	LRS	LOCIN	(#LANES)	CONTL	DRVMY	LIGHT	SVRTY	VH TYPE	02 NONE	TO								
													02 NONE	STRGHT									
													PRVTE	N -S									00
													ESNGR CAR			01	DRVR	INJB	51	F	OR-Y	020	000
																							04
																							OR-25

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

PIONEER BLVD at EAGLE CRK-SANDY HY, City of Sandy, Clackamas County, 01/01/2014 to 05/31/2018

CDS380
 08/11/2020

CITY OF SANDY, CLACKAMAS COUNTY

SER#	INVEST	RD DFT	UNLOC?	D C S V L K LAT	CLASS	CITY STREET	RD CHAR	INT-TYPE	INT-REL	OFFRD	WTHR	CRASH	SPL USE	TRLR QTY	MOVE	PH TYPE	SVRTY	E X RES	LOC	ACT EVENT	CAUSE
						FIRST STREET	DIRECT	(MEDIAN)		RNDBT	SURF	COLL	OWNER		FROM						
						SECOND STREET		LESS	TRAF-	DRVMY	LIGHT	SVRTY	VH TYPE		TO						
						LRS	LOCIN	(#LANES)	CONTL												

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.

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

EAGLE CRK-SANDY HY at TUPPER RD, City of Sandy, Clackamas County, 01/01/2014 to 05/31/2018

CDS380
 08/11/2020

CITY OF SANDY, CLACKAMAS COUNTY

SER#	INVEST	RD DFT	UNLOC?	D	R	J	S	W	DATE	CLASS	CITY STREET	RD CHAR	INT-TYPE	INT-REL	OFFRD	WTHR	CRASH	SPL USE	TRLR QTY	MOVE	PH TYPE	SVRTY	E	X	RES	LOC	ACT	EVENT	CAUSE
											FIRST STREET	DIRECT	(MEDIAN)		RNDBT	SURF	COLL	OWNER		FROM									
											SECOND STREET	LOCIN	LESS	TRAF-	DRVMY	LIGHT	SVRTY	VH TYPE		TO									
											LRS		(#LANES)	CONTL															

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

MEINIG AVE at TUPPER RD, City of Sandy, Clackamas County, 01/01/2014 to 05/31/2018

CDS380
08/11/2020

CITY OF SANDY, CLACKAMAS COUNTY

SER#	INVEST	RD DFT	UNLOC?	D C S V L K LAT	CLASS	CITY STREET	RD CHAR	INT-TYPE	INT-REL	OFFRD	WTHR	CRASH	SPCL USE	TRLR QTY	MOVE	PH TYPE	SVRTY	E X RES	LOC	ACT EVENT	CAUSE
						FIRST STREET	DIRECT	(MEDIAN)		RNDBT	SURF	COLL	OWNER		FROM						
						SECOND STREET		LESS	TRAF-	DRVMY	LIGHT	SVRTY	VH TYPE		TO						
						LRS	LOCIN	(#LANES)	CONTL												

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.

Right-Turn Lane Warrant Analysis (ODOT Methodology)



Project Name: The Pad Residential Development
 Approach: Southbound Highway 211 at Tupper Road
 Scenario: 2022 Background Plus Site Trips (RIRO)

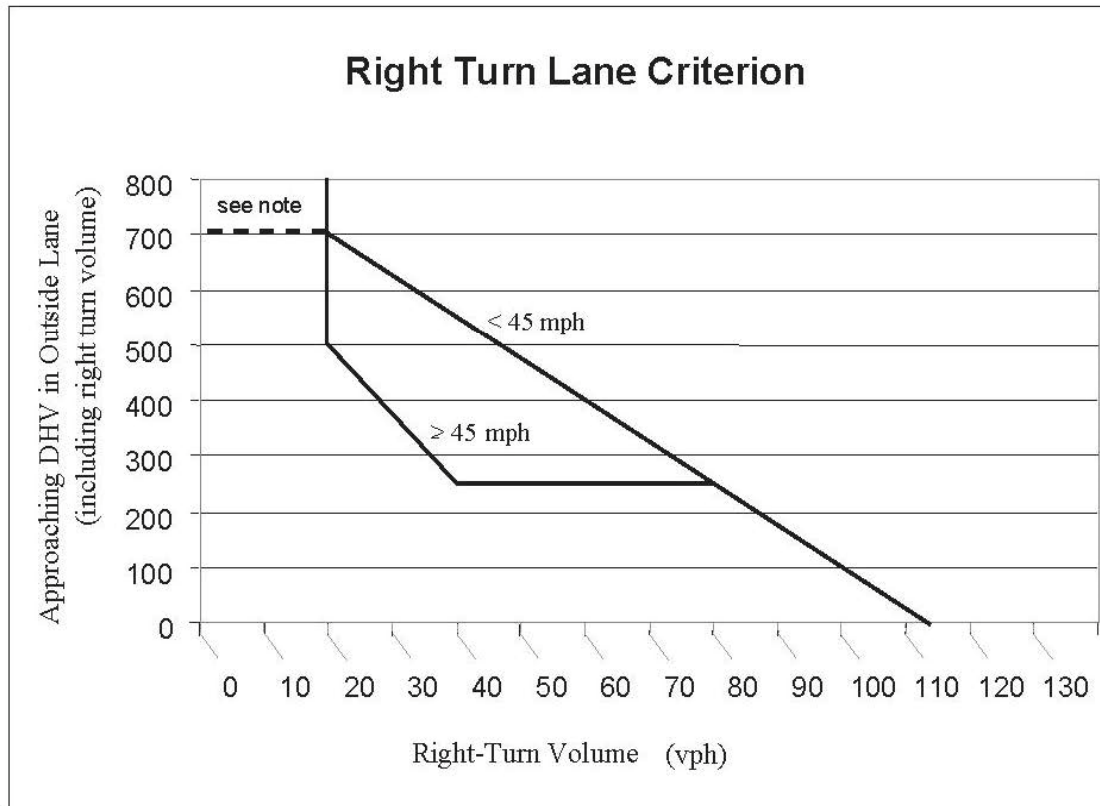
Major-Street Design Speed: 40 mph

	AM Volume	PM Volume
Number of Right Turns per Hour:	15	54
Approaching DVH in Outside Lane:	221	437
Calculated Turn Volume Threshold:	84	55
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.

Stopping Sight Distance

Design Speed 20 mph
 Reaction Time 2.5 seconds
 Acceleration 11.2 ft/sec²
 Grade (percent) -6.00%

Distance 119.8 feet

Reaction Distance

Travel Speed 20 mph
 Travel Speed 29.4 fps
 Reaction Time 2.5 seconds

Reaction Distance 73.5 feet

Braking Distance

Travel Speed 20 mph
 Acceleration 11.2 ft/sec²
 Grade (percent) -6.00%

Braking Distance 46.3 feet

For standard roadways >400 ADT, use 2.5 seconds perception/reaction time and 11.2 ft/sec² deceleration.
 (95th percentile reaction time and 10th percentile deceleration)

For VLV roadways < 400 ADT, use 2.0 seconds perception/reaction time and 13.4 ft/sec² deceleration.
 (90th percentile reaction time and 50th percentile deceleration)

EXHIBIT I – INITIAL ARBORIST REPORT



Portland Tree Consultancy

Lou Phemister
ASCA Registered Consulting Arborist #590
(573) 999-3886 / loupphemister@outlook.com

INITIAL ARBORIST REPORT

Tree Inventory & Condition Assessment

DATE: 12.27.2020

PROPERTY ADDRESS: 17650 Meining Ave, Sandy, OR 97055

CLIENT REFERENCE: Axis Design Group

PROJECT DESCRIPTION: Tree Inventory and Condition Assessment
for The Pad, a proposed residential development

Introduction

An inventory of all trees 11-inches DBH and larger over was completed on the project site detailed in Figures 1a and 1b and on adjacent trees that could be influenced by development on the project site. Trees affected by excavation for utility lines are also inventoried and their location detailed in Figure 1c. The trees within the project site were tagged with numbered aluminum discs whose numbers correspond to the ID column in the inventory table. The inventory was completed on December 24th, 2020.

Regulated Trees. Chapter 17.102 City Code

Only trees 11-inches DBH and over are regulated by the ordinance. There are 19 trees meeting that threshold on the property: Trees (2801, 2813, 2814, 2823, 2825, 2827, 2828, 2846, 2851, 2866, 2876, 2880, 2882, 2895, 2898, 3601, 3602, 3603, 3604). Of these, one tree is dying, and two are Invasive non-native species.

Tree Retention & Protection Requirements. Chapter 17.102.50

Three trees 11-inches DBH and larger are required to be retained on site. If possible, two of the three must be conifers.

Notes on Value of Trees & Tree Protection

There are four high value conifers along the edges of the property that can be expected to survive construction impacts if protected appropriately:

Tree 2823 is a very large multi-stem Western red cedar. The tree has a crown radius of around 20-ft and, if preserved, it is recommended that a tree protection area of at least 20-ft is established around the tree.

Tree 2898 is a good quality Shore pine with no low branches and this tree could be preserved with a recommended tree protection area of 10-ft radius.

Tree 2828 is a mature Ponderosa pine that has been badly pruned but is in otherwise good condition. The recommended minimum distance to excavation and fill should be 15-ft.

Tree 2846 is a Douglas fir in early maturity. It has a low spreading crown and is in very good condition. Again, a tree protection area radius of 15-ft would be the minimum recommended for protecting this tree.

- a. The tree protection areas noted above should protect the tree from any disturbance including any excavation or fill. In certain situations small areas of excavation and fill may be allowed nearer the tree if the total undisturbed area around the tree is made large enough.
- b. It should be noted that the City Code only requires a tree protection area of 10-ft from any preserved tree, but this will not be sufficient to protect most larger conifers.

Notes on Tree Protection for trees on adjacent land.

One very large True fir exists adjacent to the east property line (T 29). This tree is set back from the property line slightly and will need a minimum tree protection area of 20-ft. The other trees adjacent to the east property line can be protected with a tree protection area of 10-ft.

There is a line of semi-mature Douglas fir trees adjacent to the south property line (Trees 13 to 18). Most of these trees are in good condition and all are semi-mature. The tree protection area for these trees should be 15-ft minimum distance. The branches of these trees are low over the property and extend at least 25-ft into the property, so careful pruning will be required.

TREE INVENTORY TABLE (for Locations see Fig 1a, b and c)

ID	Tree Species	DBH	Condition	V	Condition / Constraints Notes	Location Notes
2801	Big leaf maple <i>Acer macrophyllum</i>	19	Good	H	Early maturity. Narrow CR form, but good vitality and vigor	At E edge of small raised bank
2807	Japanese maple <i>Acer palmatum</i>	9	Good	M	Asymmetric CR heavily shaded. Codominant stem with wide angle at 4.5-ft	At edge of small raised bank
2813	European wild cherry <i>Prunus avium</i>	15	Fair	L	Heavily leaning stem, growing away from big leaf maple. INVASIVE NON NATIVE	Within E tree line
2814	European wild cherry <i>Prunus avium</i>	14	Fair	L	Straight stem lean, away from big leaf maples INVASIVE NON NATIVE	Within group of smaller trees. E property line
2822	English holly <i>Ilex aquifolium</i>	10	Good/Fair	L	Strong upright crown form, but heavily shaded by western red cedar INVASIVE NON NATIVE	Under red cedar canopy
2823	Western red cedar <i>Thuja plicata</i>	64	Good	H	Large specimen tree with no significant defects. CR low over property	On small raised bank on E property line
2824	European wild cherry <i>Prunus avium</i>	8	Poor	L	Stem has 45-degree lean. Damaged surface roots evident INVASIVE NON NATIVE	Under red cedar canopy. E side property line
2825	Big leaf maple <i>Acer macrophyllum</i>	12	Good	M	CR has vigorous upright growth and good form	Growing N and clear of red cedar canopy
2827	Lodgepole pine <i>Pinus contorta</i>	36	Good	H	Full strong CR. Twin leaders from 8-ft	Grassed center of site
2828	Ponderosa pine <i>Pinus Ponderosa</i>	26	Good/Fair	H	Healthy tree with good CR form. Very poor pruning practice	Grassed center of site
2846	Douglas fir <i>Pseudotsuga menziesii</i>	19	Good	H	Good crown form and good vitality. CR is low to ground and extends 15-ft radius	5-ft from existing fence on west side
2851	Crabapple species <i>Malus spp</i>	12	Fair	L	Thin narrow and damaged CR	Grassed center of site
2866	Spruce species <i>Picea spp</i>	18	Fair/Good	M	Fair vigor. Complete CR but thin growth form	Grassed center of site
2876	Big leaf maple <i>Acer macrophyllum</i>	26	Good/Fair	M	Twin stems from ground level. Some minor basal damage	E side within tree line
2880	Orchard apple <i>Malus domestica</i>	24	Fair	M	Large domestic apple, formerly managed tree. Has heavy sapsucker damage	Grassed center of site
2882	Spruce species <i>Picea spp</i>	18	Dying	-	Recent strong decline. May have no live foliage	Adjacent to N property line
2889	Spruce species <i>Picea spp</i>	11	Fair/Poor	L	Small reduced crown under O/E lines. Large stem lesion Low vigor	OFF SITE: ROW tree at NW property corner

ID	Tree Species	DBH	Condition	V	Condition / Constraints Notes	Location Notes
2895	Maple species <i>Acer spp</i>	12	Fair/Good	M	Strong vertical growth within closely spaced tree grouping	Small raised bank on E property line
2898	Lodgepole pine <i>Pinus contorta</i>	14	Good	H	Strong vertical CR development. Lower stem among cherry laurel stems	Small raised bank on E property line
3601	Big leaf maple <i>Acer macrophyllum</i>	26	Good/Fair	M	Canopy dominant tree. Full large CR. CR low over property and 35-ft radial spread	Raised bank area at N end of property
3602	Big leaf maple <i>Acer macrophyllum</i>	17	Fair/Good	M	Twisting strong stem intertwined with dominant tree T 3601	Raised bank area at N end of property
3603	Big leaf maple <i>Acer macrophyllum</i>	24	Good/Fair	M	Strong dominant CR. Spreading CR form. CR low over property and 35-ft radial spread	Raised bank area at N end of property
3604	Big leaf maple <i>Acer macrophyllum</i>	15	Poor	L	Heavy lean over PL, likely partial uproot. Basal decay and damage on off-lean basal area	Raised bank area at N end of property. NE co
1	European wild cherry <i>Prunus avium</i>	26	Fair	M	Fully mature, low vigor. Branch failures. Pruned under O/E INVASIVE NON NATIVE	OFF SITE: On slope of hwy bank. 8-ft from AP
2	Willow species <i>Salix spp</i>	20	Fair/poor	L	Multi-stem – no dominant stem Tree but in shrub form.	OFF SITE: 11-ft from AP. W side drain channel
3	Douglas fir <i>Pseudotsuga menziesii</i>	41	Good	H	Strong complete crown. On raised root mound. No defects noted	OFF SITE: 2-ft from AP
4	Western red cedar <i>Thuja plicata</i>	45	Good	H	Complete CR and branch structure. Crown slightly thin	OFF SITE: 10-ft from AP. At drain channel
5	Big leaf maple <i>Acer macrophyllum</i>	28	Fair	M	Heavily shaded by T4. Multiple branch breakouts. Shared CR space with T4	OFF SITE: 4-ft from AP. At drain channel
6	European wild cherry <i>Prunus avium</i>	9	Poor	L	Significant stem damage. Multiple stem lesions INVASIVE NON NATIVE	OFF SITE: Park landscape area
7	Big leaf maple <i>Acer macrophyllum</i>	12	Good/Fair	M	Semi-mature. Upright CR	OFF SITE: Park landscape area
8	Big leaf maple <i>Acer macrophyllum</i>	12	Fair/Poor	L	Tree shaded under adjacent tree. No upper CR	OFF SITE: On steep hwy bank
9	Grand fir <i>Abies grandis</i>	11	Good	H	Semi-mature. Strong upright growth and good upper CR growth	OFF SITE: 20-ft from AP
10	Big leaf maple <i>Acer macrophyllum</i>	26	Fair/Good	M	Group of stems from ground level	OFF SITE: 12-ft from AP
11	Big leaf maple <i>Acer macrophyllum</i>	10	Poor/Fair	M	Severely damaged CR. Scarring of stem	OFF SITE: 6-ft from AP
12	Big leaf maple <i>Acer macrophyllum</i>	14	Good/Fair	M	Early maturity. Stem scar	OFF SITE: On steep hwy bank

ID	Tree Species	DBH	Condition	V	Condition / Constraints Notes	Location Notes
13	Douglas fir <i>Pseudotsuga menziesii</i>	20	Good	H	Group of 3 trees with shared CR and root space. Early maturity. Good vigor. CR low & 20-ft over site	OFF SITE: Adjacent children play area
14	Douglas fir <i>Pseudotsuga menziesii</i>	21	Good	H	Group of 3 trees with shared CR and root space. Early maturity. Good vigor. CR low & 20-ft over site	OFF SITE: Adjacent children play area
15	Douglas fir <i>Pseudotsuga menziesii</i>	21	Good	H	Group of 3 trees with shared CR and root space. Early maturity. Good vigor. CR low & 20-ft over site	OFF SITE: Adjacent children play area
16	Douglas fir <i>Pseudotsuga menziesii</i>	26	Good	H	No shared space. No defects noted. CR low over site to 8-ft ht. Mid-bank location	OFF SITE: Adjacent children play area
17	Douglas fir <i>Pseudotsuga menziesii</i>	17	Good/Fair	M	Semi-mature. Within grouping of shared root and CR space, at bottom of slope	OFF SITE: Adjacent children play area
18	Douglas fir <i>Pseudotsuga menziesii</i>	13	Good	M	Semi-mature. Within grouping of shared root and CR space, at bottom of slope	OFF SITE: Adjacent children play area
19	Douglas fir <i>Pseudotsuga menziesii</i>	10	Good	M	Semi-mature. Within grouping of shared root and CR space, at bottom of slope	OFF SITE: Adjacent children play area
20	Big leaf maple <i>Acer macrophyllum</i>	15	Fair	M	Two stems sound, one damaged. Among large adjacent group of similar species	OFF SITE: Within tree line, E side of property
21	Big leaf maple <i>Acer macrophyllum</i>	13	Fair/Good	M	Group of 3 large stems, average 13" diam	OFF SITE: Within tree line, E side of property
22	Big leaf maple <i>Acer macrophyllum</i>	9	Fair/Poor	L	A group of smaller stems. Some basal damage	OFF SITE: Within tree line, E side of property
23	European wild cherry <i>Prunus avium</i>	8	Fair	L	Leaning stem INVASIVE NON NATIVE	OFF SITE: Within tree line, E side of property
24	Big leaf maple <i>Acer macrophyllum</i>	11	Good/Fair	M	Vertical growing. One large live stem, two dead stems	OFF SITE: Within tree line, E side of property
25	Big leaf maple <i>Acer macrophyllum</i>	10	Good/Fair	M	Canopy sub-dominant. Twisting but strong stem	OFF SITE: Within tree line, E side of property
26	Big leaf maple <i>Acer macrophyllum</i>	15	Good	M	Early maturity. Strong vertical growing stem	OFF SITE: Within tree line, E side of property
27	Big leaf maple <i>Acer macrophyllum</i>	9	Dying	-	Functionally dead. Upper CR is missing	OFF SITE: Within tree line, E side of property
28	Big leaf maple <i>Acer macrophyllum</i>	13	Good/Fair	M	Narrow strong vertical CR	OFF SITE: Within tree line, E side of property
29	True fir <i>Abies spp</i>	29	Good	H	Very straight upright stem. Vitality appears good. Full upper CR	OFF SITE: Within tree line, E side of property
30	European wild cherry <i>Prunus avium</i>	14	Fair/Good	L	Vertical stem. Small high CR INVASIVE NON NATIVE	OFF SITE: Within tree line, E side of property
31	European wild cherry <i>Prunus avium</i>	12	Fair/Good	L	Vertical stem. Small high CR INVASIVE NON NATIVE	OFF SITE: Within tree line, E side of property

Table Notes:

DBH: Stem diameter at 4.5-ft from grade or measured as required by regulation.

V: Amenity value of tree in the opinion of the consultant. Taking into account the species type, size, and safe and healthy life expectancy of the tree (L: Low; M: Medium; H: High).

Abbreviations: AP - asphalt path; CR - Tree crown; O/E - Hi voltage overhead electricity; PL - Parking lot; SS - Self-sown;

Figure 1a Tree survey 12.24.20 (North half of site)

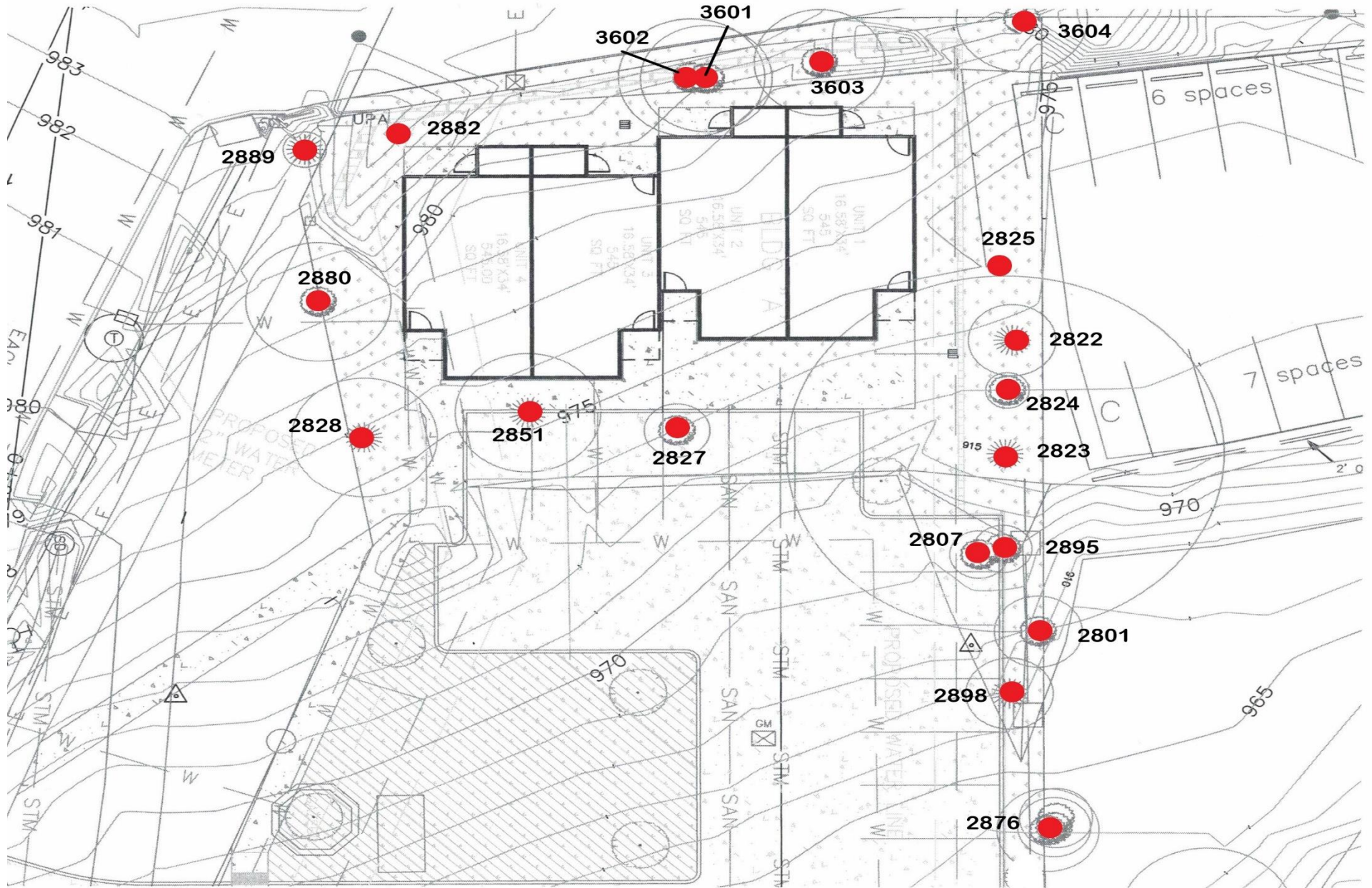


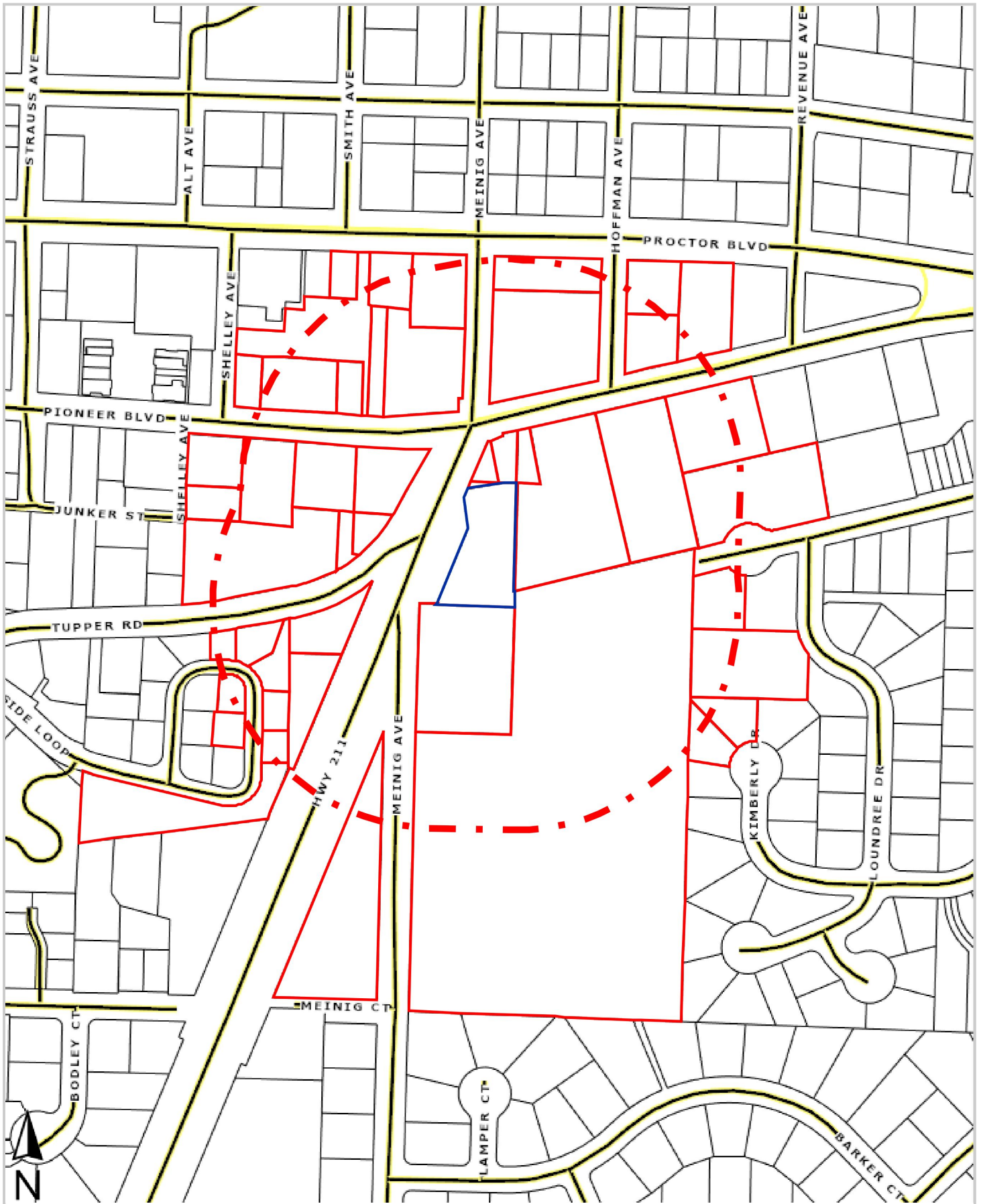
Figure 1b Tree survey 12.24.20 (South half of site)



Figure 1c Tree survey 12.24.20 (Utility alignment area)



SECTION V – ADDITIONAL ITEMS
NEIGHBORHOOD NOTIFICATION
RADIUS SEARCH AND MAILING LABELS



This map/plat is being furnished as an aid in locating the herein described land in relation to adjoining streets, natural boundaries and other land, and is not a survey of the land depicted. Except to the extent a policy of title insurance is expressly modified by endorsement, if any, the company does not insure dimensions, distances, location of easements, acreage or other matters shown thereon.

TaxAcctNum	OwnerNmFirst	OwnerNmLast	OwnerAddr	OwnerCityNm	OwnerState	OwnerZIP	SiteAddr	SiteCity	SiteState	SiteZIP
24E13CA00100		Oregon City Building Lp	3662 SW Tunnelwood St	Portland	OR	97221	39180 Proctor Blvd	Sandy	OR	97055
24E13CA00200		Milward LLC	PO Box 417	Sandy	OR	97055	39181 Pioneer Blvd	Sandy	OR	97055
24E13CA00300	Glenn	Butler	11835 SW Ebberts Ct	Beaverton	OR	97008		Sandy	OR	97055
24E13CA00400	Glenn	Butler	11835 SW Ebberts Ct	Beaverton	OR	97008	39140 Proctor Blvd	Sandy	OR	97055
24E13CA00500		46 & 2 Properties LLC	PO Box 1863	Sandy	OR	97055	39110 Proctor Blvd	Sandy	OR	97055
24E13CA00700	Wo	Kuang	11832 SE Grand Vista Dr	Clackamas	OR	97015	39131 Pioneer Blvd	Sandy	OR	97055
24E13CA00800		Jabez Properties LLC	39085 Pioneer Blvd Ste 100	Sandy	OR	97055	39085 Pioneer Blvd	Sandy	OR	97055
24E13CA01200	Kenneth	Claggett	39055 Pioneer Blvd	Sandy	OR	97055	17470 Shelley Ave	Sandy	OR	97055
24E13CA01300		City Of Sandy	39250 Pioneer Blvd	Sandy	OR	97055		Sandy	OR	97055
24E13CA06000	Karen	Huston	PO Box 476	Sandy	OR	97055	39010 Pioneer Blvd	Sandy	OR	97055
24E13CA06100	Marshall	Hilton	39000 Junker St	Sandy	OR	97055	39000 Junker St	Sandy	OR	97055
24E13CA06200		Jabez Properties LLC	39085 Pioneer Blvd Ste 100	Sandy	OR	97055	39050 Pioneer Blvd	Sandy	OR	97055
24E13CA06300	Paola	D	15475 SE 262nd Ave	Boring	OR	97009	39070 Pioneer Blvd	Sandy	OR	97055
24E13CA06400	David	Goldenberg	18127 Upper Midhill Dr	West Linn	OR	97068	39150 Pioneer Blvd	Sandy	OR	97055
24E13CA06500	David	Goldenberg	18127 Uppper Midhill Dr	West Linn	OR	97068		Sandy	OR	97055
24E13CA06600	Paola	D	15475 SE 262nd Ave	Boring	OR	97009		Sandy	OR	97055
24E13CA06700	Ernesto	Brache	39085 Pioneer Blvd Ste 100	Sandy	OR	97055		Sandy	OR	97055
24E13CA08700	Christine	Cassel	17700 Tupper Rd	Sandy	OR	97055	17700 Tupper Rd	Sandy	OR	97055
24E13CA08800	Richie	Irvin	17702 Tupper Rd	Sandy	OR	97055	17702 Tupper Rd	Sandy	OR	97055
24E13CA10400	John	Rawlinson Jr	17995 Meinig Ave	Sandy	OR	97055	17995 Meinig Ave	Sandy	OR	97055
24E13DB00600		Sandy Historical Soc Inc	PO Box 652	Sandy	OR	97055	39345 Pioneer Blvd	Sandy	OR	97055
24E13DB00800		City Of Sandy	39250 Pioneer Blvd	Sandy	OR	97055	39295 Pioneer Blvd	Sandy	OR	97055
24E13DB00900		McCool Enterprises Inc	PO Box 1105	Boring	OR	97009	39332 Proctor Blvd	Sandy	OR	97055
24E13DB01000	Bradford	Picking	PO Box 632	Sandy	OR	97055	17430 Meinig Ave	Sandy	OR	97055
24E13DB01100	Bradford	Picking	PO Box 632	Sandy	OR	97055	17450 Meinig Ave	Sandy	OR	97055
24E13DB01200		City Of Sandy	39250 Pioneer Blvd	Sandy	OR	97055		Sandy	OR	97055
24E13DB01300		City Of Sandy	39250 Pioneer Blvd	Sandy	OR	97055		Sandy	OR	97055
24E13DB01400	Sherry	Vargo	23975 SE Firwood Rd	Sandy	OR	97055	39230 Pioneer Blvd	Sandy	OR	97055
24E13DB01500	Miles	Rusth	PO Box 236	Lake Oswego	OR	97035	17650 Meinig Ave	Sandy	OR	97055
24E13DB01600		City Of Sandy	39250 Pioneer Blvd	Sandy	OR	97055		Sandy	OR	97055
24E13DB01700		City Of Sandy	39250 Pioneer Blvd	Sandy	OR	97055	39250 Pioneer Blvd	Sandy	OR	97055
24E13DB01801		Edison Plaza LLC	PO Box 99	Sandy	OR	97055	39400 Pioneer Blvd	Sandy	OR	97055
24E13DB01802		City Of Sandy	39250 Pioneer Blvd	Sandy	OR	97055		Sandy	OR	97055
24E13DB01804		Caritas Community Housing Corp	9600 SW Oak St Ste 200	Portland	OR	97223	39451 McCormick Dr	Sandy	OR	97055
24E13DB02301	Laura	Grimsley	17725 Loundree Dr	Sandy	OR	97055	17725 Loundree Dr	Sandy	OR	97055
24E13DB02303	Helen	Loundree	PO Box 104	Sandy	OR	97055	39405 McCormick Dr	Sandy	OR	97055
24E13DB02323	Robert	Tilton	39400 Kimberly Dr	Sandy	OR	97055	39400 Kimberly Dr	Sandy	OR	97055
24E13DB02324	Robert	Shea	39410 Kimberly Dr	Sandy	OR	97055	39410 Kimberly Dr	Sandy	OR	97055
24E13DB01790		City Of Sandy	39250 Pioneer Blvd	Sandy	OR	97055	39250 Pioneer Blvd	Sandy	OR	97055
24E13DB01290		City Of Sandy	39250 Pioneer Blvd	Sandy	OR	97055		Sandy	OR	97055
24E13DB01590	Miles	Rusth	PO Box 236	Lake Oswego	OR	97035		Sandy	OR	97055
24E13CA08807		Trimble Rentals LLC	PO Box 10	Sandy	OR	97055	38941 Creekside Loop	Sandy	OR	97055
24E13CA08808		Trimble Rentals LLC	PO Box 10	Sandy	OR	97055	38949 Creekside Loop	Sandy	OR	97055
24E13CA08809		Trimble Rentals LLC	PO Box 10	Sandy	OR	97055	38961 Creekside Loop	Sandy	OR	97055
24E13CA08810		Trimble Rentals LLC	PO Box 10	Sandy	OR	97055	38971 Creekside Loop	Sandy	OR	97055
24E13CA08814		Trimble Rentals LLC	PO Box 10	Sandy	OR	97055	38956 Creekside Loop	Sandy	OR	97055

24E13CA08815	Trimble Rentals LLC	PO Box 10	Sandy	OR	97055	38966 Creekside Loop	Sandy	OR	97055
24E13CA08818	City Of Sandy	39250 Pioneer Blvd	Sandy	OR	97055		Sandy	OR	97055
24E13CA08819	City Of Sandy	39250 Pioneer Blvd	Sandy	OR	97055		Sandy	OR	97055
24E13CA00100E1	Oregon City Building Lp	3662 SW Tunnelwood St	Portland	OR	97221		Sandy	OR	97055
24E13CA00800E2	Jabez Properties LLC	39085 Pioneer Blvd Ste 100	Sandy	OR	97055	39085 Pioneer Blvd	Sandy	OR	97055
24E13CA00800E3	Jabez Properties LLC	39085 Pioneer Blvd Ste 100	Sandy	OR	97055	39085 Pioneer Blvd	Sandy	OR	97055

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