



**Planning & Community Dev.**  
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**AGENDA**  
**Molalla Planning Commission**  
**6:30 PM, March 2, 2022**

**Meeting Location:**

**Molalla City Hall**  
**117 N Molalla Avenue.**  
**Molalla, OR 97038**

The Planning Commission Meeting will begin at 6:30pm. The Planning Commission has adopted Public Participation Rules. Copies of these rules and public comment cards are available at the entry desk. Public comment cards must be turned in prior to the start of the Commission meeting. The City will endeavor to provide a qualified bilingual interpreter, at no cost, if requested at least 48 hours prior to the meeting. To obtain services call the City Recorder at (503) 829-6855.

**I. CALL TO ORDER**

**II. FLAG SALUTE AND ROLL CALL**

**III. PUBLIC COMMENT – Limited to 3 minutes per person**

**IV. MINUTES:**

- February 2, 2022, Planning Commission Meeting

**V. QUASI-JUDICIAL HEARING:**

- SDR07-2021 – 1000 W Main St (60-unit apartment complex)

**VI. REPORTS AND ANNOUNCEMENTS**

- Planning Report

**VII. ADJOURNMENT**



**Molalla Planning Commission  
MINUTES  
Molalla Adult Center  
315 Kennel Ave., Molalla, OR  
97038  
February 2, 2022**

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The February 2, 2022, meeting of the Molalla Planning Commission was called to order by Chair Rae Botsford at 6:32pm.

**COMMISSIONER ATTENDANCE:**

Chair Rae Lynn Botsford – Present  
Commissioner Rick Deaton – Present  
Commissioner Doug Eaglebear – Absent  
Commissioner Jennifer Satter – Present  
Commissioner Jacob Giberson – Present  
Commissioner Connie Sharp – Present

**STAFF IN ATTENDANCE:**

Mac Corthell, Director of Community Development – Present  
Dan Zinder, Senior Planner – Present  
Julie Larson, Planning Specialist – Present

**AGENDA:**

**I. CALL TO ORDER**

**II. FLAG SALUTE AND ROLL CALL**

**III. PUBLIC COMMENT** – Limited to 3 minutes per person  
No Public Comment

**IV. MINUTES:**

- December 1, 2021, Planning Commission Meeting
- January 5, 2022, Planning Commission Meeting

Planning Commission Approves Minutes 6-0

**V. QUASI-JUDICIAL HEARING:**

- SDR08-2021, MP01-2021 & CUP02-2021 – 31330 S HWY 213  
(Starbucks Retail Drive Thru)

Begins at 0:01:57 of meeting video (link posted below)

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Senior Planner, Dan Zinder, presented the staff report and materials for planning file SDR08-2021, MP01-2021 & CUP02-2021 which seeks site design and conditional permit use approval of a new coffee shop building/drive-through, and a partition of the property located at 31330 S HWY 213.

After discussion, Commissioner Giberson made a motion to approve SDR08-2021, MP01-2021 & CUP02-2021 with modifications to conditions requested by the applicant. Commissioner Farrens made a second motion. Motion passes 6-0

**VI. REPORTS AND ANNOUNCEMENTS**

- Planners Report
- Directors Report

Begins at 0:53:01 of meeting video (link posted below)

**VII. ADJOURNMENT**

Meeting adjourned at 7:38pm

**PLANNING COMMISSION MEETING CAN BE VIEWED IN IT'S ENTIRIETY HERE:**

[February 2, 2022 Planning Commission Meeting Video](#)

\_\_\_\_\_  
Chair, Rae Lynn Botsford

\_\_\_\_\_  
Date

ATTEST: \_\_\_\_\_  
Mac Corthell, Planning Director



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## CITY OF MOLALLA STAFF REPORT

### SDR07-2021; Cascade Place

**Date:** February 22, 2021 for the March 2, 2022 Planning Commission Meeting

**File No.:** SDR07-2021

**Proposal:** Site design review for a new 60-unit apartment complex.

**Addresses:** 1000 W Main ST

**Tax Lots:** Lot 01500 of Taxmap 52E08C

**Applicant:** Green Light – Home First, LLC  
3050 SE Division Street #270  
Portland, OR 97202

**Property Owners:** Diana Puhlman  
1000 W Main  
Molalla, OR 97038

**Applicable Standards:** Molalla Municipal Code, Title 17, Development Code

#### **Division II, Zoning Regulations**

*Section 17-2.2.030 Allowed Uses*

*Section 17-2.2.040 Lot and Development Standards*

*Section 17-2.3.080 Multifamily Development*

*Section 17-2.4.030 Water Resources Overlay*

#### **Division III, Community Design Standards**

*Section 17-3.2.030 Residential Buildings*

*Chapter 17-3.3 Access and Circulation*

*Chapter 17-3.4 Landscaping, Fences and Walls, Outdoor Lighting*

*Chapter 17-3.5 Parking and Loading*

*Chapter 17-3.6 Public Facilities*

**Division IV, Application Review Procedures and Approval Criteria**

*Chapter 17-4.1.040 Type III Procedure (Quasi-Judicial Review –  
Public Hearing)*

*Chapter 17-4.2.050 Approval Criteria (Site Design Review)*

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EXHIBIT B: APPLICATION PACKAGE FOR SDR04-2021

EXHIBIT C: MOLALLA PUBLIC WORKS COMMENTS

EXHIBIT D: MOLALLA FIRE DEPARTMENT COMMENTS

EXHIBIT E: ODOT COMMENTS

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## I. EXECUTIVE SUMMARY

### **Proposal:**

The Applicants seek approval for a site design review for a new 60-unit apartment complex on a 2.95 acre parcel in Molalla. Current zoning of the subject parcel is Medium-High Density Residential (R-3) and no change to the zoning designation is proposed. The applicant proposes a single access to the parcel from the arterial OR-211, which is the only street fronting the property. The Applicant proposes frontage improvements along OR-211 and is partnering with the City of Molalla to extend frontage improvements along the frontage of the parcel directly to the east, currently the site of the Church of Latter Day Saints. The Applicant has also proposed an adjustment to minimum parking standards of subject to (MMC 17-3.5.030 C,2). The Applicant has provided a parking memo as a supplement to their Transportation Impact Analysis justifying this request.

### **Site Description:**

The site has an existing home and two out-buildings. The applicant proposes to demolish all existing structures as part of this project. Nearby cross streets to OR-211 include S Ona WY to the west and N Hezzie LN to the east. The property slopes slightly to the southwest. Bear Creek crosses the southeast corner of the property and drainage from the property flows to Bear Creek. There is an existing storm culvert from the adjacent parcel to the east that crosses the property and outfalls at Bear Creek. The Applicant proposes to redirect

### **Surrounding Zoning and Land Uses:**

The property is surrounded by R-3 Medium-High Density Residential zoned land with the exception of R-1 Low Density Residential land to the northeast across OR-211. Adjacent land uses include single family homes to the west, southwest, and northeast, an abandoned shop on R-3 land due north, the Church of Latter Day Saints to the east, and publicly owned land to the south.

### **Public Agency Responses:**

Staff circulated notice of the project to the City's Public Works Department, Fire Marshal, and ODOT on January 20, 2022. The City has included responses from ODOT, Molalla Fire District, and Molalla Public Works as Exhibits C, D, and E respectively, and integrated their comments into the findings and conditions of this staff report.

### **Public Notice and Comments:**

Per MMC 17-4.1.040, notice of the public hearing was sent to all property owners within 300 feet of the subject properties and to a group of interested parties on January 27, 2022. Notice was published in the Molalla Pioneer on February 9, 2022. Signage containing public notice information was posted on the property on February 14, 2022. As of February 22, 2022 Staff had received no public comment on the application.

## I. Recommendation

Based on the application materials and findings demonstrating present or conditioned compliance with the applicable criteria, staff recommends **APPROVAL** of Site Design Review SDR04-2021, subject to the conditions of approval to follow. This approval is based on the Applicant's written narrative, site plans, preliminary partition plat, and supplemental application materials. Any modifications to the approved plans other than those required by the conditions of this decision will require a new land use application and approval.

## II. Conditions of Approval

### 1. Building Permits, Engineering Plan Approvals, and Certificate of Occupancy Required:

- a. Per Molalla Municipal Code (hereinafter MMC) 17-4.2.070 and the State of Oregon Structural Specialty Code, upon approval of this Site Design Review, the applicant must submit for building permit authorization from Molalla Planning Staff and Engineering Plan Review from Molalla Public Works for proposed buildings and demolition of existing structures. Per MMC 17-4.2.070, this site design review has an approval period of 1-year from the date of approval. As a condition of approval, the Applicant/owner shall submit for both Building Permit Authorization for all proposed improvements through the City of Molalla Planning Department and Civil Plan Review through the City of Molalla Public Works Department within the 1-year approval period. Extension requests for the 1-year period are subject to the Code provisions of MMC 17-4.2.070, B.
- b. Per MMC 17-4.9.020 and the State of Oregon Structural Specialty Code, upon approval of this Site Design Review (change of use), the applicant must obtain a Certificate of Occupancy from the Clackamas County Building Official. As a condition of approval, the Applicant/owner shall obtain a Certificate of Occupancy through the Clackamas County Building Official for all onsite occupants prior to operation of the new, proposed use/occupancy.

Note: City approval is required for all Certificates of Occupancy.

### 2. Conditions Requiring Requiring Resolution Prior To Building Permit Approval by the Molalla Planning Department

- a. The applicant shall modify the front facing elevations of buildings B, C, D, and E so



that they differ by at least three of the elements described in MMC 17-3.2.030 D, 3, a-g.

- b. A State Highway Approach Road Permit from ODOT for access to the state highway for the proposed use is required. Truck turning templates shall be provided as needed to ensure vehicles can enter and exit the approach safely. Site access to the state highway is regulated by OAR 734.51.
- c. Per MMC 17-3.3.030 C, 6, prior to building permit and civil review submissions, the applicant shall;
  - Double check turning radius. 24/48 is required for a 20-foot-wide access road and larger. 44/56 for anything less than a 20-foot access
  - Submit striping plan for no parking areas for approval from the Molalla Fire Department
  - Please indicate Turn-a-round area on plans for fire apparatus and how it will be striped
- d. Per MMC 17-3.3.030 C, 10 the Applicant shall modify the width of the proposed access to meet multi-family Private Driveway Access Width Standards of Table 11 of the Molalla Transportation Systems Plan.
- e. Per MMC 17-3.3.030 C, 15 the pedestrian walkway across the driveway apron shall be constructed of concrete and shall be designed consistent with the Americans with Disabilities requirements.
- f. An ODOT Miscellaneous Permit must be obtained for all work in the highway right of way. When the total value of improvements within the ODOT right of way is estimated to be \$100,000 or more, an agreement with ODOT is required to address the transfer of ownership of the improvement to ODOT. An Intergovernmental Agreement (IGA) is required for agreements involving local governments and a Cooperative Improvement Agreement (CIA) is required for private sector agreements. The agreement shall address the work standards that must be followed, maintenance responsibilities, and compliance with ORS 276.071.
- g. All walkways and sidewalks shall be constructed in consistency with ADA requirements (MMC 17-3.3.040 B, 2).
- h. The Applicant shall provide screening elements between Building A and the OR-211 frontage to bolster the side façade appearance.

- i. The applicant shall submit a modified lighting plan with their building permits showing that parking lot illumination is in conformance with MMC 17-3.4.050 C, 9.
- j. Per Staff response to MMC 17-3.5.030 C 2, the Applicant shall stub proposed sidewalks along the southern row of proposed should parking to the eastern property line to facilitate a potential future need for shared parking with the adjacent property to the east. Applicant shall ensure sidewalk extensions are provided lighting in accordance with MMC 17-3.4.050.
- k. The Applicant shall specify bike rack style meeting the standards of MMC 17-3.5.040 with their building permit submissions.
- l. Applicant will be required to meet all requirements of the Transportation System Master Plan (TSP), ODOT, and ADA and access requirements as determined by ODOT. In addition to its own frontage, the Applicant will be collaborating with the City to complete frontage improvements along the adjacent LDS Church property to the east (974 W MAIN ST). In order to design the center turn lane consistent with ODOT standards, the roadway will need to be widened to connect the left turn lane from Ona Way to the left turn lane at Hezzie Lane. If required during design review, additional striping and pavement tapers may be required as necessary.
- m. Access to public streets shall be limited to the location identified on the application materials or as required by ODOT. All accesses shall be constructed in such a manner as to eliminate turning conflicts. The proposed width for access shall meet ODOT Standards. Applicant will be required to dedicate a 10-foot-wide public utility easement fronting the public right-of-way if one does not exist. Applicant shall provide proof s existing dedication.
- n. Roadway lighting is required on all new developments. Applicant shall be required to install roadway lighting. Location and number shall be determined during design review (MMC 17-3.6.020). Illumination within the ODOT right of way must be in accordance with AASHTO illumination standards and the ODOT Lighting Policy and Guidelines, which states that local jurisdictions must enter into an Intergovernmental Agreement (IGA) with ODOT wherein the local jurisdiction is responsible for installation, maintenance, operation, and energy costs.
- o. Applicant shall be required to submit sanitary sewer design plans to Oregon DEQ to determine that City wastewater treatment facilities have capacity for the project. Applicant shall provide a Certificate of Capacity to Oregon DEQ at time of plan submission. No Public Works permit can be issued without DEQ's approval of the

sewer system and the Certificate of Capacity.

- p. Extensions for fire protection may be required and all public water lines shall be within a public waterline easement on formats approved by the Public Works Department. In accordance with MMC 13.04 Water. Should Fire Department regulations require additional fire flow that results in looping the water line through the site, then applicants engineer shall coordinate with Public Works for the extension of a public water line, and dedication of easements.
- q. Connection to Bear Creek drainage is water of the state and shall comply with all DEQ requirements. Onsite private storm system shall comply with plumbing code requirements. The detention and flow control facilities shall be reviewed, permitted, and inspected by Public Works. The onsite storm conveyance system shall be reviewed and inspected by Clackamas County Building under a plumbing permit. The connection to water of the state (Bear Creek Drainage) shall be reviewed and permitted by DEQ including water quality requirements. in Accordance with MMC 13.13 Surface Water Management.
- r. Separate engineering drawings reflecting the installation of public utilities will be required. For residential development projects, all public improvements shall be completed and accepted by the Public Works Department, or otherwise bonded in accordance with MMC 17-3.6.010 and the City of Molalla Public Works Design Standards prior to issuance of building permits. No connections to City services shall be allowed until improvements to the public system to which connection is sought are completed and accepted by City of Molalla Public Works.
  - i. No construction of, or connection to, any existing or proposed public utility/improvements will be permitted until all plans are approved by Staff, all fees have been paid, all necessary permits, bonding, right-of-way, and easements have been obtained and approved by staff, and Staff is notified a minimum of 24 hours in advance.
  - ii. Staff reserves the right to require revisions/modifications to the public improvement construction plans and completed street improvements if additional modifications or expansion of the sight distance onto adjacent streets is required.
  - iii. All public utility/improvement plans submitted for review shall be based upon a 22"x 34" format and shall be prepared in accordance with the City of Molalla Public Work's Standards.
  - iv. All survey monuments on the subject site or that may be subject to disturbance

within the construction area, or the construction of any off-site improvements shall be adequately referenced and protected prior to commencement of any construction activity. If the survey monuments are disturbed, moved, relocated, or destroyed as a result of any construction, the project shall, at its cost, retain the services of a registered professional land surveyor in the State of Oregon to restore the monument to its original condition and file the necessary surveys as required by Oregon State law. A copy of any recorded survey shall be submitted to Staff.

- v. Plans submitted for review shall meet the requirements described in Section 1 of the Molalla Standard Specifications for Public Works Construction.
- vi. The applicant shall contact the Oregon Water Resources Department and inform them of any existing wells located on the subject site. Any existing well shall be limited to irrigation purposes only. Proper separation, in conformance with applicable State standards, shall be maintained between irrigation systems, public water systems, and public sanitary systems. Should the project abandon any existing wells, they shall be properly abandoned in conformance with State standards and supply the City with a copy of the final document.
- vii. The project shall utilize existing water, sewer, and storm water 'stub-outs' wherever possible. Water for domestic and fire protection shall be looped through the proposed site. Any 'stub-outs' determined to be not needed for the proposed development or any future development of the subject property shall be abandoned in accordance with the Molalla Standard Specifications for Public Works Construction.
- viii. All public improvement designs shall meet the requirements of the Molalla Standard Specifications for Public Works Construction as amended by the Public Works Director.
- ix. General Easements – A 10-foot-wide public utility easement shall be dedicated to the City adjacent to all public right-of-way and no structures are allowed to encroach into the easement. Applicant shall be required to submit a legal description and exhibit map for review and sign City easements. Once completed, applicant will be required to record easements with the County Recorder's Office and return the original document to the City prior to final occupancy.
- x. General Erosion Control – The applicant shall install, operate, and maintain adequate erosion control measures in conformance with the standards adopted by the City of Molalla and DEQ during the construction of any public/private utility and building improvements until such time as approved permanent vegetative

materials have been installed. Applicant or Applicant's Contractor shall be responsible for all erosion control requirements under the 1200-C permit and shall coordinate directly with DEQ for questions related to 1200-C permit compliance.

- xi. System Development Charges shall be paid prior to release of Building Permit Authorization from the City of Molalla.

### 3. Conditions to be Met Prior To Occupancy:

- a. All improvements required by this site design review shall be installed and approved by the Planning Official prior to occupancy.
- b. Applicant will be required to construct half street improvements and right of way donation as necessary to be consistent with the Transportation System Plan adopted cross section for OR-211/OR-213 which includes a 14ft Center/turn lane, 12ft travel lane, 2ft bike buffer, 5ft bike lane, 6 1/2ft sidewalk, 1 1/2ft back of sidewalk buffer. Planter strip along both frontages to be developed in consistency with neighboring development "Stoneplace Apartments" to the east. Dedication of right-of-way is required as necessary to accommodate these improvements.
- c. Right-of-way Dedications/Donations: If right of way dedication fronts streets under the jurisdiction of the City of Molalla, Applicant shall submit dedication on formats approved by the Public Works Department. On ODOT rights of way, applicant will be required to donate sufficient right-of-way along variable width improvements and construct sidewalk widening to ODOT standards. ODOT requires donations of right-of-way to follow the requirements of Chapter 5.322. Developer Mitigation Donation in the ODOT Right-of-Way Manual. Applicant is advised that donation must be completed and recorded prior to submission of final plat or final partition plat in order for Public Works to process plat documents.
- d. The Applicant shall record a private easement with the abutting church property to the east for storm drainage.

### 4. Ongoing Conditions:

- a. No visual obstructions shall be placed in vision clearance areas (MMC 17-3.3.030 G).
- b. No proposed fencing shall be made of prohibited materials, as detailed in MMC 17-3.4

- c. All landscaping shall be maintained in good condition, or otherwise replaced by the property owner (MMC 17-3.4.030 G).
- d. Fences and walls shall be maintained in good condition, or otherwise replaced by the property owner (MMC 17-3.4.040 F).
- e. Connections to City utilities for each parcel shall be in conformance with applicable Molalla Public Works Design Standards at the time of site design review.
- f. As an ongoing condition of approval, all outdoor lighting shall be maintained in good condition, or otherwise replaced by the property owner (MMC 17-3.4.050 C).
- g. As a condition of approval, parking shall be provided consistent with ADA requirements (MMC17-3.5.030 H).
- h. All proposed parking spaces shall be reserved for tenants, employees, or guests of the proposed multi-family use, except for shared parking pursuant to Section 17-3.5.030.D
- i. Any maintenance of vegetation within the Bear Creek Corridor shall be done in accordance with MMC 17-2.4.040 G 4.

**Exhibit A:**

*City Staff's Findings of Fact for SDR04-2021*

**A. The application is complete, in accordance with Section 17-4.2.040;**

**Findings:** The City received the Applicant's proposal on November 16, 2021 and deemed it incomplete on December 10, 2021. The Applicant resubmitted on January 5, 2022 and the application was deemed complete in accordance with Section 17-4.2.040 on January 14, 2022.

**B. The application complies with all of the applicable provisions of the underlying Zoning District (Division II), including, but not limited to, building and yard setbacks, lot area and dimensions, density and floor area, lot coverage, building height, building orientation, architecture, and other applicable standards;**

**17-2.2.030 Allowed Uses**

**Findings:** The Applicant's submitted application is for a 60-unit apartment complex. Per MMC Table 17-2.2.030 Multifamily Dwellings are a permitted use in the R-3 zone per special use standards of 17-2.3.080 Multifamily Development. This standard is met.

**17-2.2.040 Lot and Development Standards**

**Findings:** The property resides in an R-3 Medium-High density residential zone and is therefore subject to *Table 17-2.2.040.D Lot and Development Standards for Residential Zones*. The proposal complies with these standards as follows:

**Residential Density** – Development in an R-3 zone is has a minimum density of eight (8) dwelling units and maximum of twenty-four (24) dwelling units per buildable acre. The Applicant proposes 60 dwelling units on a 2.95 acre parcel of which 0.05 acres will be dedicated as right-of-way. The proposed density is thus  $60(\text{unit})/2.9\text{acres}$  or twenty (20) dwelling units per acre. This standard is met.

**Minimum Lot Area** – R-3 zoning standards require 2,000 SF per dwelling unit for multi-family development. The Applicant's proposal provides 2105 SF per dwelling unit. This standard is met.

**Minimum Lot Width** – R-3 zoning standards require 80 lot width for multi-family development. The subject property is 196 ft wide. This standard is met.



**Minimum Lot Depth** – R-3 zoning standards do not specify a minimum lot depth. This standard does not apply.

**Building and Structure Height** – Maximum building height in the R-3 zone is 45ft. The height of the proposed structures are between 33-35ft. This standard is met.

**Fences and non-building walls** – The site contains existing interior side yard chain-link fencing at 6 ft in height. This fencing is located within one foot of the eastern property line of the site. The applicant does not propose changes to this fencing nor is there any proposed additional fencing along the site perimeters. This standard is met.

**Lot Coverage. Maximum Lot Coverage (foundation plane area as % of site area)** - Maximum foundation plane coverage in the R-3 zone is 80%. The Applicant proposes covering 25,984 SF of the total 126,135 SF site, or 20.6% of the site. This standard is met.

**Minimum Landscape Area % (includes required parking lot, landscaping, and required screening)**  
Minimum landscaped area in the R-3 zone is 20%. The Applicant proposes landscaping 38% of the total developed area. This standard is met.

**Minimum Setbacks -**

**Front Setback Requirement: 10 ft** – The Applicant’s submitted site plan shows at least 10 ft between the proposed building and front property lines. This standard is met.

**Side Setback Requirement (for structures over 24ft high): 10 ft total between two sides** – The Applicant’s submitted site plan shows at least 10 ft between the proposed building and interior side property lines. This standard is met.

**Rear Setback Requirement: 15 ft (for structures over 24ft high)** – The Applicant’s submitted site plan shows at least 15 ft between the rear property line and interior side property lines.

**Garage Setback Requirement: 20 ft** – No garages are proposed. This standard does not apply.

**Build to Line: 20 ft** – The Applicant’s submitted site plan shows that the proposed buildings abutting OR-211 are situated within 20 ft of the right-of-way and shows pedestrian amenities between the primary building entrance and street. This standard is met.

### 17-2.3.080 Multifamily Development

- A. **Purpose.** The following standards are intended to ensure that multifamily developments are planned with adequate open space and are designed to prevent conflicts between

residential uses, on-site recreation, and vehicle circulation and parking areas. The standards supplement the design standards of Division III.

B. **Applicability.** This section applies to new multifamily developments.

**Findings:** This application involves Site Design Review for multifamily dwellings. Therefore, these standards are applicable.

C. **Standards.**

1. **Common Open Space and Landscaping.** A minimum of 15 percent of the site area in a multifamily development shall be designated and permanently reserved as common area or open space, in accordance with all of the following criteria:
  - a. "Site area" for the purposes of this section is defined as the subject lot or lots after subtracting any required dedication of street right-of-way.

**Findings:** The Applicant's submitted landscaping plan shows 26,142 SF of the total 126,135 SF of the site are designated as common/open space. This exceeds the 15% minimum required for this site. This standard is met.

- b. The common area or open space shall contain one or more of the following: outdoor recreation area, tree grove (e.g., existing mature trees), turf play fields or playgrounds, sports courts, swim pool, walking fitness course, natural area with picnic benches, or similar open space amenities as appropriate for the intended residents.

**Findings:** The Applicant's submitted landscaping plan shows pedestrian amenities, outdoor seating areas, a playground, a basketball court, a gazebo, picnic areas, and natural landscaped areas. This standard is met.

- c. In order to be counted as eligible toward the minimum open space area, such areas shall have dimensions of not less than 20 feet.

**Findings:** The Applicant has only included areas with dimensions of 20 feet or greater in their common open space calculations. This standard is met.

- d. Open space and common areas not containing recreational facilities shall be landscaped.

**Findings:** The Applicant's submitted landscaping plan shows that all open space areas not containing recreational facilities are landscaped. This standard is met.

- e. Buildings located in the C-1 zone are exempt from this section.

**Findings:** The property is not located within the C-1 zone. Therefore, this exemption is not applicable.

2. **Private Open Space.** Private open space areas shall be required for dwelling units based on the following criteria:
  - a. A minimum of 40 percent of all ground-floor dwelling units shall have front or rear patios or decks containing at least 48 square feet of usable area. Ground floor housing means the housing unit entrance (front or rear) is within five feet of the finished ground elevation (i.e., after grading and landscaping). This section does not apply to buildings within the C-1 zone.

**Findings:** The Applicant's submitted architectural plans show concrete patios greater than 48 square feet provided to each ground-floor dwelling. This standard is met.

- b. A minimum of 40 percent of all upper-floor housing units shall have balconies or porches containing at least 48 square feet of usable area. Upper-floor housing means housing units with a first floor elevation that is more than five feet above the finished grade.

**Findings:** The Applicant's submitted architectural plans show that balconies greater than 48 square feet are provided to each upper-floor housing unit. This standard is met.

3. **Building Orientation and Design, Access and Circulation, Landscaping and Screening, Parking and Loading, and Public Facilities.** The standards of Chapters 17-3.2 through 17-3.6 shall be met.

**Findings:** Staff discusses the Applicant's degree of compliance with Chapter 17, Division III standards under item D.

4. **Trash Storage.** Trash receptacles, recycling, and storage facilities shall be oriented away from building entrances, set back at least 10 feet from any public right-of-way and adjacent residences, and shall be screened with an evergreen hedge or solid fence or wall of not less than six feet in height. Receptacles must be accessible to trash pick-up trucks. (Ord. 2017-08 §1)

**Findings:** The Applicant's submitted site plans show a trash enclosure that is well more than 10 ft from OR-211, enclosed with a 6 ft high screening fence, and across the parking lot from the buildings/courtyard. This standard is met.

## Section 17-2.4.030: Water Resources (WR) Overlay

- A. **Purpose.** *The Water Resources (WR) Overlay District is intended to protect and enhance significant wetlands, stream corridors and floodplains identified on the Molalla Natural Features Inventory by:*
- 1. Conserving significant riparian corridors, undeveloped floodplains and locally significant wetlands in keeping with the requirements of State Planning Goal 5 (Natural Resources) and applicable state statutes and administrative rules, and the Molalla Comprehensive Plan;*
  - 2. Protecting and enhancing water quality;*
  - 3. Preventing property damage during floods and storms;*
  - 4. Limiting development activity in designated riparian corridors;*
  - 5. Protecting native plant species;*
  - 6. Maintaining and enhancing fish and wildlife habitats; and*
  - 7. Conserving associated scenic and recreational values.*
- B. **Boundaries and Setbacks.** *The general location of the WR Overlay District is shown on the Molalla Comprehensive Plan Map (for areas within the UGB) and the Molalla Zoning Map (for areas within the City limits) and includes:*
- 1. Locally significant wetlands identified on the Molalla Local Wetlands Inventory or the Natural Features Inventory.*
  - 2. The riparian corridor extending upland 50 feet from the tops-of-bank of Bear Creek, Creamery Creek, and the Molalla River tributary as shown on the Natural Features Map.*
    - a. Where a significant wetland is located fully or partially within the riparian corridor, the riparian corridor shall extend 50 feet from the upland edge of the wetland;*
    - b. The riparian buffer for isolated wetlands shall extend 25 feet from the edge of the wetland.*
  - 3. The 100-year floodplain on properties identified as vacant or partly vacant on the 2007 Molalla Buildable Lands Inventory.*
- Findings:** Bear Creek flows through the southwestern corner of the site. A 50ft riparian buffer is applied to the Bear Creek Stream Corridor. This buffered area comprises the corridor to which these standards apply. The Applicant submitted a wetland delineation with DSL concurrence showing that no additional wetlands exist on the property.
- C. **The Department of State Lands Notification.** *The Oregon Department of State Lands (DSL) shall be notified in writing of all applications to the City of Molalla for development activities, including applications for plan authorizations, development permits, or building permits, and*

*of development proposals within the Molalla UGB, that may affect any wetlands, creeks or waterways identified in the Local Wetlands Inventory or Natural Features Inventory.*

**Findings:** The Applicant does not propose any development activities within the Bear Creek Corridor so no contact with DSL is required. Criteria D-F do not apply.

- G. **Development Regulations.** In addition to the requirements of the underlying zone, the following restrictions and exceptions shall apply within the WR Overlay District:*
- 1. **Removal of Native Vegetation.** The removal of vegetation from the WR Overlay District is prohibited except for the following:*
    - a. Perimeter mowing of a wetland for fire protection purposes;*
    - b. Removal of non-native vegetation and replacement with native plant species;*
    - c. For the development of water-related or water-dependent uses, provided they are designed and constructed to minimize impact on the existing riparian vegetation;*
    - d. Removal of emergent in-channel vegetation that has the potential to cause flooding; and*
    - e. Hazardous Tree Removal. Hazardous trees are those that pose an imminent health, safety, or welfare threat to persons or property.*
  
  - 2. **Building, Paving, Grading, and Fill.** Within the WR Overlay District, the placement of structures or impervious surfaces, including grading and the placement of fill is prohibited except for the following:*
    - a. Replacement of existing structures with structures located on the original building footprint that do not disturb additional wetland or riparian corridor surface area;*
    - b. Streets, roads and paths that are included in the Molalla Transportation System Plan;*
    - c. Water-related and water-dependent uses, including drainage facilities, water and sewer facilities, flood control projects, drainage pumps, public paths, access ways, trails, picnic areas or interpretive and educational displays and overlooks, including benches and outdoor furniture;*
    - d. Routine maintenance or replacement of existing public facilities projects and public emergencies, including emergency repairs to public facilities; and*
    - e. In-channel erosion or flood control measures that have been approved by the Oregon Division of State Lands (DSL), the U.S. Army Corps of Engineers or another state or federal regulatory agency, that utilize bio-engineering methods (rather than rip rap).*
  
  - 3. The following uses and activities are prohibited within the WR Overlay District:*
    - a. New residential, commercial, industrial, or public/semi-public construction;*
    - b. Expansion of existing buildings or structures;*
    - c. Expansion of areas of pre-existing non-native ornamental landscaping such as lawn and gardens; and*
    - d. Dumping, piling, or disposal of refuse, yard debris, or other material.*

4. *Site Maintenance. Any use, sign or structure, and the maintenance thereof, lawfully existing on the date of adoption of this ordinance, is permitted within the WR Overlay District.*
  - a. *Such use, sign or structure may continue at a similar level and manner as existed on the date of the adoption of this ordinance.*
  - b. *The maintenance and alteration of pre-existing ornamental landscaping is permitted within the WR Overlay District as long as no additional native vegetation is disturbed.*
  - c. *Maintenance of lawns, planted vegetation and landscaping shall be kept to a minimum and not include the spraying of pesticides or herbicides.*
  - d. *Vegetation that is removed or diseased shall be replanted with native species.*
  - e. *Maintenance trimming of existing trees shall be kept at a minimum and under no circumstances can the trimming maintenance be so severe as to compromise the tree's health, longevity, and resource functions.*
  - f. *Vegetation within utility easements shall be kept in a natural state and replanted when necessary with native plant species. (Ord. 2017-08 §1)*

**Findings:** These standards are met subject to a condition of approval. The Applicant does not propose any development activities within the Bear Creek Corridor. Standards G 1-3 do not apply. As a condition of approval any maintenance of vegetation within the Bear Creek Corridor shall be done in accordance with MMC 17-2.4.030 G 4.

**C. The proposal includes required upgrades, if any, to existing development that does not comply with the applicable zoning district standards, pursuant to Chapter 17-1.4 Nonconforming Situations;**

**Findings:** The Applicant's proposes to remove all existing development from the property and build from vacant ground in compliance with applicable development standards. This standard does not apply.

**D. The proposal complies with all the Development and Design Standards of Division III, as applicable:**

**Findings:** Applicable Criteria under Division III. Community Design Standards for this project include:

Section 17-3.2.030 – Residential Buildings

Chapter 17-3.3 Access and Circulation

Chapter 17-3.4 Landscaping, Fences and Walls, Outdoor Lighting

Chapter 17-3.5 Parking and Loading

### 17-3.2.030 Residential Buildings

- A. **Purpose.** The following requirements are intended to create and maintain a built environment that is conducive to walking; reduces dependency on the automobile for short trips; provides natural surveillance of public spaces; addresses the orientation and design of garages; and creates a human-scale design, e.g., with buildings placed close to public ways and large building walls divided into smaller planes with detailing.
- B. **Building Orientation.** Residential buildings that are subject to the provisions of this chapter, pursuant to Section 17-3.2.020, shall conform to all of the following standards in subsections B.1 through 3, below, as generally illustrated in Figure 17-3.2-1. Figure 17-3.2-2 provides examples of non-compliance.
  - 1. **Building Orientation to Street.** Except as provided below, dwelling units shall orient toward a street, have a primary entrance opening toward the street, and be connected to the right-of-way with an approved walkway or residential front yard.
    - a. A dwelling may have its primary entrance oriented to a yard other than the front or street yard where the only permitted access to the property is from a shared driveway or flag lot drive and orienting the dwelling entrance to the street is not practical due to the layout of the lot and driveway.
    - b. Where there is no adjacent street to which a dwelling may be oriented, or it is not practical to orient a dwelling to an adjacent street due to lot layout, topographic, or other characteristics of the site, the dwelling may orient to a walkway, courtyard, open space, common area, lobby, or breezeway (i.e., for multifamily buildings).
    - c. Where a flag lot is permitted, building orientation shall conform to the provisions for flag lots under Chapter 17-4.3.

**Findings:** Per exception a. the Applicant's submitted site plan shows that Buildings A-F are accessed from a shared access drive from OR-211. Per exception b. orientation of Building A towards the access drive is most appropriate for noise buffering from OR-211. All buildings are oriented towards common open space onsite and pedestrian facilities are proposed from the OR-211 sidewalk to all primary building entrances. This standard is met.

- 2. **Limitation on Parking Between Primary Entrance and Street.** Off-street parking is not allowed between a primary building entrance and the street to which it is oriented, except that assisted living facilities, group care facilities, and similar institutional-residential uses serving clients with disabilities may have one driveway located between the primary building entrance and an adjacent street as required to serve as a drop-off or loading zone, provided the primary building entrance shall connect to an adjacent street by a pedestrian walkway that conforms to the standards of Section 17-3.3.040. The intent of this exception is to provide for one drop-off or loading zone

while maintaining a direct, convenient, and safe pedestrian access to a primary building entrance.

**Findings:** The Applicant's submitted site plans show no off-street parking proposed between primary entrances of buildings adjacent to OR-211 and OR-211. This standard is met.

3. **Build-To Line.** Where a new building is proposed in a zone that requires a build-to line per Section 17-2.2.040, the building shall comply with the build-to line standard and the development shall meet the standards for pedestrian access under Section 17-3.3.040.

**Findings:** The Applicant's submitted site plan shows that the proposed buildings abutting OR-211 are situated within 20 ft of the right-of-way and shows pedestrian amenities between the primary building entrance and street. This standard is met.

- C. **Garages.** The following standards apply to all types of vehicle storage, including, but not limited to, buildings, carports, canopies, and other permanent and temporary structures. The standards are intended to balance residents' desire for a convenient, safe, and private vehicle access to their homes with the public interest in maintaining safe and aesthetically pleasing streetscapes. The standards therefore promote pedestrian safety and visibility of public ways, while addressing aesthetic concerns associated with street-facing garages.
  1. **Alleys and Shared Drives.** Where a dwelling abuts a rear or side alley, or a shared driveway, including flag lot drives, the garage or carport opening(s) for that dwelling shall orient to the alley or shared drive, as applicable, and not a street.
  2. **Setback for Garage Opening Facing Street.** No garage or carport opening shall be placed closer than 16 feet to a street right-of-way. On corner lots, garages facing a side street (i.e., not the same street as the front entrance) may be located closer than 16 feet to a street right-of-way.
  3. **Width of Garage Openings Facing Street.** Where one or more garage openings face a street, the total width of all garage openings on that building elevation shall not exceed 50 percent of the width of that elevation; except this standard does not apply where the garage opening is recessed behind the front elevation of the dwelling by not less than four feet for its entire width, or where all garage openings are placed behind the primary entrance to the dwelling. An arbor, portico, or similar architectural feature extending the entire width of the garage may be used as the basis of measuring the garage recess. A garage opening is considered to be facing a street where the opening is parallel to, or within 45 degrees of, the street right-of-way line.
  4. **Three-Car and Wider Garages.** Where three or more contiguous garage parking bays are proposed facing the same street, the garage opening closest to a side property line shall be recessed at least two feet behind the adjacent opening(s) to break up the



street-facing elevation and diminish the appearance of the garage from the street. Side-loaded garages, on interior lots, i.e., where the garage openings are turned away from the street, are exempt from this requirement.

5. **Garages for Duplex Dwellings.** Duplex design shall conform to Section 17-2.3.060.

**Findings:** The applicant's submitted application does not include garages or other vehicle storage structures. These standards do not apply.

D. **Architecture.** The following standards require variation in architectural plans to avoid monotony in new developments. The standards support the creation of architecturally varied neighborhoods, whether a neighborhood develops all at once or one lot at a time, avoiding homogeneous street frontages that detract from the community's appearance. The standards are applied through the Site Design Review process for new townhome dwellings and new multifamily dwellings, and through the Zoning Checklist (Type I) review process prior to issuance of building permits for new single-family dwellings and new duplex dwellings. In addition to the following requirements, duplexes, townhomes, and multifamily projects shall conform to the special use standards of Chapter 17-2.3.

1. **Detailed Design.** Dwelling designs shall incorporate not fewer than four architectural features per dwelling unit from subdivisions a through k, as generally illustrated in this chapter. Applicants are encouraged to use those elements that best suit the proposed building style and design.
  - a. Covered front porch: not less than six feet in depth and not less than 30 percent of the width of dwelling, excluding the landing for dwelling entrance.
  - b. Dormers: minimum of two required for each single-family dwelling and two each for other dwellings; must be a functional part of the structure, for example, providing light into a living space.
  - c. Recessed entrance: not less than four feet deep.
  - d. Windows: not less than 30 percent of surface area of all street-facing elevation(s).
  - e. Window trim: minimum four-inch width (all elevations).
  - f. Eaves: overhang of not less than 12 inches.
  - g. Offset: offset in façade and/or roof (see subsection 2, "Articulation"); counts twice if both façade and roof offsets are provided.
  - h. Bay window: projects from front elevation by 12 inches.
  - i. Balcony: one per dwelling unit facing street.
  - j. Decorative top: e.g., cornice or pediment with flat roof or brackets with pitched roof.
  - k. Other: feature not listed but providing visual relief or contextually appropriate design similar to subdivisions a through j, as approved by the Planning Official through a Type I procedure.

**Findings:** The Applicant's submitted architectural plans show four of the above standards; balconies which face the street and common open space areas, minimum 12-in. eaves, off-sets in the facades, and recessed entries (see Exhibit 4). These standards are met.

2. **Articulation.** Plans for residential buildings shall incorporate design features such as varying rooflines, offsets, balconies, projections (e.g., overhangs, porches, or similar features), recessed or covered entrances, window reveals, or similar elements that break up otherwise long, uninterrupted elevations. Such elements shall occur at a minimum interval of 40 feet, and each floor shall contain at least two elements from the following options, as generally illustrated in this Section 17-3.2.030.
  - a. Recess (e.g., porch, courtyard, entrance balcony, or similar feature) that has a minimum depth of four feet;
  - b. Extension (e.g., floor area, porch, entrance, balcony, overhang, or similar feature) that projects a minimum of two feet and runs horizontally for a minimum length of four feet; or
  - c. Offsets or breaks in roof elevation of two feet or greater in height.

**Findings:** The Applicant's submitted architectural plans show balconies, recessed entries, and varied rooflines intervals of less than 40 feet. These standards are met.

3. **House Plan Variety.** This subsection applies to land divisions and new developments with five or more residential buildings. No two directly adjacent or opposite dwelling units in a single-family development, or buildings in a multifamily development, may possess the same front or street-facing elevation. This standard is met when front or street-facing elevations differ from one another by no fewer than three of the elements listed in subdivisions a through g. Where façades repeat on the same block face, they must have at least three intervening lots between them that meet the above standard. Land division approvals will be conditioned to assure compliance with this subsection.
  - a. **Materials.** The plans specify different exterior cladding materials, a different combination of materials, or different dimensions, spacing, or arrangement of the same materials. This criterion does not require or prohibit any combination of materials; it only requires that plans not repeat or mirror one another. Materials used on the front façade must turn the corner and extend at least two feet deep onto the side elevations.
  - b. **Articulation.** The plans have different offsets, recesses, or projections; or the front building elevations break in different places. For example, a plan that has a stoop entry (recess) varies from one that has an entry under a front porch (projection). For this criterion to apply, a recess must have a minimum depth of four feet and a projection or offset must be at least four feet in depth.

- c. **Variation in Roof Elevation.** The plans have different roof forms (e.g., gable versus gambrel or hip), different roof height (by at least 10 percent), different orientation (e.g., front-facing versus side-facing gable), or different roof projections (e.g., with and without dormer or shed, or different type of dormer or shed).
- d. **Entry or Porch.** The plans have different configuration or detailing of the front porch or covered entrance.
- e. **Fenestration.** The plans have different placement, shape, or orientation of windows or different placement of doors.
- f. **Height.** The elevation of the primary roofline (along the axis of the longest roofline) changes by not less than four feet from building to building, or from dwelling unit to dwelling unit (e.g., townhome units), as applicable. Changes in grade of eight feet or more from one lot to the adjacent lot are counted toward change in height for purposes of evaluating façade variation.
- g. **Color Palette.** Variation in color palette. (Ord. 2017-08 §1)

**Findings:** This standard is met subject to a condition of approval. The Applicant’s submitted site plans show 6 proposed buildings and these standards apply to multifamily developments with more than 5 buildings. Buildings B, C, D, and E are either adjacent or opposite and do not provide front facing elevations that differ by at least three of the elements described in MMC 17-3.2.030 D, 3, a-g. As a condition of approval, the applicant shall modify the front facing elevations of buildings B, C, D, and E so that they differ by at least three of the elements described in MMC 17-3.2.030 D, 3, a-g.

### 17-3.3.030 Vehicular Access and Circulation

- A. **Purpose and Intent.** Section 17-3.3.030 implements the street access policies of the City of Molalla Transportation System Plan. It is intended to promote safe vehicle access and egress to properties, while maintaining traffic operations in conformance with adopted standards. “Safety,” for the purposes of this chapter, extends to all modes of transportation.
- B. **Permit Required.** Vehicular access to a public street (e.g., a new or modified driveway connection to a street or highway) requires an approach permit approved by the applicable roadway authority.

**Findings:** This standard is met subject to a condition of approval. The Applicant’s submitted application involves Site Design Review for a new multi-family housing project that takes access from OR-211. OR-211 is an arterial road under the jurisdiction of the Oregon Department of Transportation (ODOT). A State Highway Approach Road Permit from ODOT for access to the state highway for the proposed use is required. Truck turning templates shall be provided as needed to ensure vehicles can enter and exit the approach safely. Site access to the state highway is regulated by OAR 734.51.

- C. **Traffic Study Requirements.** The City, in reviewing a development proposal or other action requiring an approach permit, may require a traffic impact analysis, pursuant to Section 17-3.6.020, to determine compliance with this Code.

**Findings:** Criteria for requiring a full traffic impact analysis were met. The Applicant submitted a Traffic Impact Study prepared by a Registered Engineer as part of their submitted application package. This standard is met.

- D. **Approach and Driveway Development Standards.** Approaches and driveways shall conform to all of the following development standards:

1. The number of approaches on higher classification streets (e.g., collector and arterial streets) shall be minimized; where practicable, access shall be taken first from a lower classification street.

**Findings:** The Applicant's submitted application proposes access from OR-211. The subject site is not adjacent to any other public streets. This standard is met.

2. Approaches shall conform to the spacing standards of subsections E and F, below, and shall conform to minimum sight distance and channelization standards of the roadway authority.

**Findings:** Per the Molalla Transportation Systems Plan (TSP), OR-211 is classified as an arterial road. The road is under the jurisdiction of ODOT and the parcel has an existing, permitted access. Per the TSP, access spacing for private drives on arterial roads is 150 ft. The Applicant's submitted application shows that all proposed accesses are at least 150 ft from adjacent roadways and driveways. The applicant's proposal meets local standards subject to access approval by ODOT.

3. Driveways shall be paved and meet applicable construction standards. Where permeable paving surfaces are allowed or required, such surfaces shall conform to applicable Public Works Design Standards.

**Findings:** The Applicant's submitted site plan shows that all driveway surfaces are paved. This standard is met.

4. The City Engineer may limit the number or location of connections to a street, or limit directional travel at an approach to one-way, right-turn only, or other restrictions, where the roadway authority requires mitigation to alleviate safety or traffic operations concerns.

**Findings:** Staff finds that the proposed number, locations, and directional travels of proposed access points are appropriate for the proposed site. This standard is met.

5. Where the spacing standards of the roadway authority limit the number or location of connections to a street or highway, the City Engineer may require a driveway extend to one or more edges of a parcel and be designed to allow for future extension and inter-parcel circulation as adjacent properties develop. The City Engineer may also require the owner(s) of the subject site to record an access easement for future joint use of the approach and driveway as the adjacent property(ies) develop(s).

**Findings:** Staff finds that driveway spacing complies with City of Molalla spacing standards for arterial streets. Preparing for future vehicular inter-parcel circulation is not appropriate for this project. This standard is met subject to access approval by ODOT.

6. Where applicable codes require emergency vehicle access, approaches and driveways shall be designed and constructed to accommodate emergency vehicle apparatus and shall conform to applicable fire protection requirements. The City Engineer may restrict parking, require signage, or require other public safety improvements pursuant to the recommendations of an emergency service provider.

**Findings:** This standard is met subject to conditions of approval. Prior to building permit and civil review submissions, the applicant shall;

- Double check turning radius. 24/48 is required for a 20-foot-wide access road and larger. 44/56 for anything less than a 20-foot access
- Submit striping plan for no parking areas for approval from the Molalla Fire Department
- Please indicate Turn-a-round area on plans for fire apparatus and how it will be striped

7. As applicable, approaches and driveways shall be designed and constructed to accommodate truck/trailer-turning movements.

**Findings:** The Applicant's submitted site plan includes a modified hammerhead turnaround that is designed to accommodate fire apparatus, waste collection vehicles, and delivery trucks. This standard is met.

8. Except where the City Engineer and roadway authority, as applicable, permit an open access with perpendicular or angled parking, driveways shall accommodate all projected vehicular traffic on-site without vehicles stacking or backing up onto a street.

**Findings:** All proposed vehicular parking and circulation areas are internal to the site. No vehicle stacking is anticipated for a multi-family development. This standard is met.

9. Driveways shall be designed so that vehicle areas, including, but not limited to, drive-up and drive-through facilities and vehicle storage and service areas, do not obstruct any public right-of-way.

**Findings:** The Applicant's submitted site plan shows that the proposed driveways do not cause any obstructions to the public right of way. This standard is met.

10. Approaches and driveways shall not be wider than necessary to safely accommodate projected peak hour trips and turning movements, and shall be designed to minimize crossing distances for pedestrians.

**Findings:** This standard is met subject to a condition of approval. The Applicant's submitted site plan shows a 23' access drive. Per the Molalla TSP Table 11, standards for multi-family access width are between 24' and 30'. The proposed access does not meet this standard. As a condition of approval, the Applicant shall modify the width of the proposed access to meet multi-family Private Driveway Access Width Standards of Table 11 of the Molalla Transportation Systems Plan.

11. As it deems necessary for pedestrian safety, the City Engineer, in consultation with the roadway authority, as applicable, may require that traffic-calming features, textured driveway surfaces (e.g., pavers or similar devices), curb extensions, signage or traffic control devices, or other features, be installed on or in the vicinity of a site as a condition of development approval.

**Findings:** Staff will not be requiring additional pedestrian safety features. This standard is met.

12. Construction of approaches along acceleration or deceleration lanes, and along tapered (reduced width) portions of a roadway, shall be avoided; except where no reasonable alternative exists and the approach does not create safety or traffic operations concern.

**Findings:** This application does not include approaches along acceleration or deceleration lanes or reduced width portions of roadway. This standard does not apply.

13. Approaches and driveways shall be located and designed to allow for safe maneuvering in and around loading areas, while avoiding conflicts with pedestrians, parking, landscaping, and buildings.

**Findings:** This application does not include loading areas. This standard does not apply.

14. Where sidewalks or walkways occur adjacent to a roadway, driveway aprons constructed of concrete shall be installed between the driveway and roadway edge. The roadway authority may require the driveway apron be installed outside the required sidewalk or walkway surface, consistent with Americans with Disabilities Act (ADA) requirements, and to manage surface water runoff and protect the roadway surface.

15. Where an accessible route is required pursuant to ADA, approaches and driveways shall meet accessibility requirements where they coincide with an accessible route.

**Findings:** These standards are met subject to a condition of approval. This application includes a sidewalk adjacent to the site along OR-211 that crosses the driveway apron but does not specify materials. As a condition of approval, the pedestrian walkway across the driveway apron shall be constructed of concrete and shall be designed consistent with the Americans with Disabilities requirements.

16. The City Engineer may require changes to the proposed configuration and design of an approach, including the number of drive aisles or lanes, surfacing, traffic-calming features, allowable turning movements, and other changes or mitigation, to ensure traffic safety and operations.

**Findings:** Staff does not have additional configuration and design requirements for the approach.

17. Where a new approach onto a state highway or a change of use adjacent to a state highway requires ODOT approval, the applicant is responsible for obtaining ODOT approval. The City Engineer may approve a development conditionally, requiring the applicant first obtain required ODOT permit(s) before commencing development, in which case the City will work cooperatively with the applicant and ODOT to avoid unnecessary delays.

**Findings:** This standard is met subject to conditions of approval. The Applicant's submitted application involves Site Design Review for a new multi-family housing project that takes access from OR-211. OR-211 is an arterial road under the jurisdiction of the Oregon Department of Transportation (ODOT). A State Highway Approach Road Permit from ODOT for access to the state highway for the proposed use is required. Truck turning templates shall be provided as needed to ensure vehicles can enter and exit the approach safely. Site access to the state highway is regulated by OAR 734.51.

An ODOT Miscellaneous Permit must be obtained for all work in the highway right of way. When the total value of improvements within the ODOT right of way is estimated to be \$100,000 or more, an agreement with ODOT is required to address the transfer of ownership of the improvement to ODOT. An Intergovernmental Agreement (IGA) is required for agreements involving local governments and a Cooperative Improvement Agreement (CIA) is required for private sector agreements. The agreement shall address the work standards that must be followed, maintenance responsibilities, and compliance with ORS 276.071, which includes State of Oregon prevailing wage requirements.

Completion of ODOT permitting is required prior to building permit approval.

18. Where an approach or driveway crosses a drainage ditch, canal, railroad, or other feature that is under the jurisdiction of another agency, the applicant is responsible for obtaining all required approvals and permits from that agency prior to commencing development.

**Findings:** The approach of the proposed development does not cross any feature that is under the jurisdiction of another agency. This standard does not apply.

19. Where a proposed driveway crosses a culvert or drainage ditch, the City Engineer may require the developer to install a culvert extending under and beyond the edges of the driveway on both sides of it, pursuant to applicable Public Works Design Standards.

**Findings:** The approach of the proposed development does not cross any culvert or drainage ditch. This standard does not apply.

20. Except as otherwise required by the applicable roadway authority or waived by the City Engineer temporary driveways providing access to a construction site or staging area shall be paved or graveled to prevent tracking of mud onto adjacent paved streets.

**Findings:** The Applicant's submitted application states that this standard will be met during construction.

21. Development that increases impervious surface area shall conform to the storm drainage and surface water management requirements of Section 17-3.6.050.

**Findings:** The Applicant has submitted a preliminary stormwater report with their application along with planned improvements for surface water management. This standard is met for the purposes of this review and will be evaluated further during engineering plan review.

E. **Approach Separation from Street Intersections.** Except as provided by subsection H, minimum distances shall be maintained between approaches and street intersections consistent with the current version of the Public Works Design Standards and Transportation System Plan.

F. **Approach Spacing.** Except as provided by subsection H or as required to maintain street operations and safety, the following minimum distances shall be maintained between approaches consistent with the current version of the Public Works Design Standards and Transportation System Plan.

**Findings:** Per the Molalla Transportation Systems Plan (TSP), OR-211 is classified as an arterial road. The road is under the jurisdiction of ODOT and the parcel has an existing, permitted access. Per the TSP, access spacing for private drives on arterial roads is 150 ft. The Applicant's submitted application shows that all proposed accesses are at least 150 ft from adjacent roadways and driveways. The applicant's proposal meets local standards subject to access approval by ODOT.

G. **Vision Clearance.** No visual obstruction (e.g., sign, structure, solid fence, or shrub vegetation) greater than 2.5 feet in height shall be placed in "vision clearance areas" at street intersections.. The minimum vision clearance area may be modified by the Planning Official



through a Type I procedure, upon finding that more or less sight distance is required (i.e., due to traffic speeds, roadway alignment, etc.). Placement of light poles, utility poles, and tree trunks should be avoided within vision clearance areas.

**Findings:** The Applicant's submitted site plan shows no visual obstructions in the vision clearance area. The Applicant intends to remove existing vegetation obstructing vision clearance as part of this application. This standard is met subject to conditions of approval. As an ongoing condition of approval, no visual obstructions shall be placed in vision clearance areas.

H. **Exceptions and Adjustments.** The City Engineer may approve adjustments to the spacing standards of subsections E and F, above, where an existing connection to a City street does not meet the standards of the roadway authority and the proposed development moves in the direction of code compliance. The Planning Official through a Type II procedure may also approve a deviation to the spacing standards on City streets where it finds that mitigation measures, such as consolidated access (removal of one access), joint use driveways (more than one property uses same access), directional limitations (e.g., one-way), turning restrictions (e.g., right-in/ right-out only), or other mitigation alleviate all traffic operations and safety concerns.

**Findings:** The Applicant has not applied for an exception or adjustment to access or approach spacing. This standard does not apply.

I. **Joint Use Access Easement and Maintenance Agreement.** Where the City approves a joint use driveway, the property owners shall record an easement with the deed allowing joint use of and cross access between adjacent properties. The owners of the properties agreeing to joint use of the driveway shall record a joint maintenance agreement with the deed, defining maintenance responsibilities of property owners. The applicant shall provide a fully executed copy of the agreement to the City for its records, but the City is not responsible for maintaining the driveway or resolving any dispute between property owners.

**Findings:** The proposal is for a single parcel and no joint use access drive is proposed as part of this application. This standard does not apply.

### 17-3.3.040 Pedestrian Access and Circulation

B. **Standards.** Developments shall conform to all of the following standards for pedestrian access and circulation as generally illustrated in Figure 17-3.3-3:

1. **Continuous Walkway System.** A pedestrian walkway system shall extend throughout the development site and connect to adjacent sidewalks, if any, and to all future phases of the development, as applicable.

**Findings:** The Applicant’s submitted site plan shows a continuous sidewalk that connects all buildings with adjacent public sidewalks and with other buildings in the development. This standard is met.

2. **Safe, Direct, and Convenient.** Walkways within developments shall provide safe, reasonably direct, and convenient connections between primary building entrances and all adjacent parking areas, recreational areas, playgrounds, and public rights-of-way conforming to the following standards:
  - a. The walkway is reasonably direct when it follows a route that does not deviate unnecessarily from a straight line or it does not involve a significant amount of out-of-direction travel.
  - b. The walkway is designed primarily for pedestrian safety and convenience, meaning it is reasonably free from hazards and provides a reasonably smooth and consistent surface and direct route of travel between destinations. The Planning Official may require landscape buffering between walkways and adjacent parking lots or driveways to mitigate safety concerns.
  - c. The walkway network connects to all primary building entrances, consistent with the building design standards of Chapter 17-3.2 and, where required, Americans with Disabilities Act (ADA) requirements.

**Findings:** These standards are met subject to a condition of approval. The Applicant’s submitted site plans show a walkway that provides a safe, continuous, and direct pedestrian route throughout the site and that directly connects to the proposed pedestrian sidewalk along OR-211. As a condition of approval, all walkways and sidewalks shall be constructed in consistency with ADA requirements.

3. **Vehicle/Walkway Separation.** Except as required for crosswalks, per subsection 4, below, where a walkway abuts a driveway or street it shall be raised six inches and curbed along the edge of the driveway or street. Alternatively, the Planning Official may approve a walkway abutting a driveway at the same grade as the driveway if the walkway is physically separated from all vehicle-maneuvering areas. An example of such separation is a row of bollards (designed for use in parking areas) with adequate minimum spacing between them to prevent vehicles from entering the walkway.

**Findings:** The Applicant’s submitted site plans show curbing planned for walkways where they abut driveways or streets. This standard is met.

4. **Crosswalks.** Where a walkway crosses a parking area or driveway (“crosswalk”), it shall be clearly marked with contrasting paving materials (e.g., pavers, light-color concrete inlay between asphalt, or similar contrasting material). The crosswalk may be part of a speed

table to improve driver-visibility of pedestrians. Painted or thermo-plastic striping and similar types of non-permanent applications are discouraged, but may be approved for lesser used crosswalks not exceeding 24 feet in length.

**Findings:** The Applicant's submitted site plans show two instances where the pedestrian walkway/sidewalk crosses drive aisles. The Applicant's submitted application states that shown crossings shall be marked as required by this code. This standard is met.

5. **Walkway Width and Surface.** Walkways, including access ways required for subdivisions pursuant to Chapter 17-4.3, shall be constructed of concrete, asphalt, brick or masonry pavers, or other durable surface, as approved by the City Engineer, and not less than six feet wide. Multi-use paths (i.e., designed for shared use by bicyclists and pedestrians) shall be concrete or asphalt and shall conform to the current version of the Public Works Design Standards and Transportation System Plan.
  
6. **Walkway Construction (Private).** Walkway surfaces may be concrete, asphalt, brick or masonry pavers, or other City-approved durable surface meeting ADA requirements. Walkways shall be not less than six feet in width in commercial and mixed use developments and where access ways are required for subdivisions under Division IV.

**Findings:** The Applicant's submitted site plan shows walkways throughout the site are constructed of concrete and are at least 6 ft in width. These standards are met.

7. **Multi-Use Pathways.** Multi-use pathways, where approved, shall be a minimum width and constructed of materials consistent with the current version of the Public Works Design Standards and Transportation System Plan.

**Findings:** This application does not include multiuse pathways. This standard does not apply.

## Chapter 17-3.4 Landscaping, Fences and Walls, Outdoor Lighting

### 17-3.4.030 Landscaping and Screening

- A. **General Landscape Standard.** All portions of a lot not otherwise developed with buildings, accessory structures, vehicle maneuvering areas, or parking shall be landscaped.
  
- B. **Minimum Landscape Area.** All lots shall conform to the minimum landscape area standards of the applicable zoning district, as contained in Tables 17-2.2.040.D and 17-2.2.040.E. The Planning Official, consistent with the purposes in Section 17-3.4.010, may

allow credit toward the minimum landscape area for existing vegetation that is retained in the development.

**Findings:** The Applicant's submitted site plans show that 48,379 SF of proposed onsite landscaping, or 38%. Requirements for total landscaping and common open space are 20% and 15% respectively. These standards are met.

C. **Plant Selection.** A combination of deciduous and evergreen trees, shrubs, and ground covers shall be used for all planted areas, the selection of which shall be based on local climate, exposure, water availability, and drainage conditions, among other factors. When new vegetation is planted, soils shall be amended and irrigation shall be provided, as necessary, to allow for healthy plant growth. The selection of plants shall be based on all of the following standards and guidelines:

1. Use plants that are appropriate to the local climate, exposure, and water availability. The presence of utilities and drainage conditions shall also be considered.
2. Plant species that do not require irrigation once established (naturalized) are preferred over species that require irrigation.
3. Trees shall be not less than two-inch caliper for street trees and one and one-half-inch caliper for other trees at the time of planting. Trees to be planted under or near power lines shall be selected so as to not conflict with power lines at maturity.
4. Shrubs shall be planted from five-gallon containers, minimum, where they are for required screens or buffers, and two-gallon containers minimum elsewhere.
5. Shrubs shall be spaced in order to provide the intended screen or canopy cover within two years of planting.
6. All landscape areas, whether required or not, that are not planted with trees and shrubs or covered with allowable non-plant material, shall have ground cover plants that are sized and spaced to achieve plant coverage of not less than 75 percent at maturity.
7. Bark dust, chips, aggregate, or other non-plant ground covers may be used, but shall cover not more than 35 percent of any landscape area. Non-plant ground covers cannot be a substitute for required ground cover plants.
8. Where stormwater retention or detention, or water quality treatment facilities are proposed, they shall meet the requirements of the current version of the Public Works Design Standards.
9. Existing mature trees that can thrive in a developed area and that do not conflict with other provisions of this Code shall be retained where specimens are in good health, have desirable aesthetic characteristics, and do not present a hazard.
10. Landscape plans shall avoid conflicts between plants and buildings, streets, walkways, utilities, and other features of the built environment.

11. Evergreen plants shall be used where a sight-obscuring landscape screen is required.
12. Deciduous trees should be used where summer shade and winter sunlight is desirable.
13. Landscape plans should provide focal points within a development, for example, by preserving large or unique trees or groves or by using flowering plants or trees with fall color.
14. Landscape plans should use a combination of plants for seasonal variation in color and yearlong interest.
15. Where plants are used to screen outdoor storage or mechanical equipment, the selected plants shall have growth characteristics that are compatible with such features.
16. Landscape plans shall provide for both temporary and permanent erosion control measures, which shall include plantings where cuts or fills, including berms, swales, stormwater detention facilities, and similar grading, is proposed.
17. When new vegetation is planted, soils shall be amended and irrigation provided, as necessary, until the plants are naturalized and able to grow on their own.

**Findings:** The Applicant's submitted landscaping plans and narrative demonstrate that proposed plantings, coverage, tree retention, species composition, screening, visual impact, and soil amendments meet the above guidelines. Above ground stormwater detention facilities are not proposed. These standards are met.

**D. Central Commercial C-1 District Streetscape Standard.** Developers of projects within the Central Commercial C-1 zoning district can meet the landscape area requirement of subsection B, in part, by installing street trees in front of their projects. The Planning Official shall grant credit toward the landscape area requirement using a ratio of 1:1, where one square foot of planted area (e.g., tree well or planter surface area) receives one square foot of credit. The Planning Official may grant additional landscape area credit by the same ratio where the developer widens the sidewalk or creates a plaza or other civic space pursuant to Section 17-3.2.050.

**Findings:** The subject properties are located in the C-2 zone. This standard does not apply.

**E. Parking Lot Landscaping.** All of the following standards shall be met for parking lots. If a development contains multiple parking lots, then the standards shall be evaluated separately for each parking lot.

1. A minimum of 10 percent of the total surface area of all parking areas, as measured around the perimeter of all parking spaces and maneuvering areas, shall be landscaped. Such landscaping shall consist of shade trees distributed

throughout the parking area. A combination of deciduous and evergreen trees, shrubs, and ground cover plants is required. The trees shall be planned so that they provide a partial canopy cover over the parking lot within five years. At a minimum, one tree per 12 parking spaces on average shall be planted over and around the parking area.

**Findings:** The Applicant's submitted landscaping plan shows that the proposed landscaped surfaces within the parking lot total 6,418 sq. ft., or 18% of the parking lot area. The submitted landscaping plan shows 16 trees to be planted in the parking area for 124 proposed spaces. This provides one (1) tree for every 7.75 spaces. This standard is met.

2. All parking areas with more than 20 spaces shall provide landscape islands with trees that break up the parking area into rows of not more than 10 contiguous parking spaces. Landscape islands and planters shall have dimensions of not less than 48 square feet of area and no dimension of less than six feet, to ensure adequate soil, water, and space for healthy plant growth.

**Findings:** The Applicants submitted site plans show 124 total parking spaces so this standard applies. There are no proposed rows with more than 10 contiguous parking spaces without a treed landscape island of at least 48 SF breaking it up. This standard is met.

3. All required parking lot landscape areas not otherwise planted with trees must contain a combination of shrubs and groundcover plants so that, within two years of planting, not less than 50 percent of that area is covered with living plants.

**Findings:** The Applicants submitted site plans show all proposed parking lot landscaping islands include trees in addition to other plants. This standard is met.

4. Wheel stops, curbs, bollards, or other physical barriers are required along the edges of all vehicle-maneuvering areas to protect landscaping from being damaged by vehicles. Trees shall be planted not less than two feet from any such barrier.

**Findings:** The Applicant's submitted application states that all landscaped areas will be protected by six (6) inch curbing. This standard is met.

5. Trees planted in tree wells within sidewalks or other paved areas shall be installed with root barriers, consistent with applicable nursery standards.

**Findings:** The Applicant's submitted application states that root barriers will be provided. This standard is met.

F. **Screening Requirements.** Screening is required for outdoor storage areas, unenclosed uses, and parking lots, and may be required in other situations as determined by the Planning Official. Landscaping shall be provided pursuant to the standards of subsections F.1 through 3. (See also Figure 17-3.4-4.)

1. **Outdoor Storage and Unenclosed Uses.** All areas of a site containing or proposed to contain outdoor storage of goods, materials, equipment, and vehicles (other than required parking lots and service and delivery areas, per Site Design Review), and areas containing junk, salvage materials, or similar contents, shall be screened from view from adjacent rights-of-way and residential uses by a sight-obscuring fence, wall, landscape screen, or combination of screening methods. See also Section 17-3.4.040 for related fence and wall standards.

**Findings:** The Applicant's submitted site plans that the proposed trash receptacle is screened by a 6ft chain link fence. Landscape screening is thus not required. This standard is met.

2. **Parking Lots.** The edges of parking lots shall be screened to minimize vehicle headlights shining into adjacent rights-of-way and residential yards. Parking lots abutting a sidewalk or walkway shall be screened using a low-growing hedge or low garden wall to a height of between three feet and four feet.

**Findings:** The Applicant's submitted site plans show that all parking spaces directed toward adjacent lots are screened by low growing fences. No parking areas are directed at residential properties nor the right of way. This standard is met.

3. **Other Uses Requiring Screening.** The Planning Official may require screening in other situations as authorized by this Code, including, but not limited to, outdoor storage areas, blank walls, Special Uses pursuant to Chapter 17-2.3, flag lots, and as mitigation where an applicant has requested an adjustment pursuant to Chapter 17-4.7.

**Findings:** This criterion can be met with a condition of approval. The Applicant's building placement has the side façade of Building A facing OR-211. This orientation bolsters the layout and circulation of the internal courtyard and mitigates noise from OR-211 for Building A but leaves a side façade of Building A facing OR-211. As a condition of approval, the Applicant shall

provide screening elements between Building A and the OR-211 frontage to bolster the side façade appearance.

- G. **Maintenance.** All landscaping shall be maintained in good condition, or otherwise replaced by the property owner.

**Findings:** This criterion can be met with a condition of approval. As an ongoing condition of approval all landscaping shall be maintained in good condition, or otherwise replaced by the property owner.

### 17-3.4.040 Fences and Walls

- A. **Purpose.** This section provides general development standards for fences, and walls that are not part of a building, such as screening walls and retaining walls.
- B. **Applicability.** Section 17-3.4.040 applies to all fences, and to walls that are not part of a building, including modifications to existing fences and walls.
- C. **Height.**
  - 1. **Residential Zones.** Fences and freestanding walls (i.e., exclusive of building walls) for residential uses shall not exceed the following heights above grade, where grade is measured from the base of the subject fence or wall.
    - a. **Within Front or Street-Facing Side Yard Setback.** Four feet; except the following additional height is allowed:
      - (1) A fence may be constructed to a maximum height of six feet where it is located on a street-facing side yard.
      - (2) A fence may be constructed to a maximum height of six feet where the fence is of open chain link or other “see-through” composition that allows 90 percent light transmission.
      - (3) One incidental garden structure (e.g., arbor or gate) not exceeding eight feet in height and six feet in width is allowed within a front or street-facing yard provided it does not encroach into a required vision clearance area.
    - b. **Within an Interior Side or Rear Yard Setback.** Six feet; except the fence or wall height, as applicable, shall not exceed the distance from the fence or wall line to the nearest primary structure on an adjacent property.

**Findings:** The Applicant’s submitted application does not include any street facing or front fencing. The Applicant proposes to retain an existing 6ft chain-link fence on the interior eastern property line. These standards are met.



2. **Non-Residential Zones.**

**Findings:** The Applicant's proposal is in a residential zone. These standards do not apply.

3. **All Zones.** Fences and walls shall comply with the vision clearance standards of Section 17-3.3.030.G. Other provisions of this Code, or the requirements of the roadway authority, may limit allowable height of a fence or wall below the height limits of this section.

**Findings:** No fences and walls are proposed in vision clearance areas as a part of this application. This standard is met.

- D. **Materials.** Prohibited fence and wall materials include straw bales, tarps, barbed or razor wire (except in the M-2 Heavy Industrial zone); scrap lumber, untreated wood (except cedar or redwood), corrugated metal, sheet metal, scrap materials; dead, diseased, or dying plants; and materials similar to those listed herein.

**Findings:** This standard is met subject to a condition of approval. As an ongoing condition of approval, all fencing shall be comprised of approved materials subject to MMC section 17-3.4.040 D.

- E. **Permitting.** A Type I approval is required to install a fence of six feet or less in height, or a wall that is four feet or less in height. All other walls and fences require review and approval by the Planning Official through a Type II procedure. The Planning Official may require installation of walls or fences as a condition of approval for development, as provided by other Code sections. A building permit may be required for some fences and walls, pursuant to applicable building codes. Walls greater than four feet in height shall be designed by a Professional Engineer licensed in the State of Oregon.

**Findings:** The Applicant does not propose new fencing with this application.

- F. **Maintenance.** Fences and walls shall be maintained in good condition, or otherwise replaced by the property owner. (Ord. 2017-08 §1)

**Findings:** This standard is met subject to a condition of approval. As an ongoing condition of approval, fences and walls shall be maintained in good condition, or otherwise replaced by the property owner.

### 17-3.4.050 Outdoor Lighting

#### C. Standards.

1. Light poles, except as required by a roadway authority or public safety agency, shall not exceed a height of 20 feet; pedestal- or bollard-style lighting shall be used to illuminate walkways. Flag poles, utility poles, and streetlights are exempt from this requirement.

**Findings:** The Applicant's submitted lighting plan shows outdoor lighting poles that will not exceed 20 ft in height and otherwise meets standards. This standard is met.

2. Where a light standard is placed over a sidewalk or walkway, a minimum vertical clearance of eight feet shall be maintained.

**Findings:** The Applicant's submitted lighting plan does not include overhead lighting that leaves less than 8ft of clearance. This standard is met.

3. Outdoor lighting levels shall be subject to review and approval through Site Design Review. As a guideline, lighting levels shall be no greater than necessary to provide for pedestrian safety, property or business identification, and crime prevention.

**Findings:** The Applicant's submitted lighting plan shows that planned lighting levels are not greater than necessary to provide safety. Lighting is focused on building entrance, walkway, and parking areas. This standard is met.

4. Except as provided for up-lighting of flags and permitted building-mounted signs, all outdoor light fixtures shall be directed downward, and have full cutoff and full shielding to preserve views of the night sky and to minimize excessive light spillover onto adjacent properties.

**Findings:** The Applicant's submitted lighting plan shows planned outdoor light fixtures that are downward-facing lights with cutoffs to minimize light intrusion onto adjacent properties. This standard is met.

5. Lighting shall be installed where it will not obstruct public ways, driveways, or walkways.

**Findings:** The Applicant's submitted lighting plan shows no lighting obstructing public ways, driveways, or walkways. This standard is met.

6. Walkway lighting in private areas shall have a minimum average illumination of not less than 0.2 foot-candles. Lighting along public walkways shall meet the current version of the Public Works Design Standards and AASHTO lighting requirements.

**Findings:** The Applicant's submitted lighting plan shows that lighting over walkways averages over 0.2 foot candles. This standard is met.

7. Active building entrances shall have a minimum average illumination of not less than two foot-candles.

**Findings:** The Applicant's submitted lighting plan shows that lighting above all active entrances exceeds two foot candles. This standard is met.

8. Surfaces of signs shall have an illumination level of not more than two foot candles.

**Findings:** The Applicant's submitted application does not include signs. This standard is met.

9. Parking lots and outdoor services areas, including quick vehicle service areas, shall have a minimum illumination of not less than 0.2 foot-candles, average illumination of approximately 0.8 foot-candles, and a uniformity ratio (maximum-to-minimum ratio) of not more than 20:1.

**Findings:** This standard is met subject to a condition of approval. The Applicant's submitted lighting plan shows that the planned lighting in the parking area has a minimum illumination of 0.2 foot-candles, average illumination of 2.3 foot-candles, and a uniformity ratio of 29.5:1. Average illumination and minimum to maximum lighting ratio is substantially greater than the allowed limits. As a condition of approval, the applicant shall submit a modified lighting plan with their building permits showing that parking lot illumination is in conformance with MMC 17-3.4.050 C,9.

10. Where illumination grid lighting plans cannot be reviewed or if fixtures do not provide photometrics and bulbs are under 2,000 lumens, use the following guidelines:
- a. Poles should be no greater in height than four times the distance to the property line.
  - b. Maximum lumen levels should be based on fixture height.
  - c. Private illumination shall not be used to light adjoining public right-of-way.

**Findings:** The Applicant's submitted lighting plan shows that these standards are met.

11. Where a light standard is placed within a walkway, an unobstructed pedestrian through zone not less than 48 inches wide shall be maintained.

**Findings:** The Applicant's submitted lighting plan shows that planned lighting located near walkways have unobstructed pedestrian through zones not less than 48 inches wide. This standard is met.

12. Lighting subject to this section shall consist of materials approved for outdoor use and shall be installed according to the manufacturer's specifications.

**Findings:** The Applicant's submitted lighting plan shows that planned lighting is designed for outdoor use. This standard is met.

## Chapter 17-3.5 Parking and Loading

### Section 17-3.5.020: Applicability and General Regulations

- A. Where the Regulations Apply.** The regulations of this chapter apply to all parking areas in all zones, at all times, whether parking is required by this Code or put in for the convenience of property owners or users.

**Findings:** These standards apply to parking proposed within the Applicant's submitted application.

**B. Occupancy.** All required parking areas must be developed in accordance with the requirements of this Code prior to occupancy of any structure on the subject site. Where landscaping, screening, or other improvements are required pursuant to this Code, all such improvements must be installed and approved by the Planning Official prior to occupancy.

**Findings:** This standard is met subject to a condition of approval. As a condition of approval all improvements required by this site design review shall be installed and approved by the Planning Official prior to occupancy.

**C. Calculations of Amounts of Required and Allowed Parking.**

1. When computing parking spaces based on floor area, parking structures and non-leasable floor spaces, such as storage closets, mechanical equipment rooms, and similar spaces, are not counted.
2. The number of parking spaces is computed based on the primary uses on the site except as stated in subsection C.3. When there are two or more separate primary uses on a site, the minimum and maximum parking for the site is the sum of the required or allowed parking for the individual primary uses. For shared parking, see Section 17-3.5.030.D.
3. When more than 50 percent of the floor area on a site is in an accessory use, the required or allowed parking is calculated separately for the accessory use. An example would be a 10,000 square foot building with a 7,000 square foot warehouse and a 3,000 square foot accessory retail area. The minimum and maximum parking would be computed separately for the retail and warehouse uses.
4. Required parking spaces periodically used for the storage of equipment or goods may be counted toward meeting minimum parking standards, provided that such storage is an allowed use under Section 17-2.2.030, and is permitted as a Temporary Use under Section 17-2.3.160.

**Findings:** Staff reviewed the Applicant's submitted application considering these standards. Accessory uses do not account for over 50% of the Applicant's proposal so the primary use of multifamily residential applies for all applicable floor area of the proposed development. No proposed parking spaces are reserved for the storage of equipment or goods.

**D. Use of Required Parking Spaces.** Except as otherwise provided by this section, required parking spaces must be available for residents, customers, or employees of the use. Fees may be charged for the use of required parking spaces. Required parking spaces may not be assigned in any way to a use on another site, except for shared parking pursuant to Section 17-3.5.030.D.

**Findings:** This standard is met subject to a condition of approval. As a condition of approval, all proposed parking spaces shall be reserved for tenants, employees, or guests of the proposed multi-family use, except for shared parking pursuant to Section 17-3.5.030.D.

**E. Proximity of Parking to Use.** Required parking spaces for residential uses must be located on the site of the use or on a parcel or tract owned in common by all the owners of the properties that will use the parking area. Required parking spaces for nonresidential uses must be located on the site of the use or in a parking area that has its closest pedestrian access point within 800 feet of the site.

**Findings:** The proposed use is residential. All proposed parking is located onsite. This standard is met.

**F. Improvement of Parking Areas.** Motorized vehicle parking is allowed only on streets with an improved shoulder of sufficient width; within garages, carports, and other approved structures; and on driveways or parking lots that have been developed in conformance with this Code. For applicable design standards, see Chapter 17-3.2 Building Orientation and Design; Chapter 17-3.3 Access and Circulation; Chapter 17-3.4 Landscaping, Fences and Walls, Outdoor Lighting and Chapter 17-3.6 Public Facilities. (Ord. 2017-08 §1)

**Findings:** Offstreet parking is not available for the proposed use. Proposed parking is on an onsite parking lot being developed in conformance with this code. This standard is met.

### Section 17-3.5.030: Automobile Parking

- A. Minimum Number of Off-Street Automobile Parking Spaces.** Except as provided by this subsection A, or as required for Americans with Disabilities Act compliance under subsection G, off-street parking shall be provided pursuant to one of the following three standards:
1. The standards in Table 17-3.5.030.A;
  2. A standard from Table 17-3.5.030.A for a use that the Planning Official determines is similar to the proposed use; or
  3. Subsection C Exceptions, which includes a Parking Demand Analysis option.

**Findings:** The Applicant's submitted application proposes 128 parking spaces, including four designated ADA parking spaces. The proposed use contains 30 2-bedroom apartments, and 30 3-bedroom apartments. Multi-family dwellings require a minimum of 2 parking spaces for two bedroom units and 2.5 parking spaces for three bedroom units. Therefore, a minimum of 135 parking spaces are required for the proposed use. The proposed Clubhouse will be used

exclusively by apartment tenants. This structure includes a 144 sq. ft. office, which requires 1 additional parking space. Based on these standards, a total of 136 spaces are required for the apartment complex. The Applicant's proposed parking is thus below the minimum standard for this development. Per MMC Section 17-4.7.030 C,2 the Applicant has requested an adjustment to the minimum, which is addressed in the response to that section.

#### B. Carpool and Vanpool Parking Requirements.

1. Carpool and vanpool parking spaces shall be identified for the following uses:
  - a. New commercial and industrial developments with 50 or more parking spaces;
  - b. New institutional or public assembly uses; and
  - c. Transit park-and-ride facilities with 50 or more parking spaces.

**Findings:** The Applicant's submitted application is for multi-family development. These standards do not apply.

#### C. Exceptions and Reductions to Off-Street Parking.

**Findings:** The Applicant has requested an adjustment to the minimum parking standards subject to subsection C,2.

2. The applicant may propose a parking standard that is different than the standard under subsections A.1 and 2, for review and action by the Planning Official through a Type I or II procedure. The applicant's proposal shall consist of a written request and a parking analysis prepared by a qualified professional. The parking analysis, at a minimum, shall assess the average parking demand and available supply for existing and proposed uses on the subject site; opportunities for shared parking with other uses in the vicinity; existing public parking in the vicinity; transportation options existing or planned near the site, such as frequent bus service, carpools, or private shuttles; and other relevant factors. This parking analysis applies to a request in the reduction or an increase in parking ratios.

**Findings:** The Applicant has requested an adjustment to the minimum parking standards subject to this section. The applicant submitted a parking memo indicating that the 85<sup>th</sup> percentile for an affordable multi-family apartment complex with 30 2-bedroom apartments and 30 3-bedroom apartments would be 82 parking spaces. Projected peak demand was calculated at 123 parking spaces. The proposed development provides 124 standard stalls with 4 ADA accessible stalls. The adjustment would thus allow for 128 stalls as a minimum standard for the development.

Staff recommends approval of this adjustment as part of this site design review subject to a condition of approval. The proposed condition provides appropriate pedestrian infrastructure onsite in the event that the Applicant requires a shared parking agreement to accommodate additional parking for the facility.

The Applicant's submitted parking analysis indicates that the proposed development has provided parking exceeding projected demand for all high-demand scenarios for affordable housing developments of this size. While a new SCTA bus shelter is under development within a quarter mile of the proposed development at Cascade Center, providing connections to local and regional destinations, existing transit facilities in town are limited. Thus, it is reasonable to project that this development may fall toward the higher end of the projected scale for parking demand. In the event that the proposed development becomes an extreme high-end demand case, Staff advises that the development prepare accordingly by developing pedestrian facilities to the adjacent LDS Church property to the east to accommodate a potential shared parking agreement should the need arise. As a condition of approval, the Applicant shall stub proposed sidewalks along the southern row of proposed should parking to the eastern property line to facilitate a potential future need for shared parking with the adjacent property to the east. Applicant shall ensure sidewalk extensions are provided lighting in accordance with MMC 17-3.4.050.

As discussed in the response to MMC 17-3.5.040, the Applicant has also provided additional bicycle parking onsite, exceeding standards.

- D. **Maximum Number of Off-Street Automobile Parking Spaces.** The maximum number of off-street automobile parking spaces allowed per site equals the minimum number of required spaces for the use pursuant to Table 17-3.5.030.A, times a factor of:
1. 1.2 spaces for uses fronting a street with adjacent on-street parking spaces; or
  2. 1.5 spaces, for uses fronting no street with adjacent on-street parking; or
  3. A factor based on applicant's projected parking demand, subject to City approval.

**Findings:** The Applicant's submitted application proposes 128 parking spaces. The proposed use contains 30 2-bedroom apartments and 30 3-bedroom apartments. The Applicant has requested an adjustment to the minimum number of parking spaces to 124. The maximum parking requirement for this development is 1.5 times the minimum of 124 parking spaces, or 186 spaces. This standard is met.

- E. **Shared Parking.** Required parking facilities for two or more uses, structures, or parcels of land may be satisfied by the same parking facilities used jointly, to the extent that the owners or operators show that the need for parking facilities does not materially overlap (e.g., uses primarily of a daytime versus nighttime nature; weekday uses versus weekend



uses), and provided that the right of joint use is evidenced by a recorded deed, lease, contract, or similar written instrument establishing the joint use. Shared parking requests shall be subject to review and approval through a Type I Review.

**Findings:** The Applicant has not requested any shared parking arrangements. This standard does not apply.

- F. **Parking Stall Design and Minimum Dimensions.** Where a new off-street parking area is proposed, or an existing off-street parking area is proposed for expansion, the entire parking area shall be improved in conformance with this Code. At a minimum the parking spaces and drive aisles shall be paved with asphalt, concrete, or other City-approved materials, provided the Americans with Disabilities Act requirements are met, and shall conform to the minimum dimensions in Table 17-3.5.030.F and the figures below. All off-street parking areas shall contain wheel stops, perimeter curbing, bollards, or other edging as required to prevent vehicles from damaging buildings or encroaching into walkways, sidewalks, landscapes, or the public right-of-way. Parking areas shall also provide for surface water management, pursuant to Section 17-3.6.050.

**Findings:** Proposed parking stalls are all 90 degree angled parking stalls. Table 17-3.5.030 F requires that 90 degree angled spaces, as proposed, require:

18' stall depth.

8.5' stall curb width

23' drive aisle (2 way).

The Applicant's submitted application shows 19' stall lengths, 9' stall widths, and 23' drive aisles. This standard is met.

- G. **Adjustments to Parking Area Dimensions.** The dimensions in subsection E are minimum standards. The Planning Official, through a Type II procedure, may adjust the dimensions based on evidence that a particular use will require more or less maneuvering area. For example, the Planning Official may approve an adjustment where an attendant will be present to move vehicles, as with valet parking. In such cases, a form of guarantee must be filed with the City ensuring that an attendant will always be present when the lot is in operation.

**Findings:** The Applicant has not requested any modifications to parking area dimensions and Staff finds that no adjustments are necessary to meet compliance with this code. This criterion does not apply.

- H. **Americans with Disabilities Act (ADA).** Parking shall be provided consistent with ADA requirements, including, but not limited to, the minimum number of spaces for automobiles, van-accessible spaces, location of spaces relative to building entrances, accessible routes between parking areas and building entrances, identification signs, lighting, and other design and construction requirements.

**Findings:** The Applicant's submitted site plan shows 4 proposed ADA spaces. This standard is met.

- I. **Electric Charging Stations.** Charging stations for electric vehicles are allowed as an accessory use to parking areas developed in conformance with this Code, provided the charging station complies with applicable building codes and any applicable state or federal requirements.

**Findings:** No electric charging stations are proposed. This criterion does not apply.

### 17-3.5.040 Bicycle Parking

- A. **Standards.** *Bicycle parking spaces shall be provided with new development and, where a change of use occurs, at a minimum, shall follow the standards in Table 17-3.5.040.A. Where an application is subject to Conditional Use Permit approval or the applicant has requested a reduction to an automobile-parking standard, pursuant to Section 17-3.5.030.C, the Planning Official may require bicycle parking spaces in addition to those in Table 17-3.5.040.A.*

**Findings:** Per Table 17-3.5.040.A two bicycle parking spaces are required for every 4 dwelling units. The Applicant's submitted application is for 60 dwelling units and 42 bike parking stalls are provided. This standard is met.

- B. **Design.** *Bicycle parking shall consist of staple-design steel racks or other City-approved racks, lockers, or storage lids providing a safe and secure means of storing a bicycle, consistent with the Public Works Design Standards.*

**Findings:** This standard is met subject to a condition of approval. Staff finds that the Applicant's submitted application shows proposed bike rack locations but does not specify rack style. As a condition of approval, the Applicant shall specify bike rack style meeting the standards of MMC 17-3.5.040 with their building permit submissions.

*C. Exemptions. This section does not apply to single-family and duplex housing, home occupations, and agricultural uses.*

**Findings:** These standards do apply to the submitted application for multi-family development.

*D. Hazards. Bicycle parking shall not impede or create a hazard to pedestrians or vehicles and shall be located to not conflict with the vision clearance standards of Section 17-3.3.030.G.*

**Findings:** The Applicant's submitted site plans show that proposed bicycle parking is separated from the pedestrian walkway and is not anticipated to cause a hazard. Standard is met.

### 17-3.5.040 Loading Areas

- A. **Purpose.** The purpose of Section 17-3.5.050 is to provide adequate loading areas for commercial and industrial uses that do not interfere with the operation of adjacent streets.
- B. **Applicability.** Section 17-3.5.050 applies to uses that are expected to have service or delivery truck visits. It applies only to uses visited by trucks with a 40-foot or longer wheelbase, at a frequency of one or more vehicles per week. The Planning Official shall determine through a Type I review the number, size, and location of required loading areas, if any.
- C. **Standard.** Where an off-street loading space is required, it shall be large enough to accommodate the largest vehicle that is expected to serve the use without obstructing vehicles or pedestrian traffic on adjacent streets and driveways. The Planning Official may restrict the use of other public rights-of-way, so applicants are advised to provide complete and accurate information about the potential need for loading spaces.
- D. **Placement, Setbacks, and Landscaping.** Loading areas shall conform to the standards of Chapter 17-3.2 Building Orientation and Design; Chapter 17-3.3 Access and Circulation; and Chapter 17-3.4 Landscaping, Fences and Walls, Outdoor Lighting. Where parking areas are prohibited between a building and the street, loading areas are also prohibited.
- E. **Exceptions and Adjustments.** The Planning Official, through a Type I Review, may approve a loading area adjacent to or within a street right-of-way where it finds that loading and unloading operations are short in duration (i.e., less than one hour), infrequent, do not obstruct traffic during peak traffic hours, do not interfere with emergency response services, and are acceptable to the applicable roadway authority. (Ord. 2017-08 §1)

**Findings:** Loading areas are not included with this application nor are they required for residential uses. These standards do not apply.

## Chapter 17-3.6 Public Facilities

### **17-3.6.020 Transportation Standards**

**Findings:** Transportation standards are met subject to conditions of approval.

#### **ODOT Findings:**

The applicant proposes a 60-unit affordable housing development adjacent to OR 211 with an access to the highway. Affordable housing is a high priority for the State of Oregon and it is encouraging to see this type of quality housing being built in Molalla. The development will be constructing significant improvements along OR 211 including adding a center turn lane, bicycle lanes and sidewalk. As noted in ODOT's pre-application comments, there would be a gap in sidewalk facilities between this development and the new Cascade Center Shopping Mall in front of the church property. ODOT recognizes and appreciates the City of Molalla working in partnership with the developer to include construction of sidewalks in front of the church property as part of this project.

Due to the 35mph posted speed and the City's Transportation System Plan cross section, a center left turn lane will be required to provide safe access to the development. In order to design the center turn lane consistent with ODOT standards, the roadway will need to be widened to connect the left turn lane from Ona Way to connect to the left turn lane at Hezzie Lane.

ODOT recommends that the City require the half street improvements and right of way donation as necessary to be consistent with the Transportation System Plan adopted cross section which includes a 14ft turn lane, 12ft travel lane, 2ft bike buffer, 5ft bike lane, 6 1/2ft sidewalk, 1 1/2ft back of sidewalk buffer. The applicant's narrative incorrectly states, "The applicant is also proposing to install half street improvements along the road frontage including 10ft center turn lane, and 11ft travel lane, 6 ft bike lane, 6in curb, planter strip, and a 6ft sidewalk." They are proposing to donate 11ft of right of way to ODOT. Based on the discrepancy from the TSP cross section, it may be best for the city to not specify the amount of right of way donation in the conditions of approval.

All alterations within the State highway right of way are subject to the ODOT Highway Design Manual (HDM) standards. Alterations along the State highway but outside of ODOT right-of-way may also be subject to ODOT review pending its potential impact to safe operation of the highway. If proposed alterations deviate from ODOT standards a Design Exception Request must be prepared by a licensed engineer for review by ODOT Technical Services. Preparation of a

Design Exception request does not guarantee its ultimate approval. Until more detailed plans have been reviewed, ODOT cannot make a determination whether design elements will require a Design Exception.

Note: Design Exception Requests may take up to 3 months to process.

All ODOT permits and approvals must reach 100% plans before the District Contact will sign-off on a local jurisdiction Building Permit, or other necessary requirement prior to construction. The City should not issue the Occupancy Permit until all improvements in the State highway have been completed and accepted by ODOT.

### **City of Molalla Findings and Conditions:**

1. The proposed 60 unit affordable housing development will not require a traffic impact analysis update. Applicant has prepared and submitted a Transportation Impact Study for the proposed development and receives City approval with this site design review. Proposed development does not meet signal threshold at the OR 211/Leroy intersection and therefore no signal improvements will be required.
2. OR 211: OR 211 (W Main Street) is an arterial street under Oregon Department of Transportation (ODOT) jurisdiction. Applicant will be required to meet all requirements of the Transportation System Master Plan (TSP), ODOT, and ADA and access requirements as determined by ODOT. In addition to its own frontage, the Applicant will be collaborating with the City to complete frontage improvements along the adjacent LDS Church property to the east (974 W MAIN ST). In order to design the center turn lane consistent with ODOT standards, the roadway will need to be widened to connect the left turn lane from Ona Way to the left turn lane at Hezzie Lane. If required during design review, additional striping and pavement tapers may be required as necessary.
3. Applicant will be required to construct half street improvements and right of way donation as necessary to be consistent with the Transportation System Plan adopted cross section for OR-211/OR-213 which includes a 14ft Center/turn lane, 12ft travel lane, 2ft bike buffer, 5ft bike lane, 6 1/2ft sidewalk, 1 1/2ft back of sidewalk buffer. Planter strip along both frontages to be developed in consistency with neighboring development "Stoneplace Apartments" to the east. Dedication of right-of-way is required as necessary to accommodate these improvements.
4. Right-of-way Dedications/Donations: If right of way dedication fronts streets under the jurisdiction of the City of Molalla, Applicant shall submit dedication on formats approved by the Public Works Department. On ODOT rights of way, applicant will be required to donate sufficient right-of-way along variable width improvements and construct sidewalk

widening to ODOT standards. ODOT requires donations of right-of-way to follow the requirements of Chapter 5.322. Developer Mitigation Donation in the ODOT Right-of-Way Manual. Applicant is advised that donation must be completed and recorded prior to submission of final plat or final partition plat in order for Public Works to process plat documents.

5. Access to public streets shall be limited to the location identified on the application materials or as required by ODOT. All accesses shall be constructed in such a manner as to eliminate turning conflicts. The proposed width for access shall meet ODOT Standards.
6. Applicant will be required to dedicate a 10-foot-wide public utility easement fronting the public right-of-way if one does not exist. Applicant shall provide proof s existing dedication.
7. Roadway lighting is required on all new developments. Applicant shall be required to install roadway lighting. Location and number shall be determined during design review (MMC 17-3.6.020). Illumination within the ODOT right of way must be in accordance with AASHTO illumination standards and the ODOT Lighting Policy and Guidelines, which states that local jurisdictions must enter into an Intergovernmental Agreement (IGA) with ODOT wherein the local jurisdiction is responsible for installation, maintenance, operation, and energy costs.
8. An ODOT Miscellaneous Permit must be obtained for all work in the highway right of way. When the total value of improvements within the ODOT right of way is estimated to be \$100,000 or more, an agreement with ODOT is required to address the transfer of ownership of the improvement to ODOT. An Intergovernmental Agreement (IGA) is required for agreements involving local governments and a Cooperative Improvement Agreement (CIA) is required for private sector agreements. The agreement shall address the work standards that must be followed, maintenance responsibilities, and compliance with ORS 276.071, which includes State of Oregon prevailing wage requirements.

### **17-3.6.040 Sanitary Sewer and Water Service Improvements**

**Findings:** Sanitary Sewer and Water Service standards are met subject to conditions of approval.

**Sanitary:** A 12-inch sanitary main exists on OR Hwy 211/W Main Street. Sanitary main approx. 13.50 feet deep near proposed site and will serve this development to the south by gravity system.

Applicant shall be required to submit sanitary sewer design plans to Oregon DEQ to determine that City wastewater treatment facilities have capacity for the project. Applicant shall provide a

Certificate of Capacity to Oregon DEQ at time of plan submission. No Public Works permit can be issued without DEQ's approval of the sewer system and the Certificate of Capacity.

**Water:** A 12-inch water main exists on OR Hwy 211/W Main Street and will serve this development. Extensions for fire protection may be required and all public water lines shall be within a public waterline easement on formats approved by the Public Works Department. In accordance with MMC 13.04 Water. Should Fire Department regulations require additional fire flow that results in looping the water line through the site, then applicants engineer shall coordinate with Public Works for the extension of a public water line, and dedication of easements.

### **17-3.6.050 Storm Drainage and Surface Water Management Facilities**

**Findings:** Applicant proposes to collect and detain all stormwater onsite and discharge to Bear Creek drainage. Connection to Bear Creek drainage is water of the state and shall comply with all DEQ requirements. Onsite private storm system shall comply with plumbing code requirements. The detention and flow control facilities shall be reviewed, permitted, and inspected by Public Works. The onsite storm conveyance system shall be reviewed and inspected by Clackamas County Building under a plumbing permit. The connection to water of the state (Bear Creek Drainage) shall be reviewed and permitted by DEQ including water quality requirements. in Accordance with MMC 13.13 Surface Water Management.

As a condition of approval the Applicant shall record a private easement with the abutting church property to the east for storm drainage prior to occupancy.

### **17-3.6.060 Utilities**

**Findings:** Utilities standards are met subject to a condition of approval. All utilities to the project shall be served underground services. No overhead crossings of public right of way shall be approved by the city.

### **17-3.6.070 Easements**

**Findings:** Refer to utility easement requirements addressed in responses to sections 17-3.6.020 and 17-3.6.040.

### **17-3.6.80 Construction Plan Approval**

**Findings:** Construction Plan Approval standards are met subject to conditions of approval. From the materials submitted, it appears that the storm drain, domestic water, and sanitary sewer facilities will be obtained from main line connections and/or extensions. Separate engineering

drawings reflecting the installation of public utilities will be required. For residential development projects, all public improvements shall be completed and accepted by the Public Works Department, or otherwise bonded in accordance with MMC 17-3.6.010 and the City of Molalla Public Works Design Standards prior to issuance of building permits. No connections to City services shall be allowed until improvements to the public system to which connection is sought are completed and accepted by City of Molalla Public Works. City of Molalla Construction plan approval requirements include:

- A. No construction of, or connection to, any existing or proposed public utility/improvements will be permitted until all plans are approved by Staff, all fees have been paid, all necessary permits, bonding, right-of-way, and easements have been obtained and approved by staff, and Staff is notified a minimum of 24 hours in advance.
- B. Staff reserves the right to require revisions/modifications to the public improvement construction plans and completed street improvements if additional modifications or expansion of the sight distance onto adjacent streets is required.
- C. All public utility/improvement plans submitted for review shall be based upon a 22"x 34" format and shall be prepared in accordance with the City of Molalla Public Work's Standards.
- D. All survey monuments on the subject site or that may be subject to disturbance within the construction area, or the construction of any off-site improvements shall be adequately referenced and protected prior to commencement of any construction activity. If the survey monuments are disturbed, moved, relocated, or destroyed as a result of any construction, the project shall, at its cost, retain the services of a registered professional land surveyor in the State of Oregon to restore the monument to its original condition and file the necessary surveys as required by Oregon State law. A copy of any recorded survey shall be submitted to Staff.
- E. Plans submitted for review shall meet the requirements described in Section 1 of the Molalla Standard Specifications for Public Works Construction.
- F. The applicant shall contact the Oregon Water Resources Department and inform them of any existing wells located on the subject site. Any existing well shall be limited to irrigation purposes only. Proper separation, in conformance with applicable State standards, shall be maintained between irrigation systems, public water systems, and public sanitary systems. Should the project abandon any existing wells, they shall be properly abandoned in conformance with State standards and supply the City with a copy of the final document.



- G. The project shall utilize existing water, sewer, and storm water 'stub-outs' wherever possible. Water for domestic and fire protection shall be looped through the proposed site. Any 'stub-outs' determined to be not needed for the proposed development or any future development of the subject property shall be abandoned in accordance with the Molalla Standard Specifications for Public Works Construction.
- H. All public improvement designs shall meet the requirements of the Molalla Standard Specifications for Public Works Construction as amended by the Public Works Director.
- I. General Easements – A 10-foot-wide public utility easement shall be dedicated to the City adjacent to all public right-of-way and no structures are allowed to encroach into the easement. Applicant shall be required to submit a legal description and exhibit map for review and sign City easements. Once completed, applicant will be required to record easements with the County Recorder's Office and return the original document to the City prior to final occupancy.
- J. General Erosion Control – The applicant shall install, operate, and maintain adequate erosion control measures in conformance with the standards adopted by the City of Molalla and DEQ during the construction of any public/private utility and building improvements until such time as approved permanent vegetative materials have been installed. Applicant or Applicant's Contractor shall be responsible for all erosion control requirements under the 1200-C permit and shall coordinate directly with DEQ for questions related to 1200-C permit compliance.
- K. System Development Charges shall be paid prior to release of Building Permit Authorization from the City of Molalla.

**E. For non-residential uses, all adverse impacts to adjacent properties, such as light, glare, noise, odor, vibration, smoke, dust, or visual impact, are avoided; or where impacts cannot be avoided, they are minimized; and**

**Findings:** This project is for a residential use. This standard does not apply.

**F. The proposal meets all existing conditions of approval for the site or use, as required by prior land use decision(s), as applicable. Note: Compliance with**

other City codes and requirements, though not applicable land use criteria, may be required prior to issuance of building permits. (Ord. 2017-08 §1)

**Findings:** Staff did not find any prior, unmet land use decisions for the property. The subject proposal shall be developed in compliance with Molalla Municipal Code.

## Exhibit B:

*Application Package For SDR07-2021*



**Planning & Community Development**  
117 N. Molalla Avenue  
Molalla, OR. 97038  
(503) 759-0219  
Fax: (503) 829-3676

<i>FOR OFFICE USE ONLY:</i>	
Planning File No. : _____	City Approval: _____
Date Received: _____ Fee: _____	Title: _____
Land Use Type: II	Date: _____
Received by: _____	Fee Paid: _____

## APPLICATION FOR LAND USE ACTION

Type of Land Use Action Requested: (check all that apply)

- |  |  |
|--|--|
| <input type="checkbox"/> Annexation  | <input type="checkbox"/> Conditional Use               |
| <input type="checkbox"/> Plan Amendment (Proposed Zone _____)                  | <input type="checkbox"/> Partition (# of lots _____)   |
| <input type="checkbox"/> Planned Unit Development                              | <input type="checkbox"/> Subdivision (# of lots _____) |
| <input checked="" type="checkbox"/> Site Design Review                         | <input type="checkbox"/> Other: _____                  |
| <input type="checkbox"/> Variance (list standards to be varied in description) |  |

### Owner/Applicant:

Applicant: GREEN LIGHT -- HOME FIRST, LLC Phone: 503-320-8929

Applicant Address: 3050 SE Division Street #270, Portland Email: ben@hfdpartners.com

Owner: Diana Puhlman Phone: 503-829-8543

Owner Address: 1000 West Main, Molalla, OR 97038 Email: puhlman@molalla.net

Contact for additional info: Steve Kay, Cascadia Planning + Development Srvc., 503-804-1089, steve@cascadiapd.com

### Property Information:

Address: 1000 W Main Street

Assessors \_\_\_\_\_

Map/Taxlot #: 52E08C / 1500

Current Use of \_\_\_\_\_ Zoning \_\_\_\_\_

Site: Single-Family Dwelling Designation: R-3

Intended Use: Apartment Complex

### Proposed Action:

Approval of a Type III Site Plan Review and Tree Removal Permit for a 60-Unit Apartment Complex and Associated Site and Street Frontage Improvements.

Proposed Use: 60-Unit Apartment Complex

Proposed No. of Phases (one each year): 1

**Authorizing Signatures:**

*I hereby certify that the information on this application and attachments are correct and that the property affected by this application is in the exclusive ownership or control of the applicant, or that the applicant has the consent of all partners in ownership of the affected property. An authorization letter from the property owner has been attached in the event that the owner's signature has not been provided below.*

**Property Owner(s):**

Diana Puhlman	DocuSigned by: Diana R Puhlman P.O.B. Faye L Puhlman
Print or Type	Signature
Print or Type	Signature

**Applicant(s) or Authorized Agent:**

Home First Development, LLC	Signature
Print or Type	Signature
Robert Justus	Signature
Print or Type	Signature

**The following materials must be submitted with your application or it will not be accepted at the counter.** Once taken at the counter, the City has up to 30 days to review the materials submitted to determine if we have everything we need to complete the review. Applicant can verify submittal includes specific materials necessary for the application per checklist.

- 3 Copies of Application Form\*** completely filled out and signed by the property owner (or person with authority to make decisions on the property).
- Copy of Deed** to verify ownership, easements, etc.
- At least 3 folded** sets of plans\*
- At least 3 copies** of narrative addressing application criteria\*
- Fee** (along with calculations utilized to determine fee if applicable)

**\*Please Note** that the required numbers of copies identified on the checklist are required for completeness; however, upon initial submittal applicants are encouraged to submit only 3 copies for completeness review. Prior to completeness, the required number of copies identified on the checklist and one full electronic copy will be required to be submitted.



PO Box 1920, Silverton, OR 97381  
www.cascadiapd.com / 503-804-1089

**CITY OF MOLALLA  
APPLICATION FOR  
LAND USE REVIEW**

**WEST MAIN STREET  
APARTMENTS**

Location: 1000 W Main Street  
Tax Lot 1500, Tax Map 52E08C  
Clackamas County, Oregon

Prepared by: Steve Kay, AICP  
Mason McGonagall, Ph.D.

Prepared for: Green Light – Home First, LLC  
3050 SE Division Street #270  
Portland, OR 97202

November 3, 2021

## **APPLICANT'S STATEMENT**

**PROJECT NAME:** West Main Street Apartments

**REQUEST:** Approval of a Type III Site Design Review Application for a 60-unit Apartment Complex in the R-3 Zoning District

**LEGAL DESCRIPTION:** Tax Lot 1500 of Tax Map 52E08C Clackamas County, Oregon

**APPLICANT'S REPRESENTATIVE:** Steve Kay, AICP  
Cascadia Planning + Development Services  
P.O. Box 1920  
Silverton, OR 97381  
503-804-1089  
steve@cascadiapd.com

**APPLICANT/OWNER:** Green Light -- Home First, LLC  
3050 SE Division Street #270  
Portland, OR 97202

**PROPERTY SIZE:** 2.95 acres +/-

**LOCATION:** 1000 W Main Street  
Molalla, OR 97038

**I. APPLICABLE REGULATIONS**

**A. Molalla Comprehensive Plan**

**B. Molalla Development Code: Title 17**

**Chapter 17-2: Zoning Regulations**

**Section 17-2.2.030: Allowed Uses**

**Section 17-2.2.040: Lot and Development Standards**

**Section 17-2.3.080: Multifamily Development**

**Section 17-2.4.030: Water Resources (WR) Overlay**

**Chapter 17-3: Community Design Standards**

**Section 17-3.2.030: Residential Buildings**

**Section 17-3.3: Access and Circulation**

**Section 17-3.4: Landscaping, Fences and Walls, Outdoor Lighting**

**Section 17-3.5: Parking and Loading**

**Section 17-3.6: Public Facilities**

**Chapter 17-4: Application Review Procedures and Approval Criteria**

**Section 17-4.2: Site Design Review**

**Section 17-4.7: Adjustments and Variances**

**II. AFFECTED JURISDICTIONS**

<b>Domestic Water:</b>	<b>City of Molalla</b>
<b>Fire Protection:</b>	<b>Molalla Rural Fire Protection District #73</b>
<b>Electric:</b>	<b>Portland General Electric</b>
<b>Police Protection:</b>	<b>City of Molalla</b>
<b>Schools:</b>	<b>Molalla River School District</b>
<b>Sewer:</b>	<b>City of Molalla</b>
<b>Streets:</b>	<b>City of Molalla</b>



### III. **BACKGROUND:**

The applicant/owner, Green Light -- Home First LLC is requesting approval of a Type III Site Design Review application for an apartment complex that will provide 60 affordable housing units. The subject property is located at 1000 W Main Street, contains approximately 2.95 acres, and is identified by the Clackamas County Assessor as Tax Lot 1500 of Tax Map 52E08C. As indicated by the attached Preliminary Development Plans, the applicant will remove an existing single-family dwelling, barn and accessory structures with the proposed development (see Exhibit 4).

The subject property is located within an R-3 Medium High Density Residential Zone along the south side of W Main Street. To the west of the site is another large R-3 zoned parcel that contains a single-family dwelling. A church is located to the immediate east of the subject site, also in the R-3 zone. Across West Main Street, to the north of the site, are several R-1 zoned parcels that are developed with single-family dwellings. To the south of the site, across Bear Creek, is a C-2 zoned General Commercial parcel which contains a single-family dwelling and barn.

The site generally slopes down from the east side to the west side of the property with steeper grades in the southwest corner of the property. As discussed in the Geotechnical Report, drainage from the property currently flows to Bear Creek, located in the southwest corner of the site (see Exhibit 6). According to the Wetland Delineation Report, the creek was determined to be a riverine flow-through feature, and no wetland was found to be associated with the waterway (see Exhibit 7). The attached Preliminary Site Plan illustrates that a minimum 50-ft. buffer will be provided along the creek. The applicant's Preliminary Grading Plan demonstrates that no disturbance to the creek, its banks, or to the riparian vegetation will occur with the proposed development. Grading is limited to parking lot and utility improvements, as well as developing benched areas for the proposed apartment buildings.

Per the City's Transportation System Plan, West Main Street, also identified as Highway 211, is under State (ODOT) jurisdiction and is classified as an Arterial Street and Transit Route. The site is within the general area of a current ODOT right-of-way pedestrian, biking, and ADA improvement project along W Main Street/Highway 211. The attached Site Plan indicates that the applicant is proposing to retain the existing driveway connection to W Main Street/Hwy 211 for the proposed parking area (see Exhibit 4). To meet right-of-way width standards, the applicant is proposing to dedicate 11-ft. along W. Main Street. The applicant is also proposing to install half-street improvements along the road frontage including 10-ft. center turn lane, and 11-ft. travel lane, 6-ft. bike lane, 6-in. curb, planter strip, and a 6-ft. sidewalk. In addition, the applicant is proposing to extend the improvements along the adjacent Church of Latter Day Saints property and will be requesting reimbursement from the City of Molalla for those costs.

The attached Preliminary Development Plans demonstrate that the proposed 60-unit apartment complex meets the density standards of the R-3 zoning district (see Exhibit 4). After dedicating area for additional right-of-way along the site's Main Street/Highway 211 frontage, the site's net buildable area is 2.90 acres. Multi-family residential use of the property requires the development of a minimum of 23 dwelling units (8 du./ac. x 2.90 ac. = 23.2, or 23 units, rounding down to the nearest unit, per the code) and a maximum of 70 dwelling units (24 du./ac. x 2.90 ac.= 69.6, or 70 units).

Per the attached Parking Analysis Memo, the parking demand for low income multi-family units is less than the minimum off-street parking standard, therefore the applicant is requesting a reduction in the number of parking spaces for the use (see Exhibit 8). The attached Preliminary Site Plan and this narrative demonstrates that the proposed development meets all other applicable Code standards.

As indicated by the attached Overall Utility Plan, the applicant is proposing to install a new water meter and lateral lines to provide domestic and fire service for the apartment complex (see Exhibit 4). The applicant is also proposing to extend a sanitary sewer to the site from the main line within the right-of-way. The applicant's Preliminary Stormwater Report, as well as the Preliminary Grading and Storm Plan, indicate that stormwater will be managed using subsurface detention pipes before discharging drainage into Bear Creek at the pre-development rate.

A copy of the signed Application Form, Property Deed, Preliminary Development Plans, Wetland Delineation Report, Preliminary Stormwater Report, Traffic Impact Analysis, Parking Analysis Memo, and Geotechnical Investigation Report are included with this application packet. The applicant's exhibits and narrative demonstrate that the proposed land use request meets the criteria or approval as outlined by the Molalla Development Code.

**IV. FINDINGS**

**A. MOLALLA COMPREHENSIVE PLAN**

**COMMENT:**

Except where required by the Molalla Development Code, this application is not required to address the City's goals and policies related to the development of land, since the Molalla Comprehensive Plan is implemented by the Code.

**B. MOLALLA DEVELOPMENT CODE**

**TITLE 17: DEVELOPMENT CODE – DIVISION II: ZONING REGULATIONS**

**CHAPTER 17-2.2: ZONING DISTRICT REGULATIONS**

**Section 17-2.2.030: Allowed Uses**

**Table 17-2.2.030 identifies the land uses that are allowed in the Residential Districts. Multifamily Dwelling Use is Permitted with Special Use Standards in the R-3 zone. Uses listed as "Permitted Subject to Special Use Standards (S)" are allowed provided they conform to the Chapter 17-2.3 Special Use Standards and Section 17-2.2.040 Lot and Development Standards.**

**COMMENT:**

The attached Preliminary Site Plan indicates that the applicant is proposing to develop a 33-ft. high three-story multifamily structures and a 19-ft. one-story detached clubhouse on the subject property (see Exhibit 4). The submitted Building Floor Plans illustrate that the proposed buildings will contain a total of 60 apartment dwelling units. Per Table 17-2.2.030, multi-family dwellings are permitted subject to special use standards in the R-3 zone.

**Section 17-2.2.040: Lot and Development Standards for Residential Zones**

**Table 17-2.2.040.D identifies the residential density, lot dimensions, lot coverage, landscaping, and setbacks that are required in Residential Districts.**

**R-3 Zone:**

**A. Minimum 8 DU (Dwelling Units) and a Max 24 DU per net buildable acre**

**COMMENT:**

Per Table 17-2.2.040D, the R-3 zone's minimum density standard is 8 units/net acre, and the maximum density standard is 24 units/net acre. The gross area of the site is 2.95 acres, and after dedicating additional right-of-way along the Main Street/Hwy. 211 frontage, the net buildable area is 2.90 acres. As such, the minimum site density is 23 dwelling units (8 du./ac. x 2.90 ac. = 23.2, or 23 units, rounding down to the nearest unit, per the code) and the maximum site density is 70 dwelling units (24 du./ac. x 2.90 ac.= 69.6, or 70 units). Therefore, the proposed 60-unit apartment complex meets the density standards.

**B. Minimum Lot Area – Multifamily: 2,000 sf per unit**

**COMMENT:**

The subject site contains a total of 126,135 sq. ft. after the required right-of-way dedication. Since the proposed 60-unit apartment complex requires a site area of 120,000 sq. ft., this standard has been met.

**C. Minimum Lot Width – Multifamily: 80 ft**

**COMMENT:**

The attached Preliminary Site Plan indicates that the lot exceeds the 80-ft. minimum lot width standard (see Exhibit 4).

**D. Building or Structure Height – 45 ft**

**Fences and Non-Building Walls – Max. Heights:**

- **Front Yard: 4 ft**
- **Interior Side: 6 ft**

- **Rear Yard: 6 ft**
- **Street Side or Reverse Frontage: 6 ft**

**COMMENT:**

The attached Building and Landscape Plans show that the proposed structures do not exceed maximum height limit standards set forth in this section (see Exhibit 4).

- E. Lot Coverage. Maximum Lot Coverage (foundation plane area as % of site area – Multifamily or Cottage Cluster: 80%**

**COMMENT:**

The attached Preliminary Site Plan indicates the foundation plane area is 25,984 sq. ft., which is 20.6% of the 126,135 sq. ft. net site area. Therefore, this standard is met.

- F. Minimum Landscape Area (% lot area) – 20%**

**COMMENT:**

The attached Landscape Plan shows that the total landscape area, is 48,379 sq. ft., which is 38% of the net site area. Therefore, this standard has been met.

- G. Minimum Setbacks:**

- **Front and Street-Side Setback Yards – Standard: 10 ft**
- Interior Side Setback Yards:**

- **Structures <12 to >24’ height: 10 ft**
- **Common Walls or Zero Lot Line Developments: 0 ft one side; 6 ft other side**

**Rear Setback Yard:**

- **Structure >24’ height: 15 ft**
- **Structure 12’-24’ height: 10 ft**
- **Structure <12’ height: 5 ft**
- **Common Walls or Zero Lot Line: 3 ft**

- H. Build to Line Maximum – 20 ft; At least one primary building entrance shall be built no farther from the street right-of-way than the build-to line; except that where a greater setback is required for a Planned Street Improvement, the build-to line increases proportionately.**

**COMMENT:**

The proposed development, as shown on the Preliminary Site Plan, will maintain a minimum front yard, 10-ft. interior side yard, and 15-ft. rear yard setback (see Exhibit 4). Due to the presence of Bear Creek at the southwestern corner of the site, the plan demonstrates that a 50-ft. vegetated buffer will be maintained from the waterway to the proposed development (see Exhibit 4).

**CHAPTER 17-2.3: SPECIAL USE STANDARDS**

**Section 17-2.3.080: Multifamily Development**

**C. Standards.**

- 1. Common Open Space and Landscaping. A minimum of 15 percent of the site area in a multifamily development shall be designated and permanently reserved as common area or open space, in accordance with all of the following criteria:**
  - a. "Site area" for the purposes of this section is defined as the subject lot or lots after subtracting any required dedication of street right-of-way.**
  - b. The common area or open space shall contain one or more of the following: outdoor recreation area, tree grove (e.g., existing mature trees), turf play fields or playgrounds, sports courts, swim pool, walking fitness course, natural area with picnic benches, or similar open space amenities as appropriate for the intended residents.**
  - c. In order to be counted as eligible toward the minimum open space area, such areas shall have dimensions of not less than 20 feet.**
  - d. Open space and common areas not containing recreational facilities shall be landscaped.**

**COMMENT:**

The attached Landscape Plan shows that the common open space for the development totals 26,142 sq. ft. of the 126,135 sq. ft. net site area. As such, the common open space comprises 21% of the net site area, which exceeds the 15% minimum common area standard (see Exhibit 4). Common open and amenity spaces shown on the Site Plan and Landscape Plan exceed 20-ft. in all dimensions and contain a combination of outdoor recreation spaces that include pedestrian pathways, a playground, a natural area with picnic areas, gazebos, and landscaped areas.

2. **Private Open Space.** Private open space areas shall be required for dwelling units based on the following criteria:
  - a. A minimum of 40 percent of all ground-floor dwelling units shall have front or rear patios or decks containing at least 48 square feet of usable area. Ground floor housing means the housing unit entrance (front or rear) is within five feet of the finished ground elevation (i.e., after grading and landscaping).
  - b. A minimum of 40 percent of all upper-floor housing units shall have balconies or porches containing at least 48 square feet of usable area. Upper-floor housing means housing units with a first floor elevation that is more than five feet above the finished grade.

**COMMENT:**

To meet these standards, by utilizing private at grade patios and private balconies for the upper floors, all 60 dwelling units provide at least 48 square feet of private open space for tenants. The proposed private open space areas are noted on the attached Building Floor Plans (see Exhibit 4).

3. **Building Orientation and Design, Access and Circulation, Landscaping and Screening, Parking and Loading, and Public Facilities.** The standards of Chapters 17-3.2 through 17-3.6 shall be met.

**COMMENT:**

Building orientation, design, access, landscaping, and parking standards for multifamily residential development meet the requirements of Chapters 17-3.2 through 17-3.6, as addressed the narrative provided below.

4. **Trash Storage.** Trash receptacles, recycling, and storage facilities shall be oriented away from building entrances, set back at least 10 feet from any public right-of-way and adjacent residences, and shall be screened with an evergreen hedge or solid fence or wall of not less than six feet in height. Receptacles must be accessible to trash pick-up trucks.

**COMMENT:**

As shown on the Preliminary Site Plan, a waste and recycling storage enclosure will be provided within the proposed parking area. As demonstrated by the submitted plans, the enclosure will include 6-ft. high screening and will maintain a minimum 10-ft. setback from rights-of-way and adjacent residences (see Exhibit 4).

**Section 17-2.4.030: Water Resources (WR) Overlay**

- B. Boundaries and Setbacks.** The general location of the WR Overlay District is shown on the Molalla Comprehensive Plan Map (for areas within the UGB) and the Molalla Zoning Map (for areas within the City limits) and includes:
- 1. Locally significant wetlands identified on the Molalla Local Wetlands Inventory or the Natural Features Inventory.**
  - 2. The riparian corridor extending upland 50 feet from the tops-of-bank of Bear Creek, Creamery Creek, and the Molalla River tributary as shown on the Natural Features Map.**
    - a. Where a significant wetland is located fully or partially within the riparian corridor, the riparian corridor shall extend 50 feet from the upland edge of the wetland;**
    - b. The riparian buffer for isolated wetlands shall extend 25 feet from the edge of the wetland.**

**COMMENT:**

The attached Wetland Delineation Report notes that Bear Creek flows through the southwestern corner of the site, comprising 0.04 acres of the property. The study states that the creek is classified as a riverine flow-through, and no wetlands were found to be associated with it (see Exhibit 7). Since City maps indicate that this portion of the site is located in the WR Overlay District, the applicant has submitted a Wetland Delineation Report for review (see Exhibit 7). As required, the attached Site Plan demonstrates that a 50-ft. riparian corridor, measured from the top of bank or Bear Creek, will be maintained with the proposed development (see Exhibit 4).

- C. The Department of State Lands Notification.** The Oregon Department of State Lands (DSL) shall be notified in writing of all applications to the City of Molalla for development activities, including applications for plan authorizations, development permits, or building permits, and of development proposals within the Molalla UGB, that may affect any wetlands, creeks or waterways identified in the Local Wetlands Inventory or Natural Features Inventory.

**COMMENT:**

As discussed above, no wetlands have been delineated on the site. Since the required setbacks from the development to the top of bank will be provided, no impacts to waterways are proposed.

**D. Site Plan Required. When a use or activity that requires the issuance of a building permit or approval of a land use application is proposed on a parcel within, or partially within the WR Overlay District, the property owner shall submit a scaled site plan to the City that that shows the precise location of:**

- 1. Topography;**
- 2. The stream top-of-bank;**
- 3. The 100-year flood elevation;**
- 4. The delineated wetland boundary with documentation of concurrence by the Oregon Division of State Lands;**
- 5. The required riparian setback;**
- 6. Existing vegetative cover and type; and**
- 7. Existing and proposed site improvements.**

**COMMENT:**

As required the attached Preliminary Site Plan and Preliminary Grading Plan identify existing and proposed site improvements, proposed grading, and other applicable plan information listed above (see Exhibit 4). A Wetland Delineation Report and Oregon Department of State Lands concurrence has also been submitted with this application (see Exhibit 6).

**F. Permitted Uses. The following uses are permitted within the WR Overlay District:**

- 1. Trails.**
- 2. Passive recreation uses and activities.**
- 3. Maintenance of existing structures, lawns and gardens.**
- 4. Normal maintenance and expansion of existing public facilities.**
- 5. Construction of public facilities projects identified in**



**adopted public facilities master plans.**

- 6. Construction of transportation facilities identified in the adopted Transportation System Plan.**

**COMMENT:**

The applicant proposes normal maintenance and passive recreational uses and activities along the identified Bear Creek riparian corridor. No planned or proposed public facilities or transportation facilities area proposed within the riparian corridor.

- G. Development Regulations. In addition to the requirements of the underlying zone, the following restrictions and exceptions shall apply within the WR Overlay District:**

- 1. Removal of Native Vegetation. The removal of vegetation from the WR Overlay District is prohibited except for the following:**

- a. Perimeter mowing of a wetland for fire protection purposes;**
- b. Removal of non-native vegetation and replacement with native plan species;**
- c. For the development of water-related or water-dependent uses, provided they are designed and constructed to minimize impact on the existing riparian vegetation;**
- d. Removal of emergent in-channel vegetation that has the potential to cause flooding; and**
- e. Hazardous Tree Removal. Hazardous trees are those that pose an imminent health, safety, or welfare threat to persons or property.**

**COMMENT:**

The applicant does not propose the removal of native vegetation from the WR Overlay District.

- 2. Building, Paving, Grading, and Fill. Within the WR Overlay District, the placement of structures or impervious surfaces, including grading and the placement of fill is prohibited except for the following:**

- a. Replacement of existing structures with structures located on the original building footprint that do not disturb additional**

wetland or riparian corridor surface area;

- b. Streets, roads and paths that are included in the Molalla Transportation System Plan;
- c. Water-related and water-dependent uses, including drainage facilities, water and sewer facilities, flood control projects, drainage pumps, public paths, access ways, trails, picnic areas or interpretive and educational displays and overlooks, including benches and outdoor furniture;
- d. Routine maintenance or replacement of existing public facilities projects and public emergencies, including emergency repairs to public facilities; and
- e. In-channel erosion or flood control measures that have been approved by the Oregon Division of State Lands (DSL), the U.S. Army Corps of Engineers or another state or federal regulatory agency, that utilize bio-engineering methods (rather than rip rap).

**COMMENT:**

No building, paving, grading, or fill activities are proposed within the WR District at the site. Therefore, this standard is not applicable.

- 3. The following uses and activities are prohibited within the WR Overlay District:
  - a. New residential, commercial, industrial, or public/semi-public construction;
  - b. Expansion of existing buildings or structures;
  - c. Expansion of areas of pre-existing non-native ornamental landscaping such as lawn and gardens; and
  - d. Dumping, piling, or disposal of refuse, yard debris, or other material.

**COMMENT:**

A new residential use is being proposed on the subject site, however the proposed apartment complex is located outside of the 50-ft. riparian corridor along Bear Creek. Therefore, the above use and activities will not be located within the WR Overlay District.

- 4. Site Maintenance. Any use, sign or structure, and the maintenance thereof, lawfully existing on the date of adoption of this ordinance, is permitted within the WR Overlay District.**
  - a. Such use, sign or structure may continue at a similar level and manner as existed on the date of the adoption of this ordinance.**
  - b. The maintenance and alteration of pre-existing ornamental landscaping is permitted within the WR Overlay District as long as no additional native vegetation is disturbed.**
  - c. Maintenance of lawns, planted vegetation and landscaping shall be kept to a minimum and not include the spraying of pesticides or herbicides.**
  - d. Vegetation that is removed or diseased shall be replanted with native species.**
  - e. Maintenance trimming of existing trees shall be kept at a minimum and under no circumstances can the trimming maintenance be so severe as to compromise the tree's health, longevity, and resource functions.**
  - f. Vegetation within utility easements shall be kept in a natural state and replanted when necessary with native plant species.**

**COMMENT:**

As required, any future maintenance of vegetation within the WR Overlay District will be completed in accordance with the above standards.

**CHAPTER 17-3.2: BUILDING ORIENTATION AND DESIGN**

**Section 17-3.2.030: Residential Buildings**

- B. Building Orientation.** Residential buildings that are subject to the provisions of this chapter, pursuant to Section 17-3.2.020, shall conform to all of the following standards in subsections B.1 through 3, below, as generally illustrated in Figure 17-3.2-1. Figure 17-3.2-2 provides examples of non-compliance.
- 1. Building Orientation to Street.** Except as provided below, dwelling units shall orient toward a street, have a primary entrance opening toward the street, and be connected to the right-of-way with an approved walkway or residential front yard.
    - a.** A dwelling may have its primary entrance oriented to a yard other than the front or street yard where the only permitted access to the property is from a shared driveway or flag lot drive and orienting the dwelling entrance to the street is not practical due to the layout of the lot and driveway.
    - b.** Where there is no adjacent street to which a dwelling may be oriented, or it is not practical to orient a dwelling to an adjacent street due to lot layout, topographic, or other characteristics of the site, the dwelling may orient to a walkway, courtyard, open space, common area, lobby, or breezeway (i.e., for multifamily buildings).

**COMMENT:**

The attached Preliminary Site Plan illustrates that the primary entrance for each apartment building is oriented toward common open space areas within the apartment complex (see Exhibit 4).

- C. Garages.** The following standards apply to all types of vehicle storage, including, but not limited to, buildings, carports, canopies, and other permanent and temporary structures. The standards are intended to balance residents' desire for a convenient, safe, and private vehicle access to their homes with the public interest in maintaining safe and aesthetically pleasing streetscapes. The standards therefore promote pedestrian safety and visibility of public ways, while addressing aesthetic concerns associated with street-facing garages.

**COMMENT:**

The applicant is not proposing to construct a garage with the apartment complex development, therefore these standards do not apply.

**D. Architecture.** The following standards require variation in architectural plans to avoid monotony in new developments. The standards support the creation of architecturally varied neighborhoods, whether a neighborhood develops all at once or one lot at a time, avoiding homogeneous street frontages that detract from the community's appearance. The standards are applied through the Site Design Review process for new townhome dwellings and new multifamily dwellings, and through the Zoning Checklist (Type I) review process prior to issuance of building permits for new single-family dwellings and new duplex dwellings. In addition to the following requirements, duplexes, townhomes, and multifamily projects shall conform to the special use standards of Chapter 17-2.3.

- 1. Detailed Design.** Dwelling designs shall incorporate not fewer than four architectural features per dwelling unit from subdivisions a through k, as generally illustrated in this chapter. Applicants are encouraged to use those elements that best suit the proposed building style and design.
  - a. Covered front porch:** not less than six feet in depth and not less than 30 percent of the width of dwelling, excluding the landing for dwelling entrance.
  - b. Dormers:** minimum of two required for each single-family dwelling and two each for other dwellings; must be a functional part of the structure, for example, providing light into a living space.
  - c. Recessed entrance:** not less than four feet deep.
  - d. Windows:** not less than 30 percent of surface area of all street-facing elevation(s).
  - e. Window trim:** minimum four-inch width (all elevations).
  - f. Eaves:** overhang of not less than 12 inches.
  - g. Offset:** offset in façade and/or roof (see subsection 2, "Articulation"); counts twice if both façade and roof offsets are provided.
  - h. Bay window:** projects from front elevation by

12 inches.

- i. **Balcony: one per dwelling unit facing street.**
- j. **Decorative top: e.g., cornice or pediment with flat roof or brackets with pitched roof.**
- k. **Other: feature not listed but providing visual relief or contextually appropriate design similar to subdivisions a through j, as approved by the Planning Official through a Type I procedure.**

**COMMENT:**

The submitted Building Floor Plans and Elevations indicate that the proposed apartment structures include balconies which face the street and common open space areas, minimum 12-in. eaves, off-sets in the facades, and recessed entries (see Exhibit 4). Therefore, the above standards are met.

- 2. **Articulation. Plans for residential buildings shall incorporate design features such as varying rooflines, offsets, balconies, projections (e.g., overhangs, porches, or similar features), recessed or covered entrances, window reveals, or similar elements that break up otherwise long, uninterrupted elevations. Such elements shall occur at a minimum interval of 40 feet, and each floor shall contain at least two elements from the following options, as generally illustrated in this Section 17-3.2.030.**
  - a. **Recess (e.g., porch, courtyard, entrance balcony, or similar feature) that has a minimum depth of four feet;**
  - b. **Extension (e.g., floor area, porch, entrance, balcony, overhang, or similar feature) that projects a minimum of two feet and runs horizontally for a minimum length of four feet; or**
  - c. **Offsets or breaks in roof elevation of two feet or greater in height.**

**COMMENT:**

As shown on the attached Building Plans and Elevations indicate that extended balconies are provided on the 2<sup>nd</sup> and 3<sup>rd</sup> floors of the structures. In addition, recessed entries are provided in accordance with the above standards (see Exhibit 4).

3. **House Plan Variety.** This subsection applies to land divisions and new developments with five or more residential buildings. No two directly adjacent or opposite dwelling units in a single-family development, or buildings in a multifamily development, may possess the same front or street-facing elevation. This standard is met when front or street-facing elevations differ from one another by no fewer than three of the elements listed in subdivisions a through g. Where façades repeat on the same block face, they must have at least three intervening lots between them that meet the above standard. Land division approvals will be conditioned to assure compliance with this subsection.

**COMMENT:**

The attached Site Plan illustrates that due to the limited site width, only one multi-family structure will front W Main Street. Therefore, the above standards do not apply.

**CHAPTER 17-3.3: ACCESS AND CIRCULATION**

**Section 17-3.3.030: Vehicular Access and Circulation**

- B. **Permit Required.** Vehicular access to a public street (e.g., a new or modified driveway connection to a street or highway) requires an approach permit approved by the applicable roadway authority.

**COMMENT:**

Per the City's Transportation System Plan, W Main Street, also identified as Highway 211, is under State (ODOT) jurisdiction and is classified as an Arterial Street and a Transit Route. As required, an access permit will be obtained from ODOT prior to the construction of the proposed driveway approach.

- C. **Traffic Study Requirements.** The City, in reviewing a development proposal or other action requiring an approach permit, may require a traffic impact analysis, pursuant to Section 17-3.6.020, to determine compliance with this Code.

**COMMENT:**

As required, the applicant has prepared and submitted a Transportation Impact Study for the proposed development (see Exhibit 6). The study was scoped with input from both City of Molalla and ODOT staff. Per the attached report, adequate site distance can be provided upon removal of vegetation at the intersection.

- D. **Approach and Driveway Development Standards.** Approaches

and driveways shall conform to all of the following development standards:

1. **The number of approaches on higher classification streets (e.g., collector and arterial streets) shall be minimized; where practicable, access shall be taken first from a lower classification street.**

**COMMENT:**

A single access approach from W Main Street/Highway 211, an Arterial Street, is proposed. There are no lower classification streets which can provide access for the proposed development.

2. **Approaches shall conform to the spacing standards of subsections E and F, below, and shall conform to minimum sight distance and channelization standards of the roadway authority.**

**COMMENT:**

As discussed in the attached Transportation Impact Study, sight distance at the location of the proposed access driveway is adequate (see Exhibit 6). The attached Preliminary Site Plan also indicates that ODOT channelization standards have been met (see Exhibit 4).

3. **Driveways shall be paved and meet applicable construction standards. Where permeable paving surfaces are allowed or required, such surfaces shall conform to applicable Public Works Design Standards.**

**COMMENT:**

The proposed parking surfaces will be paved with an asphalt surface and will meet applicable construction standards, as illustrated on the Preliminary Site Plan (see Exhibit 4). No permeable paving surfaces are proposed.

4. **The City Engineer may limit the number or location of connections to a street, or limit directional travel at an approach to one-way, right-turn only, or other restrictions, where the roadway authority requires mitigation to alleviate safety or traffic operations concerns.**

**COMMENT:**

The submitted Transportation Impact Study and Site Plan indicate that the applicant is proposing to install a center left turn lane along the site frontage, to the east along the frontage of the Church of Jesus Christ of Latter Day Saints, and west of the site to the S Ona Way intersection (see Exhibits 4 and 6). With the proposed improvements, no turning restrictions will be required when entering or exiting the site.



5. **Where the spacing standards of the roadway authority limit the number or location of connections to a street or highway, the City Engineer may require a driveway extend to one or more edges of a parcel and be designed to allow for future extension and inter-parcel circulation as adjacent properties develop. The City Engineer may also require the owner(s) of the subject site to record an access easement for future joint use of the approach and driveway as the adjacent property(ies) develop(s).**

**COMMENT:**

The proposed access drive does not have the potential to serve adjacent properties, therefore the above standards do not apply.

6. **Where applicable codes require emergency vehicle access, approaches and driveways shall be designed and constructed to accommodate emergency vehicle apparatus and shall conform to applicable fire protection requirements. The City Engineer may restrict parking, require signage, or require other public safety improvements pursuant to the recommendations of an emergency service provider.**

**COMMENT:**

The submitted Site Plan demonstrates that a modified hammerhead turnaround meeting Fire Code standards has been provided within the proposed parking lot (see Exhibit 4).

7. **As applicable, approaches and driveways shall be designed and constructed to accommodate truck/trailer-turning movements.**

**COMMENT:**

As demonstrated by the Site Plan, the proposed parking lot includes a modified hammerhead turnaround that can accommodate fire apparatus, waste collection vehicles, and delivery trucks and vans (see Exhibit 4).

8. **Except where the City Engineer and roadway authority, as applicable, permit an open access with perpendicular or angled parking, driveways shall accommodate all projected vehicular traffic on-site without vehicles stacking or backing up onto a street.**

**COMMENT:**

As shown on the Preliminary Site Plan, the proposed parking area is open access with perpendicular parking stalls (see Exhibits 4 and 6). The submitted plan demonstrates that vehicles can turn around on-site so that they can exit in a forward manner.

9. **Driveways shall be designed so that vehicle areas, including, but not limited to, drive-up and drive-through facilities and vehicle storage and service areas, do not obstruct any public right-of-way.**
10. **Approaches and driveways shall not be wider than necessary to safely accommodate projected peak hour trips and turning movements, and shall be designed to minimize crossing distances for pedestrians.**

**COMMENT:**

Drive up and drive-through services are not proposed. The proposed aisles and stall dimensions meet City standards. The proposed driveway approach is 23-Ft. wide, which is appropriate for the proposed multi-family use and provides a safe crossing width for pedestrians.

11. **As it deems necessary for pedestrian safety, the City Engineer, in consultation with the roadway authority, as applicable, may require that traffic-calming features, textured driveway surfaces (e.g., pavers or similar devices), curb extensions, signage or traffic control devices, or other features, be installed on or in the vicinity of a site as a condition of development approval.**

**COMMENT:**

Due to the limited size of the parking area, the applicant is not proposing to install traffic calming features within the development.

12. **Construction of approaches along acceleration or deceleration lanes, and along tapered (reduced width) portions of a roadway, shall be avoided; except where no reasonable alternative exists and the approach does not create safety or traffic operations concern.**

**COMMENT:**

The driveway approach for the proposed development is not within acceleration or deceleration lanes or tapered portions. Therefore, this standard does not apply.

13. **Approaches and driveways shall be located and**

**designed to allow for safe maneuvering in and around loading areas, while avoiding conflicts with pedestrians, parking, landscaping, and buildings.**

**COMMENT:**

The submitted Site Plan illustrates the proposed driveway approach and a parking area which can accommodate standard vehicles, waste collection vehicles, fire apparatus, and delivery vehicles in a safe manner (see Exhibit 4).

- 14. Where sidewalks or walkways occur adjacent to a roadway, driveway aprons constructed of concrete shall be installed between the driveway and roadway edge. The roadway authority may require the driveway apron be installed outside the required sidewalk or walkway surface, consistent with Americans with Disabilities Act (ADA) requirements, and to manage surface water runoff and protect the roadway surface.**
- 15. Where an accessible route is required pursuant to ADA, approaches and driveways shall meet accessibility requirements where they coincide with an accessible route.**

**COMMENT:**

The submitted Site Plan indicates that a curb-separated X-ft. sidewalk will be installed along the site's frontage and the Church of Jesus Christ of Latter Day Saints street frontage (see Exhibit 4). As required, the proposed driveway approach is located between the ADA compliant sidewalk and the curb.

- 16. The City Engineer may require changes to the proposed configuration and design of an approach, including the number of drive aisles or lanes, surfacing, traffic-calming features, allowable turning movements, and other changes or mitigation, to ensure traffic safety and operations.**

**COMMENT:**

The applicant is not proposing a modified driveway approach design with this application.

- 17. Where a new approach onto a state highway or a change of use adjacent to a state highway requires ODOT approval, the applicant is responsible for obtaining ODOT approval. The City Engineer may approve a development conditionally, requiring the applicant first obtain required ODOT permit(s) before commencing development, in which case the City will**

**work cooperatively with the applicant and ODOT to avoid unnecessary delays.**

**COMMENT:**

As previously addressed, West Main Street/Highway 211, is under State (ODOT) jurisdiction and is classified as an Arterial Street and Transit Route. Therefore, the applicant will request an access permit from ODOT for the proposed driveway approach.

- 18. Where an approach or driveway crosses a drainage ditch, canal, railroad, or other feature that is under the jurisdiction of another agency, the applicant is responsible for obtaining all required approvals and permits from that agency prior to commencing development.**
- 19. Where a proposed driveway crosses a culvert or drainage ditch, the City Engineer may require the developer to install a culvert extending under and beyond the edges of the driveway on both sides of it, pursuant to applicable Public Works Design Standards.**

**COMMENT:**

The proposed driveway will not cross a culvert, drainage ditch, or other feature. Therefore, this standard does not apply.

- 20. Except as otherwise required by the applicable roadway authority or waived by the City Engineer temporary driveways providing access to a construction site or staging area shall be paved or graveled to prevent tracking of mud onto adjacent paved streets.**

**COMMENT:**

As required, the construction entrance to the site will be graveled in accordance with the above standards.

- 21. Development that increases impervious surface area shall conform to the storm drainage and surface water management requirements of Section 17-3.6.050.**

**COMMENT:**

As shown on the Drainage Plan, stormwater from all on-site impervious surfaces will be managed in accordance with Section 17-3.6.050 (see Exhibit 4).

**E. Approach Separation from Street Intersections. Except as**

provided by subsection H, minimum distances shall be maintained between approaches and street intersections consistent with the current version of the Public Works Design Standards and Transportation System Plan.

**COMMENT:**

As required, the submitted Site Plan demonstrates that minimum spacing standards between the proposed driveway and other intersections along W Main Street have been met (see Exhibit 4).

- F. Approach Spacing.** Except as provided by subsection H or as required to maintain street operations and safety, the following minimum distances shall be maintained between approaches consistent with the current version of the Public Works Design Standards and Transportation System Plan.
  
- G. Vision Clearance.** No visual obstruction (e.g., sign, structure, solid fence, or shrub vegetation) greater than 2.5 feet in height shall be placed in “vision clearance areas” at street intersections. The minimum vision clearance area may be modified by the Planning Official through a Type I procedure, upon finding that more or less sight distance is required (i.e., due to traffic speeds, roadway alignment, etc.). Placement of light poles, utility poles, and tree trunks should be avoided within vision clearance areas.

**COMMENT:**

As required, the proposed driveway meets the above approach spacing standards. The attached Transportation Impact Study indicates that minimum vision clearance standards will be met at the driveway’s intersection with W Main Street (see Exhibit 6).

- H. Exceptions and Adjustments.** The City Engineer may approve adjustments to the spacing standards of subsections E and F, above, where an existing connection to a City street does not meet the standards of the roadway authority and the proposed development moves in the direction of code compliance. The Planning Official through a Type II procedure may also approve a deviation to the spacing standards on City streets where it finds that mitigation measures, such as consolidated access (removal of one access), joint use driveways (more than one property uses same access), directional limitations (e.g., one-way), turning restrictions (e.g., right-in/right-out only), or other mitigation alleviate all traffic operations and safety concerns.

**COMMENT:**

The applicant is not proposing an exception or adjustment to the spacing requirements of this section. Therefore, the above standards do not apply.

**Section 17-3.3.040: Pedestrian Access and Circulation**

**B. Standards. Developments shall conform to all of the following standards for pedestrian access and circulation as generally illustrated in Figure 17-3.3-3:**

**1. Continuous Walkway System. A pedestrian walkway system shall extend throughout the development site and connect to adjacent sidewalks, if any, and to all future phases of the development, as applicable.**

**COMMENT:**

As shown on the Preliminary Site Plan, the applicant is proposing to install 5-ft. wide paved pedestrian pathways from the apartment buildings to the parking lot, common open space amenities, and the proposed sidewalk along W Main Street (see Exhibit 4). Where adjacent to parking stalls, the walkway width is increased to 7-feet.

**2. Safe, Direct, and Convenient. Walkways within developments shall provide safe, reasonably direct, and convenient connections between primary building entrances and all adjacent parking areas, recreational areas, playgrounds, and public rights-of-way conforming to the following standards:**

**a. The walkway is reasonably direct when it follows a route that does not deviate unnecessarily from a straight line or it does not involve a significant amount of out-of-direction travel.**

**COMMENT:**

A continuous pedestrian walkway system within the development has been illustrated on the Site Plan. The walkways provide direct connections without unnecessary deviations to the right-of-way, parking area, all apartment buildings, the clubhouse, playground, and common open space areas (see Exhibit 4).

**b. The walkway is designed primarily for pedestrian safety and convenience, meaning it is reasonably free from hazards and provides a reasonably smooth and consistent surface and direct route of travel between destinations. The Planning Official may require landscape buffering between walkways and adjacent**

**parking lots or driveways to mitigate safety concerns.**

**COMMENT:**

Convenience and safety are provided by paved pedestrian walkways which offers a smooth and nonhazardous surface for tenants, employees, and visitors. The walkways connect the parking areas to all complex buildings and amenity spaces.

- c. The walkway network connects to all primary building entrances, consistent with the building design standards of Chapter 17-3.2 and, where required, Americans with Disabilities Act (ADA) requirements.**

**COMMENT:**

The continuous walkway provides ADA routes from the public sidewalk and parking lot to the primary entrances of all buildings on the site (see Exhibit 4).

- 3. Vehicle/Walkway Separation. Except as required for crosswalks, per subsection 4, below, where a walkway abuts a driveway or street it shall be raised six inches and curbed along the edge of the driveway or street. Alternatively, the Planning Official may approve a walkway abutting a driveway at the same grade as the driveway if the walkway is physically separated from all vehicle-maneuvering areas. An example of such separation is a row of bollards (designed for use in parking areas) with adequate minimum spacing between them to prevent vehicles from entering the walkway.**

**COMMENT:**

To separate the vehicle areas from the walkways, 6-in. high curbs are proposed.

- 4. Crosswalks. Where a walkway crosses a parking area or driveway (“crosswalk”), it shall be clearly marked with contrasting paving materials (e.g., pavers, light-color concrete inlay between asphalt, or similar contrasting material). The crosswalk may be part of a speed table to improve driver-visibility of pedestrians. Painted or thermo-plastic striping and similar types of non-permanent applications are discouraged, but may be approved for lesser used crosswalks not exceeding 24 feet in length.**

**COMMENT:**

As required, where pedestrian routes

5. **Walkway Width and Surface.** Walkways, including access ways required for subdivisions pursuant to Chapter 17-4.3, shall be constructed of concrete, asphalt, brick or masonry pavers, or other durable surface, as approved by the City Engineer, and not less than six feet wide. Multi-use paths (i.e., designed for shared use by bicyclists and pedestrians) shall be concrete or asphalt and shall conform to the current version of the Public Works Design Standards and Transportation System Plan.

**COMMENT:**

The attached Site Plan indicates that the proposed concrete sidewalk is 6-ft. wide, complying with the above standards.

6. **Walkway Construction (Private).** Walkway surfaces may be concrete, asphalt, brick or masonry pavers, or other City-approved durable surface meeting ADA requirements. Walkways shall be not less than six feet in width in commercial and mixed use developments and where access ways are required for subdivisions under Division IV.

**COMMENT:**

The submitted Site Plan demonstrates that the proposed internal concrete walkways are in compliance with this section.

7. **Multi-Use Pathways.** Multi-use pathways, where approved, shall be a minimum width and constructed of materials consistent with the current version of the Public Works Design Standards and Transportation System Plan.

**COMMENT:**

Multi-use pathways are not proposed or required for this development. Therefore, this standard does not apply.

**CHAPTER 17-3.4: LANDSCAPING, FENCES AND WALLS, OUTDOOR LIGHTING**

**Section 17-3.4.030: Landscaping and Screening**



- A. General Landscape Standard. All portions of a lot not otherwise developed with buildings, accessory structures, vehicle maneuvering areas, or parking shall be landscaped.**

**COMMENT:**

As shown on the attached Planting Plan, landscaping is proposed for all required areas of the site which are not developed with apartment buildings, the clubhouse, and parking areas (see Exhibit 4).

- B. Minimum Landscape Area. All lots shall conform to the minimum landscape area standards of the applicable zoning district, as contained in Tables 17-2.2.040.D and 17-2.2.040.E. The Planning Official, consistent with the purposes in Section 17-3.4.010, may allow credit toward the minimum landscape area for existing vegetation that is retained in the development.**

**COMMENT:**

Per Table 17-2.2040(D), 20% of the site is required to be landscaped in the R-3 zone. The applicant is proposing 48,379 sq. ft. of landscaped area for the 126,135 sq. ft. site, providing 38% landscape coverage for the proposed development.

- C. Plant Selection. A combination of deciduous and evergreen trees, shrubs, and ground covers shall be used for all planted areas, the selection of which shall be based on local climate, exposure, water availability, and drainage conditions, among other factors. When new vegetation is planted, soils shall be amended and irrigation shall be provided, as necessary, to allow for healthy plant growth. The selection of plants shall be based on all of the following standards and guidelines:**
  - 1. Use plants that are appropriate to the local climate, exposure, and water availability. The presence of utilities and drainage conditions shall also be considered.**

**COMMENT:**

The Planting Plan demonstrates that proposed landscaping accounts for area drainage conditions, climate, exposure, and water availability on site (see Exhibit 4).

- 2. Plant species that do not require irrigation once established (naturalized) are preferred over species that require irrigation.**
- 3. Trees shall be not less than two-inch caliper for street trees and one and one-half-inch caliper for other trees at the time of planting. Trees to be planted under or**

**near power lines shall be selected so as to not conflict with power lines at maturity.**

**COMMENT:**

The proposed landscaping incorporates drought tolerant plant and tree species where feasible. As required, the proposed street trees meet the above standards and do not present a hazard to power lines (see Exhibit 4).

- 4. Shrubs shall be planted from five-gallon containers, minimum, where they are for required screens or buffers, and two-gallon containers minimum elsewhere.**
- 5. Shrubs shall be spaced in order to provide the intended screen or canopy cover within two years of planting.**

**COMMENT:**

As demonstrated by the attached Planting Plan, the proposed shrubs will provide screening within two years of planting.

- 6. All landscape areas, whether required or not, that are not planted with trees and shrubs or covered with allowable non-plant material, shall have ground cover plants that are sized and spaced to achieve plant coverage of not less than 75 percent at maturity.**

**COMMENT:**

As illustrated on the attached Planting Plan, landscaping is provided in all required areas and will achieve the maturity requirements of this section.

- 7. Bark dust, chips, aggregate, or other non-plant ground covers may be used, but shall cover not more than 35 percent of any landscape area. Non-plant ground covers cannot be a substitute for required ground cover plants.**

**COMMENT:**

As required, the proposed non-plant ground covers are limited to 35% of the landscaped area.

- 8. Where stormwater retention or detention, or water quality treatment facilities are proposed, they shall meet the requirements of the current version of the Public Works Design Standards.**

**COMMENT:**

The attached Preliminary Stormwater Report and Storm Plan demonstrate that all City Public Works and ODOT standards are met.

- 9. Existing mature trees that can thrive in a developed area and that do not conflict with other provisions of this Code shall be retained where specimens are in good health, have desirable aesthetic characteristics, and do not present a hazard.**

**COMMENT:**

The Existing Conditions Plan indicates that 9 trees are proposed for removal to accommodate development of the apartment complex (see Exhibit 4). Where feasible, the applicant is proposing to retain existing trees on the subject site, including within the 50-ft. wide riparian area along Bear Creek.

- 10. Landscape plans shall avoid conflicts between plants and buildings, streets, walkways, utilities, and other features of the built environment.**

**COMMENT:**

As required, buildings, walkways, parking, utilities, and other features are designed to avoid impacts to plants and trees included within the Planting Plan (see Exhibit 4).

- 11. Evergreen plants shall be used where a sight-obscuring landscape screen is required.**

**COMMENT:**

The attached Planting Plan illustrates that screening meeting the above standards is provided between the proposed parking lot and adjacent uses.

- 12. Deciduous trees should be used where summer shade and winter sunlight is desirable.**

**COMMENT:**

To fulfill this standard where summer shade and winter light are needed for the apartment complex, deciduous trees are proposed on the attached Planting Plan (see Exhibit 4).

- 13. Landscape plans should provide focal points within a development, for example, by preserving large or unique trees or groves or by using flowering plants or trees with fall color.**

**COMMENT:**

The attached Planting Plan demonstrates that flowering plants and trees with fall color are incorporated into the landscape design.

- 14. Landscape plans should use a combination of plants for seasonal variation in color and yearlong interest.**

**COMMENT:**

As required, a variety of plants and trees which provide seasonal variation are utilized throughout the apartment complex (see Exhibit 4).

- 15. Where plants are used to screen outdoor storage or mechanical equipment, the selected plants shall have growth characteristics that are compatible with such features.**

**COMMENT:**

The applicant does not propose outdoor storage or mechanical equipment with this development, therefore this standard does not apply.

- 16. Landscape plans shall provide for both temporary and permanent erosion control measures, which shall include plantings where cuts or fills, including berms, swales, stormwater detention facilities, and similar grading, is proposed.**

**COMMENT:**

The submitted Grading Plan demonstrates that swales and steep slopes are not proposed. Temporary erosion control measures are illustrated on the attached Erosion Control Plan (see Exhibit 4).

- 17. When new vegetation is planted, soils shall be amended and irrigation provided, as necessary, until the plants are naturalized and able to grow on their own.**

**COMMENT:**

As required, new vegetation will be planted in amended soils with irrigation which complies with the standards of this section.

- E. Parking Lot Landscaping. All of the following standards shall be met for parking lots. If a development contains multiple parking lots, then the standards shall be evaluated separately for each parking lot.**

1. **A minimum of 10 percent of the total surface area of all parking areas, as measured around the perimeter of all parking spaces and maneuvering areas, shall be landscaped. Such landscaping shall consist of shade trees distributed throughout the parking area. A combination of deciduous and evergreen trees, shrubs, and ground cover plants is required. The trees shall be planned so that they provide a partial canopy cover over the parking lot within five years. At a minimum, one tree per 12 parking spaces on average shall be planted over and around the parking area.**

**COMMENT:**

Total parking for the site occupies 35,279 sq. ft., therefore a minimum of 3,528 sq. ft. of landscape area within and around the parking lot is required. The proposed landscaped surfaces within the parking lot total 6,418 sq. ft., or 18% of the parking lot area. The attached Planting Plan utilizes a combination of deciduous and evergreen trees with a variety of shrubs and ground cover plants to provide parking area tree canopy and seasonal color in accordance with the above standards (see Exhibit 4).

2. **All parking areas with more than 20 spaces shall provide landscape islands with trees that break up the parking area into rows of not more than 10 contiguous parking spaces. Landscape islands and planters shall have dimensions of not less than 48 square feet of area and no dimension of less than six feet, to ensure adequate soil, water, and space for healthy plant growth.**

**COMMENT:**

To meet this requirement for the 124 standard space parking lot, the Landscape Plan illustrates that landscape islands are spaced a minimum of every 10 parking spaces throughout the parking area. Each of these planters meets the dimensional and planting requirements of this section.

3. **All required parking lot landscape areas not otherwise planted with trees must contain a combination of shrubs and groundcover plants so that, within two years of planting, not less than 50 percent of that area is covered with living plants.**

**COMMENT:**

As required, a variety of plants and trees providing seasonal are utilized throughout the parking lot area to provide 50% minimum coverage with two-year maturity, as shown on the Landscape Plan (see Exhibit 4).

4. **Wheel stops, curbs, bollards, or other physical barriers are required along the edges of all vehicle-**

maneuvering areas to protect landscaping from being damaged by vehicles. Trees shall be planted not less than two feet from any such barrier.

5. Trees planted in tree wells within sidewalks or other paved areas shall be installed with root barriers, consistent with applicable nursery standards.

**COMMENT:**

The submitted Site Plan demonstrates that curbs are provided along all parking perimeters and surrounding landscaped beds within the parking area. Root barriers will be provided where needed to prevent walkway lift and parking area impacts.

- F. **Screening Requirements.** Screening is required for outdoor storage areas, unenclosed uses, and parking lots, and may be required in other situations as determined by the Planning Official. Landscaping shall be provided pursuant to the standards of subsections F.1 through 3.

1. **Outdoor Storage and Unenclosed Uses.** All areas of a site containing or proposed to contain outdoor storage of goods, materials, equipment, and vehicles (other than required parking lots and service and delivery areas, per Site Design Review), and areas containing junk, salvage materials, or similar contents, shall be screened from view from adjacent rights-of-way and residential uses by a sight-obscuring fence, wall, landscape screen, or combination of screening methods. See also Section 17-3.4.040 for related fence and wall standards.

**COMMENT:**

The attached Clubhouse and Trash Enclosure Plan indicates that the waste storage area will be screened by a 6-ft. high chain-link fence with slats (see Exhibit 4). Therefore, landscape screening is not required for the storage area.

2. **Parking Lots.** The edges of parking lots shall be screened to minimize vehicle headlights shining into adjacent rights-of-way and residential yards. Parking lots abutting a sidewalk or walkway shall be screened using a low-growing hedge or low garden wall to a height of between three feet and four feet.

**COMMENT:**

Where parking spaces are directed towards residential yards and rights-of-way, low growing hedges will provide screening as illustrated on the attached Planting Plan (see Exhibit 4).

3. **Other Uses Requiring Screening.** The Planning Official may require screening in other situations as authorized by this Code, including, but not limited to, outdoor storage areas, blank walls, Special Uses pursuant to Chapter 17-2.3, flag lots, and as mitigation where an applicant has requested an adjustment pursuant to Chapter 17-4.7.

**COMMENT:**

If required by the Planning Official, landscape screening will be provided where additional mitigation is required.

- G. **Maintenance.** All landscaping shall be maintained in good condition, or otherwise replaced by the property owner.

**COMMENT:**

As required, landscape maintenance will be provided by the property owner in compliance with this section.

**Section 17-3.4.040: Fences and Walls**

**C. Height**

1. **Residential Zones.** Fences and freestanding walls (i.e., exclusive of building walls) for residential uses shall not exceed the following heights above grade, where grade is measured from the base of the subject fence or wall.
  - a. **Within Front or Street-Facing Side Yard Setback.** Four feet; except the following additional height is allowed:
    - (1) A fence may be constructed to a maximum height of six feet where it is located on a street-facing side yard.
    - (2) A fence may be constructed to a maximum height of six feet where the fence is of open chain link or other “see-through” composition that allows 90 percent light transmission.
    - (3) One incidental garden structure (e.g., arbor or gate) not exceeding eight feet in height and six feet in width is

allowed within a front or street-facing yard provided it does not encroach into a required vision clearance area.

**COMMENT:**

Street-facing fencing is not proposed with this development. Therefore, this section is not applicable.

- b. Within an Interior Side or Rear Yard Setback. Six feet; except the fence or wall height, as applicable, shall not exceed the distance from the fence or wall line to the nearest primary structure on an adjacent property.**
- 3. All Zones. Fences and walls shall comply with the vision clearance standards of Section 17-3.3.030.G. Other provisions of this Code, or the requirements of the roadway authority, may limit allowable height of a fence or wall below the height limits of this section.**
- D. Materials. Prohibited fence and wall materials include straw bales, tarps, barbed or razor wire (except in the M-2 Heavy Industrial zone); scrap lumber, untreated wood (except cedar or redwood), corrugated metal, sheet metal, scrap materials; dead, diseased, or dying plants; and materials similar to those listed herein.**
- E. Permitting. A Type I approval is required to install a fence of six feet or less in height, or a wall that is four feet or less in height. All other walls and fences require review and approval by the Planning Official through a Type II procedure. The Planning Official may require installation of walls or fences as a condition of approval for development, as provided by other Code sections. A building permit may be required for some fences and walls, pursuant to applicable building codes. Walls greater than four feet in height shall be designed by a Professional Engineer licensed in the State of Oregon.**
- F. Maintenance. Fences and walls shall be maintained in good condition, or otherwise replaced by the property owner.**

**COMMENT:**

An existing Type I interior side yard chain-link fencing at 6-ft. in height is located within one foot of the eastern property line of the site. The applicant does not propose changes to this fencing or install additional fencing along the site perimeters. Fence maintenance or replacement, where necessary, will be coordinated between property owners of the subject site and the adjacent parcel.



**Section 17-3.4.050: Outdoor Lighting**

**C. Standards.**

- 1. Light poles, except as required by a roadway authority or public safety agency, shall not exceed a height of 20 feet; pedestal- or bollard-style lighting shall be used to illuminate walkways. Flag poles, utility poles, and streetlights are exempt from this requirement.**
- 2. Where a light standard is placed over a sidewalk or walkway, a minimum vertical clearance of eight feet shall be maintained.**
- 3. Outdoor lighting levels shall be subject to review and approval through Site Design Review. As a guideline, lighting levels shall be no greater than necessary to provide for pedestrian safety, property or business identification, and crime prevention.**
- 4. Except as provided for up-lighting of flags and permitted building-mounted signs, all outdoor light fixtures shall be directed downward, and have full cutoff and full shielding to preserve views of the night sky and to minimize excessive light spillover onto adjacent properties.**
- 5. Lighting shall be installed where it will not obstruct public ways, driveways, or walkways.**
- 6. Walkway lighting in private areas shall have a minimum average illumination of not less than 0.2 foot-candles. Lighting along public walkways shall meet the current version of the Public Works Design Standards and AASHTO lighting requirements.**
- 7. Active building entrances shall have a minimum average illumination of not less than two foot-candles.**
- 8. Surfaces of signs shall have an illumination level of not more than two foot-candles.**
- 9. Parking lots and outdoor services areas, including quick vehicle service areas, shall have a minimum illumination of not less than 0.2 foot-candles, average illumination of approximately 0.8 foot-candles, and a uniformity ratio (maximum-to-minimum ratio) of not more than 20:1.**

10. Where illumination grid lighting plans cannot be reviewed or if fixtures do not provide photometrics and bulbs are under 2,000 lumens, use the following guidelines:
    - a. Poles should be no greater in height than four times the distance to the property line.
    - b. Maximum lumen levels should be based on fixture height.
    - c. Private illumination shall not be used to light adjoining public right-of-way.
  11. Where a light standard is placed within a walkway, an unobstructed pedestrian through zone not less than 48 inches wide shall be maintained.
  12. Lighting subject to this section shall consist of materials approved for outdoor use and shall be installed according to the manufacturer's specifications.
- D. Permitting. A Type I approval is required to install or replace outdoor lighting. The Planning Official may require lighting as a condition of approval for some projects, pursuant to other Code requirements.
  - E. Maintenance. For public health and safety, outdoor lighting shall be maintained in good condition, or otherwise replaced by the property owner.

**COMMENT:**

The attached Site Lighting Plan demonstrates that all of the above lighting standards have been met (see Exhibit 4).

**CHAPTER 17-3.5:      PARKING AND LOADING**

**Section 17-3.5.020:    Applicability and General Regulations**

- C.      **Calculations of Amounts of Required and Allowed Parking.**
  2.      The number of parking spaces is computed based on the primary uses on the site except as stated in subsection C.3. When there are two or more separate primary uses on a site, the minimum and maximum parking for the site is the sum of the required or

allowed parking for the individual primary uses. For shared parking, see Section 17-3.5.030.D.

**Section 17-3.5.030: Automobile Parking**

**A. Minimum Number of Off-Street Automobile Parking Spaces.** Except as provided by this subsection A, or as required for Americans with Disabilities Act compliance under subsection G, off-street parking shall be provided pursuant to one of the following three standards:

- 1. The standards in Table 17-3.5.030.A;**
- 2. A standard from Table 17-3.5.030.A for a use that the Planning Official determines is similar to the proposed use; or**
- 3. Subsection B Exceptions, which includes a Parking Demand Analysis option.**

**Table 17-3.5.030.A identifies Automobile Parking Space Minimum Requirements by Use. The minimum number of parking spaces for Multifamily Use is 2 spaces per 2-bedroom unit and 2.5 spaces per unit with 3 bedrooms or more.**

**COMMENT:**

Included with this Site Design Review is an exception to the minimum off-street parking standards through the application of Section 17-3.5.030(C)(2) standards. The attached Site Plan indicates that the applicant is proposing to develop 30 two-bedroom and 30 three-bedroom units on the site (see Exhibit 4). Per Table 17-3.5.030.A, multi-family dwellings require a minimum of 2 parking spaces for two-bedroom units and 2.5 parking spaces for three bedroom units. Therefore, a minimum of 135 parking spaces are required for the proposed use. The proposed Clubhouse will be used exclusively by apartment tenants. This structure includes a 144 sq. ft. office, which requires 1 additional parking space. Based on these standards, a total of 136 spaces are required for the apartment complex. The applicant is proposing to provide 124 standard and 4 ADA parking stalls for the apartment complex. As such, a 9% adjustment to the minimum parking standard is requested and has been addressed under Section 17-4.7.030(C)(2) in the narrative provided below.

**C. Exceptions and Reductions to Off-Street Parking.**

- 2. The applicant may propose a parking standard that is different than the standard under subsections A.1 and 2, for review and action by the Planning Official through a Type I or II procedure. The applicant's proposal shall consist of a written request and a parking analysis prepared by a qualified professional. The parking analysis, at a minimum, shall assess the average parking demand and available supply for**

existing and proposed uses on the subject site; opportunities for shared parking with other uses in the vicinity; existing public parking in the vicinity; transportation options existing or planned near the site, such as frequent bus service, carpools, or private shuttles; and other relevant factors. This parking analysis applies to a request in the reduction or an increase in parking ratios.

**COMMENT:**

The attached Parking Analysis Memo indicates that the proposed number of parking spaces exceeds the number of spaces required for the use (see Exhibit 8). The analysis finds that the parking demand for 60 low-income multi-family housing units is 80 parking spaces. An additional parking demand of 1 space is required for the proposed office use. Since the applicant is proposing to develop 124 standard stalls, the proposed number of parking spaces exceeds the calculated parking demand. As such, the requested reduction to off-street parking standards meets the standards of this section.

- 3. The Planning Official, through a Type II procedure, may reduce the off-street parking standards of Table 17-3.5.030.A for sites with one or more of the following features:**
  - a. Sites containing or adjacent to a bus stop with frequent transit service, whose frontage is improved with a bus stop waiting shelter consistent with the standards of the applicable transit provider, are allowed a 20 percent reduction to the standard number of automobile parking spaces.**
  - b. Space being dedicated for a transit facility such as a park-and-ride, bus pull-out, or other transit facility: Allow up to a 10 percent reduction in the number of automobile parking spaces.**
  - c. Site has dedicated parking spaces for carpool or vanpool vehicles: Allow up to a 10 percent reduction to the standard number of automobile parking spaces.**
  - d. Site has dedicated parking spaces for motorcycles, scooters, or electric carts: Allow reductions to the standard dimensions for parking spaces.**
  - e. Site has more than the minimum number of required bicycle parking spaces: Allow up to a**

10 percent reduction to the number of automobile parking spaces.

f. Site has off-street parking or other public parking in the vicinity of the site.

4. The number of required off-street parking spaces may be reduced through the provision of shared parking, pursuant to subsection E.

**COMMENT:**

Although the attached Parking Analysis Memo determined that the number of proposed vehicle parking spaces exceeds the parking demand for low-income housing, the applicant is proposing to encourage bicycle use through the provision of more than the minimum number of required bicycle parking spaces. The City bicycle parking standards require the provision of 30 bicycle parking spaces for 60 multi-family units. The applicant is proposing to install a total of 42 bicycle parking spaces for the multi-family use.

**D. Maximum Number of Off-Street Automobile Parking Spaces. The maximum number of off-street automobile parking spaces allowed per site equals the minimum number of required spaces for the use pursuant to Table 17-3.5.030.A, times a factor of:**

1. 1.2 spaces for uses fronting a street with adjacent on-street parking spaces; or
2. 1.5 spaces, for uses fronting no street with adjacent on-street parking; or
3. A factor based on applicant's projected parking demand, subject to City approval.

**COMMENT:**

The applicant is not proposing to exceed parking space maximums set forth in this section.

**F. Parking Stall Design and Minimum Dimensions. Where a new off-street parking area is proposed, or an existing off-street parking area is proposed for expansion, the entire parking area shall be improved in conformance with this Code. At a minimum the parking spaces and drive aisles shall be paved with asphalt, concrete, or other City-approved materials, provided the Americans with Disabilities Act requirements are met, and shall conform to the minimum dimensions in Table 17-3.5.030.F and the figures below. All off-street parking areas shall contain wheel stops, perimeter curbing, bollards, or other edging as required to prevent vehicles from damaging buildings or encroaching into walkways, sidewalks,**

landscapes, or the public right-of-way. Parking areas shall also provide for surface water management, pursuant to Section 17-3.6.050.

**COMMENT:**

The attached Site Plan illustrates that the proposed parking stalls and drive aisles are designed to conform with all standards and dimensions set forth in this section. In addition, parking area surface water management complies with the Molalla Development Code Storm Drainage and Surface Water Management Facilities as discussed under Section 17-3.6.050.

- H. **Americans with Disabilities Act (ADA).** Parking shall be provided consistent with ADA requirements, including, but not limited to, the minimum number of spaces for automobiles, van-accessible spaces, location of spaces relative to building entrances, accessible routes between parking areas and building entrances, identification signs, lighting, and other design and construction requirements.

**COMMENT:**

As required, the attached Site Plan indicates that 4 ADA stalls meeting the above standards are included in the proposed parking lot.

**Section 17-3.5.040: Bicycle Parking**

- A. **Standards.** Bicycle parking spaces shall be provided with new development and, where a change of use occurs, at a minimum, shall follow the standards in Table 17-3.5.040.A. Where an application is subject to Conditional Use Permit approval or the applicant has requested a reduction to an automobile-parking standard, pursuant to Section 17-3.5.030.C, the Planning Official may require bicycle parking spaces in addition to those in Table 17-3.5.040.A.

Table 17-3.5.040.A identifies Bicycle Parking Space Minimum Requirements by Use. The minimum number of bicycle parking spaces for Multifamily Use is 2 spaces per 4 dwelling units.

- B. **Design.** Bicycle parking shall consist of staple-design steel racks or other City-approved racks, lockers, or storage lids providing a safe and secure means of storing a bicycle, consistent with the Public Works Design Standards.
- D. **Hazards.** Bicycle parking shall not impede or create a hazard to pedestrians or vehicles, and shall be located so as to not conflict with the vision clearance standards of Section 17-3.3.030.G.

**COMMENT:**

Per Table 17-3.5.040.A, 30 bicycle parking spaces are required for the 60 unit apartment complex. The applicant is proposing to provide 42 bicycle parking spaces, therefore this standard is met.

**Section 17-3.5.050: Loading Areas**

- A. Purpose. The purpose of Section 17-3.5.050 is to provide adequate loading areas for commercial and industrial uses that do not interfere with the operation of adjacent streets.**

**COMMENT:**

The applicant is not proposing a commercial or industrial use for the site, therefore these standards do not apply.

**CHAPTER 17-3.6: PUBLIC FACILITIES**

**Section 17-3.6.040: Sanitary Sewer and Water Service Improvements**

- A. Sewers and Water Mains Required. All new development is required to connect to City water and sanitary sewer systems. Sanitary sewer and water system improvements shall be installed to serve each new development and to connect developments to existing mains in accordance with the adopted facility master plans and applicable Public Works Design Standards. Where streets are required to be stubbed to the edge of the subdivision, sewer and water system improvements and other utilities shall also be stubbed with the streets, except as may be waived by the City Engineer where alternate alignment(s) are provided.**
- B. Sewer and Water Plan Approval. Development permits for sewer and water improvements shall not be issued until the City Engineer has approved all sanitary sewer and water plans in conformance with City standards.**

**COMMENT:**

The attached Overall Utility Plan indicates that the proposed development will connect to an existing public water main within W Main Street (see Exhibit 4). The applicant is also proposing to extend sanitary sewer service from an existing main line in the adjacent right-of-way. As required, sanitary sewer and water plans will conform with City standards and a development permit will be obtain prior to the construction of the improvements.

**Section 17-3.6.050: Storm Drainage and Surface Water Management Facilities**

- A. **General Provisions.** The City shall issue a development permit only where adequate provisions for stormwater runoff have been made in conformance with the requirements of the current version of the Public Works Design Standards and Stormwater Master Plan.
- B. **Accommodation of Upstream Drainage.** Culverts and other drainage facilities shall be large enough to accommodate existing and potential future runoff from the entire upstream drainage area, whether inside or outside the development. Such facilities shall be subject to review and approval by the City Engineer.
- C. **Effect on Downstream Drainage.** Where it is anticipated by the City Engineer that the additional runoff resulting from the development will overload an existing drainage facility, the City shall withhold approval of the development until provisions have been made for improvement of the potential condition or until provisions have been made for storage of additional runoff caused by the development in accordance with City standards.
- E. **Existing Watercourse.** Where a proposed development is traversed by a watercourse, drainage way, channel, or stream, the City may require a stormwater easement or drainage right-of-way conforming substantially with the lines of such watercourse and such further width as will be adequate for conveyance and maintenance to protect the public health and safety.

**COMMENT:**

The applicant's Grading and Drainage Plan, and Preliminary Stormwater Report, indicate that stormwater will be managed using subsurface detention pipes before discharging drainage into Bear Creek at the pre-development rate (see Exhibits 4 and 10). As required, the storm facilities have been designed to accommodate upstream drainage and will not create a negative impact on downstream drainage. If required, the applicant will provide a stormwater easement where Bear Creek traverses the site.

**Section 17-3.6.060: Utilities**

- B. **Underground Utilities.**
  - 1. **General Requirement.** The requirements of the utility service provider shall be met. All utility lines in new subdivisions, including, but not limited to, those required for electric, communication, and lighting, and related facilities, shall be placed underground, except



where the City Engineer determines that placing utilities underground would adversely impact adjacent land uses. The Planning Official may require screening and buffering of above ground facilities to protect the public health, safety, or welfare.

**COMMENT:**

As required, all utilities will be placed underground in accordance with the standards of this section.

**CHAPTER 17-4.2: SITE DESIGN REVIEW**

**Section 17-4.2.040: Application Submission Requirements**

**A. General Submission Requirements.**

1. Information required for Type II or Type III review, as applicable (see Chapter 17-4.1).
2. Public Facilities and Services Impact Study. The impact study shall quantify and assess the effect of the development on public facilities and services. The City shall advise as to the scope of the study. The study shall address, at a minimum, the transportation system, including required improvements for vehicles and pedestrians; the drainage system; the parks system; water system; and sewer system. For each system and type of impact, the study shall propose improvements necessary to meet City requirements. The City may require a Traffic Impact Analysis pursuant to Section 17-3.6.020.A(4).

**B. Site Design Review Information.** In addition to the general submission requirements, an applicant for Site Design Review shall provide the following information, as deemed applicable by the Planning Official. The Planning Official may request any information that he or she needs to review the proposal and prepare a complete staff report and recommendation to the approval body.

1. Site Analysis Map.
2. Proposed Site Plan.
3. Architectural Drawings.
4. Preliminary Grading Plan.

5. **Landscape Plan.**
6. **Deed Restrictions.**
7. **Narrative.**
8. **Traffic Impact Analysis, when required by Section 17-3.6.020.A(4).**
9. **Other information determined by the Planning Official. The City may require studies or exhibits prepared by qualified professionals to address specific site features or project impacts (e.g., traffic, noise, environmental features, natural hazards, etc.), as necessary to determine a proposal's conformance with this Code.**

**COMMENT:**

All of the Site Design Review materials listed above have been included with this application. The attached Transportation Impact Statement indicates that the proposed development will generate more than 100 average daily trips, therefore this application will be reviewed through a Type III procedure.

**V. SUMMARY AND CONCLUSIONS**

Based upon the findings of this Applicant's Statement and the submitted exhibits, the applicant has demonstrated compliance with relevant sections of the Molalla Development Code. Therefore, the applicant requests that the submitted application be approved.

**VI. EXHIBITS**

- 1. Application Form**
- 2. Property Deed**
- 3. City Pre-Application Conference Notes**
- 4. Preliminary Development Plans**
  - a. Civil Plans**
  - b. Landscape Plans**
  - c. Architectural Plans**
- 5. Geotechnical Report**
- 6. Wetland Delineation Report and DSL Concurrence**
- 7. Transportation Impact Study**
- 8. Parking Analysis Memo**
- 9. Public Facilities and Services Impact Study**
- 10. Preliminary Stormwater Report**

# APPLICATION FORM

**EXHIBIT 1**



**Planning & Community Development**  
117 N. Molalla Avenue  
Molalla, OR. 97038  
(503) 759-0219  
Fax: (503) 829-3676

<i>FOR OFFICE USE ONLY:</i>	
Planning File No. : _____	City Approval: _____
Date Received: _____ Fee: _____	Title _____
Land Use Type: II	Date: _____
Received by: _____	Fee Paid: _____

## APPLICATION FOR LAND USE ACTION

### Type of Land Use Action Requested: (check all that apply)

- |  |  |
|--|--|
| <input type="checkbox"/> Annexation  | <input type="checkbox"/> Conditional Use               |
| <input type="checkbox"/> Plan Amendment (Proposed Zone _____)                  | <input type="checkbox"/> Partition (# of lots _____)   |
| <input type="checkbox"/> Planned Unit Development                              | <input type="checkbox"/> Subdivision (# of lots _____) |
| <input checked="" type="checkbox"/> Site Design Review                         | <input type="checkbox"/> Other: _____                  |
| <input type="checkbox"/> Variance (list standards to be varied in description) |  |

### Owner/Applicant:

Applicant: GREEN LIGHT -- HOME FIRST, LLC Phone: 503-320-8929

Applicant Address: 3050 SE Division Street #270, Portlanc Email: ben@hfdpartners.com

Owner: Diana Puhlman Phone: 503-829-8543

Owner Address: 1000 West Main, Molalla, OR 97038 Email: puhlman@molalla.net

Contact for additional info: Steve Kay, Cascadia Planning + Development Svc., 503-804-1089, steve@cascadiapd.com

### Property Information:

Address: 1000 W Main Street

Assessors \_\_\_\_\_

Map/Taxlot #: 52E08C / 1500

Current Use of \_\_\_\_\_ Zoning \_\_\_\_\_

Site: Single-Family Dwelling Designation: R-3

Intended Use: Apartment Complex

### Proposed Action:

Approval of a Type III Site Plan Review and Tree Removal Permit for a 60-Unit Apartment Complex and Associated Site and Street Frontage Improvements.

Proposed Use: 60-Unit Apartment Complex

Proposed No. of Phases (one each year): 1

**Authorizing Signatures:**

*I hereby certify that the information on this application and attachments are correct and that the property affected by this application is in the exclusive ownership or control of the applicant, or that the applicant has the consent of all partners in ownership of the affected property. An authorization letter from the property owner has been attached in the event that the owner's signature has not been provided below.*

**Property Owner(s):**

Diana Puhlman

Print or Type

DocuSigned by:  
Diana R Puhlman P.O.d. Faye L Puhlman  
06564740E48E43B...  
Signature

Print or Type

Signature

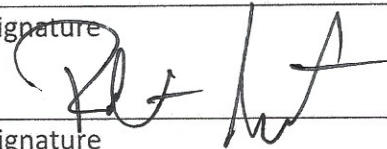
**Applicant(s) or Authorized Agent:**

Home First Development, LLC

Print or Type

Signature

Robert Justus



Print or Type

Signature

**The following materials must be submitted with your application or it will not be accepted at the counter.** Once taken at the counter, the City has up to 30 days to review the materials submitted to determine if we have everything we need to complete the review. Applicant can verify submittal includes specific materials necessary for the application per checklist.

- 3 Copies of Application Form\*** completely filled out and signed by the property owner (or person with authority to make decisions on the property).
- Copy of Deed** to verify ownership, easements, etc.
- At least 3 folded** sets of plans\*
- At least 3 copies** of narrative addressing application criteria\*
- Fee** (along with calculations utilized to determine fee if applicable)

**\*Please Note** that the required numbers of copies identified on the checklist are required for completeness; however, upon initial submittal applicants are encouraged to submit only 3 copies for completeness review. Prior to completeness, the required number of copies identified on the checklist and one full electronic copy will be required to be submitted.

# PROPERTY DEED

EXHIBIT 2



STEWART TITLE

AFTER RECORDING, RETURN TO:  
ROY D PUHLMAN  
13210 S HWY 211  
MOLALLA, OR 97038

UNTIL FURTHER NOTICE, ALL FUTURE  
TAX STATEMENTS SHALL BE SENT TO:  
ROY D PUHLMAN  
13210 S HWY 211  
MOLALLA, OR 97038  
TAX ACCOUNT NO.: R52E08C01500

STATUTORY SPECIAL WARRANTY DEED

COLETTE E SLEDGE, TRUSTEE OR HER SUCCESSORS IN TRUST UNDER THE  
COLETTE E. SLEDGE LIVING TRUST DATED 9-15-91

Grantor, conveys and specially warrants to ROY D PUHLMAN, \*\*  
Grantee, the following described real property free of  
encumbrances created or suffered by the grantor except as  
specifically set forth herein situated in CLACKAMAS County,  
State of Oregon, to-wit:

\*\* FAYE L PUHLMAN, HUSBAND AND WIFE  
SEE EXHIBIT "A" ATTACHED HERETO AND MADE A PART HEREOF.

The said property is free of encumbrances created or suffered by  
the grantor RIGHTS OF THE PUBLIC IN AND TO ANY PORTION OF THE  
HEREIN DESCRIBED PREMISES LYING WITHIN THE BOUNDARIES OF S  
HIGHWAY 211

THIS INSTRUMENT WILL NOT ALLOW USE OF THE PROPERTY DESCRIBED IN  
THIS INSTRUMENT IN VIOLATION OF APPLICABLE LAND USE LAWS AND  
REGULATIONS. BEFORE SIGNING OR ACCEPTING THIS INSTRUMENT, THE  
PERSON ACQUIRING FEE TITLE TO THE PROPERTY SHOULD CHECK WITH THE  
APPROPRIATE CITY OR COUNTY PLANNING DEPARTMENT TO VERIFY  
APPROVED USES AND TO DETERMINE ANY LIMITS ON LAWSUITS AGAINST  
FARMING OR FOREST PRACTICES AS DEFINED IN ORS 30.930.

The true and actual consideration for the within conveyance is  
\$75,000.00

Dated this 22<sup>nd</sup> day of May

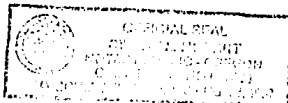
STATE OF OREGON

*Colette E. Sledge*  
Colette E. Sledge, Trustee

COUNTY OF CLACKAMAS

On May 22, 1996, personally appeared the above named  
COLETTE E SLEDGE, TRUSTEE and acknowledged the foregoing  
instrument to be HER voluntary act and deed.

*Cynthia Stewart*  
Notary Public for  
STATE OF OREGON  
My commission expires



96-041122

10  
207  
20

9611611-C  
PE

Contract 5710



EXHIBIT "A"

Legal Description:

Part of the Rachel Larking Donation Land Claim No. 43 in Township 5 South, Range 2 East, of the Willamette Meridian, in the County of Clackamas and State of Oregon. Described as follows:

*Beginning at the Northeast corner of that tract of land conveyed to Harvey C. Burghardt, et ux, by Deed recorded in Deed Book 491, page 381 and running thence South 81°30' East along the South line of Market Road No. 32, 196 feet to a point; thence South 18°47' West 669.00 feet, more or less, to the South boundary of that tract of land conveyed to L.O. Nightingale, et ux, by Deed recorded in Deed Book 137, page 426; thence North 81°30' West along the South boundary of the Nightingale tract 196.00 feet, more or less, to the point of intersection of said South boundary with the Southerly extension of the Easterly boundary line of the aforesaid Harvey C. Burghardt tract; thence Northerly along the Southerly extension of the East boundary line of the said Burghardt tract 244.00 feet, more or less, to the Southeast corner of said Burghardt tract; thence continuing Northerly along the East boundary line of the said Burghardt tract 425.00 feet to the point of beginning.*

STATE OF OREGON 96-041122  
CLACKAMAS COUNTY  
Received and placed in the public  
records of Clackamas County  
RECEIPT# AND FEE: 37188 \$30.00  
DATE AND TIME: 06/06/96 02:09 PM  
JOHN KAUFFMAN, COUNTY CLERK

2

# **CITY PRE-APPLICATION CONFERENCE NOTES**

**EXHIBIT 3**



Planning Department  
117 N Molalla Avenue  
PO Box 248  
Molalla, Oregon 97038  
Phone: (503) 759-0205  
communityplanner@cityofmolalla.com

## Planning Process Summary: Pre03-2021

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Applicant: Rob Justus – Home First Development

Site Address (or TLNO): 1000 W Main, Molalla, OR 97038

Site Zoning: Medium-High Density Residential (R-3)

Proposed Use: 60 Unit Apartment Complex

Pre-App Conference Date: February 17, 2021

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### Process

#### Site Design Review

- Per Molalla Municipal Code Section 17-4.2.020 site design review is required.
- Per Molalla Municipal Code Section 17-4.2.030 the proposed project meets thresholds for Type III Review: Quasi-Judicial Review with a Public Hearing.
- Type III Review processes are explained in Molalla Municipal Code Section 17-4.1.040

### Timeline

- Upon application submittal, the City has **30 days** for “Completeness Review” to determine whether the project meets submission requirements of 17-4.2.040 Application Submission Requirements
- If the project is deemed complete the City has **120 days** from that Completeness determination to bring the project to hearing and render a decision
- If the submission is not complete the Applicant has **180 days** from the incompleteness determination to resubmit a complete application
- If the project is not appealed, the Decision becomes final **10 days** after issuance of a notice of decision
- If *approved*, the Applicant may submit plans for Public Works Civil Review and building permit authorization, integrating all conditions of approval, upon the decision becoming final. This authorization releases Clackamas County to review building permits.

*Note: If needed corrections to the application are minor the City typically works with the Applicant to achieve completeness within the 30 day period*

## Molalla Planning Department Fees

- Type III Site Design Review: \$3000
- Building Permit Authorization: \$575 + \$75 per unit up to 20 units; \$15 per unit over 20 units

## Applicable Approval Criteria (Section 17-4.2.050 Approval Criteria)

*Staff has determined that narrative responses to each criterion from the sections below are required:*

### **Chapter 17, Division 2**

Section 17-2.2.030 Allowed Uses

Section 17-2.2.040 Lot and Development Standards

Section 17-2.3.080 Multifamily Development

Section 17-2.4.030 Water Resources (WR) Overlay

### **Chapter 17, Division 3**

Section 17-3.2.030 Residential Buildings

Chapter 17-3.3 Access and Circulation

Chapter 17-3.4 Landscaping, Fences and Walls, Outdoor Lighting,

Chapter 17-3.5 Parking and Loading

Chapter 17-3.6 Public Facilities

*Reference Sections:*

### **Chapter 17, Division 4**

Review all portions of Chapter 17-4.2 Site Design Review

Type III procedures are outlined in Section 17-4.1.040



# Oregon

Kate Brown, Governor

## Department of Transportation

Region 1 Headquarters  
123 NW Flanders Street  
Portland, Oregon 97209  
(503) 731.8200  
FAX (503) 731.8259

February 28, 2021

ODOT #12009

## ODOT Response

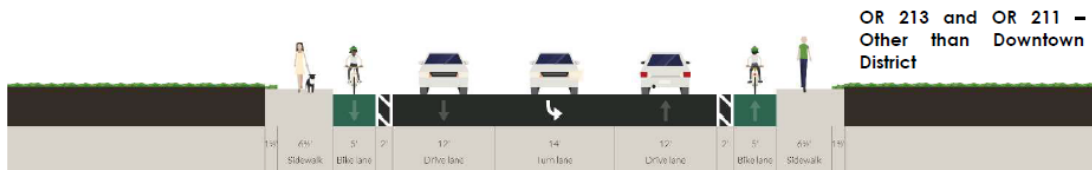
<b>Project Name:</b> Affordable Housing 1000 W Main St	<b>Applicant:</b> Rob Justice, Home First Development
<b>Jurisdiction:</b> City of Molalla	<b>State Highway:</b> OR 211
<b>Site Address:</b> 1000 W Main St	

The site of this proposed land use action is adjacent to W Main St (OR 211). ODOT has permitting authority for this facility and an interest in ensuring that this proposed land use is compatible with its safe and efficient operation. **Please direct the applicant to the District Contact indicated below to determine permit requirements and obtain application information.**

### COMMENTS/FINDINGS

The applicant proposes a 60 unit affordable housing development adjacent to OR 211 with an access to the highway. Due to the 35mph posted speed and the City's Transportation System Plan cross section, a center left turn lane will be required to provide safe access to the development. In order to design the center turn lane consistent with ODOT standards, the roadway may need to be widened to connect the left turn lane from Ona Way to connect to the left turn lane at Hezzie Lane. Prior to submitting design plans to our District 2C office for permitting, it is recommended that the applicant prepare a conceptual layout of the roadway improvements for ODOT review. **To coordinate review of the conceptual layout, please direct the applicant to contact the Development Review Planner identified below.**

ODOT recommends that the City the frontage improvements and right of way donation as necessary to be consistent with the adopted cross section as shown below.



**Arterial with Buffered Bike Lanes and Center Turn Lane (68-foot ROW, 52-foot Paved Width)**

The Cascade Shopping Center is currently being developed at 121 S Hezzie Lane just to the east of this development. The residents of the new housing development will be within a short walk of the shopping center. There is currently a gap in sidewalk along the church frontage between the proposed development and the shopping center. We encourage the applicant to explore the opportunity of working with the City and the church to construct sidewalks along the housing development site and church frontage to facilitate safe pedestrian access to the shopping center. The church would need to be willing to donate right of way to ODOT for the improvements.

All alterations within the State highway right of way are subject to the ODOT Highway Design Manual (HDM) standards. Alterations along the State highway but outside of ODOT right-of-way may also be subject to ODOT review pending its potential impact to safe operation of the highway. If proposed alterations deviate from ODOT standards a Design Exception Request must be prepared by a licensed engineer for review by ODOT Technical Services. Preparation of a Design Exception request does not guarantee its ultimate approval. Until more detailed plans have been reviewed, ODOT cannot make a determination whether design elements will require a Design Exception.

Note: Design Exception Requests may take up to 3 months to process.

All ODOT permits and approvals must reach 100% plans before the District Contact will sign-off on a local jurisdiction Building Permit, or other necessary requirement prior to construction. The City should not issue the Occupancy Permit until all improvements in the State highway have been completed and accepted by ODOT.

### **ODOT RECOMMENDED LOCAL CONDITIONS OF APPROVAL**

#### Traffic Impacts

- The applicant shall submit a traffic impact analysis to assess the impacts of the proposed use on the State highway system. The analysis must be conducted by a Professional Engineer registered in Oregon. **Contact the ODOT Traffic representative identified below and the local jurisdiction to scope the study.**

#### Frontage Improvements and Right of Way

- Curb, sidewalk, buffered bike lane and road widening shall be constructed as necessary to be consistent with local, ODOT and ADA standards.
- Right of way donated to ODOT as necessary to accommodate the planned cross section shall be provided. The deed must be to the State of Oregon, Oregon Department of Transportation. The ODOT District contact will assist in coordinating the transfer. ODOT should provide verification to the local jurisdiction that this requirement has been fulfilled. The property owner must be the signatory for the deed and will be responsible for a certified environmental assessment of the site prior to transfer of property to the Department.

Note: It may take up to **3 months** to transfer ownership of property to ODOT.

#### Access to the State Highway

- A State Highway Approach Road Permit from ODOT for access to the state highway for the proposed use is required. Truck turning templates shall be provided as needed to ensure vehicles can enter and exit the approach safely. Site access to the state highway is regulated by OAR 734.51. For application information go to <http://www.oregon.gov/ODOT/HWY/ACCESSMGT/Pages/Application-Forms.aspx>.

Note: It may take **2 to 3 months** to process a State Highway Approach Road Permit.

#### Permits and Agreements to Work in State Right of Way

- An ODOT Miscellaneous Permit must be obtained for all work in the highway right of way. When the total value of improvements within the ODOT right of way is estimated to

be \$100,000 or more, an agreement with ODOT is required to address the transfer of ownership of the improvement to ODOT. An Intergovernmental Agreement (IGA) is required for agreements involving local governments and a Cooperative Improvement Agreement (CIA) is required for private sector agreements. The agreement shall address the work standards that must be followed, maintenance responsibilities, and compliance with ORS 276.071, which includes State of Oregon prevailing wage requirements.

Note: If a CIA is required, it may take up to **6 months** to process.

Illumination within the ODOT right of way must be in accordance with AASHTO illumination standards and the ODOT Lighting Policy and Guidelines, which states that local jurisdictions must enter into an Intergovernmental Agreement (IGA) with ODOT wherein the local jurisdiction is responsible for installation, maintenance, operation, and energy costs.

An ODOT Miscellaneous Permit is required for connection to state highway drainage facilities. Connection will only be considered if the site’s drainage naturally enters ODOT right of way. The applicant must provide ODOT District with a preliminary drainage plan showing impacts to the highway right of way.

A drainage study prepared by an Oregon Registered Professional Engineer is usually required by ODOT if:

1. Total peak runoff entering the highway right of way is greater than 1.77 cubic feet per second; or
2. The improvements create an increase of the impervious surface area greater than 10,758 square feet.

**Please send a copy of the Land Use Notice to:**

ODOT Region 1 Planning  
Development Review  
123 NW Flanders St  
Portland, OR 97209

[ODOT\\_R1\\_DevRev@odot.state.or.us](mailto:ODOT_R1_DevRev@odot.state.or.us)

Development Review Planner: Marah Danielson	503.731.8258, marah.b.danielson@odot.state.or.us
Traffic Contact: Avi Tayar, P.E.	503.731.8221 Abraham.tayar@odot.state.or.us
District Contact: Loretta Kieffer	503.667.7441 Loretta.l.kieffer@odot.state.or.us

## Subject: 1000 west main



**Mike Penunuri** <penunuri@molallafire.org>  
to Dan Zinder, Mac Corthell

Wed, Feb 17, 7:51 AM (1 day ago)

**You are viewing an attached message.** Green Light LLC Mail can't verify the authenticity of attached messages.

Dan and Mac. below are preliminary comments for 1000 West Main Street. We have a board meeting this morning and I don't know if I will make the pre-app.

- 1) Hydrants and locations need to be added to plans for approval. No landscaping. within 3 feet. 4 feet for electrical . 26 feet clear space is required directly in front of hydrants. See OFC D103.1 for details
- 2) FDC locations need to be added to the plans for approval.
- 3) Look at height of units at the sidewall/roof intersection if more than 30 feet, the access has to be at least 26 feet in width. See OFC D105
- 4) Double check turning radius in the complex. 24/48 radius for 20 foot driving surface or 44/56 for anything less.
- 5) There are several area that will need to be marked as "NO Parking" those can be discussed at a later date once the final foot print is developed.
- 6) Please add mail box locations to the prints as those can at times block access.
- 6) Please add car port foot prints on plans if covered parking is planned. Measurements for driving surfaces should be taken from these car ports. Not the vehicles.
- 7) Address signs as per other apartments in Molalla.

Again, these comments are preliminary based on the information provided in the pre-application packet. More comments will be made as the project develops.

Mike Penunuri  
Lieutenant/Paramedic  
Molalla Fire District  
503-829-2200 Ext. 104

This message is confidential. It may also be privileged or otherwise protected by work product immunity or other legal rules. If you have received it by mistake, please let us know by e-mail reply and delete it from your system; you may not copy this message or disclose its contents to anyone.



DRAWINGS FOR:  
**MOLALLA APARTMENTS**  
 13210 MAIN STREET  
 MOLALLA, OR 97038

FOR:  
**HOME FIRST DEVELOPMENT PARTNERS**  
 866 N. COLUMBIA BLVD, SUITE A-25  
 PORTLAND, OR 97217

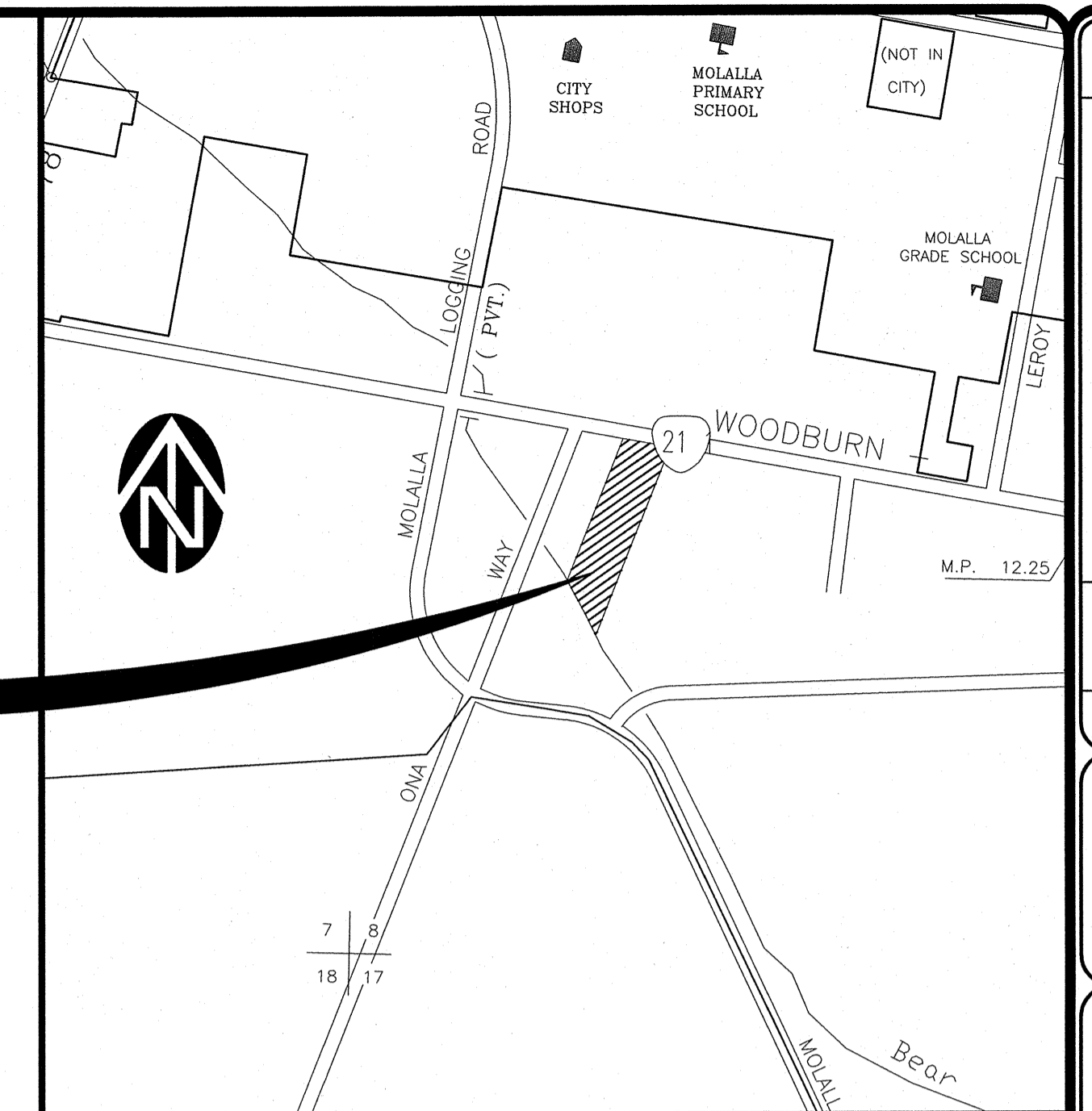
**PROJECT MANAGER: ROB JUSTUS**  
 360-530-9914

**DRAWING INDEX**

DWG	TITLE
C1.0	COVER SHEET, VICINITY & LOCATION MAPS, DRAWING INDEX
C1.1	CONSTRUCTION NOTES
C1.2	CONSTRUCTION NOTES
A100	ARCHITECTURAL SITE PLAN (BY OTHERS)
C2.0	EXISTING CONDITIONS, EROSION CONTROL, & DEMOLITION PLAN
C2.1	POST CONSTRUCTION EROSION CONTROL PLAN
C2.2	EROSION CONTROL NOTES & DETAILS
C2.3	EROSION CONTROL NOTES & DETAILS
C2.4	EROSION CONTROL NOTES & DETAILS
C3.0	GRADING & DRAINAGE PLAN
C3.1	SURFACING PLAN
C4.0	OVERALL UTILITY PLAN
C4.1	UTILITY PLAN & PROFILE
C5.0	CIVIL DETAILS
C5.1	CIVIL DETAILS
C5.2	CIVIL DETAILS
C5.3	CIVIL DETAILS

SEE HIGHWAY 211 (MAIN STREET) PLANS FOR REQUIRED PUBLIC STREET IMPROVEMENTS.

PROJECT LOCATION



VICINITY MAP

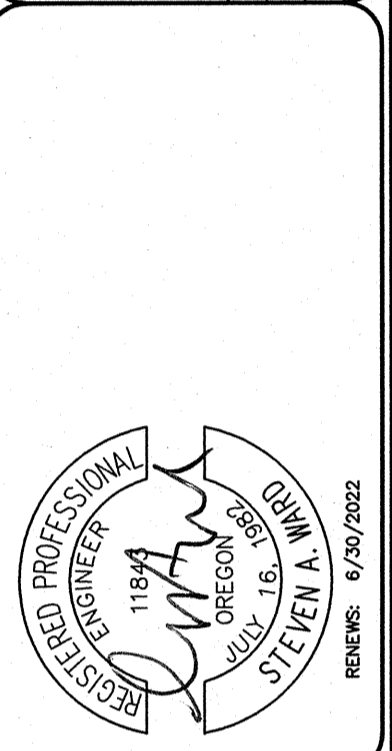
**GENERAL LEGEND**

ITEM	PROPOSED	EXISTING
SANITARY SEWER	—SS—	—SS—
STORM DRAIN	—SD—	—SD—
WATER	—W—	—W—
GAS	—G—	—G—
TELEPHONE	—T—	—T—
POWER	—P—	—P—
FENCE	—X—X—	—X—X—
BARRICADE	[Symbol]	[Symbol]
TELEPHONE MANHOLE	[Symbol]	[Symbol]
TELEPHONE PEDESTAL	[Symbol]	[Symbol]
SANITARY SEWER MANHOLE	[Symbol]	[Symbol]
STORM DRAIN MANHOLE	[Symbol]	[Symbol]
CATCH BASIN	[Symbol]	[Symbol]
FIRE HYDRANT AND VALVE	[Symbol]	[Symbol]
WATER METER	[Symbol]	[Symbol]
WATER VALVE	[Symbol]	[Symbol]
POWER POLE	[Symbol]	[Symbol]
POWER POLE W/ANCHOR	[Symbol]	[Symbol]
POLE W/LUMINARE	[Symbol]	[Symbol]
LIGHT POLE	[Symbol]	[Symbol]
SIGN POST	[Symbol]	[Symbol]
MAILBOX	[Symbol]	[Symbol]
HEDGE OR BRUSH	[Symbol]	[Symbol]
TREES	[Symbol]	[Symbol]
STREET OR ALLEY RIGHT OF WAY	R/W	
PLATTED LOT LINE	[Symbol]	
OWNERSHIP LINE	[Symbol]	
EASEMENT OR TEMPORARY RIGHT OF WAY	[Symbol]	
PROJECT CENTERLINE AND	2 3 4 5	



Know what's below.  
 Call before you dig.

NO.	DATE	DESCRIPTION	BY
1	01/04/23	ADDED TREES @ SW CORNER	AR



**WESTTECH ENGINEERING, INC.**  
 CONSULTING ENGINEERS AND PLANNERS  
 3841 Fairview Industrial Dr., S.E., Suite 100, Salem, OR 97302  
 Phone: (503) 585-2474, Fax: (503) 585-3886  
 E-mail: westtech@westtech-eng.com

MOLALLA APARTMENTS  
 HOME FIRST DEVELOPMENT PARTNERS  
**COVER SHEET,  
 VICINITY & LOCATION MAPS,  
 & DRAWING INDEX**

**DRAWING  
 C1.0**  
**JOB NUMBER  
 3312.0000.0**

GENERAL NOTES

- Contractor shall procure and conform to all construction permits required by the City of Molalla and ODOT.
- Owner to pay all project permit costs, including but not limited to utility tapping, TV, and chlorination costs. The Contractor shall coordinate with the Approving Agency to determine appropriate fees and provide the Owner with 48 hours notice prior to the required payment of fees or costs. Contractor to apply for and pay all Private Plumbing and Electrical Permits
- Oregon law requires the Contractor to follow rules adopted by the Oregon Utility Notification Center. Those rules are set forth in OAR 952-001-0010 through OAR 952-001-0090. Obtain copies of the rules by calling the center. (Note: the telephone number for the Oregon Utility Notification Center is 503-232-1987).
- Contractor to notify City, ODOT, and all utility companies a minimum of 48 business hours (2 business days) prior to start of construction, and comply with all other notification requirements of the Approving Agency with jurisdiction over the work.
- Contractor shall provide all bonds and insurance required by public and/or private agencies having jurisdiction. Where required by public and/or private agencies having jurisdiction, the Contractor shall submit a suitable maintenance bond prior to final payment.
- All materials and workmanship for facilities in street right-of-way or easements shall conform to Approving Agencies' construction specifications wherein each has jurisdiction, including but not limited to the City, Oregon Health Division (OHD), and the Oregon Department of Environmental Quality (DEQ).
- Unless otherwise approved by the Public Works Director, construction of all public facilities shall be done between 7:00 a.m. and 6:00 p.m., Monday through Saturday.
- The Contractor shall perform all work necessary to complete the project in accordance with the approved construction drawings including such incidentals as may be necessary to meet the Approving Agencies' requirements and provide a completed project.
- Any inspection by the City, ODOT, or other Approving Agency shall not, in any way, relieve the Contractor from any obligation to perform the work in strict compliance with the contract documents, applicable codes, and Approving Agency requirements.
- Contractor shall maintain one complete set of approved drawings on the construction site at all times whereon he will record all approved deviations in construction from the approved drawings, as well as the station locations and depths of all existing utilities encountered. These field record drawings shall be kept up to date at all times and shall be available for inspection by the Approving Agency or Owner's Representative upon request. Failure to conform to this requirement may result in delay in payment and/or final acceptance of the project.
- Upon completion of construction of all new facilities, Contractor shall submit a clean set of field record drawings containing all as-built information to the Engineer. All information shown on the Contractor's field record drawings shall be subject to verification. If significant errors or deviations are noted, an as-built survey prepared and stamped by a registered professional Land Surveyor shall be completed at the Contractor's expense.
- Contractor shall procure and conform to DEQ stormwater permit No. 1200C for construction activities where 1 acre or more are disturbed.
- The contractor shall retain and pay for the services of a registered Civil Engineer and/or Land Surveyor licensed in the State of Oregon to establish construction control and perform initial construction surveys to establish the lines and grades of improvements as indicated on the drawings. Staking for buildings, structures, curbs, gravity drainage pipes/structures and other critical improvements shall be completed using equipment accurate to 0.04 feet horizontally and 0.02 feet vertically, or better. Use of GPS equipment for final construction staking of these critical improvements is prohibited. The registered professional surveyor shall provide the design engineer with copies of all grade sheets for construction staking performed for the project.
- See architectural drawings for site lighting, site dimensioning, and continuation of all utilities.

TRAFFIC CONTROL:

- Contractor shall erect and maintain barricades, warning signs, traffic cones (and all other traffic control devices required) per City and ODOT requirements in accordance with the current MUTCD (including Oregon amendments). Access to driveways shall be maintained at all times. All traffic control measures shall be approved and in place prior to any construction activity. Prior to any work in the existing public right-of-way, Contractor shall submit final traffic control plan to the Approving Agency for review and issuance of a Lane Closure or Work in Right-of-Way Permit. The Traffic Control Plan shall include provisions to route pedestrians around and through the work area in accordance with ODOT Standards.

TESTING AND INSPECTION:

- For public and private improvements, the Contractor shall be responsible to ensure that all required or necessary inspections are completed by authorized inspectors prior to proceeding with subsequent work which covers or that is dependent on the work to be inspected. Failure to obtain necessary inspection(s) and approval(s) shall result in the Contractor being fully responsible for all problems and/or corrective measures arising from uninspected work.
- Unless otherwise specified, the attached "Required Testing and Frequency" table outlines the minimum testing schedule for private improvements on the project. This testing schedule is not complete, and does not relieve the Contractor of the responsibility of obtaining all necessary inspections or observations for all work performed, regardless of who is responsible for payment. Cost for retesting shall be borne by the Contractor.

EXISTING UTILITIES & FACILITIES:

- The location and descriptions of existing utilities shown on the drawings are compiled from available records and/or field surveys. The Engineer or utility companies do not guarantee the accuracy or the completeness of such records. Contractor shall field verify locations and sizes of all existing utilities prior to construction.
- Contractor shall field verify location and depth of all existing utilities where new facilities cross. All utility crossings marked or shown on the drawings shall be potholed using hand tools or other non-invasive methods prior to excavating or boring. Contractor shall be responsible for exposing potential utility conflicts far enough ahead of construction to make necessary grade or alignment modifications without delaying the work. If grade or alignment modification is necessary, Contractor shall notify the Design Engineer, and the Design Engineer or the Owner's Representative shall obtain approval from the Approving Agency prior to construction.
- The Contractor shall be responsible for locating and marking all existing survey monuments of record (including but not limited to property and street monuments) prior to construction. If any survey monuments are removed, disturbed or destroyed during construction of the project, the Contractor shall retain and pay for the services of a Registered Professional Surveyor licensed in the State of Oregon to reference and replace all such monuments prior to final payment. The monuments shall be replaced within a maximum of 90 days, and the County Surveyor shall be notified in writing as required by per ORS 209.150.
- All facilities shall be maintained in-place by the Contractor unless otherwise shown or directed. Contractor shall take all precautions necessary to support, maintain, or otherwise protect existing utilities and other facilities at all times during construction. Contractor to leave existing facilities in an equal or better-than-original condition and to the satisfaction of the Approving Agency and Owner's Representative.
- Utilities or interfering portions of utilities that are abandoned in place shall be removed by the Contractor to the extent necessary to accomplish the work. The Contractor shall plug the remaining exposed ends of abandoned utilities after appropriate verification procedures have taken place.
- Contractor shall remove all existing signs, mailboxes, fences, landscaping, etc., as required to avoid damage during construction and replace them to existing or better condition.
- The Contractor shall be responsible for managing construction activities to ensure that public streets and right-of-ways are kept clean of mud, dust or debris. Dust abatement shall be maintained by adequate watering of the site by the Contractor.

GRADING, PAVING & DRAINAGE:

- Unless otherwise noted, all grading, rock and paving to conform to Oregon Standard Specifications for Construction (OSSC/ODOT/APWA), 2021 edition.
- Clear and grub within work limits all surface vegetation, trees, stumps, brush, roots, etc. Do not damage or remove trees except as approved by the Owner's Representative or as shown on the drawings. Protect all roots two inches in diameter or larger.
- Strip work limits, removing all organic matter, which cannot be compacted into a stable mass. All trees, brush, and debris associated with clearing, stripping or grading shall be removed and disposed of off-site.
- For public and private improvements, except as otherwise allowed by the specifications, drawing details or notes, immediately following stripping and grading operations, compact subgrade to 92% of the maximum dry density per AASHTO T-180 test method (Modified Proctor). Subgrade must be inspected and approved by the Owner's authorized representative before placing, engineered fills or fine grading for base rock.
- Engineered fills shall be constructed and compacted in 6" lifts over approved subgrade. All fills shall be engineered and comply with the Oregon Structural Specialty Code, with each lift compacted to 92% of the maximum dry density per AASHTO T-180 test method (Modified Proctor).
- Granular baserock shall conform to the requirements of OSSC (ODOT/APWA) 02630.10 (Dense Graded Base Aggregate), with no more than 10% passing the #40 sieve and no more than 5% passing the #200 sieve.
- Compact granular baserock to 92% of the maximum dry density per AASHTO T-180 test method (Modified Proctor). Written baserock compaction test results from an independent testing laboratory must be received by the Owner's authorized representative before placing AC pavement, and a finished rock grade proof-roll (witnessed by the Owners authorized representative) must be performed.
- A.C. pavement shall conform to OSSC (ODOT/APWA) 00745 (Hot Mixed Asphalt Concrete Pavement) for standard duty mix. Unless otherwise specified or shown on the drawings, base lifts shall be 3/4" dense graded mix, while wearing courses shall be 1/2" dense graded mix. Unless otherwise specified or shown on the drawings, A.C. pavement for parking lots and streets shall be Level 2 mix (50 blow Marshall) per OSSC (ODOT/APWA) 00744.13. A.C. Pavement shall be compacted to a minimum of 91% of maximum density as determined by the Rice standard method. Written AC pavement compaction test results from an independent testing laboratory must be received by the Owner's authorized representative before final payment.
- Pavement surface shall be a smooth, well-sealed, tight mat without depressions or bird baths. Bony or open graded pavement surfaces shall be repaired to the satisfaction of the Owner's authorized representative, prior to final acceptance of the work.

- HMAC mixtures shall be placed only when the surface is dry and weather conditions are such that proper handling, finishing and compaction can be accomplished. In no case shall bituminous mixtures be placed when the surface temperature is below the minimum established under 2018 OSSC (ODOT/APWA) 00744.40 (AC - Season and Temperature Limitations) or the project specifications, whichever is more stringent.
- Contractor shall protect new pavement against traffic as required, until it has cooled sufficiently to avoid tracking.
- For parking lots or private access drives, the final lift of AC pavement shall not be placed until after the building is fully enclosed and weatherproof, unless otherwise approved by the Owner's authorized representative.
- Unless otherwise shown on the drawings or details, straight grades shall be run between all finish grade elevations and/or finish contour lines shown (exception: where grades are shown across sidewalks, slopes shall be adjusted to ensure that maximum allowable sidewalk cross slopes are not exceeded).
- Finish pavement grades at transition to existing pavement shall match existing pavement grades or be feathered past joints with existing pavement as required to provide a smooth, free draining surface.
- All existing or constructed manholes, cleanouts, monument boxes, gas valves, water valves and similar structures shall be adjusted to match finish grade of the pavement, sidewalk, landscaped area or median strip wherein they lie. Verify that all valve boxes and risers are clean and centered over the operating nut.
- Unless otherwise shown on the drawings, no cut or fill slopes shall be constructed steeper than 2H:1V.
- Unless otherwise shown on the landscape plans, all planter areas shall be backfilled with approved topsoil minimum 8" thick. Stripping materials shall not be used for planter backfill.
- Contractor shall seed and mulch (uniformly by hand or hydroseed) all exposed slopes and disturbed areas which are not scheduled to be landscaped, including trench restoration areas. If the Contractor fails to apply seed and mulch in a timely manner during periods favorable for germination, or if the seeded areas fail to germinate, the Owner's Representative may (at his discretion) require the Contractor to install sod to cover such disturbed areas.

CURBS & SIDEWALKS:

- Unless otherwise shown or indicated on the drawings, 6-inches nominal curb exposure used for design of all parking lot and street grades.
- Where new curbing connects to existing curbing or is installed along existing streets or pavement, the gutter grade shall match the existing street grades so as to allow drainage from the street to the gutter and through any transitions. The Contractor shall notify the Owner's Representative in writing of any grade discrepancies or problems prior to curb placement.
- Contractor shall construct all handicap access ramps in accordance with current ADA requirements.
- Sidewalks shall be a minimum of 4-inches thick and standard residential driveways shall be a minimum of 6-inches thick. Commercial use driveways and alley approaches shall be minimum 8-inches thick. All curbs, sidewalks and driveways shall be constructed using 3300-psi concrete, and shall be cured with Type 1 or Type 1D clear curing compound. All sidewalks shall be ADA compliant.
- Curb & sidewalk concrete shall be placed only during periods when it will not be damaged by rain (protect unhardened concrete from precipitation). Concrete shall not be placed on frozen baserock. Do not begin concrete placement until temperature in the shade is a minimum of 35F and rising, and stop placement if air temperature falls below 35F. Protect concrete from freezing for a minimum of 5 days after placement per OSSC (ODOT/APWA) 00440.40.d & 00756.40 or the project specifications, whichever is more stringent.
- Contraction joints shall be installed directly over any pipes that cross under the sidewalk, to control cracking. In general, cracks in new curbs or sidewalks (at locations other than contraction joints) are not acceptable, and cracked panels shall be removed & replaced unless otherwise approved by the Approving Agency and the design engineer.

- All sidewalks shall be ADA compliant. Direction of sidewalk cross slope shall conform with the slope direction shown on the grading plan. Sidewalk cross slopes shall not exceed 1:67 (1.5%) nor be less than 1%. Longitudinal slope shall not exceed 1:20 (5%).
- Where trench excavation requires removal of PCC curbs and/or sidewalks, the curbs and/or sidewalks shall be sawcut and removed at a tooled joint unless otherwise authorized in writing by the Approving Agency. The sawcut lines shown on the drawings are schematic and not intended to show the exact alignment of such cuts.
- Unless otherwise shown on the drawings, areas along curbs and sidewalks shall be backfilled with approved topsoil, as well as being seeded and mulched (or hydroseeded).

PIPED UTILITIES:

- All tapping of existing sanitary sewer, storm drain mains, and manholes must be done by Contractor forces.
- The Contractor shall have appropriate equipment on site to produce a firm, smooth, undisturbed subgrade at the trench bottom, true to grade. The bottom of the trench excavation shall be smooth, free of loose materials or tooth grooves for the entire width of the trench prior to placing the granular bedding material.

- All pipes shall be bedded with minimum 6-inches of 3/4"-0 crushed rock bedding and backfilled with compacted 3/4"-0 crushed rock in the pipe zone (crushed rock shall extend a minimum of 12-inches over the top of the pipe in all cases). Unless CDF or other backfill is shown or noted on the drawings, crushed rock trench backfill shall be used under all improved areas, including pavement, sidewalks, foundation slabs, buildings, etc.
- Granular trench bedding and backfill shall conform to the requirements of OSSC (ODOT/APWA) 02630.10 (Dense Graded Base Aggregate), 3/4"-0. Unless otherwise shown on the drawings, compact granular backfill to 92% of the maximum dry density per AASHTO T-180 test method (Modified Proctor).
- Contractor shall arrange to abandon existing sewer and water services not scheduled to remain in service in accordance with approving agency requirements.
- All piped utilities abandoned in place shall have all openings closed with concrete plugs with a minimum length equal to 2 times the diameter of the abandoned pipe.
- The end of all utility service lines shall be marked with a 2-x-4 painted white and wired to pipe stub. The pipe depth shall be written on the post in 2" block letters and red lined on the drawings for preparation of As-Built Drawings.
- All non-metallic water, sanitary and storm sewer piping shall have an electrically conductive insulated 12 gauge solid core copper tracer wire the full length of the installed pipe using blue wire for water and green wire for storm and sanitary piping. Tracer wire shall be extended up into all valve boxes, catch basins, manholes and lateral cleanout boxes. Tracer wire penetrations into manholes shall be within 18 inches of the rim elevation and adjacent to manhole steps. The tracer wire shall be tied to the top manhole step or otherwise supported to allow retrieval from the outside of the manhole. All tracer wire splices shall be made with waterproof splices or waterproof/corrosion resistant wire nuts.
- No trenches in sidewalks, roads, or driveways shall be left in an open condition overnight. All such trenches shall be closed before the end of each workday and normal traffic and pedestrian flows restored.
- Before mandrel testing, TV inspection or final acceptance of gravity pipelines, all trench compaction shall be completed and all sewers and storm drains flushed & cleaned to remove all mud, debris & foreign material from the pipelines, manholes and/or catch basins.
- Where future extensions are shown upstream of new manholes (sewer or storm), catch basins or junction boxes, pipe stubs (with gasketed caps) shall be installed at design grades to a point 2' minimum outside of the structure.

WATER SYSTEM:

- City forces to operate all valves, including fire hydrants, on existing public mains.
- All Public water mains to conform to City Standards and Specifications.
- All Private water mains shall be Class 52 ductile iron or C-900 PVC (DR 18).
- All fittings 4-inches through 24-inches in diameter shall be ductile iron fittings in conformance with AWWA C-153 or AWWA C-110. The minimum working pressure for all MJ cast iron or ductile iron fittings 4-inches through 24-inch in diameter shall be 350 psi for MJ fittings and 250 psi for flanged fittings.
- All water mains to be installed with a minimum 36 inch cover to finish grade unless otherwise noted or directed. Water service lines shall be installed with a minimum 30-inch cover. Deeper depths may be required as shown on the drawings or to avoid obstructions.
- Unless otherwise shown or approved by the Engineer, all valves shall be flange connected to adjacent tees or crosses.
- Thrust restraint shall be provided on all bends, tees and other direction changes per Approving Agency requirements and as specified or shown on the drawings.
- Unless otherwise noted, water service pipe 3-inch and smaller on the private side of the meter shall be Schedule 40 PVC. Unless otherwise specified, private water service piping shall be hydrostatically pressure tested to a minimum of 150% of the maximum static pressure at the site. All materials and workmanship for all private water lines, including water lines located within any building envelope, shall be installed in conformance with Uniform Plumbing Code requirements. All water service pipe on the private side of the meter shall be installed by a licensed plumber in accordance with Uniform Plumbing Code requirements.
- Domestic and fire backflow prevention devices and vaults shall conform to requirements of public and/or private agencies having jurisdiction. The Contractor shall be responsible for having backflow devices tested and certified prior to final acceptance of the work.
- Contractor shall provide all necessary equipment and materials (including plugs, blowoffs, valves, service taps, etc.) required to flush, test and disinfect waterlines per the Approving Agency requirements.
- The work shall be performed in a manner designated to maintain water service to buildings supplied from the existing waterlines. In no case shall service to any main line or building be interrupted for more than four (4) hours in any one-day. Contractor shall notify the Approving Agency and all affected residents and businesses a minimum of 24 business hours (1 business day) before any interruption of service.

- Where new waterlines cross below or within 18-inches vertical separation above a sewer main or sewer service lateral, center one full length of waterline pipe at point of crossing the sewer line or sewer lateral. In addition (unless otherwise approved in writing by the Approving Agency, existing sewer mains and/or service laterals within this zone shall be replaced with a full length of Class 50 Ductile Iron or C-900 PVC pipe (DR 18) centered at the crossing in accordance with OAR 333-061 and Approving Agency requirements. Connect to existing sewer lines with approved rubber couplings. Example: For an 8-inch waterline with 36-inches cover, 4-inch service lateral inverts within 5.67-feet (68-inches) of finish grade must be DI or C-900 PVC at the crossing.
- All waterlines, services and appurtenances shall be pressure tested for leakage. All testing shall conform to requirements as outlined in the specifications, Approving Agency standards and/or testing forms. The hydrostatic test shall be performed with all service line corporation stops open and meter stops closed, and with all hydrant line valves open. Prior to the start of each pressure test, the position of all mainline valves, hydrant line valves and service line corporation stops in the test segment shall be verified.
- After the pressure test and prior to disinfecting, the water lines shall be thoroughly flushed through hydrants, blow offs or by other approved means.
- Disinfection & Bacteriological Testing. All water mains and service lines shall be chlorine disinfected per Approving Agency requirements, AWWA C-651 or OAR 333-061 (25 mg/L minimum chlorine solution, 24 hours contact time), whichever is more stringent. Unless otherwise approved by the Approving Agency, a Representative from the Approving Agency shall witness the application of the chlorine solution and the chlorine testing at the end of the 24 hour contact period. After the 24 hour chlorine contact period, the free chlorine concentration shall be checked, and if it is found to be 10 mg/L or more, the chlorine solution shall be drained (otherwise the line shall be rechlorinated), the waterline flushed with potable water, and a minimum of two consecutive samples taken at least 24 hours apart shall be collected from the waterline for microbiological analysis (ie. one sample immediately after flushing, and another sample 24 hours later). Contractor to pay for laboratory analysis of water samples taken under the supervision of the Approving Agency. If the results of both analyses indicate that the water is free of coliform organisms, the waterline may be placed in service. Should the initial treatment prove ineffective, the chlorination shall be repeated until confirmed tests show acceptable results.
- Disinfection of Connections. For connections which cannot be disinfected with the waterline mainlines as noted above, all fittings, valves and appurtenances, including tool surfaces which will come in contact with potable water, shall be thoroughly cleaned by washing with potable water and then swabbed or sprayed with a one percent (1%) hypochlorite solution (10,000 mg/L) in accordance with the requirements of AWWA C-651 and OAR 333-061.

SEWER & STORM MANHOLES:

- All precast manholes shall be provided with integral rubber boots. Where manholes without integral rubber boots are approved by the Owner's Representative and Approving Agency, a pipe joint shall be provided on all mainlines within 1.5 feet of the outside face of the manhole. Where required by Public Works, watertight lockdown lids required on all manholes outside of public right-of-way.
- Openings for connections to existing manholes shall be made by core-drilling the existing manhole structure, and installing a rubber boot. Connections shall be watertight and shall provide a smooth flow into and through the manhole with no ponding. Small chipping hammers or similar light tools which will not damage or crack the manhole base may be used to shape channels, but may be used to enlarge existing openings only if authorized in writing by the Owner's Representative. Use of pneumatic jackhammers shall be prohibited.
- Manhole channels depths (sewer & storm) shall be to the heights shown on the drawings, but in no case shall the channel depth be less than 2/3 of the pipe diameter. Channels, as well as shelves between the channels and the manhole walls, shall be sloped to drain per plan details.
- Manholes constructed over existing sanitary sewers shall conform to the requirements of OSSC (ODOT/APWA) 490.41, Manholes over Existing Sewers. The existing pipe shall not be broken out until after the completion of the manhole test.

SANITARY SEWER SYSTEM:

- Unless otherwise specified, sanitary sewer pipe shall be solid wall PVC in conformance with ASTM D3034, SDR 35 (≤15") or ATSM F-679, PS 46 (≥18"). Minimum stiffness shall be 46 psi per ASTM D-2412 and joint type shall be elastomeric gasket conforming to ASTM D-3212. All other appurtenances and installation to conform to the Approving Agency's specifications. All materials and workmanship for all private sanitary sewers, including sewers located within any building envelope, shall be installed in conformance with Uniform Plumbing Code requirements.
- Unless otherwise specifically noted on the drawings, manufactured fittings (tee or wye per Approving Agency) shall be used for all lateral connections to new sewer mainlines.
- Contractor shall provide all necessary materials, equipment and facilities to test sanitary sewer pipe and appurtenances for leakage in accordance with testing schedule herein or the Approving Agency's construction standards, whichever are more stringent. Sanitary sewer pipe and appurtenances shall be tested for leakage. Leakage tests shall include an air test of all sewer mains and laterals and vacuum testing of the manholes. Manhole testing shall be performed after completion of AC pavement and final surface restoration.

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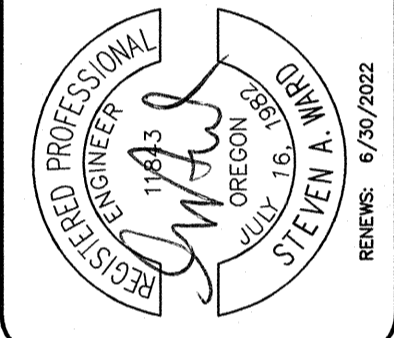
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BAR IS ONE INCH ON ORIGINAL DRAWING

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IF NO ONE INCH ON SCALES ACCORDINGLY

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DATE: SEP 2021

DRN. SAW  
DKN. AR  
CKD. AR



**WESTECH ENGINEERING, INC.**  
CONSULTING ENGINEERS AND PLANNERS

3841 Fairview Industrial Dr. S.E., Suite 100, Salem, OR 97302  
Phone: (503) 585-2474 Fax: (503) 585-3886  
E-mail: westech@westech-eng.com

MOLALLA APARTMENTS  
HOME FIRST DEVELOPMENT PARTNERS

**CONSTRUCTION NOTES**

DRAWING  
**C1.1**

JOB NUMBER  
**3312.0000.0**

86. After manhole channeling and prior to mandrel testing and/or TV inspection, flush and clean all sewers, and remove all foreign material from the mainlines and manholes. Failure to clean all dirt, rock and debris from pipelines prior to TV inspection will result in the need to re-clean and re-TV the sewer lines.
87. Contractor shall conduct deflection test of flexible sanitary sewer pipes by pulling an approved mandrel through the completed pipeline following trench compaction. The diameter of the mandrel shall be 95% of the initial pipe diameter. Test shall be conducted not less than 30 days after the trench backfilling and compaction has been completed, unless otherwise approved by the Approving Agency.
88. Upon completion of all sanitary sewer construction, testing and repair, the Contractor shall conduct a color TV acceptance inspection of all mainlines in accordance with OSSC (ODOT/APWA) 445.74 to determine compliance with grade requirements of OSSC (ODOT/APWA) 445.40.b. The TV inspection shall be conducted by an approved technical service which is equipped to make audio-visual recordings of the TV inspections on DVD or flash drive. Unless otherwise required by the Approving Agency, a standard 1-inch diameter ball shall be suspended in front of the camera during the inspection to determine the depth of any standing water. Sufficient water to reveal low areas or reverse grades shall be discharged into the pipe immediately prior to initiation of the TV inspection. The DVD and written report shall be delivered to the Approving Agency.

**STORM DRAIN SYSTEM:**

89. Storm sewer pipe materials shall conform to the construction drawings and Approving Agency's requirements. Unless otherwise noted or shown on the drawings, storm sewer pipe materials with watertight joints shall conform to the attached "Storm Pipe Table". Contractor shall use uniform pipe material on each pipe run between structures unless otherwise directed or approved. Jointed HDPE pipe shall not be used for slopes exceeding ten percent (10%). All materials and workmanship for all private storm drains, including storm drains located within any building envelope, shall be installed in conformance with Uniform Plumbing Code requirements.
90. Contractor shall designate the pipe material actually installed on the field record drawings and provide this information for inclusion on the as-built drawings.
91. Catch basins and junction boxes shall be set square with buildings or with the edge of the parking lot or street wherein they lie. Storm drain inlet structures and paving shall be adjusted so water flows into the structure without ponding water.
92. Unless otherwise approved by the Engineer, all storm drain connections shall be by manufactured tees or saddles.
93. Unless otherwise shown on the drawings, all storm pipe inlets & outfalls shall be beveled flush to match the slope wherein they lie.
94. Sweep (deflect) storm sewer pipe into catch basins and manholes as required. Maximum joint deflection shall not exceed 5 degrees or manufacturers recommendations, whichever is less.
95. Unless otherwise shown or directed, install storm sewer pipe in accordance with manufacturer installation guidelines.
96. After manhole channeling and prior to mandrel testing or final acceptance, flush and clean all sewers, and remove all foreign material from the mainlines, manholes and catch basins.
97. Mandrel Testing. Contractor shall conduct deflection test of flexible storm sewer pipes by pulling an approved mandrel through the completed pipeline following trench compaction. The diameter of the mandrel shall be 95% of the initial pipe diameter. Test shall be conducted not more than 30 days after the trench backfilling and compaction has been completed.
98. TV Inspection. Upon completion of all storm sewer construction, testing and repair, the Contractor shall conduct a color TV acceptance inspection of all mainlines in accordance with OSSC (ODOT/APWA) 445.74 to determine compliance with grade requirements of OSSC (ODOT/APWA) 445.40.b. The TV inspection shall be conducted by an approved technical service which is equipped to make audio-visual recordings of the TV inspections on DVD (VHS video tape acceptable only upon prior written approval by Public Works). Unless otherwise required by the agency with jurisdiction, a standard 1-inch diameter ball shall be suspended in front of the camera during the inspection to determine the depth of any standing water. Sufficient water to reveal low areas or reverse grades shall be discharged into the pipe immediately prior to initiation of the TV inspection. The DVD and written report shall be delivered to the Approving Agency.
99. Prior to acceptance, the Owner's Representative may lamp storm lines upstream & downstream of structures to verify that the pipes are clean and there is no grout or concrete in the mainlines, and that there are no observable bellies in the line. When necessary, sufficient water to reveal low areas shall be discharged into the pipe by the Contractor prior to any such inspection by the Owner's Representative or the Approving Agency.

**FRANCHISE & PRIVATE UTILITIES:**

100. Unless otherwise shown on the drawings or approved by jurisdiction having authority, all new franchise and private utilities (power, cable TV, telephone, gas, data, communication, control, alarms, etc.) shall be installed underground. Installation of such utilities or associated conduits in a common trench with public water, sanitary sewer, or storm sewer is prohibited.
101. Contractor shall coordinate with gas, power, telephone, and cable TV Company for location of conduits in common trenches, as well as location or relocation of vaults, pedestals, etc. The Contractor shall be responsible for providing franchise utility companies adequate written notice of availability of the open trench (typically 10 days minimum), and reasonable access to the open trench. Unless otherwise approved in writing by the Approving Agency, all above-grade facilities shall be located in PUEs (where PUEs exist or will be granted by the development), and otherwise shall be placed in a location outside the proposed sidewalk location.
102. Unless otherwise approved by the Approving Agency, installation of private utilities (including either franchise utilities or private water, sewer or storm services) in a common trench with or within 3 feet horizontally of and paralleling public water, sanitary sewer or storm drains is prohibited.
103. Power, telephone and TV trenching and conduits shall be installed per utility company requirements with pull wire. Contractor shall verify with utility company for size, location and type of conduit before construction, and shall ensure that trenches are adequately prepared for installation per utility company requirements. All changes in direction of utility conduit runs shall have long radius steel bends.
104. Contractor shall notify and coordinate with franchise utilities for removal or relocation of power poles, vaults, pedestals, manholes, etc. to avoid conflict with Public utility structures, fire hydrants, meters, sewer or storm laterals, etc.

REQUIRED TESTING AND FREQUENCY TABLE		Party Responsible for payment	
		Contractor	Others (see note 1)
Streets, Fire Lanes, Common Driveways, Parking Lots, Pads, Fills, etc.			
Subgrade	1 Test/4000 S.F./Lift (4 min), locations acceptable to approving agency (typically alternate sides of road or access aisles)	✓	See note 2 & note 3
Engineered Fills	1 Test/4000 S.F./Lift (4 min), locations acceptable to approving agency	✓	See note 2 & note 5
Baseroack	1 Test/4000 S.F./Lift (4 min), locations acceptable to approving agency (typically alternate sides of road or access aisles)	✓	See note 2 & note 3
Asphalt	1 Test/6000 S.F./Lift (4 min), locations acceptable to AA (typ. alternate as above)	✓	See note 2
Piped Utilities, All			
Trench Backfill	1 Test/200 Foot Trench/Lift (4 min)	✓	See note 2
Trench AC Restoration	1 Test/300 Foot Trench (4 min)	✓	See note 2
Water			
Pressure Test	(to be witnessed by Owner's Representative or approving agency)	✓	See note 4
Bacterial Water Test	Per Oregon Health Division	✓	See note 2
Chlorine Residual Test	Per City Requirements	✓	
Sanitary Sewer			
Air Test	Per City or APWA Requirements, whichever is more stringent	✓	See note 4
Mandrel	95% of actual inside diameter	✓	See note 4
TV Inspection	All. Lines must be cleaned prior to TV work	✓	
Manhole	(1) Vacuum test per manhole, witnessed by Owner's Representative or approving agency	✓	See note 2
Storm			
Mandrel	95% of actual inside diameter	✓	See note 4
TV Inspection	All. Lines must be cleaned prior to TV work	✓	
Concrete, Block, etc.			
Slump, Air & Cylinders for structural & reinforced concrete, equipment slabs, curbs, sidewalks & PCC pavements. Unless otherwise specified, one set of cylinders per 100 cubic yards (or portion thereof) of each class of concrete placed per day. Slump & air tests required on same load as cylinders.		✓	See note 2
Building permit inspection & Special Inspection for structural concrete, reinforced masonry, epoxy anchors, etc. as required by applicable State Building Codes.		✓	See note 6
Retaining Walls			
Building permit inspection and Special Inspection, as well as compaction testing on backfill, all in conformance with applicable State Building Code requirements		✓	See note 5 & note 6
<p>Note 1: "Others" refers to Owner's authorized Representative or Approving Agency as applicable. Contractor responsible for scheduling testing. All testing must be completed prior to performing subsequent work.</p> <p>Note 2: Testing must be performed by an approved independent testing laboratory.</p> <p>Note 3: In addition to in-place density testing, the subgrade and base rock shall be proof-rolled with a loaded 10 yard dump truck provided by the Contractor. Baseroack proofroll shall take place immediately prior to (within 24 hours of) paving, and shall be witnessed by the Owner's authorized Representative or approving agency. Location and pattern of testing and proofroll to be as approved or directed by said Owner's authorized Representative or approving agency.</p> <p>Note 4: To be witnessed by the Owner's Representative or approving agency. The Contractor shall perform pretests prior to scheduling witnessed waterline or sanitary sewer pressure tests, or pipeline mandrel test.</p> <p>Note 5: The approved independent laboratory retained by the Contractor shall provide a certification (stamped by an engineer licensed in the State of Oregon) that the subgrade was prepared and all engineered fills were placed in accordance with the provisions of the construction drawings and the contract documents.</p> <p>Note 6: Regardless of who is responsible for payment, the Contractor is responsible for scheduling and coordinating any and all required inspections and Special Inspections as required by applicable building codes or jurisdictions having authority.</p>			

STORM PIPE TABLE	
Cover Depth	6" - 18" Diameter
Less than 2' Cover	Class 50 ductile iron pipe with bell and spigot joints and rubber gasket.
2' to 2-1/2' Cover	Pipe specified for lesser cover depths -or- Class 3, ASTM C-14 non-reinforced concrete pipe with bell and spigot joints & rubber gaskets, ASTM 150 Type II cement. -or- PVC pipe conforming to AWWA C900 DR 18 (6"-12") or AWWA C-905 (14"-18") with bell and spigot joints and rubber gasket
2-1/2' to 15' Cover	Pipe specified for lesser cover depths -or- PVC pipe conforming to ASTM D-3034 PVC SDR 35 (6"-15") or ASTM F-679 PVC solid wall SDR 35 (18") with bell and spigot joints and rubber gasket. -or- HDPE (high density polyethylene) pipe conforming to AASHTO M-252, (8"-10") or AASHTO M-294 (12"-18"). For slopes less than 6% the pipe shall be ADS N-12 IB ST, Hancor Sure-Lok F477, or approved equal. For slopes greater than 6% the pipe shall be ADS N-12 IB WT, Hancor Blue Seal, or approved equal with watertight pressure testable fittings, -except- jointed HDPE (high density polyethylene) pipe referenced above not permitted for depth to invert greater than 12 feet.
More than 15' Cover	See construction drawings.

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VERIFIED SCALE  
BAR IS ONE INCH ON ORIGINAL DRAWING  
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REGISTERED PROFESSIONAL ENGINEER  
WESTTECH ENGINEERING, INC.  
CONSULTING ENGINEERS AND PLANNERS  
OREGON LICENSE NO. 1443  
JULY 16, 2011  
STATE OF OREGON  
RENEW: 6/30/2022

**WESTTECH ENGINEERING, INC.**  
CONSULTING ENGINEERS AND PLANNERS

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Phone: (503) 585-2474 Fax: (503) 585-3886  
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MOLALLA APARTMENTS  
HOME FIRST DEVELOPMENT PARTNERS

**CONSTRUCTION NOTES**

DRAWING  
**C1.2**

JOB NUMBER  
3312.0000.0

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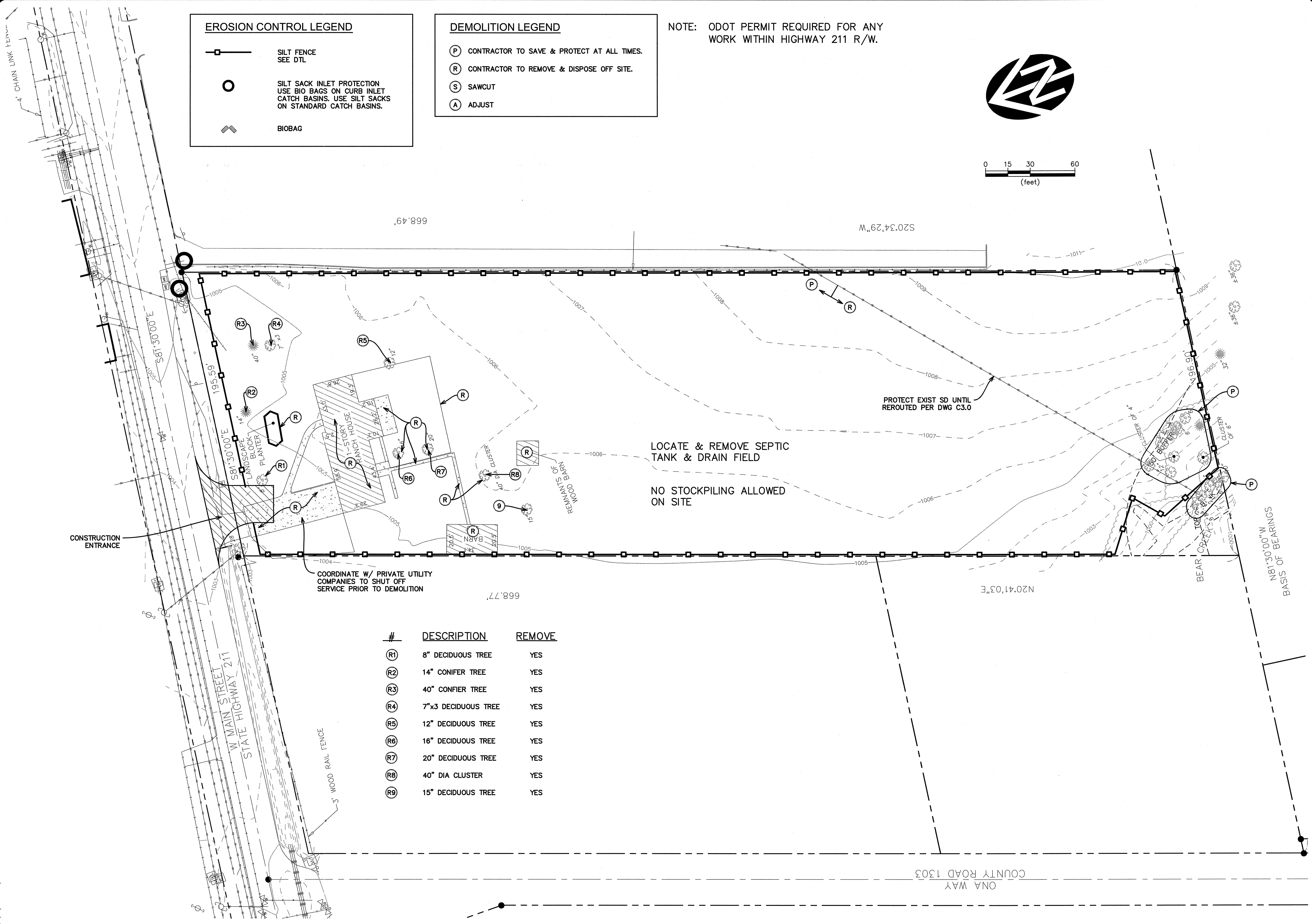
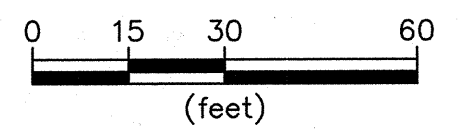
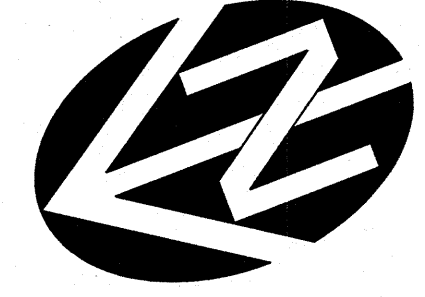
**EROSION CONTROL LEGEND**

- SILT FENCE  
SEE DTL
- SILT SACK INLET PROTECTION  
USE BIO BAGS ON CURB INLET  
CATCH BASINS. USE SILT SACKS  
ON STANDARD CATCH BASINS.
- BIOBAG

**DEMOLITION LEGEND**

- (P) CONTRACTOR TO SAVE & PROTECT AT ALL TIMES.
- (R) CONTRACTOR TO REMOVE & DISPOSE OFF SITE.
- (S) SAWCUT
- (A) ADJUST

NOTE: ODOT PERMIT REQUIRED FOR ANY WORK WITHIN HIGHWAY 211 R/W.



#	DESCRIPTION	REMOVE
(R1)	8" DECIDUOUS TREE	YES
(R2)	14" CONIFER TREE	YES
(R3)	40" CONIFER TREE	YES
(R4)	7"x3 DECIDUOUS TREE	YES
(R5)	12" DECIDUOUS TREE	YES
(R6)	16" DECIDUOUS TREE	YES
(R7)	20" DECIDUOUS TREE	YES
(R8)	40" DIA CLUSTER	YES
(R9)	15" DECIDUOUS TREE	YES

PROTECT EXIST SD UNTIL REROUTED PER DWG C3.0

LOCATE & REMOVE SEPTIC TANK & DRAIN FIELD

NO STOCKPILING ALLOWED ON SITE

COORDINATE W/ PRIVATE UTILITY COMPANIES TO SHUT OFF SERVICE PRIOR TO DEMOLITION

NO.	DATE	DESCRIPTION	BY
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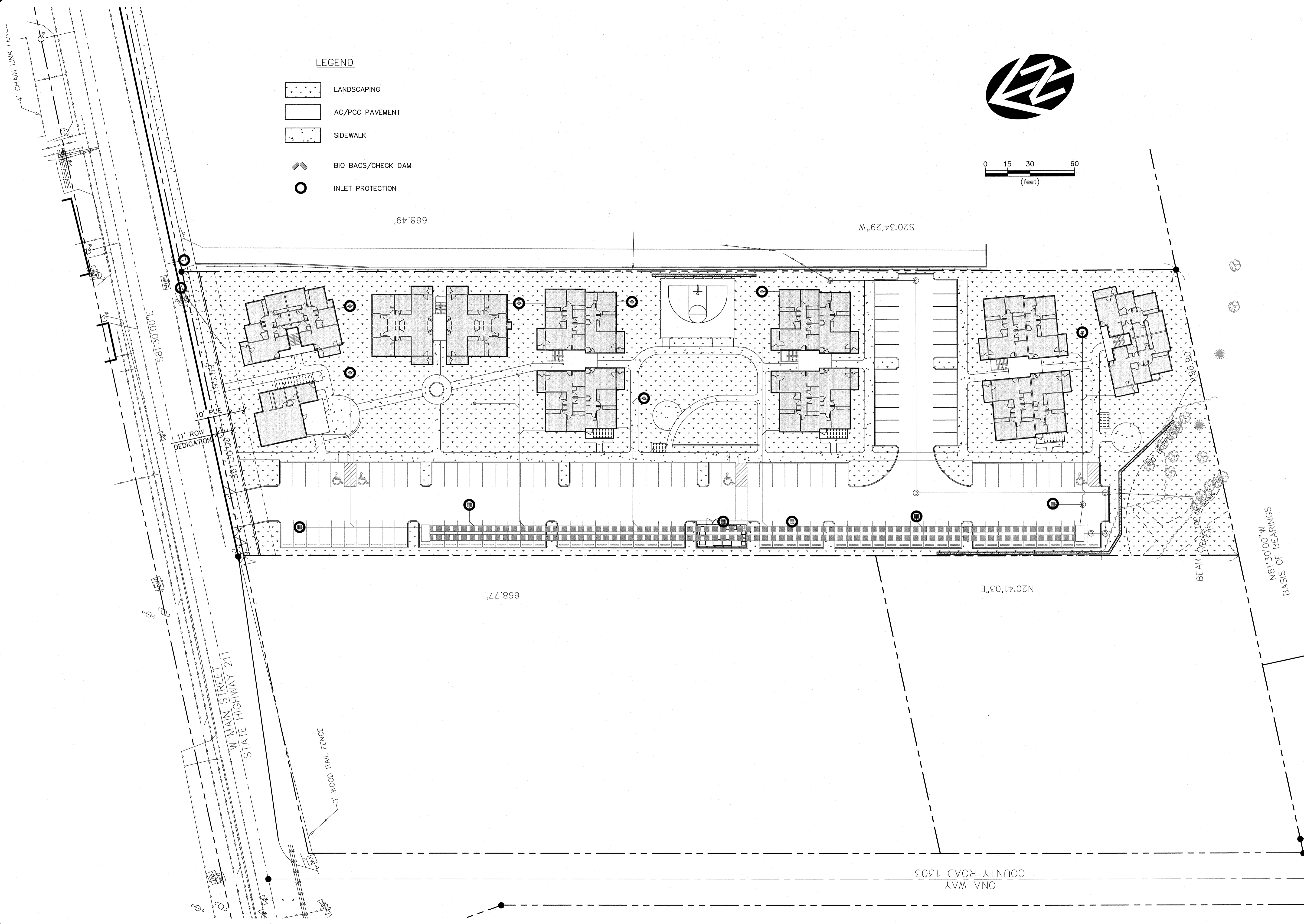
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0	07/04/22	DATE: SEP 2021

REGISTERED PROFESSIONAL ENGINEER  
 1194  
 OREGON  
 JULY 16, 2005  
 STEVEN A. GUNW  
 REVIEW: 6/20/2022

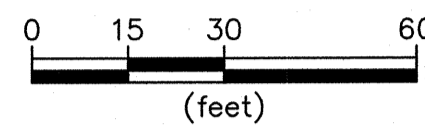
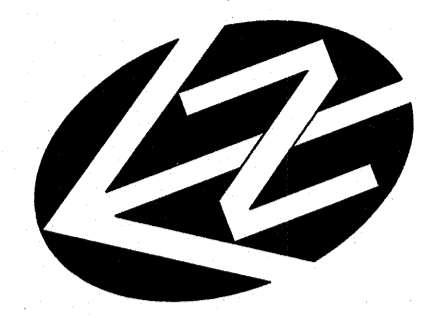
**WESTTECH ENGINEERING, INC.**  
 CONSULTING ENGINEERS AND PLANNERS  
 3841 Fairview Industrial Dr. S.E., Suite 100, Salem, OR 97302  
 Phone: (503) 585-2474 Fax: (503) 585-3986  
 E-mail: westtech@westtech-eng.com

MOLALLA APARTMENTS  
 HOME FIRST DEVELOPMENT PARTNERS  
**EXISTING CONDITIONS,  
 EROSION CONTROL,  
 & DEMOLITION PLAN**

DRAWING  
**C2.0**  
 JOB NUMBER  
**3312.0000.0**



- LEGEND**
- LANDSCAPING
  - AC/PCC PAVEMENT
  - SIDEWALK
  - BIO BAGS/CHECK DAM
  - INLET PROTECTION

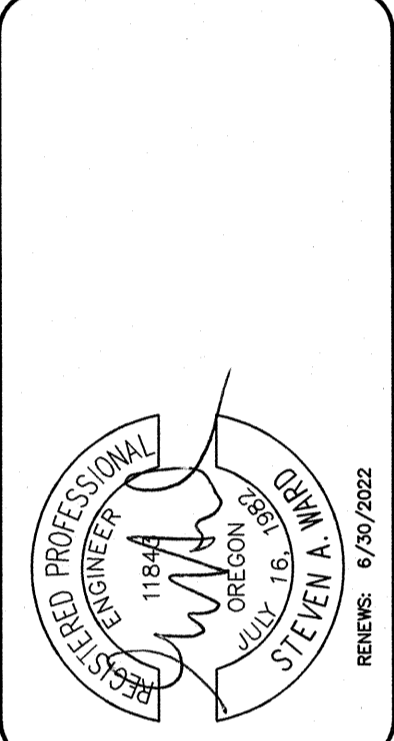


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VERIFY SCALE  
 BAR IS ONE INCH ON ORIGINAL DRAWING  
 ALL DIMENSIONS AND SCALES ACCORDINGLY

DSN: SAW  
 DRN: AR  
 CKD: SAW

DATE: SEP 2021



**WESTECH ENGINEERING, INC.**  
 CONSULTING ENGINEERS AND PLANNERS

3841 Fairview Industrial Dr. S.E., Suite 100, Salem, OR 97302  
 Phone: (503) 585-2474 Fax: (503) 585-3986  
 E-mail: westech@westech-eng.com

MOLALLA APARTMENTS  
 HOME FIRST DEVELOPMENT PARTNERS  
**POST CONSTRUCTION  
 EROSION CONTROL PLAN**

DRAWING  
**C2.1**  
 JOB NUMBER  
**3312.0000.0**

DEQ EROSION CONTROL STANDARD NOTES:

1. Include a list of all personnel (by name and position) that are responsible for the design, installation and maintenance of stormwater control measures (e.g. ESCP developer, BMP installer (see Section 4.10), as well as their individual responsibilities. (Section 4.4.c.ii)
2. Visual monitoring inspection reports must be made in accordance with DEQ 1200-C permit requirements. (Section 6.5)
3. Inspection logs must be kept in accordance with DEQ's 1200-C permit requirements. (Section 6.5.q)
4. Retain a copy of the ESCP and all revisions on site and make it available on request to DEQ, Agent, or the local municipality. (Section 4.7)
5. The permit registrant must implement the ESCP. Failure to implement any of the control measures or practices described in the ESCP is a violation of the permit. (Sections 4 and 4.11)
6. The ESCP must be accurate and reflect site conditions. (Section 4.8)
7. Submission of all ESCP revisions is not required. Submittal of the ESCP revisions is only under specific conditions. Submit all necessary revision to DEQ or Agent within 10 days. (Section 4.9)
8. Sequence clearing and grading to the maximum extent practical to prevent exposed inactive areas from becoming a source of erosion. (Section 2.2.2)
9. Create smooth surfaces between soil surface and erosion and sediment controls to prevent stormwater from bypassing controls and ponding. (section 2.2.3)
10. Identify, mark, and protect (by construction fencing or other means) critical riparian areas and vegetation including important trees and associated rooting zones, and vegetation areas to be preserved. Identify vegetative buffer zones between the site and sensitive areas (e.g., wetlands), and other areas to be preserved, especially in perimeter areas. (Section 2.2.1)
11. Preserve existing vegetation when practical and re-vegetate open areas. Re-vegetate open areas when practicable before and after grading or construction. Identify the type of vegetative seed mix used. (Section 2.2.5)
12. Maintain and delineate any existing natural buffer within the 50-foot of waters of the state. (Section 2.2.4)
13. Install perimeter sediment control, including storm drain inlet protection as well as all sediment basins, traps, and barriers prior to land disturbance. (Sections 2.1.3)
14. Control both peak flow rates and total stormwater volume, to minimize erosion at outlets and downstream channels and streambanks. (Sections 2.1.1. and 2.2.16)
15. Control sediment as needed along the site perimeter and at all operational internal storm drain inlets at all times during construction, both internally and at the site boundary. (Sections 2.2.6 and 2.2.13)
16. Establish concrete truck and other concrete equipment washout areas before beginning concrete work. (Section 2.2.14)
17. Apply temporary and/or permanent soil stabilization measures immediately on all disturbed areas as grading progresses. Temporary or permanent stabilizations measures are not required for areas that are intended to be left unvegetated, such as dirt access roads or utility pole pads. (Sections 2.2.20 and 2.2.21)
18. Establish material and waste storage areas, and other non-stormwater controls. (Section 2.3.7)
19. Keep waste container lids closed when not in use and close lids at the end of the business day for those containers that are actively used throughout the day. For waste containers that do not have lids, provide either (1) cover (e.g., a tarp, plastic sheeting, temporary roof) to prevent exposure of wastes to precipitation, or (2) a similarly effective means designed to prevent the discharge of pollutants (e.g., secondary containment). (Section 2.3.7)
20. Prevent tracking of sediment onto public or private roads using BMPs such as: construction entrance, graveled (or paved) exits and parking areas, gravel all unpaved roads located onsite, or use an exit tire wash. These BMPs must be in place prior to land-disturbing activities. (Section 2.2.7)
21. When trucking saturated soils from the site, either use water-tight trucks or drain loads on site. (Section 2.2.7.f)
22. Control prohibited discharges from leaving the construction site, i.e., concrete wash-out, wastewater from cleanout of stucco, paint and curing compounds. (Sections 1.5 and 2.3.9)
23. Ensure that steep slope areas where construction activities are not occurring are not disturbed. (Section 2.2.10)
24. Prevent soil compaction in areas where post-construction infiltration facilities are to be installed. (Section 2.2.12)
25. Use BMPs to prevent or minimize stormwater exposure to pollutants from spills; vehicle and equipment fueling, maintenance, and storage; other cleaning and maintenance activities; and waste handling activities. These pollutants include fuel, hydraulic fluid, and other oils from vehicles and machinery, as well as debris, fertilizer, pesticides and herbicides, paints, solvents, curing compounds and adhesives from construction operations.(Sections 2.2.15 and 2.3)
26. Provide plans for sedimentation basins that have been designed per Section 2.2.17 and stamped by an Oregon Professional Engineer. (See Section 2.2.17.c)
27. If engineered soils are used on site, a sedimentation basin/impoundment must be installed. (See Sections 2.2.17 and 2.2.18)
28. Provide a dewatering plan for accumulated water from precipitation and uncontaminated groundwater seepage due to shallow excavation activities. (See Section 2.4)
29. Implement the following BMPs when applicable: written spill prevention and response procedures, employee training on spill prevention and proper disposal procedures, spill kits in all vehicles, regular maintenance schedule for vehicles and machinery, material delivery and storage controls, training and signage, and covered storage areas for waste and supplies. (Section 2.3)
30. Use water, soil-binding agent or other dust control technique as needed to avoid wind-blown soil. (Section 2.2.9)
31. The application rate of fertilizers used to reestablish vegetation must follow manufacturer's recommendations to minimize nutrient releases to surface waters. Exercise caution when using time-release fertilizers within any waterway riparian zone. (Section 2.3.5)
32. If an active treatment system (for example, electro-coagulation, flocculation, filtration, etc.) for sediment or other pollutant removal is employed, submit an operation and maintenance plan (including system schematic, location of system, location of inlet, location of discharge, discharge dispersion device design, and a sampling plan and frequency) before operating the treatment system. Obtain Environmental Management Plan approval from DEQ before operating the treatment system. Operate and maintain the treatment system according to manufacturer's specifications. (Section 1.2.9)
33. Temporarily stabilize soils at the end of the shift before holidays and weekends, if needed. The registrant is responsible for ensuring that soils are stable during rain events at all times of the year. (Section 2.2)
34. As needed based on weather conditions, at the end of each workday soil stockpiles must be stabilized or covered, or other BMPs must be implemented to prevent discharges to surface waters or conveyance systems leading to surface waters. (Section 2.2.8)
35. Sediment fence: remove trapped sediment before it reaches one third of the above ground fence height and before fence removal. (Section 2.1.5.b)
36. Other sediment barriers (such as biobags): remove sediment before it reaches two inches depth above ground height and before BMP removal. (Section 2.1.5.c)
37. Catch basins: clean before retention capacity has been reduced by fifty percent. Sediment basins and sediment traps: remove trapped sediments before design capacity has been reduced by fifty percent and at completion of project. (Section 2.1.5.a)
38. Within 24 hours, significant sediment that has left the construction site, must be remediated. Investigate the cause of the sediment release and implement steps to prevent a recurrence of the discharge within the same 24 hours. Any in-stream clean-up of sediment shall be performed according to the Oregon Department of State Lands required timeframe. (Section 2.2.19.a)
39. The intentional washing of sediment into storm sewers or drainage ways must not occur. Vacuuming or dry sweeping and material pickup must be used to cleanup released sediments. (Section 2.2.19)
40. Document any portion(s) of the site where land disturbing activities have permanently ceased or will be temporarily inactive for 14 or more calendar days. (Section 6.5.f.)
41. Provide temporary stabilization for that portion of the site where construction activities cease for 14 days or more with a covering of blown straw and a tackifier, loose straw, or an adequate covering of compost mulch until work resumes on that portion of the site. (Section 2.2.20)
42. Do not remove temporary sediment control practices until permanent vegetation or other cover of exposed areas is established. Once construction is complete and the site is stabilized, all temporary erosion controls and retained soils must be removed and disposed of properly, unless needed for long term use following termination of permit coverage. (Section 2.2.21)

Rev. 12/15/20  
By: Blair Edwards

YEAR: MONTH:	'22 06	'22 07	'22 08	'22 09	'22 10	'22 11	'22 12	'23 01	'23 02	'23 03	'23 04	'23 05
CLEARING	X	X										
EXCAVATION		X	X	X								
GRADING		X	X	X	X	X	X	X	X			
CONSTRUCTION		X	X	X	X	X	X	X	X			
<b>SEDIMENT CONTROLS:</b>												
Silt Fencing		X	X	X	X	X	X	X	X			
Sediment Traps		X	X	X	X	X	X	X	X			
Sediment Basins												
Storm Inlet Protection												
Drainage Swales												
Check Dams												
Contour Furrows												
Terracing												
Pipe Slope Drains												
Rock Outlet Protection												
Gravel Construction Entrance	X	X	X	X	X	X	X	X	X			
Grass-lined Channel (Turf Reinforcement Mats)												
Protection of trees with construction fences												
Temporary Seeding and Planting												
Permanent Seeding and Planting												
Other:												

CONTROL MEASURE	PHASE 1	PHASE 2	PHASE 3	PHASE 4	PHASE 5
Silt Fencing	X	X	X	X	
Construction Entrance	X	X			
Sediment Traps			X	X	
Storm Inlet Protection			X	X	
Concrete Washout			X	X	
Rock Outlet Protection			X	X	X
Permanent Seeding and Planting					X

Phase 1: Prior to Ground Disturbance  
Phase 2: After Completion of Rough Grading  
Phase 3: After Installation of Storm Facilities  
Phase 4: After Paving & Construction  
Phase 5: After Project Completion and Cleanup

**BMP Rationale**  
A comprehensive list of available Best Management Practices (BMP) options based on DEQ's 1200-C Permit Application and ESCP Guidance Document has been reviewed to complete this Erosion and Sediment Control Plan. Some of the above listed BMPs were not chosen because they were determined to not effectively manage erosion prevention and sediment control for this project based on specific site conditions, including soil conditions, topographic constraints, accessibility to the site, and other related conditions. As the project progresses and there is a need to revise the ESCP, an Action Plan will be submitted.

SOIL TYPE(S): PER CLACKAMAS COUNTY CO. SOIL SURVEY THE SITE SOILS INCLUDE, "DAYTON SILT LOAM, SAWTELL SILT LOAM, 0 TO 8 PERCENT SLOPES, & WAPATO SILTY CLAY LOAM"  
EROSION HAZARD: PER CLACKAMAS CO. SOIL SURVEY EROSION HAZARD IS "SLIGHT"  
SITE AREA: 2.95 Ac  
DISTURBANCE AREA: 2.95 Ac

INSPECTION FREQUENCY FOR BMP

Site Condition	Minimum Frequency
1. Active period	On initial date that land disturbance activities commence.  Within 24 hours of any storm event, including runoff from snow melt, that results in discharge from the site.  At least once every 14 days, regardless of whether stormwater runoff is occurring.
2. Inactive periods greater than fourteen (14) consecutive calendar days	The Inspector may reduce the frequency of inspections in any area of the site where the stabilization steps in Section 2.2.20 have been completed to twice per month for the first month, no less than 14 calendar days apart, then once per month.
3. Periods during which the site is inaccessible due to inclement weather	If safe, accessible and practical, inspections must occur daily at a relevant discharge point or downstream location of the receiving waterbody.
4. Periods during which construction activities are suspended and runoff is unlikely due to frozen conditions.	Visual monitoring inspections may be temporarily suspended. Immediately resume monitoring upon thawing, or when weather conditions make discharges likely.
5. Periods during which construction activities are conducted and runoff is unlikely during frozen conditions.	Visual monitoring inspections may be reduced to once a month. Immediately resume monitoring upon thawing, or when weather conditions make discharges likely.

Spill Prevention Procedures and Response

- Spill prevention is an important factor in the successful operation of a storm water injection management system. All contractor employees will be trained on this plan so that they are certain of the location of materials, who to notify in case of a spill, and how to initially contain the spill of hazardous materials. Contractor employees shall never dispose waste materials into the storm water collection/treatment system. Contractor employees will be observant of other potential contamination occurrences. All contractor employees will review this plan especially with regards to the detailed spill response steps.
- This data will be posted in an accessible area at the site.

What to do in case of a spill

1. Spill kit to be located near the job trailer or another conspicuous location and clearly marked.
2. Get the spill kit.
  - a. If possible, determine visually what types of fluids have been spilled.
  - b. Put on gloves and glasses or any other necessary Personal Protective Equipment (PPE).
  - c. Get the absorbent material provided in the kit and the drain block cover.
  - d. Place the absorbent materials in the path of the spill.
  - e. Remove any debris from the vicinity of the inlet where the spill is draining.
  - f. Unroll the drain block cover and place it snugly over the inlet.
  - g. Verify that the cover has full contact with the rim of the inlet.
  - h. Use snakes, pillow or pigs to completely contain the area.
3. Notify the following personnel immediately:
  - a. Owner's Representative: Troy Croft, Phone: 503-375-7168.
  - b. When a spill includes any of the below, notify the Oregon Emergency Response System as soon as the Owner's Representative has knowledge of the release. Oregon Emergency Response System Phone: 1-800-452-0311
    - i. Any amount of oil to waters of the state;
    - ii. Oil spills on land in excess of 42 gallons;
    - iii. Hazardous materials that are equal to, or greater than, the quantity listed in the Code of Federal Regulations, 40 CFR Part 302 (List of Hazardous Substances and Reportable Quantities), and amendments adopted before July 1, 2002

NOTE: Only dry cleanup methods will be employed to clean up spills (i.e., no use of water to wash spilled materials from pavement will be conducted). All spill cleanups shall be conducted in accordance with applicable regulations.

Responsible Personnel

In case of spill contact the General Contractor and Owner's Representative immediately. The General Contractor will be responsible for either managing the spill clean up for minor spills or contacting/retaining a company for the cleanup of major spills.

Waste Management Procedures

Activities performed onsite shall implement the following to eliminate the discharge of waste:

1. Locate activities that include waste products away from waters of the state and stormwater inlets or conveyances so that stormwater coming into contact with these activities cannot reach waters of the state.
2. Ensure adequate supplies are available at all times to handle spills, leaks, and disposal of liquids, and provide secondary containment (e.g. spill berms, decks, spill containment pallets);
3. Have a spill kit available on site and ensure personnel are available to respond expeditiously in the event of a leak or spill;
4. Clean up spills or contaminated surfaces immediately using dry clean up measures (do not clean contaminated surfaces by hosing the area down), and eliminate the source of the spill to prevent a discharge or a continuation of an ongoing discharge; and
5. Store materials in a covered area (e.g., plastic sheeting, temporary roofs), or in secondary containment to prevent the exposure of these containers to precipitation or stormwater runoff, or a similarly effective means designed to prevent the discharge of pollutants from these areas.
6. Building Materials & Building Products: Minimize material exposure in cases where the exposure to precipitation or to stormwater will result in a discharge of pollutants (e.g. elevate materials from soil to prevent leaching of pollutants).

Fertilizers, pesticides, herbicides, & insecticides

Comply with all application and disposal requirements included on the registered pesticide, herbicide, insecticide, and fertilizer label. When applying fertilizers, registrants must:

1. Apply at a rate and in amounts consistent with manufacturer's specifications;
2. Apply at the appropriate time of year for the location, and preferably timed to coincide as closely as possible to the period of maximum vegetation uptake and growth;
3. Avoid applying before heavy rains that could cause excess nutrients to be discharged;
4. Never apply to frozen ground;
5. Never apply to stormwater conveyance channels; and
6. Follow all other federal, state, and local requirements regarding fertilizer application.

Authorized non-stormwater discharges anticipated for the proposed project:

1. Landscape irrigation
2. Dust control water
3. Water line flushing (potable)

Potential pollutant-generating activities anticipated for the proposed project including an inventory of pollutants for each activity:

1. Mass Grading, Street & Utility Construction
  - a. Sediment
  - b. Vehicle and machinery related pollutants (Fuels, hydraulic fluid, oils)
2. Vertical Construction
  - a. Paints, caulks, sealants, solvents
  - b. Fluorescent light ballasts
  - c. Sediment
  - d. Vehicle and machinery related pollutants (Fuels, hydraulic fluid, oils)
3. Landscaping & Irrigation
  - a. Fertilizers
  - b. Pesticides, Herbicides, Insecticides

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NO.	DATE	DESCRIPTION	BY
1	SEP 2021		

VERIFIED SCALE  
BAR IS ONE INCH ON ORIGINAL DRAWING  
THIS DRAWING IS TO BE USED ONLY FOR THE SCALES ACCORDINGLY

1" = 40'

REGISTERED PROFESSIONAL ENGINEER  
WESTTECH ENGINEERING, INC.  
CONSULTING ENGINEERS AND PLANNERS  
JULY 16, 2016  
OREGON  
STATE OF OREGON  
JULY 16, 2016  
STEVEN A. STEVENSON  
RENEW: 6/30/2022

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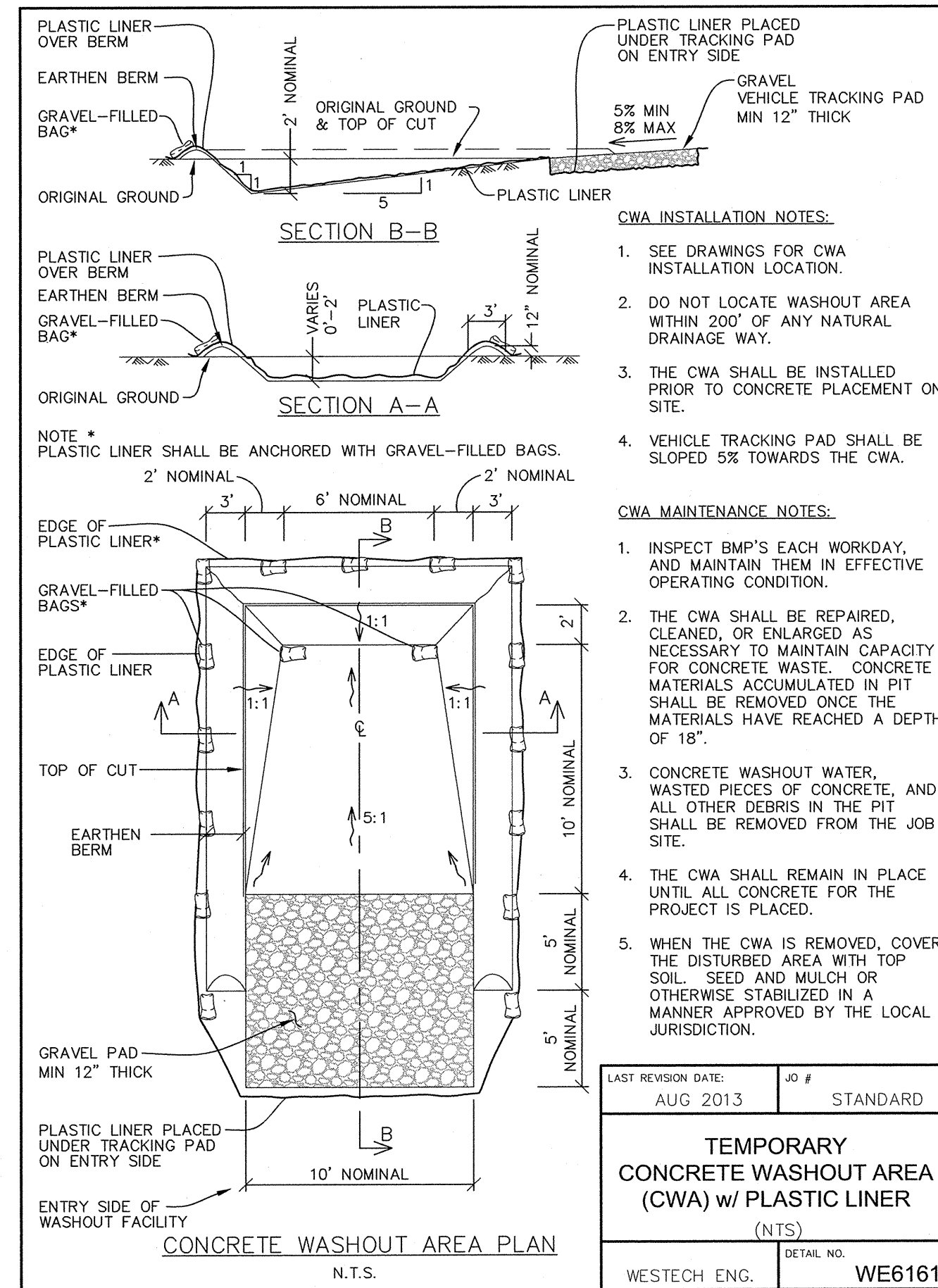
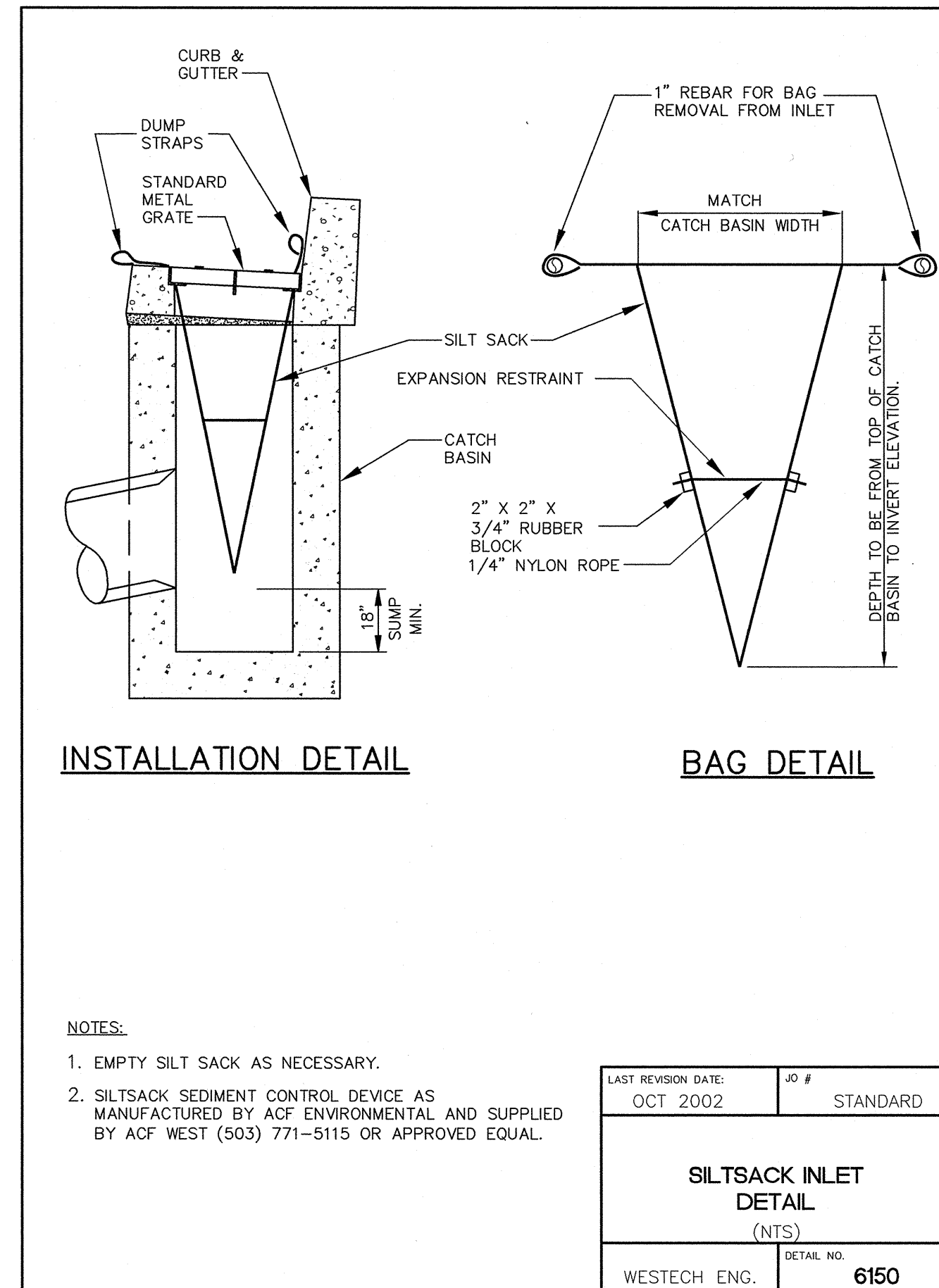
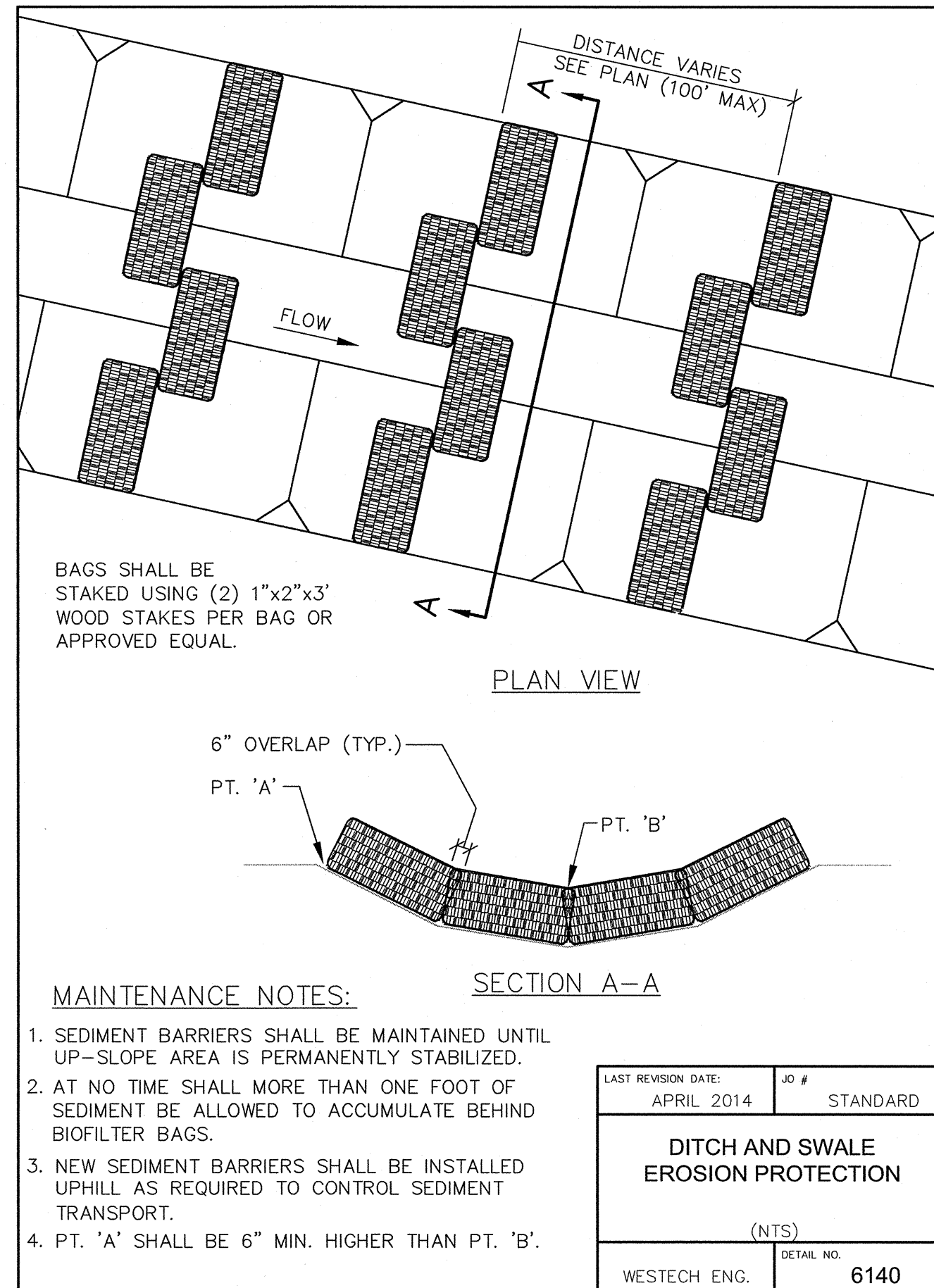
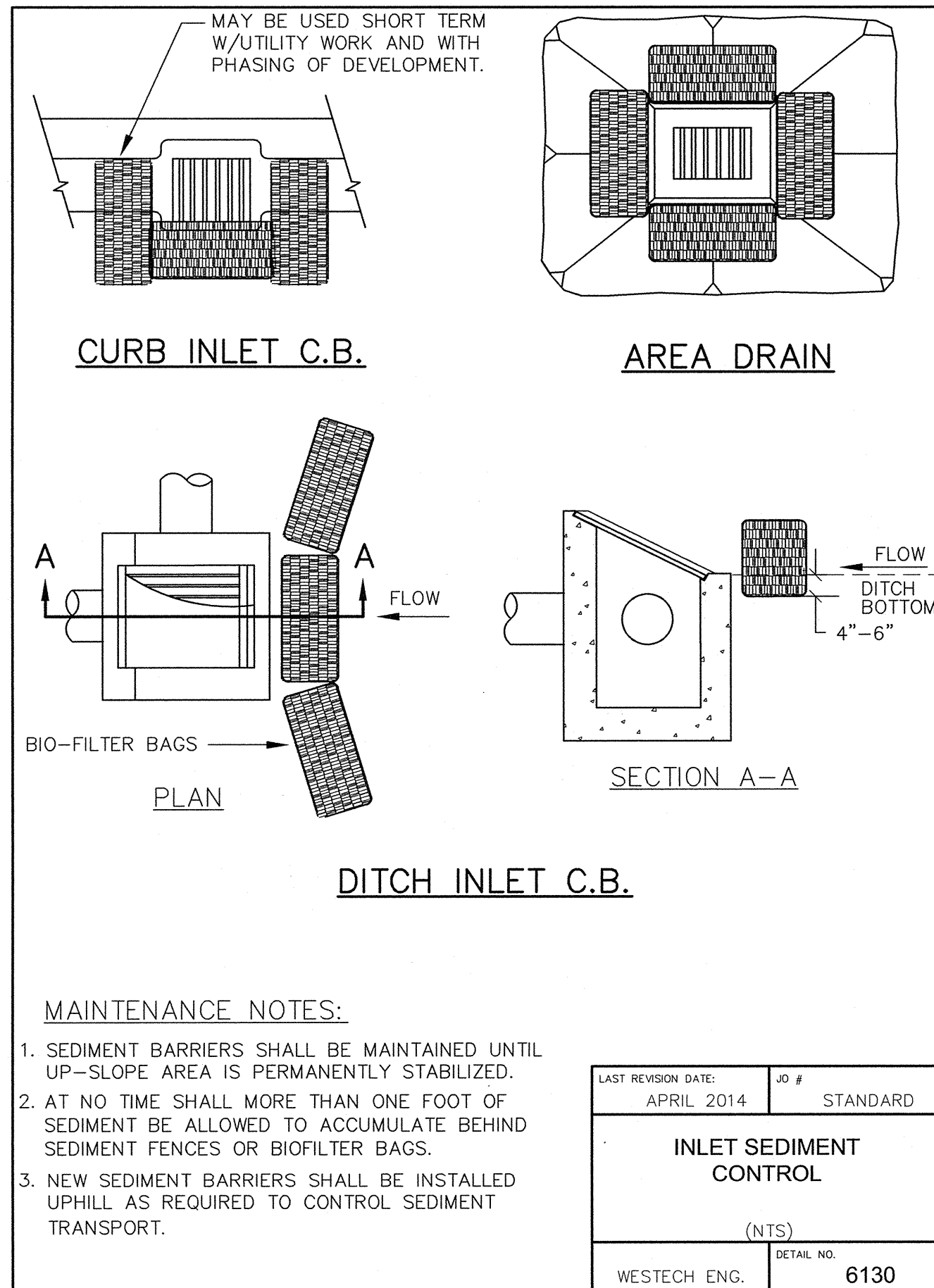
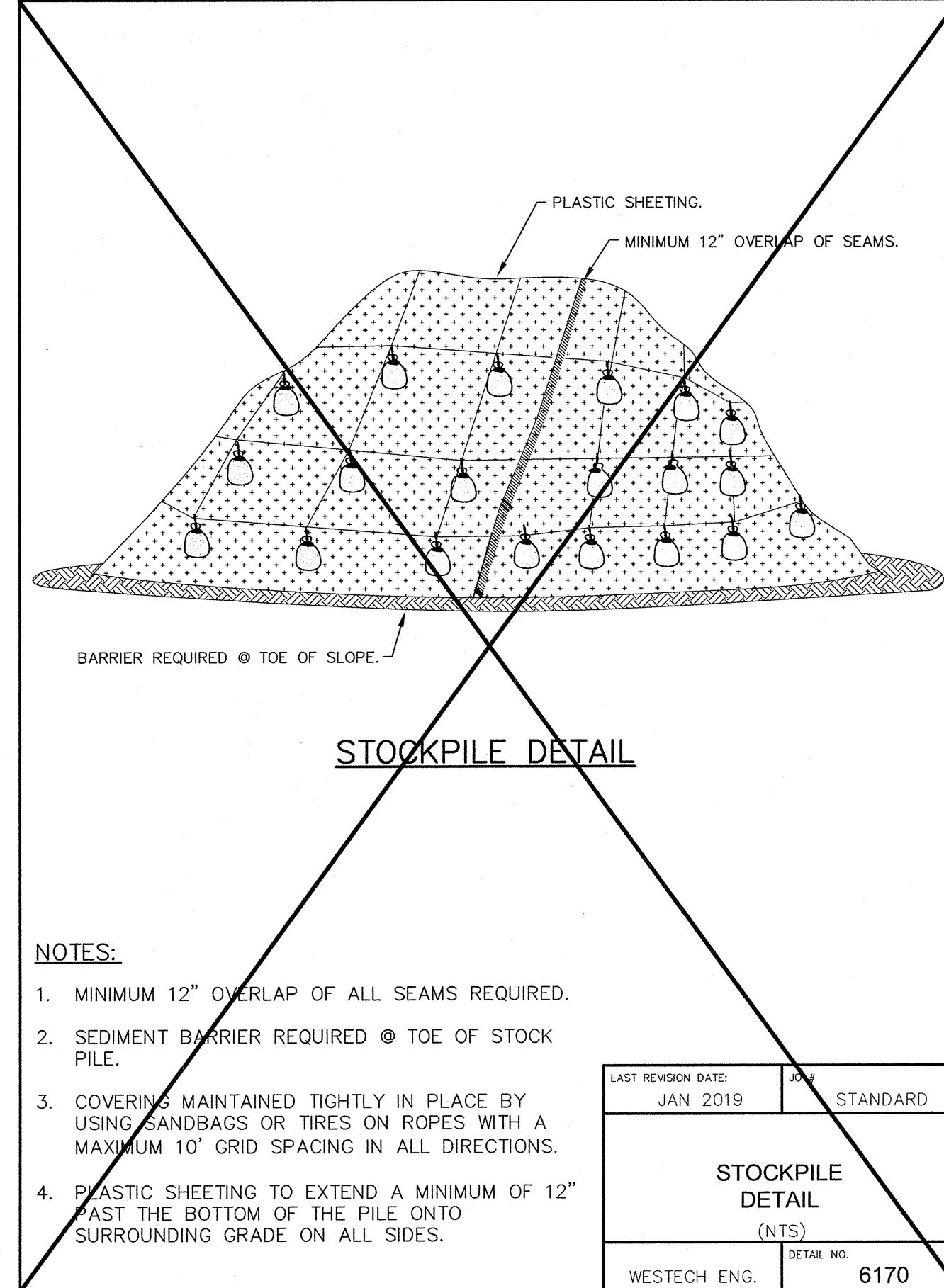
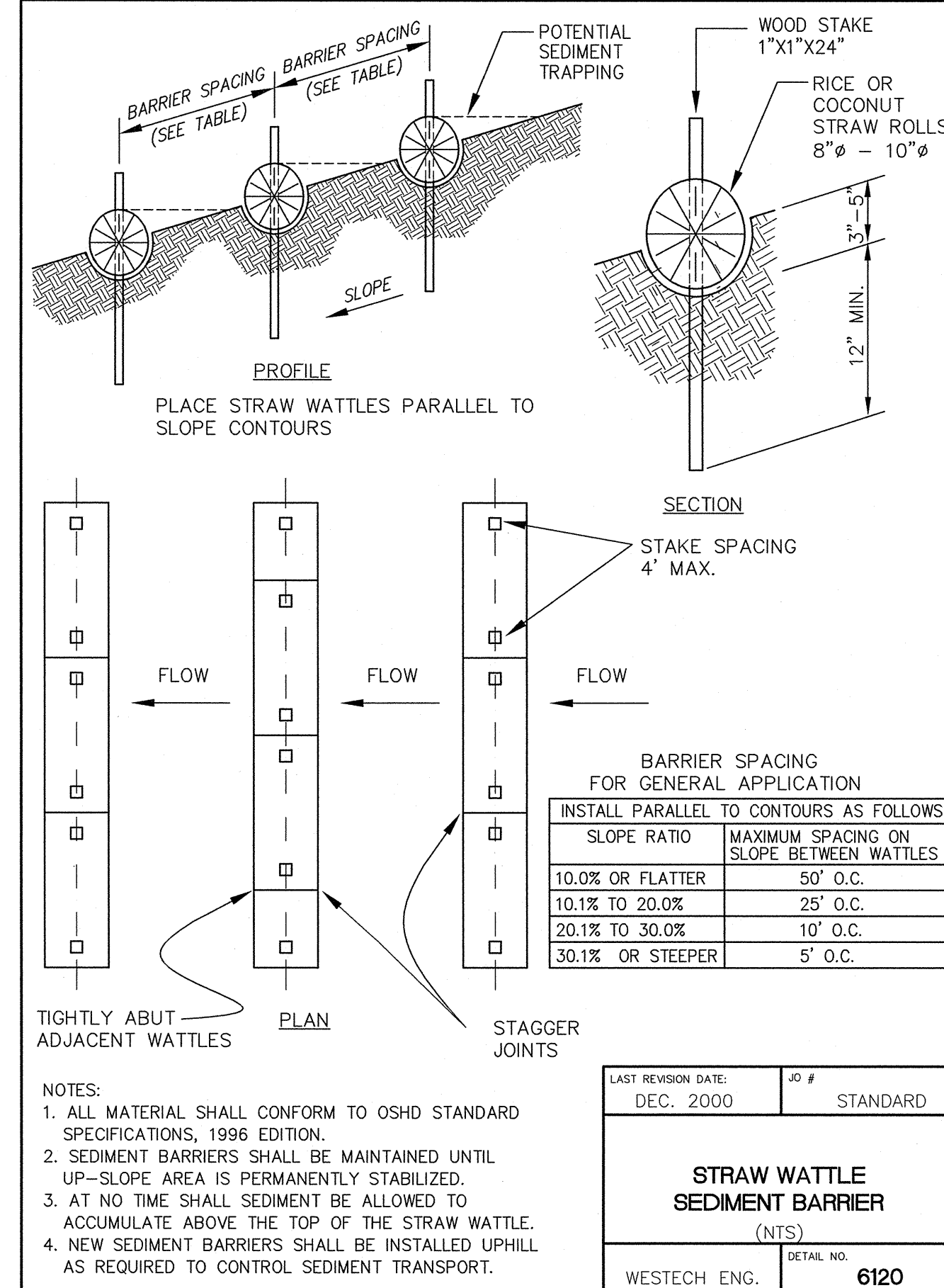
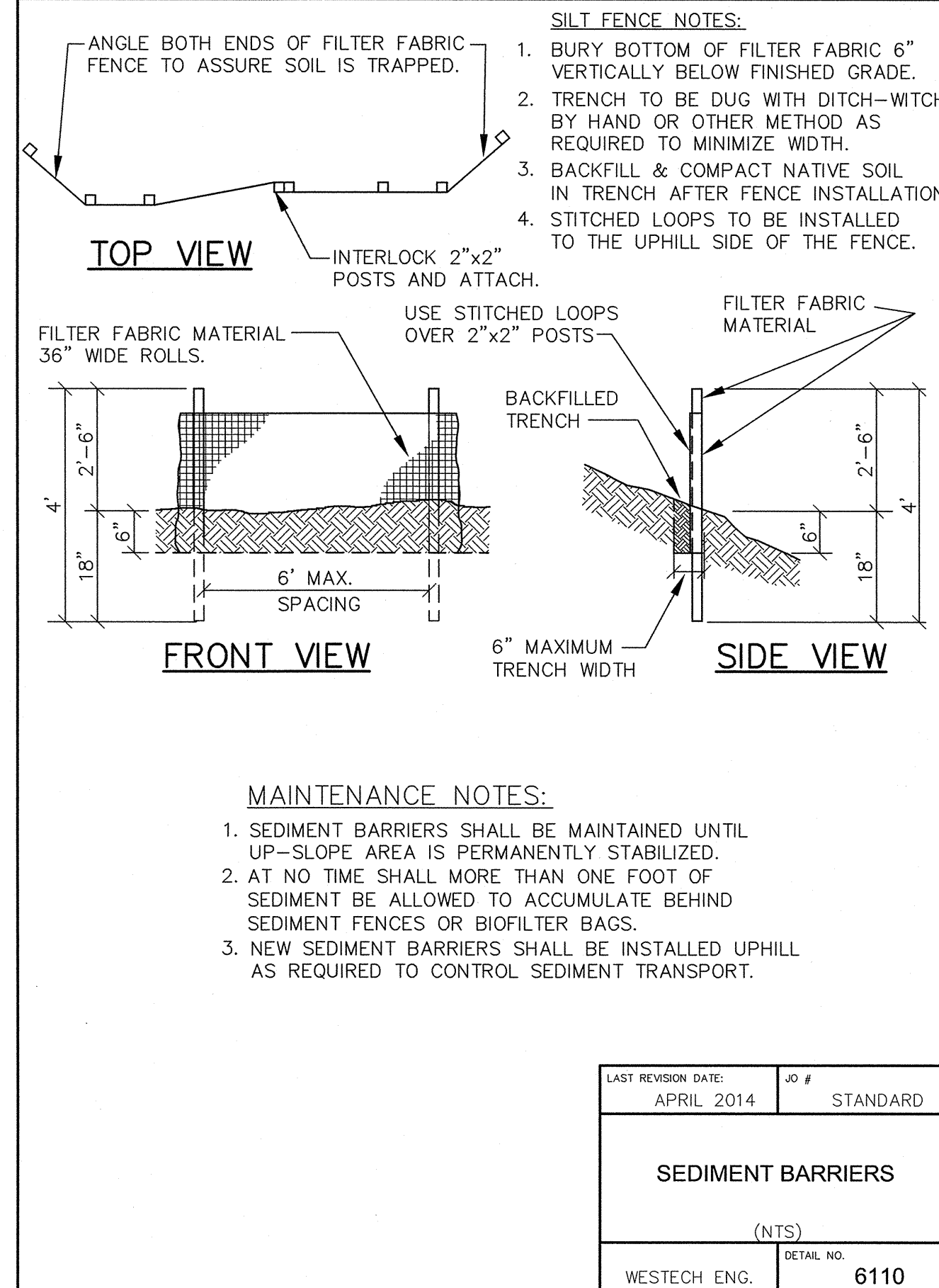
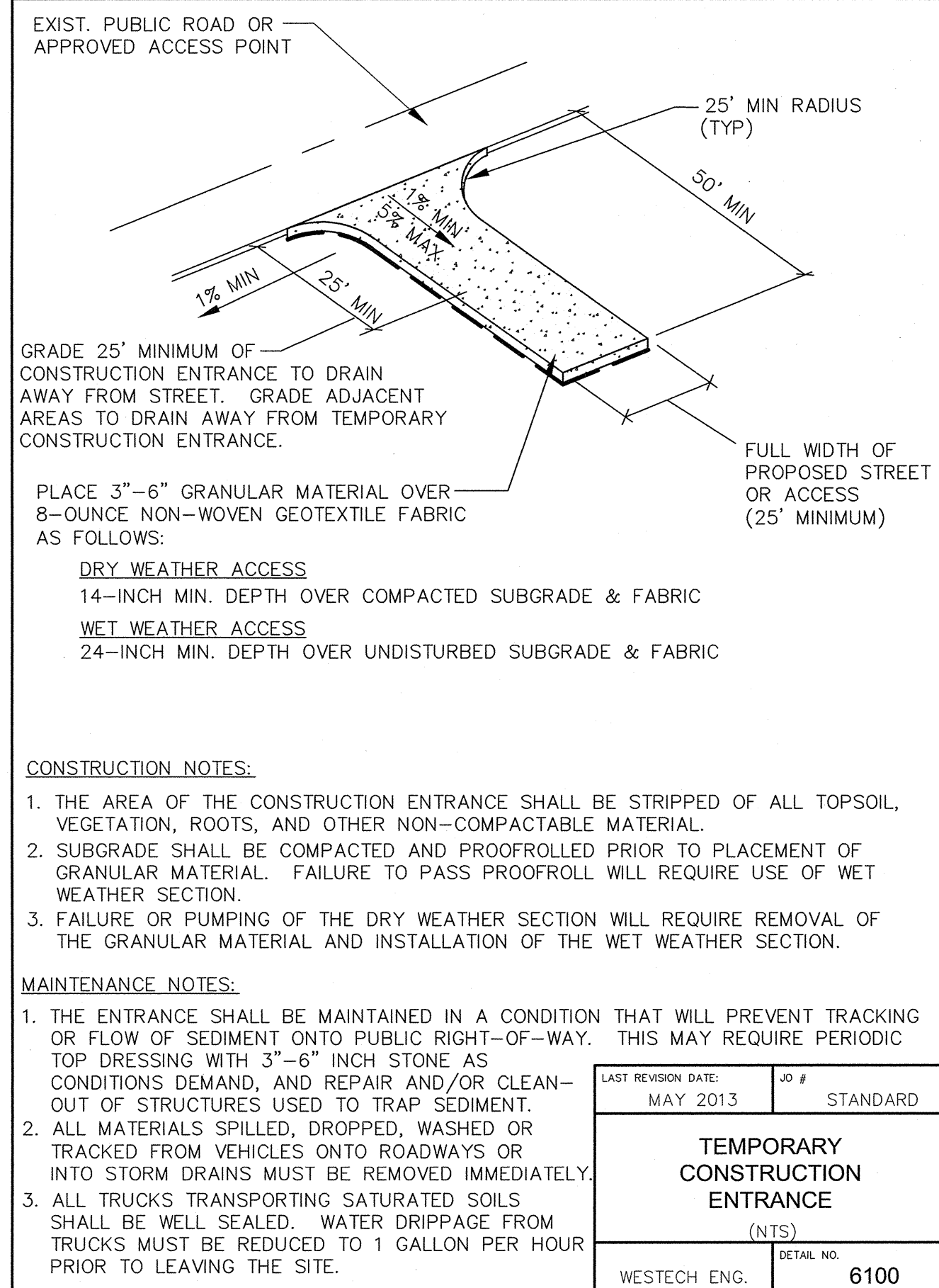
MOLLALA APARTMENTS  
HOME FIRST DEVELOPMENT PARTNERS

EROSION CONTROL  
NOTES & DETAILS

DRAWING  
C2.2

JOB NUMBER  
3312.0000.0





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**WESTECH ENGINEERING, INC.**  
CONSULTING ENGINEERS AND PLANNERS

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**MOLALLA APARTMENTS**  
HOME FIRST DEVELOPMENT PARTNERS

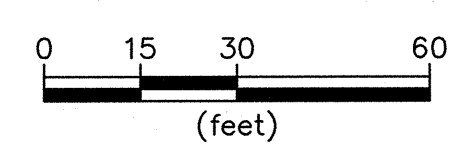
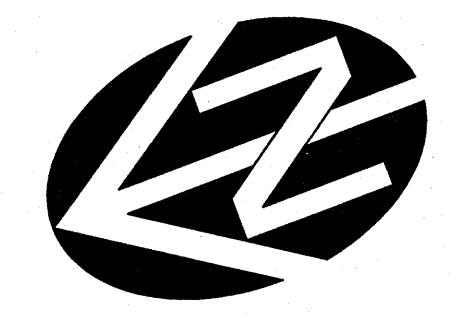
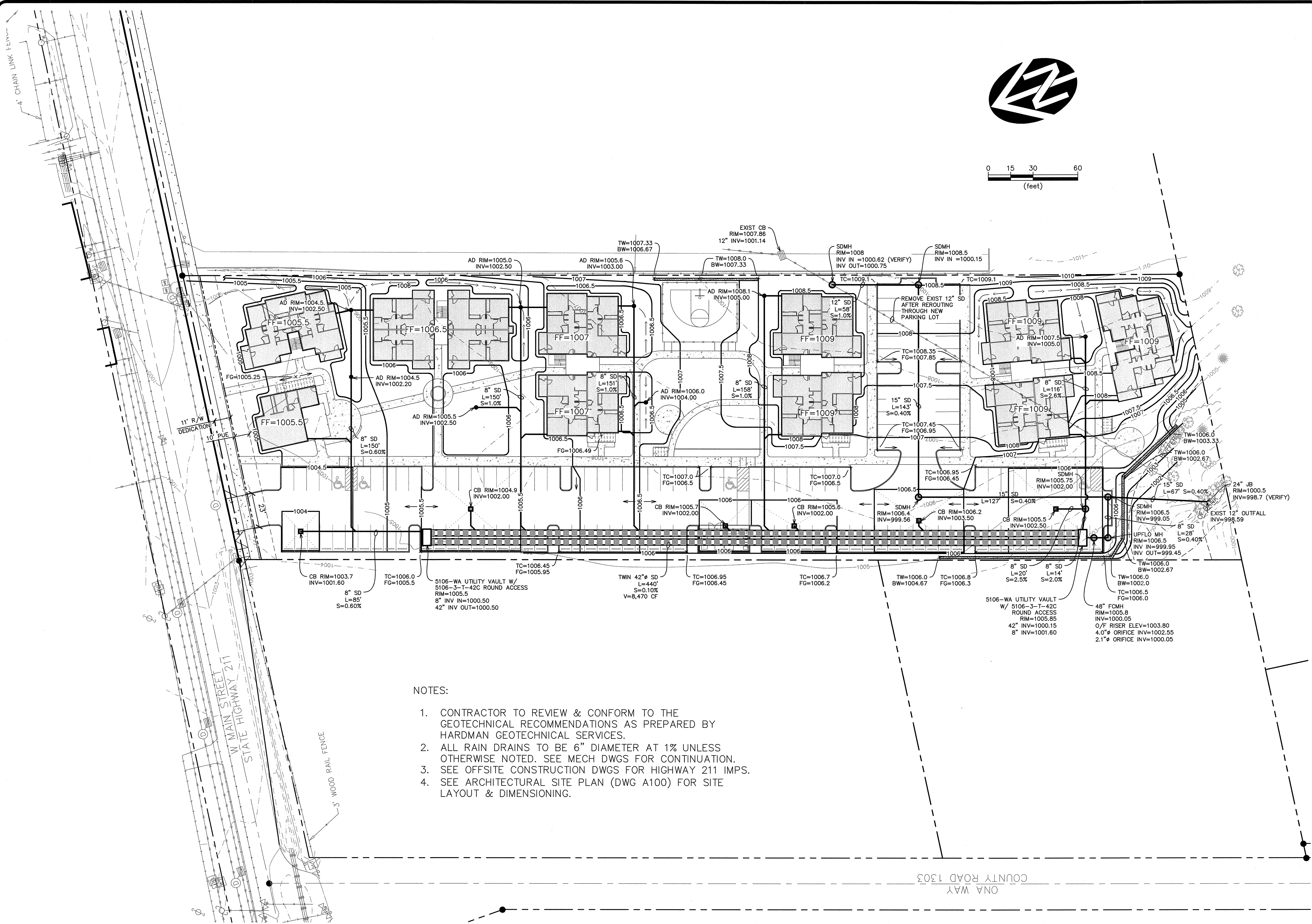
**EROSION CONTROL NOTES & DETAILS**

**DRAWING C2.4**

**JOB NUMBER 3312.0000.0**



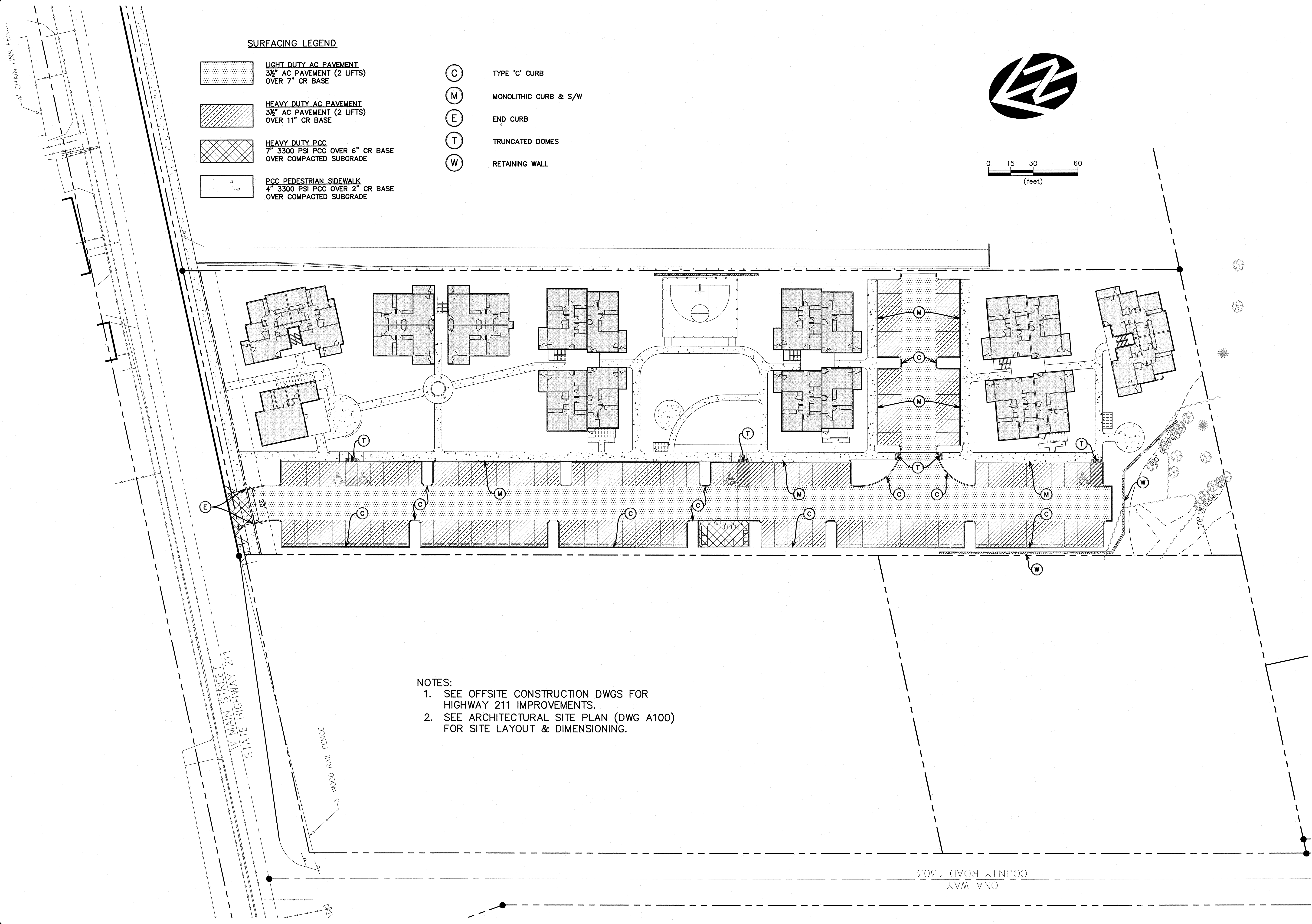
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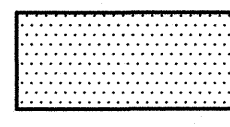
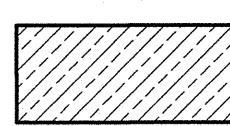
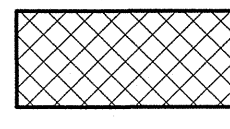
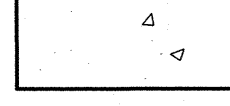
- NOTES:
1. CONTRACTOR TO REVIEW & CONFORM TO THE GEOTECHNICAL RECOMMENDATIONS AS PREPARED BY HARDMAN GEOTECHNICAL SERVICES.
  2. ALL RAIN DRAINS TO BE 6" DIAMETER AT 1% UNLESS OTHERWISE NOTED. SEE MECH DWGS FOR CONTINUATION.
  3. SEE OFFSITE CONSTRUCTION DWGS FOR HIGHWAY 211 IMPS.
  4. SEE ARCHITECTURAL SITE PLAN (DWG A100) FOR SITE LAYOUT & DIMENSIONING.






<p>VERIFY SCALE          IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY</p> <p>0</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%;">NO.</td> <td style="width: 10%;">DATE</td> <td style="width: 30%;">DESCRIPTION</td> <td style="width: 10%;">BY</td> <td style="width: 10%;">REV</td> </tr> <tr> <td>1</td> <td>01/04/22</td> <td>ADDED TREES @ SW CORNER</td> <td>AR</td> <td></td> </tr> </table>	NO.	DATE	DESCRIPTION	BY	REV	1	01/04/22	ADDED TREES @ SW CORNER	AR	
NO.	DATE	DESCRIPTION	BY	REV							
1	01/04/22	ADDED TREES @ SW CORNER	AR								
<p>REGISTERED PROFESSIONAL ENGINEER          11944 OREGON 3661          STEVEN A. STEVENSON          9/20/2022</p>											
<p><b>WESTECH ENGINEERING, INC.</b>          CONSULTING ENGINEERS AND PLANNERS          3841 Fairview Industrial Dr. S.E., Suite 100, Salem, OR 97302          Phone: (503) 585-2474, Fax: (503) 585-3986          E-mail: westech@westech-eng.com</p>											
<p><b>MOLALLA APARTMENTS</b>          HOME FIRST DEVELOPMENT PARTNERS</p>											
<p><b>GRADING &amp; DRAINAGE PLAN</b></p>											
<p>DRAWING  <b>C3.0</b></p>											
<p>JOB NUMBER  <b>3312.0000.0</b></p>											

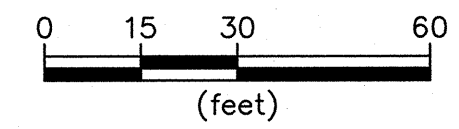
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**SURFACING LEGEND**

-  LIGHT DUTY AC PAVEMENT  
3½" AC PAVEMENT (2 LIFTS)  
OVER 7" CR BASE
-  HEAVY DUTY AC PAVEMENT  
3½" AC PAVEMENT (2 LIFTS)  
OVER 11" CR BASE
-  HEAVY DUTY PCC  
7" 3300 PSI PCC OVER 6" CR BASE  
OVER COMPACTED SUBGRADE
-  PCC PEDESTRIAN SIDEWALK  
4" 3300 PSI PCC OVER 2" CR BASE  
OVER COMPACTED SUBGRADE

-  TYPE 'C' CURB
-  MONOLITHIC CURB & S/W
-  END CURB
-  TRUNCATED DOMES
-  RETAINING WALL



- NOTES:**
- SEE OFFSITE CONSTRUCTION DWGS FOR HIGHWAY 211 IMPROVEMENTS.
  - SEE ARCHITECTURAL SITE PLAN (DWG A100) FOR SITE LAYOUT & DIMENSIONING.

NO.	DATE	DESCRIPTION	BY
1	01/04/22	ADDED TREES @ SW CORNER	AR
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DRN: SAW  
 CKD: SAW  
 DATE: SEP 2021

REGISTERED PROFESSIONAL ENGINEER  
 11/9/83  
 OREGON  
 JULY 16, 2007  
 STEVEN A. JENSEN  
 REVIEWS: 6/20/2022

**WE**

WESTECH ENGINEERING, INC.  
 CONSULTING ENGINEERS AND PLANNERS

3841 Fairview Industrial Dr. S.E., Suite 100, Salem, OR 97302  
 Phone: (503) 585-2474 Fax: (503) 585-3986  
 E-mail: westech@westech-eng.com

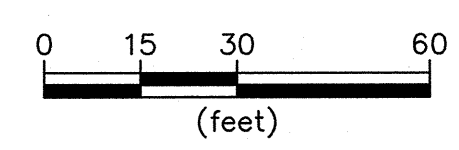
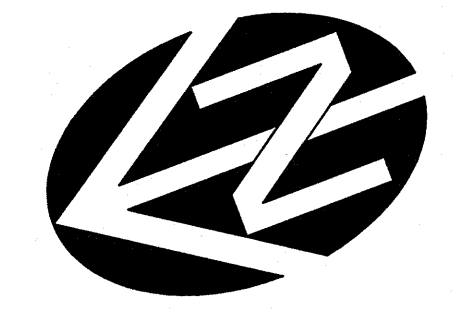
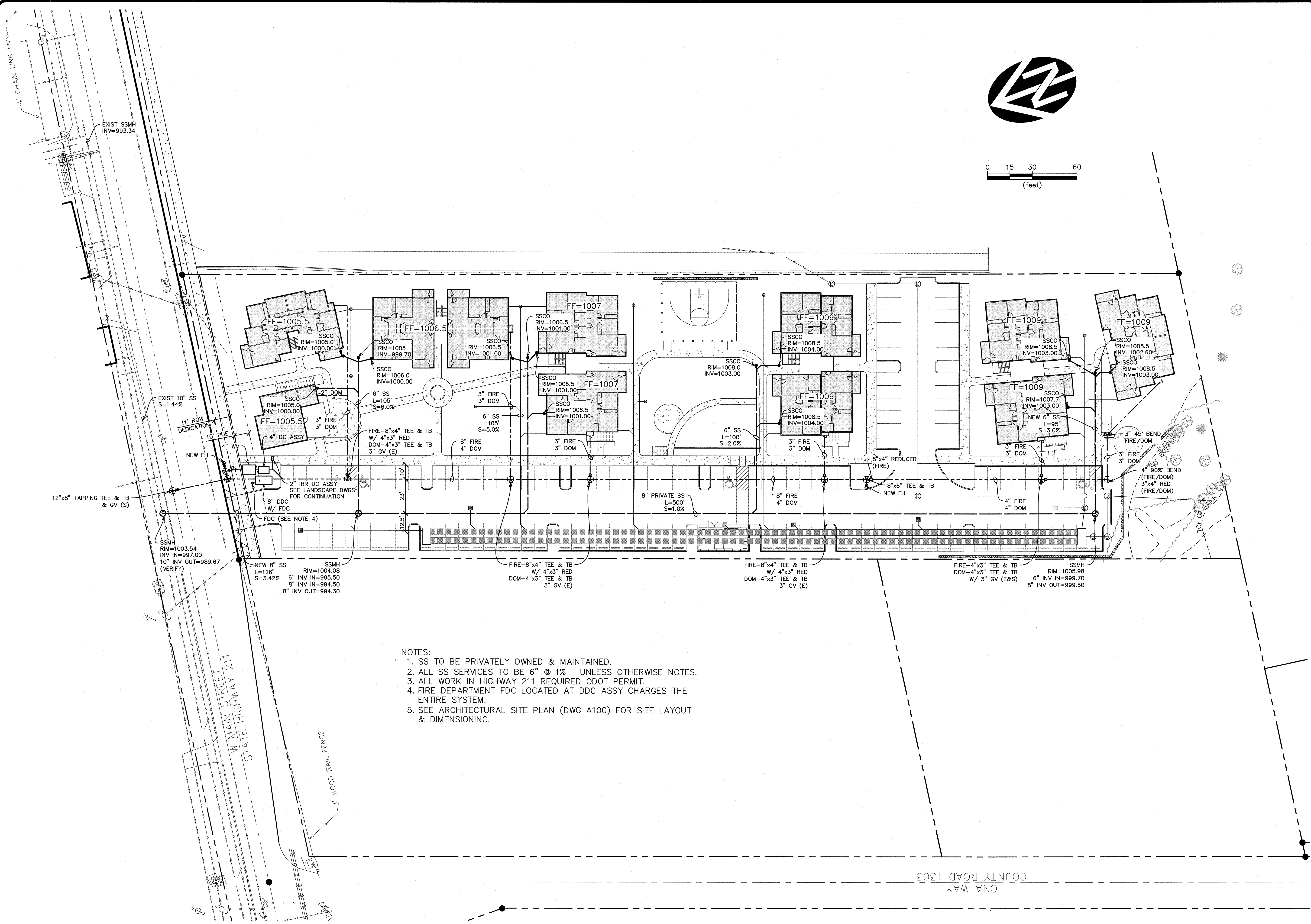
MOLALLA APARTMENTS  
 HOME FIRST DEVELOPMENT PARTNERS

**SURFACING PLAN**

DRAWING  
**C3.1**

JOB NUMBER  
**3312.0000.0**

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- NOTES:
1. SS TO BE PRIVATELY OWNED & MAINTAINED.
  2. ALL SS SERVICES TO BE 6" @ 1% UNLESS OTHERWISE NOTES.
  3. ALL WORK IN HIGHWAY 211 REQUIRED ODOT PERMIT.
  4. FIRE DEPARTMENT FDC LOCATED AT DDC ASSY CHARGES THE ENTIRE SYSTEM.
  5. SEE ARCHITECTURAL SITE PLAN (DWG A100) FOR SITE LAYOUT & DIMENSIONING.

NO.	DATE	DESCRIPTION	BY
1	01/04/22	ADDED TREES @ SW CORNER	AR

VERIFY SCALE  
 BASED ON THE ORIGINAL DRAWING  
 IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES PROPORTIONALLY

0 1" = 30'

DRN. SAU  
 CKD. SAU  
 DATE: SEP 2021

REGISTERED PROFESSIONAL ENGINEER  
 STATE OF OREGON  
 JULIE A. STEVENSON  
 REVISIONS: 6/30/2022

**WE**  
**WESTTECH ENGINEERING, INC.**  
 CONSULTING ENGINEERS AND PLANNERS

3841 Fairview Industrial Dr. S.E., Suite 100, Salem, OR 97302  
 Phone: (503) 585-2474, Fax: (503) 585-3966  
 E-mail: westtech@westtech-eng.com

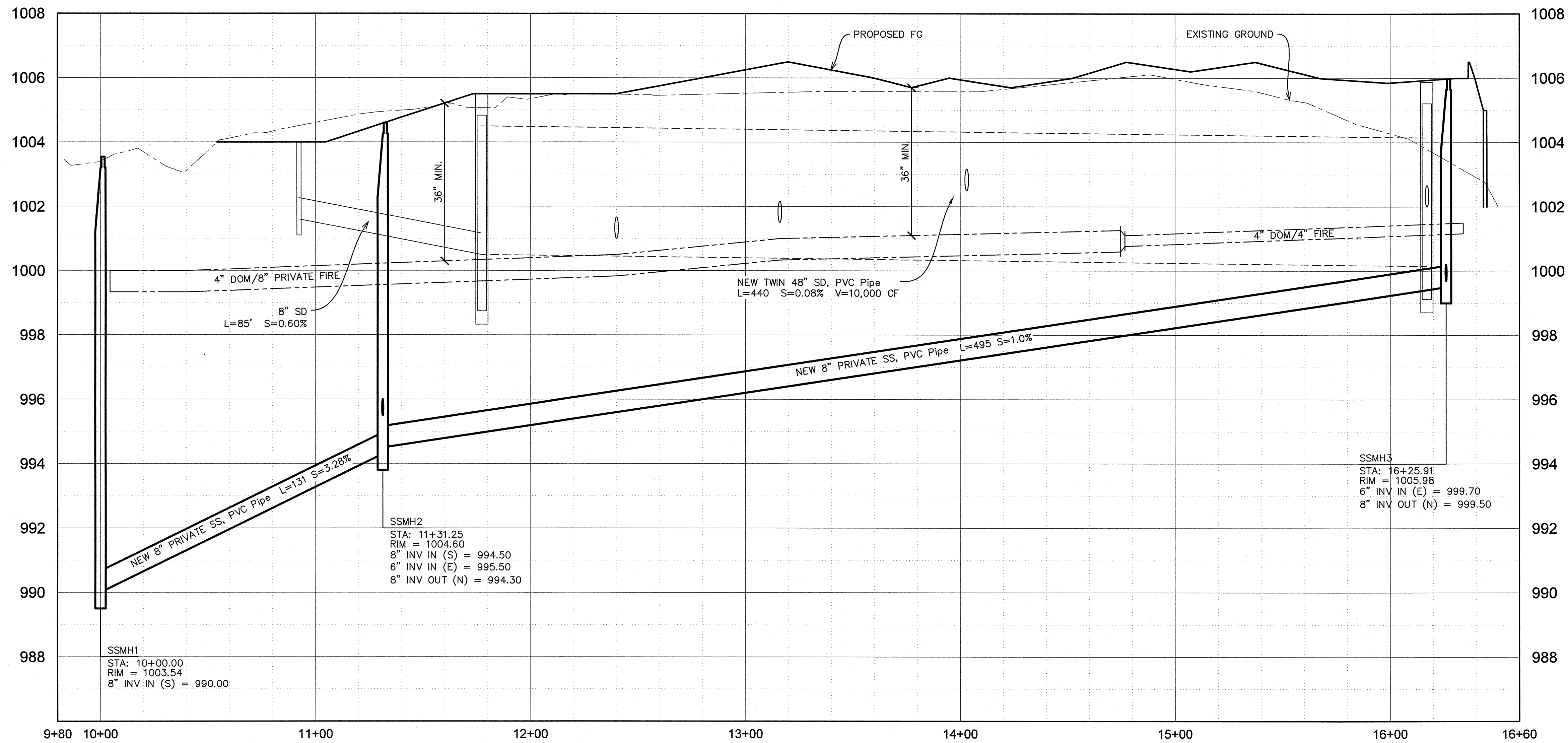
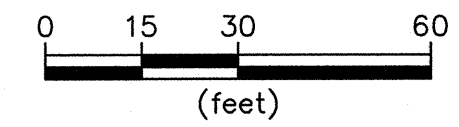
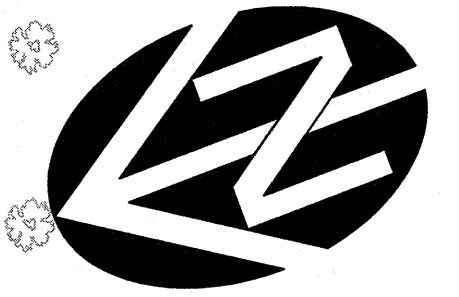
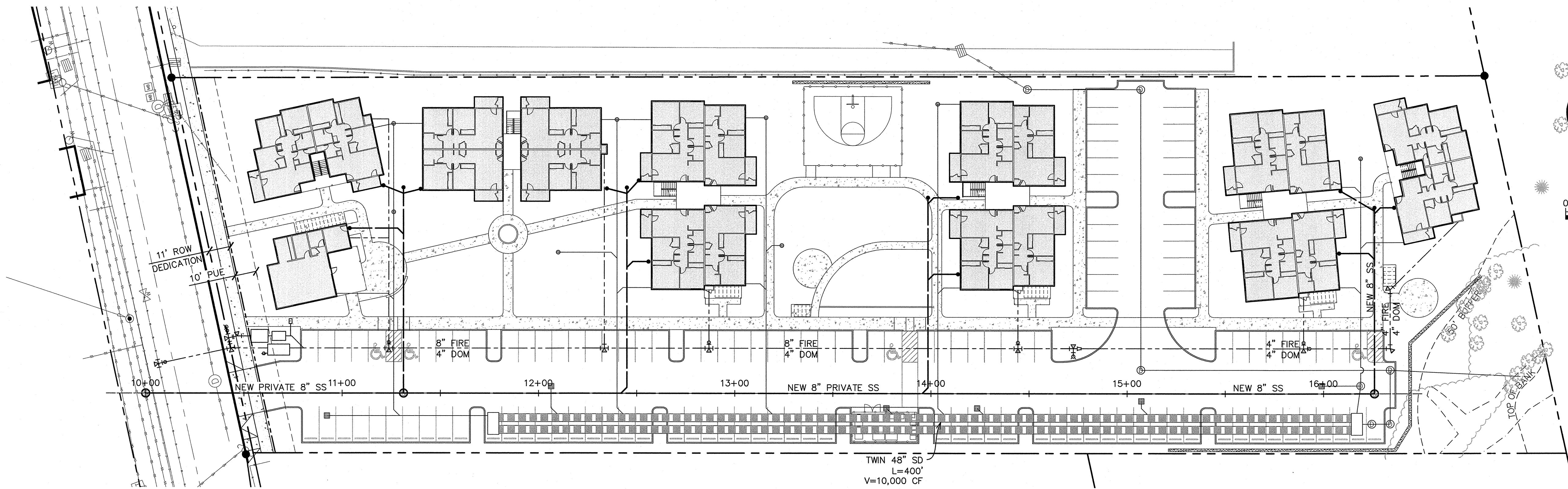
MOLALLA APARTMENTS  
 HOME FIRST DEVELOPMENT PARTNERS

**OVERALL UTILITY PLAN**

DRAWING  
**C4.0**

JOB NUMBER  
**3312.0000.0**

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VERIFY SCALE  
 THIS IS ONE INCH ON ORIGINAL DRAWING  
 IF NOT ONE INCH ON THIS SHEET, ADJUST SPACES PROPORTIONALLY

DSN: SAW  
 DRN: AR  
 CKD: SAW  
 DATE: SEP 2021

REGISTERED PROFESSIONAL ENGINEER  
 STEVEN A. SULLIVAN  
 OREGON  
 LICENSE NO. 11174  
 REVIEWS: 6/20/2022

**WESTECH ENGINEERING, INC.**  
 CONSULTING ENGINEERS AND PLANNERS

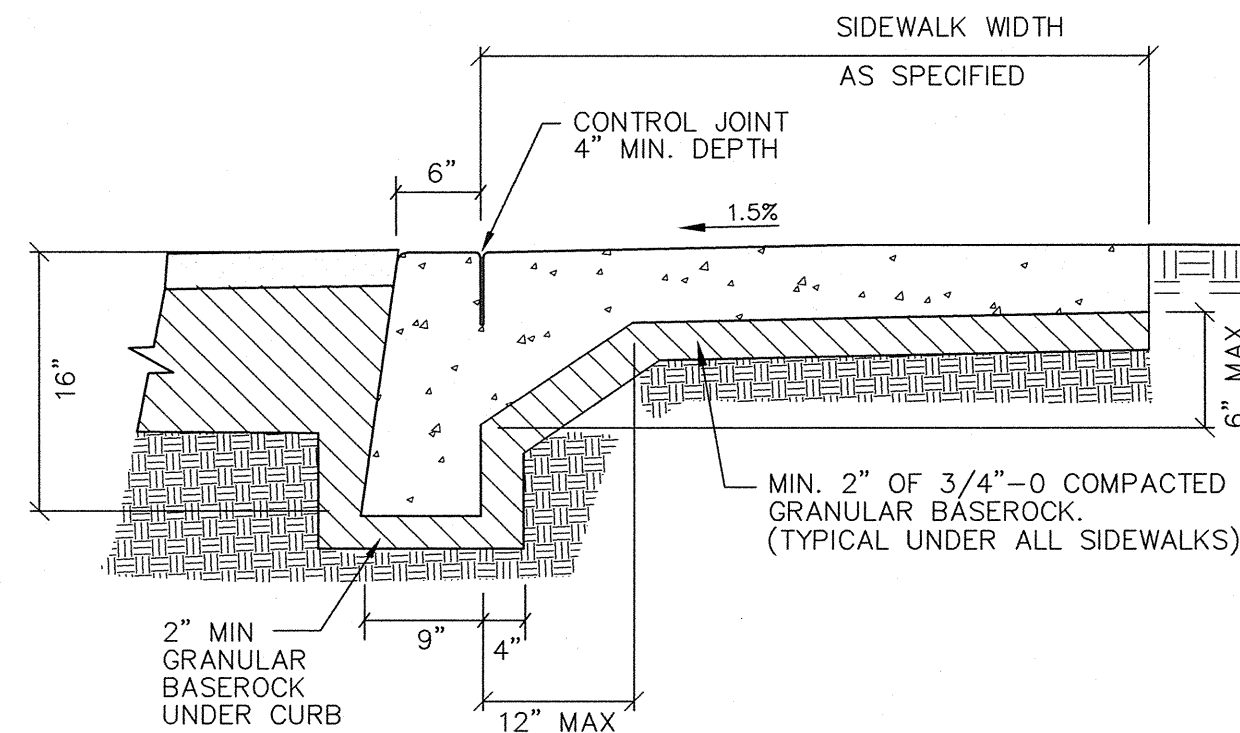
3941 Fairview Industrial Dr. S.E., Suite 100, Salem, OR 97302  
 Phone: (503) 585-2474 Fax: (503) 585-3986  
 E-mail: westech@westech-eng.com

MOLALLA APARTMENTS  
 HOME FIRST DEVELOPMENT PARTNERS

**UTILITY  
 PLAN-PROFILE**

DRAWING  
**C4.1**

JOB NUMBER  
**3312.0000.0**

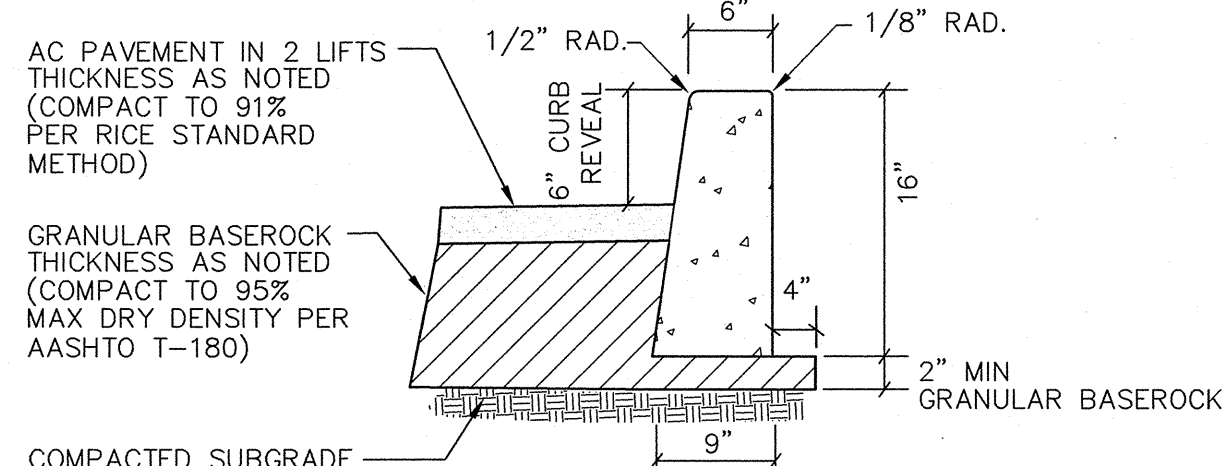


TYPICAL SECTION  
NTS

NOTES:

1. CONCRETE DEPTH FOR STANDARD SIDEWALKS SHALL BE 4" MIN.
2. CONCRETE SHALL BE 3300 PSI @ 28 DAYS.
3. INSTALL TOOLED CONTRACTION JOINTS AT 5' INTERVALS. SIDEWALKS 10' & WIDER SHALL HAVE A LONGITUDINAL CONTRACTION JOINT AT 5' ON CENTER.

LAST REVISION DATE:	NOV 2013	JD #	STANDARD
<b>MONOLITHIC CURB AND SIDEWALK</b>			
(NTS)			
WESTECH ENG.	DETAIL NO.	2112	

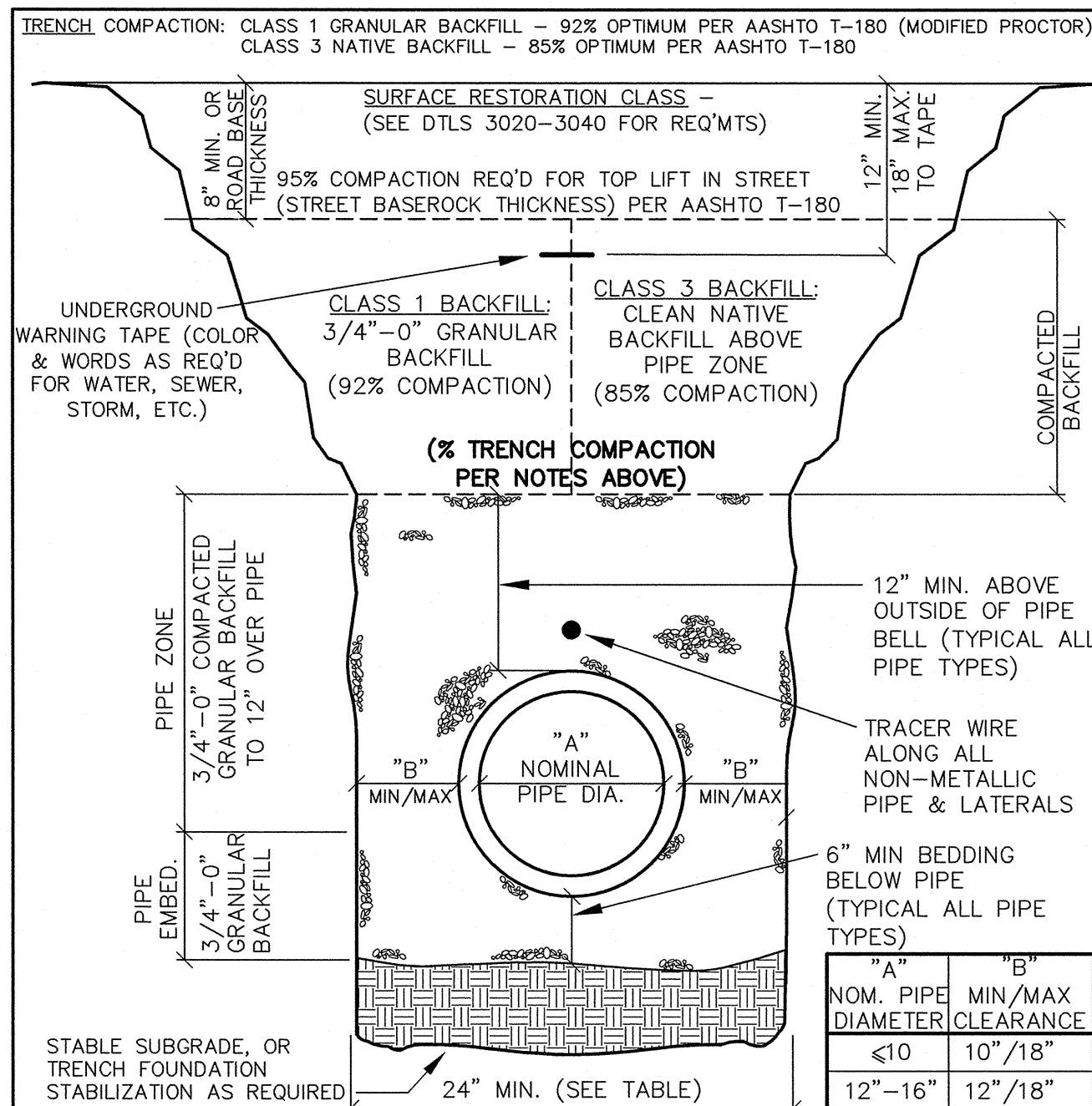


PAVEMENT/TYPE "C" CURB DETAIL  
NTS

NOTES:

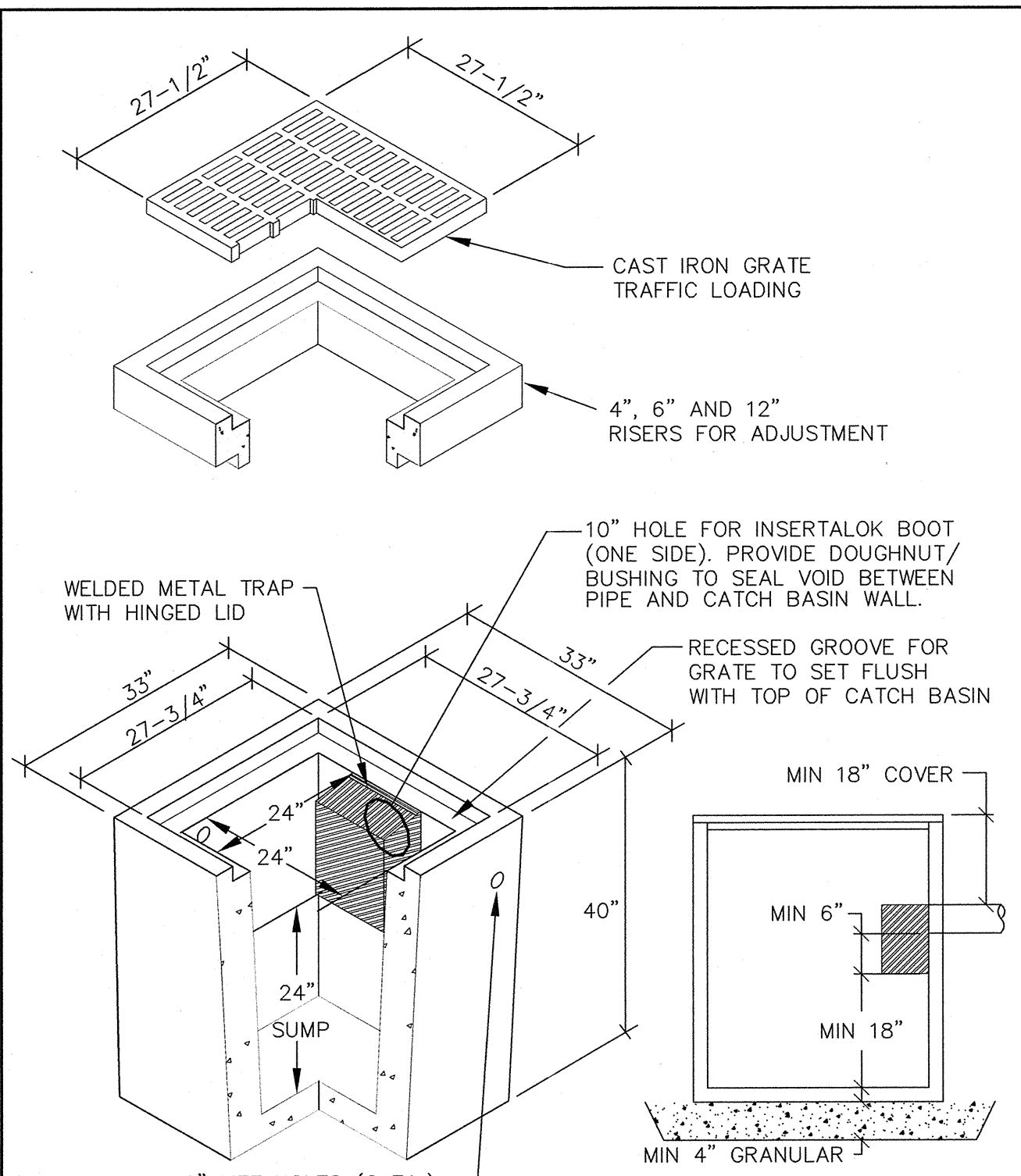
1. SEE GRADING PLAN FOR LOCATION OF LIGHT AND HEAVY DUTY PAVEMENT.
2. DESIGN SUBGRADES SHALL BE COMPACTED AND PROOF-ROLLED PRIOR TO PLACEMENT OF BASEROCK. IF SUBGRADE PASSES PROOF-ROLL BUT FAILS DENSITY TESTING, MIN. 4.5 OZ NON-WOVEN GEOTEXTILE FABRIC SHALL BE PLACED ON SUBGRADE PRIOR TO PLACEMENT OF BASEROCK. FAILURE OF PROOF-ROLL WILL REQUIRE OVEREXCAVATION.
3. IF SUBGRADE FAILS THE PROOF-ROLL, SUBGRADE SHALL BE OVEREXCAVATED TO UNDISTURBED SOIL AND BACKFILLED WITH BASEROCK OVER MIN. 8.0-OZ. NON-WOVEN FABRIC AS REQUIRED TO ALLOW COMPACTION OF UPPER (DESIGN) BASEROCK SECTION AND TO MAINTAIN STRUCTURAL INTEGRITY OF NATIVE SUBGRADE SOILS. TYPICAL MIN. OVEREXCAVATION REQUIRED IS 12-INCHES. NO RUBBER TIRE EQUIPMENT ALLOWED ON SUBGRADE FOLLOWING OVEREXCAVATION.
4. SUBGRADE TO BE PROOFROLLED IMMEDIATELY PRIOR TO PLACING BASEROCK. BASEROCK TO BE PROOFROLLED IMMEDIATELY PRIOR TO PAVING.
5. CONTRACTION JOINTS SHALL BE PLACED AT 15' MIN. INTERVALS AND SHALL EXTEND AT LEAST 50% THROUGH THE CURB SECTION.
6. ALL CONCRETE SHALL BE 3300 PSI @ 28 DAYS.
7. CURBS TO CURE A MINIMUM OF 7 DAYS PRIOR TO PLACING FINAL BASEROCK AND PAVING. USE TYPE 1 OR 1-D CLEAR CURING COMPOUND.

LAST REVISION DATE:	DEC 1999	JD #	X
<b>PAVEMENT AND TYPE 'C' CURB DETAIL</b>			
(NTS)			
WESTECH ENG.	DETAIL NO.	2390	



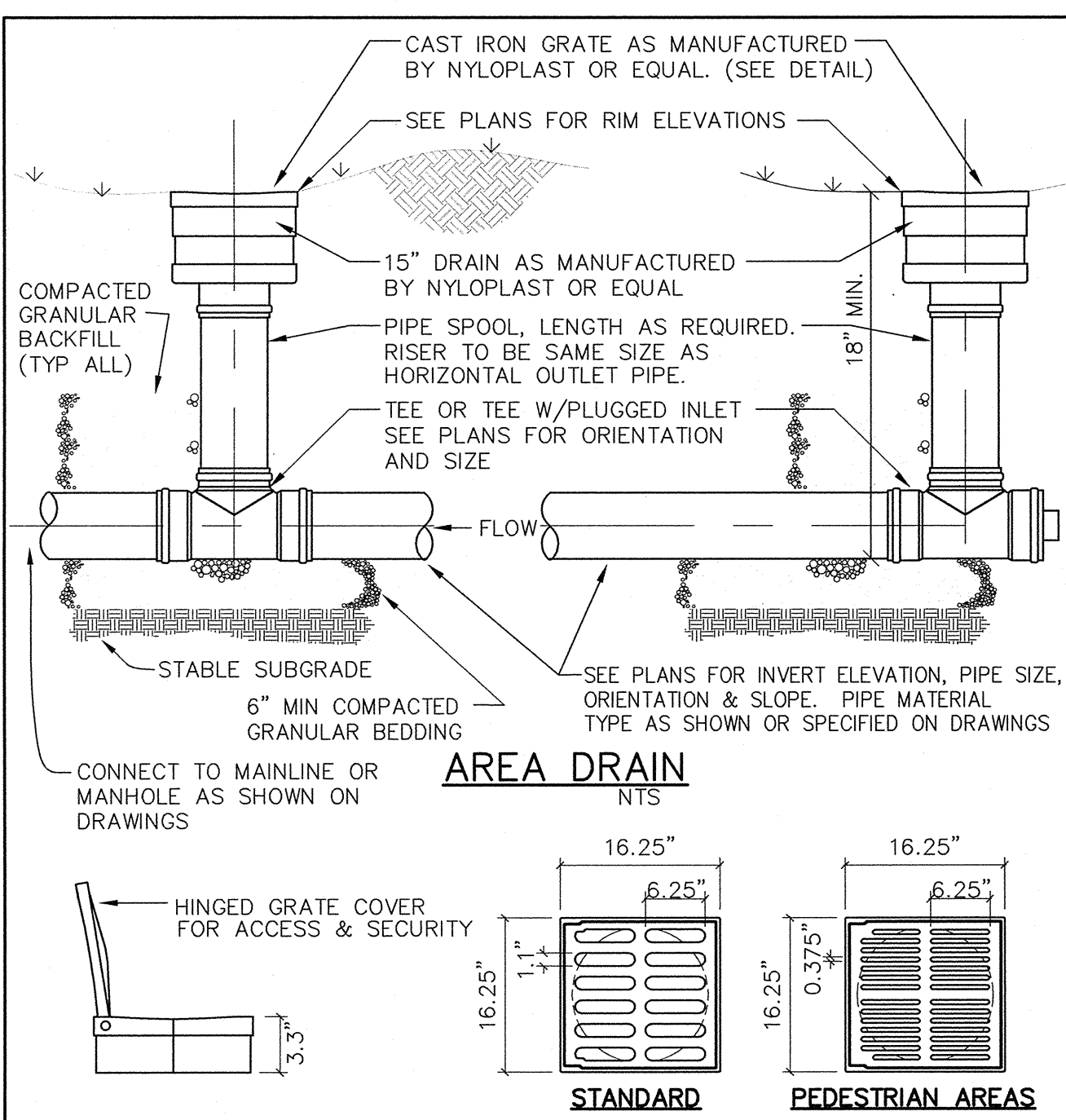
- NOTES:
1. CLASS 1 REQ'D. UNDER ALL EXIST. OR FUTURE IMPROVED AREAS INCLUDING SIDEWALKS.
  2. WHERE NEW PIPING IS IN SAME ALIGNMENT AS EXISTING PIPING, THE PIPE EMBEDMENT SHALL EXTEND TO A MIN. OF 6" BELOW THE NEW PIPING OR 6" BELOW EXISTING PIPING, WHICHEVER IS DEEPER.
  3. FOR FLEXIBLE PIPE, BOTTOM OF TRENCH SHORING SHALL BE ABOVE PIPE SPRINGLINE PRIOR TO COMPACTING BACKFILL BELOW THE PIPE SPRINGLINE AND UNDER THE PIPE HAUNCHES.
  4. MINIMUM CLEARANCES SHOWN ("B") ASSUMES STANDARD 6" WALL TRENCH BOXES SET ON TRENCH BOTTOM, AND REPRESENTS WIDTH REQUIRED TO CONSOLIDATE GRANULAR MATERIAL UNDER PIPE HAUNCHES (TO AVOID LOSS OF SIDE SUPPORT WHEN TRENCH BOX IS MOVED OR PULLED FORWARD). TRENCH WIDTH REDUCTION REQUIRES PRIOR APPROVAL BASED ON ACTUAL TRENCH SHORING PROPOSED.

LAST REVISION DATE:	JAN 2016	JD #	STANDARD
<b>TRENCH BACKFILL, BEDDING, AND PIPE ZONE</b>			
(NTS)			
WESTECH ENG.	DETAIL NO.	3010	



- NOTES:
1. SEE CONSTRUCTION DRAWINGS FOR PIPE SIZE, LOCATION AND INVERT ELEVATION.
  2. CONCRETE SHALL BE 4000 PSI @ 28 DAYS.
  3. REBAR SHALL CONFORM TO ASTM A615 GRADE 60.
  4. REBAR SHALL BE MIN. #4 BARS @ 6" C.C.
  5. SET CB SQUARE WITH BUILDINGS OR WITH EDGE OF PARKING LOT OR DRIVEWAY WHERE IT LIES.
  6. ADJUST PAVING SO WATER FLOWS TO CB WITH NO PONDING.

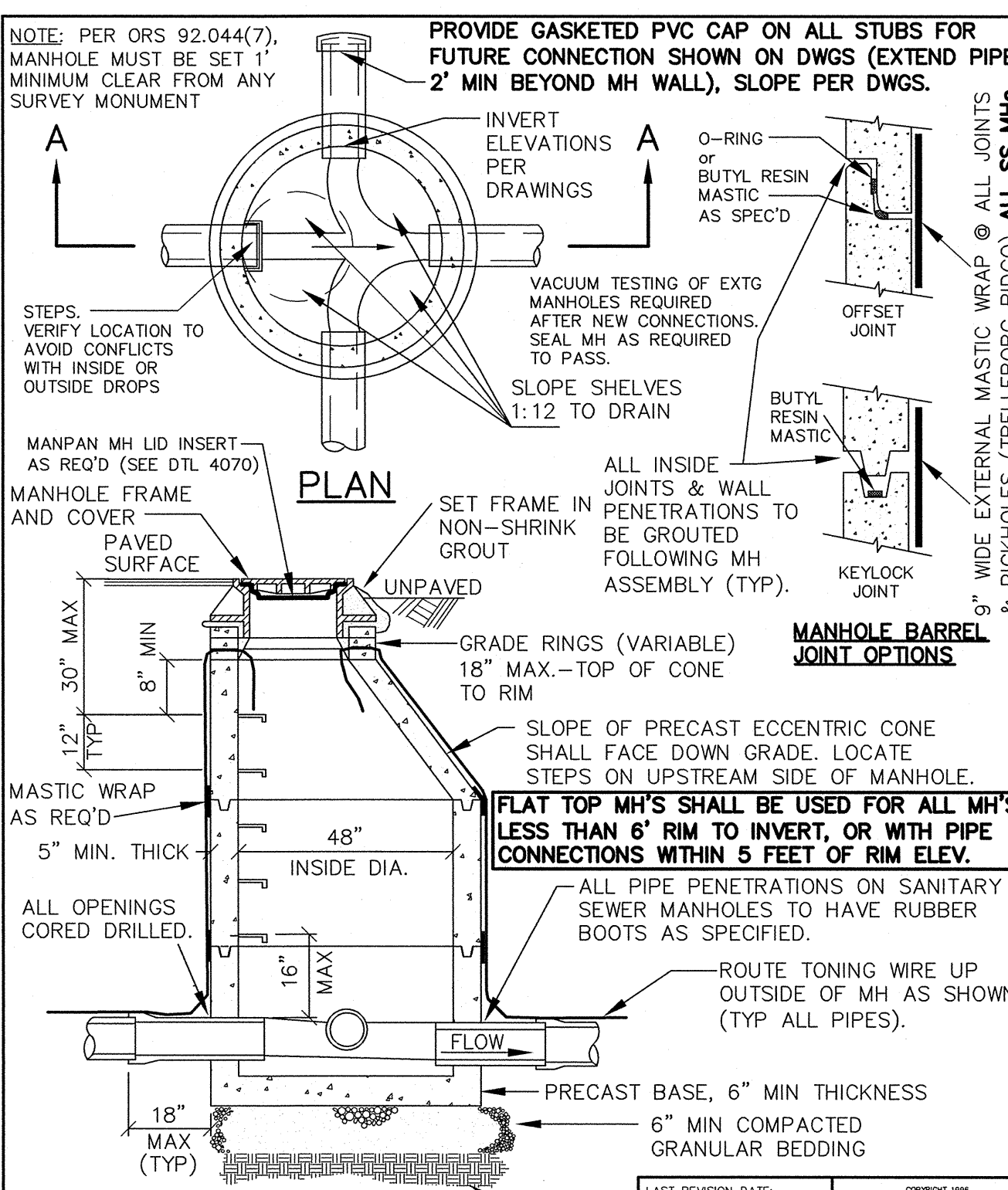
LAST REVISION DATE:	JULY 2012	JD #	STANDARD
<b>PARKING LOT CATCH BASIN (PRECAST CONCRETE)</b>			
(NTS)			
WESTECH ENG.	DETAIL NO.	3150	



15" CAST IRON GRATE DETAIL  
NTS

- NOTES:
1. AREA DRAIN NOT FOR USE IN AREAS SUBJECT TO VEHICLE TRAFFIC.
  2. USE WATERTIGHT GASKETED FITTINGS AND ADAPTORS FOR ALL PIPE CONNECTIONS.
  3. ALL GRATES IN PEDESTRIAN AREAS SHALL CONFORM WITH ADA REQUIREMENTS, INCLUDING GRATE OPENING SIZE.

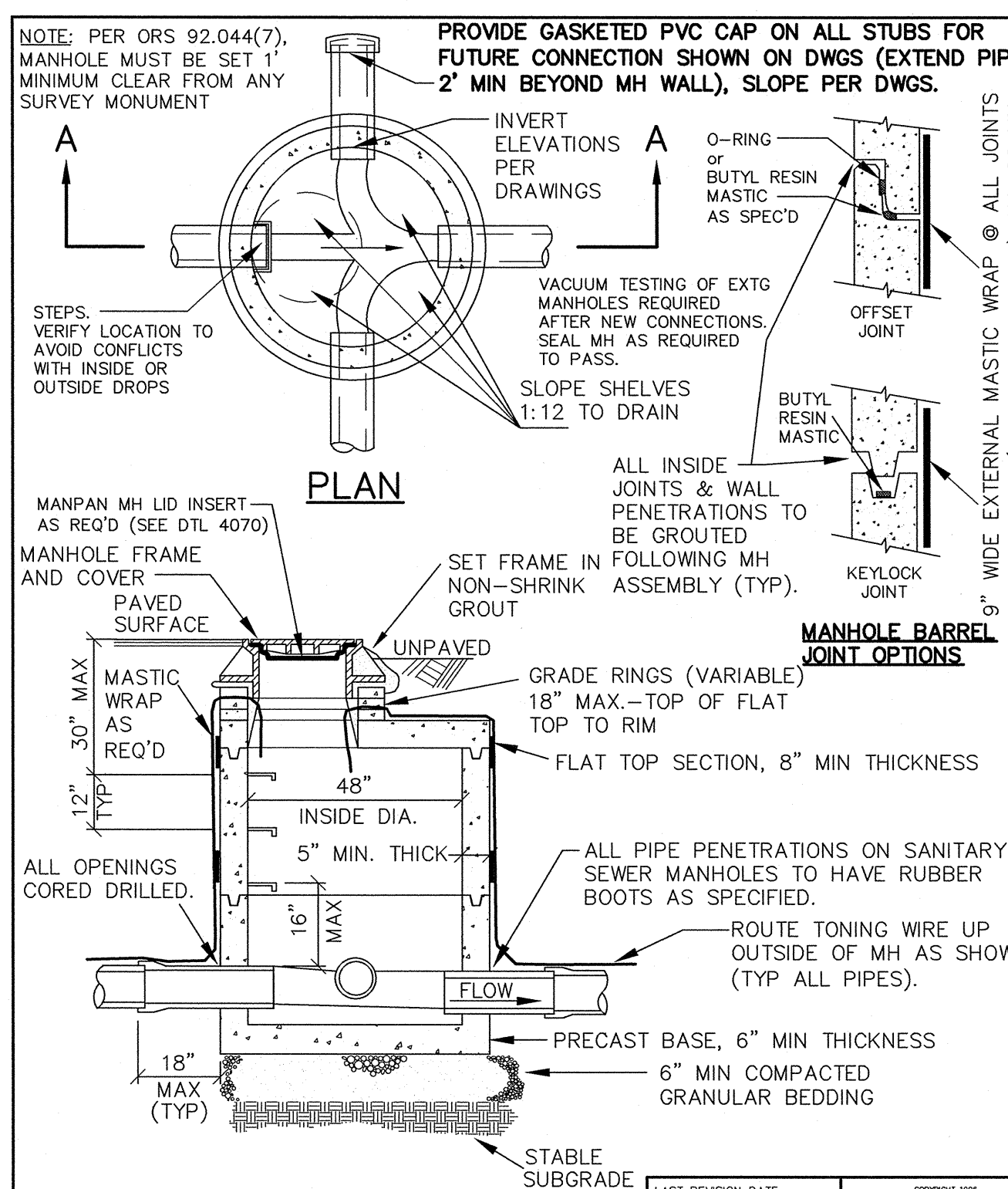
LAST REVISION DATE:	SEP 2005	JD #	STANDARD
<b>AREA DRAIN, LANDSCAPE AND PEDESTRIAN AREAS (NON-TRAFFIC)</b>			
(NTS)			
WESTECH ENG.	DETAIL NO.	3550	



MANHOLE FRAME AND COVER (STANDARD AND SUBURBAN)  
NTS

- NOTES:
1. PRECAST SECTIONS SHALL MEET OR EXCEED ASTM C-478.
  2. WATERTIGHT O-RING OR MASTIC KEYLOCK JOINTS REQUIRED, EXTERNAL SEAL AT JOINTS & PICKHOLES.
  3. STEPS TO BE POLYPROPYLENE PLASTIC WITH GRADE 60 REINFORCING ROD. ADD STEPS TO EXTG CONNECTION MH IF EXTG STEPS ARE ABSENT.

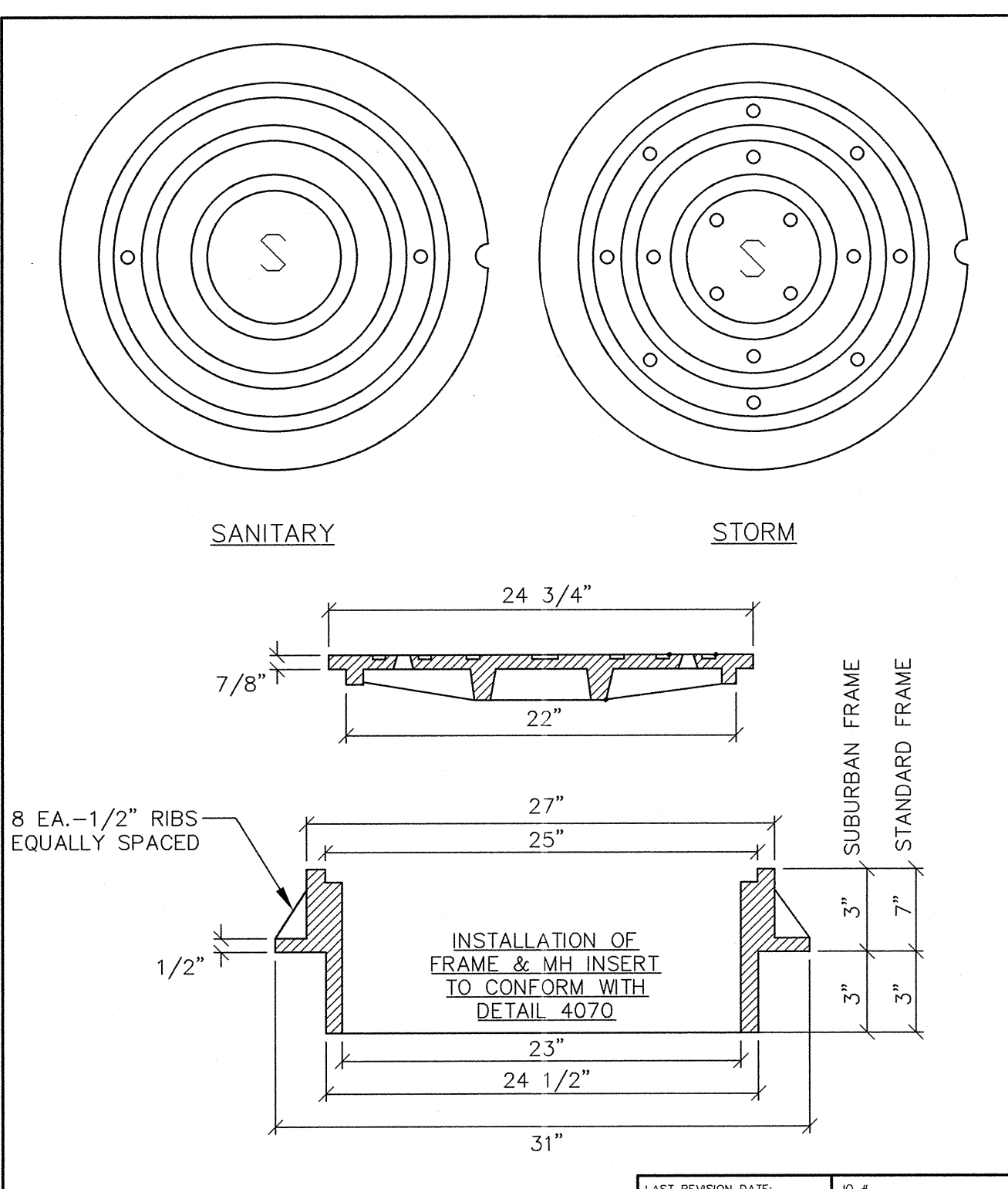
LAST REVISION DATE:	MAY 2019	JD #	STANDARD
<b>STANDARD MANHOLE FOR 21" PIPE AND SMALLER (SEWER &amp; STORM)</b>			
(NTS)			
WESTECH ENG.	DETAIL NO.	4010	



MANHOLE FRAME AND COVER (STANDARD AND SUBURBAN)  
NTS

- NOTES:
1. PRECAST SECTIONS SHALL MEET OR EXCEED ASTM C-478.
  2. WATERTIGHT O-RING OR MASTIC KEYLOCK JOINTS REQUIRED, EXTERNAL SEAL AT JOINTS & PICKHOLES.
  3. STEPS TO BE POLYPROPYLENE PLASTIC WITH GRADE 60 REINFORCING ROD. ADD STEPS TO EXTG CONNECTION MH IF EXTG STEPS ARE ABSENT.

LAST REVISION DATE:	MAY 2019	JD #	STANDARD
<b>FLAT TOP MANHOLE FOR 21" PIPE AND SMALLER (SEWER &amp; STORM)</b>			
(NTS)			
WESTECH ENG.	DETAIL NO.	4020	



MANHOLE FRAME AND COVER (STANDARD AND SUBURBAN)  
NTS

- NOTES:
1. COVER AND FRAME SHALL BE GRAY CAST IRON ASTM A-48, CLASS 30.
  2. COVER AND FRAME TO BE MACHINED TO A TRUE BEARING ALL AROUND.
  3. NOTCH LID FOR LIFTING HOOK.

LAST REVISION DATE:	DEC 2015	JD #	STANDARD
<b>MANHOLE FRAME AND COVER (STANDARD AND SUBURBAN)</b>			
(NTS)			
WESTECH ENG.	DETAIL NO.	4050	

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THIS SCALE IS FOR CONSTRUCTION PURPOSES ONLY. THIS SCALE IS NOT TO BE USED FOR AS-BUILT DRAWINGS. SCALES ACCORDINGLY.	
DSN.	SAW
DRN.	AR
CKD.	AW
DATE	SEP 2021
NO.	1
DESCRIPTION	
BY	

WESTECH ENGINEERING, INC.  
CONSULTING ENGINEERS AND PLANNERS

3641 Fairview Industrial Dr., S.E., Suite 100, Salem, OR 97302  
Phone: (503) 585-2474 Fax: (503) 585-3866  
E-mail: westech@westech-eng.com

REGISTERED PROFESSIONAL ENGINEER  
OREGON LICENSE NO. 443  
STEVEN A. JULY, P.E.

REVIEWS: 6/29/2022

MOLALLA APARTMENTS  
HOME FIRST DEVELOPMENT PARTNERS

CIVIL DETAILS

DRAWING  
C5.0

JOB NUMBER  
3312.000.0

CLEANOUT COVERS: ALL SEWER CLEANOUT LIDS TO READ "SEWER" ALL STORM CLEANOUT LIDS TO READ "STORM" OR "C/O".

**CLEANOUT FRAME & COVER**

NOTES:

- USE INLAND FOUNDRY MODEL 240 FRAME & COVER IN ALL AREAS.
- COVER AND FRAME SHALL BE GRAY CAST IRON ASTM A-48, CLASS 30.
- COVER AND FRAME TO BE MACHINED TO A TRUE BEARING ALL AROUND.

LAST REVISION DATE:	JULY 2015	JO #	STANDARD
<b>MAINLINE CLEANOUT</b>			
(NTS)			
WESTTECH ENG.	DETAIL NO.	4110	

**BROOKS NO. 1RT VALVE BOX**

NOTES:

- GV SHALL CONFORM TO AWWA C-509.
- VALVE BOXES SHALL BE PLUMB AND CENTERED DIRECTLY OVER THE VALVE NUT.
- VALVE BOX TOP SHALL BE ADJUSTED TO FINISHED GRADE.
- PVC SHALL BE ONE CONTINUOUS PIECE, NO BELLS OR COUPLERS.

LAST REVISION DATE:	JULY 2017	JO #	STANDARD
<b>GATE VALVE AND VALVE BOX DETAIL</b>			
(NTS)			
WESTTECH ENG.	DETAIL NO.	5011	

**RETAINING WALL NOTES:**

- Segmental Retaining Wall (SRW) concrete units shall be the standard color, rough face finish and conform to the requirements of ASTM C-90, ASTM C-140 and ASTM C-145. Owner to select color from samples submitted by Contractor.
- Segmental concrete block units shall conform to the Keystone TM, Retaining Wall system, manufactured by Keystone TM, Pacific Northwest Inc., or an approved alternate and conform to the requirements of ASTM C-90. The wall design is based upon **Keystone Standard units (8" H x 18" W x 21.5"; 105 lbs.)**.
- The Keystone retaining wall, or approved equal, shall be constructed per manufacturer specifications and approved construction drawings, unless modified herein.
- This SRW design is based upon the blocks specified above. The Contractor, may, at no additional cost to the owner, submit SRW design and shop drawings for an alternate SRW system for approval by the Owner's representative. The shop drawings shall include design calculations stamped by a professional engineer registered in the State of Oregon. Special inspection requirements, as specified herein, still apply to the substitute design. If the alternate wall system is approved, the Contractor shall be responsible for constructing the block layout as necessary to address any differences in the SRW block dimensions.
- The Contractor shall protect from damage, store and handle all materials in accordance with manufacturer recommendations and in a manner to prevent deterioration or damage due to moisture, temperature changes, Ultraviolet (UV) degradation, contaminants, corrosion, breaking, chipping or other causes. Damaged material shall not be incorporated into the segmental retaining wall.
- Crushed rock leveling pad shall be placed on top of compacted subgrade. Leveling pad shall be placed and compacted to a minimum of 92% of maximum dry density per AASHTO T-180 (Modified Proctor). Leveling pad thickness shall be a minimum of 8 inches as measured in place. An acceptable alternative is a 5" concrete (3300 psi) base pad on compacted subgrade.
- Maximum particle size for wall backfill shall not exceed 2 inches in diameter.
- The plasticity index (PI) for the backfill material used in the reinforced wall backfill shall not exceed 30 and the liquid limit shall not exceed 40, as per ASTM D-4318. The owner does not guarantee that all site soils meet these criteria.
- Backfill shall be placed and compacted in lifts not to exceed a loose depth thickness of 8 inches for hand operated vibratory equipment and 12 inches for walk behind, self-propelled vibratory equipment. Backfill shall be compacted to 92% of AASHTO T-180 compaction standard.
- Drainage backfill behind wall and in voids of SRW units shall consist of 1"-0 crushed rock containing no more than 5% passing No. 200 sieve. Provide 4 oz minimum drainage fabric over drain rock (12" minimum lap at any joints).
- Wall drainpipe shall be fabric covered (3 oz min) HDPE slotted pipe conforming to ASTM F-405 (ADS Sock or approved equivalent). Wall drain pipe shall be connected to solid-wall drain pipe(s) draining to daylight or to an approved storm drain system.
- The overall tolerance for the constructed face of wall relative to the vertical wall design or batter shall not exceed ± 1.25 inches maximum over a 10 foot distance; 3 inches maximum.
- The wall drainage system specified is intended to serve the Segmental Retaining Wall (SRW) in its final constructed condition in conjunction with the final site improvements in their final constructed condition. During construction, the Contractor shall manage site drainage and divert stormwater away from the wall structure as necessary to prevent overloading of wall drainage reinforced systems.
- At the end of the each day's operation, the Contractor shall slope the last level of backfill away from the wall face to direct runoff of rainwater away from the wall face. In addition, the Contractor shall not allow surface runoff from adjacent areas to enter the wall construction site.
- Inspection is required for construction of this segmental block retaining wall (SRW). Contractor shall insure all inspections are performed prior to proceeding with the next phase of work. At a minimum inspections shall include the following items: Observation that the wall subgrade bearing capacity meets the specified soil bearing capacity, or a minimum of 2,000 psf, whichever is greater. Observations of the compacted crushed rock leveling pads and wall drainage system. Observation of the wall batter. Soil testing results for plasticity index and liquid limit values for wall backfill material. Compaction results for the wall backfill.

**SEGMENTAL RETAINING WALL W/ FENCE (NON-REINFORCED)**

NOTES:

- PRECAST SECTIONS SHALL CONFORM TO ASTM C-478.
- DISTANCE FROM TOP OF OVERFLOW TO MH RIM SHALL BE BASED ON OVERFLOW CAPACITY CALC'S BY DESIGN ENGINEER (ASSUME ORIFICE CONTROL).
- 60" MINIMUM DIA. MANHOLE REQUIRED FOR OUTLET PIPE LARGER THAN 15" OR INLET > 21".
- ORIFICE CLEANING ACCESS TO BE 6" CORE HOLE THROUGH FLAT-TOP (CENTERED ON OVERFLOW) WITH CI CLEANOUT BOX GROUTED TO SLAB.

LAST REVISION DATE:	AUG. 2020	JO #	STANDARD
<b>SEGMENTAL RETAINING WALL W/ FENCE (NON-REINFORCED)</b>			
(NTS)			
WESTTECH ENG.	DETAIL NO.	8310A	

**POLLUTION/FLOW CONTROL MANHOLE W/OVERFLOW**

NOTES:

- PRECAST SECTIONS SHALL CONFORM TO ASTM C-478.
- DISTANCE FROM TOP OF OVERFLOW TO MH RIM SHALL BE BASED ON OVERFLOW CAPACITY CALC'S BY DESIGN ENGINEER (ASSUME ORIFICE CONTROL).
- 60" MINIMUM DIA. MANHOLE REQUIRED FOR OUTLET PIPE LARGER THAN 15" OR INLET > 21".
- ORIFICE CLEANING ACCESS TO BE 6" CORE HOLE THROUGH FLAT-TOP (CENTERED ON OVERFLOW) WITH CI CLEANOUT BOX GROUTED TO SLAB.

LAST REVISION DATE:	MAR 2010	JO #	STANDARD
<b>POLLUTION/FLOW CONTROL MANHOLE W/OVERFLOW</b>			
(NTS)			
WESTTECH ENG.	DETAIL NO.	U3201	

**NOTE: HYDRANT COLOR TO BE CONFORM TO LOCAL JURISDICTION REQUIREMENTS.**

**STANDARD FIRE HYDRANT ASSEMBLY**

NOTES:

- HYDRANTS TO BE MUELLER SUPER CENTURION 250, MODEL A-423 WITH FULL SIZE (5 1/4") FOOT VALVE.
- ALL HYDRANTS SHALL BE SET PLUMB.
- FOR HYDRANT LEADS LONGER THAN 30', AN ADDITIONAL GATE VALVE SHALL BE PROVIDED WITHIN 3 FT. OF THE HYDRANT.
- RESTRAIN ALL JOINTS ON ALL HYDRANT LEADS. RETAINER GLANDS SHALL TO BE USED IN LEIU OF THRUST BLOCK BEHIND HYDRANT.
- THRUST BLOCK AT STANDARD 6" FIRE HYDRANT TEE SHALL HAVE MIN. 3.7 SQ. FT. BEARING AREA.
- ALL HYDRANTS SHALL BE SET PLUMB.
- FOR HYDRANT LEADS LONGER THAN 30', AN ADDITIONAL GATE VALVE SHALL BE PROVIDED WITHIN 3 FT. OF THE HYDRANT.
- RESTRAIN ALL JOINTS ON ALL HYDRANT LEADS. RETAINER GLANDS SHALL TO BE USED IN LEIU OF THRUST BLOCK BEHIND HYDRANT.
- PAINT CURB YELLOW 10 FEET EACH WAY FROM HYDRANT & INSTALL REFLECTIVE BLUE TRAFFIC MARKER @ STREET CENTERLINE.

LAST REVISION DATE:	AUG 2019	JO #	STANDARD
<b>STANDARD FIRE HYDRANT ASSEMBLY</b>			
(NTS)			
WESTTECH ENG.	DETAIL NO.	5030	

FITTING SIZE (Inches)	TEE, WYE, & HYDRANTS	90° BEND PLUGGED CROSS TEE PLUGGED-RUNS	45° BEND	22 1/2° BEND	11 1/4° BEND
2	*	*	*	*	*
4	1.7	2.4	1.3	1.5	*
6	3.7	5.3	2.9	1.5	*
8	6.7	9.5	5.1	2.7	1.3
10	10.5	14.8	8	4.1	2
12	15.1	21.3	11.6	5.9	2.9
16	26.8	37.9	20.5	10.4	5.2
18	33.9	47.9	25.9	12.8	6.7
LARGER	**	**	**	**	**

BEARING AREA OF THRUST BLOCKS (sq. ft.)

1. ALL VALUES ARE BASED ON THE FOLLOWING ASSUMPTIONS:  
AVG. PRESSURE = 100 PSI x 2 (safety factor); 1500 PSF SOIL BEARING CAPACITY; NORMAL DISTRIBUTION SYSTEM DESIGN VELOCITY NOT TO EXCEED 5 FPS.

2. ALL FITTINGS SHALL BE WRAPPED IN PLASTIC PRIOR TO PLACEMENT OF CONCRETE.

3. BEARING SURFACE OF THRUST BLOCKING SHALL BE AGAINST UNDISTURBED SOIL.

4. TRUCK-MIXED CONCRETE MIX SHALL HAVE A MIN. 28 DAY STRENGTH OF 3300 PSI (5" MAX SLUMP). USE OF HAND-MIXED SACK-CRETE TYPE CONCRETE REQUIRES WRITTEN CITY APPROVAL PRIOR TO USE, AND SHALL BE 4000 PSI MIX, MIXED WITH MIN AMOUNT OF WATER NECESSARY FOR WORKABILITY (5" MAX SLUMP). USE OF DRY SACK-CRETE MIX (BAGS OR LOOSE MIX) IS PROHIBITED FOR PERMANENT THRUST RESTRAINT.

5. ALL PIPE ZONES SHALL BE BACKFILLED WITH GRANULAR BACKFILL, AND COMPACTED.

6. THRUST BLOCKS FOR PLUGGED CROSS AND PLUGGED TEE SHALL HAVE #4 REBAR LIFTING LOOPS INSTALLED AS SHOWN.

7. VERTICAL THRUST DETAILS-SEE DWG. 512.

8. STRADDLE BLOCK DETAILS-SEE DWG. 511.

\* BLOCK TO UNDISTURBED TRENCH WALLS

\*\* THRUST BLOCKS FOR PIPES LARGER THAN 18" WILL BE INDIVIDUALLY DESIGNED BY THE ENGINEER.

**HORIZONTAL THRUST BLOCKING**

NOTES:

- DCA- DOUBLE CHECK ASSEMBLY
- DCA SHALL CONFORM TO REQUIREMENTS OF PUBLIC/PRIVATE AGENCIES HAVING JURISDICTION.
- DCA & VAULT INSTALLATION SHALL MEET STATE OF OREGON, DEPARTMENT OF HUMAN RESOURCES, AND HEALTH DIVISION REQUIREMENTS.
- CONTRACTOR SHALL HAVE DCA TESTED AND CERTIFIED PRIOR TO ACCEPTANCE BY OWNER.
- VERIFY ADEQUATE CLEARANCES FOR TESTING AND REPAIR.
- BRASS PLUGS SHALL BE INSTALLED IN TEST COCKS.
- LOCK DOWN COVER WITH HEX HEAD BOLTS. COVER SHALL READ "WATER"
- DCA SHALL NOT BE INSTALLED IN AREAS SUBJECT TO VEHICLE TRAFFIC AND PEDESTRIAN SIDEWALK AREAS.

LAST REVISION DATE:	SEPT 2014	JO #	STANDARD
<b>HORIZONTAL THRUST BLOCKING</b>			
(NTS)			
WESTTECH ENG.	DETAIL NO.	5100	

**2" AND SMALLER DOUBLE CHECK ASSEMBLY**

NOTES:

- DCA- DOUBLE CHECK ASSEMBLY
- DCA SHALL CONFORM TO REQUIREMENTS OF PUBLIC/PRIVATE AGENCIES HAVING JURISDICTION.
- DCA & VAULT INSTALLATION SHALL MEET STATE OF OREGON, DEPARTMENT OF HUMAN RESOURCES, AND HEALTH DIVISION REQUIREMENTS.
- CONTRACTOR SHALL HAVE DCA TESTED AND CERTIFIED PRIOR TO ACCEPTANCE BY OWNER.
- VERIFY ADEQUATE CLEARANCES FOR TESTING AND REPAIR.
- BRASS PLUGS SHALL BE INSTALLED IN TEST COCKS.
- LOCK DOWN COVER WITH HEX HEAD BOLTS. COVER SHALL READ "WATER"
- DCA SHALL NOT BE INSTALLED IN AREAS SUBJECT TO VEHICLE TRAFFIC AND PEDESTRIAN SIDEWALK AREAS.

LAST REVISION DATE:	DEC 2004	JO #	STANDARD
<b>2" AND SMALLER DOUBLE CHECK ASSEMBLY</b>			
(NTS)			
WESTTECH ENG.	DETAIL NO.	5310	

**POLLUTION/FLOW CONTROL MANHOLE W/OVERFLOW**

NOTES:

- PRECAST SECTIONS SHALL CONFORM TO ASTM C-478.
- DISTANCE FROM TOP OF OVERFLOW TO MH RIM SHALL BE BASED ON OVERFLOW CAPACITY CALC'S BY DESIGN ENGINEER (ASSUME ORIFICE CONTROL).
- 60" MINIMUM DIA. MANHOLE REQUIRED FOR OUTLET PIPE LARGER THAN 15" OR INLET > 21".
- ORIFICE CLEANING ACCESS TO BE 6" CORE HOLE THROUGH FLAT-TOP (CENTERED ON OVERFLOW) WITH CI CLEANOUT BOX GROUTED TO SLAB.

LAST REVISION DATE:	MAR 2010	JO #	STANDARD
<b>POLLUTION/FLOW CONTROL MANHOLE W/OVERFLOW</b>			
(NTS)			
WESTTECH ENG.	DETAIL NO.	U3201	

VERIFIED PROFESSIONAL ENGINEER  
WESTTECH ENGINEERING, INC.  
CONSULTING ENGINEERS AND PLANNERS

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Phone: (503) 585-2474 Fax: (503) 585-3986  
E-mail: westtech@westtech-eng.com

NO.	DATE	DESCRIPTION	BY
1			

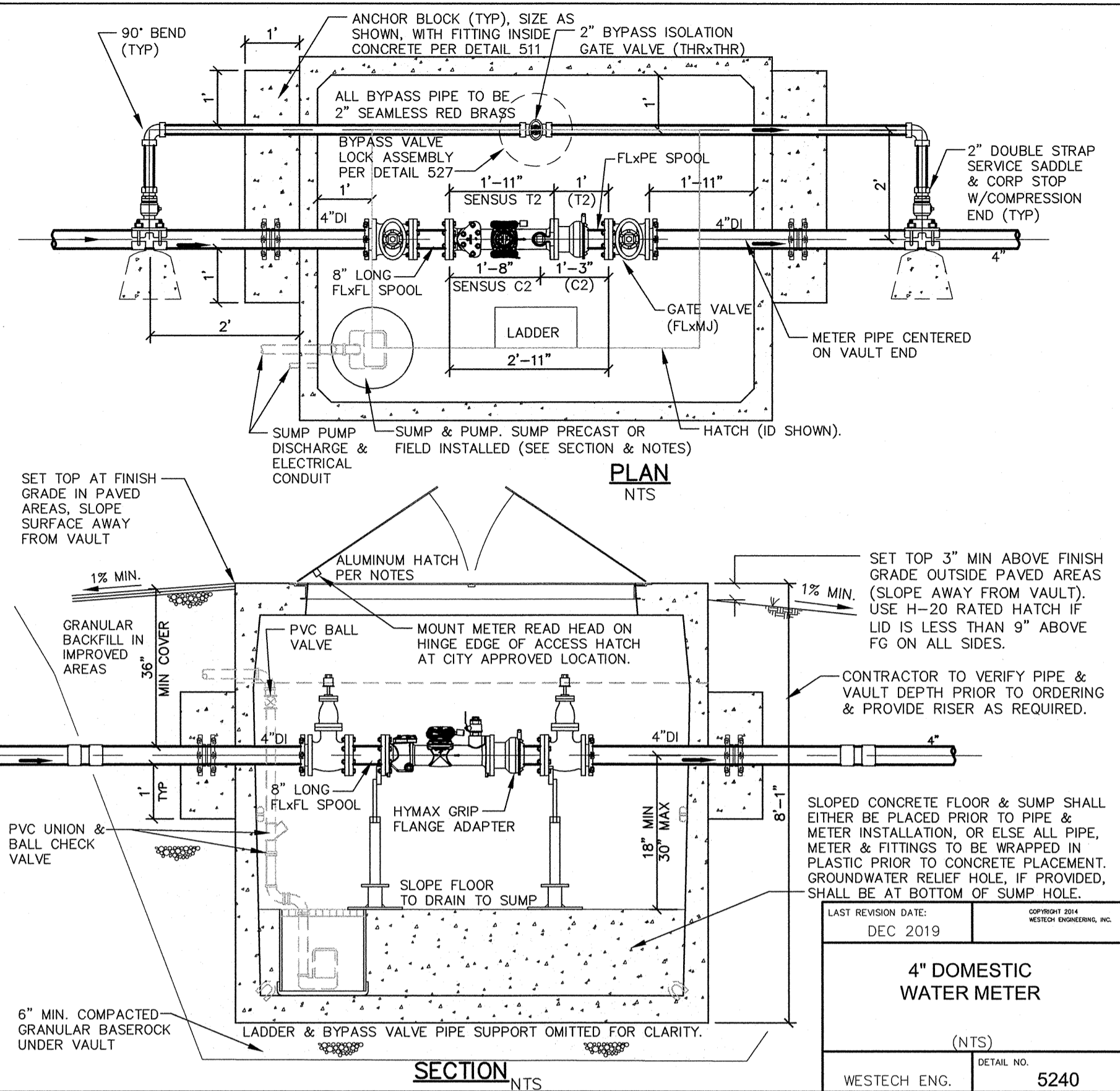
MOLLA APARTMENTS  
HOME FIRST DEVELOPMENT PARTNERS

CIVIL DETAILS

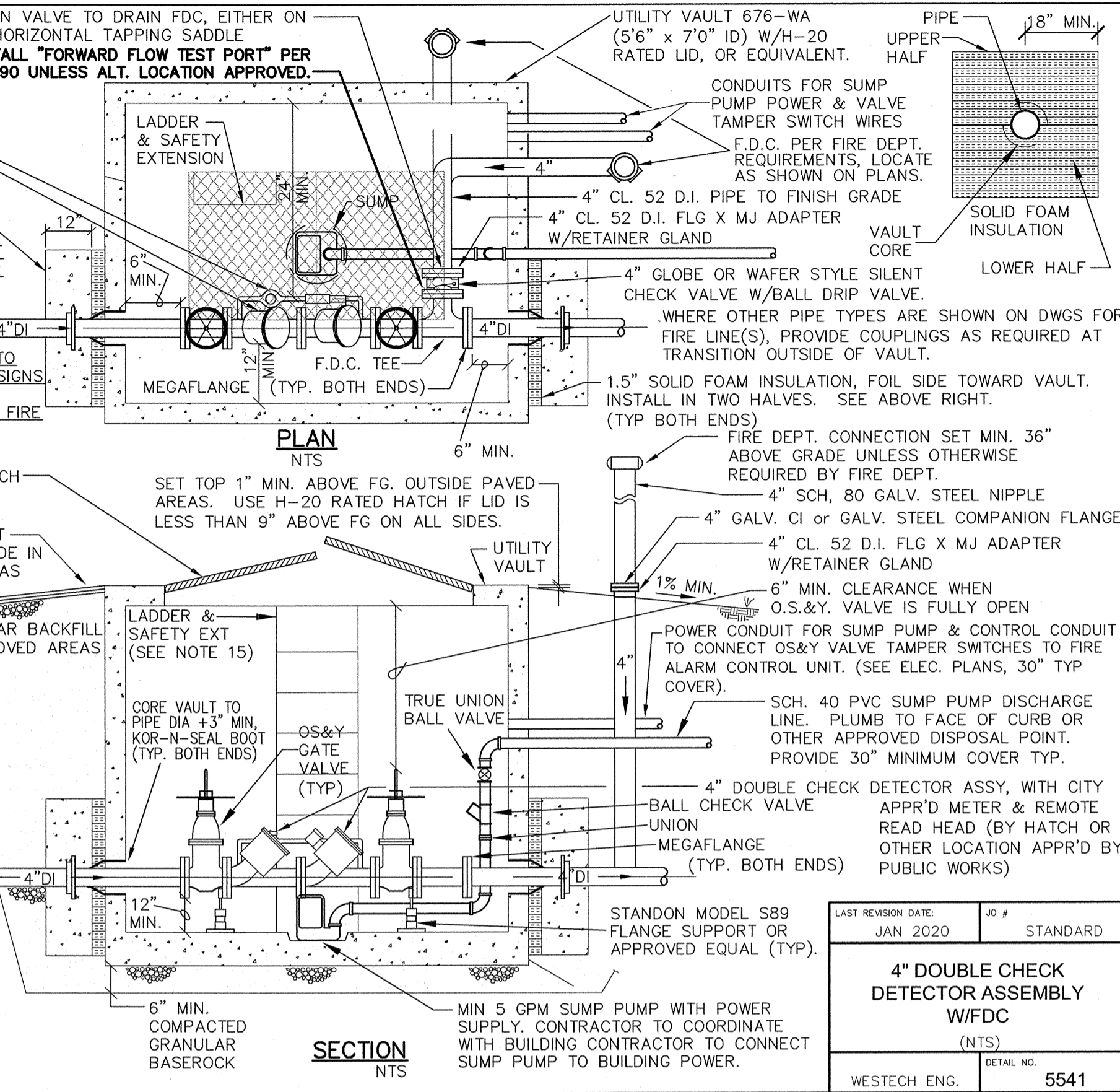
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JOB NUMBER  
3312.0000.0

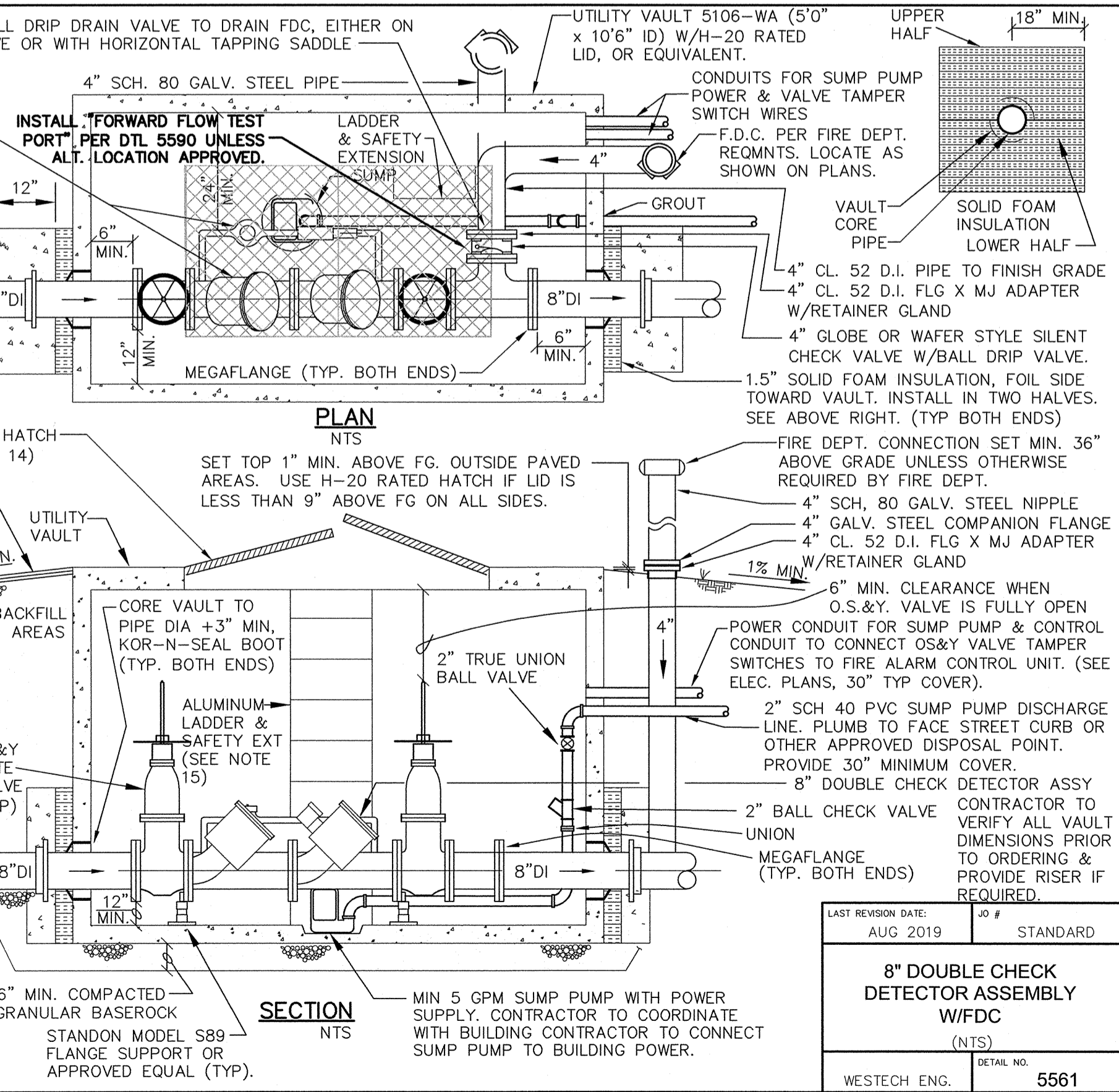
- NOTES:
- METER VAULT & PIPING SHALL CONFORM TO REQUIREMENTS OF ALL PUBLIC/PRIVATE AGENCIES HAVING JURISDICTION.
  - METER VAULT SHALL BE PLACED WITHIN RIGHT-OF-WAY UNLESS OTHERWISE APPROVED (RECORDED EASEMENT TO THE CITY REQUIRED FOR ANY METER ON PRIVATE PROPERTY).
  - ALL MATERIALS (EXCEPT THE METER) SHALL BE FURNISHED & INSTALLED BY THE CONTRACTOR. THE CONTRACTOR SHALL INSTALL A TEMPORARY SPACER SPOOL BETWEEN METER ISOLATION VALVES FOR TESTING. THE TEMPORARY SPOOL SHALL MATCH THE LENGTH OF THE ACTUAL METER TO BE PROVIDED BY THE CITY.
  - PIPING INSIDE VAULT & THROUGH WALLS TO BE CL 52 DUCTILE IRON, EXCEPT AS OTHERWISE SHOWN.
  - METER WILL BE SUPPLIED BY THE CITY, BUT SHALL BE INSTALLED (AFTER PRESSURE & OTHER TESTING OF METER VAULT PIPING) BY THE CONTRACTOR UNDER CITY INSPECTION AND APPROVAL.
  - ISOLATION VALVES IN METER VAULT SHALL BE NON-RISING STEM GATE VALVE (EPOXY COATED) WITH 2-INCH SQUARE OPERATING NUT.
  - ALL MJ CONNECTIONS (INCLUDING BYPASS LINE FITTINGS) SHALL BE ASSEMBLED WITH RETAINER GLANDS (EBA MEGA-LUGS OR APPROVED EQUAL). ROMAC ALPHA FC ALLOWED AS EQUAL FOR HYMAX GRIP FC.
  - ALL PIPE OPENINGS SHALL BE CORE DRILLED (REGARDLESS OF PRESENCE OF "KNOCKOUTS"), AND SEALED WATERTIGHT WITH NON-SHRINK GROUT.
  - PIPE SUPPORTS SHALL BE GALVANIZED STANDON S89 OR APPROVED EQUAL AT EACH ISOLATION VALVE AND AT BYPASS VALVE.
  - METER VAULT TO BE UTILITY VAULT 687-WA OR APPROVED EQUAL, CONFORMING WITH ASTM C-857. PROVIDE ALUMINUM ANGLE FRAME HATCH (48"x 72" MIN) BY USF FABRICATION OR APPROVED EQUAL (HATCH COVER TOP TO BE SAND BLASTED NON-SLIP).
    - TO BE 300 PSF PEDESTRIAN RATED WHERE LID IS SET MIN. OF 9" ABOVE GRADE.
    - TO BE H-20 RATED IF LID IS LESS THAN 9" ABOVE GRADE, OR IF LOCATED IN TRAFFIC AREA.
  - METER VAULT SHALL BE PROVIDED WITH AN OSHA APPROVED GALVANIZED STEEL LADDER AND ALUMINUM LADDER SAFETY EXTENSION. ATTACH TO VAULT WITH STAINLESS STEEL BOLTS.
  - CONTRACTOR TO INSTALL SUMP PUMP (5 GPM MIN) WITH 120V POWER SUPPLY, ALONG WITH PRIVATE POWER SOURCE (RESPONSIBILITY OF CONTRACTOR INSTALLING VAULT). SCHED 40 CONDUIT, WIRE, ETC. FOR SUMP PUMP POWER SHALL CONFORM WITH NEC REQUIREMENTS.
  - SUMP PUMP DISCHARGE PIPE SHALL BE 1 1/2-INCH SCHEDULE 40 PVC, PROVIDED WITH UNION (FOR PUMP REMOVAL), CHECK VALVE AND ISOLATION BALL VALVE. CONNECT DISCHARGE TO GRAVITY STORM DRAIN OR CURB WEEP HOLE (AT LOCATION APPROVED BY PUBLIC WORKS).
  - SUMP TO BE 18" ROUND CONCRETE PIPE OR EQUAL. PROVIDE FRP GRATE (OR SLOTTED MH LID) WITH COPEDED CUTOUT FOR DISCHARGE PIPING (IE. LID TO BE REMOVABLE WITHOUT DISASSEMBLING DISCHARGE PIPING). SUMP TO BE LARGE ENOUGH & DEEP ENOUGH TO HOUSE PUMP & FLOAT, AND KEEP WATER LEVEL BELOW SLOPED FLOOR.



- NOTES:
- DCDA - DOUBLE CHECK DETECTOR ASSEMBLY FDC-FIRE DEPARTMENT CONNECTION.
  - DCDA SHALL CONFORM TO REQUIREMENTS OF PUBLIC/PRIVATE AGENCIES HAVING JURISDICTION.
  - DCDA & VAULT INSTALLATION SHALL MEET REQUIREMENTS OF OREGON HEALTH AUTHORITY, DRINKING WATER SERVICES (DWS).
  - CONTRACTOR SHALL HAVE DCDA TESTED AND CERTIFIED PRIOR TO ACCEPTANCE BY OWNER.
  - FDC SHALL NOT EXIT THROUGH THE TOP OF THE VAULT.
  - ALL PIPE OPENINGS SHALL BE SEALED WITH NON-SHRINK WATERTIGHT GROUT.
  - BENDS, CROSSES AND TEES SHALL NOT BE INSTALLED WITHIN 5 FEET OF THE OUTSIDE VAULT WALL.
  - ALL VAULTS SHALL MEET OR EXCEED ASTM C-857. ALL VAULT CONCRETE TO BE 4500 PSI @ 28 DAYS. REBAR TO BE ASTM A-615 GRADE 60.
  - SUMP PUMP WITH POWER SUPPLY SHALL BE INSTALLED UNLESS OTHERWISE APPROVED BY PUBLIC WORKS.
  - SUMP PUMP DISCHARGE PIPE TO BE 1 1/2-INCH SCHED 40 PVC SHALL BE PLUMBED TO FACE OF STREET CURB OR OTHER DISPOSAL POINT APPROVED BY LOCAL JURISDICTION (SEE OAR 333-061-0071.3.f).
  - CONTRACTOR TO INSTALL SUMP PUMP (5 GPM MIN) WITH 120V POWER SUPPLY, ALONG WITH PRIVATE POWER SOURCE (RESPONSIBILITY OF CONTRACTOR INSTALLING VAULT). SCHED 40 CONDUIT, WIRE, ETC. FOR SUMP PUMP POWER SHALL CONFORM WITH NEC REQUIREMENTS.
  - THRUST COLLAR CONCRETE SHALL BE 3300 PSI @ 28 DAYS.
  - PROVIDE REMOTE READER (TOUCH READ HEAD) FOR DETECTOR LOOP METER PER LOCAL JURISDICTION REQUIREMENTS, MOUNTED ON HINGE EDGE OF HATCH.
  - ALUMINUM ANGLE FRAME HATCH (3'0\"/>



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  - SUMP PUMP POWER SHALL BE INSTALLED IN SCHEDULE 40 RIGID CONDUIT PER NEC REQMTS.
  - THRUST COLLAR CONCRETE SHALL BE 3300 PSI @ 28 DAYS.
  - IF REQUIRED BY LOCAL STANDARDS, PROVIDE REMOTE READER FOR DETECTOR LOOP PER LOCAL JURISDICTION REQUIREMENTS.
  - ALUMINUM ANGLE FRAME HATCH (3'0\"/>



- NOTES:
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  - ALUMINUM ANGLE FRAME HATCH (3'0\"/>



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1			

VERIFY SCALE	1"
BAR IS ONE INCH ON ORIGINAL DRAWING	
THIS SHEET MUST BE PRINTED AT THIS SCALE ACCORDING TO THESE NOTES	
DATE: SEP 2021	
DRN. SAW	
CHK. AR	
CRK. AR	

**WESTTECH ENGINEERING, INC.**  
CONSULTING ENGINEERS AND PLANNERS

3841 Fairview Industrial Dr., Suite 100, Salem, OR 97302  
Phone: (503) 585-2474 Fax: (503) 585-3886  
E-mail: westtech@westtech-eng.com

**REGISTERED PROFESSIONAL ENGINEER**  
11943  
OREGON  
JULY 16, 1993  
STEVEN A. STEVEN A.

REVISIONS: 6/20/2022

**MOLLALA APARTMENTS**  
HOME FIRST DEVELOPMENT PARTNERS

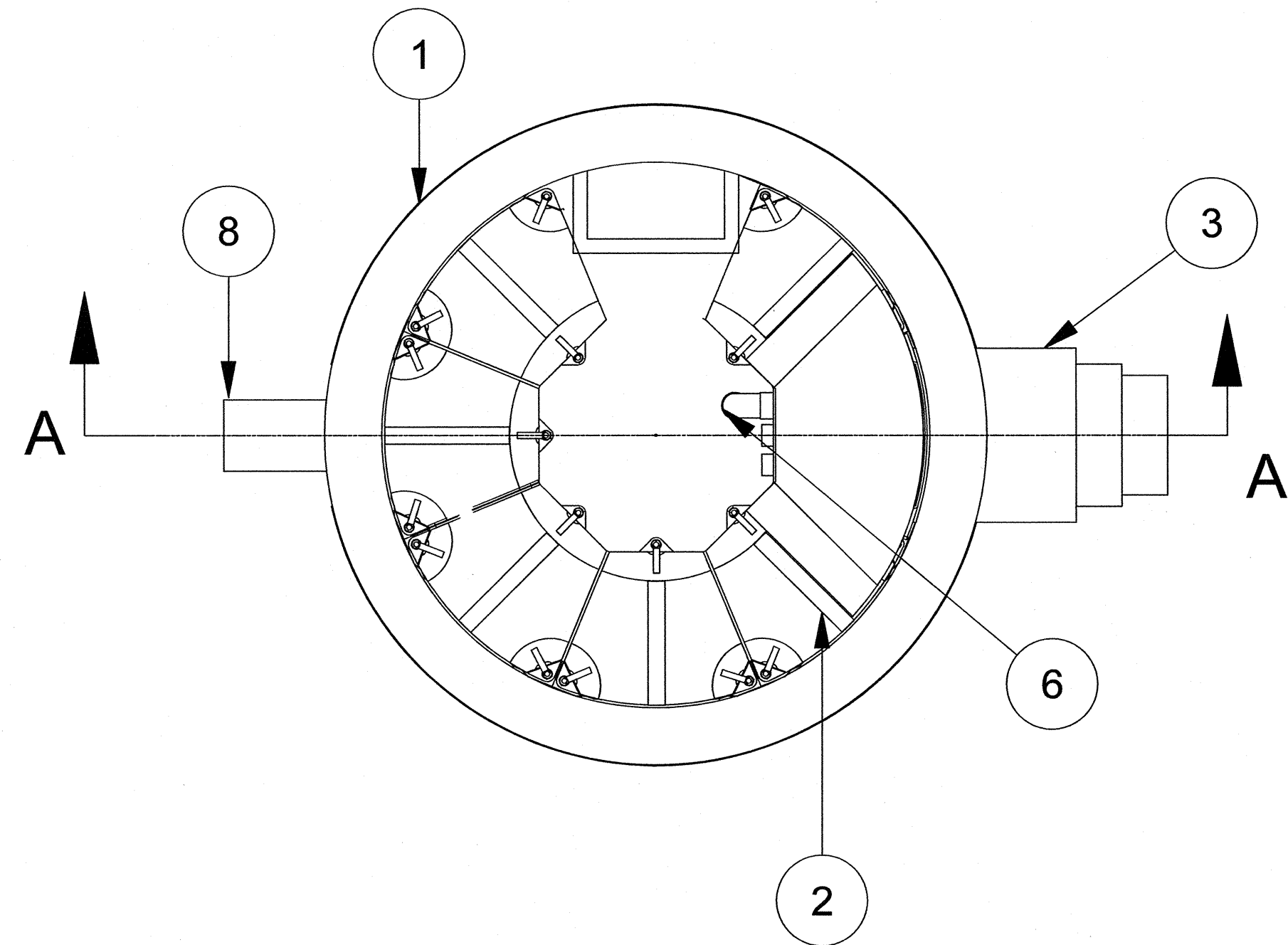
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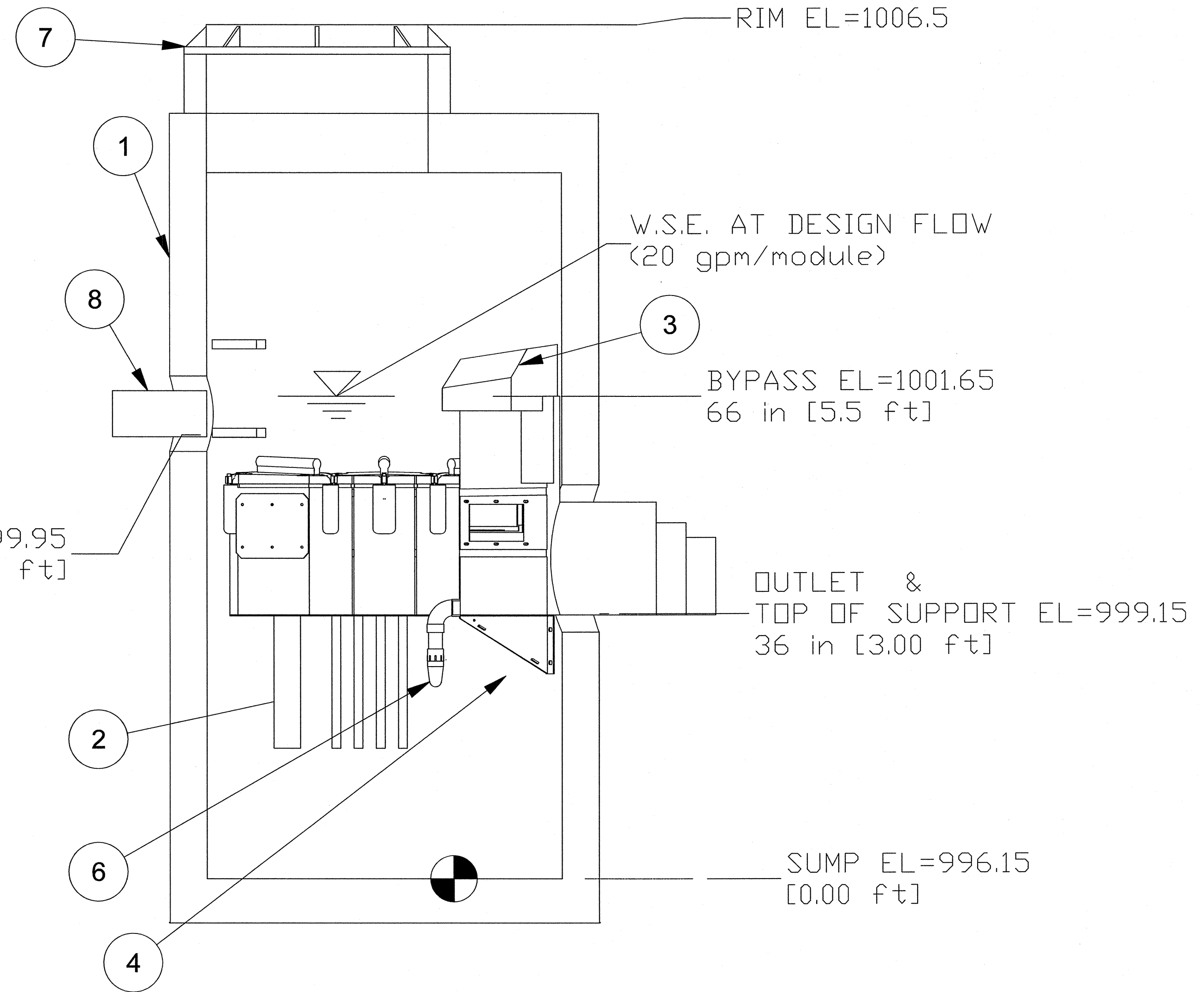
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3312.0000.0

# UP-FLO FILTER MANHOLE

BY HYDRO INTERNATIONAL®



INLET EL=999.95  
45 1/2 in [3.8 ft]



SECTION A-A

### EQUIPMENT PERFORMANCE

The stormwater filtration system shall adhere to the parameters listed below:  
 Minimum Performance Criteria: 80% removal of Sil-Co-Sil 106 at the peak treatment flow.  
 Peak Treatment Flow for 6 Filter Modules:  
 90 gpm (15 gpm, ea.)  
 Minimum Bypass Capacity: 1527 gpm (96.20 l/s)  
 Minimum Sediment Storage Capacity: 16.6 cu. ft. (0.47 cu. m.)  
 Minimum Oil Storage Capacity: 50 gal. (189 liters)  
 Media Type: Ribbons

### OUTLET PIPE STUB SIZE INFORMATION

Outside Diameter: 10.5", 12.5" or 15.3" OD  
 Concrete Penetration: Pipe Boot (by Hydro)  
 Hook-up: Fernco-type coupling (by others)

### Parts List

ITEM	QTY	SIZE	DESCRIPTION
1	1	48 in	CONCRETE MANHOLE
2	4		RIBBON FILTER MODULE
3	1		OUTLET MODULE AND PIPE STUB
4	1		SINGLE SUPPORT BRACKET
5	1		OUTLET SUPPORT BRACKET
6	1		DRAINDOWN FILTER
7	1	30 in	FRAME AND COVER
8	1	8 in	INLET PIPE

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1			

VERIFIED SCALE  
 0 1" = 1'-0"  
 IF NOT ONE INCH ON SCALE ACCURACIES

DSN. SAW  
 DRN. AR  
 CKD. SAW  
 DATE: SEP 2021

WESTECH ENGINEERING, INC.  
 CONSULTING ENGINEERS AND PLANNERS

3841 Fairview Industrial Dr. S.E., Suite 100, Salem, OR 97302  
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 E-mail: westech@westech-eng.com

MOLALLA APARTMENTS  
 HOME FIRST DEVELOPMENT PARTNERS

CIVIL DETAILS

DRAWING  
**C5.3**

JOB NUMBER  
 3312.0000.0



DRAWINGS FOR:

# HIGHWAY 211 (W MAIN ST) IMPROVEMENTS

MOLALLA, OR 97038

FOR:

HOME FIRST DEVELOPMENT PARTNERS

866 N. COLUMBIA BLVD, SUITE A-25  
PORTLAND, OR 97217

PROJECT MANAGER: ROB JUSTUS

360-530-9914

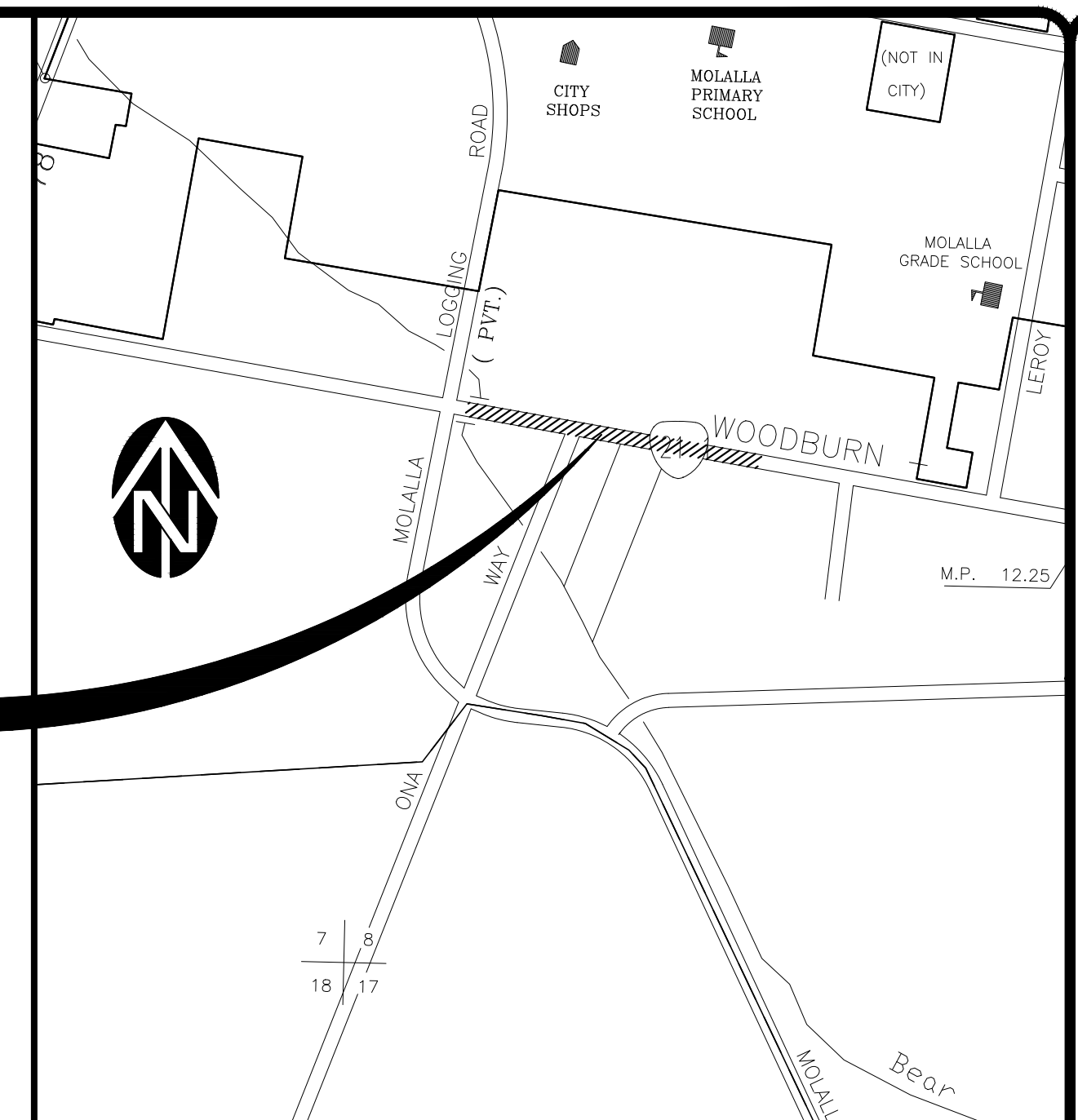
## DRAWING INDEX

DWG	TITLE
C1.0	COVER SHEET, VICINITY & LOCATION MAPS, DRAWING INDEX
C1.1	CONSTRUCTION NOTES
C1.2	CONSTRUCTION NOTES
C2.0	EXISTING CONDITIONS, EROSION CONTROL, & DEMOLITION PLAN
C2.1	EROSION CONTROL NOTES & DETAILS
C2.2	EROSION CONTROL NOTES & DETAILS
C2.3	EROSION CONTROL NOTES & DETAILS
C3.0	MOLALLA HIGHWAY PLAN & PROFILE, STA 9+40 to STA 13+80
C3.1	MOLALLA HIGHWAY PLAN & PROFILE, STA 13+80 to END
C3.2	CROSS SECTIONS
C4.0	SURFACING PLAN
C5.0	SIGNING & STRIPING PLAN
C6.0	ODOT DETAILS
C6.1	ODOT DETAILS
C6.2	ODOT DETAILS
C6.3	ODOT DETAILS
C6.4	ODOT DETAILS
C6.5	ODOT DETAILS
C6.6	ODOT DETAILS
C6.7	ODOT DETAILS
C6.8	ODOT DETAILS



Know what's below.  
Call before you dig.

PROJECT  
LOCATION



VICINITY MAP

## GENERAL LEGEND

ITEM	PROPOSED	EXISTING
SANITARY SEWER	—SS—	—SS—
STORM DRAIN	—SD—	—SD—
WATER	—W—	—W—
GAS	—G—	—G—
TELEPHONE	—T—	—T—
POWER	—P—	—P—
FENCE	—X—X—	—X—X—
BARRICADE	□	□
TELEPHONE MANHOLE	⊕	⊕
TELEPHONE PEDESTAL	⊕	⊕
SANITARY SEWER MANHOLE	⊕	⊕
STORM DRAIN MANHOLE	⊕	⊕
CATCH BASIN	⊕	⊕
FIRE HYDRANT AND VALVE	⊕	⊕
WATER METER	■	■
WATER VALVE	⊕	⊕
POWER POLE	○	○
POWER POLE W/ANCHOR	○	○
POLE W/LUMINARE	○	○
LIGHT POLE	⊕	⊕
SIGN POST	⊕	⊕
MAILBOX	⊕	⊕
HEDGE OR BRUSH	☁	☁
TREES	🌳	🌳
STREET OR ALLEY RIGHT OF WAY	R/W	
PLATTED LOT LINE	—	
OWNERSHIP LINE	—	
EASEMENT OR TEMPORARY RIGHT OF WAY	- - -	
PROJECT CENTERLINE AND	2 3 4 5	

NO.	DATE	DESCRIPTION	BY
1			



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HIGHWAY 211 IMPROVEMENTS

HOME FIRST DEVELOPMENT PARTNERS

COVER SHEET,  
VICINITY & LOCATION MAPS,  
& DRAWING INDEX

DRAWING  
**C1.0**

JOB NUMBER  
3312.0000.0

GENERAL NOTES

- Contractor shall procure and conform to all construction permits required by the City of Molalla and ODOT.
- Owner to pay all project permit costs, including but not limited to utility tapping, TV, and chlorination costs. The Contractor shall coordinate with the Approving Agency to determine appropriate fees and provide the Owner with 48 hours notice prior to the required payment of fees or costs. Contractor to apply for and pay all Private Plumbing and Electrical Permits
- Oregon law requires the Contractor to follow rules adopted by the Oregon Utility Notification Center. Those rules are set forth in OAR 952-001-0010 through OAR 952-001-0090. Obtain copies of the rules by calling the center. (Note: the telephone number for the Oregon Utility Notification Center is 503-232-1987).
- Contractor to notify City, ODOT, and all utility companies a minimum of 48 business hours (2 business days) prior to start of construction, and comply with all other notification requirements of the Approving Agency with jurisdiction over the work.
- Contractor shall provide all bonds and insurance required by public and/or private agencies having jurisdiction. Where required by public and/or private agencies having jurisdiction, the Contractor shall submit a suitable maintenance bond prior to final payment.
- All materials and workmanship for facilities in street right-of-way or easements shall conform to Approving Agencies' construction specifications wherein each has jurisdiction, including but not limited to the City, Oregon Health Division (OHD), and the Oregon Department of Environmental Quality (DEQ).
- Unless otherwise approved by the Public Works Director, construction of all public facilities shall be done between 7:00 a.m. and 6:00 p.m., Monday through Saturday.
- The Contractor shall perform all work necessary to complete the project in accordance with the approved construction drawings including such incidentals as may be necessary to meet the Approving Agencies' requirements and provide a completed project.
- Any inspection by the City, ODOT, or other Approving Agency shall not, in any way, relieve the Contractor from any obligation to perform the work in strict compliance with the contract documents, applicable codes, and Approving Agency requirements.
- Contractor shall maintain one complete set of approved drawings on the construction site at all times whereon he will record all approved deviations in construction from the approved drawings, as well as the station locations and depths of all existing utilities encountered. These field record drawings shall be kept up to date at all times and shall be available for inspection by the Approving Agency or Owner's Representative upon request. Failure to conform to this requirement may result in delay in payment and/or final acceptance of the project.
- Upon completion of construction of all new facilities, Contractor shall submit a clean set of field record drawings containing all as-built information to the Engineer. All information shown on the Contractor's field record drawings shall be subject to verification. If significant errors or deviations are noted, an as-built survey prepared and stamped by a registered professional Land Surveyor shall be completed at the Contractor's expense.
- Contractor shall procure and conform to DEQ stormwater permit No. 1200C for construction activities where 1 acre or more are disturbed.
- The contractor shall retain and pay for the services of a registered Civil Engineer and/or Land Surveyor licensed in the State of Oregon to establish construction control and perform initial construction surveys to establish the lines and grades of improvements as indicated on the drawings. Staking for buildings, structures, curbs, gravity drainage pipes/structures and other critical improvements shall be completed using equipment accurate to 0.04 feet horizontally and 0.02 feet vertically, or better. Use of GPS equipment for final construction staking of these critical improvements is prohibited. The registered professional surveyor shall provide the design engineer with copies of all grade sheets for construction staking performed for the project.
- See architectural drawings for site lighting, site dimensioning, and continuation of all utilities.

TRAFFIC CONTROL:

- Contractor shall erect and maintain barricades, warning signs, traffic cones (and all other traffic control devices required) per City and ODOT requirements in accordance with the current MUTCD (including Oregon amendments). Access to driveways shall be maintained at all times. All traffic control measures shall be approved and in place prior to any construction activity. Prior to any work in the existing public right-of-way, Contractor shall submit final traffic control plan to the Approving Agency for review and issuance of a Lane Closure or Work in Right-of-Way Permit. The Traffic Control Plan shall include provisions to route pedestrians around and through the work area in accordance with ODOT Standards.

TESTING AND INSPECTION:

- For public and private improvements, the Contractor shall be responsible to ensure that all required or necessary inspections are completed by authorized inspectors prior to proceeding with subsequent work which covers or that is dependent on the work to be inspected. Failure to obtain necessary inspection(s) and approval(s) shall result in the Contractor being fully responsible for all problems and/or corrective measures arising from uninspected work.
- Unless otherwise specified, the attached "Required Testing and Frequency" table outlines the minimum testing schedule for private improvements on the project. This testing schedule is not complete, and does not relieve the Contractor of the responsibility of obtaining all necessary inspections or observations for all work performed, regardless of who is responsible for payment. Cost for retesting shall be borne by the Contractor.

EXISTING UTILITIES & FACILITIES:

- The location and descriptions of existing utilities shown on the drawings are compiled from available records and/or field surveys. The Engineer or utility companies do not guarantee the accuracy or the completeness of such records. Contractor shall field verify locations and sizes of all existing utilities prior to construction.
- Contractor shall field verify location and depth of all existing utilities where new facilities cross. All utility crossings marked or shown on the drawings shall be potholed using hand tools or other non-invasive methods prior to excavating or boring. Contractor shall be responsible for exposing potential utility conflicts far enough ahead of construction to make necessary grade or alignment modifications without delaying the work. If grade or alignment modification is necessary, Contractor shall notify the Design Engineer, and the Design Engineer or the Owner's Representative shall obtain approval from the Approving Agency prior to construction.
- The Contractor shall be responsible for locating and marking all existing survey monuments of record (including but not limited to property and street monuments) prior to construction. If any survey monuments are removed, disturbed or destroyed during construction of the project, the Contractor shall retain and pay for the services of a Registered Professional Surveyor licensed in the State of Oregon to reference and replace all such monuments prior to final payment. The monuments shall be replaced within a maximum of 90 days, and the County Surveyor shall be notified in writing as required by per ORS 209.150.
- All facilities shall be maintained in-place by the Contractor unless otherwise shown or directed. Contractor shall take all precautions necessary to support, maintain, or otherwise protect existing utilities and other facilities at all times during construction. Contractor to leave existing facilities in an equal or better-than-original condition and to the satisfaction of the Approving Agency and Owner's Representative.
- Utilities or interfering portions of utilities that are abandoned in place shall be removed by the Contractor to the extent necessary to accomplish the work. The Contractor shall plug the remaining exposed ends of abandoned utilities after appropriate verification procedures have taken place.
- Contractor shall remove all existing signs, mailboxes, fences, landscaping, etc., as required to avoid damage during construction and replace them to existing or better condition.
- The Contractor shall be responsible for managing construction activities to ensure that public streets and right-of-ways are kept clean of mud, dust or debris. Dust abatement shall be maintained by adequate watering of the site by the Contractor.

GRADING, PAVING & DRAINAGE:

- Unless otherwise noted, all grading, rocking and paving to conform to Oregon Standard Specifications for Construction (OSSC/ODOT/APWA), 2021 edition.
- Clear and grub within work limits all surface vegetation, trees, stumps, brush, roots, etc. Do not damage or remove trees except as approved by the Owner's Representative or as shown on the drawings. Protect all roots two inches in diameter or larger.
- Strip work limits, removing all organic matter, which cannot be compacted into a stable mass. All trees, brush, and debris associated with clearing, stripping or grading shall be removed and disposed of off-site.
- For public and private improvements, except as otherwise allowed by the specifications, drawing details or notes, immediately following stripping and grading operations, compact subgrade to 92% of the maximum dry density per AASHTO T-180 test method (Modified Proctor). Subgrade must be inspected and approved by the Owner's authorized representative before placing, engineered fills or fine grading for base rock.
- Engineered fills shall be constructed and compacted in 6" lifts over approved subgrade. All fills shall be engineered and comply with the Oregon Structural Specialty Code, with each lift compacted to 92% of the maximum dry density per AASHTO T-180 test method (Modified Proctor).
- Granular base rock shall conform to the requirements of OSSC (ODOT/APWA) 02630.10 (Dense Graded Base Aggregate), with no more than 10% passing the #40 sieve and no more than 5% passing the #200 sieve.
- Compact granular base rock to 92% of the maximum dry density per AASHTO T-180 test method (Modified Proctor). Written base rock compaction test results from an independent testing laboratory must be received by the Owner's authorized representative before placing AC pavement, and a finished rock grade proof-roll (witnessed by the Owners authorized representative) must be performed.
- A.C. pavement shall conform to OSSC (ODOT/APWA) 00745 (Hot Mixed Asphalt Concrete Pavement) for standard duty mix. Unless otherwise specified or shown on the drawings, base lifts shall be 3/4" dense graded mix, while wearing courses shall be 1/2" dense graded mix. Unless otherwise specified or shown on the drawings, A.C. pavement for parking lots and streets shall be Level 2 mix (50 blow Marshall) per OSSC (ODOT/APWA) 00744.13. A.C. Pavement shall be compacted to a minimum of 91% of maximum density as determined by the Rice standard method. Written AC pavement compaction test results from an independent testing laboratory must be received by the Owner's authorized representative before final payment.
- Pavement surface shall be a smooth, well-sealed, tight mat without depressions or bird baths. Bony or open graded pavement surfaces shall be repaired to the satisfaction of the Owner's authorized representative, prior to final acceptance of the work.

- HMAC mixtures shall be placed only when the surface is dry and weather conditions are such that proper handling, finishing and compaction can be accomplished. In no case shall bituminous mixtures be placed when the surface temperature is below the minimum established under 2018 OSSC (ODOT/APWA) 00744.40 (AC - Season and Temperature Limitations) or the project specifications, whichever is more stringent.
- Contractor shall protect new pavement against traffic as required, until it has cooled sufficiently to avoid tracking.
- For parking lots or private access drives, the final lift of AC pavement shall not be placed until after the building is fully enclosed and weatherproof, unless otherwise approved by the Owner's authorized representative.
- Unless otherwise shown on the drawings or details, straight grades shall be run between all finish grade elevations and/or finish contour lines shown (exception: where grades are shown across sidewalks, slopes shall be adjusted to ensure that maximum allowable sidewalk cross slopes are not exceeded).
- Finish pavement grades at transition to existing pavement shall match existing pavement grades or be feathered past joints with existing pavement as required to provide a smooth, free draining surface.
- All existing or constructed manholes, cleanouts, monument boxes, gas valves, water valves and similar structures shall be adjusted to match finish grade of the pavement, sidewalk, landscaped area or median strip wherein they lie. Verify that all valve boxes and risers are clean and centered over the operating nut.
- Unless otherwise shown on the drawings, no cut or fill slopes shall be constructed steeper than 2H:1V.
- Unless otherwise shown on the landscape plans, all planter areas shall be backfilled with approved topsoil minimum 8" thick. Stripping materials shall not be used for planter backfill.
- Contractor shall seed and mulch (uniformly by hand or hydroseed) all exposed slopes and disturbed areas which are not scheduled to be landscaped, including trench restoration areas. If the Contractor fails to apply seed and mulch in a timely manner during periods favorable for germination, or if the seeded areas fail to germinate, the Owner's Representative may (at his discretion) require the Contractor to install sod to cover such disturbed areas.

CURBS & SIDEWALKS:

- Unless otherwise shown or indicated on the drawings, 6-inches nominal curb exposure used for design of all parking lot and street grades.
- Where new curbing connects to existing curbing or is installed along existing streets or pavement, the gutter grade shall match the existing street grades so as to allow drainage from the street to the gutter and through any transitions. The Contractor shall notify the Owner's Representative in writing of any grade discrepancies or problems prior to curb placement.
- Contractor shall construct all handicap access ramps in accordance with current ADA requirements.
- Sidewalks shall be a minimum of 4-inches thick and standard residential driveways shall be a minimum of 6-inches thick. Commercial use driveways and alley approaches shall be minimum 8-inches thick. All curbs, sidewalks and driveways shall be constructed using 3300-psi concrete, and shall be cured with Type 1 or Type 1D clear curing compound. All sidewalks shall be ADA compliant.
- Curb & sidewalk concrete shall be placed only during periods when it will not be damaged by rain (protect unhardened concrete from precipitation). Concrete shall not be placed on frozen baserock. Do not begin concrete placement until temperature in the shade is a minimum of 35F and rising, and stop placement if air temperature falls below 35F. Protect concrete from freezing for a minimum of 5 days after placement per OSSC (ODOT/APWA) 00440.40.d & 00756.40 or the project specifications, whichever is more stringent.
- Contraction joints shall be installed directly over any pipes that cross under the sidewalk, to control cracking. In general, cracks in new curbs or sidewalks (at locations other than contraction joints) are not acceptable, and cracked panels shall be removed & replaced unless otherwise approved by the Approving Agency and the design engineer.
- All sidewalks shall be ADA compliant. Direction of sidewalk cross slope shall conform with the slope direction shown on the grading plan. Sidewalk cross slopes shall not exceed 1:67 (1.5%) nor be less than 1%. Longitudinal slope shall not exceed 1:20 (5%).
- Where trench excavation requires removal of PCC curbs and/or sidewalks, the curbs and/or sidewalks shall be sawcut and removed at a tooled joint unless otherwise authorized in writing by the Approving Agency. The sawcut lines shown on the drawings are schematic and not intended to show the exact alignment of such cuts.
- Unless otherwise shown on the drawings, areas along curbs and sidewalks shall be backfilled with approved topsoil, as well as being seeded and mulched (or hydroseeded).

PIPED UTILITIES:

- All tapping of existing sanitary sewer, storm drain mains, and manholes must be done by Contractor forces.
- The Contractor shall have appropriate equipment on site to produce a firm, smooth, undisturbed subgrade at the trench bottom, true to grade. The bottom of the trench excavation shall be smooth, free of loose materials or tooth grooves for the entire width of the trench prior to placing the granular bedding material.

- All pipes shall be bedded with minimum 6-inches of 3/4"-0 crushed rock bedding and backfilled with compacted 3/4"-0 crushed rock in the pipe zone (crushed rock shall extend a minimum of 12-inches over the top of the pipe in all cases). Unless ODF or other backfill is shown or noted on the drawings, crushed rock trench backfill shall be used under all improved areas, including pavement, sidewalks, foundation slabs, buildings, etc.
- Granular trench bedding and backfill shall conform to the requirements of OSSC (ODOT/APWA) 02630.10 (Dense Graded Base Aggregate), 3/4"-0. Unless otherwise shown on the drawings, compact granular backfill to 92% of the maximum dry density per AASHTO T-180 test method (Modified Proctor).
- Contractor shall arrange to abandon existing sewer and water services not scheduled to remain in service in accordance with approving agency requirements.
- All piped utilities abandoned in place shall have all openings closed with concrete plugs with a minimum length equal to 2 times the diameter of the abandoned pipe.
- The end of all utility service lines shall be marked with a 2-x-4 painted white and wired to pipe stub. The pipe depth shall be written on the post in 2" block letters and red lined on the drawings for preparation of As-Built Drawings.
- All non-metallic water, sanitary and storm sewer piping shall have an electrically conductive insulated 12 gauge solid core copper tracer wire the full length of the installed pipe using blue wire for water and green wire for storm and sanitary piping. Tracer wire shall be extended up into all valve boxes, catch basins, manholes and lateral cleanout boxes. Tracer wire penetrations into manholes shall be within 18 inches of the rim elevation and adjacent to manhole steps. The tracer wire shall be tied to the top manhole step or otherwise supported to allow retrieval from the outside of the manhole. All tracer wire splices shall be made with waterproof splices or waterproof/corrosion resistant wire nuts.
- No trenches in sidewalks, roads, or driveways shall be left in an open condition overnight. All such trenches shall be closed before the end of each workday and normal traffic and pedestrian flows restored.
- Before mandrel testing, TV inspection or final acceptance of gravity pipelines, all trench compaction shall be completed and all sewers and storm drains flushed & cleaned to remove all mud, debris & foreign material from the pipelines, manholes and/or catch basins.
- Where future extensions are shown upstream of new manholes (sewer or storm), catch basins or junction boxes, pipe stubs (with gasketed caps) shall be installed at design grades to a point 2' minimum outside of the structure.

STORM MANHOLES:

- All precast manholes shall be provided with integral rubber boots. Where manholes without integral rubber boots are approved by the Owner's Representative and Approving Agency, a pipe joint shall be provided on all mainlines within 1.5 feet of the outside face of the manhole. Where required by Public Works, watertight lockdown lids required on all manholes outside of public right-of-way.
- Openings for connections to existing manholes shall be made by core-drilling the existing manhole structure, and installing a rubber boot. Connections shall be watertight and shall provide a smooth flow into and through the manhole with no ponding. Small chipping hammers or similar light tools which will not damage or crack the manhole base may be used to shape channels, but may be used to enlarge existing openings only if authorized in writing by the Owner's Representative. Use of pneumatic jackhammers shall be prohibited.
- Manhole channels depths (sewer & storm) shall be to the heights shown on the drawings, but in no case shall the channel depth be less than 2/3 of the pipe diameter. Channels, as well as shelves between the channels and the manhole walls, shall be sloped to drain per plan details.
- Manholes constructed over existing sanitary sewers shall conform to the requirements of OSSC (ODOT/APWA) 490.41, Manholes over Existing Sewers. The existing pipe shall not be broken out until after the completion of the manhole test.

STORM DRAIN SYSTEM:

- Storm sewer pipe materials shall conform to the construction drawings and Approving Agency's requirements. Unless otherwise noted or shown on the drawings, storm sewer pipe materials with watertight joints shall conform to the attached "Storm Pipe Table". Contractor shall use uniform pipe material on each pipe run between structures unless otherwise directed or approved. Jointed HDPE pipe shall not be used for slopes exceeding ten percent (10%). All materials and workmanship for all private storm drains, including storm drains located within any building envelope, shall be installed in conformance with Uniform Plumbing Code requirements.
- Contractor shall designate the pipe material actually installed on the field record drawings and provide this information for inclusion on the as-built drawings.
- Catch basins and junction boxes shall be set square with buildings or with the edge of the parking lot or street wherein they lie. Storm drain inlet structures and paving shall be adjusted so water flows into the structure without ponding water.
- Unless otherwise approved by the Engineer, all storm drain connections shall be by manufactured tees or saddles.
- Unless otherwise shown on the drawings, all storm pipe inlets & outfalls shall be beveled flush to match the slope wherein they lie.
- Sweep (deflect) storm sewer pipe into catch basins and manholes as required. Maximum joint deflection shall not exceed 5 degrees or manufacturers recommendations, whichever is less.

- Unless otherwise shown or directed, install storm sewer pipe in accordance with manufacturer installation guidelines.
- After manhole channeling and prior to mandrel testing or final acceptance, flush and clean all sewers, and remove all foreign material from the mainlines, manholes and catch basins.
- Mandrel Testing. Contractor shall conduct deflection test of flexible storm sewer pipes by pulling an approved mandrel through the completed pipeline following trench compaction. The diameter of the mandrel shall be 95% of the initial pipe diameter. Test shall be conducted not more than 30 days after the trench backfilling and compaction has been completed.
- TV Inspection. Upon completion of all storm sewer construction, testing and repair, the Contractor shall conduct a color TV acceptance inspection of all mainlines in accordance with OSSC (ODOT/APWA) 445.74 to determine compliance with grade requirements of OSSC (ODOT/APWA) 445.40.b. The TV inspection shall be conducted by an approved technical service which is equipped to make audio-visual recordings of the TV inspections on DVD (VHS video tape acceptable only upon prior written approval by Public Works). Unless otherwise required by the agency with jurisdiction, a standard 1-inch diameter ball shall be suspended in front of the camera during the inspection to determine the depth of any standing water. Sufficient water to reveal low areas or reverse grades shall be discharged into the pipe immediately prior to initiation of the TV inspection. The DVD and written report shall be delivered to the Approving Agency.
- Prior to acceptance, the Owner's Representative may lamp storm lines upstream & downstream of structures to verify that the pipes are clean and there is no grout or concrete in the mainlines, and that there are no observable bellies in the line. When necessary, sufficient water to reveal low areas shall be discharged into the pipe by the Contractor prior to any such inspection by the Owner's Representative or the Approving Agency.

FRANCHISE & PRIVATE UTILITIES:

- Contractor shall notify and coordinate with franchise utilities for removal or relocation of power poles, vaults, pedestals, manholes, etc. to avoid conflict with Public utility structures, fire hydrants, meters, sewer or storm laterals, etc.

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NO.	DATE	DESCRIPTION	BY
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**WESTECH ENGINEERING, INC.**  
 CONSULTING ENGINEERS AND PLANNERS  
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HIGHWAY 211 IMPROVEMENTS  
 HOME FIRST DEVELOPMENT PARTNERS  
**CONSTRUCTION NOTES**

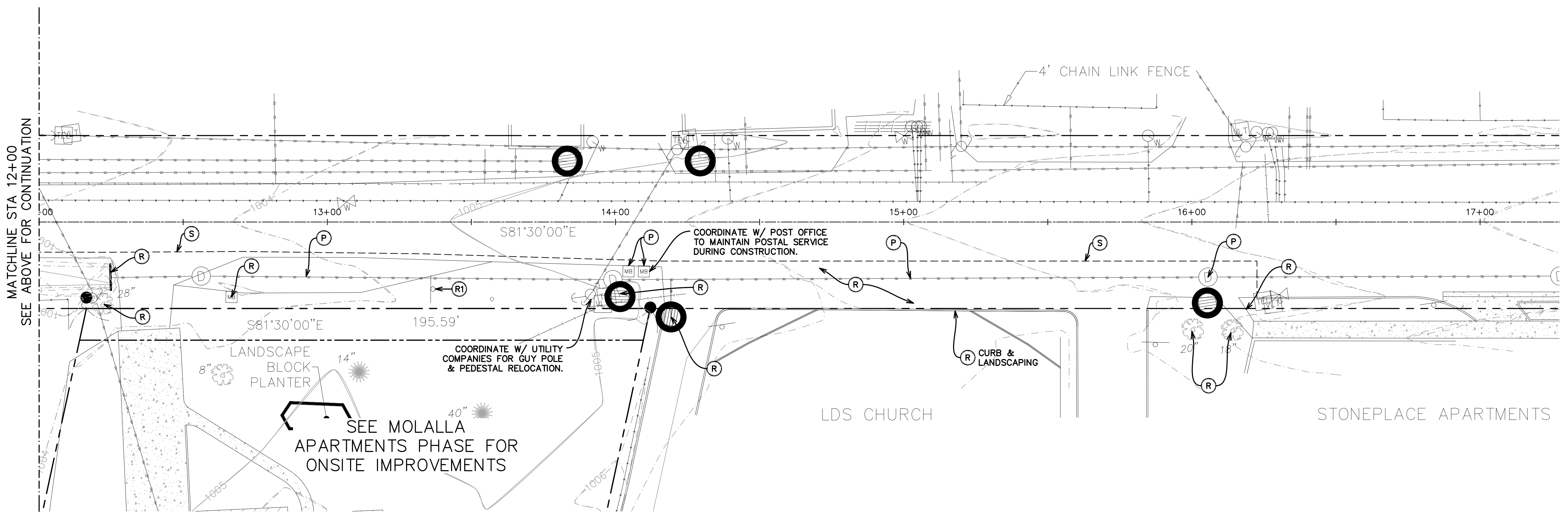
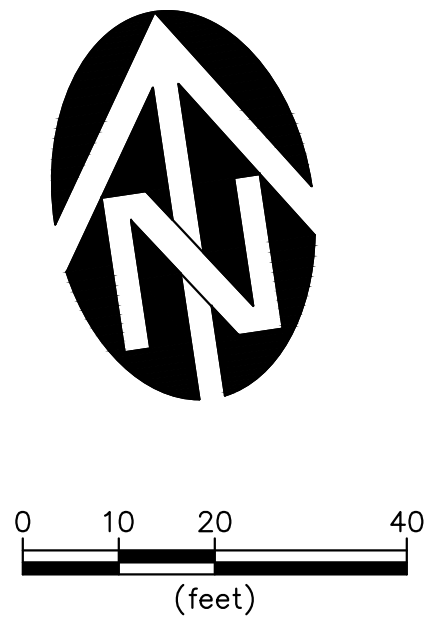
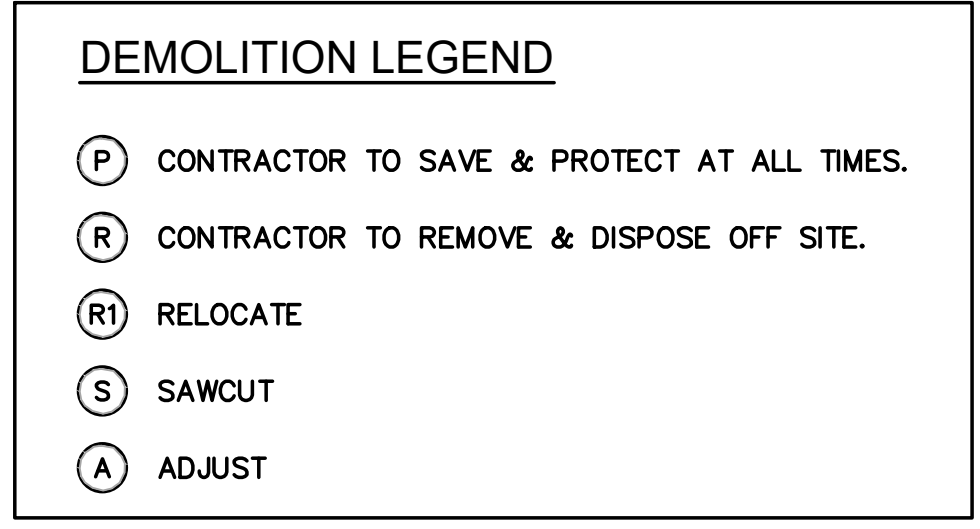
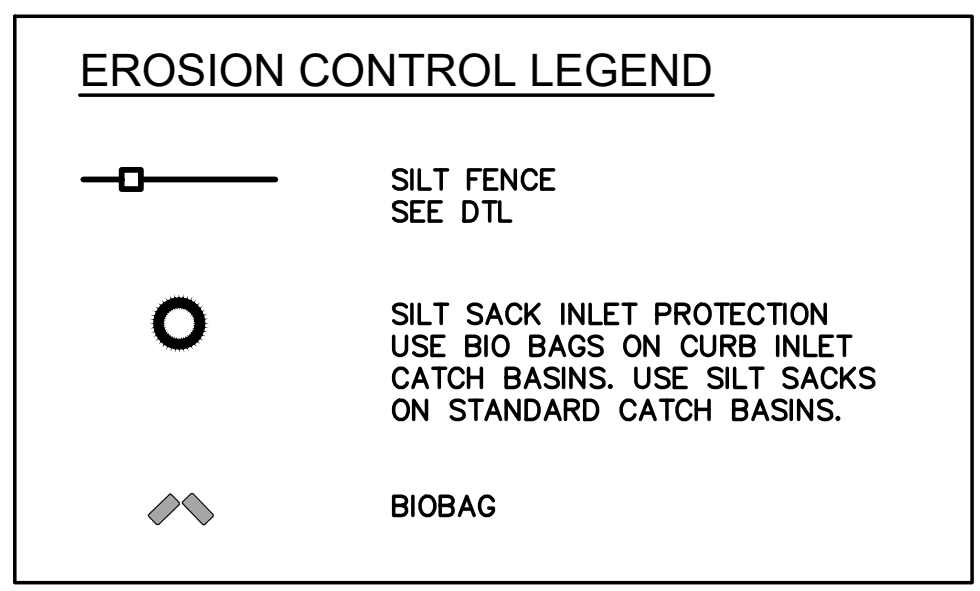
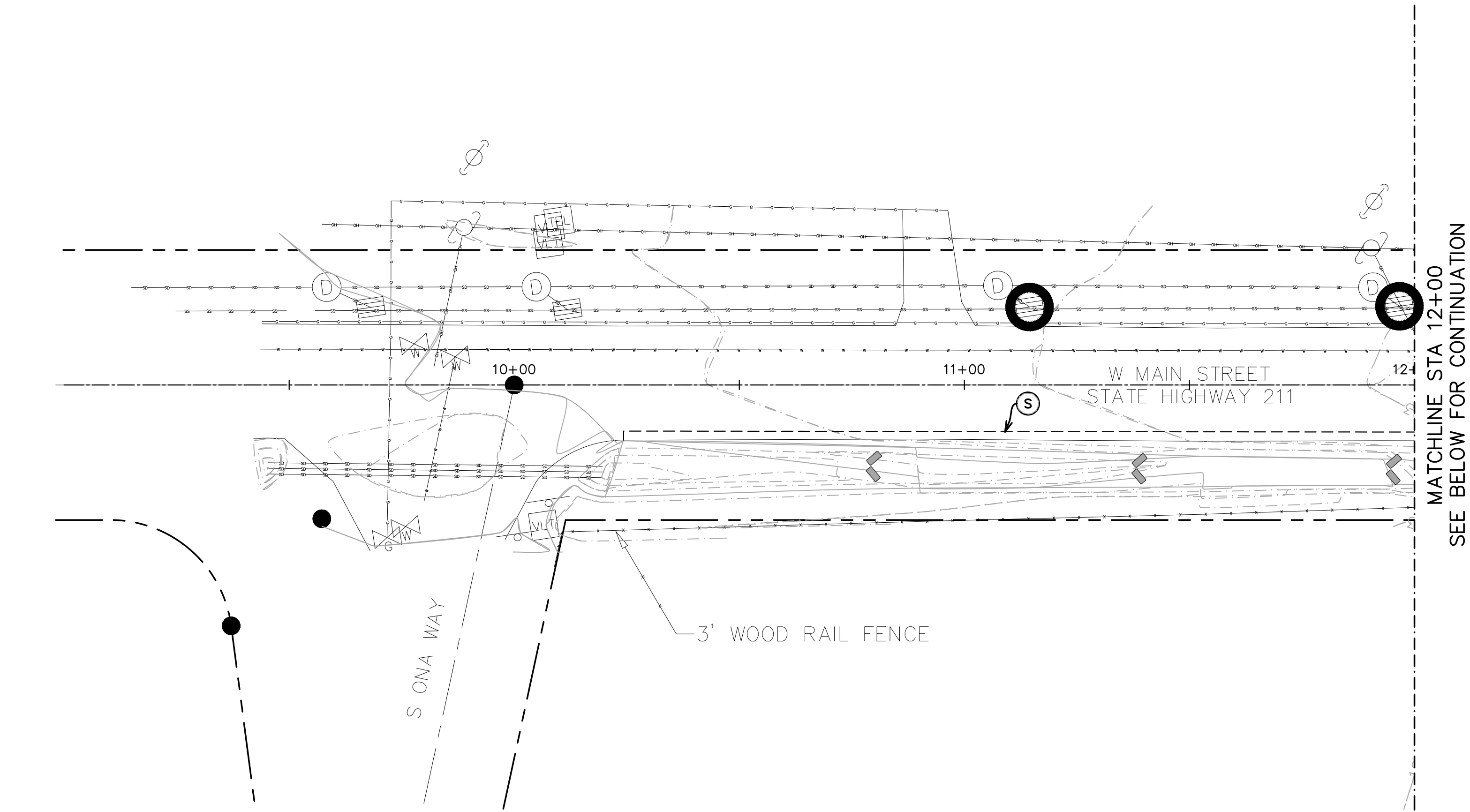
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REQUIRED TESTING AND FREQUENCY TABLE		Party Responsible for payment	
		Contractor	Others (see note 1)
Streets, Fire Lanes, Common Driveways, Parking Lots, Pads, Fills, etc.			
Subgrade	1 Test/4000 S.F./Lift (4 min), locations acceptable to approving agency (typically alternate sides of road or access aisles)	✓	See note 2 & note 3
Engineered Fills	1 Test/4000 S.F./Lift (4 min), locations acceptable to approving agency	✓	See note 2 & note 5
Baserock	1 Test/4000 S.F./Lift (4 min), locations acceptable to approving agency (typically alternate sides of road or access aisles)	✓	See note 2 & note 3
Asphalt	1 Test/6000 S.F./Lift (4 min), locations acceptable to AA (typ. alternate as above)	✓	See note 2
Piped Utilities, All			
Trench Backfill	1 Test/200 Foot Trench/Lift (4 min)	✓	See note 2
Trench AC Restoration	1 Test/300 Foot Trench (4 min)	✓	See note 2
Water			
Pressure Test	(to be witnessed by Owner's Representative or approving agency)	✓	See note 4
Bacterial Water Test	Per Oregon Health Division	✓	See note 2
Chlorine Residual Test	Per City Requirements	✓	
Sanitary Sewer			
Air Test	Per City or APWA Requirements, whichever is more stringent	✓	See note 4
Mandrel	95% of actual inside diameter	✓	See note 4
TV Inspection	All. Lines must be cleaned prior to TV work	✓	
Manhole	(1) Vacuum test per manhole, witnessed by Owner's Representative or approving agency	✓	See note 2
Storm			
Mandrel	95% of actual inside diameter	✓	See note 4
TV Inspection	All. Lines must be cleaned prior to TV work	✓	
Concrete, Block, etc.			
Slump, Air & Cylinders for structural & reinforced concrete, equipment slabs, curbs, sidewalks & PCC pavements. Unless otherwise specified, one set of cylinders per 100 cubic yards (or portion thereof) of each class of concrete placed per day. Slump & air tests required on same load as cylinders.		✓	See note 2
Building permit inspection & Special inspection for structural concrete, reinforced masonry, epoxy anchors, etc. as required by applicable State Building Codes.		✓	See note 6
Retaining Walls			
Building permit inspection and Special Inspection, as well as compaction testing on backfill, all in conformance with applicable State Building Code requirements		✓	See note 5 & note 6
<p>Note 1: "Others" refers to Owner's authorized Representative or Approving Agency as applicable. Contractor responsible for scheduling testing. All testing must be completed prior to performing subsequent work.</p> <p>Note 2: Testing must be performed by an approved independent testing laboratory.</p> <p>Note 3: In addition to in-place density testing, the subgrade and base rock shall be proof-rolled with a loaded 10 yard dump truck provided by the Contractor. Baserock proofroll shall take place immediately prior to (within 24 hours of) paving, and shall be witnessed by the Owner's authorized Representative or approving agency. Location and pattern of testing and proofroll to be as approved or directed by said Owner's authorized Representative or approving agency.</p> <p>Note 4: To be witnessed by the Owner's Representative or approving agency. The Contractor shall perform pretests prior to scheduling witnessed waterline or sanitary sewer pressure tests, or pipeline mandrel test.</p> <p>Note 5: The approved independent laboratory retained by the Contractor shall provide a certification (stamped by an engineer licensed in the State of Oregon) that the subgrade was prepared and all engineered fills were placed in accordance with the provisions of the construction drawings and the contract documents.</p> <p>Note 6: Regardless of who is responsible for payment, the Contractor is responsible for scheduling and coordinating any and all required inspections and Special Inspections as required by applicable building codes or jurisdictions having authority.</p>			

STORM PIPE TABLE	
Cover Depth	6" - 18" Diameter
Less than 2' Cover	Class 50 ductile iron pipe with bell and spigot joints and rubber gasket.
2' to 2-1/2' Cover	Pipe specified for lesser cover depths -or- Class 3, ASTM C-14 non-reinforced concrete pipe with bell and spigot joints & rubber gaskets, ASTM 150 Type II cement. -or- PVC pipe conforming to AWWA C900 DR 18 (6"-12") or AWWA C-905 (14"-18") with bell and spigot joints and rubber gasket
2-1/2' to 15' Cover	Pipe specified for lesser cover depths -or- PVC pipe conforming to ASTM D-3034 PVC SDR 35 (6"-15") or ASTM F-679 PVC solid wall SDR 35 (18") with bell and spigot joints and rubber gasket. -or- HDPE (high density polyethylene) pipe conforming to AASHTO M-252, (6"-10") or AASHTO M-294 (12"-18"). For slopes less than 6% the pipe shall be ADS N-12 IB ST, Hancor Sure-Lok F477, or approved equal. For slopes greater than 6% the pipe shall be ADS N-12 IB WT, Hancor Blue Seal, or approved equal with watertight pressure testable fittings, -except- jointed HDPE (high density polyethylene) pipe referenced above not permitted for depth to invert greater than 12 feet.
More than 15' Cover	See construction drawings.

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WESTECH ENGINEERING, INC. CONSULTING ENGINEERS AND PLANNERS 3841 Fairview Industrial Dr. S.E., Suite 100, Salem, OR 97302 Phone: (503) 585-2474 Fax: (503) 585-3966 E-mail: westech@westech-eng.com							
HIGHWAY 211 IMPROVEMENTS HOME FIRST DEVELOPMENT PARTNERS <b>CONSTRUCTION NOTES</b>							
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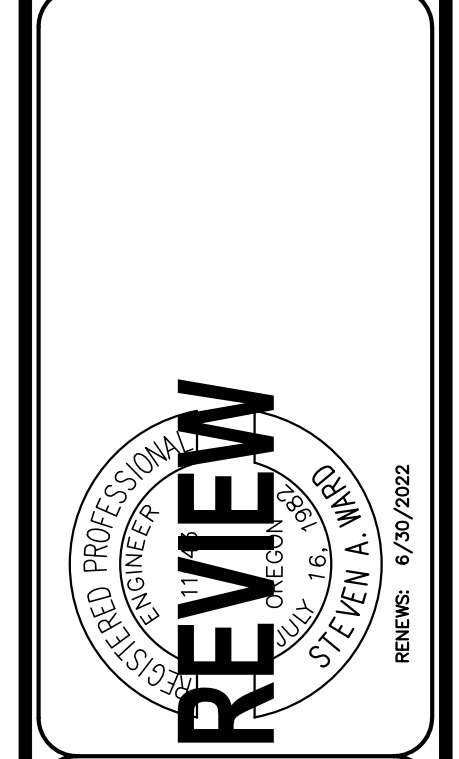
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DATE: SEP 2021



**WESTTECH ENGINEERING, INC.**  
 CONSULTING ENGINEERS AND PLANNERS

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HIGHWAY 211 IMPROVEMENTS  
 HOME FIRST DEVELOPMENT PARTNERS  
 EXISTING CONDITIONS,  
 EROSION CONTROL,  
 & DEMOLITION PLAN

DRAWING  
**C2.0**  
 JOB NUMBER  
 3312.0000.0

DEQ EROSION CONTROL STANDARD NOTES:

1. Include a list of all personnel (by name and position) that are responsible for the design, installation and maintenance of stormwater control measures (e.g. ESCP developer, BMP installer (see Section 4.10), as well as their individual responsibilities. (Section 4.4.c.ii)
2. Visual monitoring inspection reports must be made in accordance with DEQ 1200-C permit requirements. (Section 6.5)
3. Inspection logs must be kept in accordance with DEQ's 1200-C permit requirements. (Section 6.5.q)
4. Retain a copy of the ESCP and all revisions on site and make it available on request to DEQ, Agent, or the local municipality. (Section 4.7)
5. The permit registrant must implement the ESCP. Failure to implement any of the control measures or practices described in the ESCP is a violation of the permit. (Sections 4 and 4.11)
6. The ESCP must be accurate and reflect site conditions. (Section 4.8)
7. Submission of all ESCP revisions is not required. Submittal of the ESCP revisions is only under specific conditions. Submit all necessary revision to DEQ or Agent within 10 days. (Section 4.9)
8. Sequence clearing and grading to the maximum extent practical to prevent exposed inactive areas from becoming a source of erosion. (Section 2.2.2)
9. Create smooth surfaces between soil surface and erosion and sediment controls to prevent stormwater from bypassing controls and ponding. (section 2.2.3)
10. Identify, mark, and protect (by construction fencing or other means) critical riparian areas and vegetation including important trees and associated rooting zones, and vegetation areas to be preserved. Identify vegetative buffer zones between the site and sensitive areas (e.g., wetlands), and other areas to be preserved, especially in perimeter areas. (Section 2.2.1)
11. Preserve existing vegetation when practical and re-vegetate open areas. Re-vegetate open areas when practicable before and after grading or construction. Identify the type of vegetative seed mix used. (Section 2.2.5)
12. Maintain and delineate any existing natural buffer within the 50-foot of waters of the state. (Section 2.2.4)
13. Install perimeter sediment control, including storm drain inlet protection as well as all sediment basins, traps, and barriers prior to land disturbance. (Sections 2.1.3)
14. Control both peak flow rates and total stormwater volume, to minimize erosion at outlets and downstream channels and streambanks. (Sections 2.1.1. and 2.2.16)
15. Control sediment as needed along the site perimeter and at all operational internal storm drain inlets at all times during construction, both internally and at the site boundary. (Sections 2.2.6 and 2.2.13)
16. Establish concrete truck and other concrete equipment washout areas before beginning concrete work. (Section 2.2.14)
17. Apply temporary and/or permanent soil stabilization measures immediately on all disturbed areas as grading progresses. Temporary or permanent stabilizations measures are not required for areas that are intended to be left unvegetated, such as dirt access roads or utility pole pads. (Sections 2.2.20 and 2.2.21)
18. Establish material and waste storage areas, and other non-stormwater controls. (Section 2.3.7)
19. Keep waste container lids closed when not in use and close lids at the end of the business day for those containers that are actively used throughout the day. For waste containers that do not have lids, provide either (1) cover (e.g., a tarp, plastic sheeting, temporary roof) to prevent exposure of wastes to precipitation, or (2) a similarly effective means designed to prevent the discharge of pollutants (e.g., secondary containment). (Section 2.3.7)
20. Prevent tracking of sediment onto public or private roads using BMPs such as: construction entrance, graveled (or paved) exits and parking areas, gravel all unpaved roads located onsite, or use an exit tire wash. These BMPs must be in place prior to land-disturbing activities. (Section 2.2.7)
21. When trucking saturated soils from the site, either use water-tight trucks or drain loads on site. (Section 2.2.7.f)
22. Control prohibited discharges from leaving the construction site, i.e., concrete wash-out, wastewater from cleanout of stucco, paint and curing compounds. (Sections 1.5 and 2.3.9)
23. Ensure that steep slope areas where construction activities are not occurring are not disturbed. (Section 2.2.10)
24. Prevent soil compaction in areas where post-construction infiltration facilities are to be installed. (Section 2.2.12)
25. Use BMPs to prevent or minimize stormwater exposure to pollutants from spills; vehicle and equipment fueling, maintenance, and storage; other cleaning and maintenance activities; and waste handling activities. These pollutants include fuel, hydraulic fluid, and other oils from vehicles and machinery, as well as debris, fertilizer, pesticides and herbicides, paints, solvents, curing compounds and adhesives from construction operations. (Sections 2.2.15 and 2.3)
26. Provide plans for sedimentation basins that have been designed per Section 2.2.17 and stamped by an Oregon Professional Engineer. (See Section 2.2.17.a)
27. If engineered soils are used on site, a sedimentation basin/impoundment must be installed. (See Sections 2.2.17 and 2.2.18)
28. Provide a dewatering plan for accumulated water from precipitation and uncontaminated groundwater seepage due to shallow excavation activities. (See Section 2.4)
29. Implement the following BMPs when applicable: written spill prevention and response procedures, employee training on spill prevention and proper disposal procedures, spill kits in all vehicles, regular maintenance schedule for vehicles and machinery, material delivery and storage controls, training and signage, and covered storage areas for waste and supplies. (Section 2.3)
30. Use water, soil-binding agent or other dust control technique as needed to avoid wind-blown soil. (Section 2.2.9)
31. The application rate of fertilizers used to reestablish vegetation must follow manufacturer's recommendations to minimize nutrient releases to surface waters. Exercise caution when using time-release fertilizers within any waterway riparian zone. (Section 2.3.5)
32. If an active treatment system (for example, electro-coagulation, flocculation, filtration, etc.) for sediment or other pollutant removal is employed, submit an operation and maintenance plan (including system schematic, location of system, location of inlet, location of discharge, discharge dispersion device design, and a sampling plan and frequency) before operating the treatment system. Obtain Environmental Management Plan approval from DEQ before operating the treatment system. Operate and maintain the treatment system according to manufacturer's specifications. (Section 1.2.9)
33. Temporarily stabilize soils at the end of the shift before holidays and weekends, if needed. The registrant is responsible for ensuring that soils are stable during rain events at all times of the year. (Section 2.2)
34. As needed based on weather conditions, at the end of each workday soil stockpiles must be stabilized or covered, or other BMPs must be implemented to prevent discharges to surface waters or conveyance systems leading to surface waters. (Section 2.2.8)
35. Sediment fence: remove trapped sediment before it reaches one third of the above ground fence height and before fence removal. (Section 2.1.5.b)
36. Other sediment barriers (such as biobags): remove sediment before it reaches two inches depth above ground height and before BMP removal. (Section 2.1.5.c)
37. Catch basins: clean before retention capacity has been reduced by fifty percent. Sediment basins and sediment traps: remove trapped sediments before design capacity has been reduced by fifty percent and at completion of project. (Section 2.1.5.d)
38. Within 24 hours, significant sediment that has left the construction site, must be remediated. Investigate the cause of the sediment release and implement steps to prevent a recurrence of the discharge within the same 24 hours. Any in-stream clean-up of sediment shall be performed according to the Oregon Department of State Lands required timeframe. (Section 2.2.19.a)
39. The intentional washing of sediment into storm sewers or drainage ways must not occur. Vacuuming or dry sweeping and material pickup must be used to cleanup released sediments. (Section 2.2.19)
40. Document any portion(s) of the site where land disturbing activities have permanently ceased or will be temporarily inactive for 14 or more calendar days. (Section 6.5.f.)
41. Provide temporary stabilization for that portion of the site where construction activities cease for 14 days or more with a covering of blown straw and a tackifier, loose straw, or an adequate covering of compost mulch until work resumes on that portion of the site. (Section 2.2.20)
42. Do not remove temporary sediment control practices until permanent vegetation or other cover of exposed areas is established. Once construction is complete and the site is stabilized, all temporary erosion controls and retained soils must be removed and disposed of properly, unless needed for long term use following termination of permit coverage. (Section 2.2.21)

Rev. 12/15/20  
By: Blair Edwards

YEAR: MONTH:	'22 06	'22 07	'22 08	'22 09	'22 10	'22 11	'22 12	'23 01	'23 02	'23 03	'23 04	'23 05
CLEARING	X	X										
EXCAVATION		X	X	X								
GRADING		X	X	X	X	X	X	X	X			
CONSTRUCTION		X	X	X	X	X	X	X	X			
<b>SEDIMENT CONTROLS:</b>												
Silt Fencing		X	X	X	X	X	X	X	X			
Sediment Traps		X	X	X	X	X	X	X	X			
Sediment Basins												
Storm Inlet Protection												
Drainage Swales												
Check Dams												
Contour Furrows												
Terracing												
Pipe Slope Drains												
Rock Outlet Protection												
Gravel Construction Entrance	X	X	X	X	X	X	X	X	X			
Grass-lined Channel (Turf Reinforcement Mats)												
Protection of trees with construction fences												
Temporary Seeding and Planting												
Permanent Seeding and Planting												
Other:												

CONTROL MEASURE	PHASE 1	PHASE 2	PHASE 3	PHASE 4	PHASE 5
Silt Fencing	X	X	X	X	
Construction Entrance	X	X			
Sediment Traps			X	X	
Storm Inlet Protection			X	X	
Concrete Washout			X	X	
Rock Outlet Protection			X	X	X
Permanent Seeding and Planting					X

Phase 1: Prior to Ground Disturbance  
Phase 2: After Completion of Rough Grading  
Phase 3: After Installation of Storm Facilities  
Phase 4: After Paving & Construction  
Phase 5: After Project Completion and Cleanup

**BMP Rationale**  
A comprehensive list of available Best Management Practices (BMP) options based on DEQ's 1200-C Permit Application and ESCP Guidance Document has been reviewed to complete this Erosion and Sediment Control Plan. Some of the above listed BMPs were not chosen because they were determined to not effectively manage erosion prevention and sediment control for this project based on specific site conditions, including soil conditions, topographic constraints, accessibility to the site, and other related conditions. As the project progresses and there is a need to revise the ESCP, an Action Plan will be submitted.

SOIL TYPE(S): PER CLACKAMAS COUNTY CO. SOIL SURVEY THE SITE SOILS INCLUDE, "DAYTON SILT LOAM, SAWTELL SILT LOAM, 0 TO 8 PERCENT SLOPES, & WAPATO SILTY CLAY LOAM"  
EROSION HAZARD: PER CLACKAMAS CO. SOIL SURVEY EROSION HAZARD IS "SLIGHT"  
SITE AREA: 2.95 Ac  
DISTURBANCE AREA: 2.95 Ac

INSPECTION FREQUENCY FOR BMP

Site Condition	Minimum Frequency
1. Active period	On initial date that land disturbance activities commence.  Within 24 hours of any storm event, including runoff from snow melt, that results in discharge from the site.  At least once every 14 days, regardless of whether stormwater runoff is occurring.
2. Inactive periods greater than fourteen (14) consecutive calendar days	The Inspector may reduce the frequency of inspections in any area of the site where the stabilization steps in Section 2.2.20 have been completed to twice per month for the first month, no less than 14 calendar days apart, then once per month.
3. Periods during which the site is inaccessible due to inclement weather	If safe, accessible and practical, inspections must occur daily at a relevant discharge point or downstream location of the receiving waterbody.
4. Periods during which construction activities are suspended and runoff is unlikely due to frozen conditions.	Visual monitoring inspections may be temporarily suspended. Immediately resume monitoring upon thawing, or when weather conditions make discharges likely.
5. Periods during which construction activities are conducted and runoff is unlikely during frozen conditions.	Visual monitoring inspections may be reduced to once a month. Immediately resume monitoring upon thawing, or when weather conditions make discharges likely.

Spill Prevention Procedures and Response

- Spill prevention is an important factor in the successful operation of a storm water injection management system. All contractor employees will be trained on this plan so that they are certain of the location of materials, who to notify in case of a spill, and how to initially contain the spill of hazardous materials. Contractor employees shall never dispose waste materials into the storm water collection/treatment system. Contractor employees will be observant of other potential contamination occurrences. All contractor employees will review this plan especially with regards to the detailed spill response steps.
- This data will be posted in an accessible area at the site.

What to do in case of a spill

1. Spill kit to be located near the job trailer or another conspicuous location and clearly marked.
2. Get the spill kit.
  - a. If possible, determine visually what types of fluids have been spilled.
  - b. Put on gloves and glasses or any other necessary Personal Protective Equipment (PPE).
  - c. Get the absorbent material provided in the kit and the drain block cover.
  - d. Place the absorbent materials in the path of the spill.
  - e. Remove any debris from the vicinity of the inlet where the spill is draining.
  - f. Unroll the drain block cover and place it snugly over the inlet.
  - g. Verify that the cover has full contact with the rim of the inlet.
  - h. Use snakes, pillow or pigs to completely contain the area.
3. Notify the following personnel immediately:
  - a. Owner's Representative: Troy Croft, Phone: 503-375-7168.
  - b. When a spill includes any of the below, notify the Oregon Emergency Response System as soon as the Owner's Representative has knowledge of the release. Oregon Emergency Response System Phone: 1-800-452-0311
  - i. Any amount of oil to waters of the state;
  - ii. Oil spills on land in excess of 42 gallons;
  - iii. Hazardous materials that are equal to, or greater than, the quantity listed in the Code of Federal Regulations, 40 CFR Part 302 (List of Hazardous Substances and Reportable Quantities), and amendments adopted before July 1, 2002

NOTE: Only dry cleanup methods will be employed to clean up spills (i.e., no use of water to wash spilled materials from pavement will be conducted). All spill cleanups shall be conducted in accordance with applicable regulations.

Responsible Personnel

In case of spill contact the General Contractor and Owner's Representative immediately. The General Contractor will be responsible for either managing the spill clean up for minor spills or contacting/retaining a company for the cleanup of major spills.

Waste Management Procedures

Activities performed onsite shall implement the following to eliminate the discharge of waste:

1. Locate activities that include waste products away from waters of the state and stormwater inlets or conveyances so that stormwater coming into contact with these activities cannot reach waters of the state;
2. Ensure adequate supplies are available at all times to handle spills, leaks, and disposal of liquids, and provide secondary containment (e.g. spill berms, decks, spill containment pallets);
3. Have a spill kit available on site and ensure personnel are available to respond expeditiously in the event of a leak or spill;
4. Clean up spills or contaminated surfaces immediately using dry clean up measures (do not clean contaminated surfaces by hosing the area down), and eliminate the source of the spill to prevent a discharge or a continuation of an ongoing discharge; and
5. Store materials in a covered area (e.g., plastic sheeting, temporary roofs), or in secondary containment to prevent the exposure of these containers to precipitation or stormwater runoff, or a similarly effective means designed to prevent the discharge of pollutants from these areas.
6. Building Materials & Building Products: Minimize material exposure in cases where the exposure to precipitation or to stormwater will result in a discharge of pollutants (e.g. elevate materials from soil to prevent leaching of pollutants).

Fertilizers, pesticides, herbicides, & insecticides

Comply with all application and disposal requirements included on the registered pesticide, herbicide, insecticide, and fertilizer label. When applying fertilizers, registrants must:

1. Apply at a rate and in amounts consistent with manufacturer's specifications;
2. Apply at the appropriate time of year for the location, and preferably timed to coincide as closely as possible to the period of maximum vegetation uptake and growth;
3. Avoid applying before heavy rains that could cause excess nutrients to be discharged;
4. Never apply to frozen ground;
5. Never apply to stormwater conveyance channels; and
6. Follow all other federal, state, and local requirements regarding fertilizer application.

Authorized non-stormwater discharges anticipated for the proposed project:

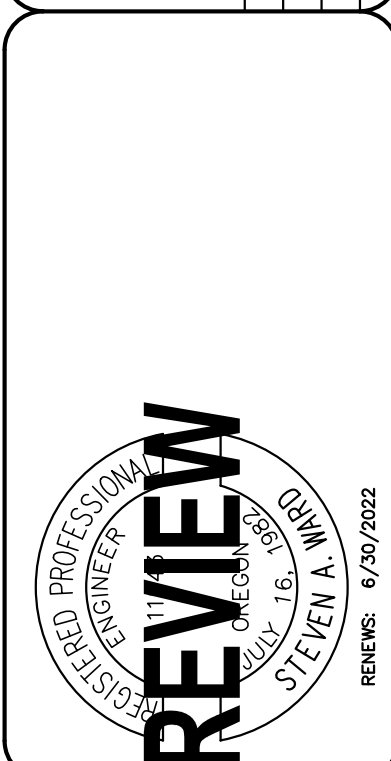
1. Landscape irrigation
2. Dust control water
3. Water line flushing (potable)

Potential pollutant-generating activities anticipated for the proposed project including an inventory of pollutants for each activity.

1. Mass Grading, Street & Utility Construction
  - a. Sediment
  - b. Vehicle and machinery related pollutants (Fuels, hydraulic fluid, oils)
2. Vertical Construction
  - a. Paints, caulks, sealants, solvents
  - b. Fluorescent light ballasts
  - c. Sediment
  - d. Vehicle and machinery related pollutants (Fuels, hydraulic fluid, oils)
3. Landscaping & Irrigation
  - a. Fertilizers
  - b. Pesticides, Herbicides, Insecticides

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CONSULTING ENGINEERS AND PLANNERS

**WE**

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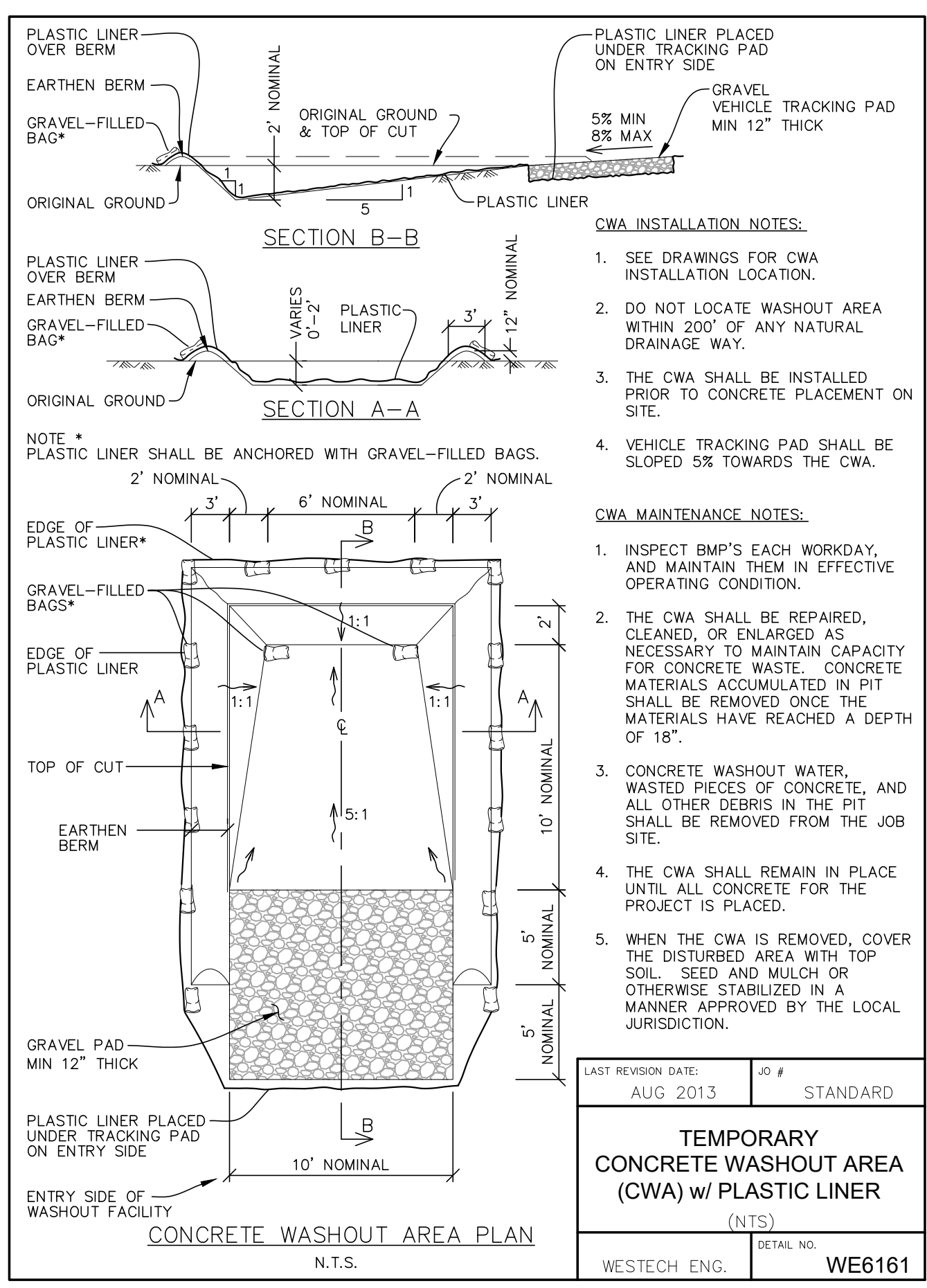
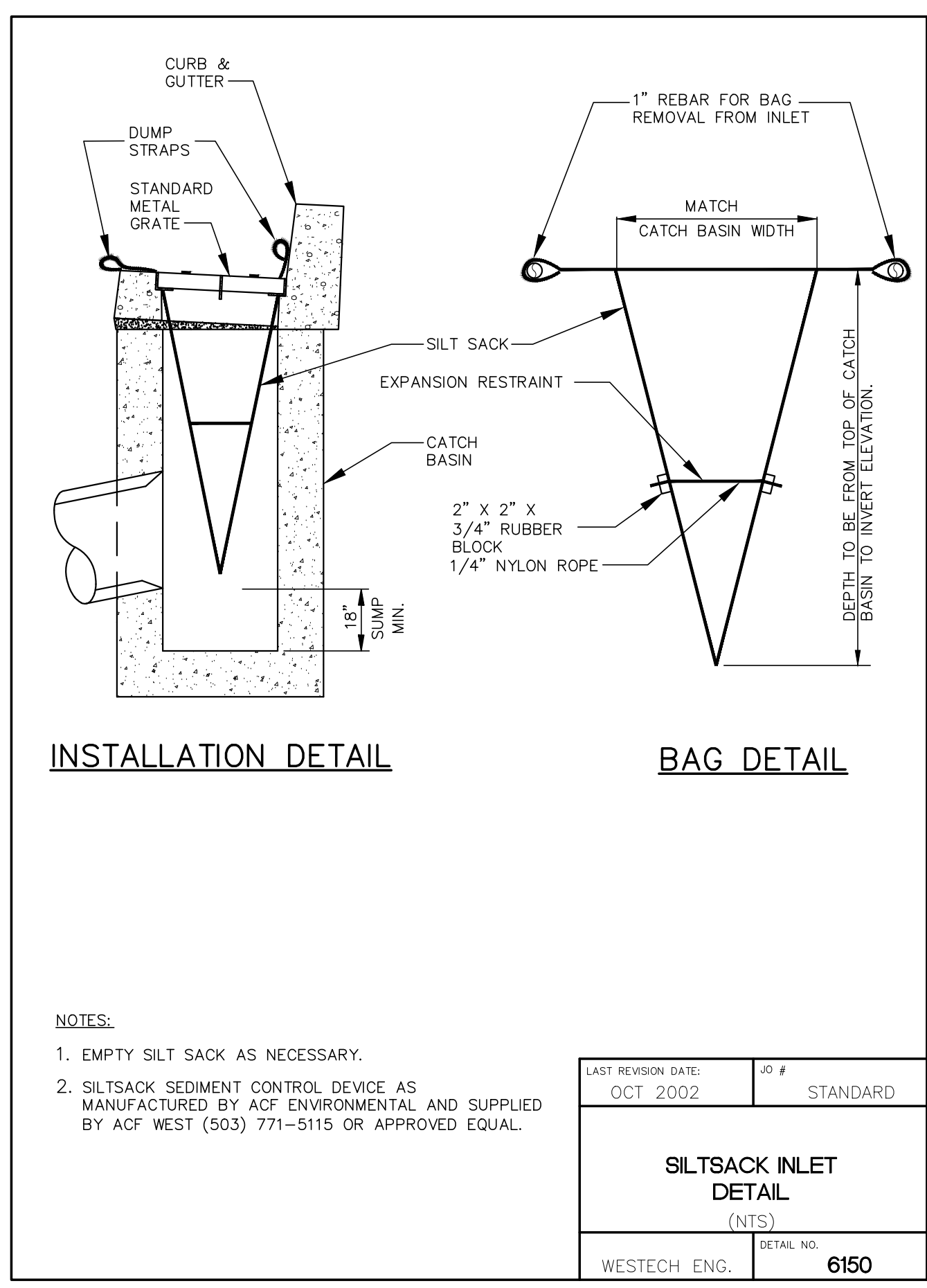
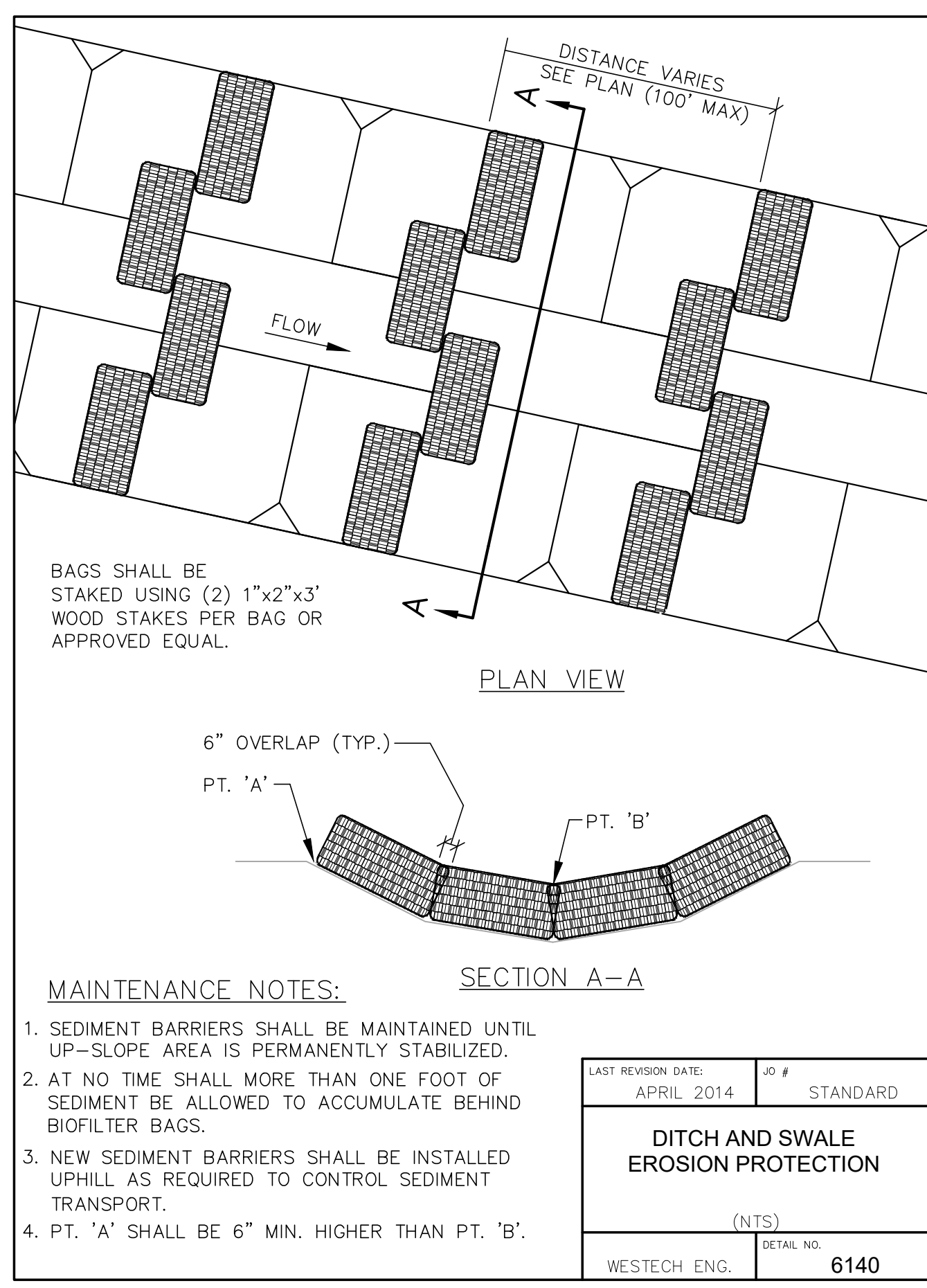
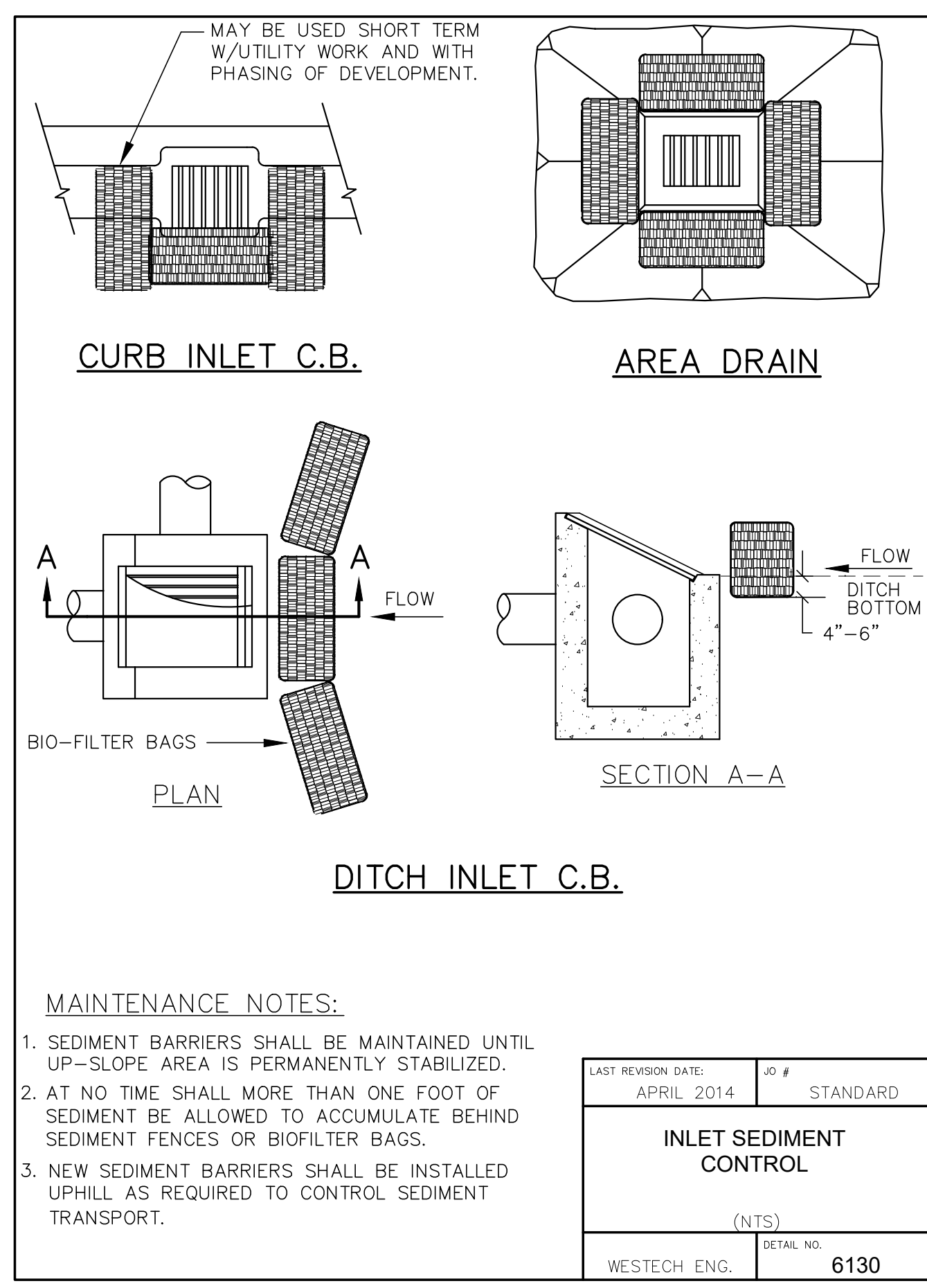
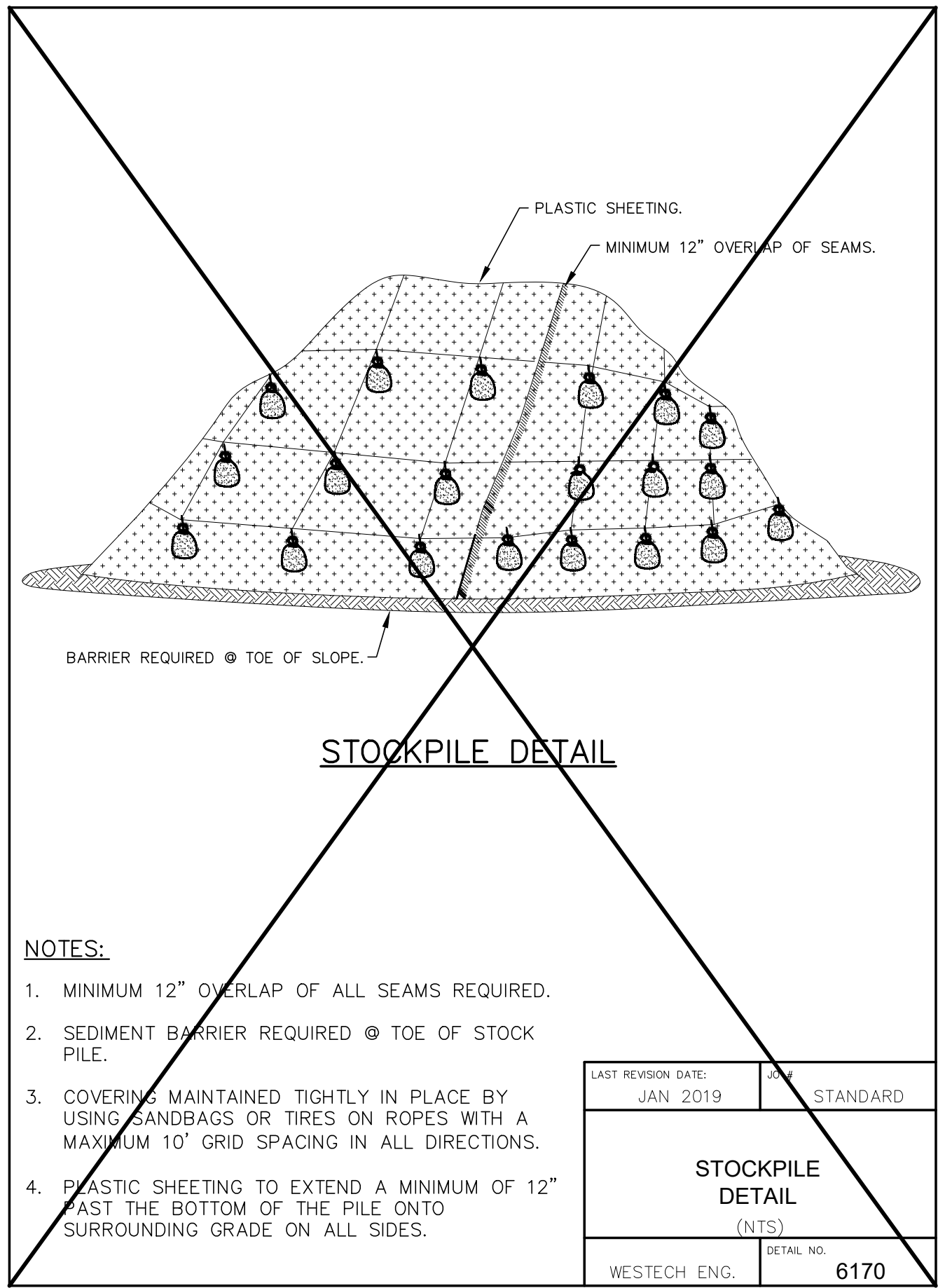
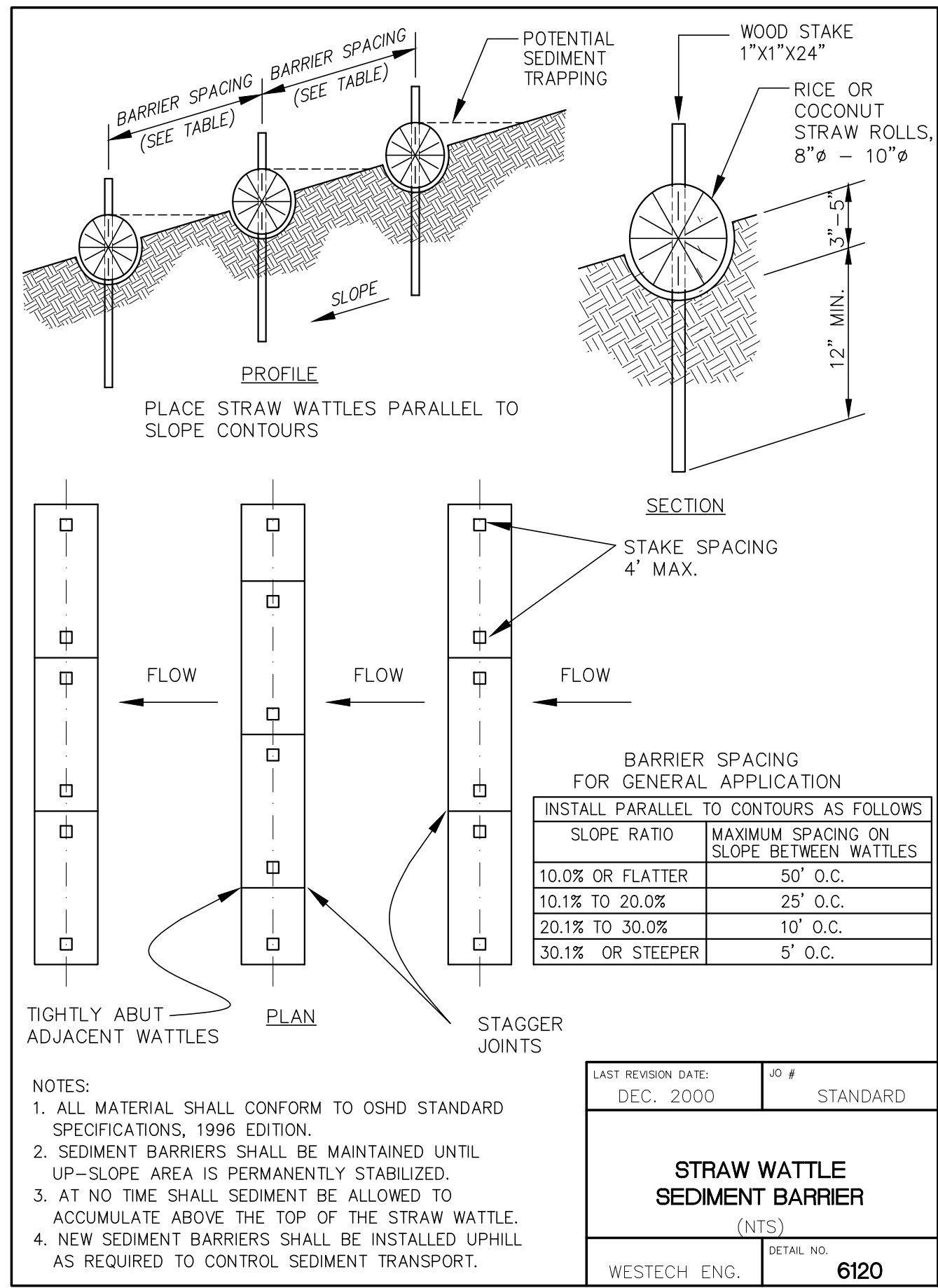
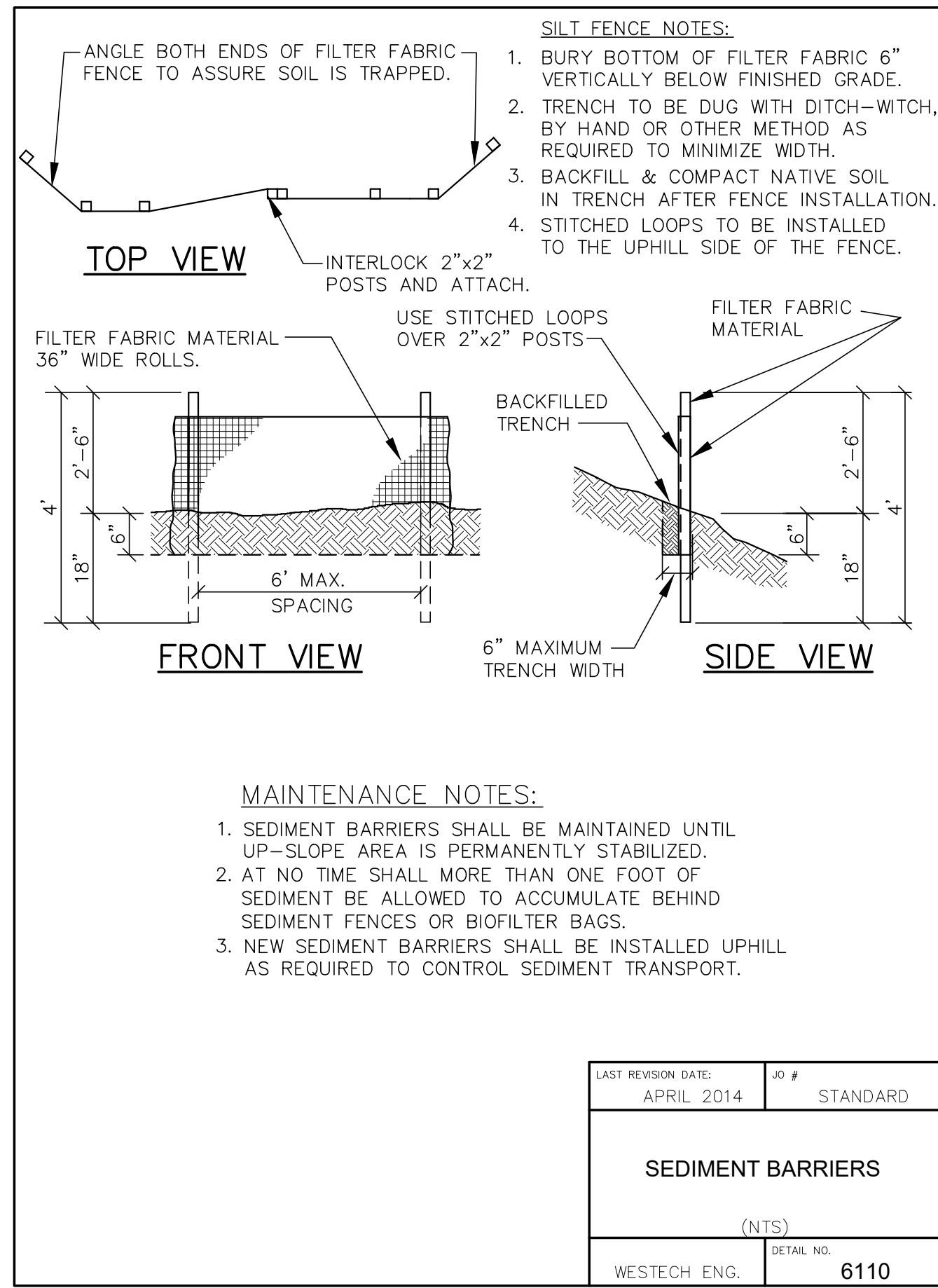
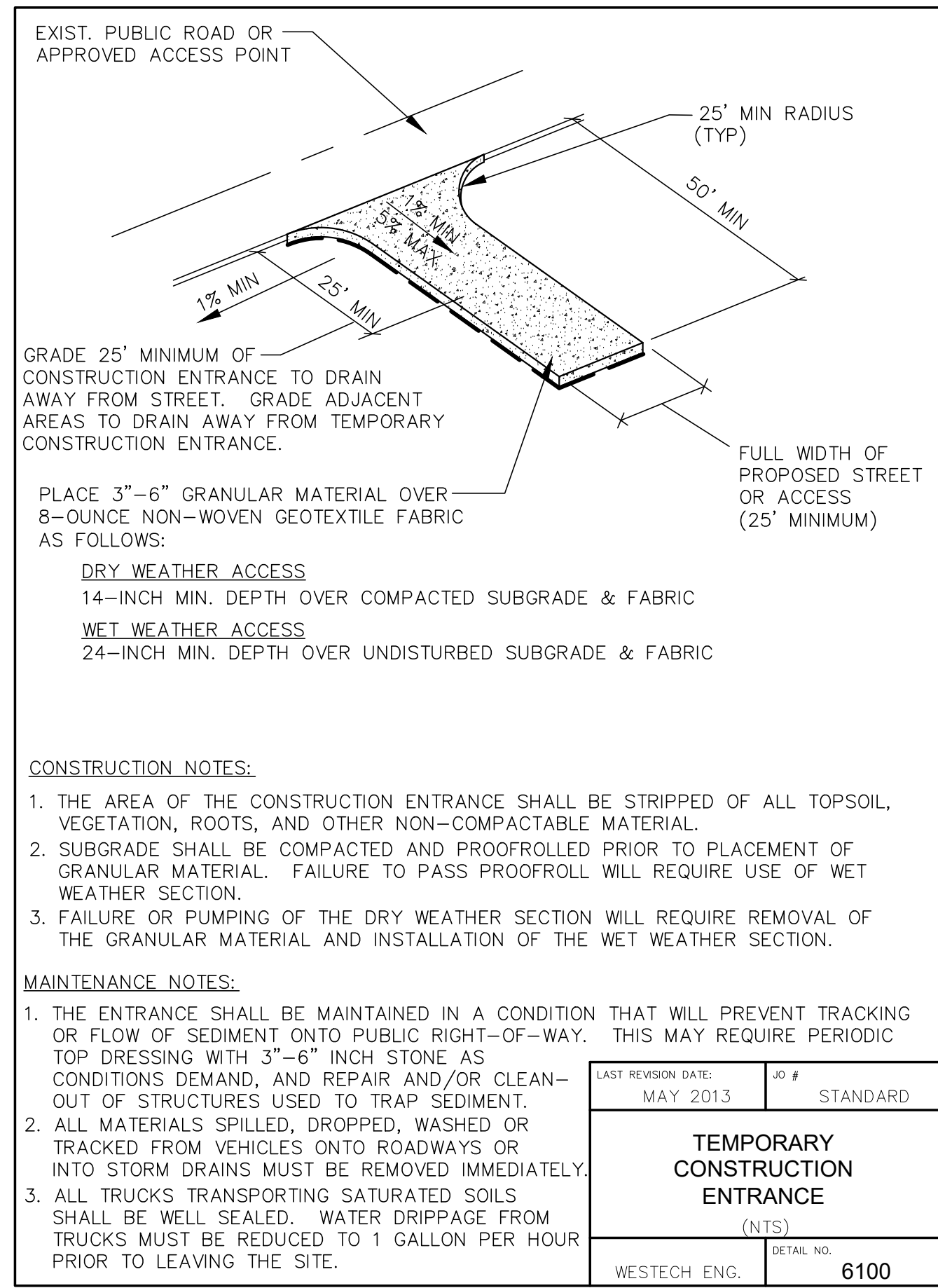
HIGHWAY 211 IMPROVEMENTS  
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**EROSION CONTROL  
NOTES & DETAILS**

DRAWING  
**C2.1**

JOB NUMBER  
**3312.0000.0**



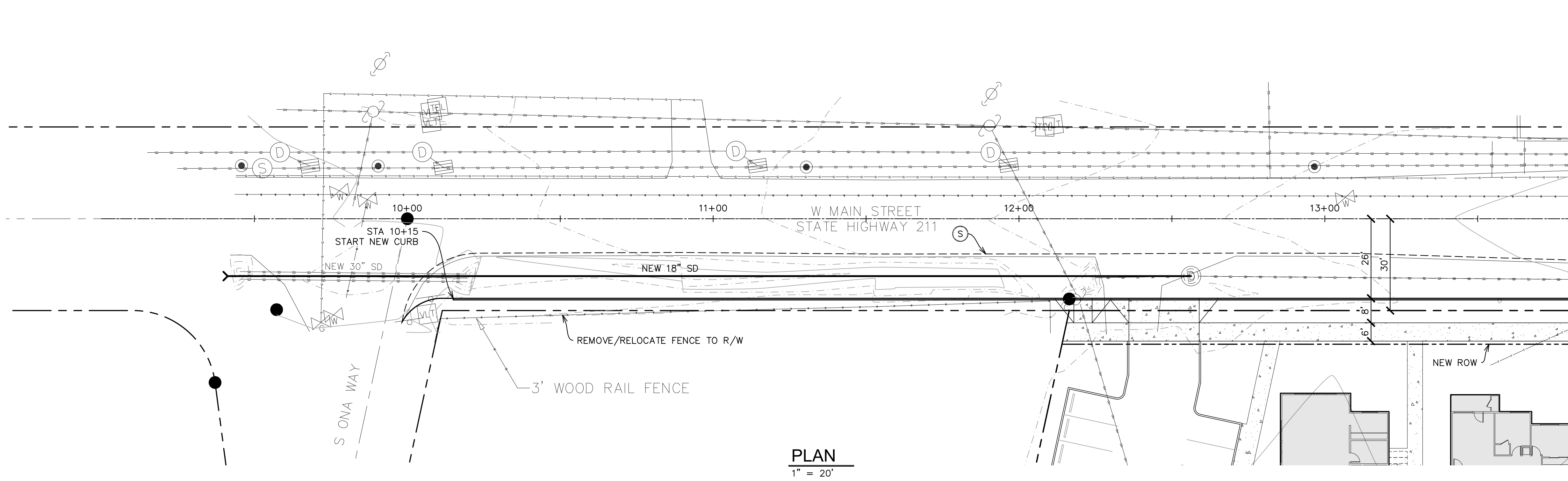


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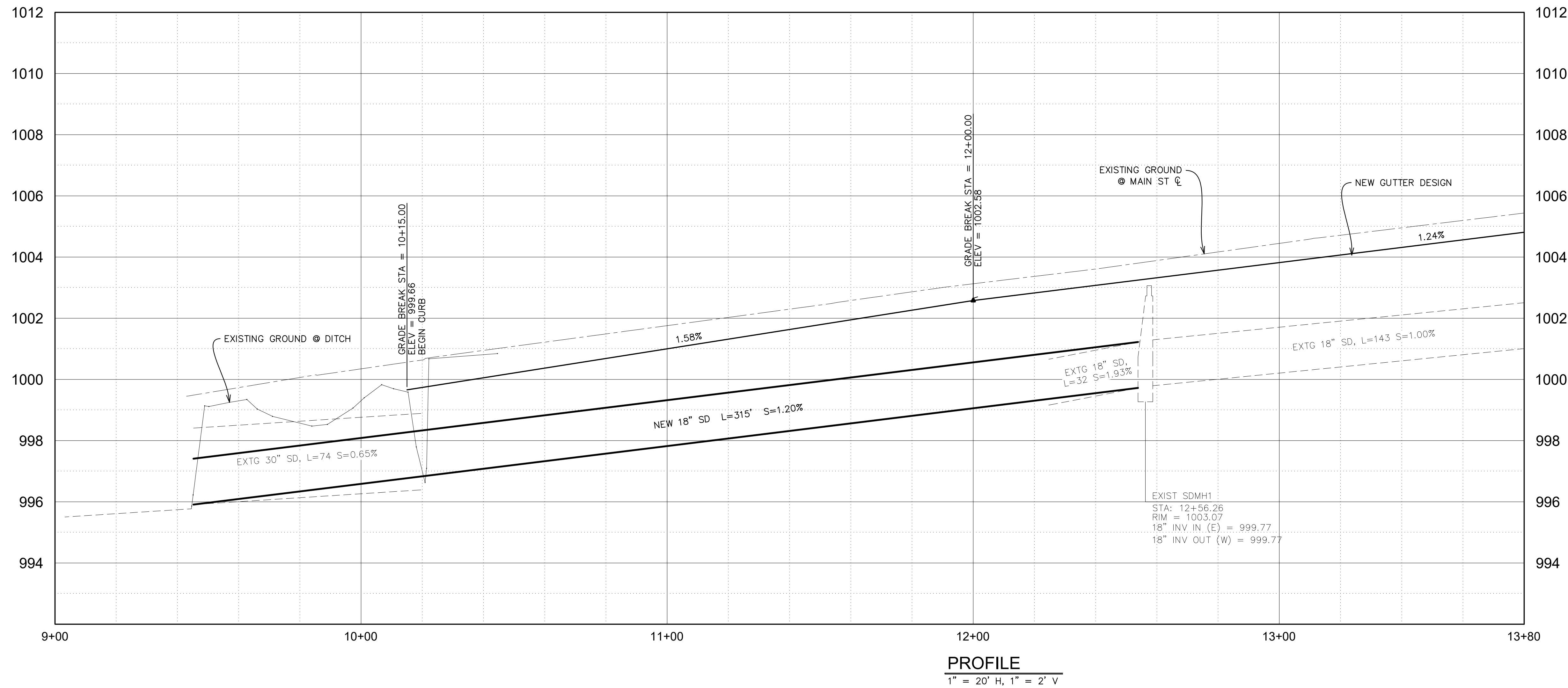
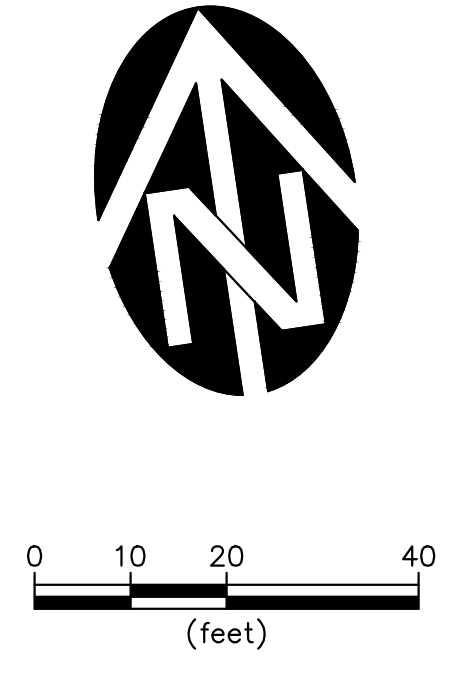
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<b>WESTECH ENGINEERING, INC.</b> CONSULTING ENGINEERS AND PLANNERS 3841 Fairview Industrial Dr. S.E., Suite 100, Salem, OR 97302 Phone: (503) 585-2474 Fax: (503) 585-3966 E-mail: westech@westech-eng.com	
<b>HOME FIRST DEVELOPMENT PARTNERS</b> <b>EROSION CONTROL NOTES &amp; DETAILS</b>	
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**REVIEW**  
 PROFESSIONAL ENGINEER  
 STEVEN H. STEVENSON  
 LICENSE NO. 16087  
 OREGON  
 6/20/2022

**WE**

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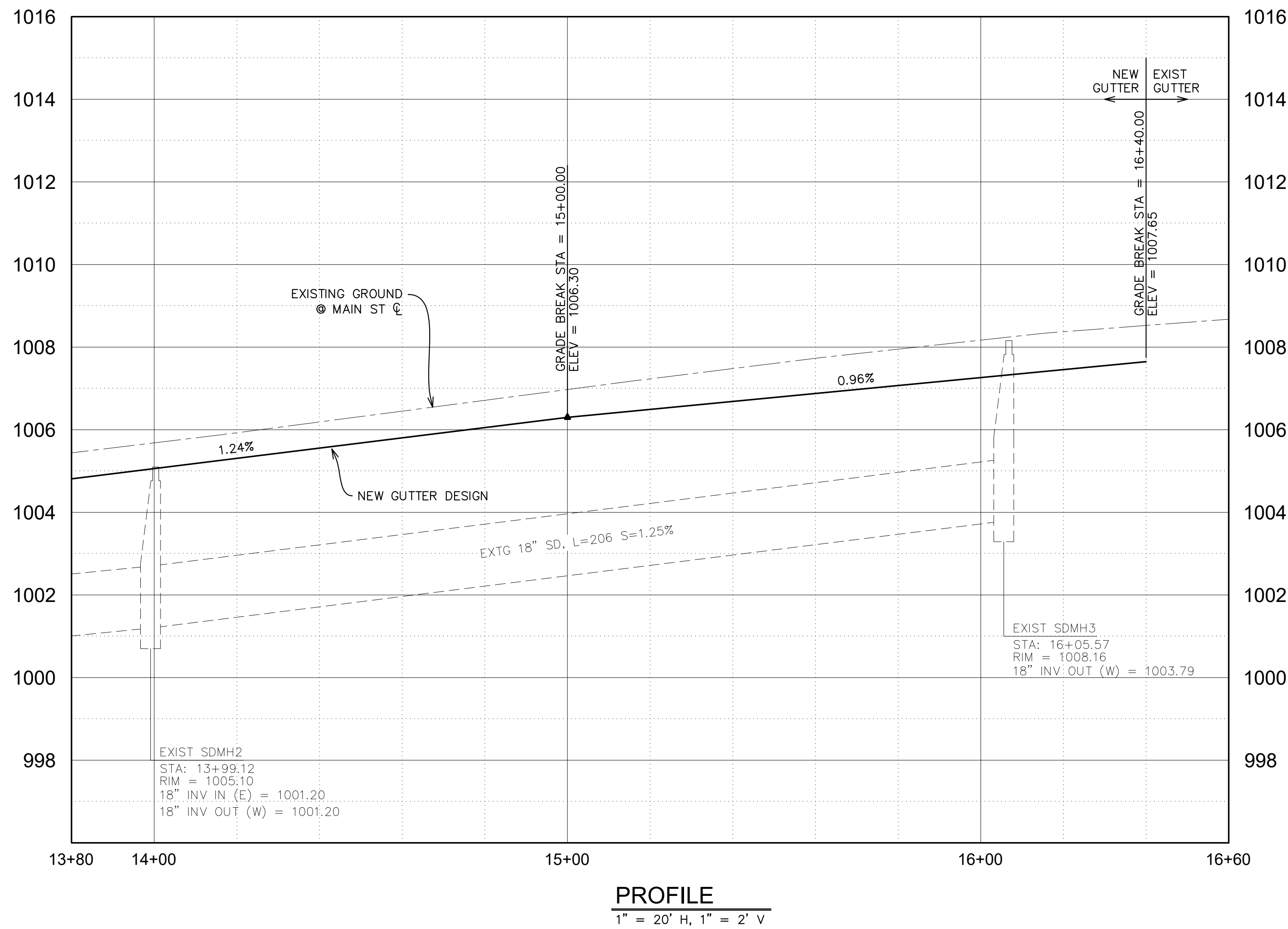
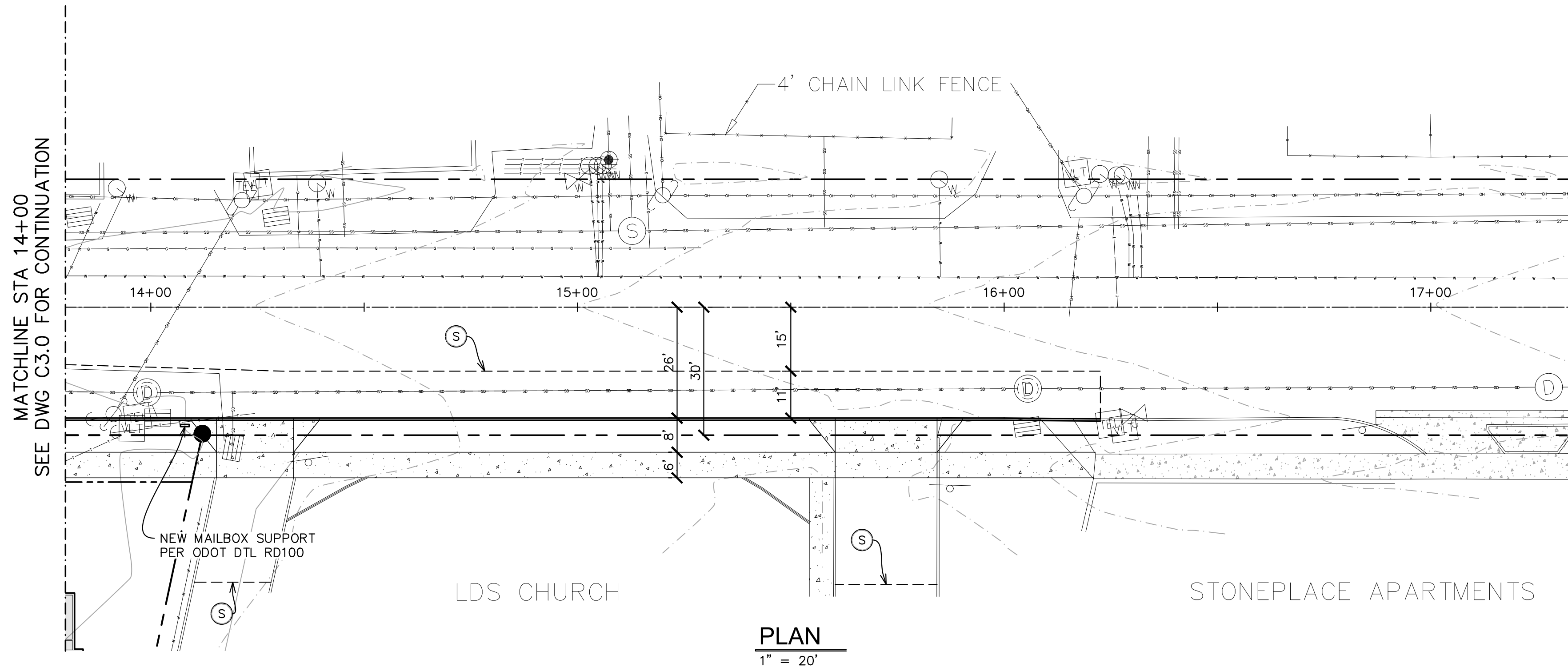
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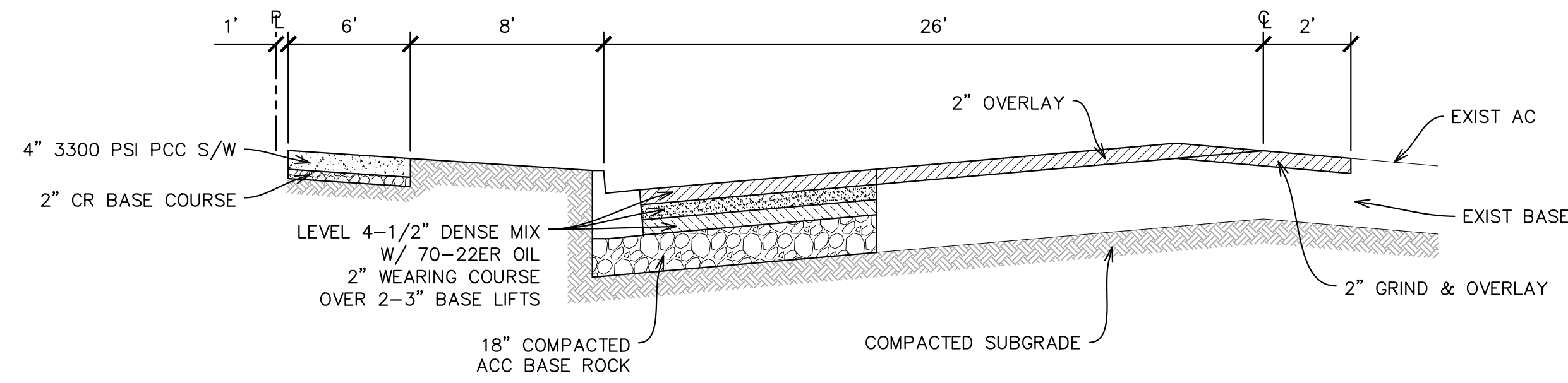
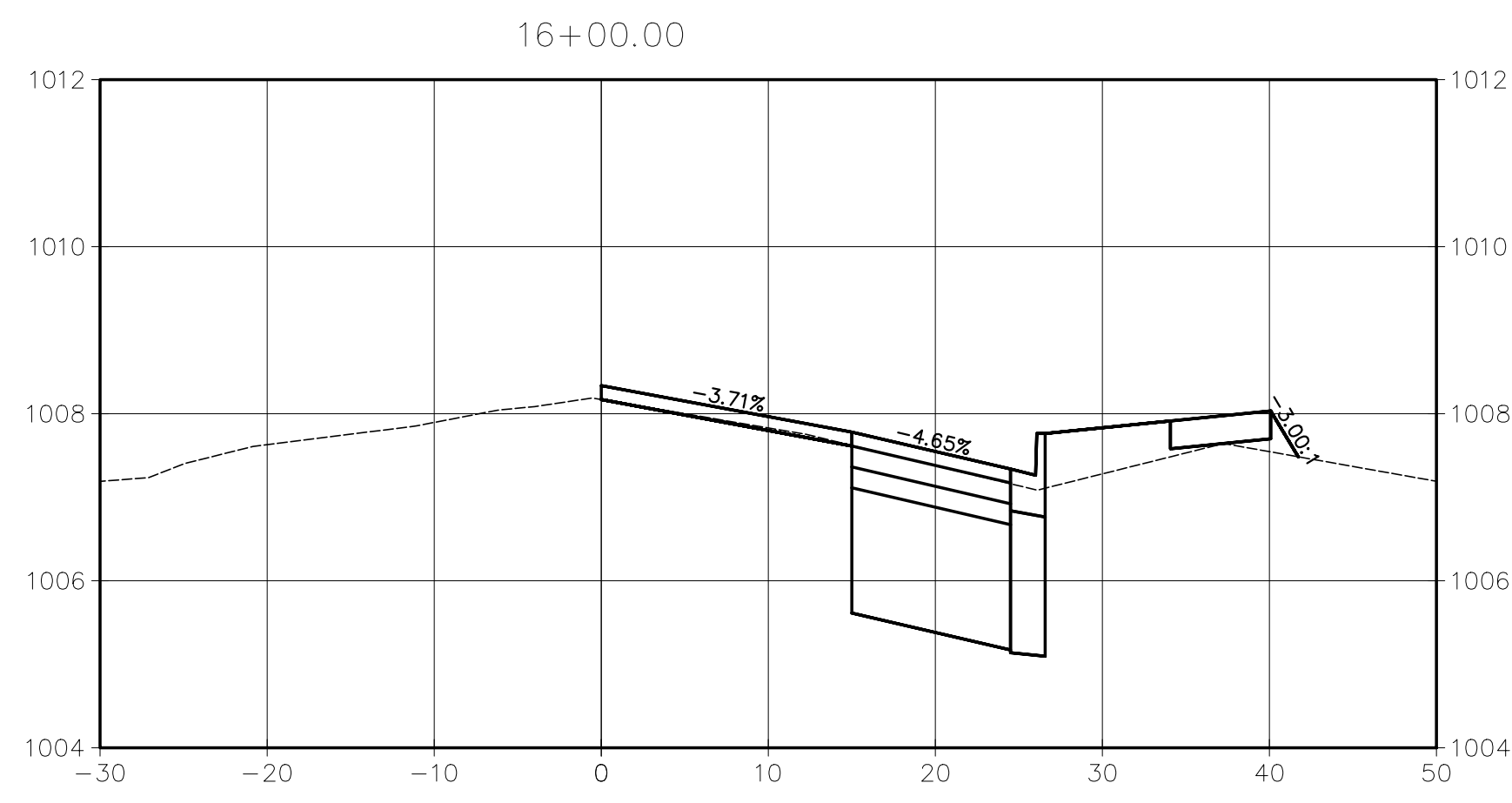
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**WESTTECH ENGINEERING, INC.**  
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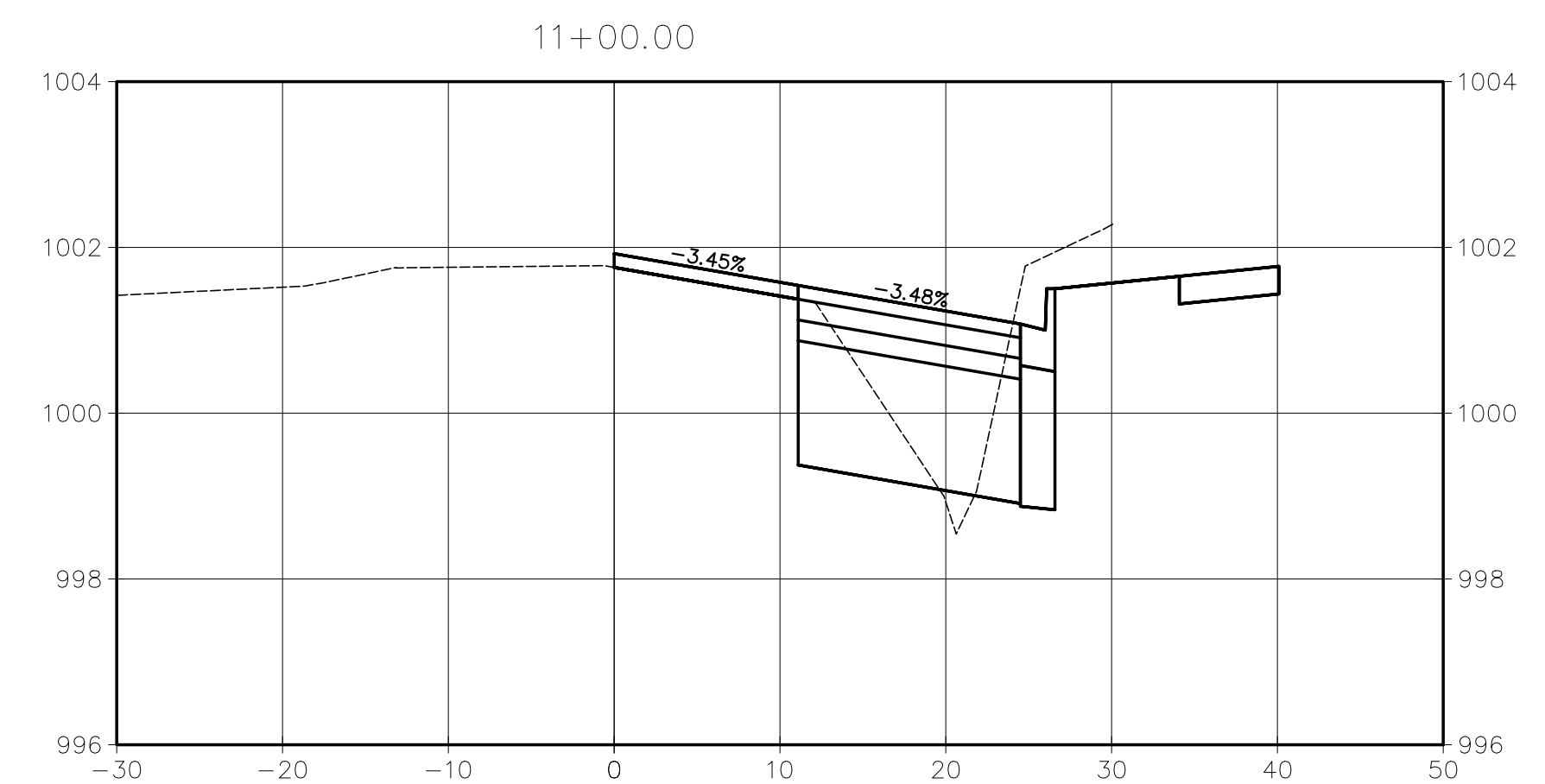
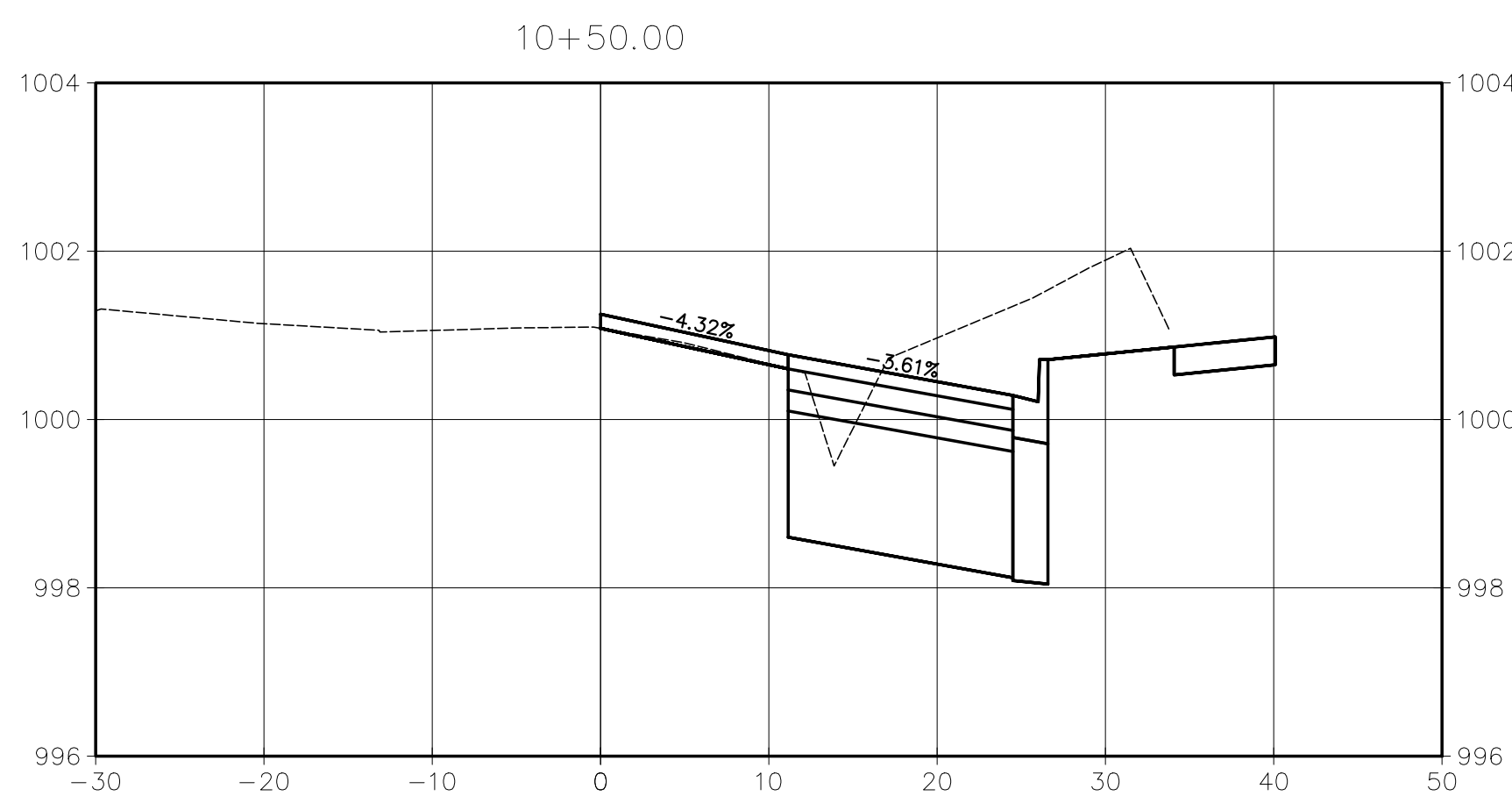
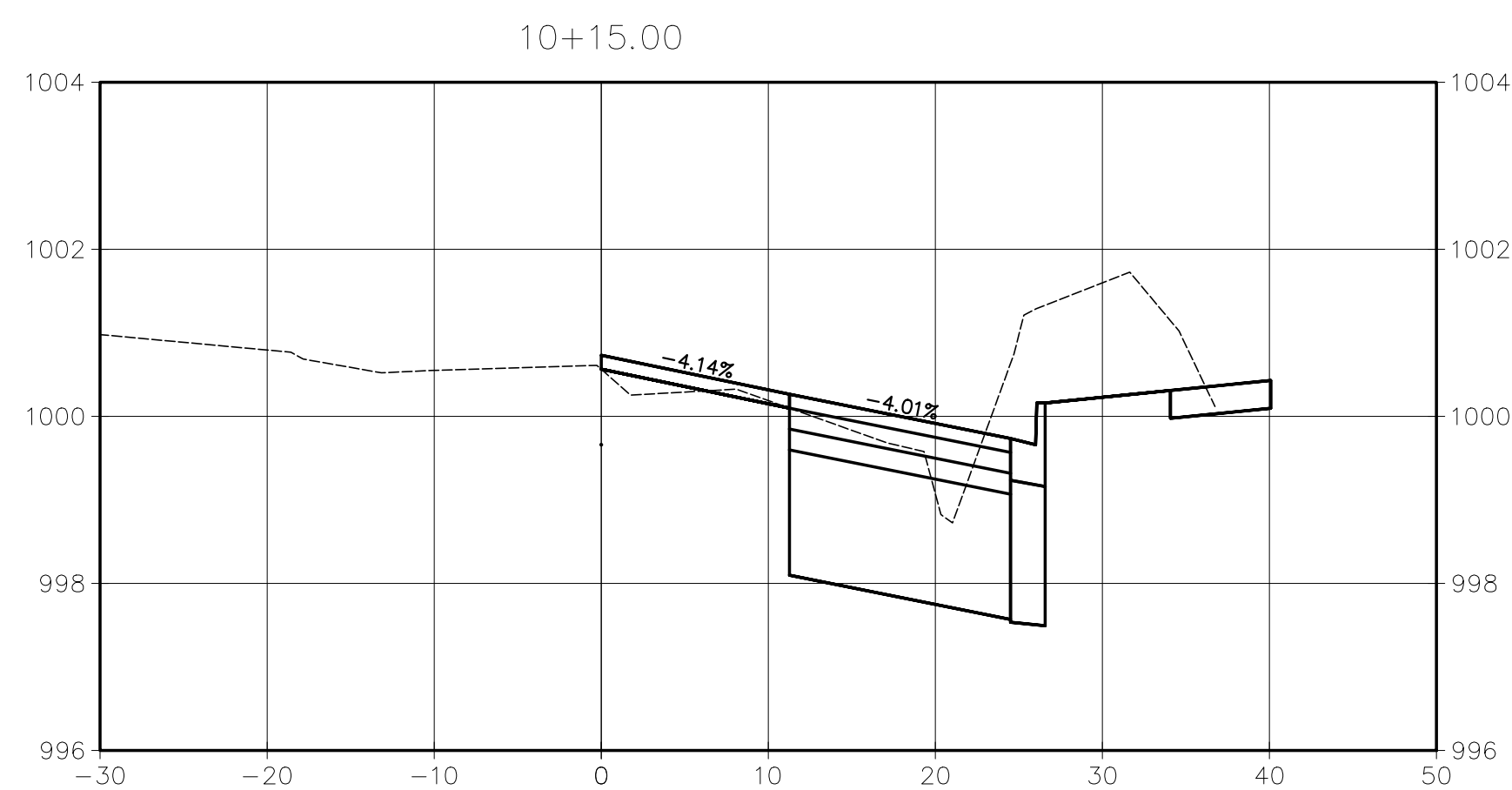
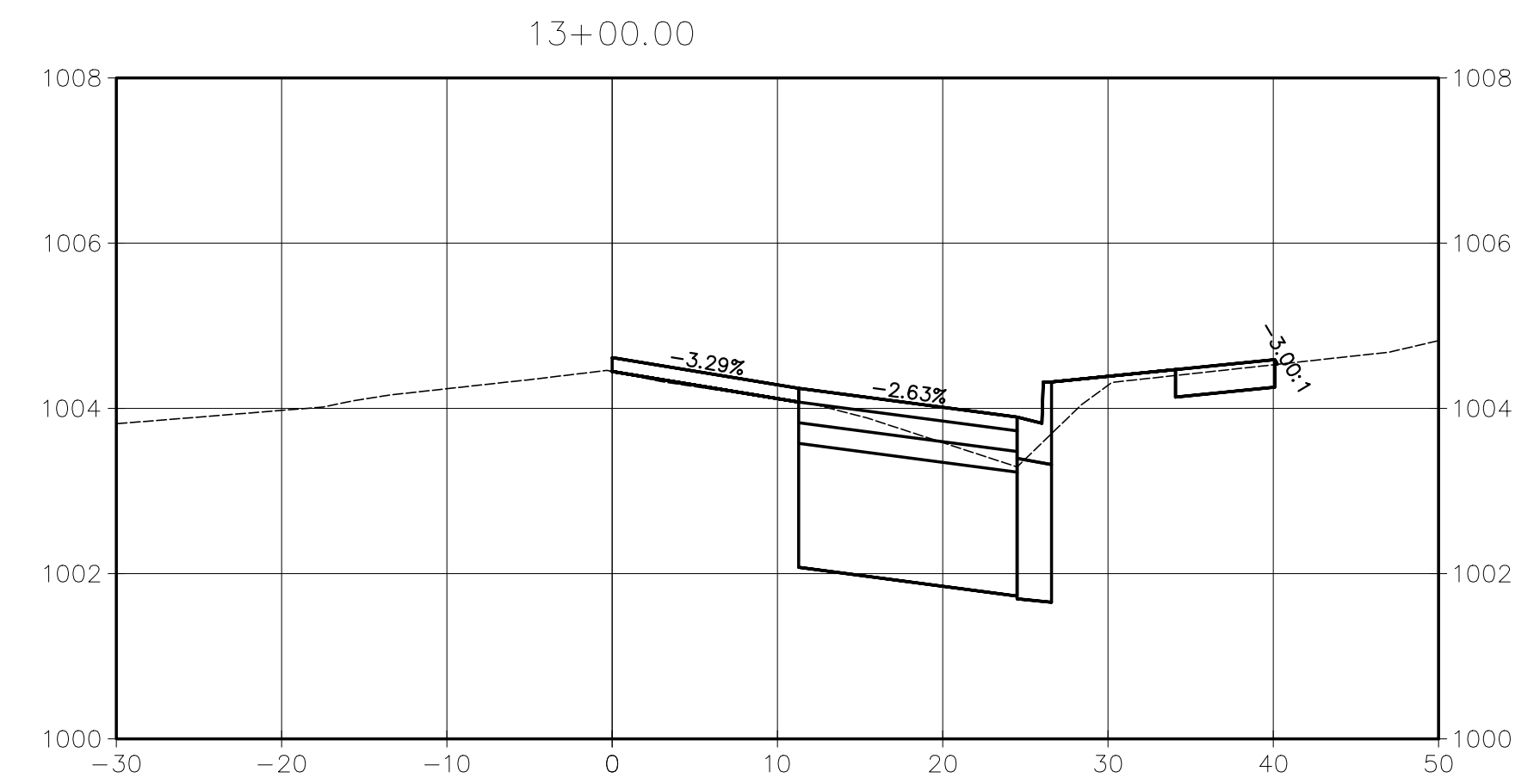
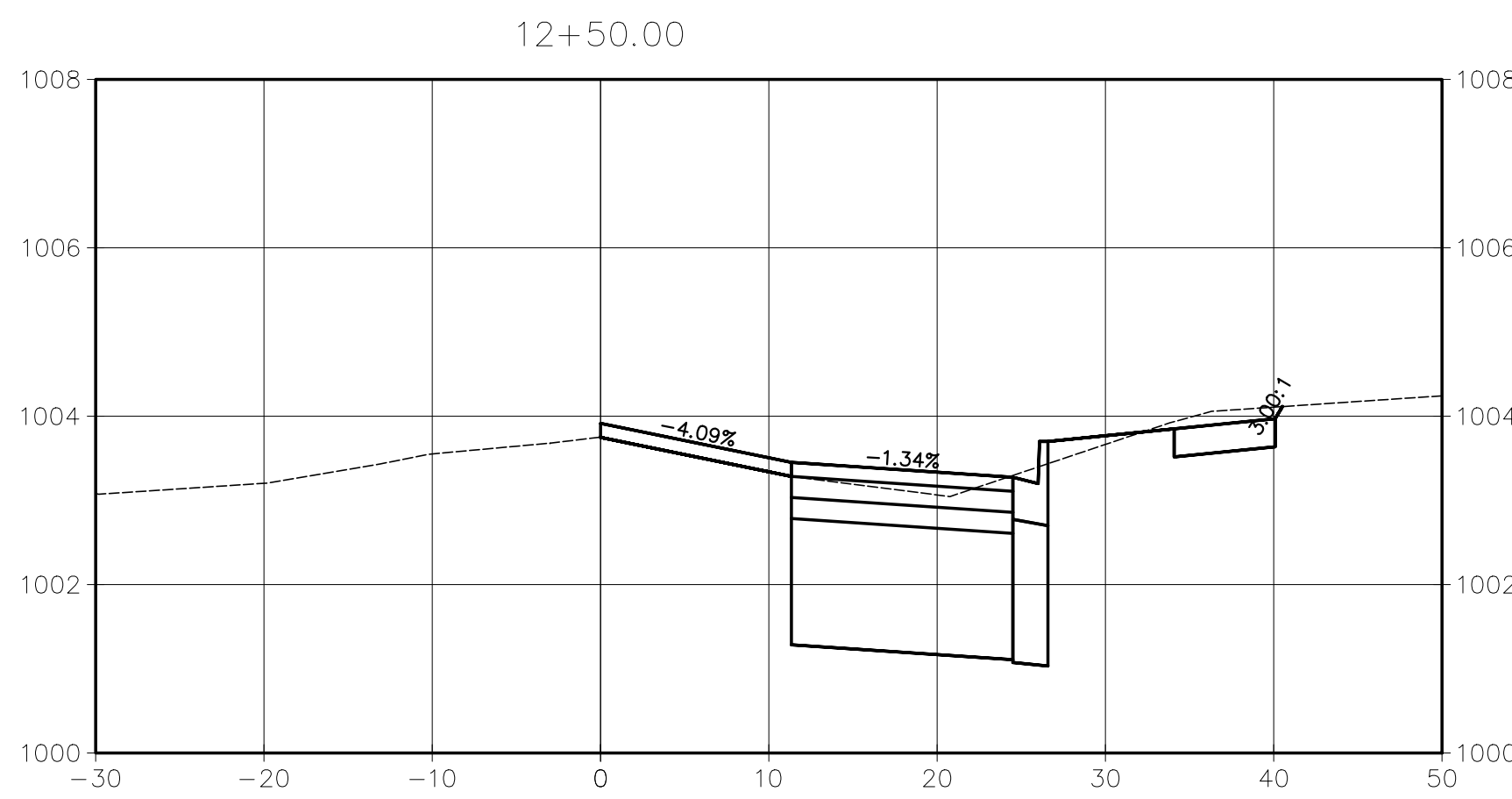
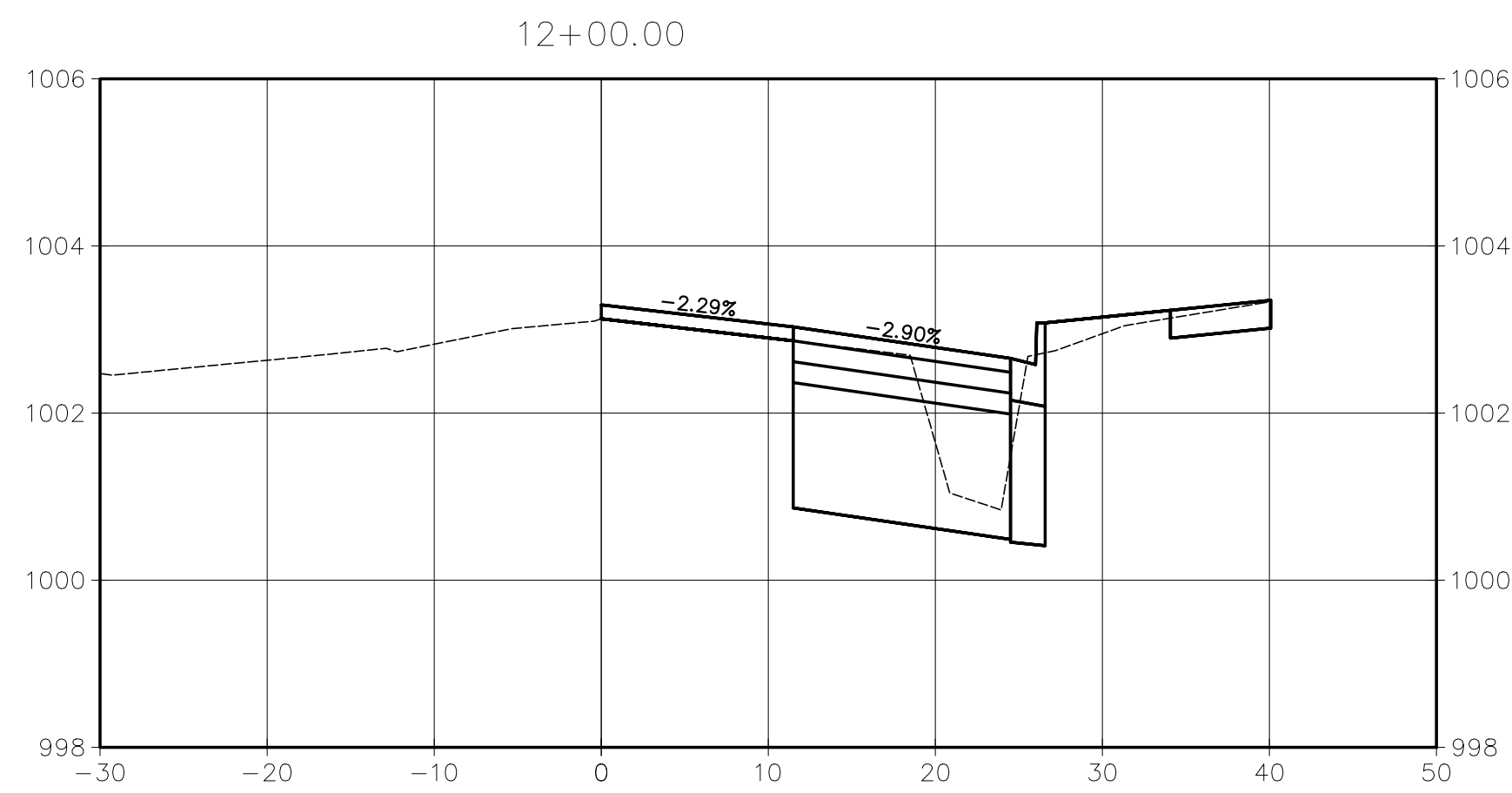
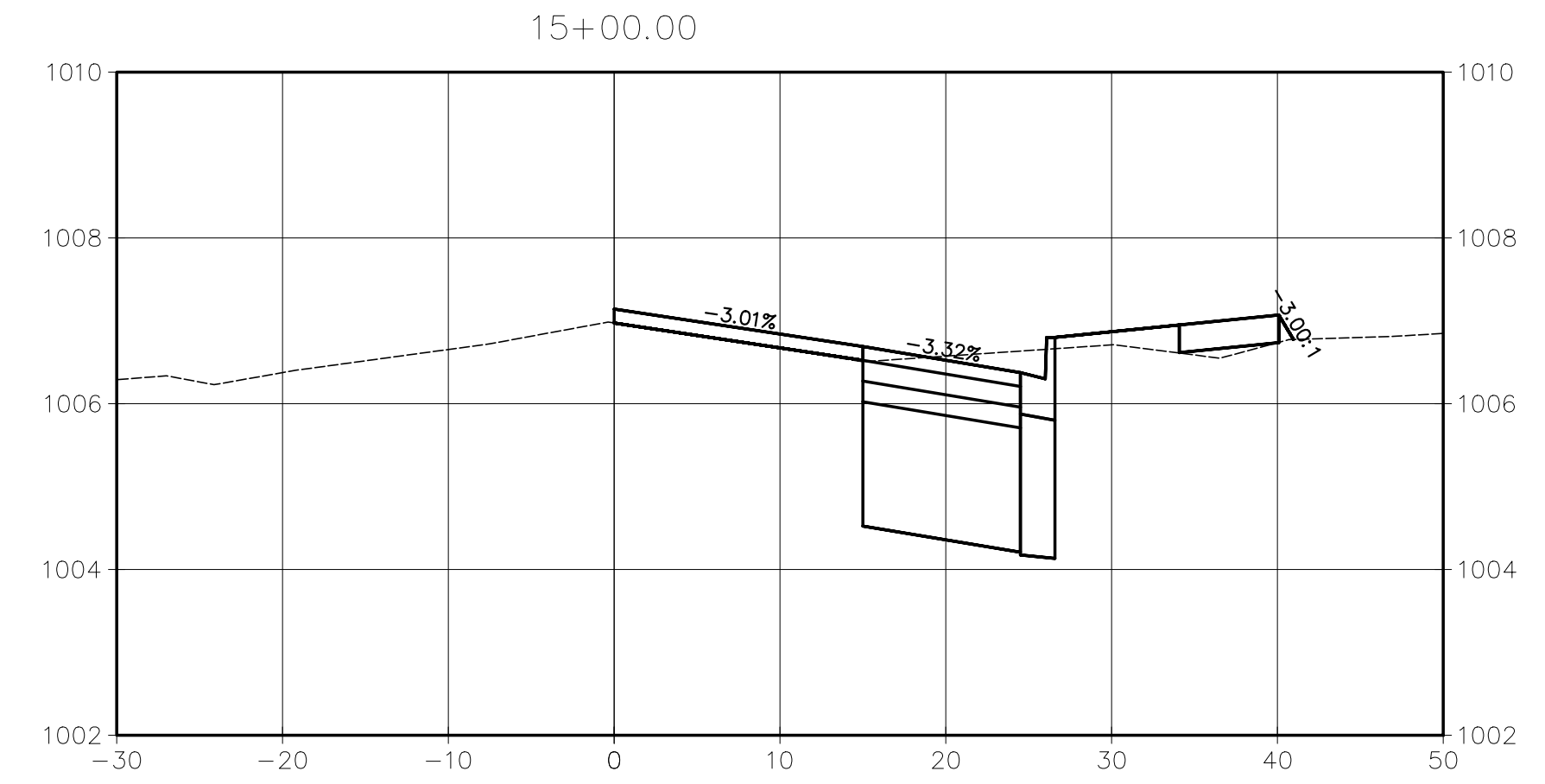
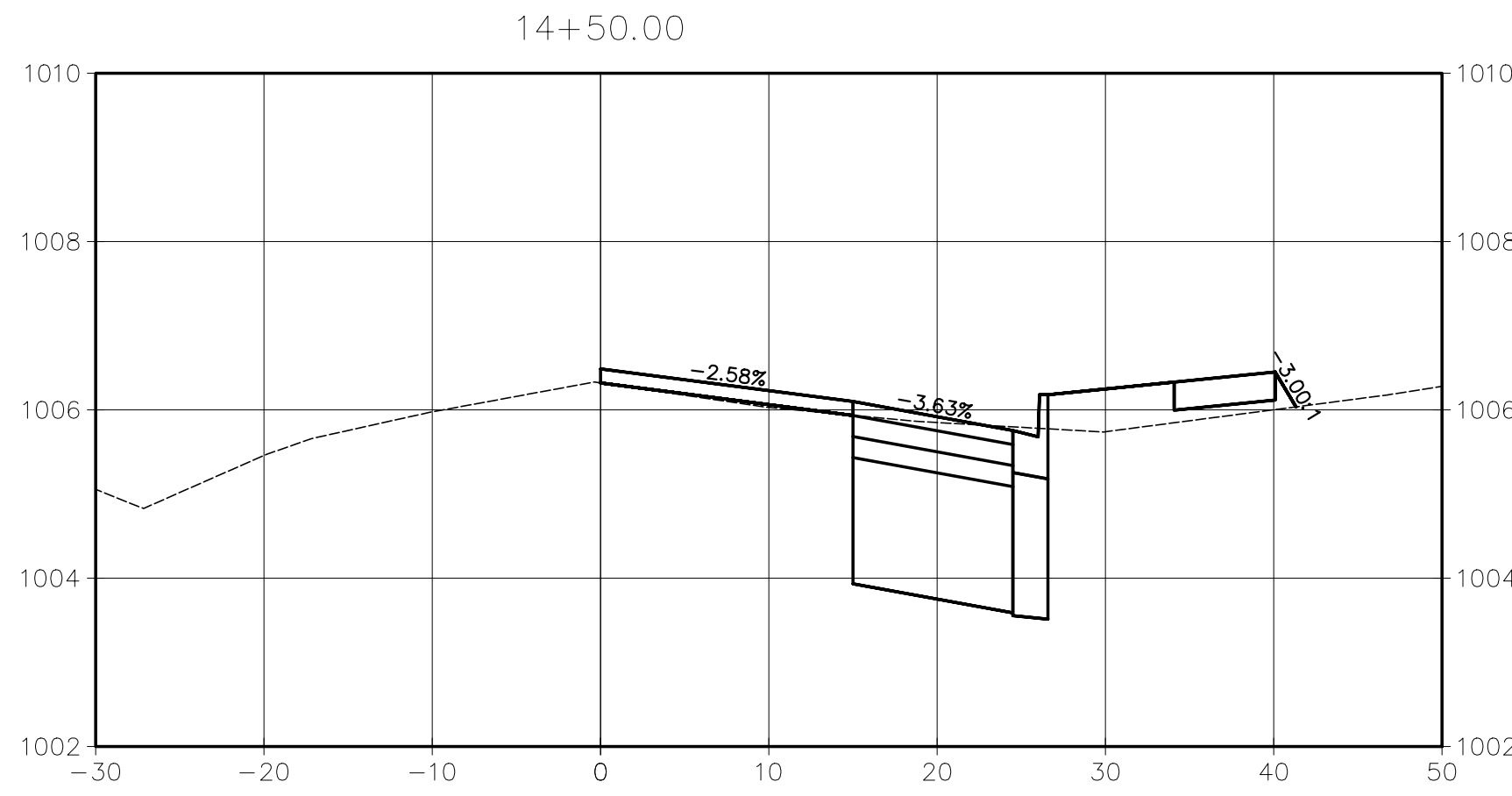
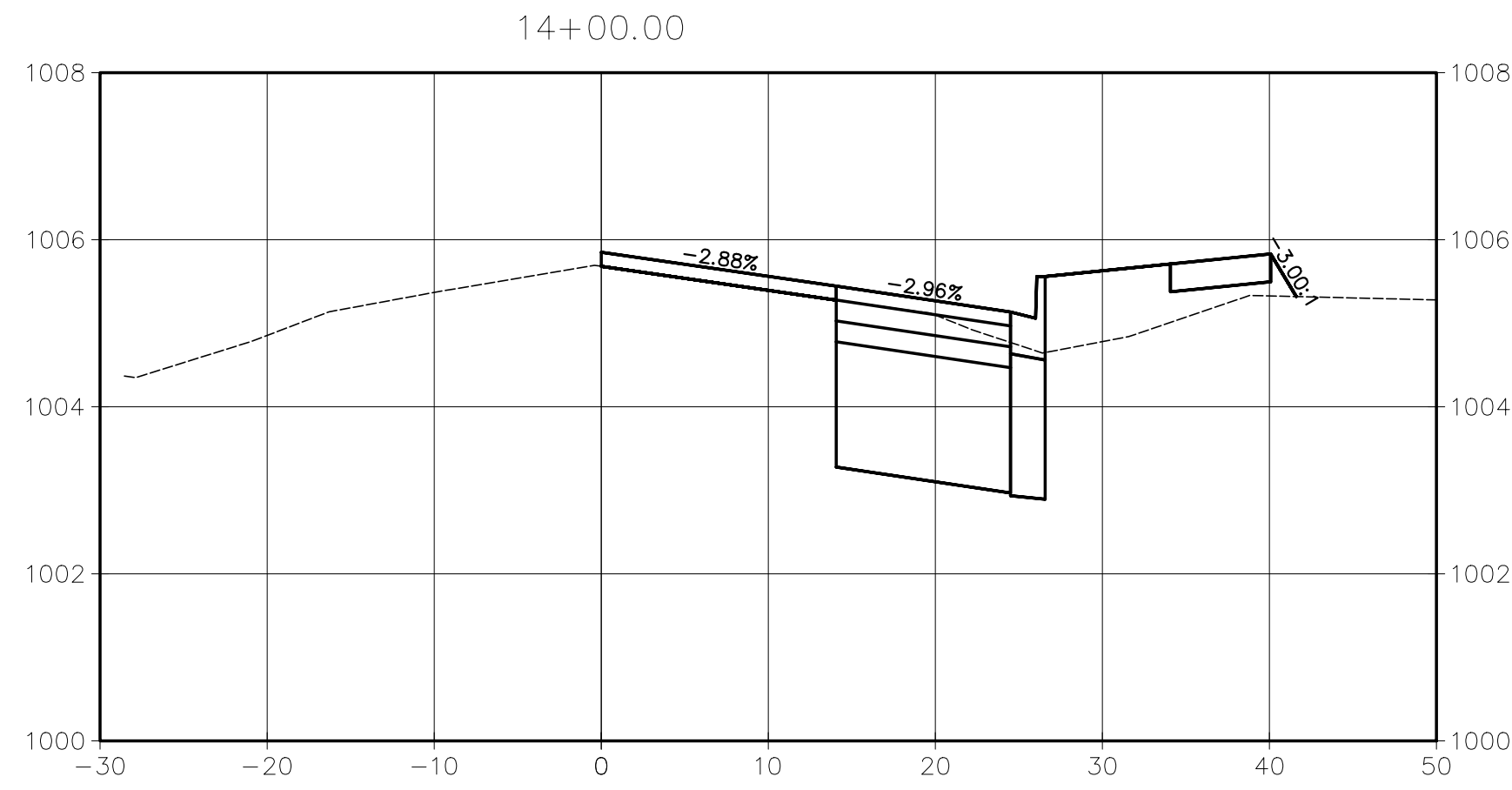
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**TYPICAL SECTION**  
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**CROSS SECTIONS**  
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CKD. SAW  
DATE: SEP 2021

REVIEW  
PROFESSIONAL ENGINEER  
STEVEN N. STEVENSON  
GHW 11.6  
RENEW: 6/20/2022

**WE**  
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HIGHWAY 211 IMPROVEMENTS  
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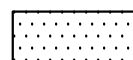
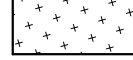
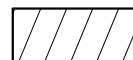
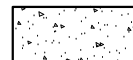

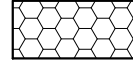




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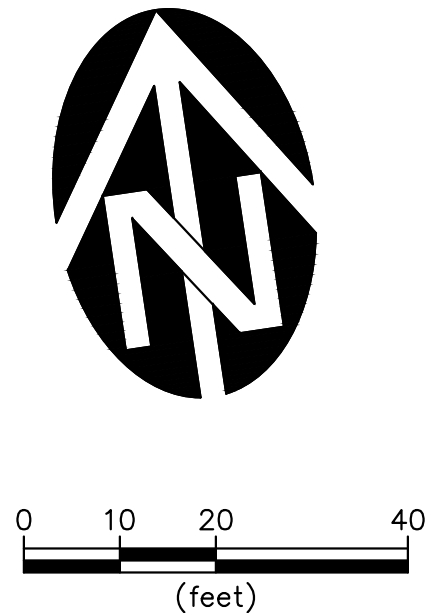
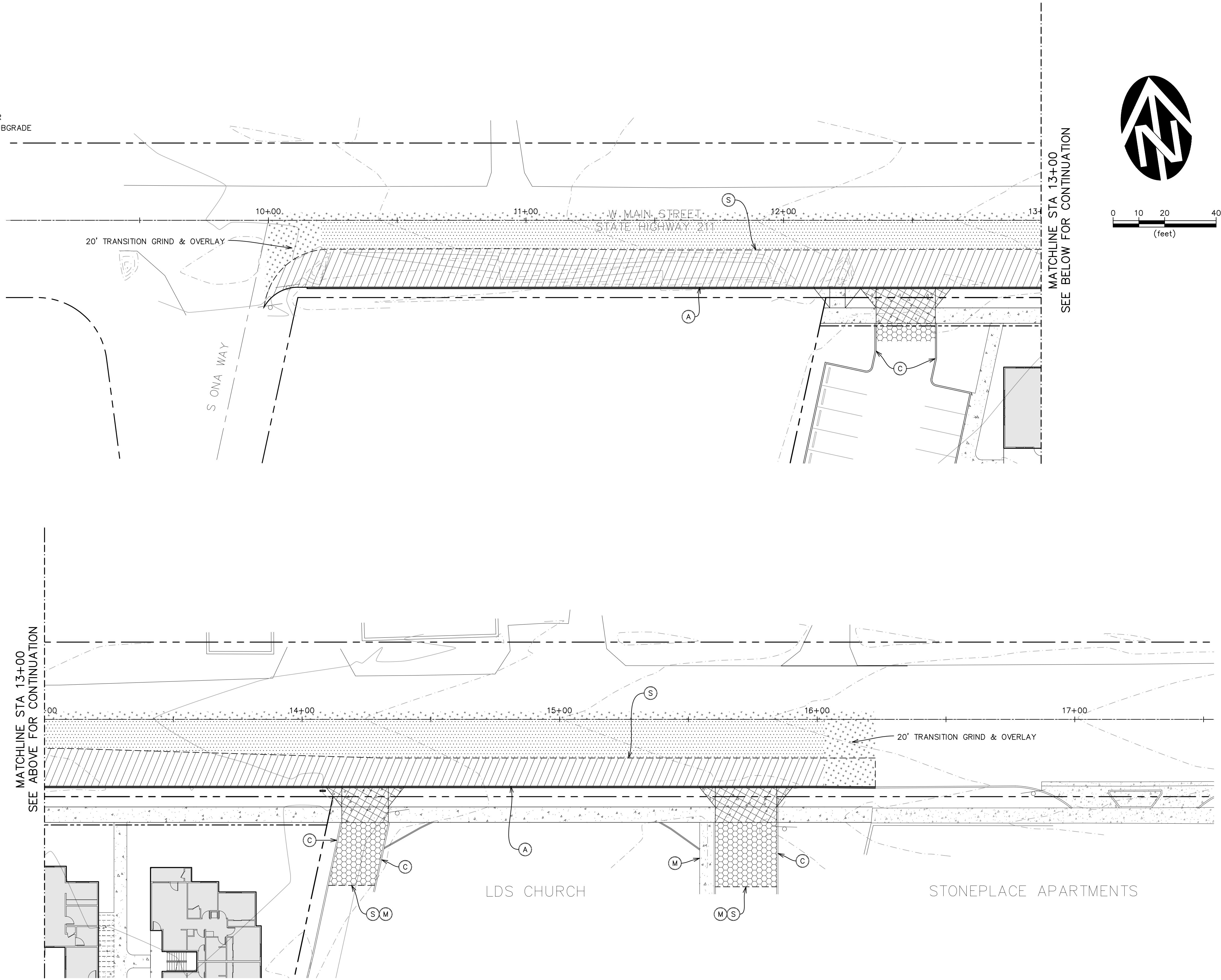
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**SURFACING**

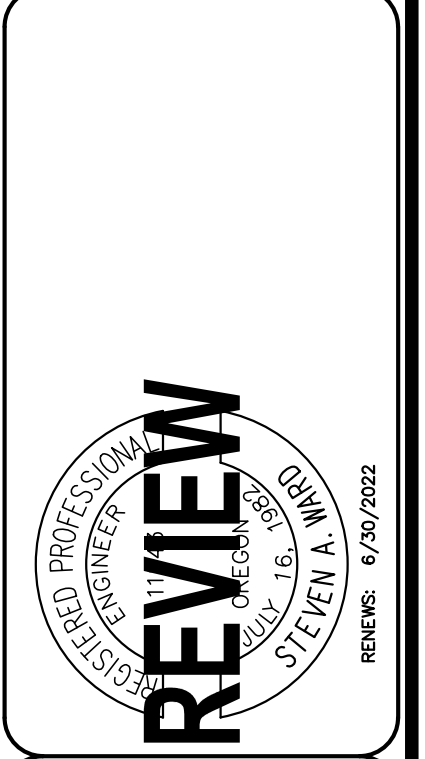
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-  **AC GRIND**
-  **A.C. PAVEMENT**  
7" AC (3 LIFTS 2½"-2½"-2") OVER  
18" CR BASE OVER COMPACTED SUBGRADE
-  **PCC SIDEWALK**  
4" 3300 PCC OVER 2" CR BASE  
OVER COMPACTED SUBGRADE
-  **NEW DRIVEWAY**  
6" 3500 PCC OVER 2" CR BASE  
OVER COMPACTED SUBGRADE
-  **COMMERCIAL DRIVEWAY**  
3" AC (1 LIFT) OVER 12" CR BASE  
OVER COMPACTED SUBGRADE
-  TYPE 'A' CURB & GUTTER
-  TYPE 'C' CURB
-  MATCH
-  SAWCUT



NO.	DATE	DESCRIPTION	BY
1	SEP 2021		

VERIFY SCALE  
 BAR IS ONE INCH ON  
 ORIGINAL DRAWING  
 IF NOT ONE INCH ON  
 SCALES ACCURACLY

DSN. SAW  
 DRN. AR  
 CKD. SAW  
 DATE: SEP 2021



**WESTTECH ENGINEERING, INC.**  
 CONSULTING ENGINEERS AND PLANNERS

3841 Fairview Industrial Dr. S.E., Suite 100, Salem, OR 97302  
 Phone: (503) 585-2474 Fax: (503) 585-3966  
 E-mail: westtech@westtech-eng.com

HIGHWAY 211 IMPROVEMENTS  
 HOME FIRST DEVELOPMENT PARTNERS

**SURFACING PLAN**

DRAWING  
**C4.0**

JOB NUMBER  
 3312.0000.0



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rd300.dgn 20-JUL-2020

**TABLE A**

"A" (in)	"B" (in)	"C" (in)	"D" (in)
4	10	4	8
6	10	4	8
8	10	6	10
10	10	6	10
12	12	6	10
15	12	6	10
18	16	6	12
21	16	6	12
24	18	6	12
30	18	6	12
36	24	6	14
42	24	6	14
48	24	6	14
54	24	6	14
60	24	6	14
66	24	6	14
72	24	6	14

For pipes over 72" diameter, see general note 3.

**MULTIPLE INSTALLATIONS**

DIAMETER	MIN. SPACE BETWEEN PIPES
Up to 48"	24"
48" to 72"	One half (1/2) dia. of pipe

**GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:**

- Surfacing of paved areas shall comply with street cut Std. Dwg. RD302.
- For pipe installation in embankment areas where the trench method will not be used and the pipe is  $\geq 36"$  diameter, increase dimension "B" to nominal pipe diameter.
- Pipes over 72" diameter are structures, and are not applicable to this drawing.
- See Std. Dwg. RD336 for tracer wire details (When required).

Effective Date: December 1, 2021 – May 31, 2022

RD300

2021

rd100.dgn 20-JUL-2020

**CONCRETE COLLAR**  
(See general note 4)

**MULTIPLE SUPPORT**  
(Supports 5 standard (Sizes 1 & 1 1/2) mailboxes or 4 large (Size 2) mailboxes)

**ADAPTOR PLATE (14 ga.)**

**SIZE 1 & 1 1/2 MOUNTING BRACKET (16 ga.)**

**SIZE 2 MOUNTING BRACKET (16 ga.) WITH ADAPTOR PLATE (14 ga.)**

**POST MOUNTING SOCKET**

**DETAIL A**

**DETAIL B**

**TABLE A**

MAILBOX LOCATION	MIN. TYP. SUPPORT DIA.	MIN. TYP. SUPPORT HT.
Through new or existing A.C.	2'-0"	2'-0"
Through well consolidated material	2'-0"	2'-6"
Through new rock surfacing & subgrade	2'-6"	2'-0" conc. collar
Through new rock surfacing & subgrade, subject to saturated soil or freeze/thaw conditions	2'-6"	2'-6" conc. collar

\* Use 2'-6" with size 2 mailbox.  
 \*\* Use if conditions are severe.

rd101.dgn 20-JUL-2020

Effective Date: December 1, 2021 – May 31, 2022

RD100

2021

rd100.dgn 20-JUL-2020

**SECTION A-A**

**MAILBOX SERVICE TURNOUT**

**SINGLE SUPPORT**

**FRONT**

**SIDE**

**MAILBOX SERVICE TURNOUT AFTER APPROACH**

**MAILBOX SERVICE TURNOUT BEFORE APPROACH**

**NEWSPAPER BOX MOUNTING DETAIL**

**NEWSPAPER BOX MOUNTING BRACKET DETAIL (14 ga.)**

**TABLE A**

MAILBOX LOCATION	MIN. TYP. SUPPORT DIA.	MIN. TYP. SUPPORT HT.
Through new or existing A.C.	2'-0"	2'-0"
Through well consolidated material	2'-0"	2'-6"
Through new rock surfacing & subgrade	2'-6"	2'-0" conc. collar
Through new rock surfacing & subgrade, subject to saturated soil or freeze/thaw conditions	2'-6"	2'-6" conc. collar

\* Use 2'-6" with size 2 mailbox.  
 \*\* Use if conditions are severe.

rd101.dgn 20-JUL-2020

Effective Date: December 1, 2021 – May 31, 2022

RD101

2021

rd300.dgn 20-JUL-2020

**GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:**

- All existing AC or PCC pavement shall be sawcut prior to repaving.
- Concrete pavement shall be replaced with concrete to a minimum thickness of 8" or to the thickness of removed pavement, whichever is greater.
- For joining new concrete to existing concrete, see contract plans for specific details.
- Place AC mix minimum thkn. of 6" or the thkn. of the removed pavement, whichever is greater. Compact as specified.

rd302.dgn 20-JUL-2020

Effective Date: December 1, 2021 – May 31, 2022

RD302

2021

VERIFY SCALE  
 BAR IS ONE INCH ON ORIGINAL DRAWING  
 IF NOT ONE INCH ON SCALES ACCURACIES

NO.	DATE	DESCRIPTION	BY
1			

DATE: SEP 2021

**WESTTECH ENGINEERING, INC.**  
 CONSULTING ENGINEERS AND PLANNERS

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 E-mail: westtech@westtech-eng.com

**ODOT DETAILS**

**DRAWING C6.0**

**JOB NUMBER 3312.0000.0**

**MANHOLE WITH PRECAST CONICAL TOP**  
 (See general note 7)

**MANHOLE WITH PRECAST FLAT SLAB TOP**  
 (See general note 5)

**DETAIL "A" TRACER WIRE**  
 (See general note 6)

**DETAIL "B" MANHOLE STEPS**  
 (See general note 7)

**DETAIL "C" PRECAST CONICAL TOP OR PRECAST FLAT SLAB TOP AND MANHOLE STEPS ORIENTATION**  
 (See general note 7)

**GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:**

- All precast products shall conform to requirements of ASTM C478.
- Standard precast manhole section diameter shall be 48". Use 42" if specified by the Engineer.
- See Std. Dwg. RD345 for pipe to manhole connections.
- See Std. Dwg. RD344 for manhole base section.
- Adjust 24" maximum.
- All connecting pipes shall have a tracer wire, or approved alternate.
- See Std. Dwg. RD336 for manhole steps.
- See Std. Dwg. RD336 for details not shown.
- See Std. Dwg. RD356 for manhole covers and frames, manhole adjustment rings, etc.
- Max. pipe diameter varies with pipe material.
- See Std. Dwg. RD342 for shallow manholes.
- Location, elevation, diameter, slope, and number of pipe(s) varies, see project plans.

**THESELECTION AND USE OF THIS STANDARD DRAWING, WHILE DESIGNED IN ACCORDANCE WITH GENERALLY ACCEPTED ENGINEERING PRINCIPLES AND PRACTICES, IS THE SOLE RESPONSIBILITY OF THE USER AND SHOULD NOT BE USED WITHOUT CONSULTING A REGISTERED PROFESSIONAL ENGINEER.**

Effective Date: December 1, 2021 – May 31, 2022

**MANHOLE WITH PRECAST CONICAL TOP**  
 (See general note 7)

**MANHOLE WITH PRECAST FLAT SLAB TOP**  
 (See general note 5)

**DETAIL "A" TRACER WIRE**  
 (See general note 6)

**DETAIL "B" MANHOLE STEPS**  
 (See general note 7)

**DETAIL "C" PRECAST CONICAL TOP OR PRECAST FLAT SLAB TOP AND MANHOLE STEPS ORIENTATION**  
 (See general note 7)

**GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:**

- All precast products shall conform to requirements of ASTM C478.
- Standard precast manhole section diameter shall be 48". Use 42" if specified by the Engineer.
- See Std. Dwg. RD345 for pipe to manhole connections.
- See Std. Dwg. RD344 for manhole base section.
- Adjust 24" maximum.
- All connecting pipes shall have a tracer wire, or approved alternate. Place tracer wire directly over pipe centerline and on top of the pipe zone material.
- Steps shall conform to requirements of ASTM C478. When H=42" or less omit steps. See Detail "C" for alignment of steps, and manhole cover and frame.
- See Std. Dwg. RD335 for details not shown.
- See Std. Dwg. RD356 for manhole covers and frames, manhole adjustment rings, etc.
- Max. pipe diameter varies with pipe material.
- See Std. Dwg. RD342 for shallow manholes.
- See project plans for details not shown.

**THESELECTION AND USE OF THIS STANDARD DRAWING, WHILE DESIGNED IN ACCORDANCE WITH GENERALLY ACCEPTED ENGINEERING PRINCIPLES AND PRACTICES, IS THE SOLE RESPONSIBILITY OF THE USER AND SHOULD NOT BE USED WITHOUT CONSULTING A REGISTERED PROFESSIONAL ENGINEER.**

Effective Date: December 1, 2021 – May 31, 2022

**SECTION A-A (Base, Riser & Flat Slab Top)**

**SECTION B-B (Base, Riser & Flat Slab Top)**

**LEGEND**  
 (See general note 3)

Cast-in-Place concrete  
 Precast concrete  
 1:2 cement mortar  
 Sewer pipe

**GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:**

- Minimum length if laterals or connections are inserted: outside diameter of pipe + 17".
- Use Section B-B when length of riser becomes less than minimum shown.
- Base may be precast or cast-in-place.
- All precast products shall conform to the requirements of ASTM C478.
- See Std. Dwg. RD336 for details not shown.
- See Std. Dwg. RD344 for manhole base section.
- See Std. Dwg. RD345 for pipe to manhole connections.
- See Std. Dwg. RD356 for manhole covers and frames.
- All concrete shall be commercial grade concrete.
- Max. pipe diameter varies with pipe material.
- Location, elevation, diameter, slope, and number of pipe(s) varies, see project plans.

**THESELECTION AND USE OF THIS STANDARD DRAWING, WHILE DESIGNED IN ACCORDANCE WITH GENERALLY ACCEPTED ENGINEERING PRINCIPLES AND PRACTICES, IS THE SOLE RESPONSIBILITY OF THE USER AND SHOULD NOT BE USED WITHOUT CONSULTING A REGISTERED PROFESSIONAL ENGINEER.**

Effective Date: December 1, 2021 – May 31, 2022

**SECTION A-A (Base, Riser & Flat Slab Top)**

**SECTION B-B (Base, Riser & Flat Slab Top)**

**LEGEND**  
 (See general note 3)

Cast-in-Place concrete  
 Precast concrete  
 1:2 cement mortar  
 Sewer pipe

**GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:**

- All concrete shall be commercial grade concrete.
- Channels shall be constructed to provide smooth slopes and radii to outlet pipe.
- Bases may be precast or cast in place.
- Max. pipe diameter varies with pipe material.
- Use on 42" and 48" diameter manhole.
- Extend pipe into manhole and grout smooth. Pipe(s) may extend 2" max. beyond the interior manhole wall.
- Location, elevation, diameter, slope, and number of pipe(s) varies, see project plans.
- All precast products shall conform to the requirements of ASTM C478.
- See Std. Dwg. RD345 for pipe to manhole connections.
- See Std. Dwg. RD336 for manhole steps details.
- See Std. Dwg. RD336 for tracer wire details.
- At spring line of pipe, extend channel up to crown line on 12:1 batter.

**THESELECTION AND USE OF THIS STANDARD DRAWING, WHILE DESIGNED IN ACCORDANCE WITH GENERALLY ACCEPTED ENGINEERING PRINCIPLES AND PRACTICES, IS THE SOLE RESPONSIBILITY OF THE USER AND SHOULD NOT BE USED WITHOUT CONSULTING A REGISTERED PROFESSIONAL ENGINEER.**

Effective Date: December 1, 2021 – May 31, 2022

VERIFY SCALE  
 BAR IS ONE INCH ON ORIGINAL DRAWING  
 IF NOT ONE INCH ON SCALES ACCURACLY

1" = 12' 0"

DSN. SAW  
 DRN. AR  
 CKD. SAW  
 DATE: SEP 2021

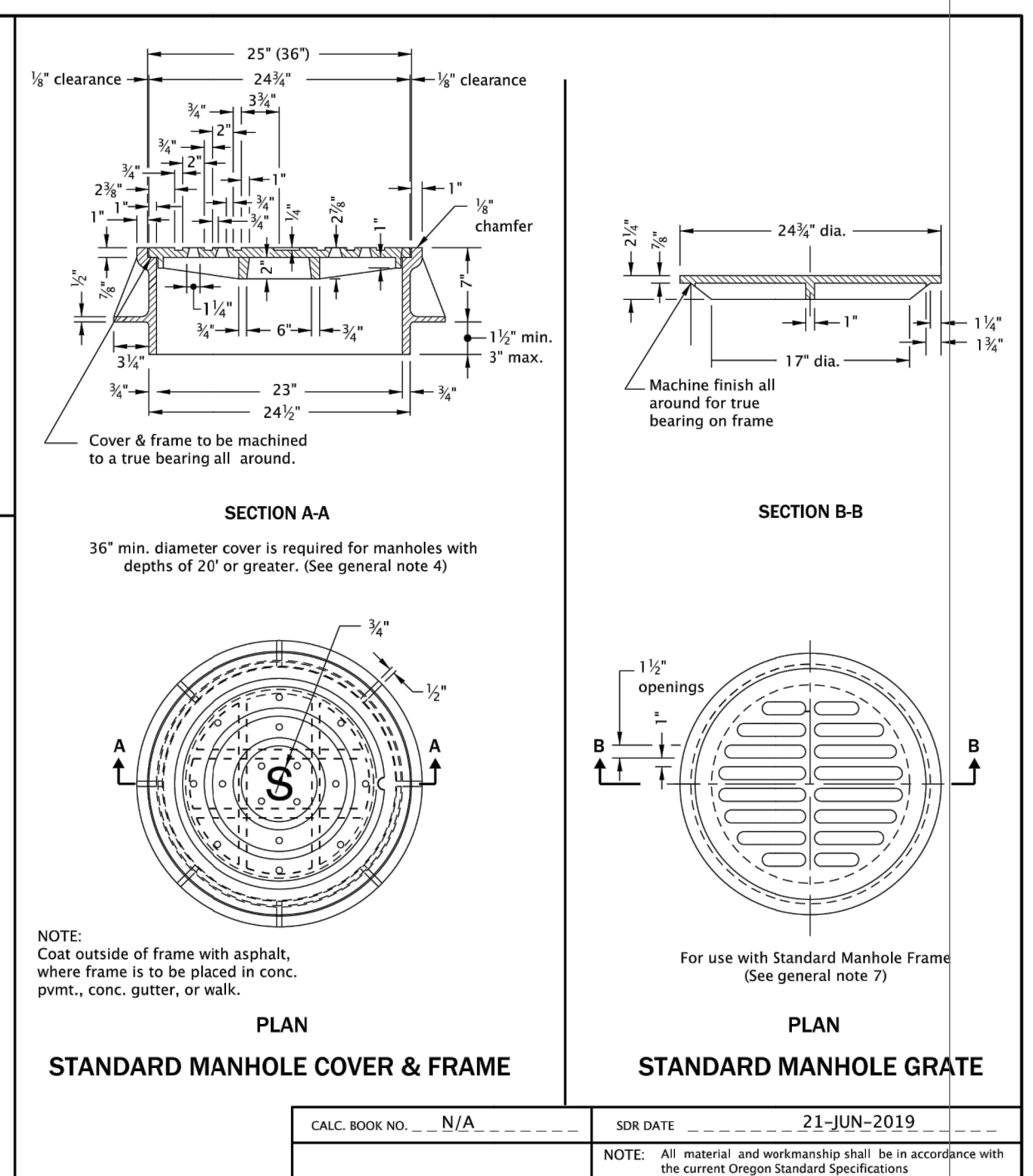
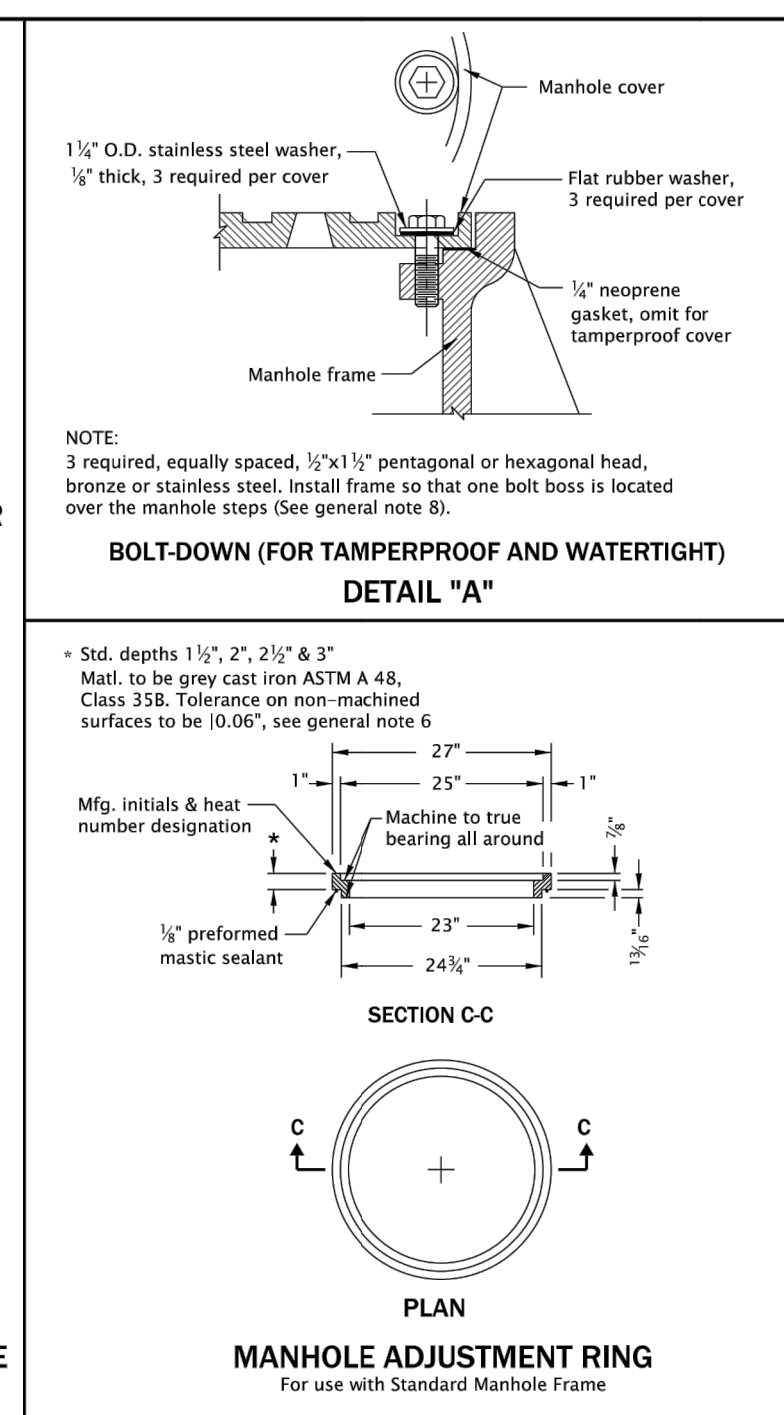
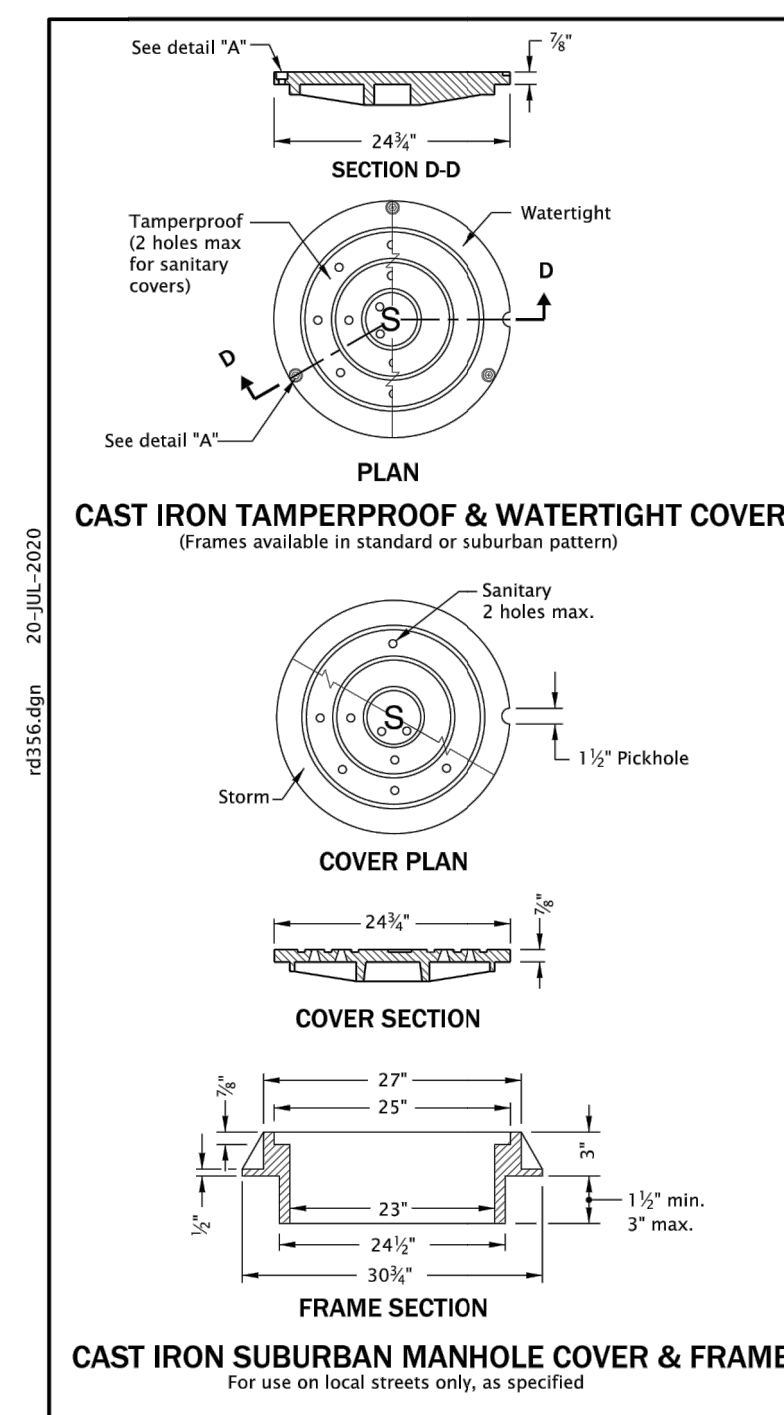
NO. 1  
 DATE  
 DESCRIPTION  
 REVISIONS

REGISTERED PROFESSIONAL ENGINEER  
**REVIEW**  
 STEVEN H. STEVENSON  
 OREGON REGISTERED PROFESSIONAL ENGINEER  
 No. 16,000

WESTTECH ENGINEERING, INC.  
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 E-mail: westtech@westtech-eng.com

HIGHWAY 211 IMPROVEMENTS  
 HOME FIRST DEVELOPMENT PARTNERS  
 ODOT DETAILS  
 DRAWING C6.1  
 JOB NUMBER 3312.0000.0

12/17/2021 12:57:18 PM  
 R:\Dwg\Home First Development Partners\Mollitia Highway - Main Street\Civil\Plots\06-0-8 Details.dwg - (06.2 tab)



**CAST IRON TAMPERPROOF & WATERTIGHT COVER**  
 (Frames available in standard or suburban pattern)

**CAST IRON SUBURBAN MANHOLE COVER & FRAME**  
 For use on local streets only, as specified

**MANHOLE ADJUSTMENT RING**  
 For use with Standard Manhole Frame

**DETAIL "A"**

NOTE:  
 3 required, equally spaced. 1/2"x1 1/2" pentagonal or hexagonal head, bronze or stainless steel. Install frame so that one bolt boss is located over the manhole steps (See general note 8).

**BOLT-DOWN (FOR TAMPERPROOF AND WATERTIGHT)**

\* Std. depths 1 1/2", 2", 2 1/2" & 3"  
 Matl. to be grey cast iron ASTM A 48, Class 35B. Tolerance on non-machined surfaces to be 0.005", see general note 6

**SECTION A-A**  
 36" min. diameter cover is required for manholes with depths of 20' or greater. (See general note 4)

**SECTION B-B**  
 For use with Standard Manhole Frame (See general note 7)

**PLAN**  
 STANDARD MANHOLE COVER & FRAME

**PLAN**  
 STANDARD MANHOLE GRATE

NOTE:  
 Coat outside of frame with asphalt, where frame is to be placed in conc. pvtmt., conc. gutter, or walk.

CALC. BOOK NO.	N/A	SOR DATE	21-JUN-2019
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications			
<b>OREGON STANDARD DRAWINGS</b>			
<b>MANHOLE COVERS AND FRAMES</b>			
DATE	2021	REVISION DESCRIPTION	

Effective Date: December 1, 2021 - May 31, 2022 RD356

**GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:**

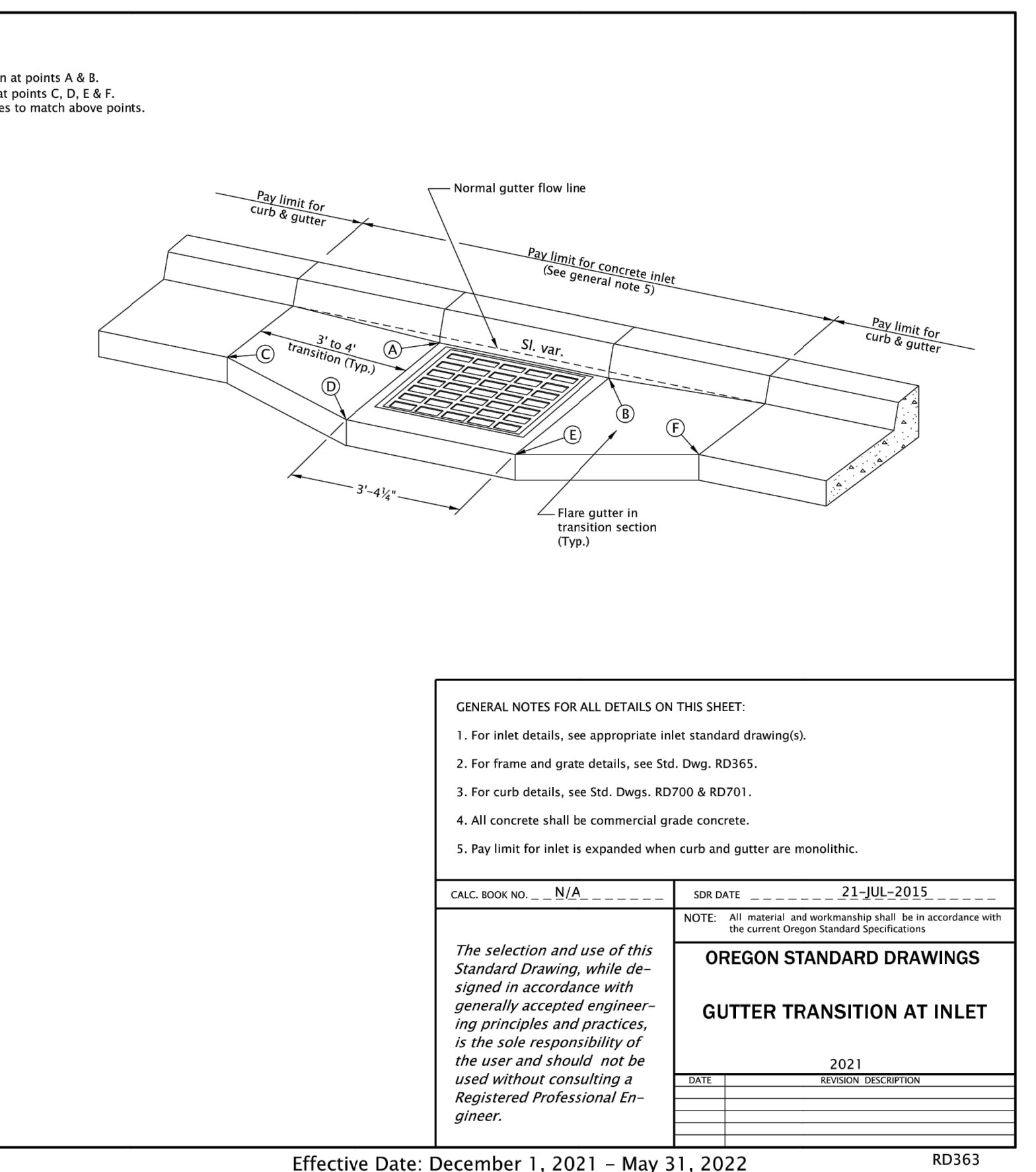
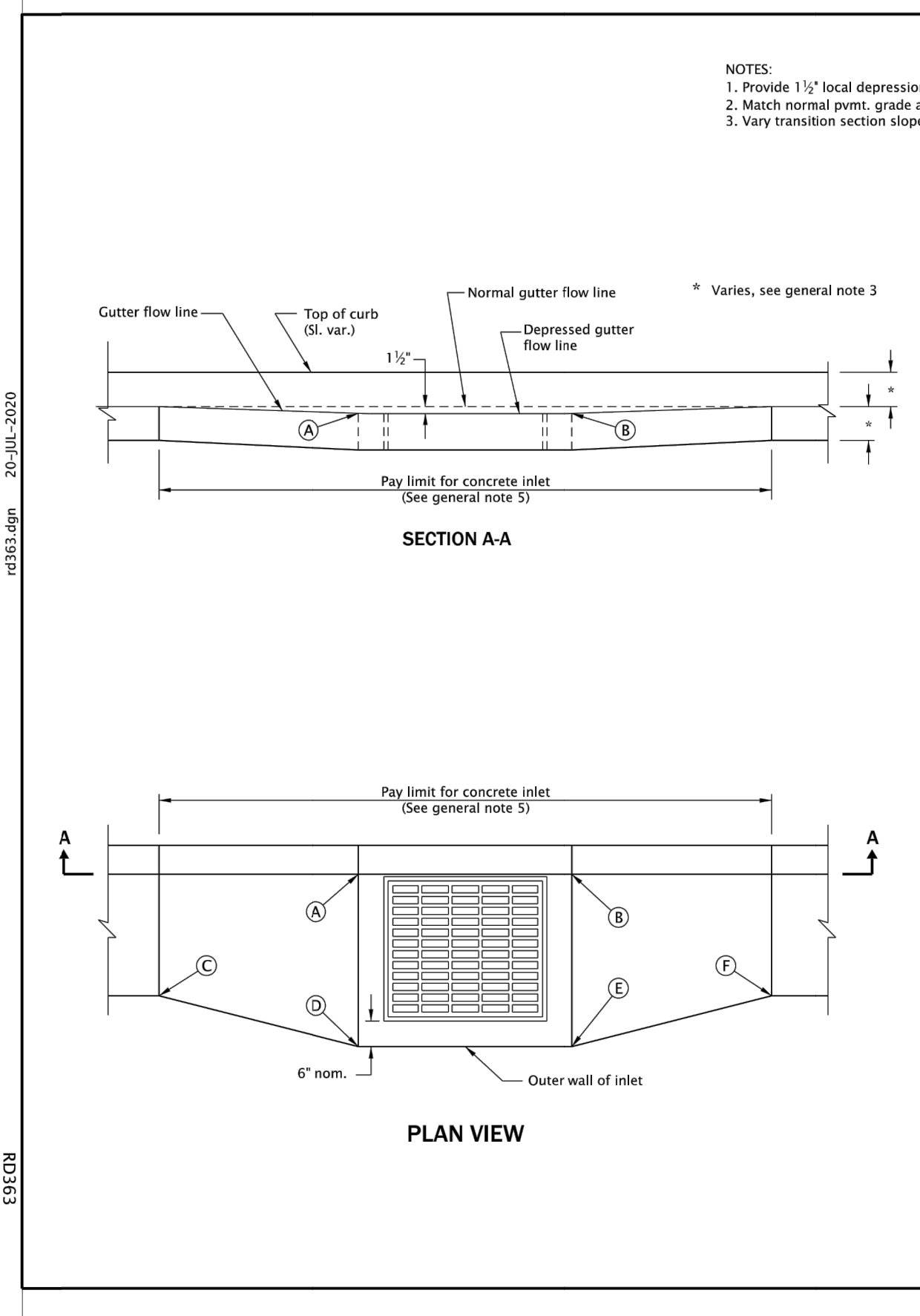
- Tamperproof covers required on sanitary or storm drain manhole where located in pedestrian ways or easement areas. Covers for sanitary manholes shall have 2 holes maximum.
- Watertight covers required if located where cover may be submerged (no holes).
- Covers and frames shall be stamped with manufacturer's initials, heat number and point of origin.
- See Std. Dwg. RD336 for manhole steps.
- See Std. Dwg. RD360 for manhole frame adjustment.
- Use ODOT's QPL for alternate manhole adjustment rings.
- Manhole grate allowed only in locations not subject to bicycle or pedestrian use.
- Use ODOT's QPL for alternate bolt-down products.

**GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:**

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

**GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:**

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications



**NOTES:**

- Provide 1/2" local depression at points A & B.
- Match normal pvtmt. grade at points C, D, E & F.
- Vary transition section slopes to match above points.

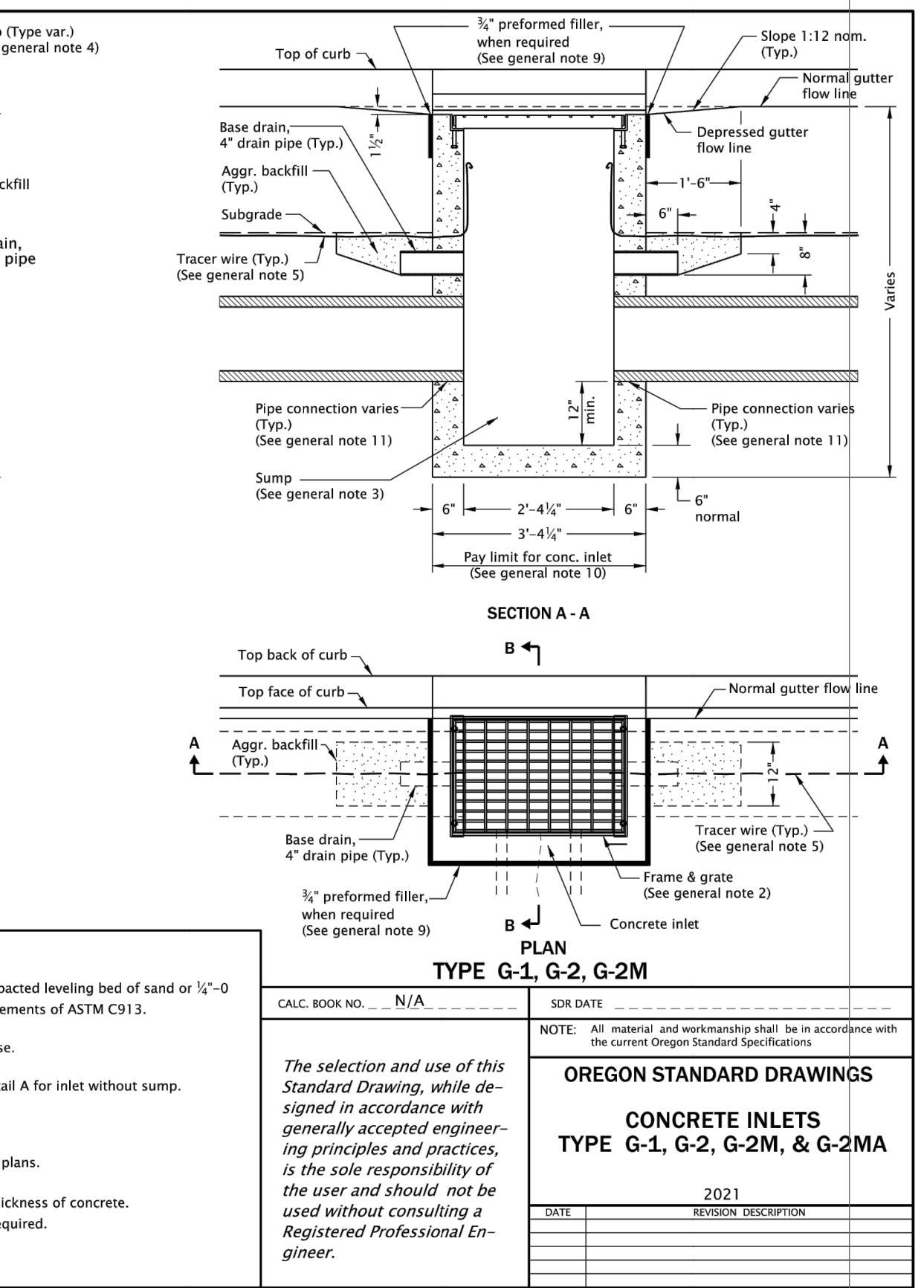
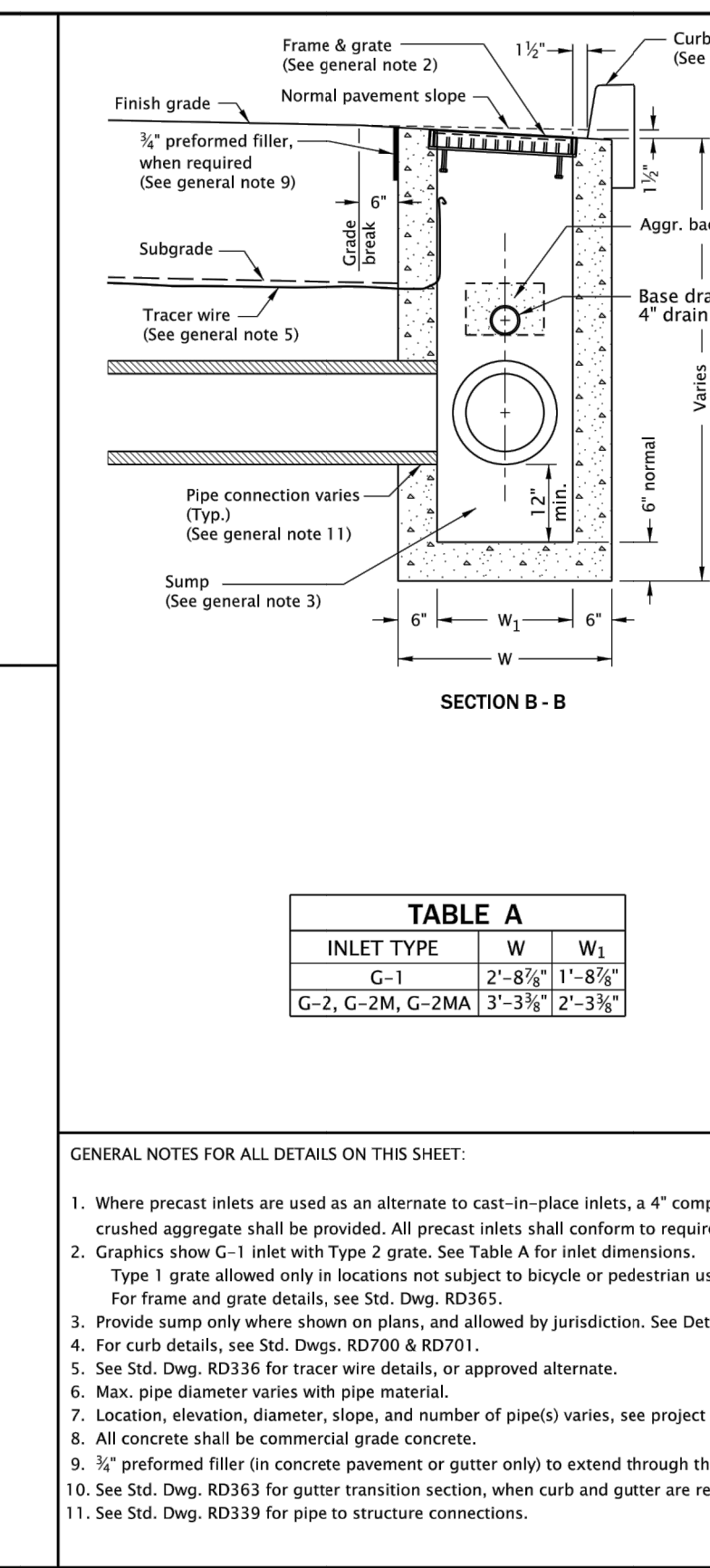
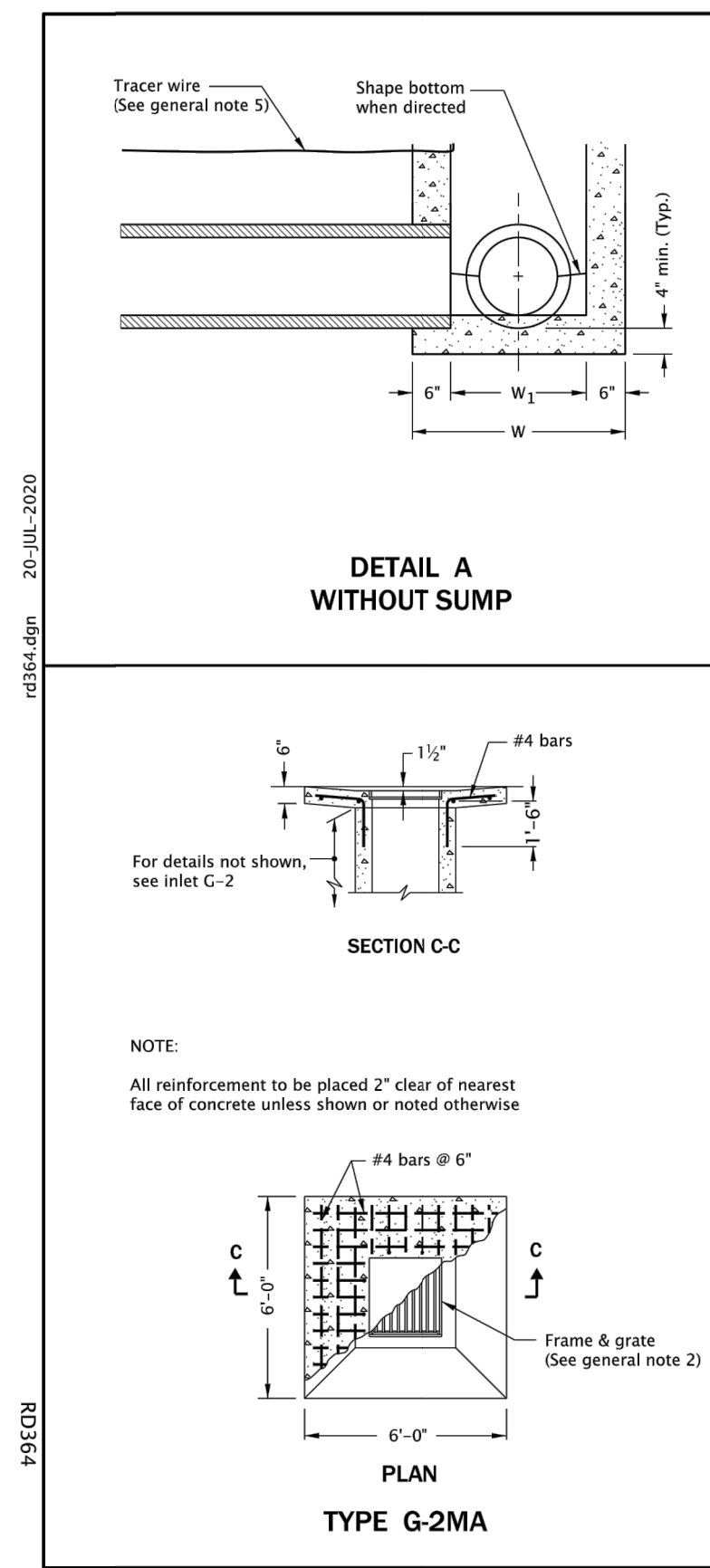
**GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:**

- For inlet details, see appropriate inlet standard drawings.
- For frame and grate details, see Std. Dwg. RD365.
- For curb details, see Std. Dwg. RD700 & RD701.
- All concrete shall be commercial grade concrete.
- Pay limit for inlet is expanded when curb and gutter are monolithic.

**NOTE:** All material and workmanship shall be in accordance with the current Oregon Standard Specifications

CALC. BOOK NO.	N/A	SOR DATE	21-JUL-2015
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications			
<b>OREGON STANDARD DRAWINGS</b>			
<b>GUTTER TRANSITION AT INLET</b>			
DATE	2021	REVISION DESCRIPTION	

Effective Date: December 1, 2021 - May 31, 2022 RD363



**DETAIL A WITHOUT SUMP**

**SECTION B-B**

**SECTION C-C**

NOTE:  
 All reinforcement to be placed 2" clear of nearest face of concrete unless shown or noted otherwise

**SECTION A-A**

**SECTION B-B**

**SECTION C-C**

**TABLE A**

INLET TYPE	W	W1
G-1	2'-8 7/8"	1'-8 7/8"
G-2, G-2M, G-2MA	3'-3 3/8"	2'-3 3/8"

**GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:**

- Where precast inlets are used as an alternate to cast-in-place inlets, a 4" compacted leveling bed of sand or 1/2"-0 crushed aggregate shall be provided. All precast inlets shall conform to requirements of ASTM C913.
- Graphics show G-1 inlet with Type 2 grate. See Table A for inlet dimensions.
- Type 1 grate allowed only in locations not subject to bicycle or pedestrian use.
- For frame and grate details, see Std. Dwg. RD365.
- For curb details, see Std. Dwg. RD700 & RD701.
- See Std. Dwg. RD336 for tracer wire details, or approved alternate.
- Max. pipe diameter varies with pipe material.
- Location, elevation, diameter, slope, and number of pipes) varies, see project plans.
- All concrete shall be commercial grade concrete.
- 1/2" preformed filler (in concrete pavement or gutter only) to extend through thickness of concrete.
- See Std. Dwg. RD363 for gutter transition section, when curb and gutter are required.
- See Std. Dwg. RD339 for pipe to structure connections.

**SECTION A-A**

**SECTION B-B**

**PLAN**  
 TYPE G-1, G-2, G-2M

CALC. BOOK NO. N/A SOR DATE 14-JUL-2014

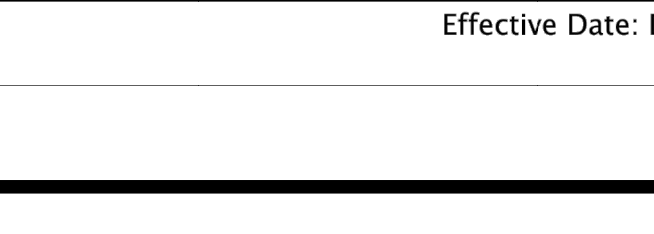
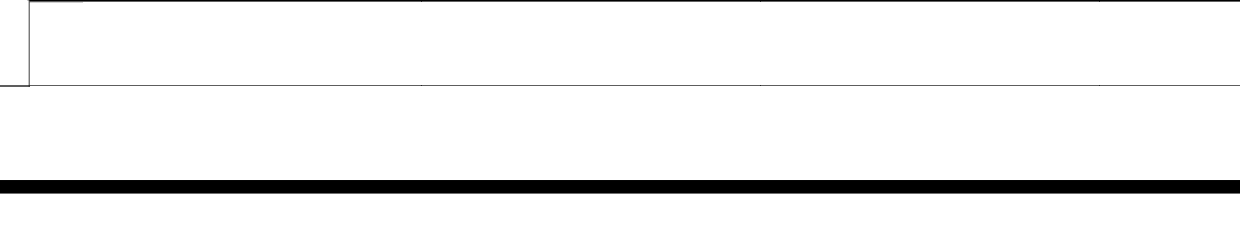
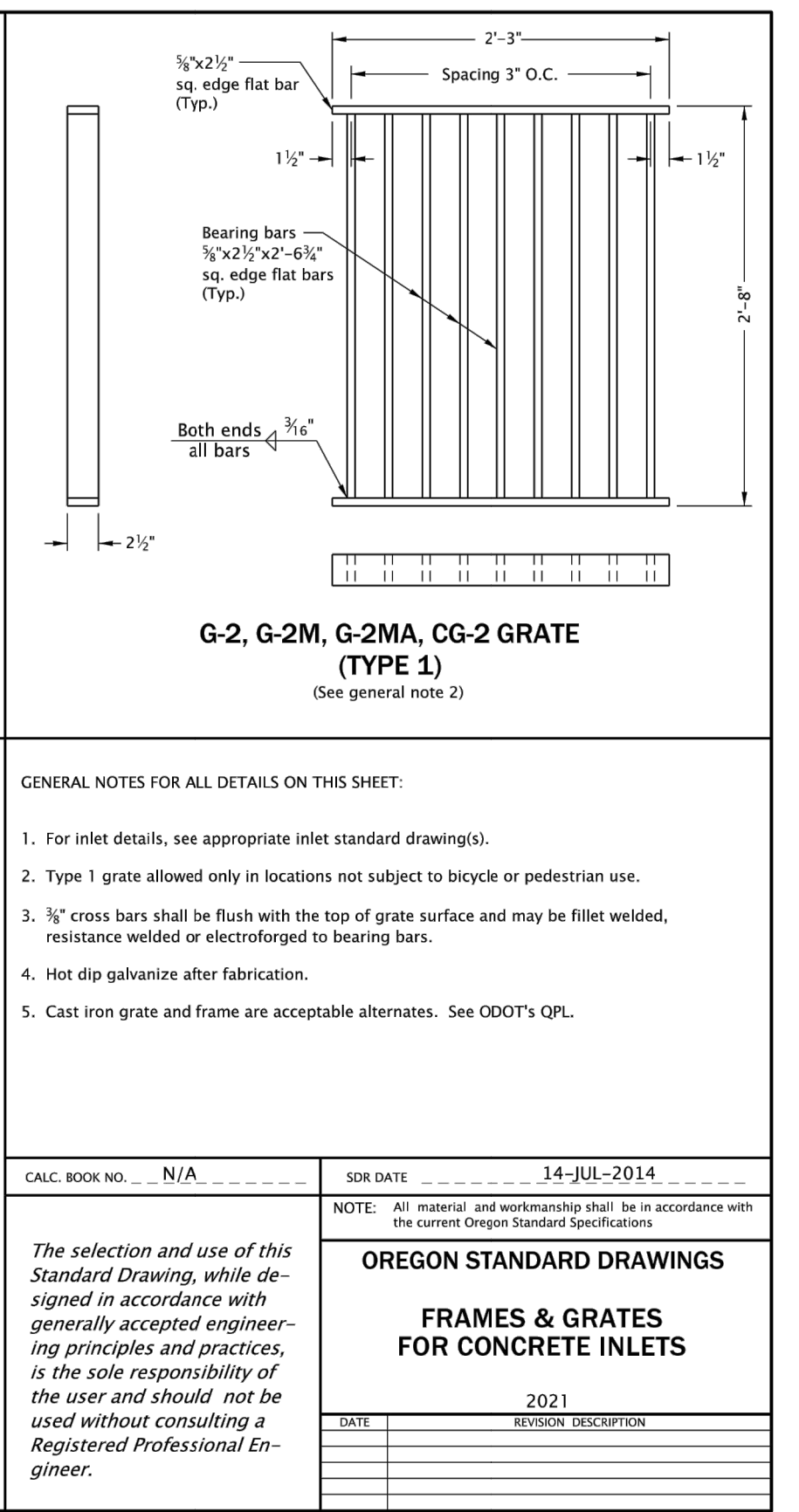
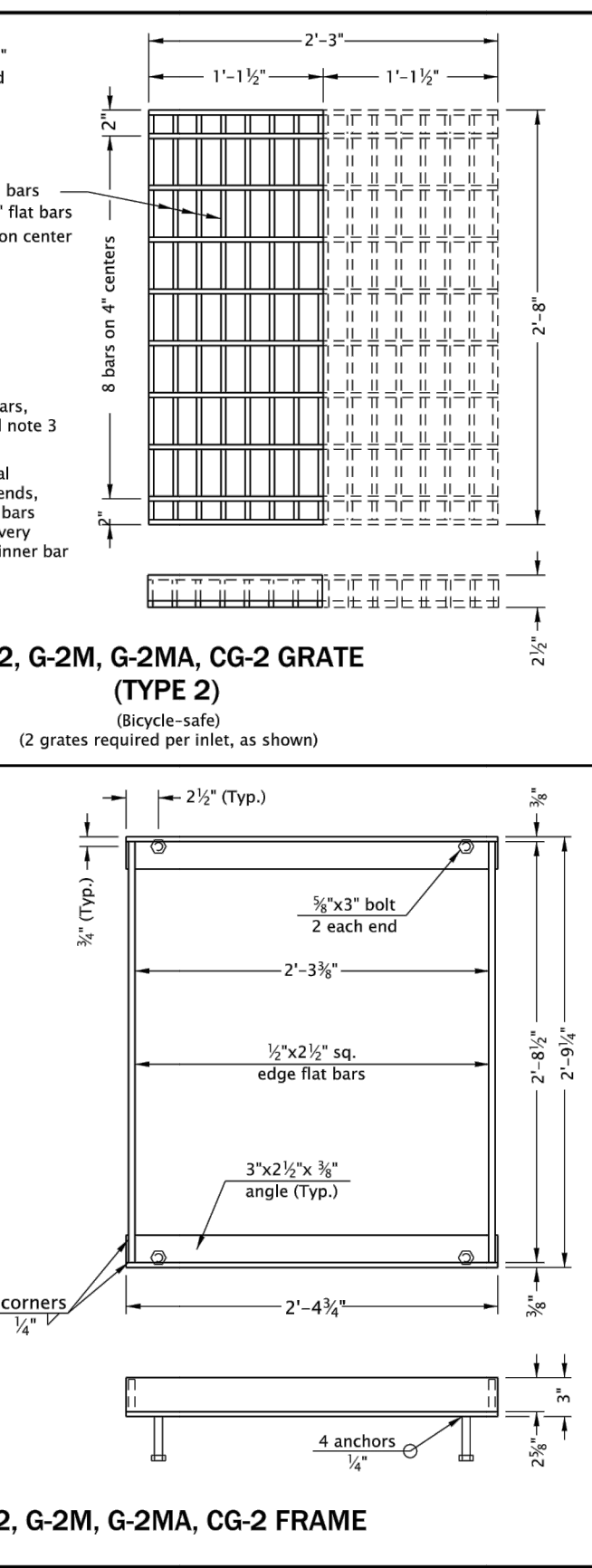
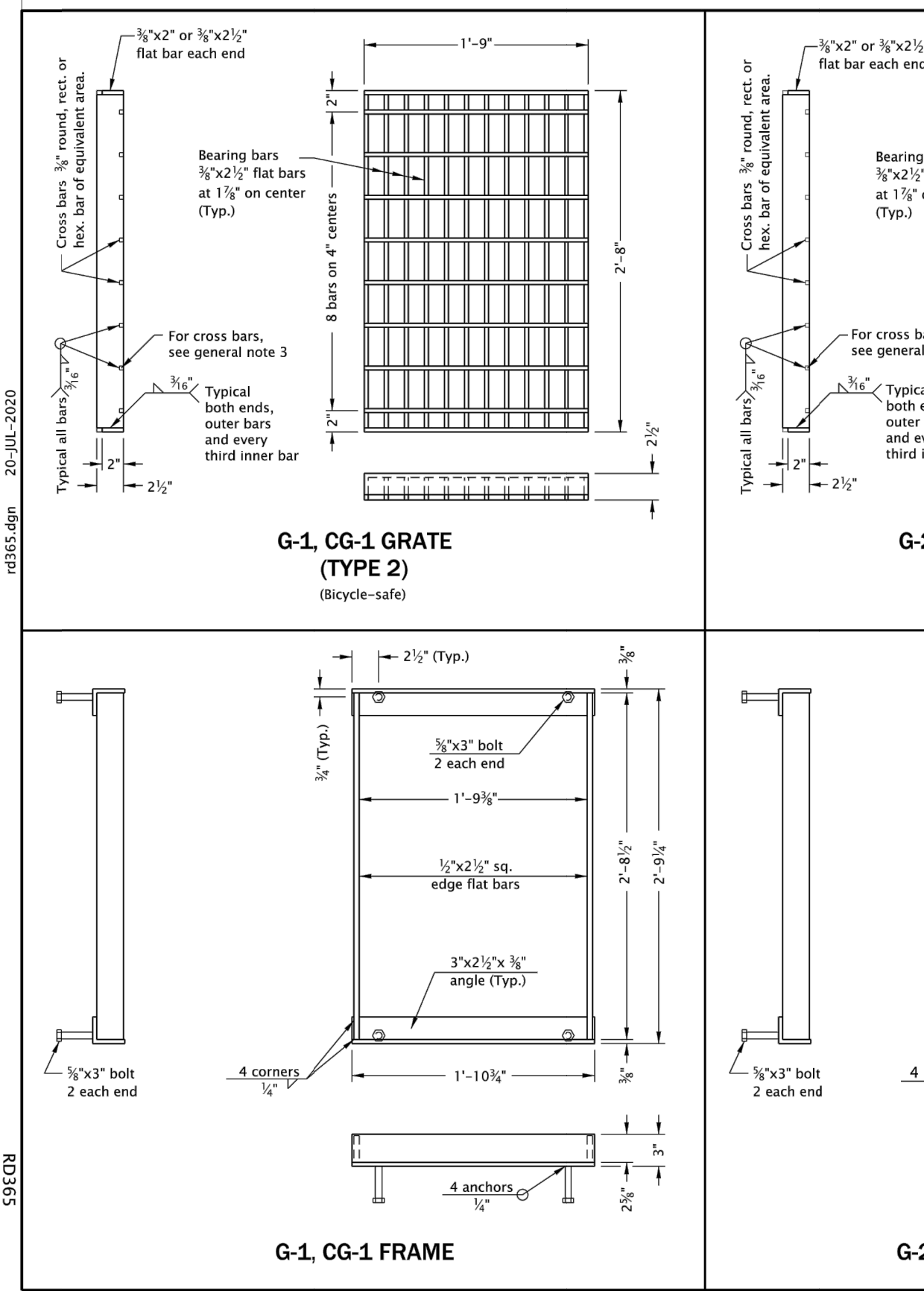
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

**OREGON STANDARD DRAWINGS**

**CONCRETE INLETS**  
 TYPE G-1, G-2, G-2M, & G-2MA

DATE 2021 REVISION DESCRIPTION

Effective Date: December 1, 2021 - May 31, 2022 RD364



**GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:**

- For inlet details, see appropriate inlet standard drawings.
- Type 1 grate allowed only in locations not subject to bicycle or pedestrian use.
- 3/8" cross bars shall be flush with the top of grate surface and may be fillet welded, resistance welded or electroforged to bearing bars.
- Hot dip galvanize after fabrication.
- Cast iron grate and frame are acceptable alternates. See ODOT's QPL.

**NOTE:** All material and workmanship shall be in accordance with the current Oregon Standard Specifications

CALC. BOOK NO.	N/A	SOR DATE	14-JUL-2014
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications			
<b>OREGON STANDARD DRAWINGS</b>			
<b>FRAMES &amp; GRATES FOR CONCRETE INLETS</b>			
DATE	2021	REVISION DESCRIPTION	

Effective Date: December 1, 2021 - May 31, 2022 RD365

VERIFY SCALE  
 BAR IS ONE INCH ON ORIGINAL DRAWING  
 IF NOT ONE INCH ON SCALES ACCORDINGLY

DSN. SAW AR 1  
 DRN. AR 1  
 CKD. SAW 1  
 DATE: SEP 2021

DESCRIPTION  
 REVISIONS

DATE NO. DESCRIPTION BY

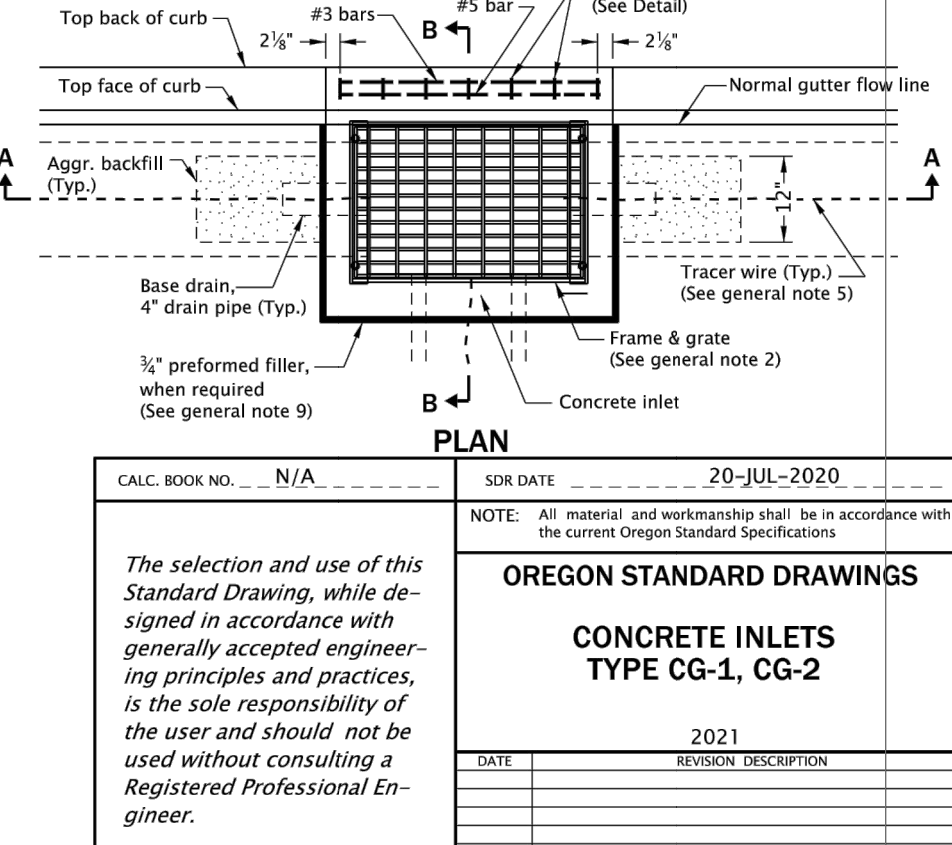
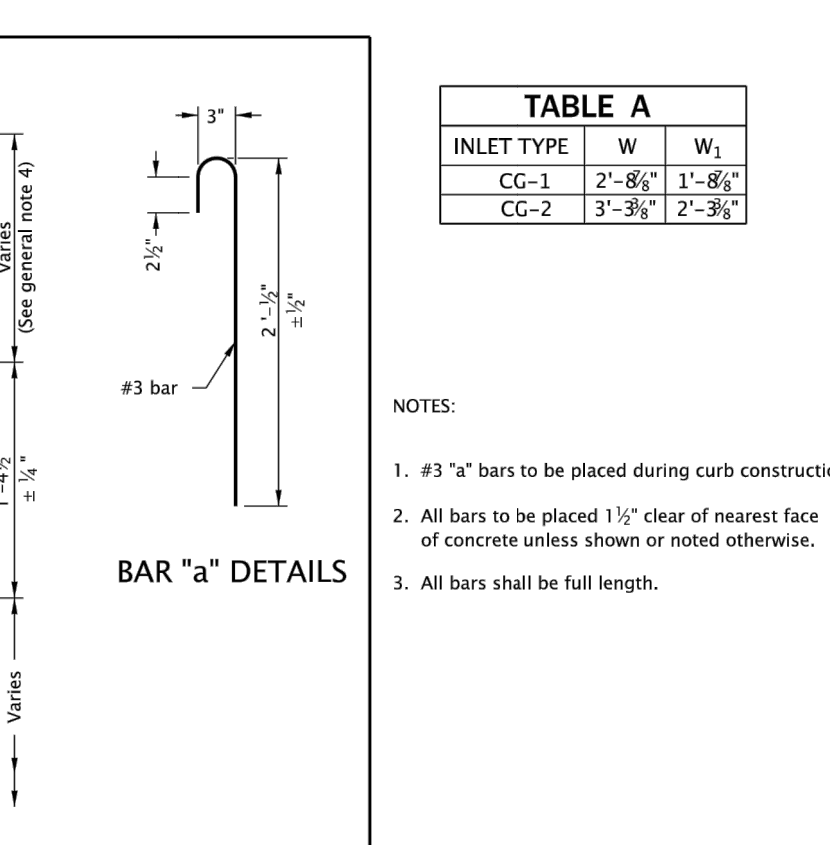
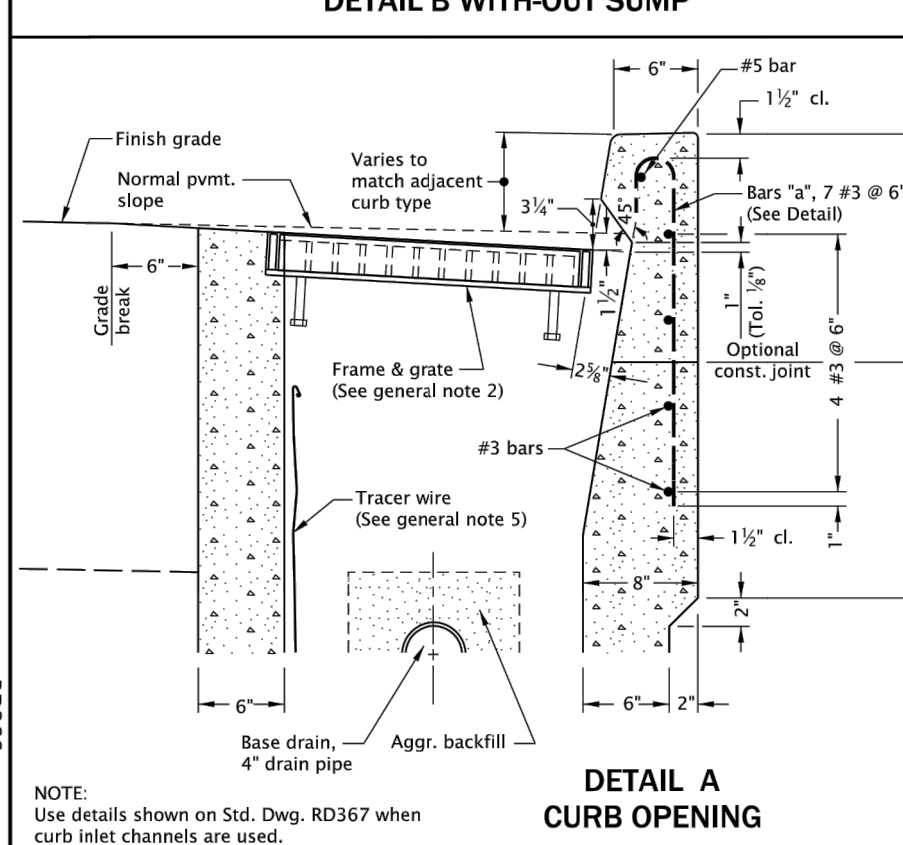
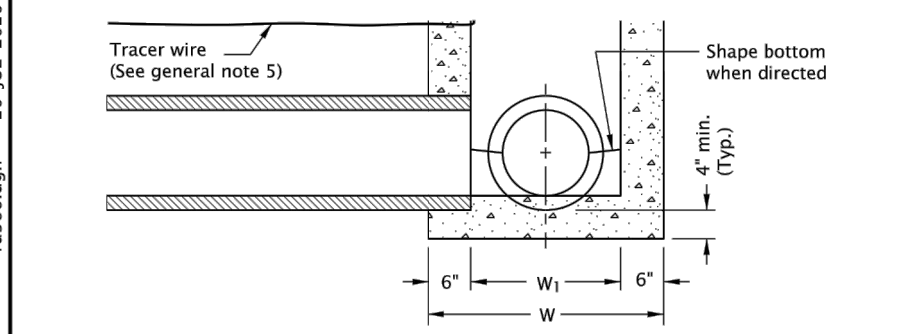
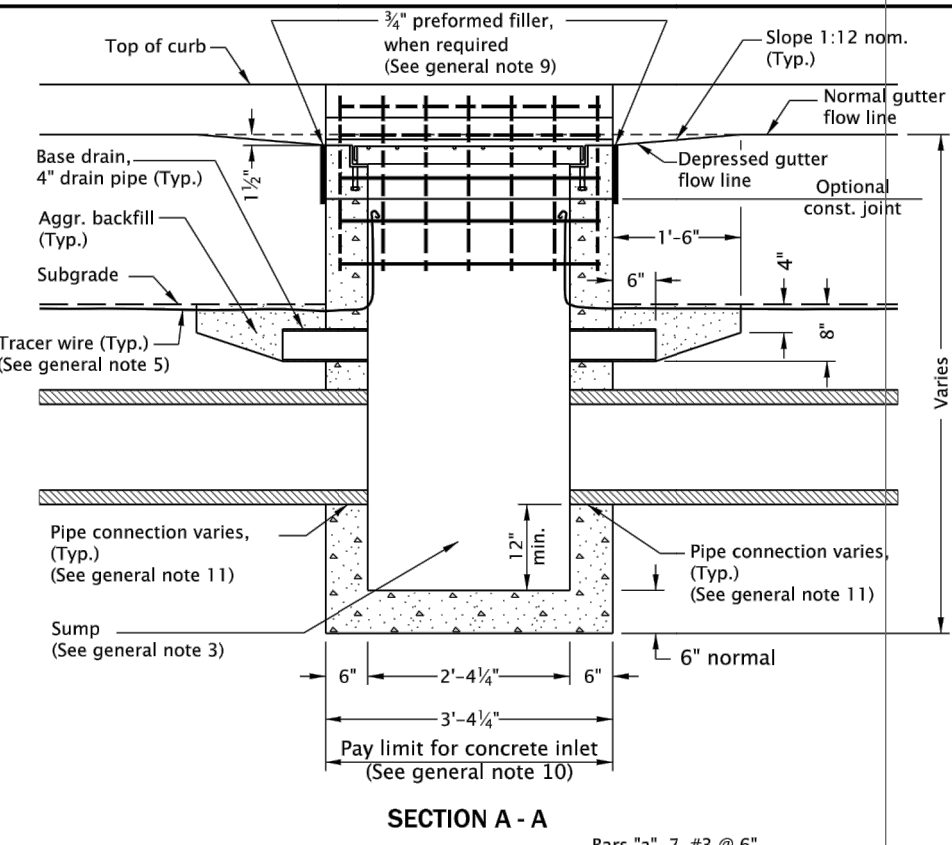
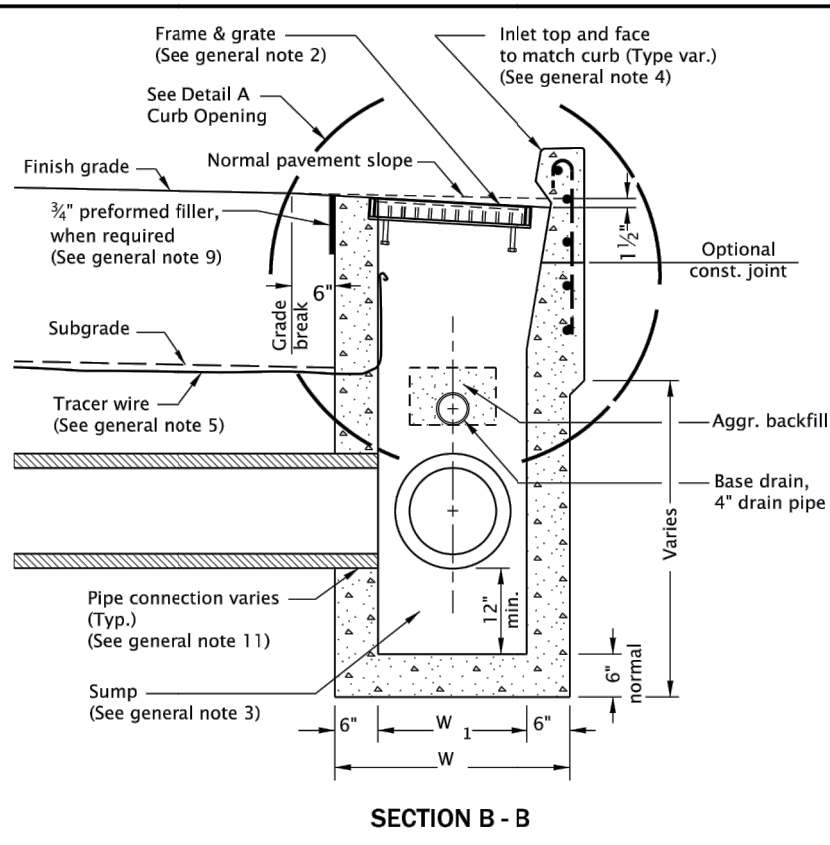
REVIEW  
 WESTTECH ENGINEERING, INC.  
 CONSULTING ENGINEERS AND PLANNERS  
 3841 Fairview Industrial Dr. S.E., Suite 100, Salem, OR 97302  
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HOME FIRST DEVELOPMENT PARTNERS  
 HIGHWAY 211 IMPROVEMENTS  
 ODOT DETAILS  
 DRAWING C6.2  
 JOB NUMBER 3312.0000.0

**GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:**

- Where precast inlets are used as an alternate to cast-in-place inlets, a 4" compacted leveling bed of sand or 1/2" crushed aggregate shall be provided.
- All precast inlets shall conform to requirements of ASTM C913.
- Graphics show CG-1 inlet with Type 2 grate. See Table A for inlet dimensions.
- Type 1 grate allowed only in locations not subject to bicycle or pedestrian use.
- For frame and grate details, see Std. Dwg. RD365.
- Provide sump only where shown on plans, and allowed by jurisdiction. See Detail B for inlet without sump.
- For curb details, see Std. Dwg. RD700 & RD701.
- See Std. Dwg. RD336 for tracer wire details, or approved alternate.
- Max. pipe diameter varies with pipe material.
- Location, elevation, diameter, slope, and number of pipes(s) varies, see project plans.
- All concrete shall be commercial grade concrete.
- 3/4" preformed filler (in concrete pavement or gutter only) to extend through thickness of concrete.
- See Std. Dwg. RD363 for gutter transition section, when curb and gutter are required. (Pay limit for inlet is expanded when curb and gutter are monolithic)
- See Std. Dwg. RD339 for pipe to structure connections.



INLET TYPE	W	W1
CG-1	2'-8 1/4"	1'-8 3/4"
CG-2	3'-3 3/4"	2'-3 3/4"

- NOTES:**
- #3 "a" bars to be placed during curb construction.
  - All bars to be placed 1/2" clear of nearest face of concrete unless shown or noted otherwise.
  - All bars shall be full length.

CALC. BOOK NO. N/A SDR DATE 20-JUL-2020

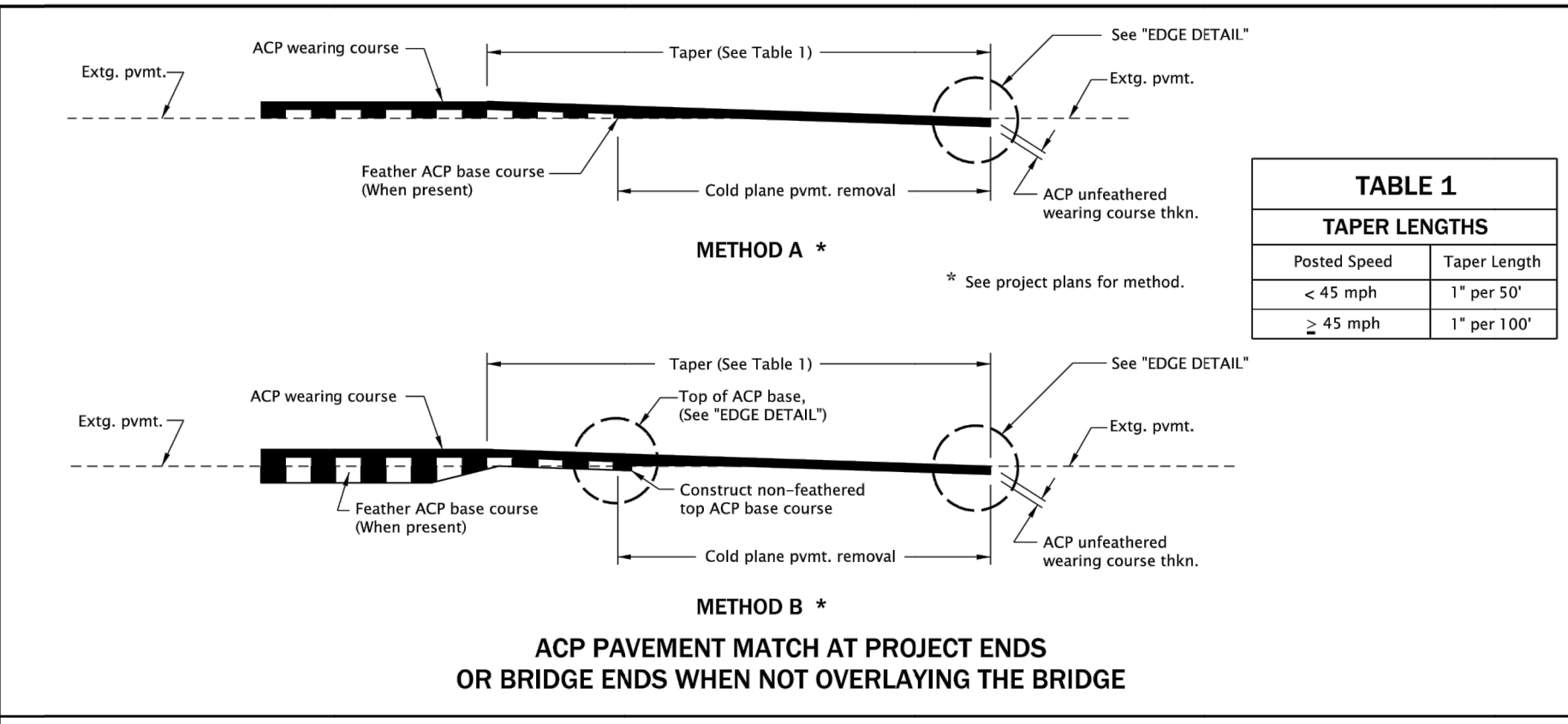
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

**OREGON STANDARD DRAWINGS**

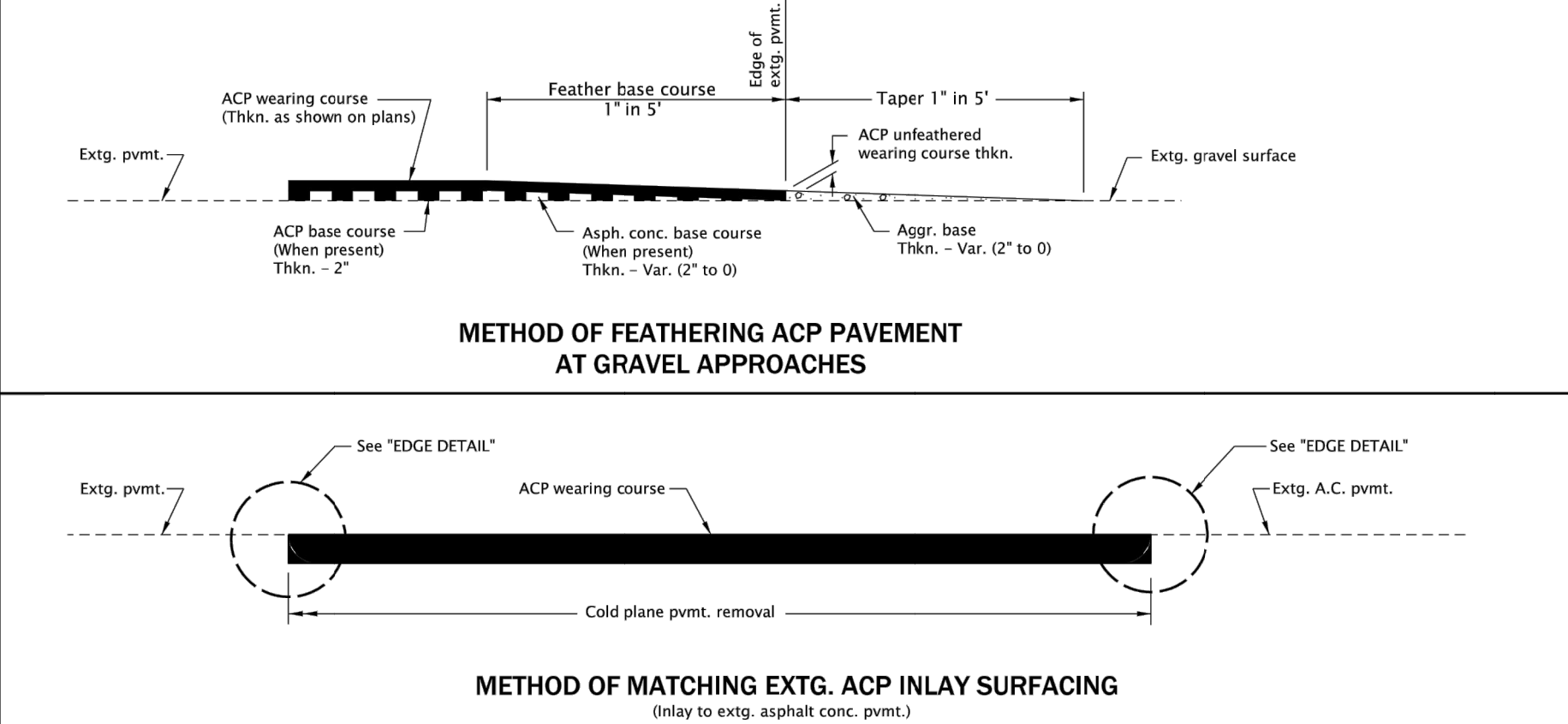
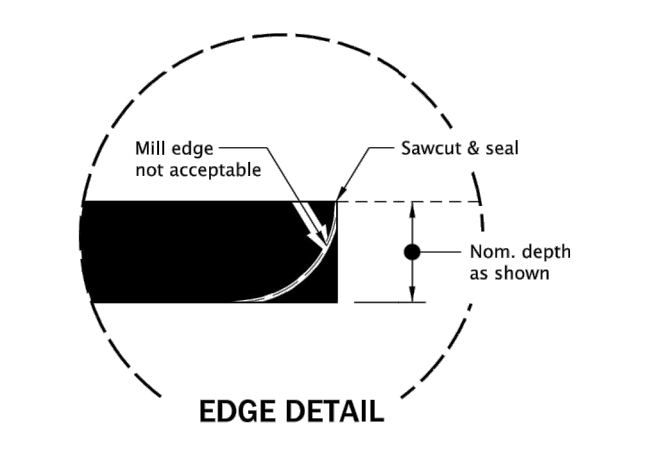
**CONCRETE INLETS TYPE CG-1, CG-2**

DATE 2021 REVISION DESCRIPTION

Effective Date: December 1, 2021 - May 31, 2022 RD366



Posted Speed	Taper Length
< 45 mph	1' per 50'
≥ 45 mph	1' per 100'



CALC. BOOK NO. N/A SDR DATE 25-JUL-2017

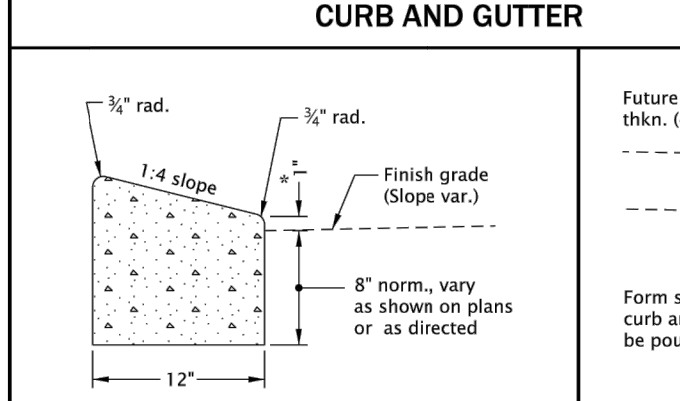
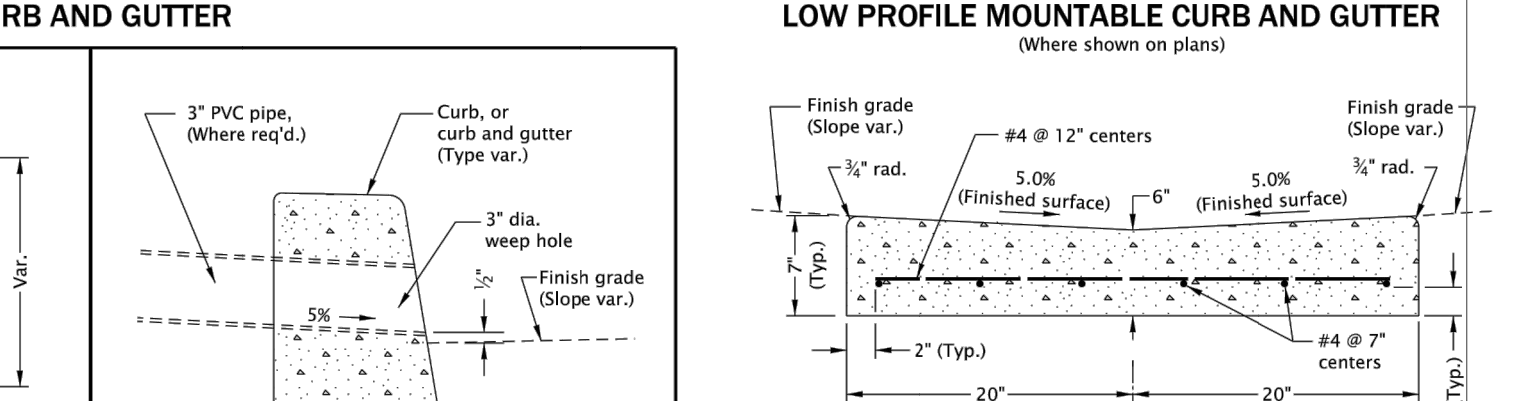
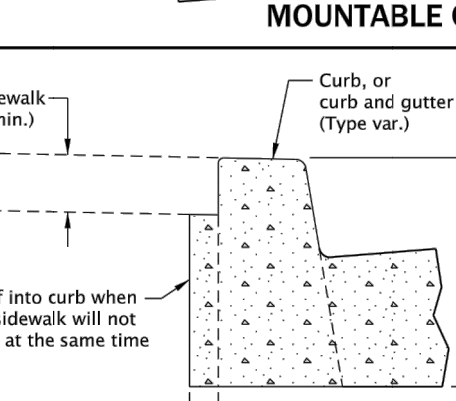
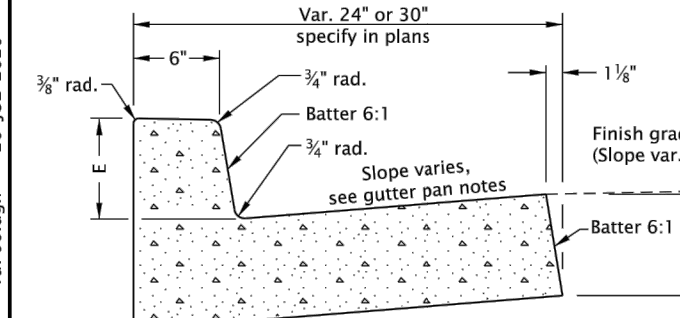
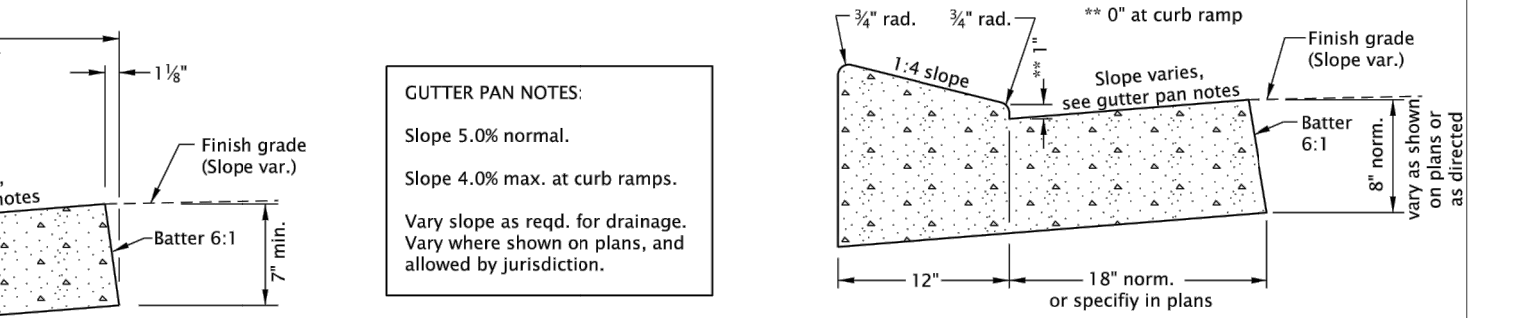
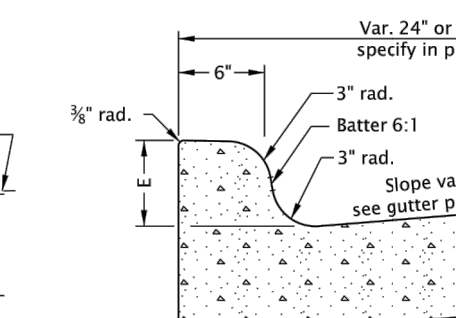
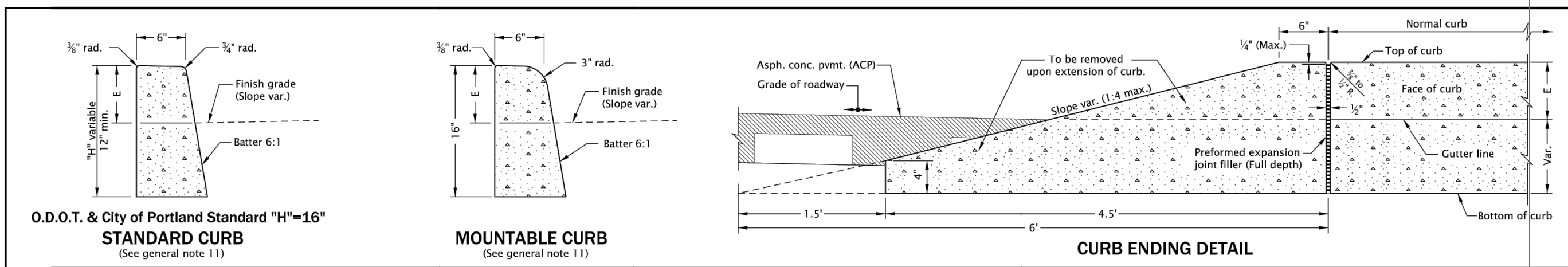
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

**OREGON STANDARD DRAWINGS**

**ASPHALT CONCRETE PAVEMENT (ACP) DETAILS**

DATE 2021 REVISION DESCRIPTION

Effective Date: December 1, 2021 - May 31, 2022 RD610



**GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:**

- Curb exposure "E" = 6" to 9", as measured vertically from flowline to highest point on curb. Vary as shown on plans or as directed. O.D.O.T. standard "E" = 7".
- Const. curb expansion joints at 200' maximum spacing, and at points of tangency, and at ends of each driveway.
- Const. curb contraction joints at 15' maximum spacing, and at ends of each inlet and curb ramp.
- Transitions shall be used to connect curbs of different exposures "E". ("E" is the total vertical dimension of those curb surfaces having a slope of 1:1 or steeper). Minimum desirable transition length shall be 20' for each 1" difference in "E".
- Tops of all curbs shall slope toward the roadway at 1.5% max. (Max. 2.0% finished surface slope), unless otherwise shown, or as directed.
- Dimensions are nominal, vary to conform with curb machine approved by the engineer.
- Dimensions adjacent to radii are measured to the point of intersection of curb surfaces.
- For drainage details, and monolithic curb & sidewalk, see Std. Dwg. RD720 & RD721.
- For sidewalk curbs, see Std. Dwg. RD701.
- For curb ramp details, see Std. Dwg. RD900 series.
- On or along state highways, curb and gutter is required at curb ramp.

CALC. BOOK NO. N/A SDR DATE 20-JUL-2020

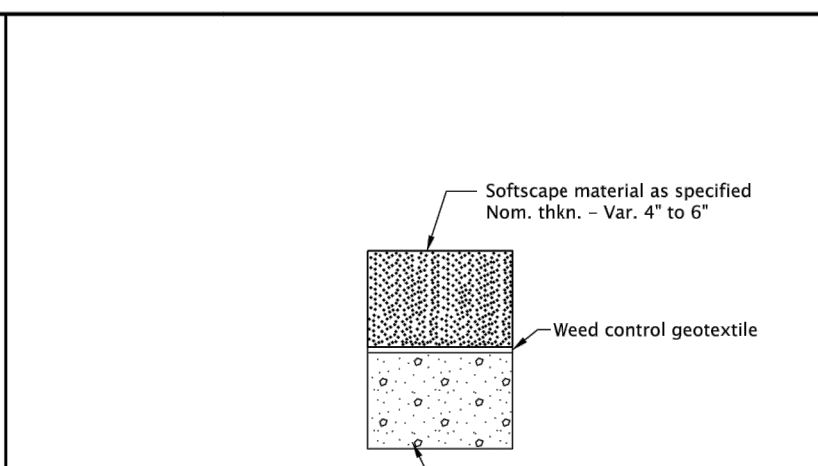
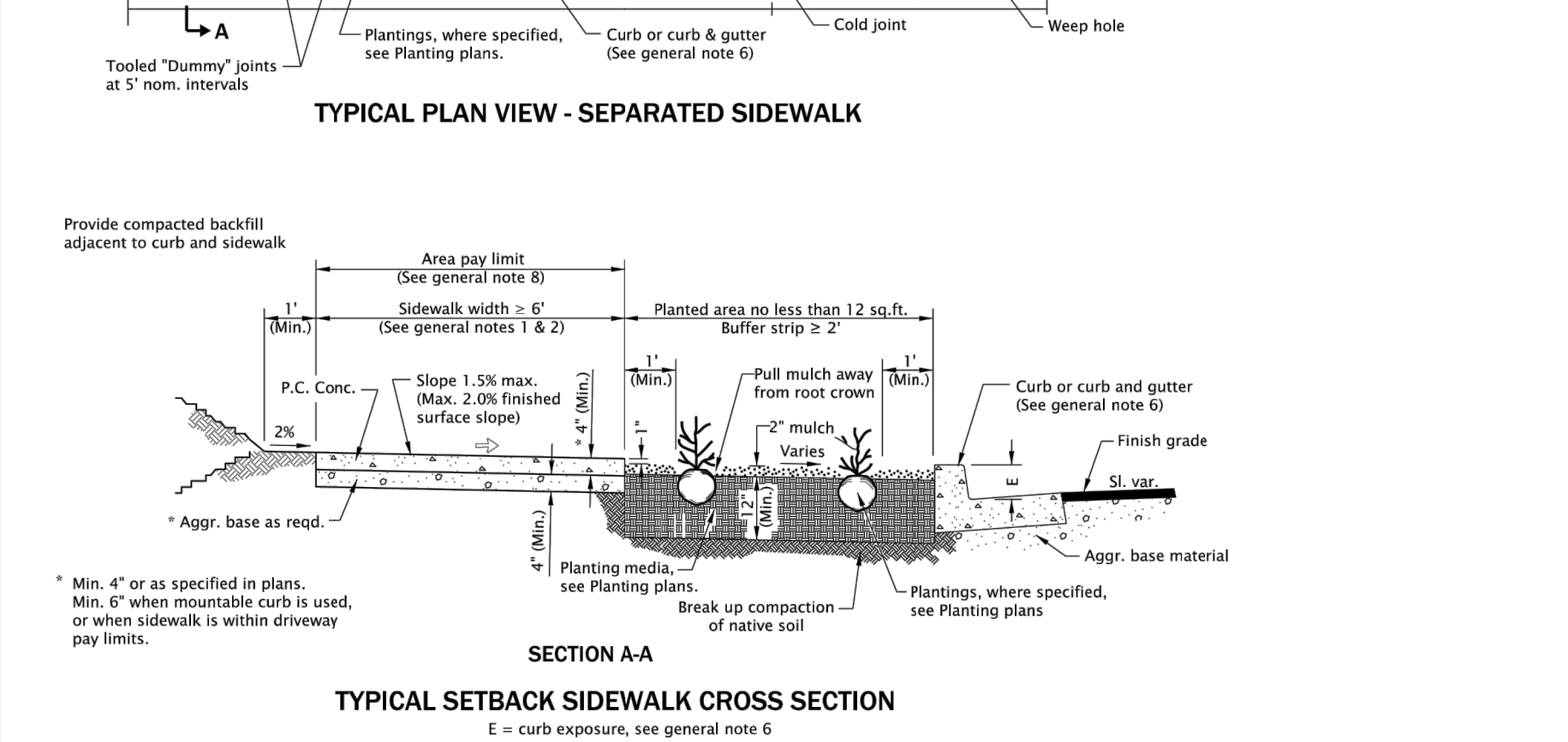
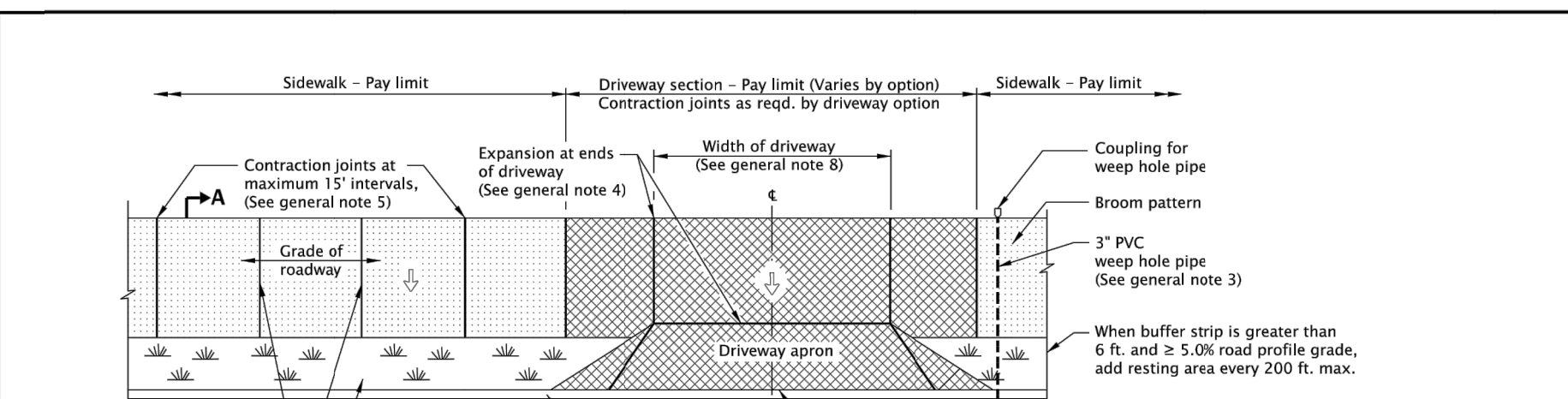
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

**OREGON STANDARD DRAWINGS**

**CURBS**

DATE 2021 REVISION DESCRIPTION

Effective Date: December 1, 2021 - May 31, 2022 RD700



**LEGEND**

- Sidewalk pay limit.
- Driveway pay limit, varies by option, (See general note 8).
- Cross slope 1.5% max. (Max. 2.0% finished surface slope) (Normal sidewalk cross slope).

CALC. BOOK NO. N/A SDR DATE 20-JUL-2020

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

**OREGON STANDARD DRAWINGS**

**SEPARATED SIDEWALKS**

DATE 2021 REVISION DESCRIPTION

*The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.*

Effective Date: December 1, 2021 - May 31, 2022 RD721

**GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:**

- Include additional paved or unpaved 2' shy distance to vertical faces higher than 5' such as retaining walls, sound walls, fences and buildings.
- Curb type and sidewalk width as shown on plans or as directed.
- On sidewalks 8' and wider, provide a longitudinal joint at the midpoint.
- Install 3" PVC weep hole pipes in sidewalks where shown on plans, and allowed by jurisdiction. Place contraction joint over top of pipe. See Std. Dwg. RD700 for weep hole details.
- Provide expansion joints around poles, posts, boxes, at ends of each driveway, and other fixtures which protrude through or against the structures.
- For sidewalk, monolithic curb & sidewalk, const. expansion joints at 45' maximum spacing. See Std. Dwg. RD722 for expansion joint details.
- Const. contraction joints at 15' maximum spacing, and at ends of each curb ramp. See Std. Dwg. RD722 for contraction joint details.
- Curb and gutter shown; see project plans for the curb design specified.
- For curb details, see Std. Dwg. RD700 & RD701.
- ODOT standard E-7.
- Sidewalk details are based on ODOT applicable standards.
- Driveway encroaches into sidewalk shown; see project plans for the driveway design specified.
- For driveway details not shown, see Std. Dwg. RD725, RD730, RD735, RD740, RD745 & RD750.
- See project plans for details not shown.
- Provide plantings in areas 12 SF or greater, as shown or directed. Treat areas less than 12 SF with mulch surfacing.

CALC. BOOK NO. N/A SDR DATE 20-JUL-2020

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

**OREGON STANDARD DRAWINGS**

**SEPARATED SIDEWALKS**

DATE 2021 REVISION DESCRIPTION

Effective Date: December 1, 2021 - May 31, 2022 RD721

VERIFY SCALE: BAR IS ONE INCH ON ORIGINAL DRAWING IF NOT ONE INCH ON SCALES ACCURACELY

DSN. SAW AR CKD. SAW DATE: SEP 2021

NO. 1 DATE: 2021 DESCRIPTION: REVISIONS

BY: [ ]

DATE: 6/20/2022

WESTTECH ENGINEERING, INC. CONSULTING ENGINEERS AND PLANNERS

3841 Fairview Industrial Dr. S.E., Suite 100, Salem, OR 97302  
Phone: (503) 585-2474 Fax: (503) 585-3966  
E-mail: westtech@westtech-eng.com

HOME FIRST DEVELOPMENT PARTNERS

ODOT DETAILS

DRAWING C6.3

JOB NUMBER 3312.0000.0

HIGHWAY 211 IMPROVEMENTS







**TM502**

Effective Date: December 01, 2021 - May 31, 2022

**TM503**

Effective Date: December 01, 2021 - May 31, 2022

**TM504**

Effective Date: December 01, 2021 - May 31, 2022

**TM517**

Effective Date: December 01, 2021 - May 31, 2022

NO.	DATE	DESCRIPTION	BY
1	SEP 2021		

VERIFIED SCALE: 1" = 10' (AS SHOWN)  
 IF NOT ONE INCH ON SCALE, ACCURACY IS NOT GUARANTEED.

REVISIONS: 6/20/2022

**WESTTECH ENGINEERING, INC.**  
 CONSULTING ENGINEERS AND PLANNERS

**REVIEW**

3841 Fairview Industrial Dr. S.E., Suite 100, Salem, OR 97302  
 Phone: (503) 585-2474 Fax: (503) 585-3966  
 E-mail: westtech@westtech-eng.com

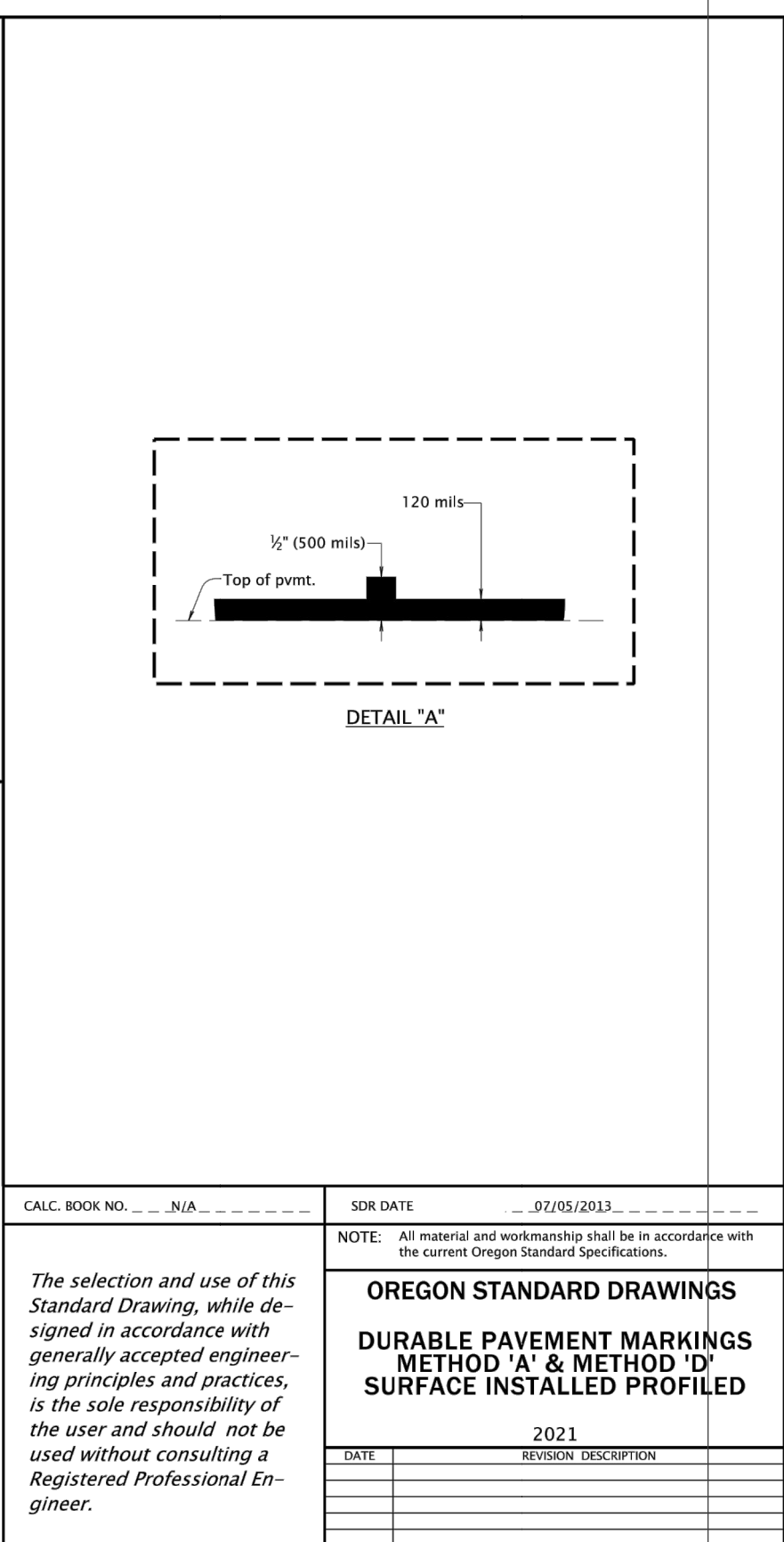
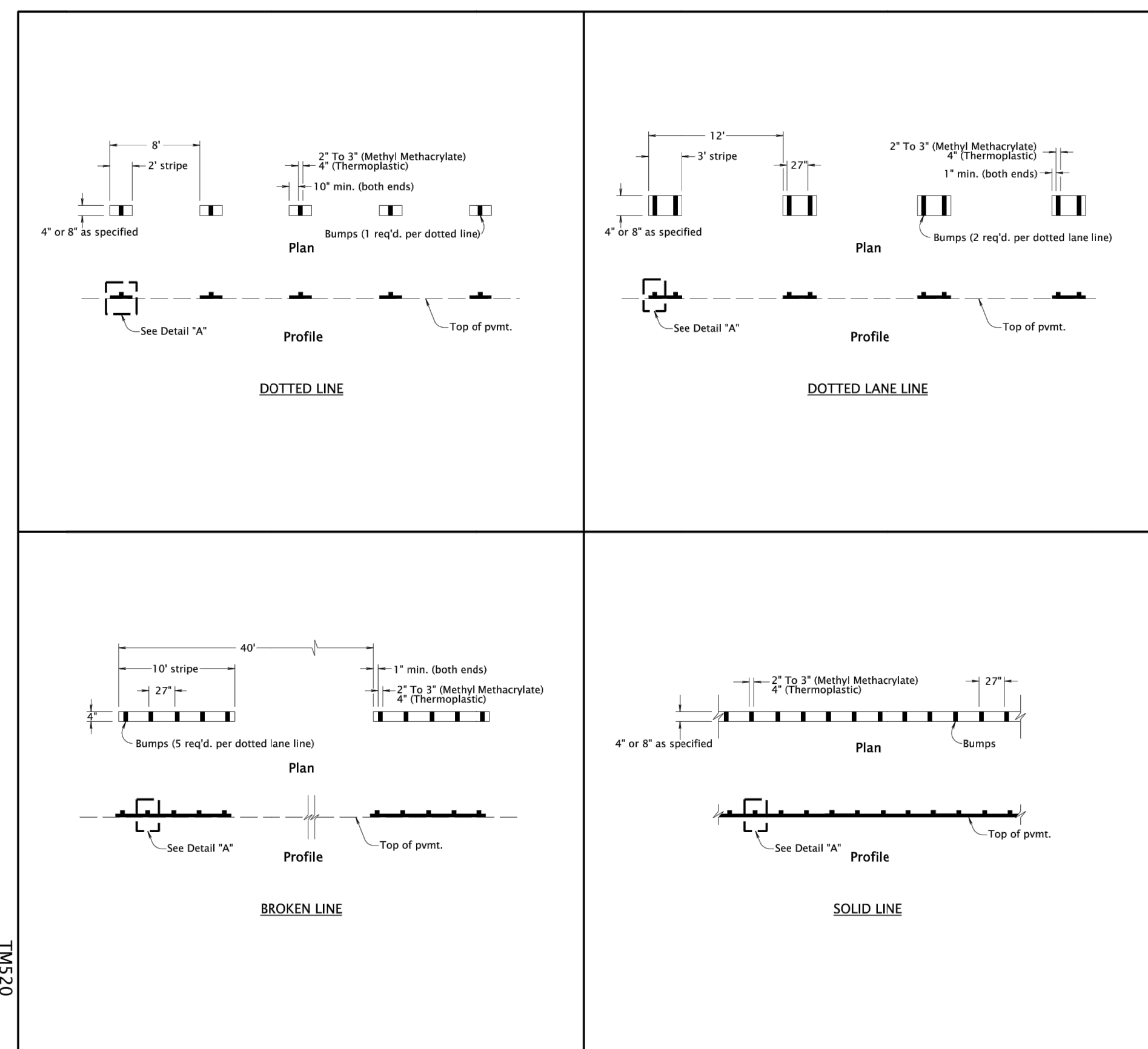
HOME FIRST DEVELOPMENT PARTNERS

IMPROVEMENTS

ODOT DETAILS

DRAWING C6.6

JOB NUMBER 3312.0000.0



Effective Date: December 01, 2021 - May 31, 2022

TM520

Calc. Book No. N/A SDR DATE 02/05/2013

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications.

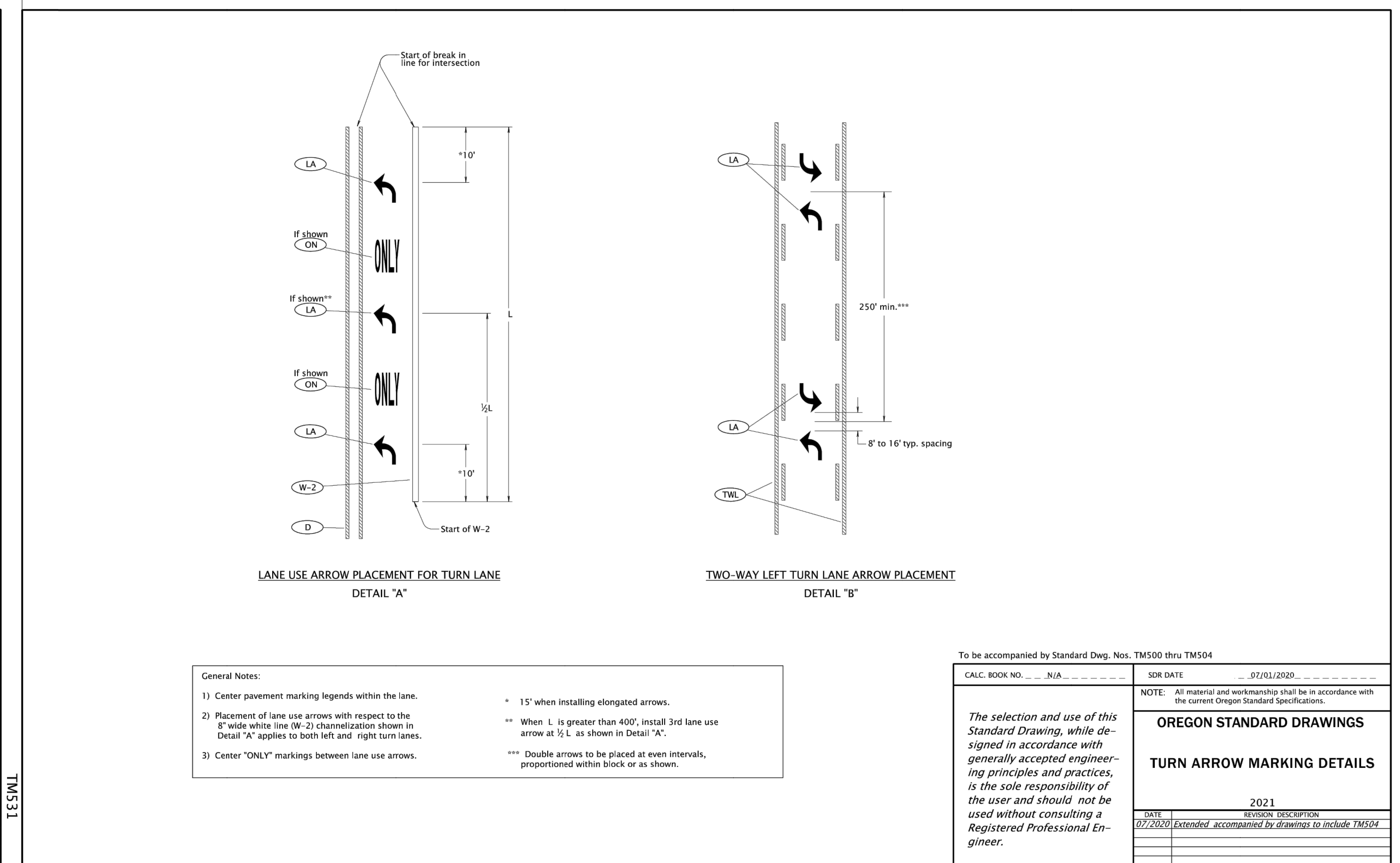
**OREGON STANDARD DRAWINGS**

**DURABLE PAVEMENT MARKINGS METHOD 'A' & METHOD 'D' SURFACE INSTALLED PROFILED**

2021

DATE	REVISION DESCRIPTION
07/20/20 Extended, accompanied by drawings to include TMS04	

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.



Effective Date: December 01, 2021 - May 31, 2022

TM531

Calc. Book No. N/A SDR DATE 02/05/2013

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications.

**OREGON STANDARD DRAWINGS**

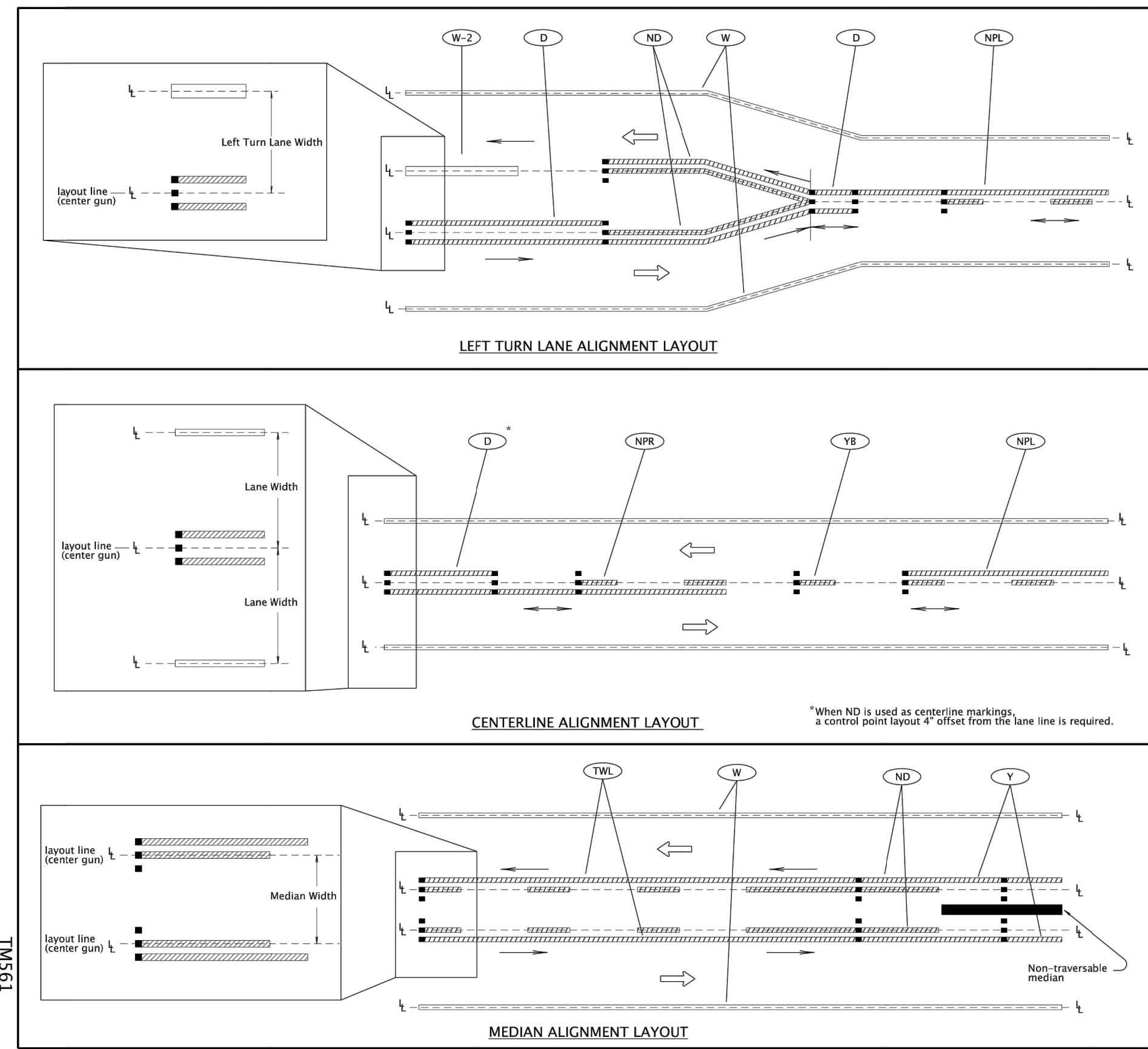
**TURN ARROW MARKING DETAILS**

2021

DATE	REVISION DESCRIPTION
07/20/20 Extended, accompanied by drawings to include TMS04	

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

General Notes:  
 1) Center pavement marking legends within the lane.  
 2) Placement of lane use arrows with respect to the 8" wide white line (W-2) channelization shown in Detail "A" applies to both left and right turn lanes.  
 3) Center "ONLY" markings between lane use arrows.  
 \* 15' when installing elongated arrows.  
 \*\* When L is greater than 400', install 3rd lane use arrow at 1/2 L as shown in Detail "A".  
 \*\*\* Double arrows to be placed at even intervals, proportioned within block or as shown.



Effective Date: December 01, 2021 - May 31, 2022

TM561

Calc. Book No. N/A SDR DATE 02/05/2013

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications.

**OREGON STANDARD DRAWINGS**

**ALIGNMENT LAYOUT: LEFT TURN LANE, CENTERLINE & MEDIANS**

2021

DATE	REVISION DESCRIPTION
07/20/20 Extended, accompanied by drawings to include TMS04	

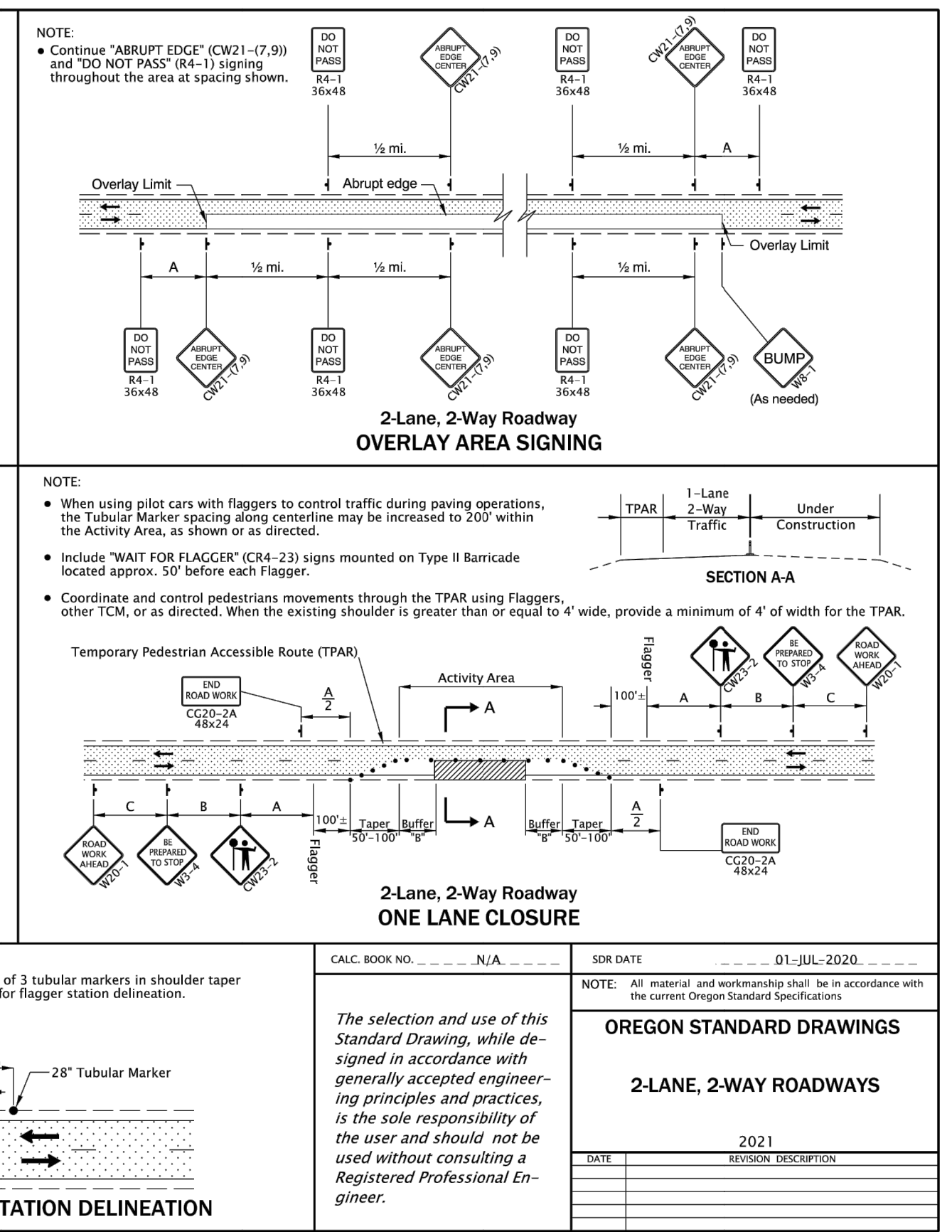
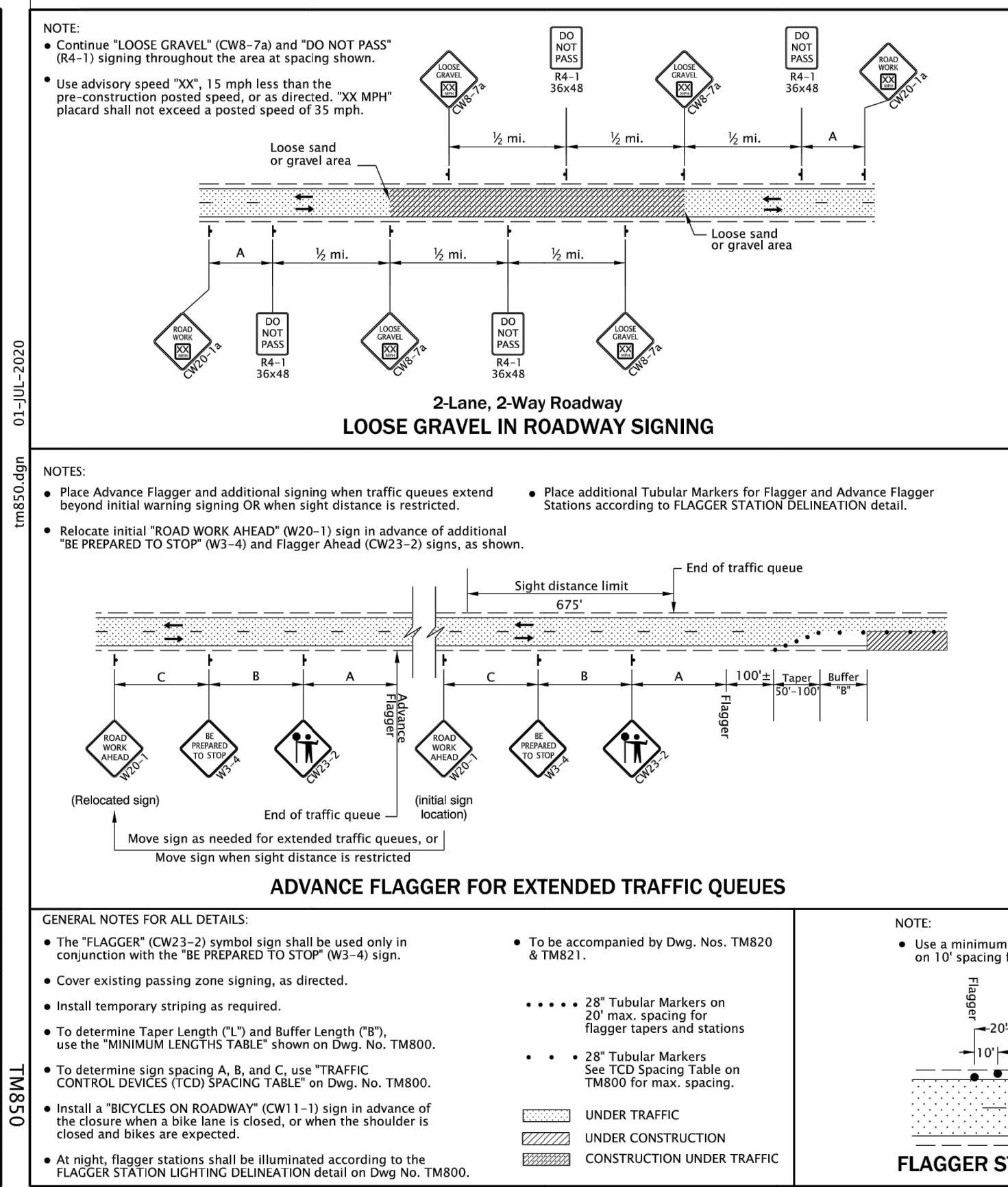
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

General note:  
 1) Install control points for pavement marking alignment layout along the center gun location.  
 2) Increasing stationing from left to right

LEGEND  
 ← Direction of Travel and Thru Traffic Side.  
 --- Lane line dimensions are shown on the striping plans.  
 → Direction of striping truck (may go either direction)  
 → Direction of striping truck (may go one direction only)  
 ■ Three gun installation system (center dot represents center gun)

Line Types requiring control points to be 4' offset from lane line:  
 For centerlines only

4' Offset of Lane Line and Center Gun



Effective Date: December 1, 2021 - May 31, 2022

TM850

Calc. Book No. N/A SDR DATE 01-JUL-2020

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications.

**OREGON STANDARD DRAWINGS**

**2-LANE, 2-WAY ROADWAYS**

2021

DATE	REVISION DESCRIPTION
07/20/20 Extended, accompanied by drawings to include TMS04	

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

GENERAL NOTES FOR ALL DETAILS:  
 • The "FLAGGER" (CW23-2) symbol sign shall be used only in conjunction with the "BE PREPARED TO STOP" (W3-4) sign.  
 • Cover existing passing zone signing, as directed.  
 • Install temporary striping as required.  
 • To determine Taper Length ("L") and Buffer Length ("B"), use the "MINIMUM LENGTHS TABLE" shown on Dwg. No. TM800.  
 • To determine sign spacings A, B, and C, use "TRAFFIC CONTROL DEVICES (TCD) SPACING TABLE" on Dwg. No. TM800.  
 • Install a "BICYCLES ON ROADWAY" (CW11-1) sign in advance of the closure when a bike lane is closed, or when the shoulder is closed and bikes are expected.  
 • At night, flagger stations shall be illuminated according to the FLAGGER STATION LIGHTING DELINEATION detail on Dwg. No. TM800.

• To be accompanied by Dwg. Nos. TM820 & TM821.  
 • 28" Tubular Markers on 20' max. spacing for flagger tapers and stations  
 • 28" Tubular Markers See TCD Spacing Table on TM800 for max. spacing.

• Use a minimum of 3 tubular markers in shoulder taper on 10' spacing for flagger station delineation.

• Place Advance Flagger and additional signing when traffic queues extend beyond initial warning signing OR when sight distance is restricted.  
 • Relocate initial "ROAD WORK AHEAD" (W20-1) sign in advance of additional "BE PREPARED TO STOP" (W3-4) and Flagger Ahead (CW23-2) signs, as shown.  
 • Place additional Tubular Markers for Flagger and Advance Flagger Stations according to FLAGGER STATION DELINEATION detail.  
 • When using pilot cars with flaggers to control traffic during paving operations, the Tubular Marker spacing along centerline may be increased to 200' within the Activity Area, as shown or as directed.  
 • Include "WAIT FOR FLAGGER" (CR4-23) signs mounted on Type II Barricade located approx. 50' before each Flagger.  
 • Coordinate and control pedestrian movements through the TPAR using Flaggers, other TCM, or as directed. When the existing shoulder is greater than or equal to 4' wide, provide a minimum of 4' of width for the TPAR.

VERIFY SCALE  
 BAR IS ONE INCH ON ORIGINAL DRAWING  
 IF NOT ONE INCH ON SCALES ACCURACLY

1" = 40'

DSN. SAU  
 DRN. AR  
 CKD. SAU  
 DATE: SEP 2021

NO. 1  
 DATE  
 DESCRIPTION  
 REVISIONS

REGISTERED PROFESSIONAL ENGINEER  
**REVIEW**  
 STEVEN L. STEVENSON  
 OREGON REGISTERED PROFESSIONAL ENGINEER NO. 1616  
 DATE: 6/20/2022

WESTECH ENGINEERING, INC.  
 CONSULTING ENGINEERS AND PLANNERS  
 3841 Fairview Industrial Dr. S.E., Suite 100, Salem, OR 97302  
 Phone: (503) 585-2474 Fax: (503) 585-3966  
 E-mail: westech@westech-eng.com

HIGHWAY 211 IMPROVEMENTS  
 HOME FIRST DEVELOPMENT PARTNERS

ODOT DETAILS

DRAWING  
**C6.7**

JOB NUMBER  
 3312.0000.0

**TM851** 01-JUL-2020  
 TMS82.dgn

**NOTE:**

- For left shoulder work, place TCD to close the left shoulder. Use "LEFT SHOULDER CLOSED" (W20-5a) sign.

**4-Lane, 2-Way Roadway SHOULDER CLOSURE**

**NOTE:**

- For left lane work, place TCD to close the left lane. Use "LEFT TWO LANES CLOSED AHEAD" (W20-5a), "LEFT LANE CLOSED AHEAD" (W20-5) and "LEFT LANE ENDS" (W4-2) symbol signs.

**4-Lane, 1-Way Roadway TWO LANE CLOSURE**

**4-Lane, 2-Way Roadway EXTERIOR LANE CLOSURE**

**4-Lane, 2-Way Roadway INTERIOR LANE CLOSURE**

**GENERAL NOTES FOR ALL DETAILS:**

- Install temporary striping as directed.
- Signaling and other TCD shown to be installed in conjunction with the work areas, shall move with the work areas.
- To determine Taper Length ("L") and Buffer Length ("B"), use the "MINIMUM LENGTHS TABLE" on Dwg. No. TM800.
- To determine sign spacing A, B, and C, use "TRAFFIC CONTROL DEVICES (TCD) SPACING TABLE" on Dwg. No. TM800.
- Channelization devices may be placed at 10' spacing around the Work Area for emphasis or if the area is exposed to traffic on both sides simultaneously.
- Install a "BICYCLES ON ROADWAY" (CW11-1) sign in advance of the closure when a bike lane is closed, or when the shoulder is closed and bikes are expected.
- To be accompanied by Dwg. Nos. TM820 & TM821.

**LEGEND:**

- 28" Tubular Markers See TCD Spacing Table on TM800 for max. spacing.
- Temp. Plastic Drums See TCD Spacing Table on TM800 for max. spacing.
- UNDER TRAFFIC
- UNDER CONSTRUCTION

**OREGON STANDARD DRAWINGS**  
**NON-FREEWAY MULTI-LANE SECTIONS**  
 DATE: 2021  
 REVISION DESCRIPTION

**Effective Date: December 1, 2021 - May 31, 2022** **TM851**

**TM852** 01-JUL-2020  
 TMS82.dgn

**4-Lane, 2-Way Roadway TWO LANE AND MEDIAN CLOSURE**

**GENERAL NOTES FOR ALL DETAILS:**

- Install temporary striping as directed.
- Signaling and other TCD shown to be installed in conjunction with the work areas, shall move with the work areas.
- To determine Taper Length ("L") and Buffer Length ("B"), use the "MINIMUM LENGTHS TABLE" on Dwg. No. TM800.
- When the length of the area under construction is less than 600 ft. use a DOUBLE REVERSE CURVE (W24-1) sign in place of the first REVERSE CURVE (W1-4) sign in each direction.
- Install a "BICYCLES ON ROADWAY" (CW11-1) sign in advance of the closure when a bike lane is closed, or when the shoulder is closed and bikes are expected.

**LEGEND:**

- 28" Tubular Markers See TCD Spacing Table on TM800 for max. spacing.
- Temp. Plastic Drums See TCD Spacing Table on TM800 for max. spacing.
- UNDER TRAFFIC
- UNDER CONSTRUCTION

**OREGON STANDARD DRAWINGS**  
**NON-FREEWAY MULTI-LANE SECTIONS**  
 DATE: 2021  
 REVISION DESCRIPTION

**Effective Date: December 1, 2021 - May 31, 2022** **TM852**

**TM880** 01-JUL-2021  
 TMS880.dgn

**Freeway or Divided Highway ONE LANE CLOSURE WITH SPEED REDUCTION (PAVING OPERATIONS)**  
 (Must be accompanied by an approved Speed Zone Order)

**NOTES:**

- Use "ABRUPT EDGE" (CW21-(7,9)) and "BUMP" (W8-1) signing for longitudinal abrupt edges of 1 inch or greater. See Inset A.
- Additional alternating "ABRUPT EDGE" (CW21-(7,9)) signs with appropriate plaques and "ROAD WORK XX MPH" (CW20-1a) to be installed on 1/2 mile intervals throughout the active work area where applicable, as shown.
- If roll-up signs are used, attach the correct plaques to the "ABRUPT EDGE" (CW21-9) sign face using hook and loop fasteners.
- Mount PCMS on finish and intermediate rollers, as shown. Use speed of "XX" on 2-line PCMS and "ROAD WORK XX MPH" (CW20-1a) signs, as follows:
  - 15 mph below speed zone order for freeways ("Y"-15)
  - 10 mph below speed zone order for non-freeways ("Y"-10)
- Install two "SPEED LIMIT ZZ" (R2-1) signs displaying the pre-construction speed limit. Do not install the two "SPEED LIMIT ZZ" signs if located 1000' or less in advance of existing SPEED LIMIT signs, or as directed.
- Once the Paving Machine is approximately 1/2 mile from the start of the paving operations, place the "Radar Speed Trailer 2" and other signing and TCD, as shown. Move "Radar Speed Trailer 2" as work progresses. Maintain "Radar Speed Trailer 2" within a 1/4 mile of the paving machine.

**GENERAL NOTES FOR ALL DETAILS:**

- Drawing intended for continuous or intermittently moving paving or pavement preservation activities on freeways or high-speed divided highways.
- Flagger is not permitted to stop or hold freeway traffic.
- If the inside shoulder in either direction is less than 4' use 36x36 signs, as shown on Dwg. Nos. TM821 and TM822.
- Unless otherwise shown, use the "MINIMUM LENGTHS TABLE" on Dwg. No. TM800 to determine Taper Length ("L") and Buffer Length ("B").
- Place a Type III barricade in closed lane on 1/2 mile spacing, as shown, after rollers have completed compaction.

**LEGEND:**

- 28" Tubular Markers @ 80 ft. max. spacing.
- 28" Tubular Markers See TCD Spacing Table on TM800 for max. spacing.
- Temp. Plastic Drums See TCD Spacing Table on TM800 for max. spacing.
- UNDER TRAFFIC
- UNDER CONSTRUCTION

**OREGON STANDARD DRAWINGS**  
**FREEWAY OR DIVIDED HIGHWAY SPEED REDUCTION (PAVING OPERATIONS)**  
 DATE: 2021  
 REVISION DESCRIPTION

**Effective Date: December 1, 2021 - May 31, 2022** **TM880**

NO.	DATE	DESCRIPTION	BY
1			

VERIFY SCALE  
 BAR IS ONE INCH ON ORIGINAL DRAWING  
 IF NOT ONE INCH ON ORIGINAL DRAWING, SCALES ACCURACIES

DSN. SAW  
 DRN. AR  
 CKD. SAW  
 DATE: SEP 2021

**REVIEW**

WESTTECH ENGINEERING, INC.  
 CONSULTING ENGINEERS AND PLANNERS  
 3841 Fairview Industrial Dr. S.E., Suite 100, Salem, OR 97302  
 Phone: (503) 585-2474 Fax: (503) 585-3966  
 E-mail: westtech@westtech-eng.com

HIGHWAY 211 IMPROVEMENTS  
 HOME FIRST DEVELOPMENT PARTNERS  
 ODOT DETAILS  
 DRAWING C6.8  
 JOB NUMBER 3312.0000.0

# MAIN STREET APARTMENTS

1000 WEST MAIN STREET  
MOLALLA, OREGON

## CLIENT / OWNER:

HOME FIRST DEVELOPMENT PARTNERS  
CONTACT: ROB JUSTUS AND ALEX REFF  
866 N. COLUMBIA BLVD., SUITE A-25  
PORTLAND, OREGON 97217

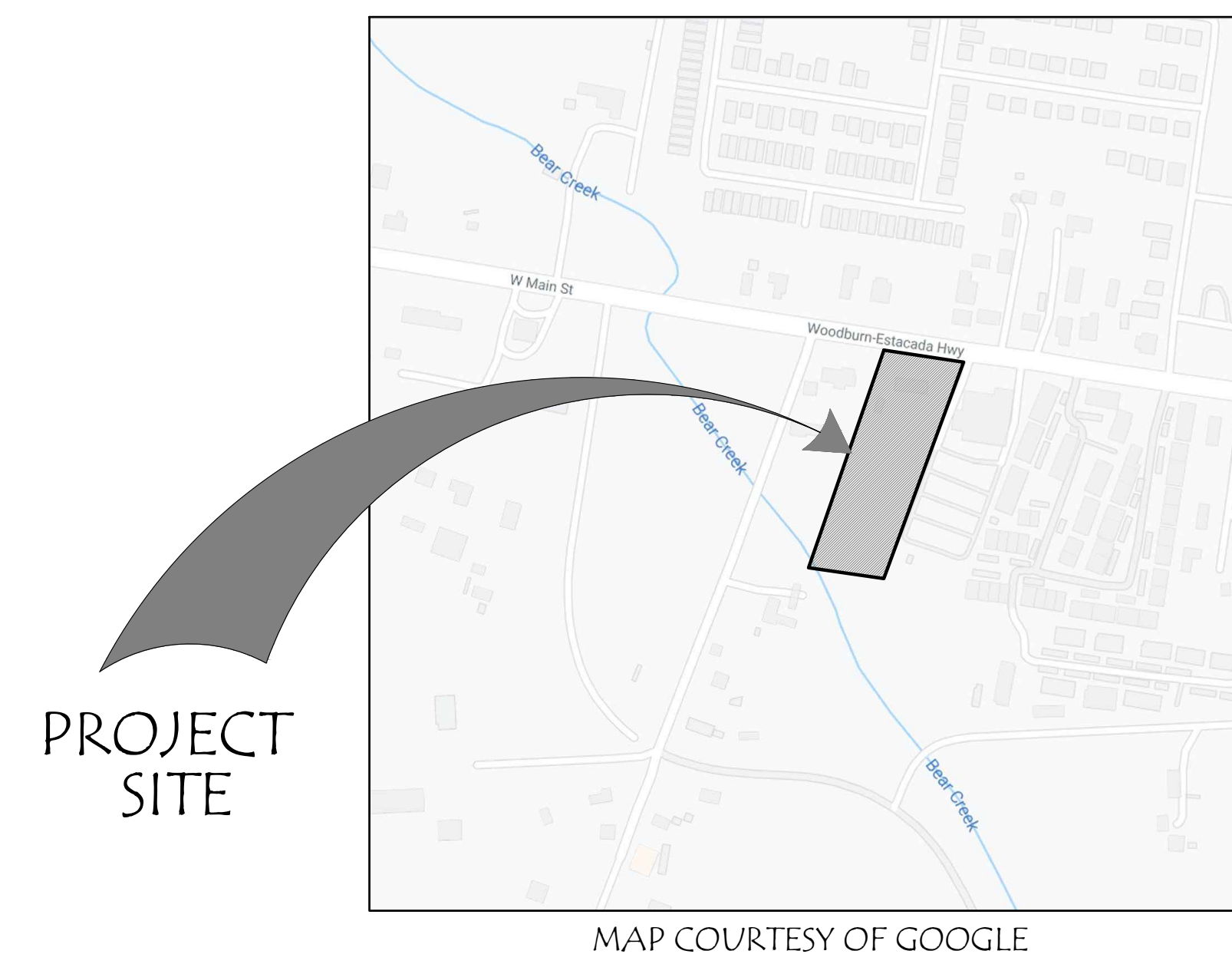
## LANDSCAPE ARCHITECT:

LAURUS DESIGNS, LLC  
LAURA ANTONSON, RLA, ASLA  
1012 PINE STREET  
SILVERTON, OREGON 97381  
503 . 784 . 6494  
LAURA@LAURUSDESIGNS.COM

## SHEET INDEX:

- LO.0 COVER SHEET
- L1.1 PRELIMINARY PLANTING PLAN
- L1.2 PRELIMINARY PLANTING PLAN

## VICINITY MAP:



CALL BEFORE YOU DIG:  
1.800.332.2344  
[www.digsafelyoregon.com](http://www.digsafelyoregon.com)

Laurus  
Designs, LLC



1012 Pine Street  
Silverton, Oregon  
503.784.6494

Main Street  
Apartments  
for  
Home First  
Development

1000 West Main Street  
Molalla, Oregon



COVER  
SHEET

December 21st, 2021

### REVISIONS

#	DATE	NOTES	INITIALS

# LO.0

SHEET 1 OF 3

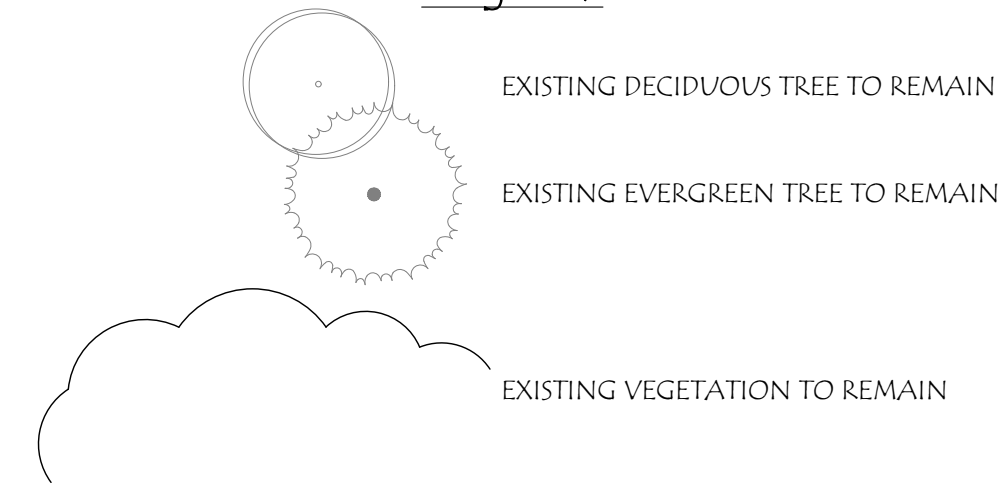
### Landscape Requirements and Calculations

SITE SQUARE FOOTAGE (SF): 128,286 SF (2.95 ACRES)  
 TOTAL LANDSCAPE SF: 48,379 SF  
 PROPOSED LANDSCAPE: 43,181 SF  
 EXISTING LANDSCAPE TO REMAIN: 5,198 SF  
 LANDSCAPE PERCENTAGE: 38%

TOTAL USEABLE OPEN SPACE (MIN. 20' WIDTH DIMENSION): 26,142 SF

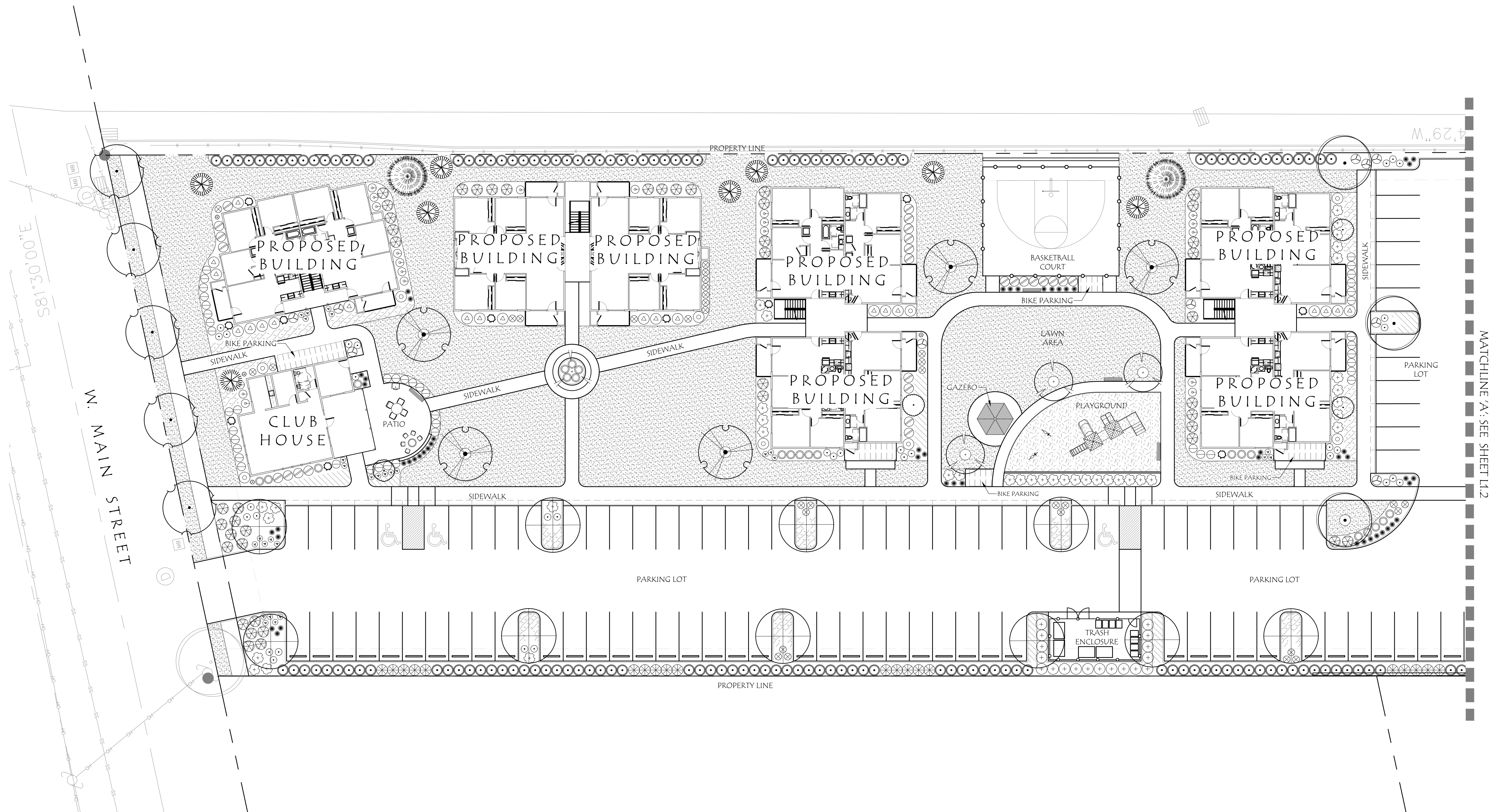
PARKING LOT SF: 35,279 SF  
 LANDSCAPE PARKING LOT SF: 6,418 SF  
 LANDSCAPE PERCENTAGE (MIN. 10 %): 18%

### Legend:



### General Notes:

1. PLANTING PLAN FOR PRELIMINARY USE ONLY, NOT FOR BIDDING OR CONSTRUCTION.
2. SEE ARCHITECTURAL DRAWINGS FOR SITE PLAN.
3. SEE CIVIL DRAWINGS FOR GRADING AND UTILITIES.
4. STREET TREES TO BE A MINIMUM OF 2" CALIPER.
5. PLANT LEGENDS SEE SHEET L1.2.
6. CHILDREN'S PLAY AREA AND WOODCHIP PLAY SURFACE TO CONFORM TO CPSC AND ASTM PLAYGROUND STANDARDS AND GUIDELINES. PLAY EQUIPMENT TO BE SELECTED.
7. SITE FURNISHINGS INCLUDING PLAY EQUIPMENT TO BE SELECTED.
8. IRRIGATION TO BE AN AUTOMATIC UNDERGROUND SYSTEM DESIGNED BY THE LANDSCAPE ARCHITECT.



Laurus Designs, LLC



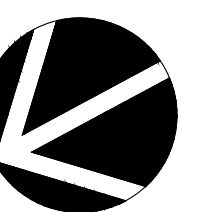
1012 Pine Street  
 Silverton, Oregon  
 503.784.6494

Main Street Apartments  
 for  
 Home First Development

1000 West Main Street  
 Molalla, Oregon



PRELIMINARY PLANTING PLAN



SCALE: 1"=20'-0"  
 0' 10' 20' 40'  
 SCALE

December 21st, 2021

### REVISIONS

#	DATE	NOTES	INITIALS

L1.1

SHEET 2 OF 3

Plant Legend

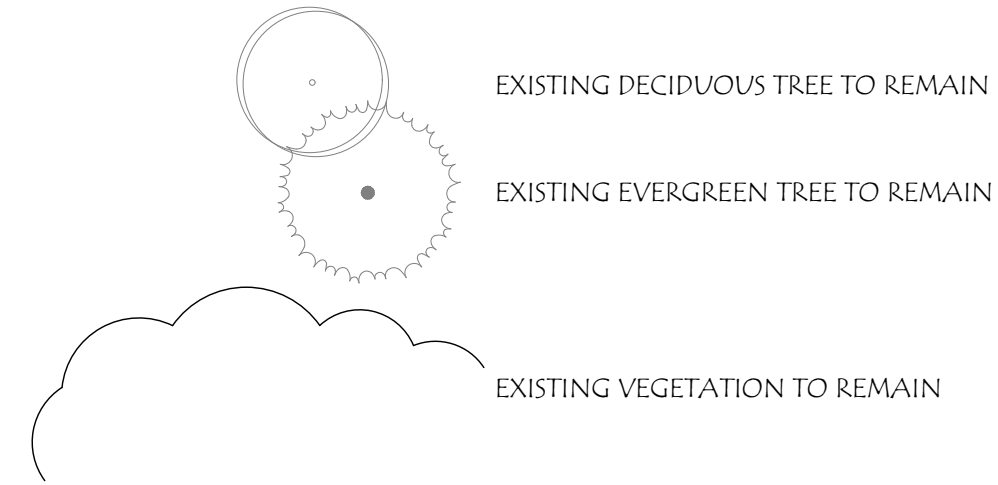
TREES	QTY	BOTANICAL / COMMON NAME	SIZE
	3	Calocedrus decurrens / Incense Cedar	4-6" Ht., B&B
	12	Chamaecyparis nootkatensis 'Glauca Pendula' / Weeping Nootka False Cypress	4-6" Ht., B&B
	4	Cornus florida / Flowering Dogwood	1 1/2" Cal., B&B
	5	Fraxinus oxycarpa 'Flame' / Flame Ash	2" Cal., B&B, Street Tree
	15	Juniperus scopulorum 'Skyrocket' / Skyrocket Juniper	4-6" Ht., B&B
	7	Nyssa sylvatica 'Wildfire' / Black Gum	1 1/2" Cal., B&B
	6	Prunus serrulata 'Amanogawa' / Japanese Flowering Cherry	1 1/2" Cal., B&B
	6	Tilia tomentosa 'Sterling' / Sterling Silver Linden	1 1/2" Cal., B&B
	11	Zelkova serrata 'Green Vase' / Sawleaf Zelkova	1 1/2" Cal., B&B

SHRUBS	QTY	BOTANICAL / COMMON NAME	SIZE
	58	Abelia x grandiflora 'Kaleidoscope' / Kaleidoscope Abelia	2 Gal.
	29	Abelia x grandiflora 'Sherwoodii' / Sherwood Glossy Abelia	2 Gal.
	196	Euonymus japonicus / Japanese Spindle	5 Gal.
	18	Euonymus japonicus 'Silver King' / Silver King Euonymus	3 Gal.
	6	Ilex crenata 'Sky Pencil' / Sky Pencil Japanese Holly	24"-30" Ht., 2 Gal. Min.
	47	Ilex crenata 'Soft Touch' / Soft Touch Japanese Holly	2 Gal.
	38	Nandina domestica 'Gulf Stream' TM / Gulf Stream Heavenly Bamboo	2 Gal.
	42	Osmanthus heterophyllus 'Goshiki' / Goshiki Holly Olive	5 Gal.
	63	Prunus laurocerasus 'Mount Vernon' / Mount Vernon Laurel	2 Gal.
	45	Rhaphiolepis indica 'Ballerina' / Ballerina Indian Hawthorn	2 Gal.
	38	Rhaphiolepis umbellata 'Minor' / Yedda Hawthorn	2 Gal.
	34	Rosa x 'KO Double' / Pink Double Knockout Rose	2 Gal.
	28	Sarcococca confusa / Sweetbox	2 Gal.
	17	Spiraea japonica 'Goldflame' / Goldflame Japanese Spirea	2 Gal.
	12	Weigela florida 'Alexandra' TM / Wine and Rose Weigela	3 Gal.

GRASSES / PERENNIALS	QTY	BOTANICAL / COMMON NAME	SIZE
	70	Helictotrichon sempervirens / Blue Oat Grass	1 Gal.
	38	Hemerocallis x 'Ruby Stella' / Ruby Stella Daylily	1 Gal.

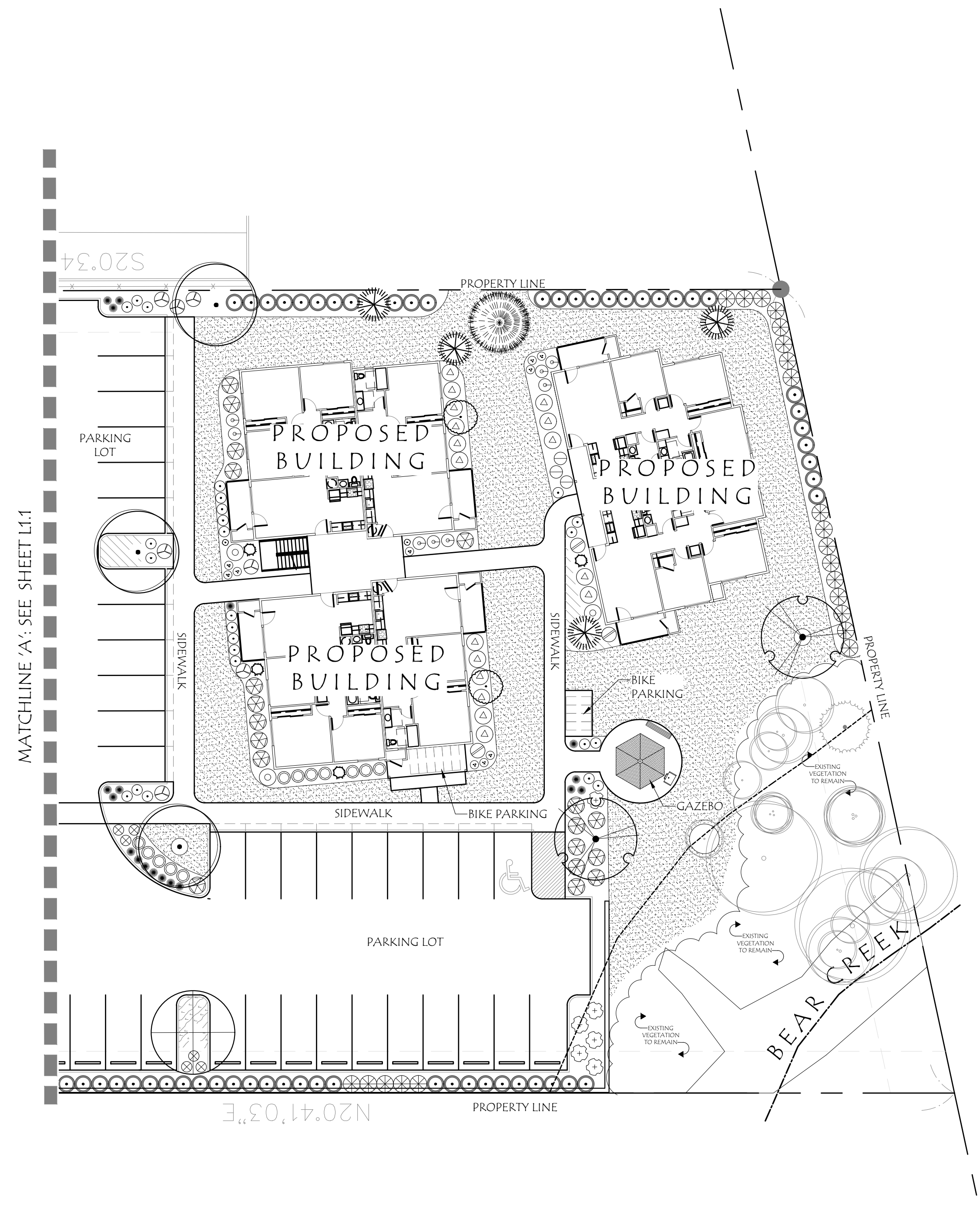
GROUND COVERS	QTY	BOTANICAL / COMMON NAME	SIZE	SPACING
	104	Arctostaphylos uva-ursi 'Massachusetts' / Massachusetts Kinnikinnick	1 Gal.	30" o.c.
	76	Rubus pentalobus 'Emerald Carpet' / Emerald Carpet Creeping Raspberry	1 Gal.	48" o.c.
	26,625 sf	ProTime 301 Water Smarter Fescue	Seed @ Rate of 350 lbs/acre	

Legend:



General Notes:

1. PLANTING PLAN FOR PRELIMINARY USE ONLY, NOT FOR BIDDING OR CONSTRUCTION.
2. SEE ARCHITECTURAL DRAWINGS FOR SITE PLAN.
3. SEE CIVIL DRAWINGS FOR GRADING AND UTILITIES.
4. STREET TREES TO BE A MINIMUM OF 2" CALIPER.
5. CHILDREN'S PLAY AREA AND WOODCHIP PLAY SURFACE TO CONFORM TO CPSC AND ASTM PLAYGROUND STANDARDS AND GUIDELINES. PLAY EQUIPMENT TO BE SELECTED.
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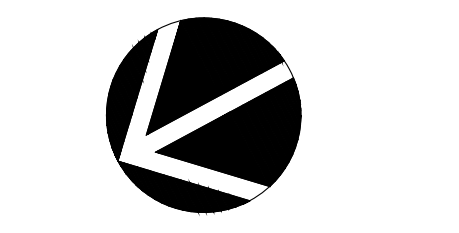


Main Street Apartments  
for  
Home First Development

1000 West Main Street  
Molalla, Oregon



PRELIMINARY PLANTING PLAN



SCALE: 1"=20'-0"  
0' 10' 20' 40'  
SCALE

December 21st, 2021

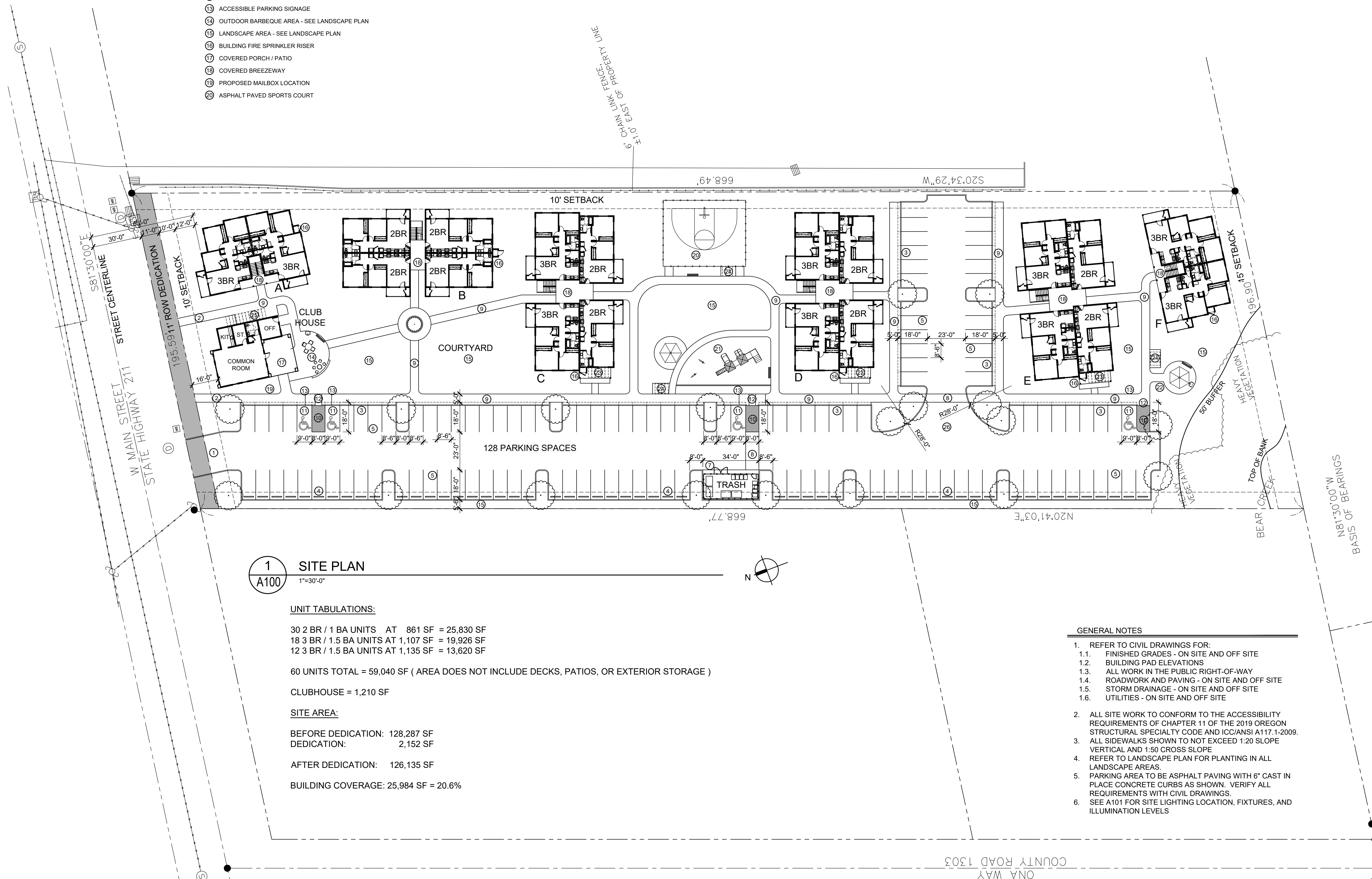
REVISIONS

#	DATE	NOTES	INITIALS



**KEY NOTES**

- ① VEHICLE SITE ENTRY
- ② PEDESTRIAN SITE ENTRY
- ③ 6" CAST IN PLACE CONCRETE CURB AROUND ENTIRE PARKING AREA
- ④ PRECAST CONCRETE WHEEL STOP AT EACH PARKING SPACE WHERE SHOWN
- ⑤ PAINTED PARKING SPACE STRIPING AT EACH PARKING SPACE
- ⑥ ASPHALT PAVED PARKING SPACES AND DRIVEWAY
- ⑦ TRASH ENCLOSURE - 6' HIGH BLACK CHAIN LINK FENCING WITH MATCHING BLACK INFILL SLATS, MATCHING PAIR OF 5' X 8' METAL GATES AND ONE 42" X 8' MANGATE WITH ACCESSIBLE HARDWARE
- ⑧ 5' WIDE PAINTED PEDESTRIAN CROSSING, 8' WIDE AT TRASH ENCLOSURE
- ⑨ 5' WIDE CONCRETE PEDESTRIAN SIDEWALK, 7' WIDE ADJACENT TO PARKING STALLS
- ⑩ STRIPED ACCESS AISLE
- ⑪ ACCESSIBLE PARKING SPACE
- ⑫ ACCESSIBLE CURB RAMP
- ⑬ ACCESSIBLE PARKING SIGNAGE
- ⑭ OUTDOOR BARBEQUE AREA - SEE LANDSCAPE PLAN
- ⑮ LANDSCAPE AREA - SEE LANDSCAPE PLAN
- ⑯ BUILDING FIRE SPRINKLER RISER
- ⑰ COVERED PORCH / PATIO
- ⑱ COVERED BREEZEWAY
- ⑲ PROPOSED MAILBOX LOCATION
- ⑳ ASPHALT PAVED SPORTS COURT
- ㉑ OUTDOOR PLAY AREA WITH COVERED SHELTER
- ㉒ OUTDOOR BARBEQUE AND COVERED SHELTER
- ㉓ COVERED BIKE PARKING FOR 6 BIKES
- ㉔ BIKE PARKING FOR 4 BIKES
- ㉕ BIKE PARKING FOR 12 BIKES
- ㉖ EMERGENCY VEHICLE TURN AROUND



**1 SITE PLAN**  
A100 1"=30'-0"

**UNIT TABULATIONS:**

30 2 BR / 1 BA UNITS AT 861 SF = 25,830 SF  
 18 3 BR / 1.5 BA UNITS AT 1,107 SF = 19,926 SF  
 12 3 BR / 1.5 BA UNITS AT 1,135 SF = 13,620 SF

60 UNITS TOTAL = 59,040 SF ( AREA DOES NOT INCLUDE DECKS, PATIOS, OR EXTERIOR STORAGE )

CLUBHOUSE = 1,210 SF

**SITE AREA:**

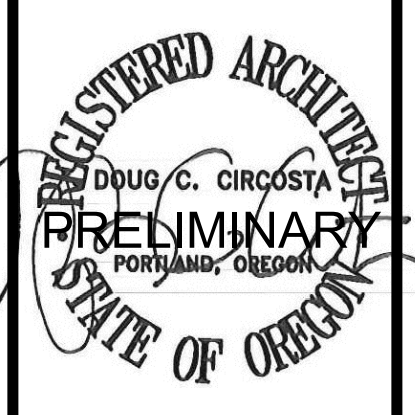
BEFORE DEDICATION: 128,287 SF  
 DEDICATION: 2,152 SF

AFTER DEDICATION: 126,135 SF

BUILDING COVERAGE: 25,984 SF = 20.6%

**GENERAL NOTES**

1. REFER TO CIVIL DRAWINGS FOR:
  - 1.1. FINISHED GRADES - ON SITE AND OFF SITE
  - 1.2. BUILDING PAD ELEVATIONS
  - 1.3. ALL WORK IN THE PUBLIC RIGHT-OF-WAY
  - 1.4. ROADWORK AND PAVING - ON SITE AND OFF SITE
  - 1.5. STORM DRAINAGE - ON SITE AND OFF SITE
  - 1.6. UTILITIES - ON SITE AND OFF SITE
2. ALL SITE WORK TO CONFORM TO THE ACCESSIBILITY REQUIREMENTS OF CHAPTER 11 OF THE 2019 OREGON STRUCTURAL SPECIALTY CODE AND ICC/ANSI A117.1-2009.
3. ALL SIDEWALKS SHOWN TO NOT EXCEED 1:20 SLOPE VERTICAL AND 1:50 CROSS SLOPE
4. REFER TO LANDSCAPE PLAN FOR PLANTING IN ALL LANDSCAPE AREAS.
5. PARKING AREA TO BE ASPHALT PAVING WITH 6" CAST IN PLACE CONCRETE CURBS AS SHOWN. VERIFY ALL REQUIREMENTS WITH CIVIL DRAWINGS.
6. SEE A101 FOR SITE LIGHTING LOCATION, FIXTURES, AND ILLUMINATION LEVELS



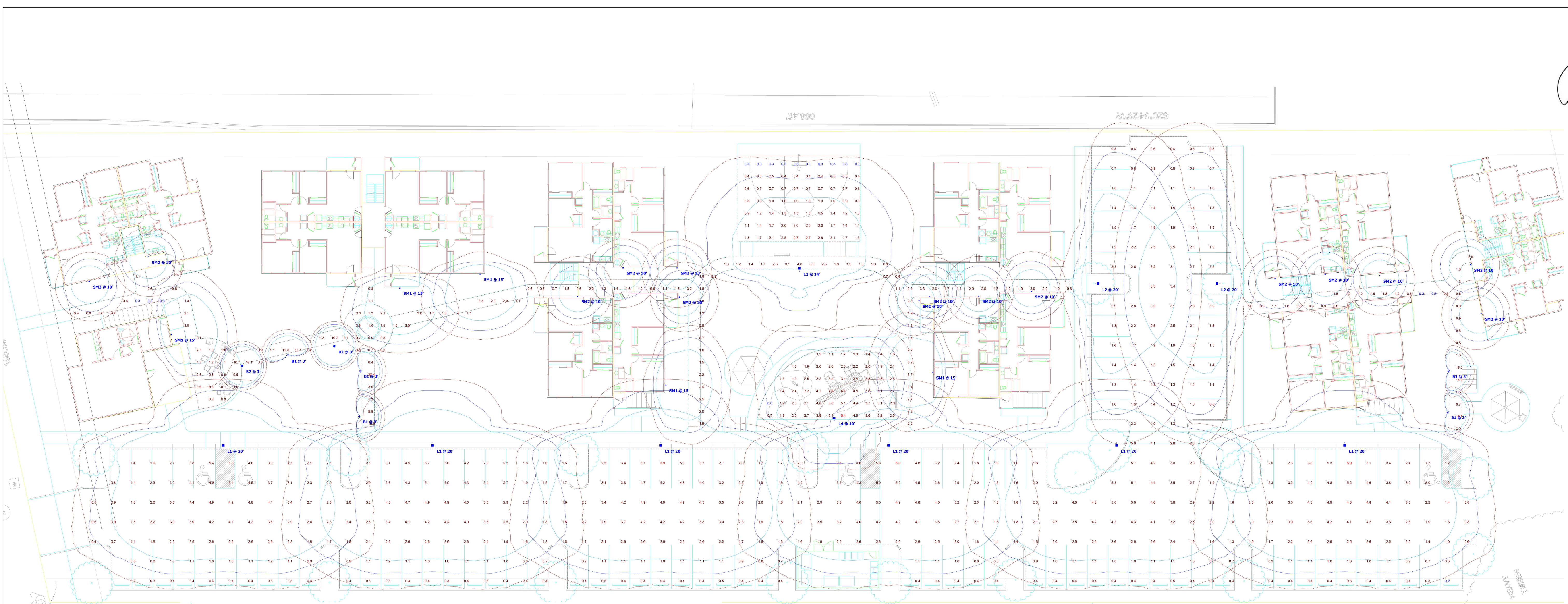
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 Doug Circosta, Architect  
 503-730-6908  
 14670 SW Forest Drive  
 Beaverton, OR 97007

**MOLALLA APARTMENTS**  
 1000 WEST MAIN STREET  
 MOLALLA, OR 97038

job no.: 2110  
 date: 10-25-2021

**SITE PLAN**

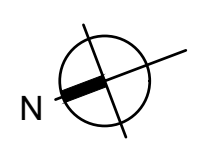
**A100**



Symbol	Label	Quantity	Manufacturer	Catalog Number	Description	Wattage
[Symbol]	B1	5	BEGA Converted by LITHONE V 17.13.2056 / H.R.	99 857 K3	99 857 K3	19.8
[Symbol]	SM1	5	Lithone Lighting	WEDGE LED P2 30K 8000U VW	WEDGE LED WITH P2 - PERFORMANCE PACKAGE, 3000K, 8000L VISUAL COMFORT WIDE OFFICE	15.0378
[Symbol]	SM2	15	Lithone Lighting	M415_REG	M415_REG	8.35
[Symbol]	B2	2	BEGA Converted by LITHONE V 17.13.2056 / H.R.	99855	99855	34
[Symbol]	L1	6	Lithone Lighting	DSK1 LED P2 30K 14W MVOLT 165	DSK1 LED P2 30K 14W 120VOLT with Non-remote shade	207
[Symbol]	L2	2	Lithone Lighting	DSK1 LED P2 30K 12W MVOLT 165	DSK1 LED P2 30K 12W 120VOLT with Non-remote shade	70
[Symbol]	L3	1	Lithone Lighting	DSK1 LED P1 30K 14W MVOLT	DSK1 LED P1 30K 14W 120VOLT	54
[Symbol]	L4	1	Lithone Lighting	DSK0 LED P2 30K 12W MVOLT	DSK0 LED P2 30K 12W 120VOLT	49

Description	Symbol	Avg	Max	Min	Max/Min	Avg/Min
Parking Lot	+	2.3 fc	5.9 fc	0.2 fc	29.5:1	11.5:1
Pathway 1 & 2	+	2.3 fc	20.4 fc	0.3 fc	68.0:1	7.7:1
Sportcourt	+	1.1 fc	2.7 fc	0.3 fc	9.0:1	3.7:1
Play Area	+	2.8 fc	6.4 fc	0.6 fc	10.7:1	4.7:1
Pathway 3	+	2.6 fc	18.7 fc	0.3 fc	62.3:1	8.7:1

1 SITE LIGHTING PLAN  
A101 NTS



MOLALLA APARTMENTS  
1000 WEST MAIN STREET  
MOLALLA, OR 97038

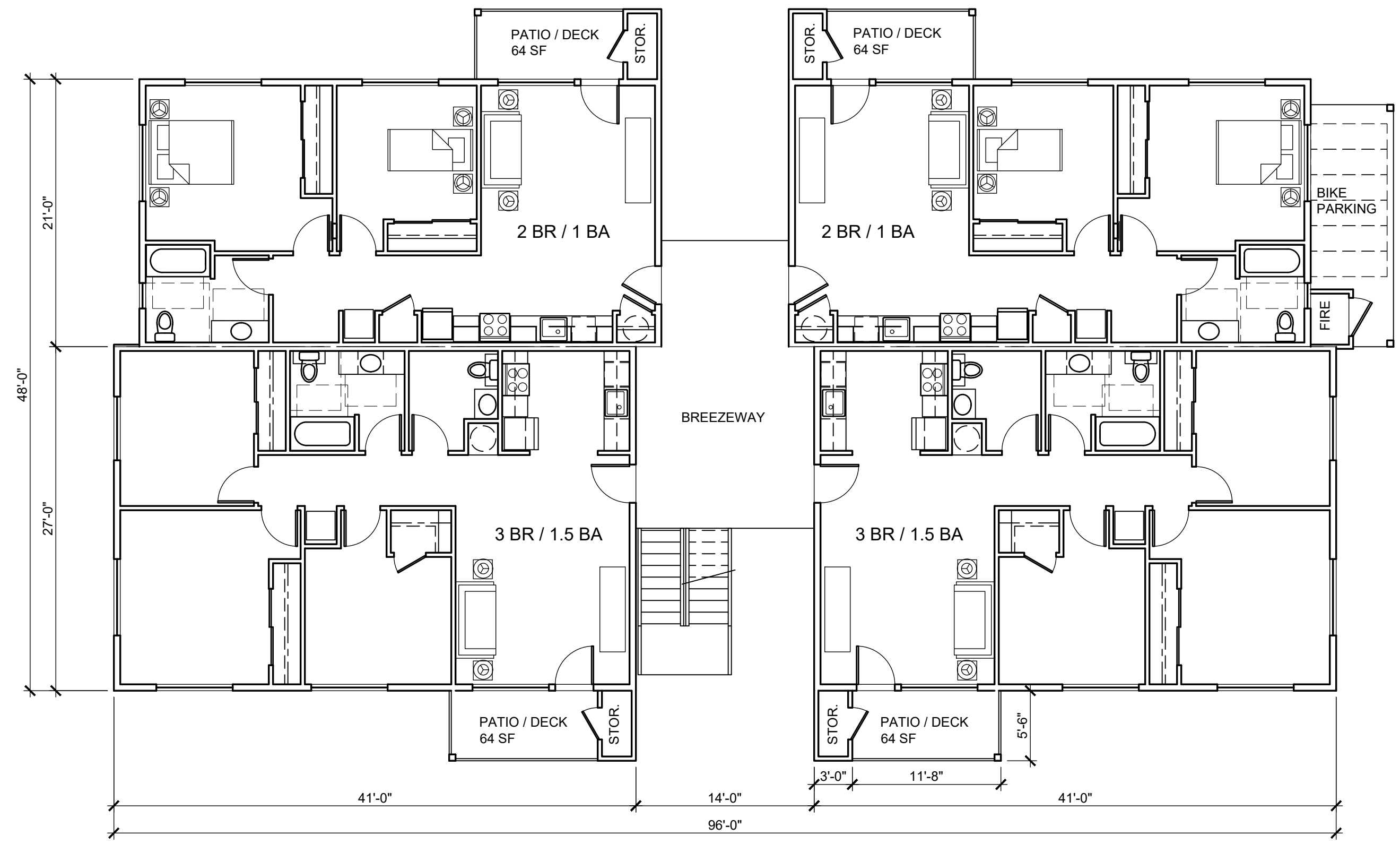
job no.: 2110  
date: 10-25-2021

SITE LIGHTING PLAN

A101



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 Beaverton, OR 97007



**5** FIRST FLOOR PLAN - BUILDINGS C, D, AND E  
 A200 1/8" = 1'-0"

**MATERIAL LEGEND**

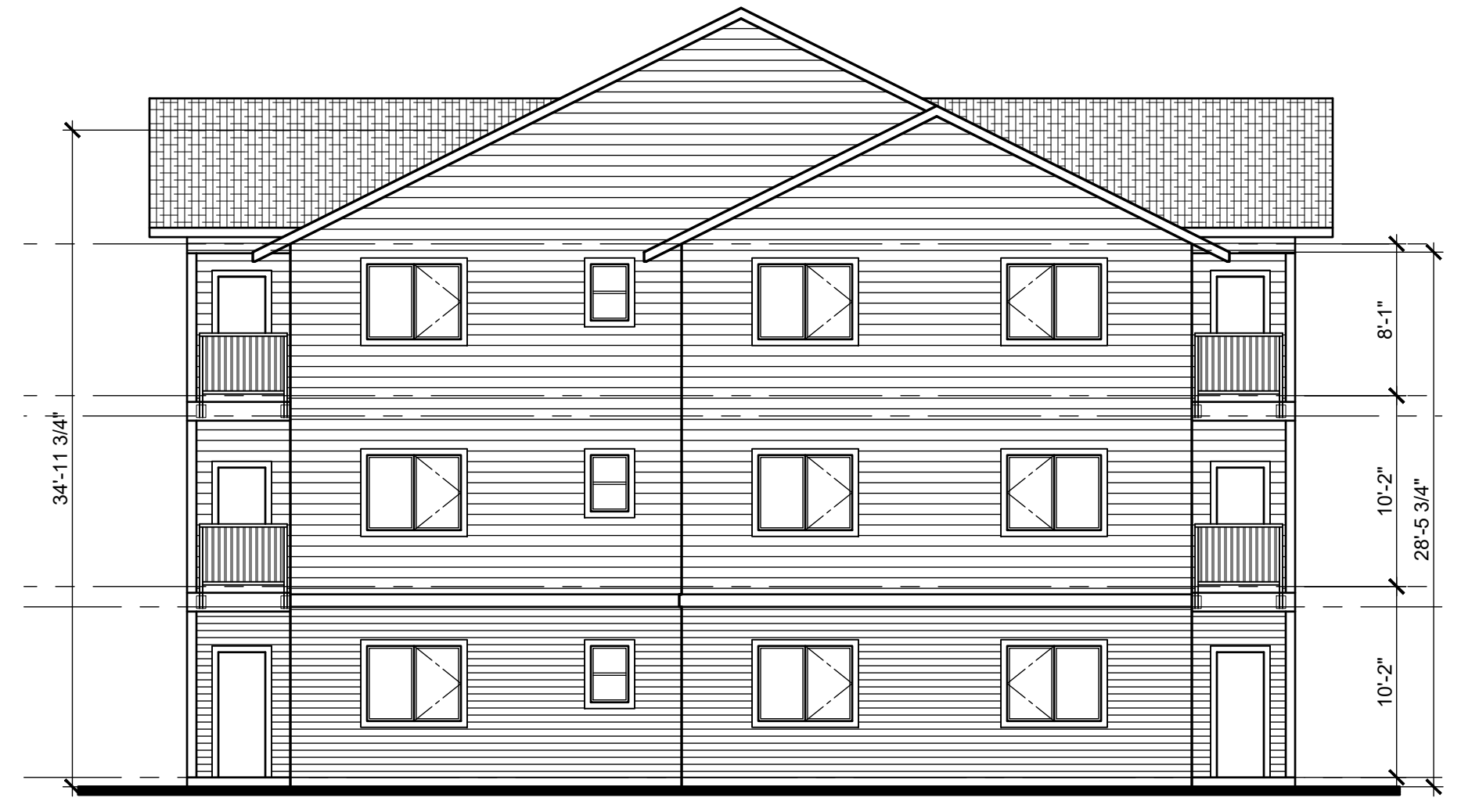
	ASPHALT SHINGLE ROOFING SYSTEM
	PAINTED FIBER CEMENT LAP SIDING WITH 4" EXPOSURE
	PAINTED FIBER CEMENT LAP SIDING WITH 7" EXPOSURE

**GENERAL NOTES**

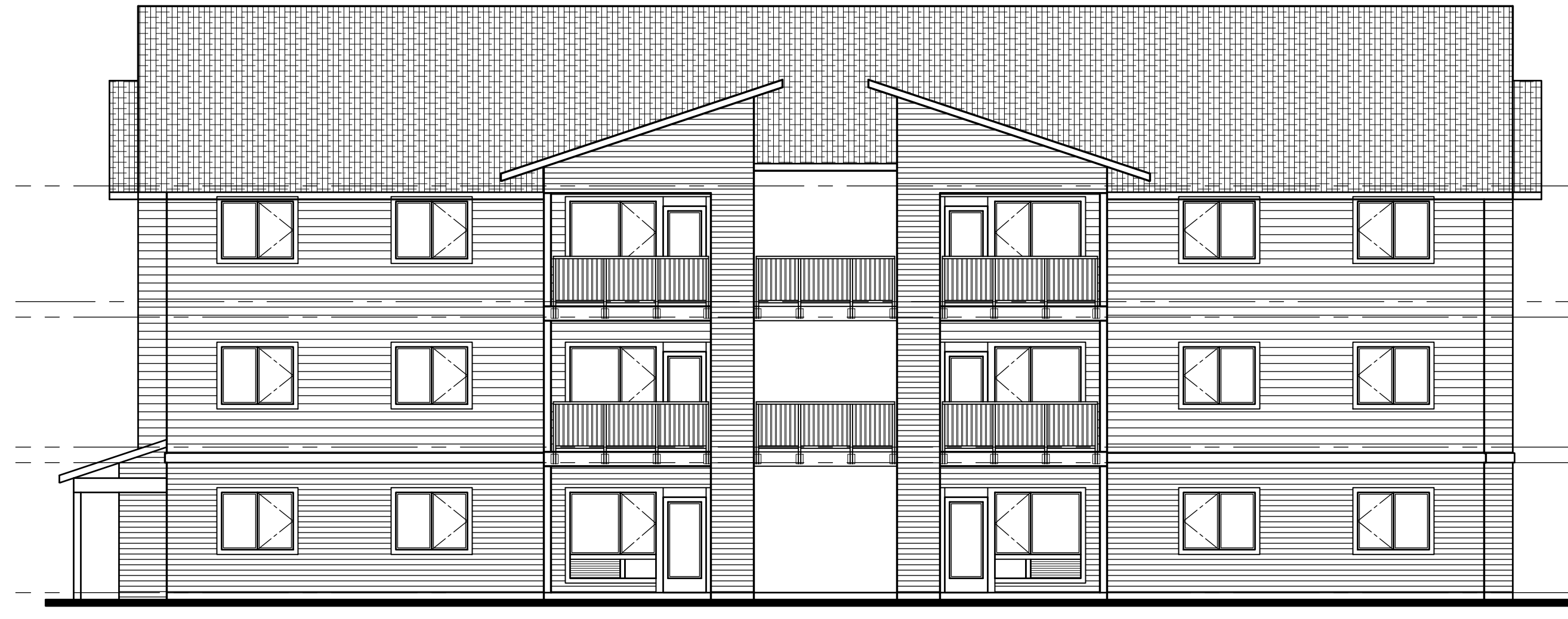
- ALL WINDOWS TO BE WHITE VINYL, DUAL PANE, LOW-E, INSULATED UNITS, CONFORMING TO CURRENT OREGON ENERGY CODE.
- ALL EXTERIOR DOORS TO BE PAINTED, INSULATED FIBERGLASS WITH INSULATED GLAZING.
- ALL BREEZEWAY LANDINGS TO BE WOOD BEAMS AND DECKING WITH CONCRETE TOPPING.
- ALL BREEZEWAY STAIRS TO BE STEEL STRINGERS WITH METAL TREADS AND METAL RAILINGS. ALL METAL TO BE BLACK FINISH.
- ALL ROOF EAVES TO HAVE PRE-FINISHED GUTTERS WITH DOWNSPOUTS CONNECTED TO STORM DRAINAGE SYSTEM.
- KEYNOTES SHOWN ON DRAWINGS APPLY TO ALL SIMILAR CONDITIONS.

**KEYNOTE LEGEND**

- 5/4 X 4 PAINTED TRIM AROUND ALL WINDOWS AND DOORS
- 5/4 X 8 PAINTED TRIM BAND
- 2 X 8 PAINTED FASCIA BOARD AT ALL ROOF RAKE AND EAVE LOCATIONS
- METAL RAILING WITH BLACK FINISH
- PAINTED WOOD POST AND AND DECK FASCIA
- TYPICAL PTAC HVAC UNIT ON GROUND FLOOR UNIT, BEHIND RAILING ON UPPER LEVELS



**3** EAST ELEVATION - BUILDINGS C, D, AND E  
 A200 1/8" = 1'-0"



**4** SOUTH ELEVATION - BUILDINGS C, D, AND E  
 A200 1/8" = 1'-0"



**1** NORTH ELEVATION - BUILDINGS C, D, AND E  
 A200 1/8" = 1'-0"



**2** WEST ELEVATION - BUILDINGS C, D, AND E  
 A200 1/8" = 1'-0"

MOLALLA APARTMENTS

1000 WEST MAIN STREET  
 MOLALLA, OR 97038

job no.: 2110  
 date: 10-25-2021

BUILDINGS  
 C, D, E

**A200**



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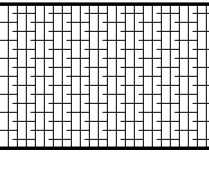
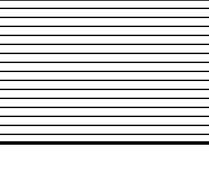
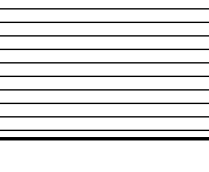
MOLALLA APARTMENTS  
 1000 WEST MAIN STREET  
 MOLALLA, OR 97038

job no.: 2110  
 date: 10-25-2021

BUILDING B

A201

**MATERIAL LEGEND**

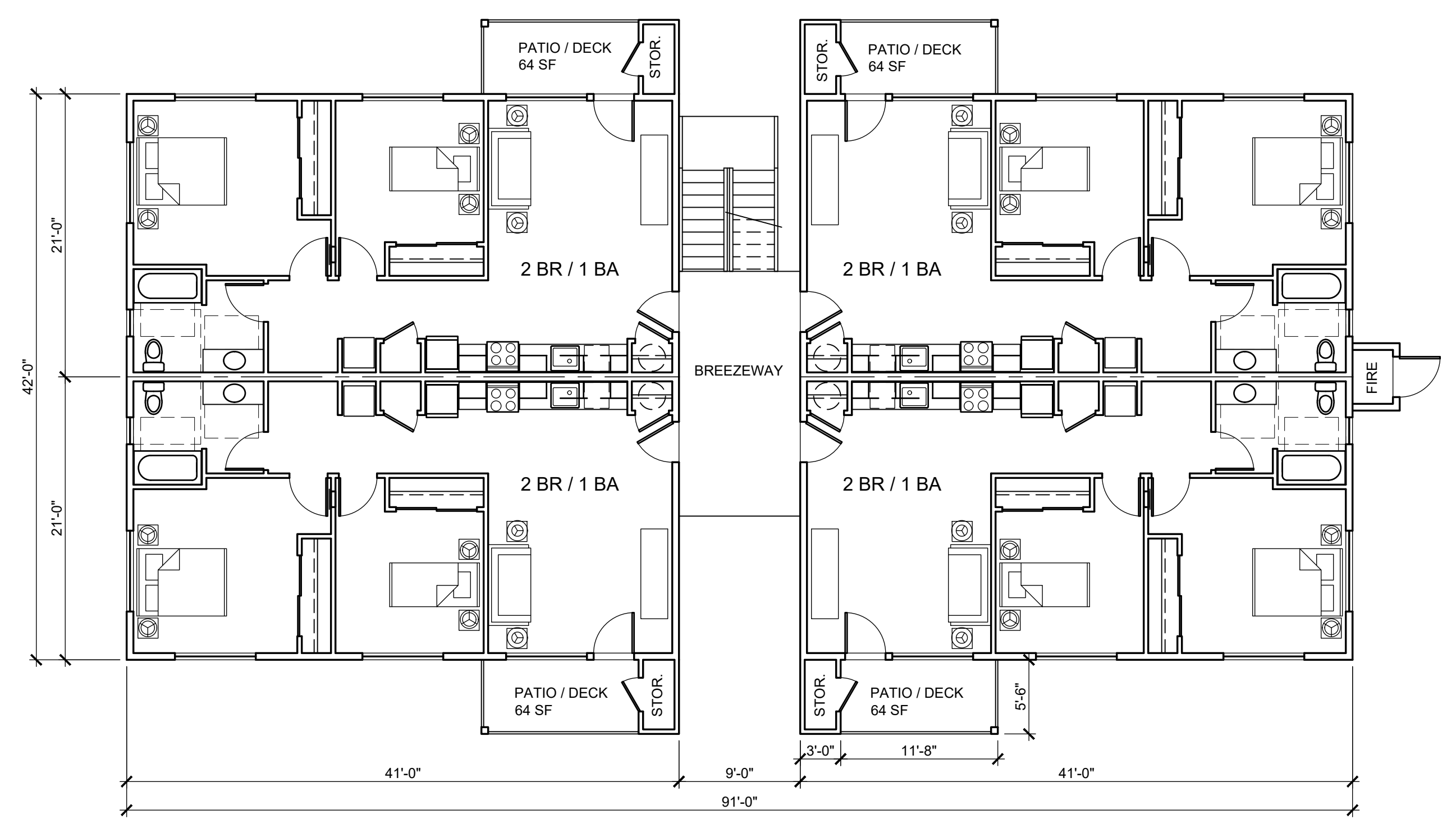
-  ASPHALT SHINGLE ROOFING SYSTEM
-  PAINTED FIBER CEMENT LAP SIDING WITH 4" EXPOSURE
-  PAINTED FIBER CEMENT LAP SIDING WITH 7" EXPOSURE

**GENERAL NOTES**

1. ALL WINDOWS TO BE WHITE VINYL, DUAL PANE, LOW-E, INSULATED UNITS CONFORMING TO CURRENT OREGON ENERGY CODE.
2. ALL EXTERIOR DOORS TO BE PAINTED, INSULATED FIBERGLASS WITH INSULATED GLAZING.
3. ALL BREEZEWAY LANDINGS TO BE WOOD BEAMS AND DECKING WITH CONCRETE TOPPING.
4. ALL BREEZEWAY STAIRS TO BE STEEL STRINGERS WITH METAL TREADS AND METAL RAILINGS. ALL METAL TO BE BLACK FINISH.
5. ALL ROOF EAVES TO HAVE PRE-FINISHED GUTTERS WITH DOWNSPOUTS CONNECTED TO STORM DRAINAGE SYSTEM.
6. KEYNOTES SHOWN ON DRAWINGS APPLY TO ALL SIMILAR CONDITIONS.

**KEYNOTE LEGEND**

- ① 5/4 X 4 PAINTED TRIM AROUND ALL WINDOWS AND DOORS
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- ④ METAL RAILING WITH BLACK FINISH
- ⑤ PAINTED WOOD POST AND AND DECK FASCIA
- ⑥ TYPICAL PTAC HVAC UNIT ON GROUND FLOOR UNIT, BEHIND RAILING ON UPPER LEVELS



5 FIRST FLOOR PLAN - BUILDINGS B  
 1/8" = 1'-0"



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



4 EAST ELEVATION - BUILDING B  
 1/8" = 1'-0"



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



2 SOUTH ELEVATION - BUILDING B  
 1/8" = 1'-0"



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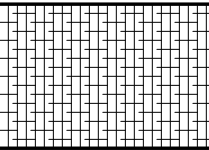
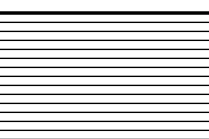
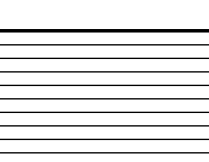
MOLALLA APARTMENTS  
 1000 WEST MAIN STREET  
 MOLALLA, OR 97038

job no.: 2110  
 date: 10-25-2021

BUILDING A

A202

**MATERIAL LEGEND**

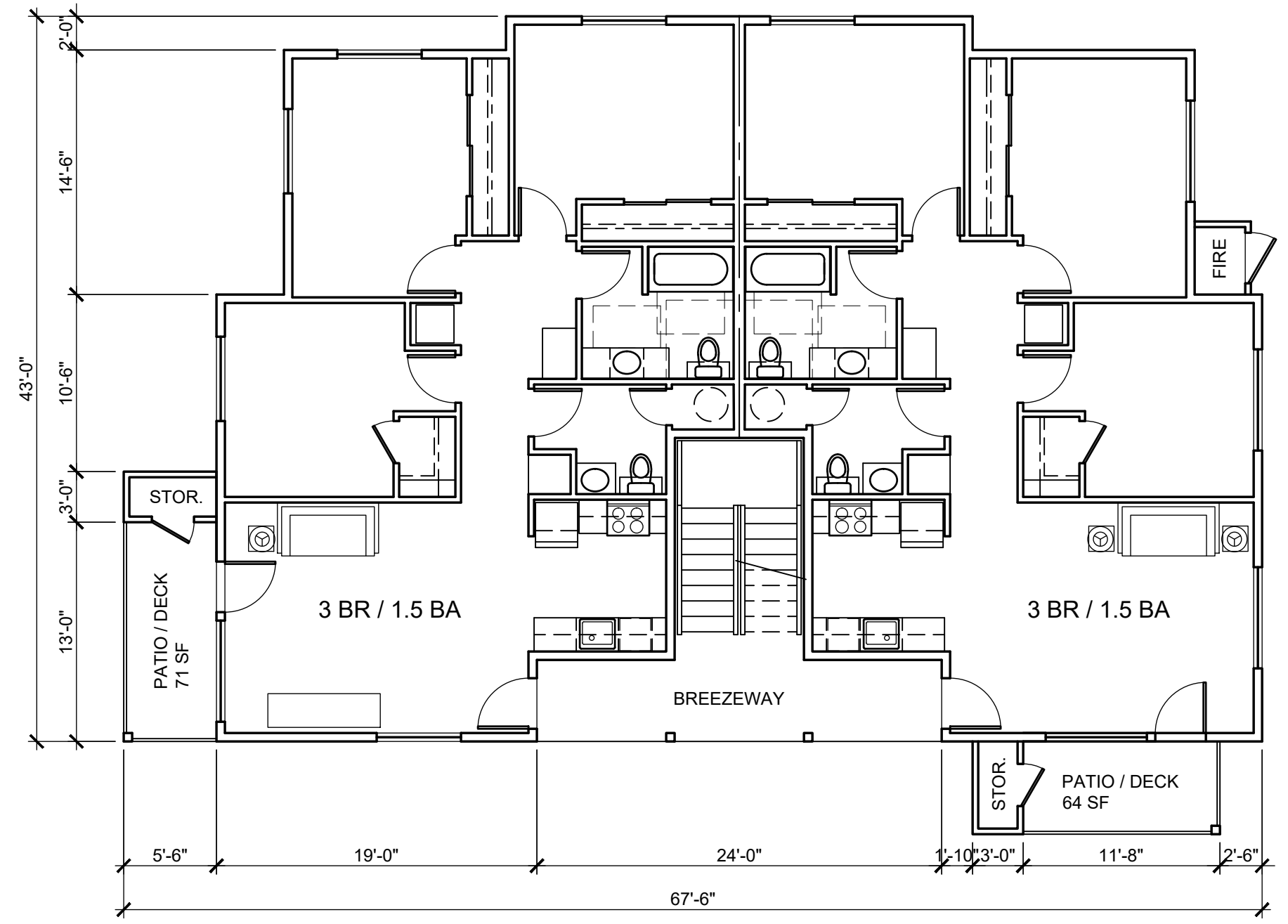
-  ASPHALT SHINGLE ROOFING SYSTEM
-  PAINTED FIBER CEMENT LAP SIDING WITH 4" EXPOSURE
-  PAINTED FIBER CEMENT LAP SIDING WITH 7" EXPOSURE

**GENERAL NOTES**

1. ALL WINDOWS TO BE WHITE VINYL, DUAL PANE, LOW-E, INSULATED UNITS CONFORMING TO CURRENT OREGON ENERGY CODE.
2. ALL EXTERIOR DOORS TO BE PAINTED, INSULATED FIBERGLASS WITH INSULATED GLAZING.
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6. KEYNOTES SHOWN ON DRAWINGS APPLY TO ALL SIMILAR CONDITIONS.

**KEYNOTE LEGEND**

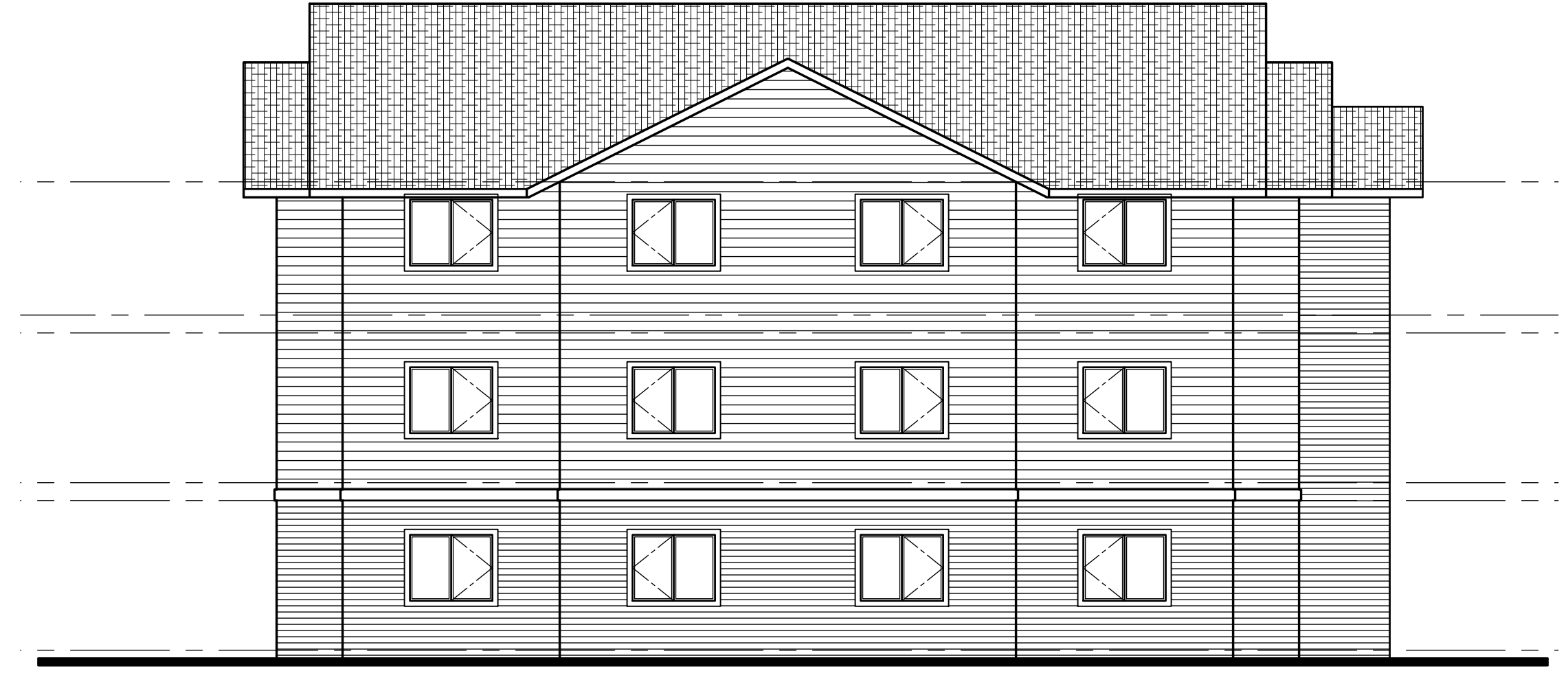
- ① 5/4 X 4 PAINTED TRIM AROUND ALL WINDOWS AND DOORS
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- ③ 2 X 8 PAINTED FASCIA BOARD AT ALL ROOF RAKE AND EAVE LOCATIONS
- ④ METAL RAILING WITH BLACK FINISH
- ⑤ PAINTED WOOD POST AND AND DECK FASCIA
- ⑥ TYPICAL PTAC HVAC UNIT ON GROUND FLOOR UNIT, BEHIND RAILING ON UPPER LEVELS



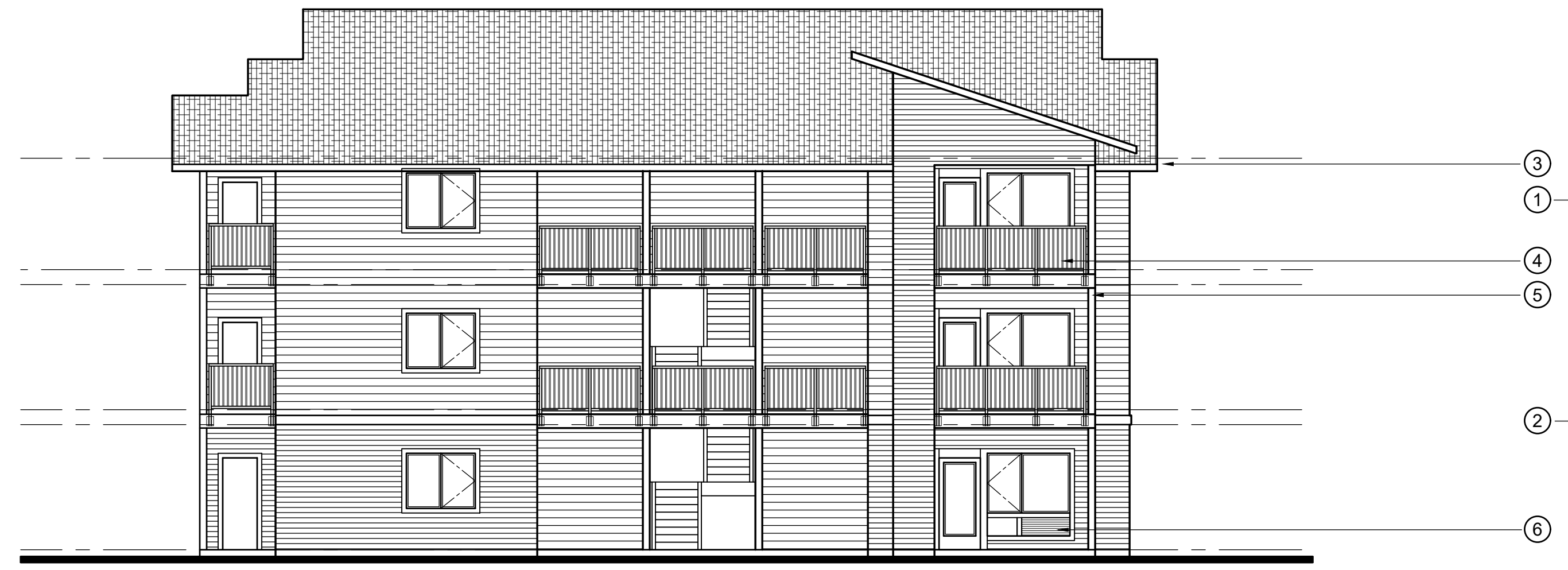
5 FIRST FLOOR PLAN - BUILDING A  
 1/8" = 1'-0"



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



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



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



2 NORTH ELEVATION - BUILDING A  
 1/8" = 1'-0"



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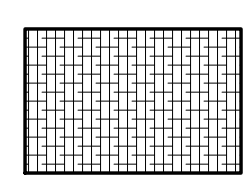
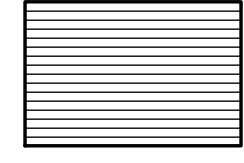
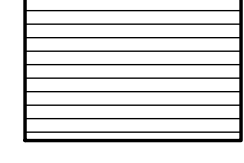
MOLALLA APARTMENTS  
 1000 WEST MAIN STREET  
 MOLALLA, OR 97038

job no.: 2110  
 date: 10-25-2021

BUILDING F

A203

**MATERIAL LEGEND**

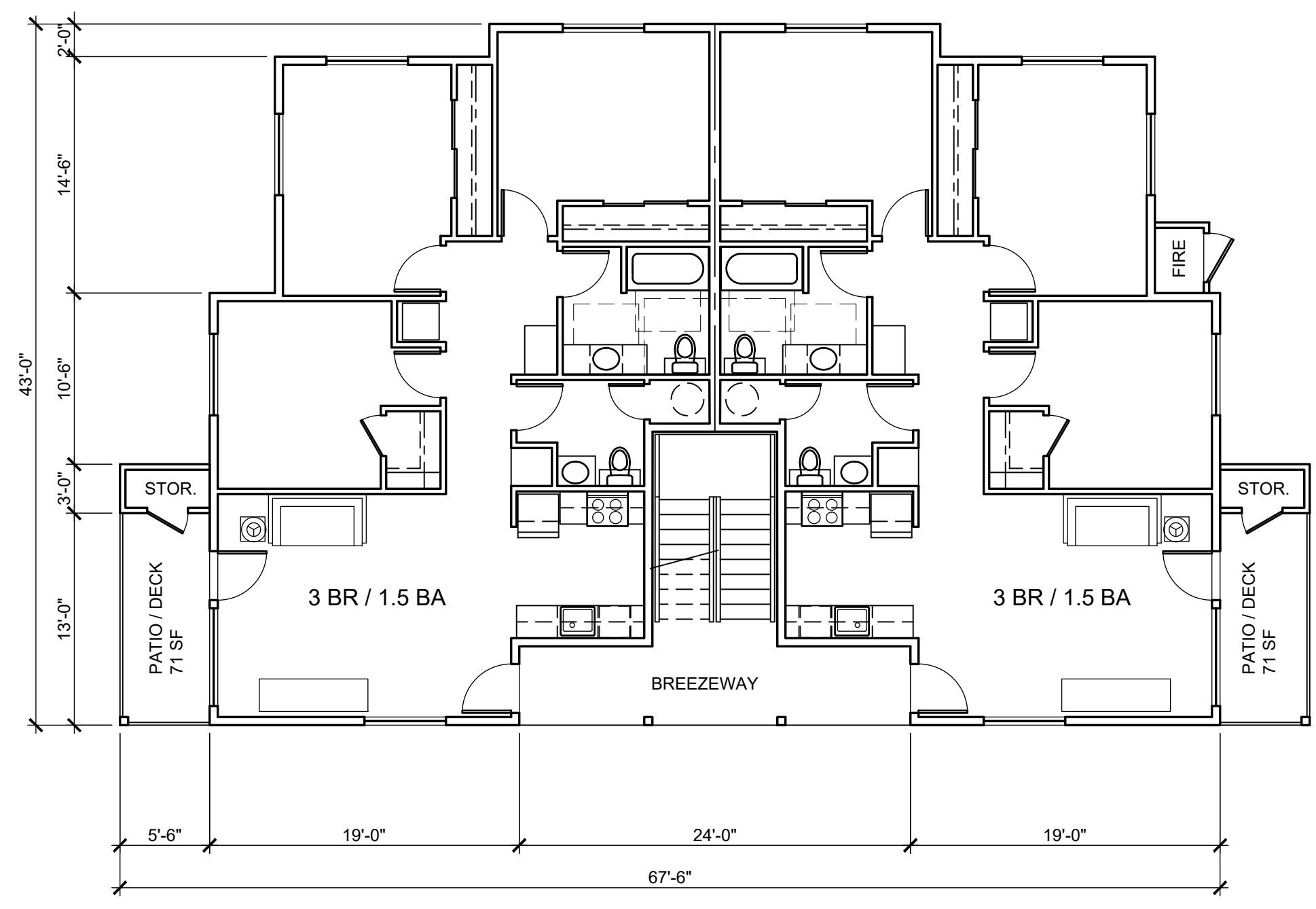
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-  PAINTED FIBER CEMENT LAP SIDING WITH 7" EXPOSURE

**GENERAL NOTES**

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3. ALL BREEZEWAY LANDINGS TO BE WOOD BEAMS AND DECKING WITH CONCRETE TOPPING.
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**KEYNOTE LEGEND**

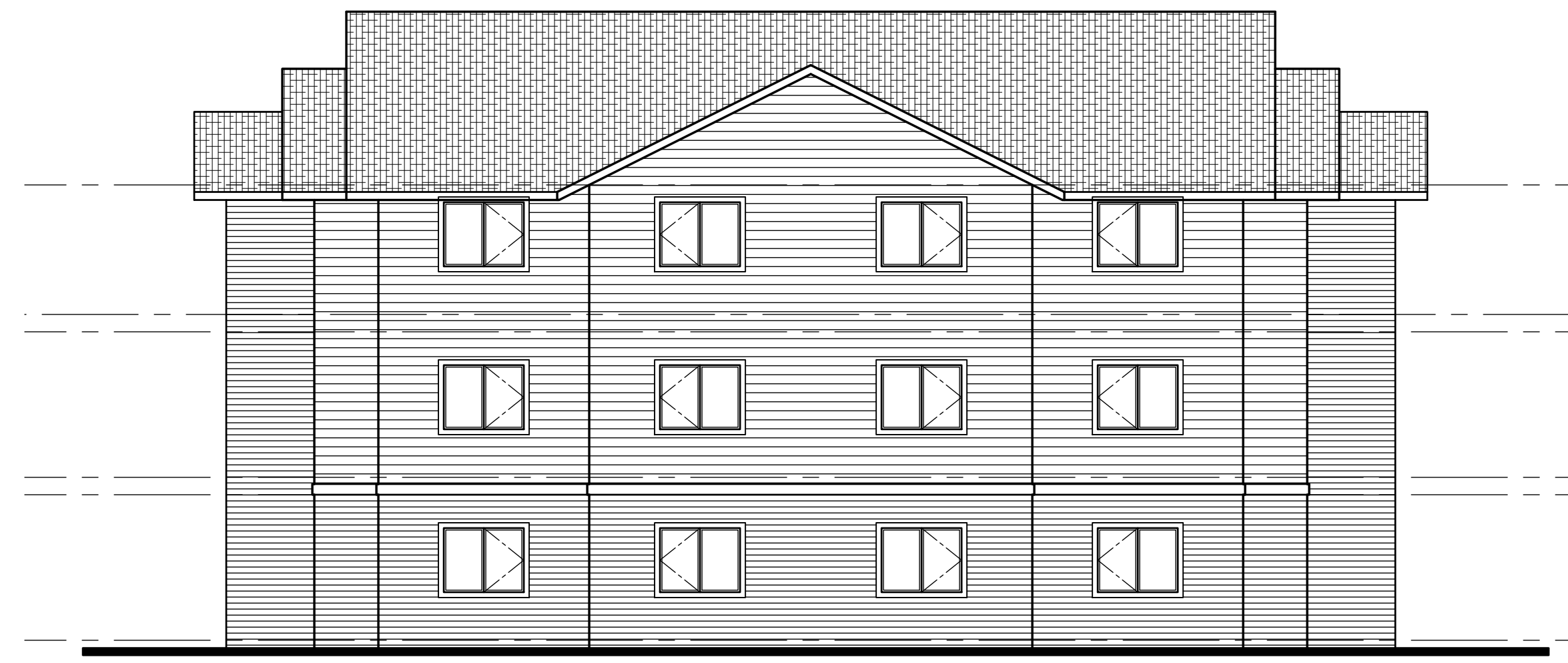
- ① 5/4 X 4 PAINTED TRIM AROUND ALL WINDOWS AND DOORS
- ② 5/4 X 8 PAINTED TRIM BAND
- ③ 2 X 8 PAINTED FASCIA BOARD AT ALL ROOF RAKE AND EAVE LOCATIONS
- ④ METAL RAILING WITH BLACK FINISH
- ⑤ PAINTED WOOD POST AND AND DECK FASCIA
- ⑥ TYPICAL PTAC HVAC UNIT ON GROUND FLOOR UNIT, BEHIND RAILING ON UPPER LEVELS



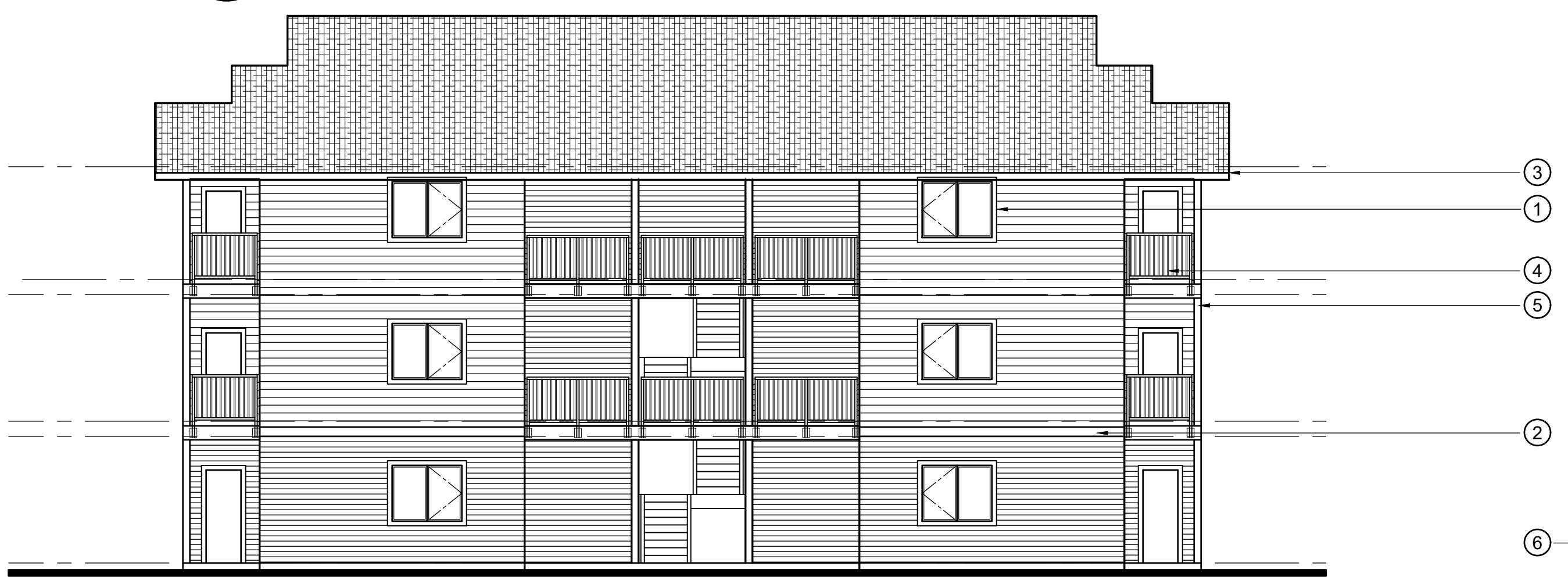
5 FIRST FLOOR PLAN - BUILDING F  
 1/8" = 1'-0"



3 EAST ELEVATION - BUILDING F  
 1/8" = 1'-0"



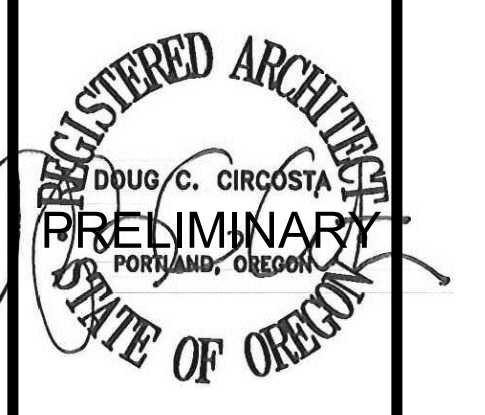
4 SOUTH ELEVATION - BUILDING F  
 1/8" = 1'-0"



1 NORTH ELEVATION - BUILDING F  
 1/8" = 1'-0"



2 WEST ELEVATION - BUILDING F  
 1/8" = 1'-0"



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 Doug Circosta, Architect  
 503-730-6908  
 14670 SW Forest Drive  
 Beaverton, OR 97007

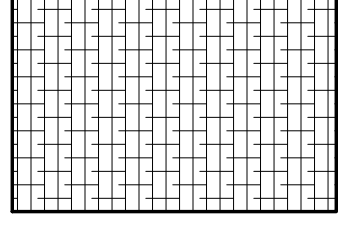
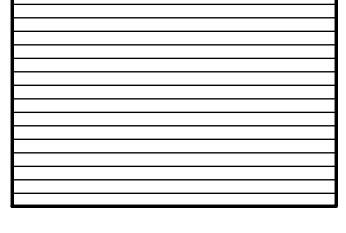
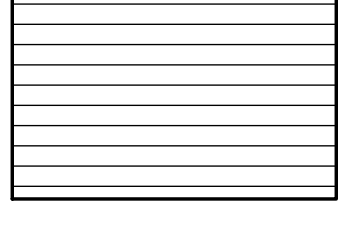
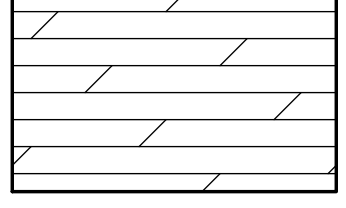
MOLALLA APARTMENTS  
 1000 WEST MAIN STREET  
 MOLALLA, OR 97038

job no.: 2110  
 date: 10-25-2021

CLUBHOUSE  
 AND TRASH  
 ENCLOSURE

**A204**

**MATERIAL LEGEND**

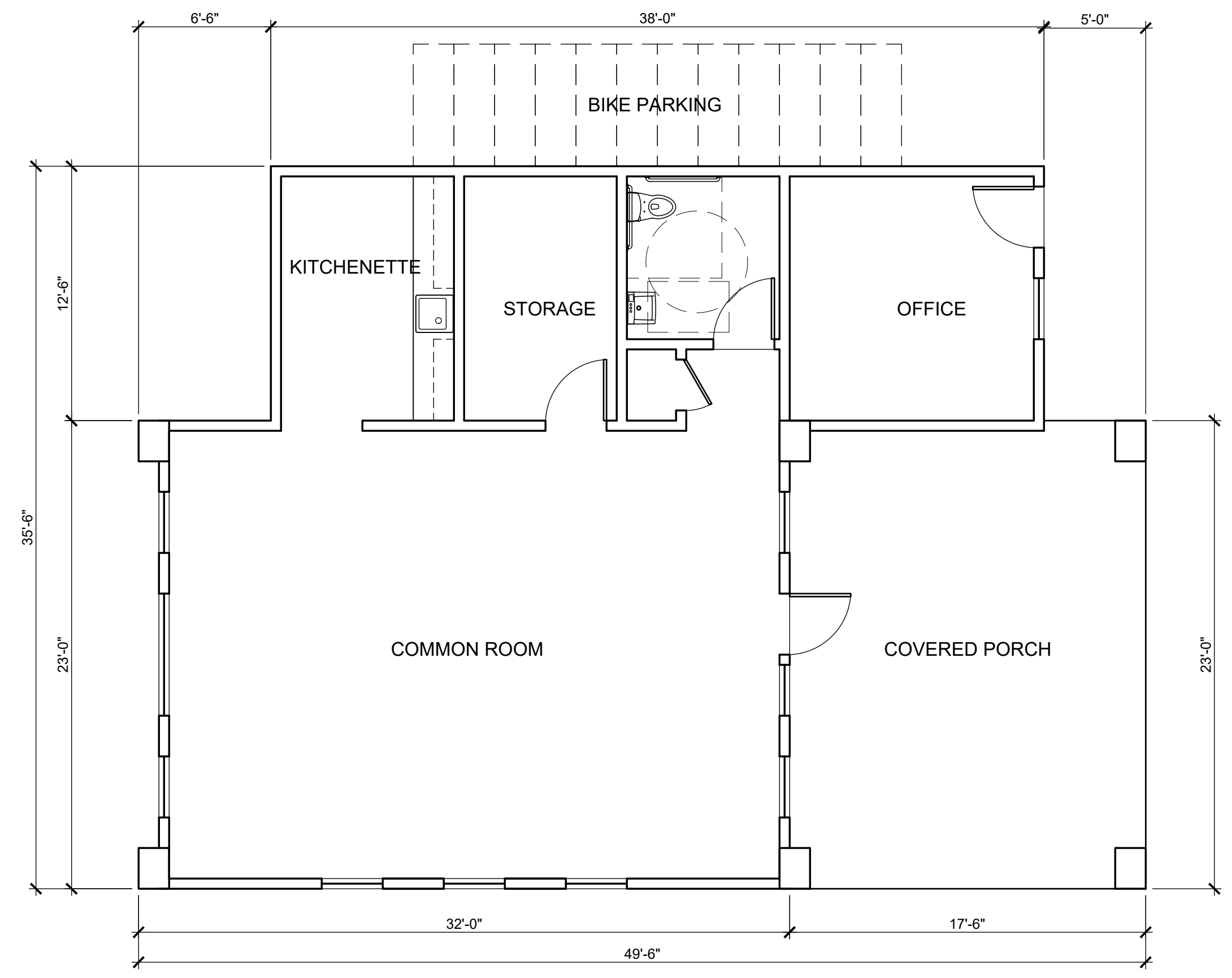
-  ASPHALT SHINGLE ROOFING SYSTEM
-  PAINTED FIBER CEMENT LAP SIDING WITH 4" EXPOSURE
-  PAINTED FIBER CEMENT LAP SIDING WITH 7" EXPOSURE
-  WOOD SIDING - STAINED

**GENERAL NOTES**

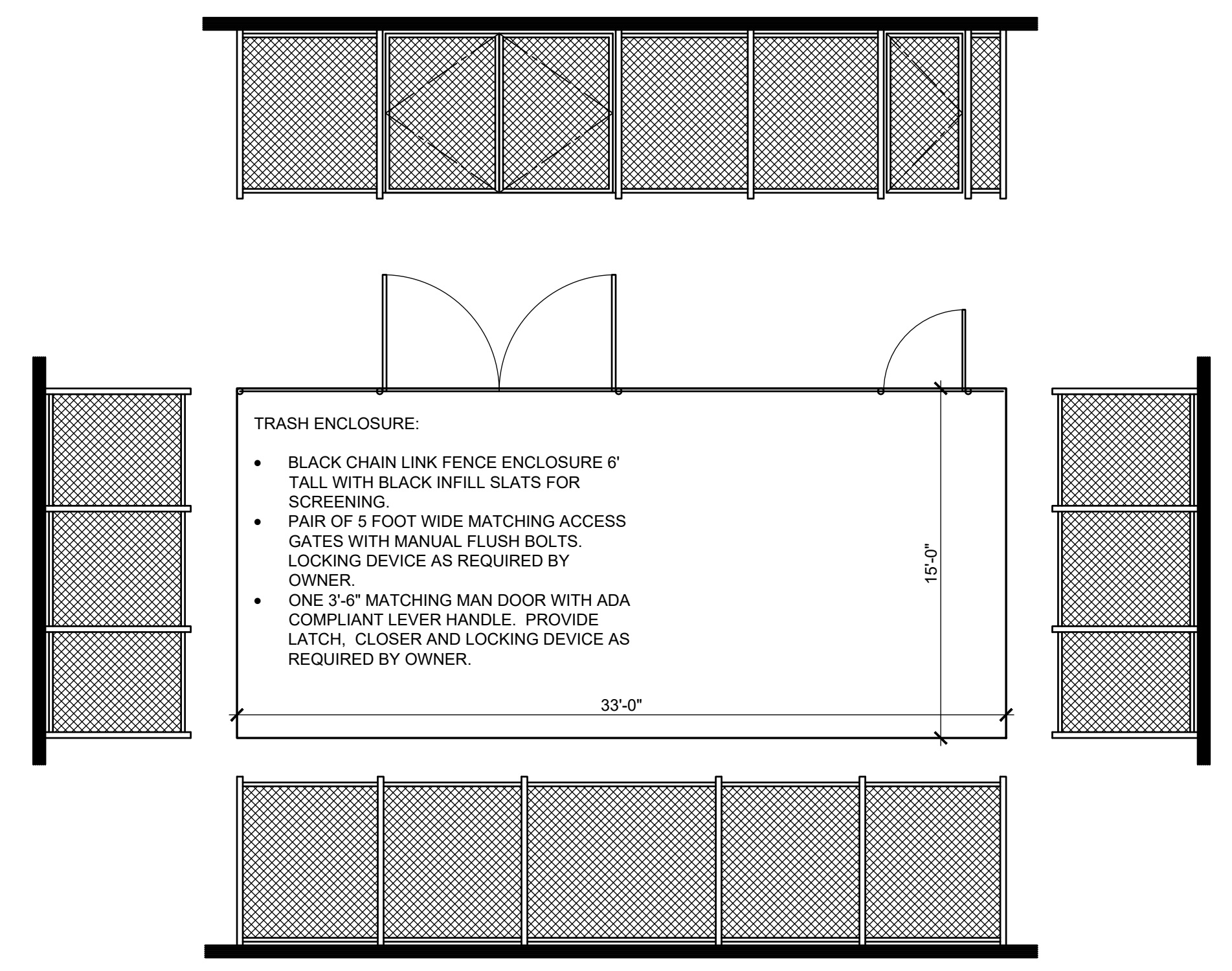
1. ALL WINDOWS TO BE WHITE VINYL, DUAL PANE, LOW-E, INSULATED UNITS CONFORMING TO CURRENT OREGON ENERGY CODE.
2. ALL EXTERIOR DOORS TO BE PAINTED, INSULATED FIBERGLASS WITH INSULATED GLAZING.
3. ALL ROOF EAVES TO HAVE PRE-FINISHED GUTTERS WITH DOWNSPOUTS CONNECTED TO STORM DRAINAGE SYSTEM.
4. KEYNOTES SHOWN ON DRAWINGS APPLY TO ALL SIMILAR CONDITIONS.

**KEYNOTE LEGEND**

- ① 5/4 X 4 PAINTED TRIM AROUND ALL WINDOWS AND DOORS
- ② 2 X 8 PAINTED FASCIA BOARD AT ALL ROOF RAKE AND EAVE LOCATIONS

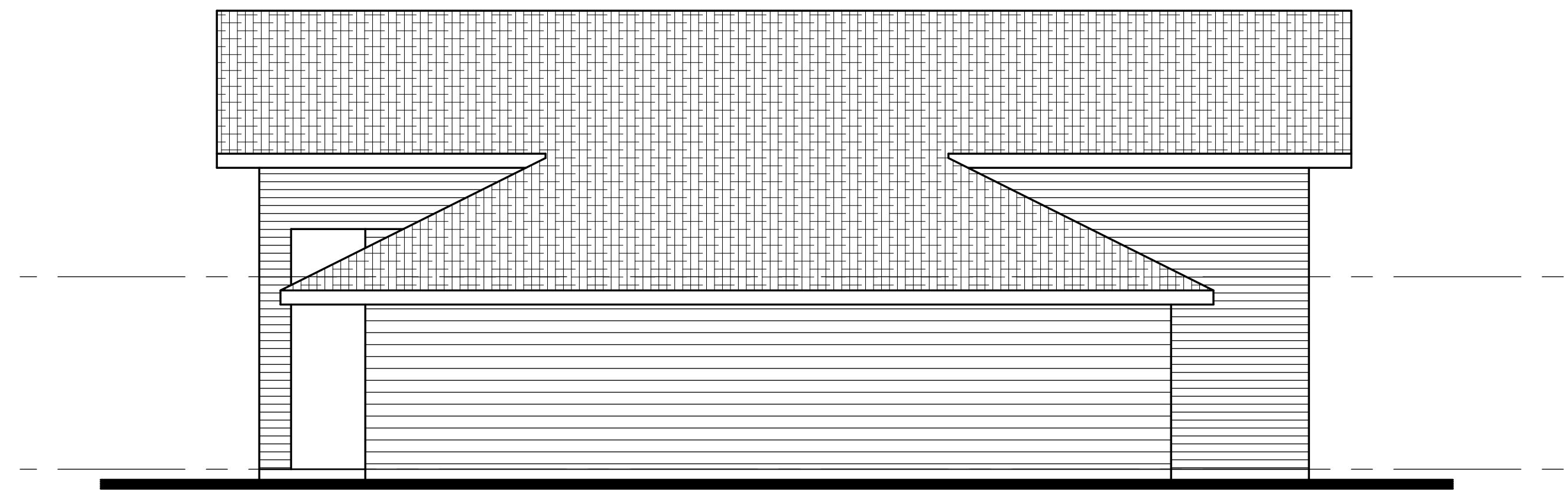


5 FLOOR PLAN - CLUBHOUSE  
 A202 3/16" = 1'-0"



- TRASH ENCLOSURE:
- BLACK CHAIN LINK FENCE ENCLOSURE 6' TALL WITH BLACK INFILL SLATS FOR SCREENING.
  - PAIR OF 5 FOOT WIDE MATCHING ACCESS GATES WITH MANUAL FLUSH BOLTS. LOCKING DEVICE AS REQUIRED BY OWNER.
  - ONE 3'-5" MATCHING MAN DOOR WITH ADA COMPLIANT LEVER HANDLE. PROVIDE LATCH, CLOSER AND LOCKING DEVICE AS REQUIRED BY OWNER.

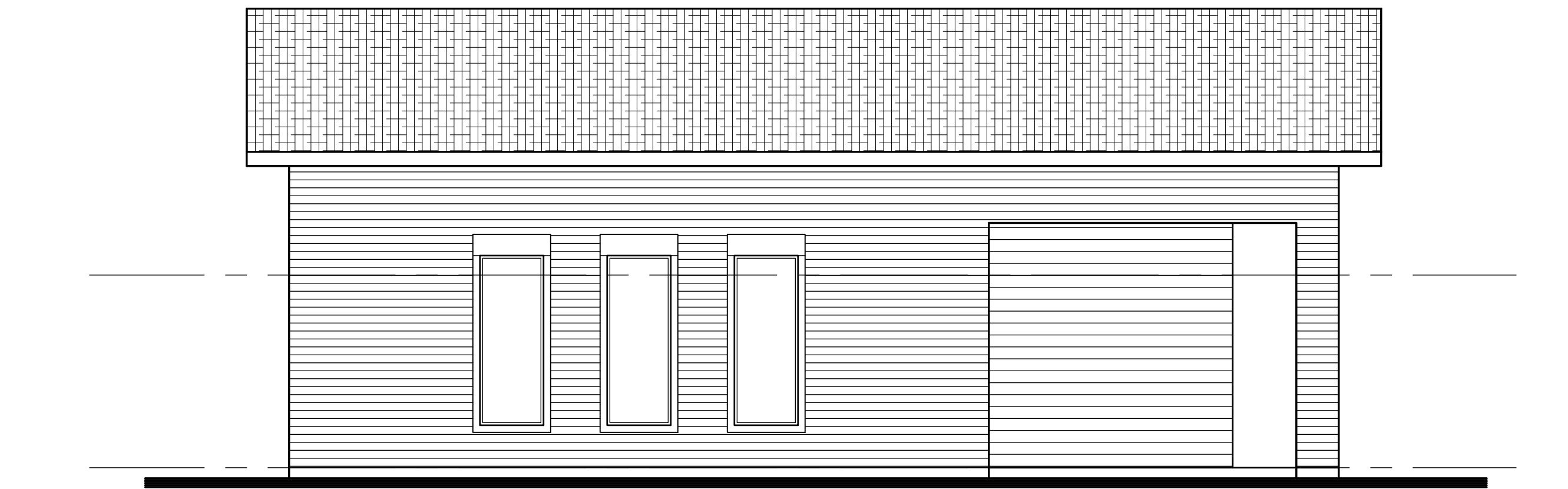
6 TRASH ENCLOSURE  
 A202 3/16" = 1'-0"



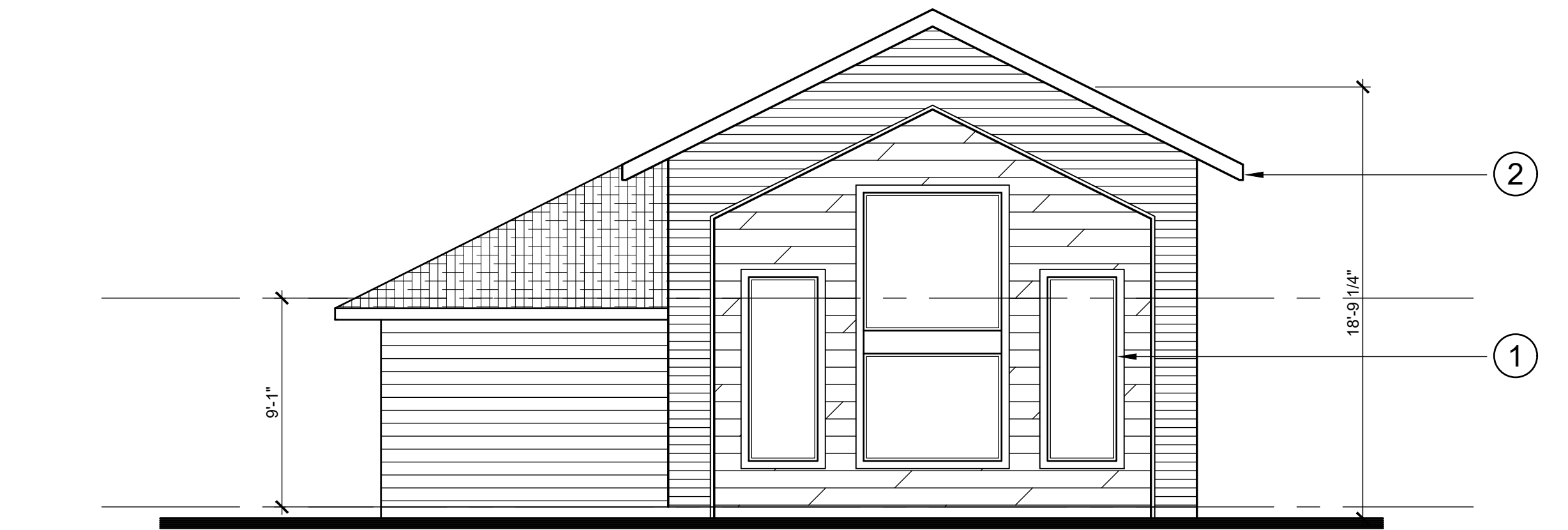
3 EAST ELEVATION - CLUBHOUSE  
 A204 3/16" = 1'-0"




4 SOUTH ELEVATION - CLUBHOUSE  
 A204 3/16" = 1'-0"



1 WEST ELEVATION - CLUBHOUSE  
 A204 3/16" = 1'-0"



2 NORTH ELEVATION - CLUBHOUSE  
 A204 3/16" = 1'-0"



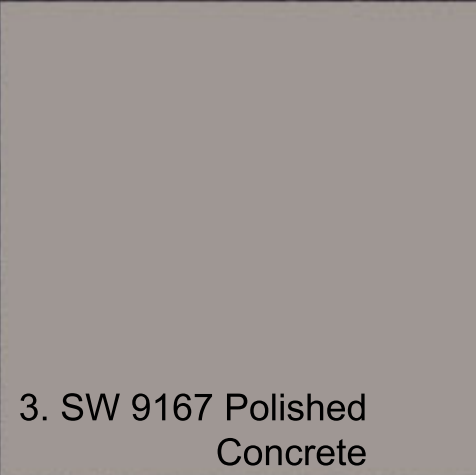
1. SW 7057 Silver Strand




2. SW 9131 Cornwall Slate




All Metal Stairs and Rails



3. SW 9167 Polished  
Concrete



4. SW 6004 Mink



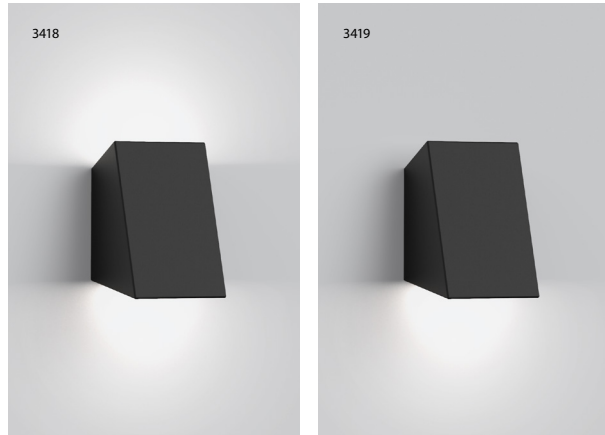
Roofing - Dual Black

PROJECT COLORS

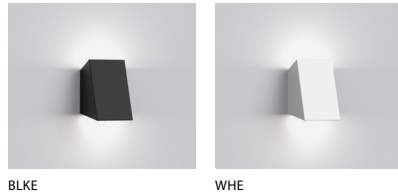


# CLIFF 3418/3419

PROJECT PROJET
SPEC TYPE
NOTES

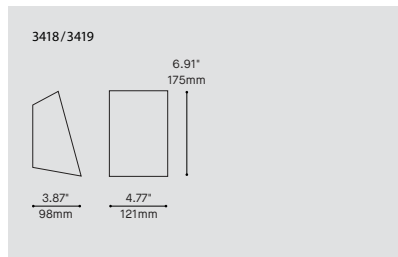


## FINISH FINI



BLKE

WHE



ORDERING SPECIFICATION	SPECIFICATION DE COMMANDE	CODE
<b>MODEL MODÈLE</b>		
3418	CLIFF - DUAL DIRECTION	
3419	CLIFF - SINGLE DIRECTION	
<b>LIGHT SOURCE SOURCE LUMINEUSE</b>		
3418		
LED.LO	LOW OUTPUT	
LED	REGULAR OUTPUT	
LED.HO	HIGH OUTPUT	
3419		
LED	REGULAR OUTPUT	
LED.HO	HIGH OUTPUT	
<b>COLOR TEMPERATURE TEMPÉRATURE DE COULEUR</b>		
30	3000K	
35	3500K	
40	4000K	
<b>COLOR RENDERING INDEX (CRI) INDICE DE RENDU DE COULEUR (IRC)</b>		80
80	80+ CRI	
<b>VOLTAGE VOLTAGE</b>		
120V	120 VOLT	
277V	277 VOLT	
<b>DIMMING OPTION OPTION DE GRADATION</b>		
DV	0-10V DIMMING (120V-277V)	
DP	PHASE DIMMING (120V ONLY)	
LED DIMMING DRIVER IS STANDARD IN THIS PRODUCT, PLEASE SPECIFY YOUR DIMMING TYPE		
<b>EMERGENCY BATTERY BATTERIE D'URGENCE</b>		
FOR INDOOR INSTALLATION ONLY. FOR 120V-277V ONLY. EM DRIVER BOX INCLUDED, INSTALLED REMOTELY. SEE EM GUIDE FOR DETAILS.		
EMB*	EMERGENCY BATTERY FOR REMOTE BOX	
* 3981EA ACCESSORY IS REQUIRED		
<b>HOUSING FINISH FINI BOITIER</b>		
BLKE	BLACK FINE TEXTURE	
WHE	WHITE FINE TEXTURE	
<b>DIFFUSER FINISH FINI DIFFUSEUR</b>		FRO
FRO	FROSTED	
<b>ACCESSORY ACCESSOIRE</b>		
3981EA	ELECTRICAL BOX FOR EMB EMERGENCY BATTERY	

## PRODUCT CHARACTERISTICS CARACTÉRISTIQUES DU PRODUIT



<b>DESIGN:</b>	A minimal yet rugged design; Cliff's charm is expressed through its simplicity and ingenuity. Its dual (3418) or single (3419) light output, can illuminate any space whether outdoor or indoor. (ADA compliant).
<b>INSTALLATION:</b>	Minimalist wall mounted installation with no visible fasteners. Cliff can be installed in two different vertical positions.
<b>LIGHT SOURCE:</b>	Custom designed LED module available in various light outputs. Offered with standard dimming options 0-10V (DV) or phase (DP).
<b>HOUSING:</b>	Durable die cast aluminum housing allows for high resistance to various weather conditions. Offered in a black or white textured finish.
<b>CERTIFIED:</b>	c-CSA-us. Rated IP65/UL Wet (water resistance).
<b>CONCEPTION:</b>	Un design à la fois minimaliste et robuste; Cliff démontre son charme par sa simplicité et son ingéniosité. Son éclairage double (3418) ou simple (3419) peut illuminer tout espace, extérieure ou intérieure. (Conforme à l'ADA).
<b>INSTALLATION:</b>	Installation murale minimale sans vis apparente. Cliff peut être installé dans deux différentes positions verticales.
<b>SOURCE LUMINEUSE:</b>	Module DEL unique offert avec plusieurs options d'intensité lumineuse. Disponible avec gradation standard de type 0-10V (DV) ou phase (DP).
<b>BOITIER:</b>	Boitier durable en aluminium moulé permet une haute résistance aux conditions extérieures variées. Disponible en fini texturé noir ou blanc.
<b>CERTIFIÉ:</b>	c-CSA-us. Évalué IP65/UL Wet (résistance à l'eau).

**Application**

System bollard head with 360° light distribution. Simply order the bollard head and also the required bollard tube in various heights and options. Both modules can be joined together easily and quickly during installation.

**Materials**

Luminaire housing constructed of die-cast marine grade, copper free (≤0.3% copper content) A360.0 aluminum alloy  
 Clear safety glass  
 Reflector made of pure anodized aluminum  
 High temperature silicone gasket  
 Mechanically captive stainless steel fasteners  
 Interlocking stainless steel mounting mechanism

**NRTL** listed to North American Standards, suitable for wet locations  
 Protection class IP65  
 Effective projection area: xxx sq. ft.  
 Weight: 10.1 lbs

**Electrical**

Operating voltage 120-277V AC  
 Minimum start temperature -30° C  
 LED module wattage 16.5 W  
 System wattage 19.8 W  
 Controllability 0-10V dimmable  
 Color rendering index Ra > 80  
 Luminaire lumens 1,838 lumens (4000K)  
 LED service life (L70) 60,000 hours

**LED color temperature**

- 4000K - Product number + **K4 (EXPRESS)**
- 3500K - Product number + **K35**
- 3000K - Product number + **K3 (EXPRESS)**
- 2700K - Product number + **K27**

**BEGA** can supply you with suitable LED replacement modules for up to 20 years after the purchase of LED luminaires - see website for details

**Finish**

All BEGA standard finishes are matte, textured polyester powder coat with minimum 3 mil thickness.

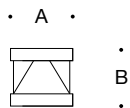
Available colors	Black (BLK)	White (WHT)	RAL:
	Bronze (BRZ)	Silver (SLV)	CUS:

Type:  
 BEGA Product:  
 Project:  
 Modified:

**Compatible bollard tube (select one)**

- 99 615** No access door - height 14 ½
- 99 622** With access door - height 32 ½
- 99 644** Integral floodlight
- 99 626** Integral GFCI outlet
- 99 658** Passive infrared motion sensor
- 99 635** Emergency lighting battery

See individual bollard tube spec sheet for details.



**System bollard head · shielded with reflector · 360°**

	LED	A	B
<b>99 856</b>	16.5 W	7 ½	7 ¼

**BEGA LED system bollard - luminaire head with unshielded light with safety guard - 180°**

**Enclosure:** Housing constructed of die-cast aluminum. Die-castings are marine grade, copper free ( $\leq 0.3\%$  copper content) A360.0 aluminum alloy. Glass diffuser, inside white. Fully gasketed for weather tight operation using molded silicone gasket.

**Installation:** BEGA LED system bollards are designed for easy attachment to system bollard tubes using an interlocking stainless steel mechanism and stainless steel set screw threaded into stainless steel insert. An accompanying bollard tube must be selected for proper installation, see below chart for compatible tube options.

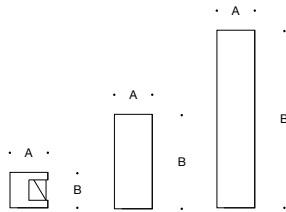
**Electrical:** 16.5W LED luminaire, 19.8 total system watts,  $-30^{\circ}\text{C}$  start temperature. Integral 120V through 277V electronic LED driver, 0-10V dimming. LED module(s) are available from factory for easy replacement. Standard LED color temperature is 3000K with a  $>80$  CRI. Available in 4000K ( $>80$  CRI); add suffix K4 to order.

**Note:** LEDs supplied with luminaire. Due to the dynamic nature of LED technology, LED luminaire data on this sheet is subject to change at the discretion of BEGA-US. For the most current technical data, please refer to [www.bega-us.com](http://www.bega-us.com).

**Finish:** All BEGA standard finishes are polyester powder coat with minimum 3 mil thickness. Available in four standard BEGA colors: Black (BLK); White (WHT); Bronze (BRZ); Silver (SLV). To specify, add appropriate suffix to catalog number. Custom colors supplied on special order.

**CSA certified** to U.S. and Canadian standards, suitable for wet locations. Protection class IP65

**Luminaire Lumens:** 923



**Bollard heads - shielded with reflector - 180°**

Lamp	A	B
<b>99 857</b> 16.5W LED	7 1/2	7 1/4

**Bollard tubes for luminaire heights 19 3/4 - 21 3/4**

	A	B	Anch. unit
<b>99 615</b>	7 1/2	14 1/2	<b>79 817</b>

**Bollard tubes for luminaire heights 31 1/2 - 39 1/4**

Integrated components	Door	A	B	Anch. unit
<b>99 622</b> —	✓	7 1/2	32	<b>79 818</b>
<b>99 644</b> 1 LED floodlight 19.3W	✓	7 1/2	32	<b>79 818</b>
<b>99 626</b> GFCI outlet	✓	7 1/2	32	<b>79 818</b>
<b>99 658</b> Passive infrared motion sensor	✓	7 1/2	32	<b>79 818</b>
<b>99 635</b> Emergency lighting battery 10W	✓	7 1/2	32	<b>79 818</b>

Type:  
 BEGA Product:  
 Project:  
 Voltage:  
 Color:  
 Options:  
 Modified:





# D-Series Size 0 LED Area Luminaire



Buy American

d<sup>#</sup>series

## Specifications

**EPA:** 0.95 ft<sup>2</sup>  
(.09 m<sup>2</sup>)

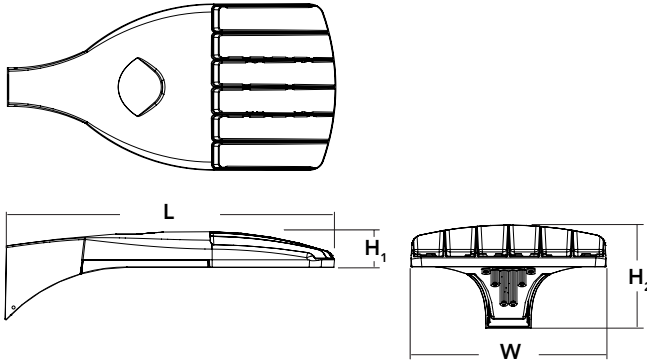
**Length:** 26"  
(66.0 cm)

**Width:** 13"  
(33.0 cm)

**Height<sub>1</sub>:** 3"  
(7.62 cm)

**Height<sub>2</sub>:** 7"  
(17.8 cm)

**Weight (max):** 16 lbs  
(7.25 kg)



Catalog  
Number

Notes

Type

Hit the Tab key or mouse over the page to see all interactive elements.

## Introduction

The modern styling of the D-Series is striking yet unobtrusive - making a bold, progressive statement even as it blends seamlessly with its environment. The D-Series distills the benefits of the latest in LED technology into a high performance, high efficacy, long-life luminaire.

The outstanding photometric performance results in sites with excellent uniformity, greater pole spacing and lower power density. It is ideal for replacing up to 400W metal halide with typical energy savings of 70% and expected service life of over 100,000 hours.

## Ordering Information

**EXAMPLE:** DSX0 LED P6 40K T3M MVOLT SPA NLTAIR2 PIRHN DDBXD

DSX0 LED		Color temperature		Distribution		Voltage		Mounting		
Series	LEDs	Color temperature		Distribution		Voltage		Mounting		
DSX0 LED	<b>Forward optics</b>		30K	3000 K	T1S	Type I short (Automotive)	T5S	Type V short <sup>3</sup>	<b>Shipped included</b>	
	P1	P5	40K	4000 K	T2S	Type II short	T5M	Type V medium <sup>3</sup>		
	P2	P6	50K	5000 K	T2M	Type II medium	T5W	Type V wide <sup>3</sup>		
	P3	P7 <sup>1</sup>			T3S	Type III short	BLC	Backlight control <sup>4</sup>		
	P4 <sup>1</sup>				T3M	Type III medium	LCCO	Left corner cutoff <sup>4</sup>		
	<b>Rotated optics</b>				T4M	Type IV medium	RCCO	Right corner cutoff <sup>4</sup>		
	P10 <sup>2</sup>	P12 <sup>2</sup>			TFTM	Forward throw medium				
	P11 <sup>2</sup>	P13 <sup>1,2</sup>			T5VS	Type V very short <sup>3</sup>				
							MVOLT	(120V-277V) <sup>5,6</sup>		<b>Shipped separately</b>
							XVOLT	(277V-480V) <sup>7,8,9</sup>		
						120 <sup>6</sup>				
						208 <sup>6</sup>				
						240 <sup>6</sup>				
						277 <sup>6</sup>				
						347 <sup>6</sup>				
						480 <sup>6</sup>				
								<b>SPA</b>	Square pole mounting	
								<b>RPA</b>	Round pole mounting <sup>10</sup>	
								<b>WBA</b>	Wall bracket <sup>3</sup>	
								<b>SPUMBA</b>	Square pole universal mounting adaptor <sup>11</sup>	
								<b>RPUMBA</b>	Round pole universal mounting adaptor <sup>11</sup>	
								<b>KMA8 DDBXD U</b>	Mast arm mounting bracket adaptor (specify finish) <sup>12</sup>	

Control options	Other options	Finish (required)
<b>Shipped installed</b>		
<b>NLTAIR2</b> nLight AIR generation 2 enabled <sup>13,14</sup>	<b>PIR</b> High/low, motion/ambient sensor, 8-15' mounting height, ambient sensor enabled at 5fc <sup>19,20</sup>	<b>DDBXD</b> Dark bronze
<b>PIRHN</b> Network, high/low motion/ambient sensor <sup>15</sup>	<b>PIRHN</b> High/low, motion/ambient sensor, 15-30' mounting height, ambient sensor enabled at 5fc <sup>19,20</sup>	<b>DBLXD</b> Black
<b>PER</b> NEMA twist-lock receptacle only (control ordered separate) <sup>16</sup>	<b>PIR1FC3V</b> High/low, motion/ambient sensor, 8-15' mounting height, ambient sensor enabled at 1fc <sup>19,20</sup>	<b>DNAXD</b> Natural aluminum
<b>PER5</b> Five-pin receptacle only (control ordered separate) <sup>16,17</sup>	<b>PIR1FC3V</b> High/low, motion/ambient sensor, 15-30' mounting height, ambient sensor enabled at 1fc <sup>19,20</sup>	<b>DWHXD</b> White
<b>PER7</b> Seven-pin receptacle only (leads exit fixture) (control ordered separate) <sup>16,17</sup>	<b>FAO</b> Field adjustable output <sup>21</sup>	<b>DDBTXD</b> Textured dark bronze
<b>DMG</b> 0-10V dimming extend out back of housing for external control (control ordered separate) <sup>18</sup>		<b>DBLBXD</b> Textured black
		<b>DNATXD</b> Textured natural aluminum
		<b>DWHGXD</b> Textured white
	<b>Shipped installed</b>	
	<b>HS</b> House-side shield <sup>22</sup>	
	<b>SF</b> Single fuse (120, 277, 347V) <sup>6</sup>	
	<b>DF</b> Double fuse (208, 240, 480V) <sup>6</sup>	
	<b>L90</b> Left rotated optics <sup>2</sup>	
	<b>R90</b> Right rotated optics <sup>2</sup>	
	<b>DDL</b> Diffused drop lens <sup>22</sup>	
	<b>HA</b> 50°C ambient operations <sup>1</sup>	
	<b>BAA</b> Buy America(n) Act Compliant	
	<b>Shipped separately</b>	
	<b>BS</b> Bird spikes <sup>23</sup>	
	<b>EGS</b> External glare shield	



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DSX0-LED  
Rev. 07/19/21  
Page 1 of 8

# Ordering Information

## Accessories

Ordered and shipped separately.

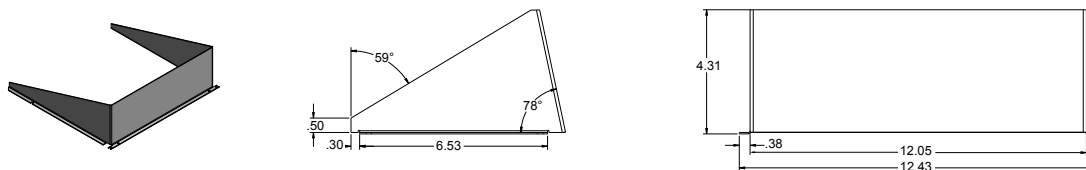
DLL127F 1.5 JU	Photocell - SSL twist-lock (120-277V) <sup>24</sup>
DLL347F 1.5 CUL JU	Photocell - SSL twist-lock (347V) <sup>24</sup>
DLL480F 1.5 CUL JU	Photocell - SSL twist-lock (480V) <sup>24</sup>
DSHORT SBK U	Shorting cap <sup>24</sup>
DSX0HS 20C U	House-side shield for P1,P2,P3 and P4 <sup>22</sup>
DSX0HS 30C U	House-side shield for P10,P11,P12 and P13 <sup>22</sup>
DSX0HS 40C U	House-side shield for P5,P6 and P7 <sup>22</sup>
DSX0DDL U	Diffused drop lens (polycarbonate) <sup>22</sup>
PUMBA DDBXD U*	Square and round pole universal mounting bracket adaptor (specify finish) <sup>25</sup>
KMA8 DDBXD U	Mast arm mounting bracket adaptor (specify finish) <sup>12</sup>
DSX0EGS (FINISH) U	External glare shield

For more control options, visit [DTL](#) and [ROAM](#) online. Link to [nLight Air 2](#)

## NOTES

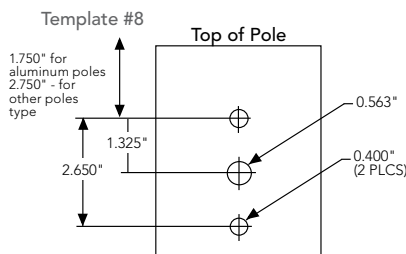
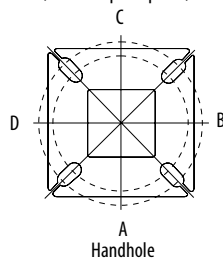
- 1 HA not available with P4, P7, and P13.
- 2 P10, P11, P12 and P13 and rotated options (L90 or R90) only available together.
- 3 Any Type 5 distribution with photocell, is not available with WBA.
- 4 Not available with HS or DDL.
- 5 MVOLT driver operates on any line voltage from 120-277V (50/60 Hz).
- 6 Single fuse (SF) requires 120V, 277V or 347V. Double fuse (DF) requires 208V, 240V or 480V. XVOLT not available with fusing (SF or DF).
- 7 XVOLT only suitable for use with P4, P7 and P13.
- 8 XVOLT operates with any voltage between 277V and 480V.
- 9 XVOLT not available with fusing (SF or DF) and not available with PIR, PIRH, PIR1FC3V, PIRH1FC3V.
- 10 Suitable for mounting to round poles between 3.5" and 12" diameter.
- 11 Universal mounting brackets intended for retrofit on existing pre-drilled poles only. 1.5 G vibration load rating per ANCI C136.31. Only usable when pole's drill pattern is NOT Lithonia template #8.
- 12 Must order fixture with SPA mounting. Must be ordered as a separate accessory; see Accessories information. For use with 2-3/8" diameter mast arm (not included).
- 13 Must be ordered with PIRHN.
- 14 Sensor cover available only in dark bronze, black, white and natural aluminum colors.
- 15 Must be ordered with NLTAIR2. For more information on nLight Air 2 visit [this link](#).
- 16 Photocell ordered and shipped as a separate line item from Acuity Brands Controls. See accessories. Shorting Cap included.
- 17 If ROAM<sup>®</sup> node required, it must be ordered and shipped as a separate line item from Acuity Brands Controls. Shorting Cap included.
- 18 DMG not available with PIRHN, PER5, PER7, PIR, PIRH, PIR1FC3V or PIRH1FC3V, FAO.
- 19 Reference Controls Options table on page 4.
- 20 Reference Motion Sensor Default Table on page 4 to see functionality.
- 21 Not available with other dimming controls options.
- 22 Not available with BLC, LCCO and RCCO distribution.
- 23 Must be ordered with fixture for factory pre-drilling.
- 24 Requires luminaire to be specified with PER, PER5 or PER7 option. See Controls Table on page 4.
- 25 For retrofit use only. Only usable when pole's drill pattern is NOT Lithonia template #8

## EGS – External Glare Shield



## Drilling

### HANDHOLE ORIENTATION (from top of pole)



### Tenon Mounting Slipfitter

Tenon O.D.	Mounting	Single Unit	2 @ 180	2 @ 90	3 @ 90	3 @ 120	4 @ 90
2-3/8"	RPA	AS3-5 190	AS3-5 280	AS3-5 290	AS3-5 390	AS3-5 320	AS3-5 490
2-7/8"	RPA	AST25-190	AST25-280	AST25-290	AST25-390	AST25-320	AST25-490
4"	RPA	AST35-190	AST35-280	AST35-290	AST35-390	AST35-320	AST35-490

Mounting Option	Drilling Template	Single	2 @ 180	2 @ 90	3 @ 90	3 @ 120	4 @ 90
Head Location		Side B	Side B & D	Side B & C	Side B, C & D	Round Pole Only	Side A, B, C & D
Drill Nomenclature	#8	DM19AS	DM28AS	DM29AS	DM39AS	DM32AS	DM49AS
<b>Minimum Acceptable Outside Pole Dimension</b>							
SPA	#8	2-7/8"	2-7/8"	3.5"	3.5"		3.5"
RPA	#8	2-7/8"	2-7/8"	3.5"	3.5"	3"	3.5"
SPUMBA	#5	2-7/8"	3"	4"	4"		4"
RPUMBA	#5	2-7/8"	3.5"	5"	5"	3.5"	5"

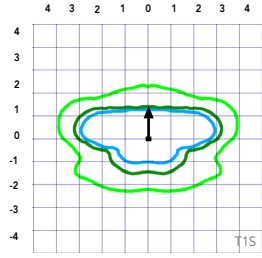
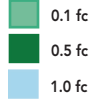
### DSX0 Area Luminaire - EPA

\*Includes luminaire and integral mounting arm. Other tenons, arms, brackets or other accessories are not included in this EPA data.

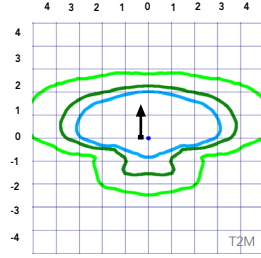
Fixture Quantity & Mounting Configuration	Single DM19	2 @ 180 DM28	2 @ 90 DM29	3 @ 90 DM39	3 @ 120 DM32	4 @ 90 DM49
Mounting Type						
DSX0 LED	0.950	1.900	1.830	2.850	2.850	3.544

Isofootcandle plots for the DSX0 LED 40C 1000 40K. Distances are in units of mounting height (20').

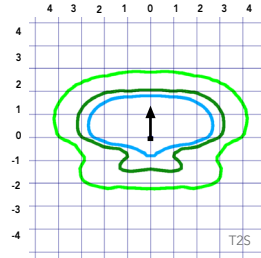
**LEGEND**



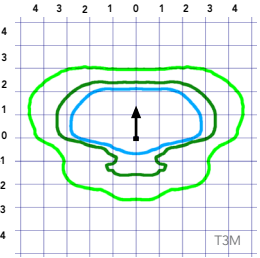
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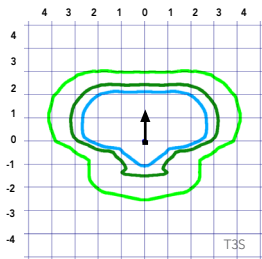
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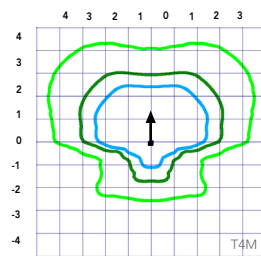
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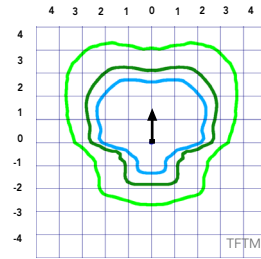
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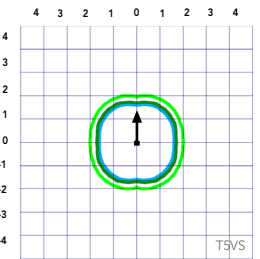
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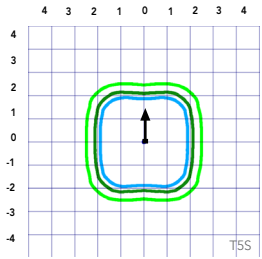
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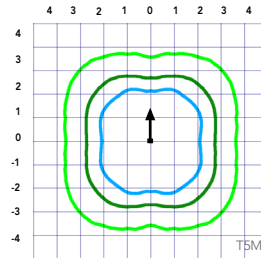
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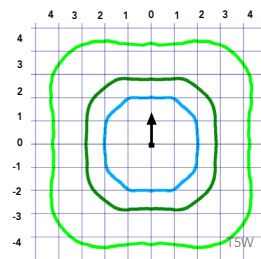
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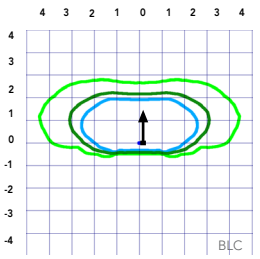
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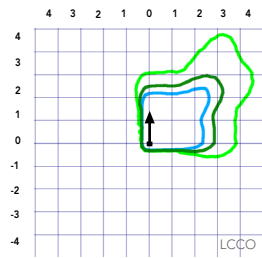
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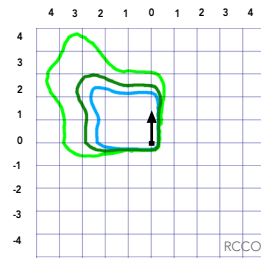
Test No. LTL23451P25 tested in accordance with IESNA LM-79-08.



Test No.



Test No.



Test No.



# D-Series Size 1 LED Area Luminaire

d<sup>series</sup>

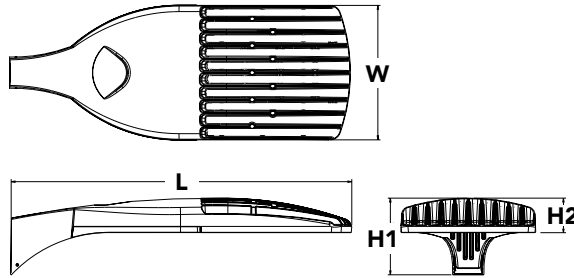


Catalog Number
Notes
Type

Hit the Tab key or mouse over the page to see all interactive elements.

## Specifications

<b>EPA:</b>	1.01 ft <sup>2</sup> (0.09 m <sup>2</sup> )
<b>Length:</b>	33" (83.8 cm)
<b>Width:</b>	13" (33.0 cm)
<b>Height H1:</b>	7-1/2" (19.0 cm)
<b>Height H2:</b>	3-1/2"
<b>Weight (max):</b>	27 lbs (12.2 kg)



## Introduction

The modern styling of the D-Series is striking yet unobtrusive - making a bold, progressive statement even as it blends seamlessly with its environment. The D-Series distills the benefits of the latest in LED technology into a high performance, high efficacy, long-life luminaire.

The outstanding photometric performance results in sites with excellent uniformity, greater pole spacing and lower power density. It is ideal for replacing up to 750W metal halide in pedestrian and area lighting applications with typical energy savings of 65% and expected service life of over 100,000 hours.

## Ordering Information

**EXAMPLE:** DSX1 LED P7 40K T3M MVOLT SPA NLTAIR2 PIRHN DDBXD

Series	LEDs	Color temperature	Distribution	Voltage	Mounting
DSX1 LED	<b>Forward optics</b> P1 P4 <sup>1</sup> P7 <sup>1</sup> P2 P5 <sup>1</sup> P8 P3 P6 <sup>1</sup> P9 <sup>1</sup> <b>Rotated optics</b> P10 <sup>2</sup> P12 <sup>2</sup> P11 <sup>2</sup> P13 <sup>1,2</sup>	30K 3000 K 40K 4000 K 50K 5000 K	T1S Type I short (Automotive) T2S Type II short T2M Type II medium T3S Type III short T3M Type III medium T4M Type IV medium TFTM Forward throw medium T5VS Type V very short <sup>3</sup> T5S Type V short <sup>3</sup> T5M Type V medium <sup>3</sup> T5W Type V wide <sup>3</sup> BLC Backlight control <sup>4</sup> LCCO Left corner cutoff <sup>4</sup> RCCO Right corner cutoff <sup>4</sup>	MVOLT <sup>5</sup> XVOLT (277V-480V) <sup>6,7,8</sup> 120 <sup>9</sup> 208 <sup>9</sup> 240 <sup>9</sup> 277 <sup>9</sup> 347 <sup>9</sup> 480 <sup>9</sup>	<b>Shipped included</b> SPA Square pole mounting RPA Round pole mounting <sup>10</sup> WBA Wall bracket <sup>3</sup> SPUMBA Square pole universal mounting adaptor <sup>11</sup> RPUMBA Round pole universal mounting adaptor <sup>9</sup> <b>Shipped separately</b> KMA8 DDBXD U Mast arm mounting bracket adaptor (specify finish) <sup>12</sup>

Control options	Other options	Finish (required)
<b>Shipped installed</b> NLTAIR2 nLight AIR generation 2 enabled <sup>13</sup> PIRHN Network, high/low motion/ambient sensor <sup>14</sup> PER NEMA twist-lock receptacle only (controls ordered separate) <sup>15</sup> PER5 Five-pin receptacle only (controls ordered separate) <sup>15,16</sup> PER7 Seven-pin receptacle only (controls ordered separate) <sup>15,16</sup> DMG 0-10v dimming wires pulled outside fixture (for use with an external control, ordered separately) <sup>17</sup> DS Dual switching <sup>18,19,20</sup>	PIR High/low, motion/ambient sensor, 8-15' mounting height, ambient sensor enabled at 5fc <sup>20,21</sup> PIRH High/low, motion/ambient sensor, 15-30' mounting height, ambient sensor enabled at 5fc <sup>20,21</sup> PIR1FC3V High/low, motion/ambient sensor, 8-15' mounting height, ambient sensor enabled at 1fc <sup>20,21</sup> PIRH1FC3V Bi-level, motion/ambient sensor, 15-30' mounting height, ambient sensor enabled at 1fc <sup>20,21</sup> FAO Field adjustable output <sup>20,21</sup>	<b>Shipped installed</b> HS House-side shield <sup>23</sup> SF Single fuse (120, 277, 347V) <sup>9</sup> DF Double fuse (208, 240, 480V) <sup>9</sup> L90 Left rotated optics <sup>2</sup> R90 Right rotated optics <sup>2</sup> HA 50°C ambient operations <sup>1</sup> BAA Buy America(n) Act Compliant <b>Shipped separately</b> BS Bird spikes <sup>24</sup> EGS External glare shield
		DDBXD Dark bronze DBLXD Black DNAXD Natural aluminum DWHXD White DDBTXD Textured dark bronze DBLBXD Textured black DNATXD Textured natural aluminum DWHGXD Textured white



## Ordering Information

### Accessories

Ordered and shipped separately.

DLL127F 1.5 JU	Photocell - SSL twist-lock (120-277V) <sup>25</sup>
DLL347F 1.5 CUL JU	Photocell - SSL twist-lock (347V) <sup>25</sup>
DLL480F 1.5 CUL JU	Photocell - SSL twist-lock (480V) <sup>25</sup>
DSHORT SBK U	Shorting cap <sup>25</sup>
DSX1HS 30C U	House-side shield for P1, P2, P3, P4 and P5 <sup>23</sup>
DSX1HS 40C U	House-side shield for P6 and P7 <sup>23</sup>
DSX1HS 60C U	House-side shield for P8, P9, P10, P11 and P12 <sup>23</sup>
PUMBA DDBXD U*	Square and round pole universal mounting bracket (specify finish) <sup>25</sup>
KMA8 DDBXD U	Mast arm mounting bracket adaptor (specify finish) <sup>12</sup>
DSX1EGS (FINISH) U	External glare shield

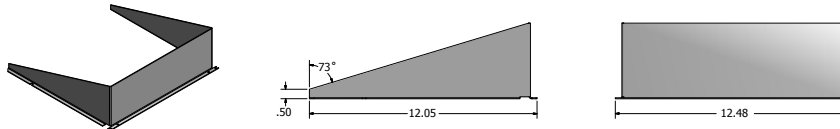
For more control options, visit [DTL](#) and [ROAM](#) online.

### NOTES

- 1 HA not available with P4, P5, P6, P7, P9 and P13.
- 2 P10, P11, P12 or P13 and rotated optics (L90, R90) only available together.
- 3 Any Type 5 distribution with photocell, is not available with WBA.
- 4 Not available with HS.
- 5 MVOLT driver operates on any line voltage from 120-277V (50/60 Hz).
- 6 XVOLT only suitable for use with P3, P5, P6, P7, P9 and P13.
- 7 XVOLT works with any voltage between 277V and 480V.
- 8 XVOLT not available with fusing (SF or DF) and not available with PIR, PIRH, PIR1FC3V, PIRH1FC3V.
- 9 Single fuse (SF) requires 120V, 277V or 347V. Double fuse (DF) requires 208V, 240V or 480V. XVOLT not available with fusing (SF or DF).
- 10 Suitable for mounting to round poles between 3.5" and 12" diameter.
- 11 Universal mounting brackets intended for retrofit on existing, pre-drilled poles only. 1.5 G vibration load rating per ANCI C136.31. Only usable when pole's drill pattern is NOT Lithonia template #8.
- 12 Must order fixture with SPA option. Must be ordered as a separate accessory; see Accessories information. For use with 2-3/8" diameter mast arm (not included).
- 13 Must be ordered with PIRHN. Sensor cover available only in dark bronze, black, white and natural aluminum colors.
- 14 Must be ordered with NLTAR2. For more information on nLight Air 2 visit [this link](#).
- 15 Photocell ordered and shipped as a separate line item from Acuity Brands Controls. See accessories. Shorting cap included.
- 16 If ROAM® node required, it must be ordered and shipped as a separate line item from Acuity Brands Controls. Node with integral dimming.
- 17 DMG not available with PIRHN, PER5, PER7, PIR, PIRH, PIR1FC3V or PIRH1FC3V, FAO.
- 18 Provides 50/50 fixture operation via (2) independent drivers. Not available with PER, PER5, PER7, PIR or PIRH. Not available P1, P2, P3, P4 or P5.
- 19 Requires (2) separately switched circuits with isolated neutral.
- 20 Reference Controls Option Default settings table on page 4.
- 21 Reference Motion Sensor table on page 4 to see functionality.
- 22 Not available with other dimming controls options.
- 23 Not available with BLC, LCCO and RCCO distribution. Also available as a separate accessory; see Accessories information.
- 24 Must be ordered with fixture for factory pre-drilling.
- 25 Requires luminaire to be specified with PER, PER5 or PER7 option. See Control Option Table on page 4.
- 26 For retrofit use only. Only usable when pole's drill pattern is NOT Lithonia template #8.

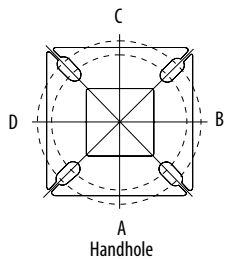
## Options

### EGS - External Glare Shield



## Drilling

### HANDHOLE ORIENTATION



### Tenon Mounting Slipfitter

Tenon O.D.	Mounting	Single Unit	2 @ 180	2 @ 90	3 @ 90	3 @ 120	4 @ 90
2-3/8"	RPA	AS3-5 190	AS3-5 280	AS3-5 290	AS3-5 390	AS3-5 320	AS3-5 490
2-7/8"	RPA	AST25-190	AST25-280	AST25-290	AST25-390	AST25-320	AST25-490
4"	RPA	AST35-190	AST35-280	AST35-290	AST35-390	AST35-320	AST35-490

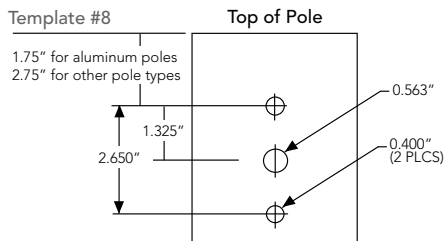
Mounting Option	Drilling Template	Single	2 @ 180	2 @ 90	3 @ 90	3 @ 120	4 @ 90
Head Location		Side B	Side B & D	Side B & C	Side B, C & D	Round Pole Only	Side A, B, C & D
Drill Nomenclature	#8	DM19AS	DM28AS	DM29AS	DM39AS	DM32AS	DM49AS

### DSX1 Area Luminaire - EPA

\*Includes luminaire and integral mounting arm. Other tenons, arms, brackets or other accessories are not included in this EPA data.

Fixture Quantity & Mounting Configuration	Single DM19	2 @ 180 DM28	2 @ 90 DM29	3 @ 90 DM39	3 @ 120 DM32	4 @ 90 DM49
Mounting Type						
DSX1 LED	1.013	2.025	1.945	3.038	2.850	3.749

	Drilling Template	Minimum Acceptable Outside Pole Dimension					
SPA	#8	2-7/8"	2-7/8"	3.5"	3.5"	3"	3.5"
RPA	#8	2-7/8"	2-7/8"	3.5"	3.5"	3"	3.5"
SPUMBA	#5	2-7/8"	3"	4"	4"	3.5"	4"
RPUMBA	#5	2-7/8"	3.5"	5"	5"	3.5"	5"





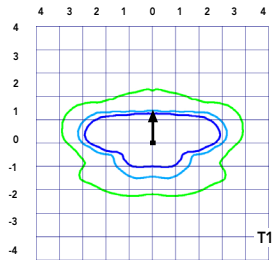
# Photometric Diagrams

To see complete photometric reports or download .ies files for this product, visit Lithonia Lighting's [D-Series Area Size 1 homepage](#).

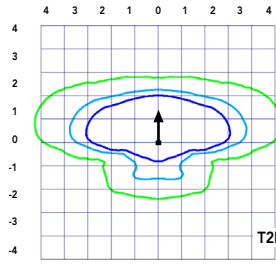
Isofootcandle plots for the DSX1 LED 60C 1000 40K. Distances are in units of mounting height (25').

### LEGEND

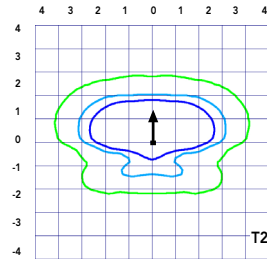
- 0.1 fc
- 0.5 fc
- 1.0 fc



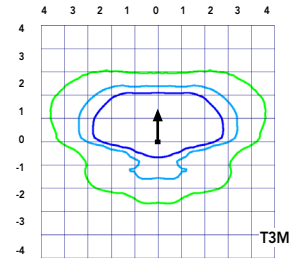
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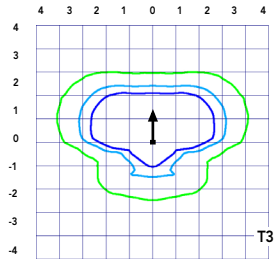
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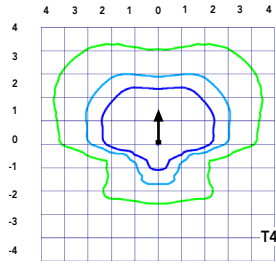
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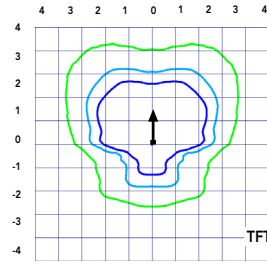
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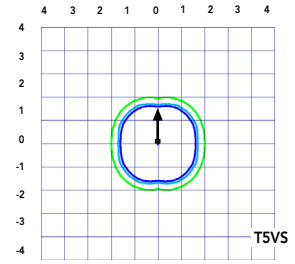
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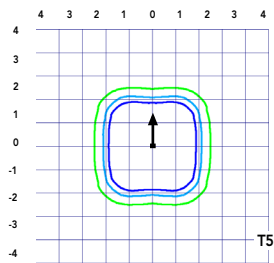
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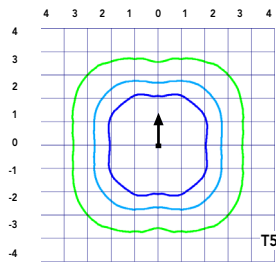
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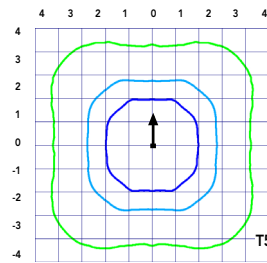
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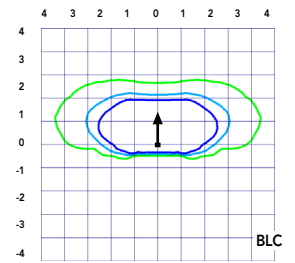
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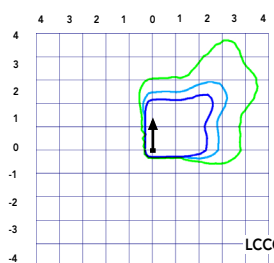
Test No. LT.L23164B tested in accordance with IESNA LM-79-08.



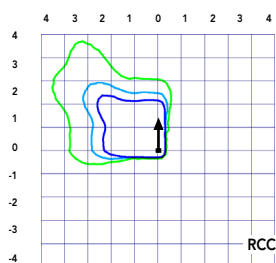
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Test No. LT.L23271 tested in accordance with IESNA LM-79-08.



Test No. LT.L23211 tested in accordance with IESNA LM-79-08.



Test No. LT.L23164B tested in accordance with IESNA LM-79-08.



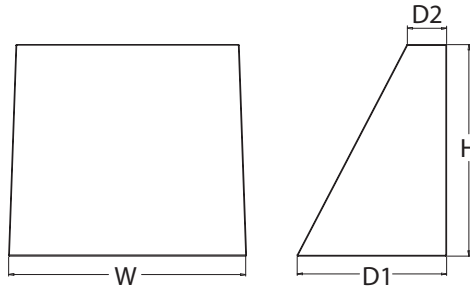
# WEDGE1 LED

## Architectural Wall Sconce



### Specifications

- Depth (D1):** 5.5"
- Depth (D2):** 1.5"
- Height:** 8"
- Width:** 9"
- Weight:** 9 lbs  
(without options)



Catalog Number

Notes

Type

Hit the Tab key or mouse over the page to see all interactive elements.

### Introduction

The WEDGE LED family is designed to meet specifier's every wall-mounted lighting need in a widely accepted shape that blends with any architecture. The clean rectilinear design comes in four sizes with lumen packages ranging from 1,200 to 25,000 lumens, providing true site-wide solution.

WEDGE1 delivers up to 2,000 lumens with a soft, non-pixelated light source, creating a visually comfortable environment. The compact size of WEDGE1, with its integrated emergency battery backup option, makes it an ideal over-the-door wall-mounted lighting solution.

### WEDGE LED Family Overview

Luminaire	Standard EM, 0°C	Cold EM, -20°C	Sensor	Lumens (4000K)					
				P1	P2	P3	P4	P5	P6
WEDGE1 LED	4W	--	--	1,200	2,000	--	--	--	--
WEDGE2 LED	10W	18W	Standalone / nLight	1,200	2,000	3,000	4,500	6,000	--
WEDGE3 LED	15W	18W	Standalone / nLight	7,500	8,500	10,000	12,000	--	--
WEDGE4 LED	--	--	Standalone / nLight	12,000	16,000	18,000	20,000	22,000	25,000

### Ordering Information

**EXAMPLE:** WEDGE1 LED P2 40K 80CRI VF MVOLT SRM PE DDBXD

Series	Package	Color Temperature	CRI	Distribution	Voltage	Mounting
WEDGE1 LED	P1 P2	27K 2700K	80CRI	VF Visual comfort forward throw	MVOLT 347 <sup>2</sup>	<b>Shipped included</b> SRM Surface mounting bracket ICW Indirect Canopy/Ceiling Washer bracket (dry/damp locations only) <sup>5</sup> <b>Shipped separately</b> AWS 3/8inch Architectural wall spacer PBBW Surface-mounted back box (top, left, right conduit entry) Use when there is no junction box available.
		30K 3000K	90CRI	VW Visual comfort wide		
		35K 3500K				
		40K 4000K				
		50K <sup>1</sup> 5000K				

Options	Finish
E4WH <sup>3</sup> Emergency battery backup, Certified in CA Title 20 MAEDBS (4W, 0°C min)	DDBXD Dark bronze
PE <sup>4</sup> Photocell, Button Type	DBLXD Black
DS Dual switching (comes with 2 drivers and 2 light engines; see page 3 for details)	DNAXD Natural aluminum
DMG 0-10V dimming wires pulled outside fixture (for use with an external control, ordered separately)	DWHXD White
BCE Bottom conduit entry for back box (PBBW). Total of 4 entry points.	DSSXD Sandstone
	DDBTXD Textured dark bronze
	DBLTXD Textured black
	DNATXD Textured natural aluminum
	DWHGXD Textured white
	DSSTXD Textured sandstone

### Accessories

Ordered and shipped separately.

- WDGEAWS DDBXD WEDGE 3/8inch Architectural Wall Spacer (specify finish)
- WDGE1PBBW DDBXD U WEDGE1 surface-mounted back box (specify finish)

### NOTES

- 1 50K not available in 90CRI.
- 2 347V not available with E4WH, DS or PE.
- 3 E4WH not available with PE or DS.
- 4 PE not available with DS.
- 5 Not qualified for DLC. Not available with E4WH.



COMMERCIAL OUTDOOR

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WEDGE1 LED  
Rev. 08/31/21

## Performance Data

### Lumen Output

Lumen values are from photometric tests performed in accordance with IESNA LM-79-08. Data is considered to be representative of the configurations shown, within the tolerances allowed by Lighting Facts. Contact factory for performance data on any configurations not shown here.

Performance Package	System Watts	Dist. Type	27K (2700K, 80 CRI)					30K (3000K, 80 CRI)					35K (3500K, 80 CRI)					40K (4000K, 80 CRI)					50K (5000K, 80 CRI)				
			Lumens	LPW	B	U	G	Lumens	LPW	B	U	G	Lumens	LPW	B	U	G	Lumens	LPW	B	U	G	Lumens	LPW	B	U	G
P1	10W	VF	1,120	112	0	0	0	1,161	116	0	0	0	1,194	119	0	0	0	1,227	123	0	0	0	1,235	123	0	0	0
		VW	1,122	112	0	0	0	1,163	116	0	0	0	1,196	120	0	0	0	1,229	123	0	0	0	1,237	124	0	0	0
P2	15W	VF	1,806	120	1	0	0	1,872	125	1	0	0	1,925	128	1	0	0	1,978	132	1	0	0	1,992	133	1	0	0
		VW	1,809	120	1	0	0	1,876	125	1	0	0	1,929	128	1	0	0	1,982	132	1	0	0	1,996	133	1	0	0

### Electrical Load

Performance Package	System Watts	Current (A)				
		120V	208V	240V	277V	347V
P1	10W	0.082	0.049	0.043	0.038	--
	13W	--	--	--	--	0.046
P2	15W	0.132	0.081	0.072	0.064	--
	18W	--	--	--	--	0.056

### Lumen Multiplier for 90CRI

CCT	Multiplier
27K	0.845
30K	0.867
35K	0.845
40K	0.885
50K	0.898

### Lumen Output in Emergency Mode (4000K, 80 CRI)

Option	Dist. Type	Lumens
E4WH	VF	646
	VW	647

### Lumen Ambient Temperature (LAT) Multipliers

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

Ambient	Lumen Multiplier
0°C / 32°F	1.03
10°C / 50°F	1.02
20°C / 68°F	1.01
25°C / 77°F	1.00
30°C / 86°F	0.99
40°C / 104°F	0.98

### Projected LED Lumen Maintenance

Data references the extrapolated performance projections for the platforms noted in a 25°C ambient, based on 10,000 hours of LED testing (tested per IESNA LM-80-08 and projected per IESNA TM-21-11).

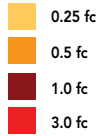
To calculate LLF, use the lumen maintenance factor that corresponds to the desired number of operating hours below. For other lumen maintenance values, contact factory.

Operating Hours	0	25,000	50,000	100,000
Lumen Maintenance Factor	1.0	>0.96	>0.95	>0.91

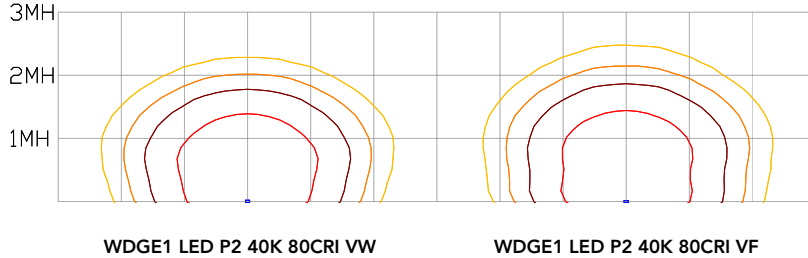
## Photometric Diagrams

To see complete photometric reports or download .ies files for this product, visit the Lithonia Lighting WDGE LED homepage. Tested in accordance with IESNA LM-79 and LM-80 standards.

### LEGEND



MH = 8ft  
Grid = 8ft x 8ft



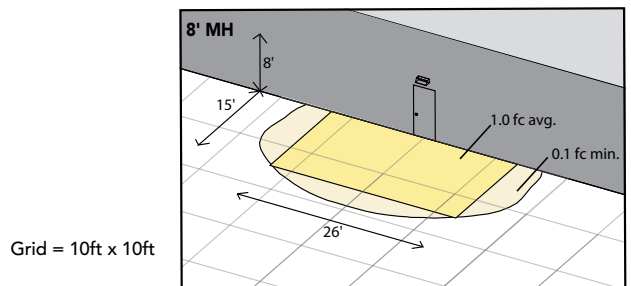
## Emergency Egress Options

### Emergency Battery Backup

The emergency battery backup is integral to the luminaire — no external housing required! This design provides reliable emergency operation while maintaining the aesthetics of the product. All emergency battery backup configurations include an independent secondary driver with an integral relay to immediately detect loss of normal power and automatically energize the luminaire. The emergency battery will power the luminaire for a minimum duration of 90 minutes (maximum duration of three hours) from the time normal power is lost and maintain a minimum of 60% of the light output at the end of 90 minutes.

Applicable codes: NFPA 70/NEC – section 700.16, NFPA 101 Life Safety Code Section 7.9

The example below shows illuminance of 1 fc average and 0.1 fc minimum in emergency mode with E4WH and VF distribution.

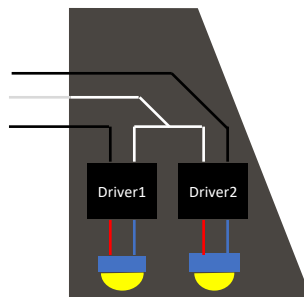


WDGE1 LED xx 40K 80CRI VF MVOLT E4WH

### Dual Switching (DS) Option

The dual switching option offers operational redundancy that certain codes require. With this option the luminaire comes integrated with two drivers and two light engines. These work completely independent to each other so that a failure of any individual component does not cause the whole luminaire to go dark. This option is typically used with a back generator or inverter providing emergency power.

Applicable codes: NFPA 70/NEC – section 700.16, NFPA 101 Life Safety Code Section 7.9





### E4WH – 4W Emergency Battery Backup

D = 5.5"

H = 8"

W = 9"



### PBBW – Surface-Mounted Back Box

Use when there is no junction box available.

D = 1.75"

H = 8"

W = 9"



### AWS – 3/8inch Architectural Wall Spacer

D = 0.38"

H = 4.4"

W = 7.5"

## FEATURES & SPECIFICATIONS

### INTENDED USE

Common architectural look, with clean rectilinear shape, of the WDGE LED was designed to blend with any type of construction, whether it be tilt-up, frame or brick. Applications include commercial offices, warehouses, hospitals, schools, malls, restaurants, and other commercial buildings.

### CONSTRUCTION

The single-piece die-cast aluminum housing integrates secondary heat sinks to optimize thermal transfer from the internal light engine heat sinks and promote long life. The driver is mounted in direct contact with the casting for a low operating temperature and long life. The die-cast door frame is fully gasketed with a one-piece solid silicone gasket to keep out moisture and dust, providing an IP66 rating for the luminaire.

### FINISH

Exterior painted parts are protected by a zinc-infused Super Durable TGIC thermoset powder coat finish that provides superior resistance to corrosion and weathering. A tightly controlled multi-stage process ensures a 3 mils thickness for a finish that can withstand extreme climate changes without cracking or peeling. Standard Super Durable colors include dark bronze, black, natural aluminum, sandstone and white. Available in textured and non-textured finishes.

### OPTICS

Well crafted reflector optics allow the light engine to be recessed within the luminaire, providing visual comfort, superior distribution, uniformity, and spacing in wall-mount applications. The WDGE LED has zero uplight and qualifies as a Nighttime Friendly™ product, meaning it is consistent with the LEED® and Green Globes™ criteria for eliminating wasteful uplight.

### ELECTRICAL

Light engine consists of high-efficacy LEDs mounted to metal-core circuit boards to maximize heat dissipation and promote long life (up to L91/100,000 hours at 25°C). The electronic driver has a power factor of >90%, THD <20%. Luminaire comes with built in 6kV surge protection, which meets a minimum Category C low exposure (per ANSI/IEEE C62.41.2).

### INSTALLATION

A universal mounting plate with integral mounting support arms allows the fixture to hinge down for easy access while making wiring connections. The 3/8" Architectural Wall Spacer (AWS) can be used to create a floating appearance or to accommodate small imperfections in the wall surface. The ICW option can be used to mount the luminaire inverted for indirect lighting in dry and damp locations. Design can withstand up to a 1.5 G vibration load rating per ANSI C136.31.

### LISTINGS

CSA certified to U.S. and Canadian standards. Luminaire is IP66 rated. PIR options are rated for wet location. Rated for -40°C minimum ambient. DesignLights Consortium® (DLC) Premium qualified product and DLC qualified product. Not all versions of this product may be DLC Premium qualified or DLC qualified. Please check the DLC Qualified Products List at [www.designlights.org/QPL](http://www.designlights.org/QPL) to confirm which versions are qualified. International Dark-Sky Association (IDA) Fixture Seal of Approval (FSA) is available for all products on this page utilizing 2700K and 3000K color temperature only and SRM mounting only.

### BUY AMERICAN

This product is assembled in the USA and meets the Buy America(n) government procurement requirements under FARS, DFARS and DOT. Please refer to [www.acuitybrands.com/resources/buy-american](http://www.acuitybrands.com/resources/buy-american) for additional information.

### WARRANTY

5-year limited warranty. Complete warranty terms located at: [www.acuitybrands.com/support/warranty/terms-and-conditions](http://www.acuitybrands.com/support/warranty/terms-and-conditions)

**Note:** Actual performance may differ as a result of end-user environment and application. All values are design or typical values, measured under laboratory conditions at 25 °C. Specifications subject to change without notice.

## WDGE LED Size 1 (WDGE1)

### OVERVIEW

The WDGE LED family is designed to meet specifier's every wall-mounted lighting need in a widely accepted shape that blends with any architecture. The clean rectilinear design comes in four sizes with lumen packages ranging from 1,200 to 25,000 lumens, providing a true site-wide solution. <br><br>WDGE1 delivers up to 2,000 lumens with a soft, non-pixelated light source, creating a visually comfortable environment. The compact size of WDGE1, with its integrated emergency battery backup option, makes it an ideal over-the-door wall-mounted lighting solution.



Product Webpage: <https://www.acuitybrands.com/products/detail/1008034>  
 Warranty: [www.acuitybrands.com/support/customer-support/terms-and-conditions](http://www.acuitybrands.com/support/customer-support/terms-and-conditions)

*The product images shown are for illustration purposes only and may not be an exact representation of the product.*

ORDERING INFORMATION		WDGE1 LED (Incomplete)					
Series*		Lamp Type*		LED Configuration*		Correlated Color Temperature*	
WDGE1	Wall pack	LED	LED	P1	Package 1	27K	2700K
				P2	Package 2	30K	3000K
						35K	3500K
						40K	4000K
						50K	5000K
Color Rendering Index*		Distribution*		Voltage*		Mounting*	
80CRI	80CRI	VF	Visual forward throw	347	347V	ICW	Indirect Canopy/Ceiling Washer
90CRI	90CRI	VW	Visual wide	MVOLT	120-277V	PBBW	Premium Backbox for WST LED 2016 design
						SRM	Surface mount

Mounting 2		Driver Configuration		Dimming Wires		Photocell	
AWS	Architectural Wall Spacer	DS	Dual switching; Provides 50/50 luminaire operation via two independent drivers on two separate circuits	DMG	0-10v dimming wires pulled outside fixture (for use with an external control, ordered separately)	PE	Photocell, buttontype

Emergency Battery Pack		Conduit Entry		Finish*			
E4WH	Emergency battery backup, 4W, Hot	BCE	Bottom Conduit Entry	DBLBXD	Textured black, super durable	DMBXD	Medium bronze, super durable
				DBLXD	Black finish, super durable	DNATXD	Textured natural aluminum, super durable
				DDBTXD	Textured dark bronze, super durable	DNAXD	Natural aluminum finish, super durable
				DDBXD	Dark bronze finish, super durable	DSPDXD	Textured dark grey, super durable
				DGCXD	Charcoal grey, super durable	DSPJXD	Light grey, super durable
				DGRHXD	Dark green, RAL6012, super durable	DSSTXD	Textured sandstone, super durable
				DGYGXD	Grey, RAL7040, super durable	DSSXD	Sandstone, super durable
				DGYRXD	DGYRXD	DTGXD	Tennis green, super durable
				DGYWXD	Dark grey, RAL7012, super durable	DWHDXD	White, RAL9002, super durable

Finish* (Cont...)	
DWHGXD	Textured white, super durable
DWHXD	White, super durable
DWJPD	White aluminium, RAL9006, super durable

*This is a dynamic specification sheet that is based on certain selections made by the user. All results generated are for informational purposes only. The user should validate the results with its agency sales representative to determine whether the product has been configured correctly before ordering. Acuity Brands Lighting is not responsible for any loss resulting from product configuration errors.*

*Not all versions of the product are available with all options.*

*Specifications subject to change without notice.*

*Actual performance may differ as a result of end-user environment and application.*

*All values are design or typical values, measured under laboratory conditions at 25 °C.*

*See the full specification sheet at the product page link above for full product information and detailed ordering information.*

*Certain airborne contaminants can diminish the integrity of acrylic and/or polycarbonate.*

*Visit: <http://www.acuitybrandslighting.com/library/ll/documents/specsheets/acrylic-polycarbonate-compatibility.pdf> for Acrylic-Polycarbonate Compatibility table for suitable uses.*

*All trademarks referenced are property of their respective owners.*





lancaster  
**moble**

# Home First Molalla Transportation Impact Study Molalla, Oregon

Date:

October 5, 2021

Prepared for:

Tim Lawler

Green Light -- Home First, LLC

Prepared by:

Nick Mesler, EIT

Jennifer Danziger, PE



RENEWS: 12.31.21



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## Executive Summary

1. The property located at 1000 W Main Street in southwest Molalla, Oregon has been proposed for redevelopment with 60 multifamily units in mid-rise, three-story buildings intended to serve as affordable housing. The , approximately 3.00-acre site on Map No. 52E08C Tax Lot 1500 currently has one single-family home. The proposed project intends to take access via a single, two-way driveway along OR 211, approximately 240 feet east of S Ona Way.
2. The trip generation calculations project a net increase of 21 morning peak hour trips, 25 evening peak hour trips, and of 316 average weekday trips. Given the low trip generation, none of these trips are expected to use either the northbound driveway at Cascade Center or Leroy Avenue; therefore, the project will not trigger the signal warrant at the OR 211/Leroy Avenue intersection.
3. No significant trends or crash patterns were identified at any of the study intersections, with the exception of OR 211 at S Ona Way. It is anticipated that the planned widening of OR 211 by the proposed project will reduce collisions at the intersection.
4. Upon the planned removal of the onsite foliage as part of the proposed redevelopment project, sufficient sight distance exceeding the 415-foot requirement can be achieved.
5. Preliminary traffic signal warrants are not projected to be met at any of the applicable study intersections under year 2023 Buildout Conditions.
6. Left-turn lane warrants were met for the westbound approach at the intersection of OR 211 at S Ona Way during both the morning and evening peak hours. Half-street improvements from the project site to the eastern leg of the S Ona Way intersection will be completed by the project applicant to provide a two-way left-turn-lane thereby allowing for a westbound left-turn lane to be installed, as it is warranted.
7. The westbound left-turn movement at the intersection of OR 211 and the site access driveway, under year 2023 buildout conditions, does not meet the minimum threshold for consideration of a left-turn lane. However, a westbound left-turn lane will be provided the planned two-way left-turn-lane along OR 211.
8. All study intersections are projected to operate at an acceptable v/c ratio less than 0.90 per ODOT standards upon buildout of the proposed development through year 2023, with the exception of the OR 211 & Leroy Avenue and OR 211 & Dixon Avenue intersections. These intersections are projected to have a volume to capacity ratio exceeding the allowable 0.90 maximum during in the Year 2023 analysis scenarios. The substandard operations at these intersections will be present with and without the addition of project traffic. The proposed project is not a direct cause to the substandard conditions at these intersections.
9. Queuing analysis results show the 95th percentile queues at the study intersections are anticipated to provide adequate vehicle storage space that does not inhibit safe and expeditious travel under all scenarios.

# Project Description

## Introduction

The property located at 1000 W Main Street in southwest Molalla, Oregon has been proposed for redevelopment. The proposed Home First affordable housing development will redevelop the existing single family residential property, providing 60 units in mid-rise, three-story buildings.

This report examines the traffic impacts of the proposed development on the transportation system in the vicinity of the project site. Based on correspondence with Molalla’s city engineer and ODOT’s development coordinator, this report conducts safety and capacity/level of service analyses at the following four (4) intersections and the site access driveway:

1. OR 211 & OR 213
2. OR 211 & S Ona Way
3. OR 211 & Site Access Driveway
4. OR 211 & Leroy Avenue
5. OR 211 & Dixon Avenue

All supporting data and calculations are included in the appendix to this report.

## Location Description

The proposed project intends to develop the currently undeveloped, approximately 3.00-acre site on Map No. 52E08C Tax Lot 1500 with 60 units mid-rise three-story multifamily housing intended to serve as affordable housing. The project intends to take access via a single, two-way driveway along OR 211, approximately 240 feet east of S Ona Way. The existing zoning is classified as Medium-High Density Residential (R-3), which is consistent with the proposed development.

Figure 1 displays a vicinity map of the project site, with the project site outlined in yellow and the City of Molalla outlined in green. A site plan depicting the proposed project is provided as an attachment.





Figure 1: Project Location (image from Google Earth)

## Vicinity Streets

The study area includes five roadways expected to be impacted by the proposed development. Table 1 provides a description of each of the vicinity roadways.

Table 1: Roadway Characteristics

Street Name	Jurisdiction	Functional Classification	Travel Lanes	Speed	Curbs & Sidewalks	On-Street Parking	Bicycle Facilities
OR 211	ODOT	Arterial & District Hwy	2-3	35 mph	Partial both sides	None	Partial both sides
OR 213	ODOT	Arterial & District Hwy	2-3	35 mph	Partial both sides	None	Partial both sides
S Ona Way	City of Molalla	Minor / Local	2	25 mph	None	None	None
Leroy Avenue	City of Molalla	Local	2	25 mph	Continuous	None	None
Dixon Avenue	City of Molalla	Local	2	25 mph	None	None	None

Notes: Functional Classification based on the Molalla Transportation System Plan

## Study Intersections

Through coordination with the City of Molalla and ODOT, four (4) study intersections were identified for evaluation. The existing characteristics of these intersections are summarized in Table 2.

**Table 2: Vicinity Intersection Descriptions**

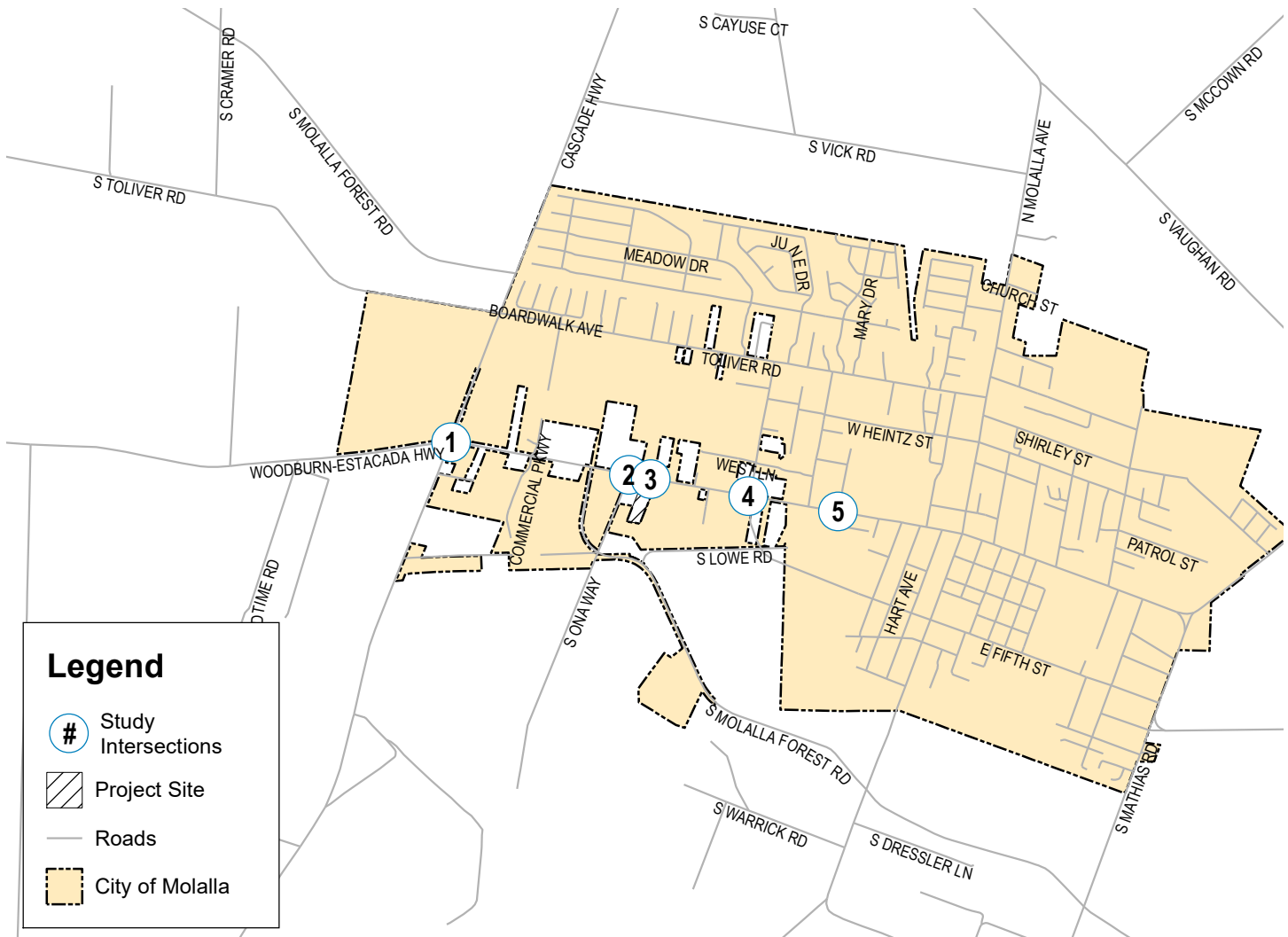
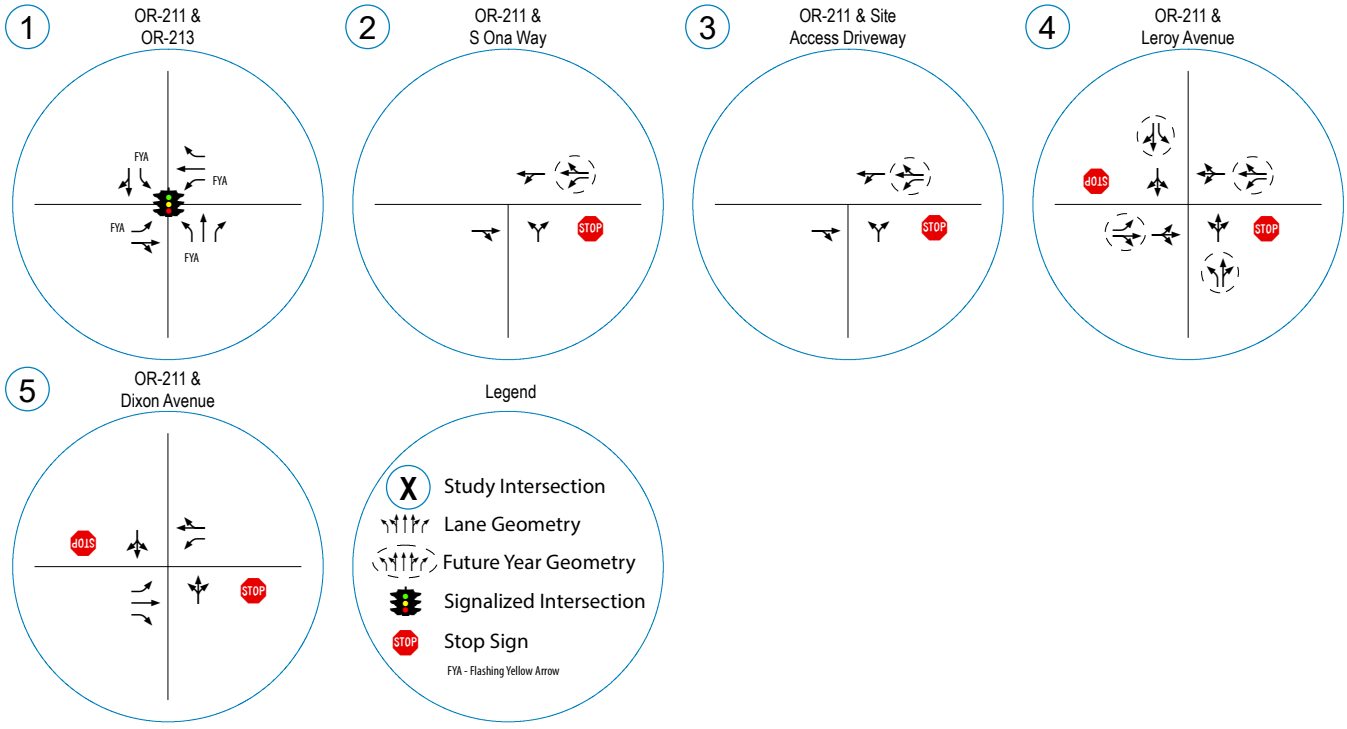
	Intersection	Geometry	Traffic Control	Phasing/Stopped Approaches
1	OR 211 & OR 213	4-Leg	Signalized	Protected/Permitted Left Turn for All Approaches
2	OR 211 & S Ona Way	3-Leg	Stop Controlled	NB Stop Controlled
3	OR 211 & Site Access Drive	3-Leg	Stop Controlled	NB Stop Controlled
4	OR 211 & Leroy Avenue	4-Leg	Stop Controlled	SB Stop Controlled
5	OR 211 & Dixon Avenue	4-Leg	Stop Controlled	NB/SB Stop Controlled

A vicinity map showing the project site, vicinity streets, and intersection configurations is shown in Figure 2.

## Transit

South Clackamas Transit District has three routes that serve the City of Molalla. Two of the routes have a bus stop on the north side of OR 211 (W Main Street) at the Safeway Shopping Center just over 1/2-mile walking/biking distance from the project site:

- The Molalla City route loops throughout the City in a largely clockwise direction. The bus runs from 7:30 AM to 5:35 PM, Monday through Friday, 9:30 AM to 3:45 PM, Saturday, and has no service on Sunday. Headways are roughly one hour.
- The Molalla to Canby route loops Clackamas County with two stops in Molalla. The bus runs from 6:30 AM to 6:15 PM, Monday through Friday, and has no weekend service.



## Site Trips

### Trip Generation

To estimate the number of trips that could be generated by the proposed development, trip rates from the *Trip Generation Manual*<sup>1</sup> were used. Data from the land use code 210, Single Family Detached Housing is used to estimate the existing site's trip generation based on the number of units (1 unit). Land use code 221, Multifamily Housing (Mid-Rise) is used to estimate the proposed development's trip generation based on the number units (60 units).

The resulting trip generation estimates are summarized in Table 3. Detailed trip generation calculations are included in the appendix to this report.

**Table 3: Trip Generation Summary**

Land Use	ITE Code	Intensity	AM Peak Hour			PM Peak Hour			Weekday Total
			In	Out	Total	In	Out	Total	
Single Family Housing	210	1 unit	0	1	1	1	0	1	10
Multifamily Housing (Mid-Rise)	221	60 units	6	16	22	16	10	26	326
Net Total			6	15	21	15	10	25	316

The trip generation calculations show that the proposed development is projected to generate a net increase of 21 morning peak hour trips, 25 evening peak hour trips, and of 316 average weekday trips.

### Trip Distribution

The directional distribution of site trips to and from the proposed development was estimated based on locations of likely trip destinations, locations of major transportation facilities in the site vicinity, and existing travel patterns at the study area intersections.

The following trip distribution was estimated and used for analysis:

- Approximately 35 percent of trips will travel to/from the east along OR 211
- Approximately 25 percent of trips will travel to/from the west along OR 211
- Approximately 30 percent of trips will travel to/from the north along OR 213
- Approximately 10 percent of trips will travel to/from the south along OR 213

The trip distribution and assignment for the total site trips generated during the morning and evening peak hours are shown in Figure 3.

<sup>1</sup> Institute of Transportation Engineers (ITE), *Trip Generation Manual*, 10th Edition, 2017.



## OR 211 at Leroy Avenue

A future traffic signal is planned for installation at the intersection of OR 211 at Leroy Avenue. The Cascade Center project will construct the south leg of the intersection, but signalizing the intersection is not a requirement of Cascade Center.

The need for a traffic signal at this intersection is driven primarily by traffic volumes entering the intersection. Traffic signal warrants require minimum thresholds to be met for both the major street (OR 211) *and* the minor street (Leroy Avenue). Through traffic on OR 211 is high enough to meet the thresholds, but neither the northbound traffic from the new approach to constructed with Cascade Center or the southbound approach of Leroy Avenue will not meet the thresholds. This is due primarily to ODOT requirements that dictate the right-turning trips should generally not be included in the analysis.

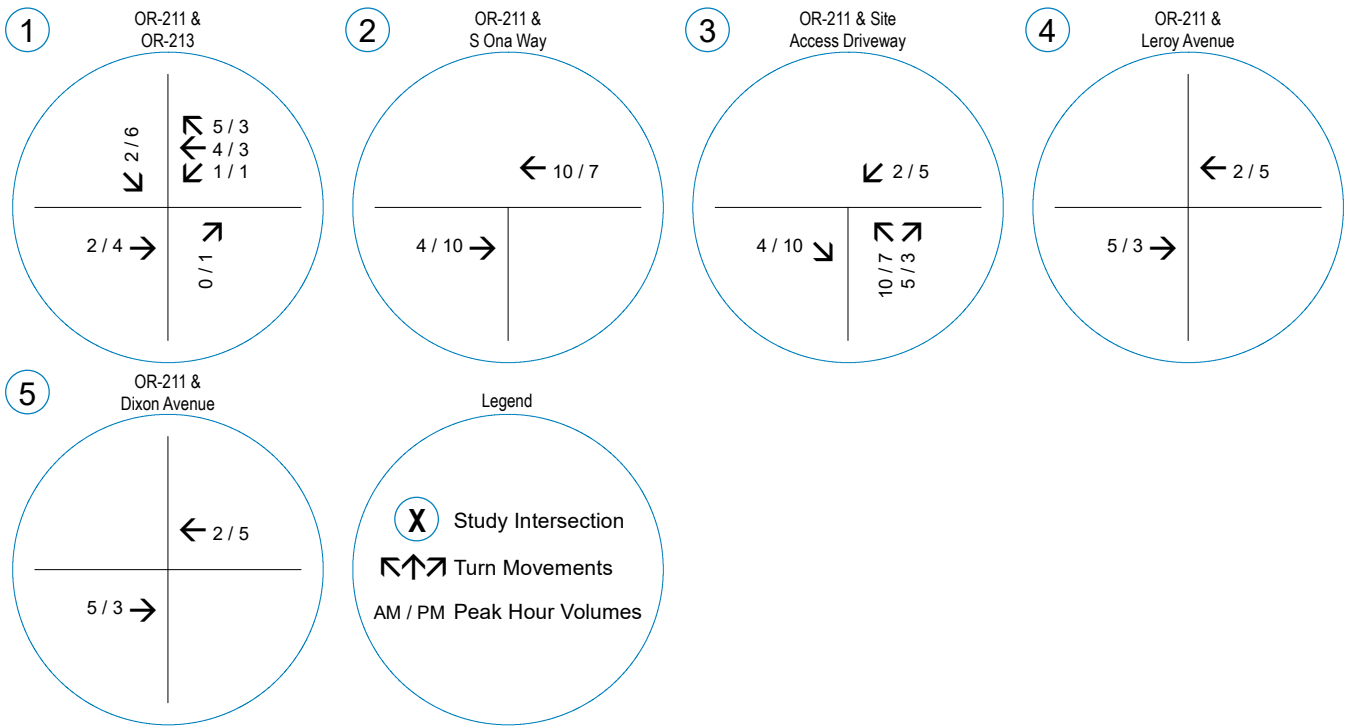
Site-generated traffic expected to travel east-west through the Leroy Avenue/OR 211 intersection without turning. However, even if a vehicle is traveling between the site and the planned Cascade Center, it would not be a new trip on the south leg since trips to/from Cascade Center have already been included in the calculations for the signal. Only new development south of OR 211 with access to the south approach could increase the trip generation on the south leg and trigger the signal.

Table 4 shows the northbound traffic on Leroy Avenue with all in-process trips accounted for (including Cascade Center) and the proposed development.

**Table 4: Leroy Avenue Traffic Volumes**

Description	Northbound PM Peak Hour Volume
Threshold to Meet Signal Warrants	95
2023 Background Conditions	74
Proposed Development	0
<b>Trip Remaining</b>	<b>21</b>

As shown in Table 4, the volumes on Leroy Avenue will not be sufficient to meet traffic signal warrants with the proposed development in place. It is also important to note that the proposed development is not expected to add trips to Leroy Avenue either.



## Traffic Volumes

### Existing Conditions

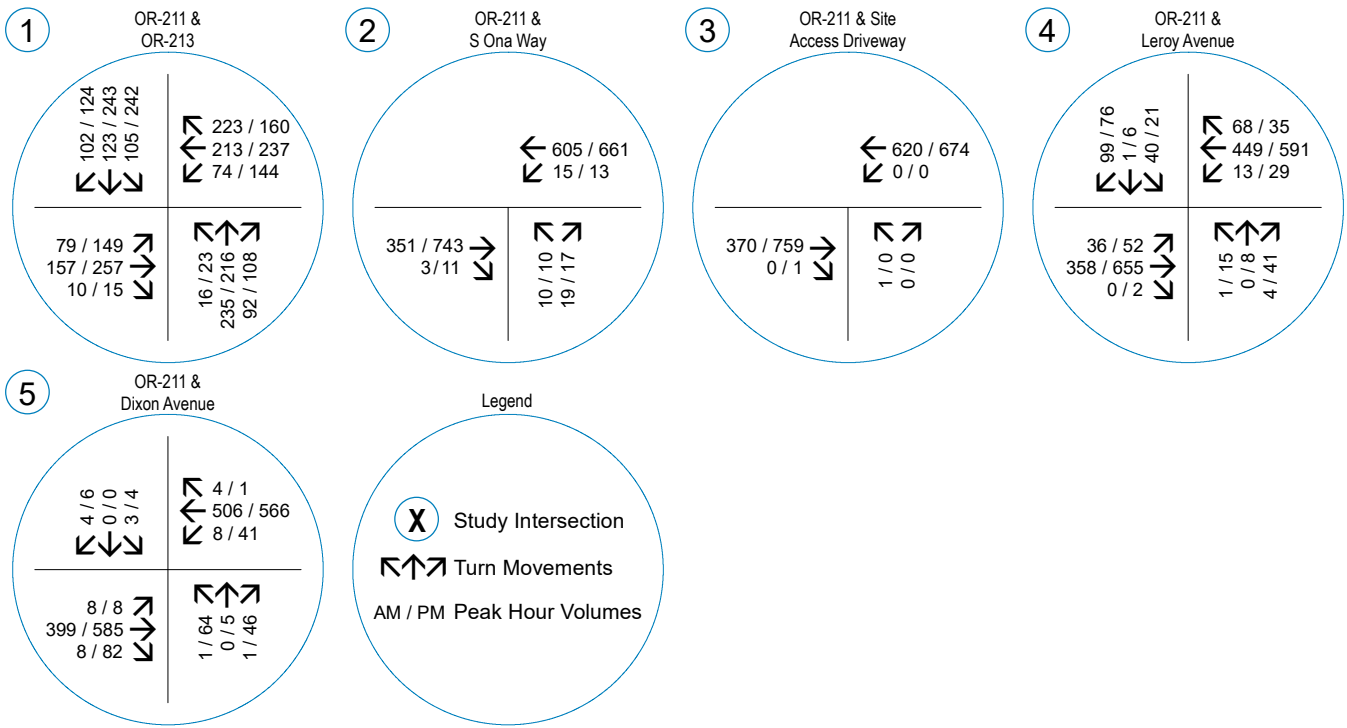
Due to the ongoing COVID-19 viral pandemic, traffic volumes have been depressed relative to normal conditions since mid-March 2020. Under these conditions, traditional traffic count data collection methods are not recommended. Therefore, the following methodology was used to adjust historical traffic counts at the study intersections to estimate year 2021 traffic conditions without the influence of COVID-19:

- New turning movement counts were collected on Tuesday, September 21, 2021 at the study area intersections.
- Historical turning movement counts from Tuesday, October 15, 2019, were obtained at the intersection of OR 211 & OR 213.
- A growth rate for the study area traffic was derived using ODOT's 2039 Future Volume Table, in accordance with ODOT's *Analysis Procedures Manual*. Averaging data corresponding to mileposts 16.08 and 16.12 of ODOT highway number 160 (OR 213) and mileposts 11.26 and 12.14 of ODOT highway number 161 (OR 211) resulted in a linear growth factor of 2.26 percent per year. This factor was applied to all 2019 turning movements to account for two years of growth.
- Traffic volumes on the highways will also be seasonally adjusted to reflect the 30<sup>th</sup> highest hour of traffic, per procedures described in ODOT's *Analysis Procedures Manual*. Using the ODOT's Seasonal Trend Table<sup>2</sup>, a seasonal adjustment factor of 1.0266 and 1.0286 was calculated based on the Commuter seasonal trend, for the October 2019 and September 2021 counts, respectively. The adjustment factor will be applied to through volumes on OR 211 at its intersection with the site access/Safeway driveway, and to all turning movement volumes at the intersection of OR 213 & OR 211.
- The seasonally adjusted and growth adjusted 2019 counts were compared to the seasonally adjusted 2021 counts to establish a COVID-19 adjustment factor. A total adjustment of 1.255 and 1.208 was applied to all intersection turning movements for the morning and evening peak hours, respectively.

Figure 4 shows the year 2021 existing traffic volumes at the study intersections during the morning and evening peak hours.

---

<sup>2</sup> ODOT Seasonal Trend Table (Updated 7/20/2021)



## Background Conditions

To provide analysis of the impact of the proposed development on the nearby transportation facilities, an estimate of future traffic volumes is required. Two components were included in the background traffic estimates: 1) general growth and 2) growth associated with planned developments. Although buildout is targeted to be completed in 2022, an analysis year of 2023 was evaluated to provide a conservative estimate of traffic conditions.

For the general background growth, the annual growth rate of 2.26 percent per year was applied to the adjusted year 2021 existing traffic volumes. This growth rate was derived from ODOT's 2039 Future Volume Table, as described above.

In addition to the general growth, three nearby developments that are approved but not yet constructed at the time of the traffic counts were included as in-process traffic:

1. Hezzie Lane Subdivision
2. Cascade Center
3. Colima Apartments

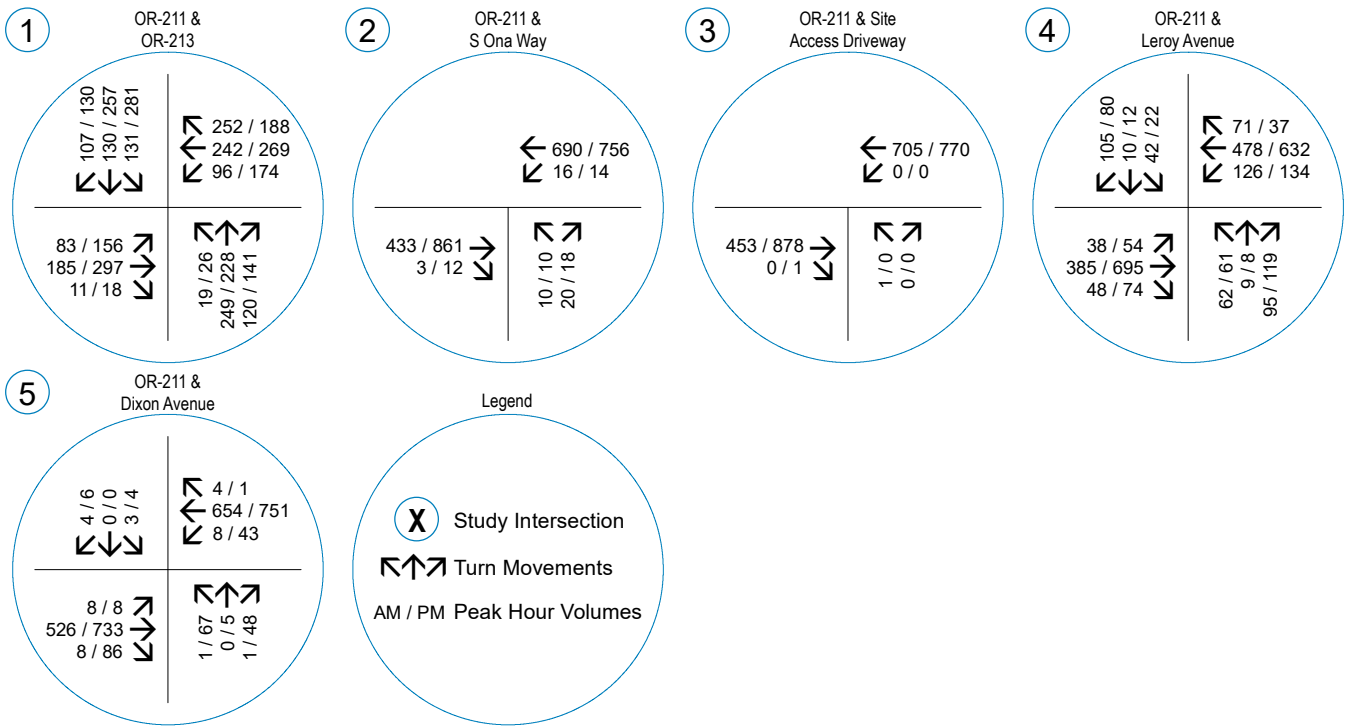
Trips from the Cascade Center and Colima Apartments were taken directly from the Transportation Impact Studies prepared for those projects. The Hezzie Lane Subdivision was not required to prepare a TIS. For this project, the trip generation was calculated using the ITE manual. The trip assignments for these developments were added to the general growth to estimate the year 2023 background volumes shown in Figure 5 for the study intersections during the morning and evening peak hours.

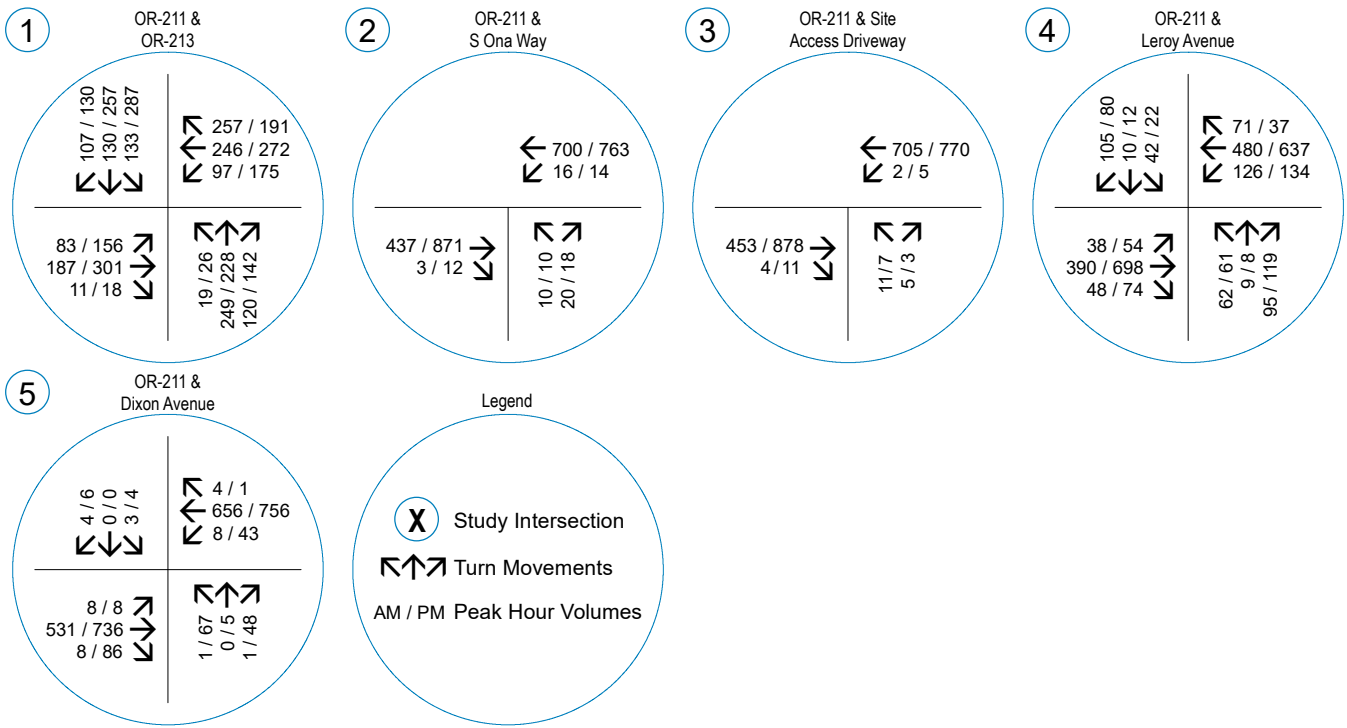
Based on the Cascade Center TIA (conducted by Kittelson & Associates, August 2019), left-turn lanes were identified to be constructed at the intersection of OR 211 & Leroy Avenue for both the eastbound and westbound approaches. Therefore, this geometry change was assumed under the Year 2023 Background conditions.

## Buildout Conditions

Peak hour trips calculated to be generated by the proposed development, as described earlier within the *Site Trips* section, were added to the year 2023 background volumes to obtain the expected Year 2023 buildout conditions. Figure 6 shows the resulting year 2023 buildout traffic volumes at the study intersections during the morning and evening peak hours.

As discussed at the outset of the project, the City of Molalla and ODOT have determined that half-street improvements fronting the project site up to S Ona Way would be required to upgrade the existing OR 211 cross-section from two lanes to three lanes with a two-way left-turn-lane. This improvement will extend to the S Ona Way intersection, allowing for a new westbound left-turn lane at both the intersection and the site access. The Buildout Year 2023 Conditions analysis includes these improvements as directed by ODOT staff.





## Safety Analysis

### Crash History Review

Using data obtained from ODOT's Crash Data System, a review of approximately five years of the most recent available crash history (January 2015 through December 2019) was performed at the study intersections. The crash data was evaluated based on the number of crashes, the type of collisions, and the severity of the collisions. Crash severity is based on injuries sustained by people involved in the crash, and includes five categories:

- *PDO* – Property Damage Only
- *Injury C* – Possible Injury
- *Injury B* – Suspected Minor Injury
- *Injury A* – Suspected Serious Injury
- *Fatality*

Crash rates provide the ability to compare safety risks at different intersections by accounting for both the number of crashes that have occurred during the study period and the number of vehicles that typically travel through the intersection. Crash rates were calculated using the common assumption that traffic counted during the evening peak hour represents approximately 10 percent of the average daily traffic (ADT) at the intersection.



Table 5 provides a summary of crash types while Table 6 summarizes crash severities and rates for each of the study intersections. Detailed crash data is provided in the appendix to this report.

The study intersections adhere to the crash analysis methodologies within ODOT's Analysis Procedures Manual (APM). According to *Exhibit 4-1: Intersection Crash Rates per MEV by Land Type and Traffic Control* of the APM, intersections which experience crash rates in excess of their respective 90<sup>th</sup> percentile crash rates should be "flagged for further analysis". Crash rates in excess of 90<sup>th</sup> percentile crashes per million entering vehicles (CMEV) may be indicative of design deficiencies and therefore require a need for further investigation and possible mitigation.

For intersections in urban settings, the following 90<sup>th</sup> percentile rates are applicable to the study intersections:

- Unsignalized, three-legged intersection: 0.293 CMEV
- Unsignalized, four-legged intersection: 0.408 CMEV
- Signalized, four-legged intersection: 0.860 CMEV

Table 5: Crash Type Summary

Intersection		Crash Type							Total Crashes
		Turn	Rear End	Angle	Side swipe	Fixed Object	Ped	Bike	
1	OR 211 at OR 213	10	7	3	2	0	0	0	22
2	OR 211 at Ona Way	1	10	0	2	2	0	0	15
3	OR 211 at Leroy Avenue	2	5	0	1	0	0	0	8
4	OR 211 at Dixon Avenue	1	0	0	0	0	0	1	2

Table 6: Crash Severity and Rate Summary

Intersection		Severity					Total Crashes	PHEV	Crash Rate	90 <sup>th</sup> % Rate
		PDO	C	B	A	Fatal				
1	OR 211 at OR 213	15	5	2	0	0	22	1,918	0.628	0.860
2	OR 211 at Ona Way	8	7	0	0	0	15	1,455	0.565	0.293
3	OR 211 at Leroy Avenue	1	3	4	0	0	8	1,531	0.286	0.293
4	OR 211 at Dixon Avenue	1	0	0	1	0	2	1,408	0.078	0.408

**Crash Severity**

The intersection of OR 211 & Dixon Avenue experienced one reported crash that was classified as *Injury A* and involved a bicyclist. The collision occurred when a vehicle turning left (specific direction of travel appears incorrect in the crash report) struck an eastbound bicyclist traveling straight in the crosswalk. The driver of the vehicle was reported to have failed to yield the right of way due to their view being obscured by a fence, sign, phone booth, etc. The bicyclist sustained injuries consistent with *Injury A* classification and the driver of the vehicle was not reported to have sustained any injuries. The collision was reported to have occurred during the daytime under clear and dry conditions.

**ODOT 90<sup>th</sup> Percentile Crash Rates**

Intersection crash rates were calculated and one intersection was had a rate above the respective ODOT 90<sup>th</sup> percentile crash rates. OR 211 at Ona Way was identified to have a crash rate of 0.565, exceeding the ODOT rate of 0.293 for three-legged, stop-controlled intersections.

The planned widening of OR 211 by the proposed project is anticipated to reduce collisions at the intersection. The planned widening will provide a two-way left-turn lane, allowing for westbound left-turning traffic to make a left turn without stopping in the mainline travelled way, thereby reducing the incidence of turning and rear-end collisions. These collision types accounted for 73% of the total reported crashes and nine of the 10 rear-end collisions were between vehicles traveling westbound. Reducing these collision types is anticipated to significantly reduce the crash rate at this intersection.



## Sight Distance Evaluation

A sight distance analysis was conducted at the site access driveway. To evaluate the sight distance available at these intersections, intersection sight distance was measured and recommended in accordance with the current AASHTO manual<sup>3</sup>. According to AASHTO, the driver's eye is assumed to be 14.5 feet from the near edge of the nearest travel lane of the intersecting street and at a height of 3.5 feet above the minor-street approach pavement. The vehicle driver's eye-height along the major-street approach is assumed to be 3.5 feet above the cross-street pavement. OR 211 has a posted speed limit of 35 mph in both directions and will be widened to a three-lane cross-section, thus the minimum intersection sight distance required is 415 feet in both directions. To account for the half-street improvements that will be constructed by the project the driver's eye is assumed to be 21 feet from the near edge of the nearest travel lane of the intersecting street (6 feet of half-street improvements + ~15 standard distance).

A field investigation was conducted on Monday afternoon, September 28<sup>th</sup>, 2021, to measure sight distance for this location. Figure 7 and Figure 8 display sight distance viewpoints from the future site access driveway for the eastbound and westbound approaches, respectively. The following observations were made:

- Sight distance is measured to be approximately 250 feet east of the site access driveway. Sight distance is currently obstructed by onsite foliage, falling short of the 415-foot sight distance requirement. Upon the planned removal of the onsite foliage and fence, as part of the proposed redevelopment project, sufficient sight distance exceeding the 415-foot requirement can be achieved. Sufficient sight distance will be maintained by the proposed development by keeping clear sight distance triangles for this approach including structures and planted foliage.
- Sight distance is measured to exceed 415 feet west of the site access driveway. There is currently a tree within the sight distance triangle, but is not significantly obstructing sight distance. Thus, the 415-foot requirement is met and exceeded. Sufficient sight distance will be maintained by the proposed development by keeping clear sight distance triangles for this approach including structures and planted foliage.

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<sup>3</sup> American Association of State Highway and Transportation Officials (AASHTO), *A Policy on Geometric Design of Highways and Streets*, 7th Edition, 2018.



Figure 7: Site Access Looking East- 21' From Edge of Travel Lane



Figure 8: Site Access Looking West - 21' From Edge of Travel Lane

## Warrant Analysis

### **Traffic Signal Warrants**

Preliminary traffic signal warrants were examined for all of the unsignalized study intersections to determine whether the installation of a new traffic signal will be warranted at the intersections by the project buildout year 2023. Based on the preliminary analysis, traffic signal warrants are not projected to be met for any of the unsignalized study intersections. Accordingly, no signalization of the unsignalized study intersection is necessary or recommended.

### **Left-turn Lane Warrants**

Left-turn lane warrants were examined for westbound traffic at the intersection of OR 211 and S Ona Way and at the intersection of OR 211 and the site access driveway. A left-turn refuge is primarily a safety consideration for the major street, removing left-turning vehicles from the through traffic stream. The warrants examined implement the design curves developed by the Texas Transportation Institute (TTI), as adopted by ODOT in its *Analysis Procedures Manual*. These warrants are evaluated based on the number of left-turning vehicles, the number of advancing and opposing vehicles, the number of lanes, and the roadway travel speed.

#### *S Ona Way*

Left-turn lane warrants were met for the westbound approach of this intersection during both the morning and evening peak hours. Half-street improvements from the project site to the eastern leg of the S Ona Way intersection will be completed by the Project applicant to provide a two-way left-turn-lane thereby allowing for a westbound left-turn lane to be installed, as it is warranted.

#### *Site Access Driveway*

The westbound left-turn movement is estimated at two and five vehicles during the AM and PM peak hours, respectively, under year 2023 buildout conditions, which does not meet the minimum threshold for consideration of a left-turn lane. Left-turning volumes during other hours of the day are generally expected to be below the 10-vehicle threshold. However, the site is required to improve OR 211 to ultimately include a two-way left-turn-lane, allowing for a left-turn pocket. This improvement will benefit safety and operations at the site access.

## Operational Analysis

An operational analysis was conducted for each of the study intersections per the signalized and unsignalized intersection analysis methodologies in the *Highway Capacity Manual (HCM)*<sup>4</sup>. Intersections are generally evaluated based on the average control delay experienced by vehicles and are assigned a grade according to their operation. The level of service (LOS) of an intersection can range from LOS A, which indicates very little, or no delay experienced by vehicles, to LOS F, which indicates a high degree of congestion and delay. The volume-to-capacity (v/c) ratio is a measure that compares the traffic volumes (demand) against the available capacity of an intersection. The analysis was performed using the Synchro which applies the HCM6 methodologies.

## Performance Targets

Since the study intersections are under ODOT jurisdiction, the applicable performance targets for these facilities are established under the Oregon Highway Plan (OHP) and are based on the v/c ratio of the intersection. Since OR 213 and OR 211 are District Highways located in the City's Urban Growth Boundary with speed limits between 35 and 45 mph, the target maximum allowable v/c ratio is 0.90.<sup>5</sup>

## Delay & Capacity Analysis

Results of the analysis are shown in Table 7. Detailed reports are provided in the appendix.

As shown, all study intersections are projected to operate within ODOT standards under all analysis scenarios, with the exception of the following intersections:

4. OR 211 at Leroy Avenue (v/c > 0.90 – Background and Buildout Conditions AM & PM Peak Hours)

The substandard operations at this intersection are directly precipitated by the Cascade Center development. The proposed project is not anticipated to directly contribute to the substandard conditions at this intersection.

5. OR 211 at Dixon Avenue (v/c > 0.90 – Background and Buildout Conditions PM Peak Hours)

The substandard operations at this intersection will be present with and without the addition of project traffic. The proposed project is not a direct cause to the substandard conditions at this intersection.

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<sup>4</sup> Transportation Research Board, *Highway Capacity Manual 6<sup>th</sup> Edition*, 2016.

<sup>5</sup> Oregon Department of Transportation, 1999 Oregon Highway Plan, Including amendments November 1999 through May 2015, 1999.

Table 7: Capacity Analysis Summary

Intersection & Scenario	Morning Peak Hour			Evening Peak Hour		
	LOS	Delay (s)	V/C	LOS	Delay (s)	V/C
<b>1. OR 211 at OR 213</b>						
2021 Existing Condition	B	17.9	0.51	C	20.9	0.68
2023 Background Condition	B	19.8	0.57	C	23.5	0.77
2023 Buildout Condition	B	20.0	0.57	C	23.8	0.78
<b>2. OR 211 at Ona Way</b>						
2021 Existing Condition	C	16.6	0.10	D	28.9	0.18
2023 Background Condition	C	19.6	0.13	E	39.4	0.24
2023 Buildout Condition	C	19.7	0.13	E	40.8	0.25
<b>3. OR 211 at Site Access Driveway</b>						
2021 Existing Condition	C	23.1	0.01	A	0.0	0.00
2023 Background Condition	D	29.2	0.01	A	0.0	0.00
2023 Buildout Condition	C	16.5	0.06	C	22.5	0.05
<b>4. OR 211 at Leroy Avenue</b>						
2021 Existing Condition	D	31.4	0.57	F	55.8	0.64
2023 Background Condition	F	>300	1.64	F	>300	2.95
2023 Buildout Condition	F	>300	1.64	F	>300	3.08
<b>5. OR 211 at Dixon Avenue</b>						
2021 Existing Condition	C	19.6	0.03	F	90.3	0.83
2023 Background Condition	D	28.2	0.05	F	>300	1.57
2023 Buildout Condition	D	28.4	0.05	F	>300	1.59

*BOLDED results indicate operation above acceptable jurisdictional standards.*

## Queueing Analysis

In accordance with the ODOT Analysis Procedures Manual (APM), an analysis of projected queuing was conducted for the study intersections. In order to determine the expected queuing which may form at critical study intersection turning movements, a queuing analysis was conducted based on the results of a Synchro/SimTraffic simulation (version 10.3.122.0), with the reported values representing 95<sup>th</sup> percentile queue lengths. The 95<sup>th</sup> percentile queue is a statistical measurement which indicates there is a 5 percent chance that the queue may exceed this length during the analysis period; however, given this is a probability, the 95<sup>th</sup> percentile queue length may theoretically never be met or observed in the field.

The projected 95<sup>th</sup> percentile queue lengths reported in the simulation are presented in Table 8 for the morning and evening peak hours. Reported queue lengths were rounded up to the nearest 25 feet, equivalent to an average vehicle length. Five trial runs of the simulation were conducted. Detailed queuing analysis worksheets are included in the appendix to this report.

**Table 8: 95<sup>th</sup> Percentile Queueing Analysis Summary**

Intersection/Movement	Available Storage (ft)	2023 Background Queue (ft)		2023 Buildout Queue (ft)	
		AM	PM	AM	PM
<b>1. OR 213 at OR 211</b>					
NB Left-Turn Lane	250	50	50	50	50
NB Right-Turn Lane	260	50	75	50	75
EB Left-Turn Lane	260	100	125	100	125
SB Left-Turn Lane	310	150	250	150	275
WB Left-Turn Lane	235	100	150	100	200
WB Right-Turn Lane	230	175	125	150	125
<b>2. OR 211 at Ona Way</b>					
NB Approach	>100	50	50	50	50
WB Approach/LT Lane	100	50	100	50	50
<b>3. OR 211 at Site Access Driveway</b>					
NB Approach	50	25	0	50	50
WB Left-Turn Lane	100	0	75	25	25
<b>4. OR 211 at Leroy Avenue</b>					
EB Left-Turn Lane	100	50	75	50	50
SB Approach	250	175	125	150	150
WB Left-Turn Lane	100	75	75	75	75
<b>5. OR 211 at Dixon Avenue</b>					
EB Left-Turn Lane	80	50	25	50	25
EB Right-Turn Lane	120	0	0	0	25
WB Left-Turn Lane	145	25	50	25	50

*BOLDED text indicates queue extends beyond available lane storage.*

Queueing analysis results show the 95<sup>th</sup> percentile queues at the study intersections are anticipated to provide adequate vehicle storage space that does not inhibit safe and expeditious travel under all scenarios.



## Conclusions

Key findings of this study include:

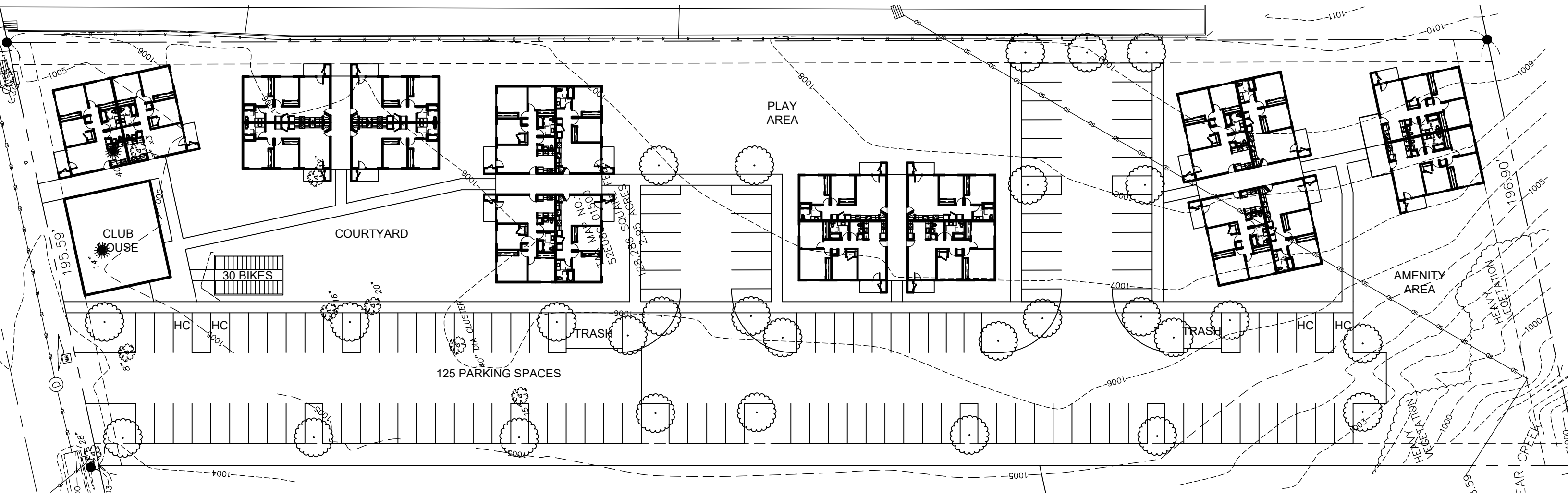
- No significant trends or crash patterns were identified at any of the study intersections, with the exception of OR 211 at S Ona Way. It is anticipated that the planned widening of OR 211 by the proposed project will reduce collisions at the intersection.
- Upon the planned removal of the onsite foliage as part of the proposed redevelopment project, sufficient sight distance exceeding the 415-foot requirement can be achieved.
- Preliminary traffic signal warrants are not projected to be met at any of the applicable study intersections under year 2023 Buildout Conditions.
- Left-turn lane warrants were met for the westbound approach at the intersection of OR 211 at S Ona Way during both the morning and evening peak hours. Half-street improvements from the project site to the eastern leg of the S Ona Way intersection will be completed by the project applicant to provide a two-way left-turn-lane thereby allowing for a westbound left-turn lane to be installed, as it is warranted.
- All study intersections are projected to operate at an acceptable v/c ratio less than 0.90 per ODOT standards upon buildout of the proposed development through year 2023, with the exception of the OR 211 & Leroy Avenue and OR 211 & Dixon Avenue intersections. These intersections are projected to have a volume to capacity ratio exceeding the allowable 0.90 maximum during in the Year 2023 analysis scenarios. The substandard operations at these intersections will be present with and without the addition of project traffic. The proposed project is not a direct cause to the substandard conditions at these intersections.
- Queuing analysis results show the 95th percentile queues at the study intersections are anticipated to provide adequate vehicle storage space that does not inhibit safe and expeditious travel under all scenarios.

# Appendix



# 1. Project Site Plan





## 2. Project Trip Generation





## TRIP GENERATION CALCULATIONS

*Land Use:* Single-Family Detached Housing  
*Land Use Code:* 210  
*Setting/Location:* General Urban/Suburban  
*Variable:* Dwelling Units  
*Variable Value:* 1

### AM PEAK HOUR

*Trip Rate:* 0.74

	Enter	Exit	Total
Directional Distribution	25%	75%	
Trip Ends	0	1	1

### PM PEAK HOUR

*Trip Rate:* 0.99

	Enter	Exit	Total
Directional Distribution	63%	37%	
Trip Ends	1	0	1

### WEEKDAY

*Trip Rate:* 9.44

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	5	5	10

### SATURDAY

*Trip Rate:* 9.54

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	5	5	10

Source: Trip Generation Manual, Tenth Edition



## TRIP GENERATION CALCULATIONS

*Land Use:* Multifamily Housing (Mid-Rise)  
*Land Use Code:* 221  
*Setting/Location:* General Urban/Suburban  
*Variable:* Dwelling Units  
*Variable Value:* 60

### AM PEAK HOUR

*Trip Rate:* 0.36

	Enter	Exit	Total
Directional Distribution	26%	74%	
Trip Ends	6	16	22

### PM PEAK HOUR

*Trip Rate:* 0.44

	Enter	Exit	Total
Directional Distribution	61%	39%	
Trip Ends	16	10	26

### WEEKDAY

*Trip Rate:* 5.44

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	163	163	326

### SATURDAY

*Trip Rate:* 4.91

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	147	147	294

Source: TRIP GENERATION, Tenth Edition

# 3. Traffic Counts







ALL TRAFFIC DATA SERVICES

(303) 216-2439

www.alltrafficdata.net

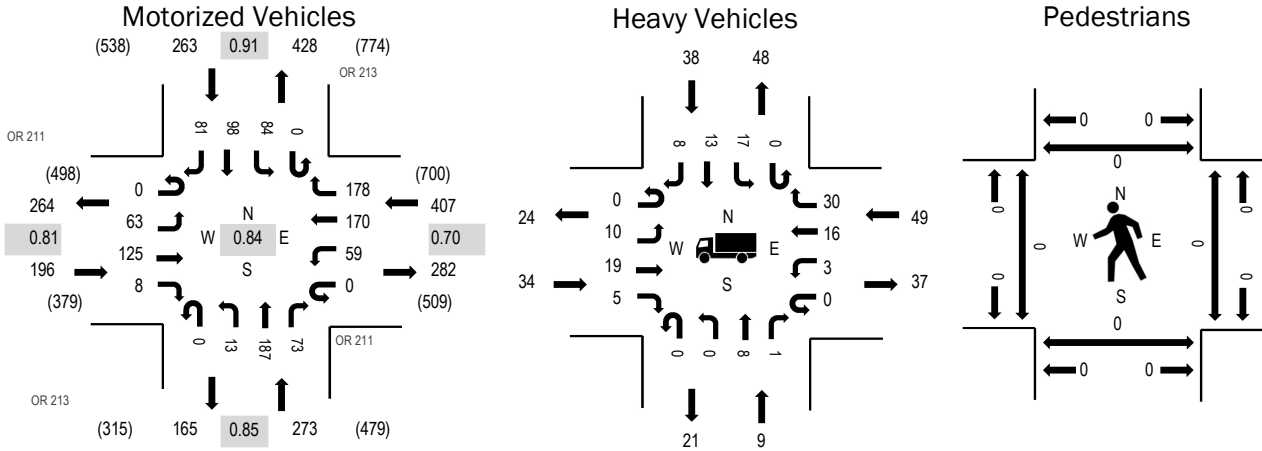
Location: 1 OR 213 & OR 211 AM

Date: Tuesday, September 21, 2021

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

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

Peak Hour



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	17.3%	0.81
WB	12.0%	0.70
NB	3.3%	0.85
SB	14.4%	0.91
All	11.4%	0.84

Traffic Counts - Motorized Vehicles

Interval Start Time	OR 211 Eastbound				OR 211 Westbound				OR 213 Northbound				OR 213 Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
7:00 AM	0	5	14	2	0	4	15	14	0	1	14	4	0	6	1	2	82	1,139
7:05 AM	0	5	11	0	0	1	17	11	0	2	14	8	0	10	5	7	91	1,138
7:10 AM	0	5	9	0	0	4	15	24	0	2	15	15	0	9	9	9	116	1,127
7:15 AM	0	6	8	0	0	0	13	15	0	0	20	5	0	2	6	7	82	1,080
7:20 AM	0	6	10	1	0	7	15	27	0	4	15	4	0	5	5	4	103	1,081
7:25 AM	0	8	19	2	0	6	19	23	0	0	19	7	0	5	12	5	125	1,047
7:30 AM	0	4	12	0	0	12	13	23	0	1	17	9	0	5	9	7	112	1,015
7:35 AM	0	5	7	0	0	7	11	6	0	0	9	2	0	10	14	10	81	975
7:40 AM	0	8	11	0	0	3	15	16	0	0	20	9	0	10	9	7	108	961
7:45 AM	0	4	8	0	0	10	12	2	0	2	18	3	0	4	9	6	78	944
7:50 AM	0	0	9	1	0	2	12	6	0	1	16	3	0	6	11	10	77	940
7:55 AM	0	7	7	2	0	3	13	11	0	0	10	4	0	12	8	7	84	962
8:00 AM	0	7	7	1	0	2	6	11	0	1	17	5	0	3	16	5	81	957
8:05 AM	0	11	8	0	0	4	8	13	0	0	13	3	0	4	5	11	80	
8:10 AM	0	7	14	0	0	3	5	7	0	1	9	2	0	5	8	8	69	
8:15 AM	0	8	5	1	0	4	13	12	0	2	9	9	0	7	8	5	83	
8:20 AM	0	1	5	0	0	4	9	15	0	0	10	5	0	7	9	4	69	
8:25 AM	0	8	5	0	0	2	13	16	0	4	7	4	0	13	16	5	93	
8:30 AM	0	6	3	0	0	1	9	6	0	0	14	4	0	11	8	10	72	
8:35 AM	0	5	10	0	0	3	7	12	0	3	9	4	0	4	5	5	67	
8:40 AM	0	7	6	0	0	2	24	13	0	1	9	5	0	5	7	12	91	
8:45 AM	0	5	5	0	0	2	11	7	0	1	17	5	0	5	9	7	74	
8:50 AM	0	10	9	0	0	10	15	10	0	3	9	3	0	5	10	15	99	
8:55 AM	0	8	21	0	0	2	7	5	0	0	13	5	0	6	8	4	79	
Count Total	0	146	223	10	0	98	297	305	0	29	323	127	0	159	207	172	2,096	
Peak Hour	0	63	125	8	0	59	170	178	0	13	187	73	0	84	98	81	1,139	

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

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	3	2	2	0	7	7:00 AM	0	0	0	0	0	7:00 AM	0	0	0	0	0
7:05 AM	1	0	4	2	7	7:05 AM	0	0	0	0	0	7:05 AM	0	0	0	0	0
7:10 AM	1	1	4	3	9	7:10 AM	0	0	0	0	0	7:10 AM	0	0	0	0	0
7:15 AM	0	1	6	0	7	7:15 AM	0	0	0	0	0	7:15 AM	0	0	0	0	0
7:20 AM	6	1	6	3	16	7:20 AM	0	0	0	0	0	7:20 AM	0	0	0	0	0
7:25 AM	8	1	6	4	19	7:25 AM	0	0	0	0	0	7:25 AM	0	0	0	0	0
7:30 AM	1	0	3	4	8	7:30 AM	0	0	0	0	0	7:30 AM	0	0	0	0	0
7:35 AM	3	0	2	5	10	7:35 AM	0	0	0	0	0	7:35 AM	0	0	0	0	0
7:40 AM	3	1	4	1	9	7:40 AM	0	0	0	0	0	7:40 AM	0	0	0	0	0
7:45 AM	3	1	4	4	12	7:45 AM	0	0	0	0	0	7:45 AM	0	0	0	0	0
7:50 AM	1	1	4	3	9	7:50 AM	0	0	0	0	0	7:50 AM	0	0	0	0	0
7:55 AM	4	0	4	9	17	7:55 AM	0	0	0	0	0	7:55 AM	0	0	0	0	0
8:00 AM	3	0	2	5	10	8:00 AM	0	0	0	0	0	8:00 AM	0	0	0	0	0
8:05 AM	3	1	4	4	12	8:05 AM	0	0	0	0	0	8:05 AM	0	0	0	0	0
8:10 AM	3	2	1	4	10	8:10 AM	0	0	0	0	0	8:10 AM	0	0	0	0	0
8:15 AM	1	1	2	6	10	8:15 AM	0	0	0	0	0	8:15 AM	0	0	0	0	0
8:20 AM	1	1	5	6	13	8:20 AM	0	0	0	0	0	8:20 AM	0	0	0	0	0
8:25 AM	1	1	5	2	9	8:25 AM	0	0	0	0	0	8:25 AM	0	0	0	0	0
8:30 AM	0	0	2	4	6	8:30 AM	0	0	0	0	0	8:30 AM	0	0	0	0	0
8:35 AM	3	0	2	6	11	8:35 AM	0	0	0	0	0	8:35 AM	0	0	0	0	0
8:40 AM	2	2	4	3	11	8:40 AM	0	0	0	0	0	8:40 AM	0	0	0	0	0
8:45 AM	0	4	4	3	11	8:45 AM	0	0	0	0	0	8:45 AM	0	0	0	0	0
8:50 AM	1	2	7	2	12	8:50 AM	0	0	0	0	0	8:50 AM	0	0	0	0	0
8:55 AM	4	1	2	5	12	8:55 AM	0	0	0	0	0	8:55 AM	0	0	0	0	0
Count Total	56	24	89	88	257	Count Total	0	0	0	0	0	Count Total	0	0	0	0	0
Peak Hour	34	9	49	38	130	Peak Hour	0	0	0	0	0	Peak Hour	0	0	0	0	0



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

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	0	0	3	1	4	7:00 AM	0	0	0	0	0	7:00 AM	2	0	0	0	2
7:05 AM	3	0	4	0	7	7:05 AM	0	0	0	0	0	7:05 AM	0	0	0	0	0
7:10 AM	1	0	1	0	2	7:10 AM	0	0	0	0	0	7:10 AM	0	0	0	0	0
7:15 AM	2	0	4	4	10	7:15 AM	0	0	0	0	0	7:15 AM	0	0	0	4	4
7:20 AM	1	0	4	1	6	7:20 AM	0	0	0	0	0	7:20 AM	0	0	0	0	0
7:25 AM	8	0	3	2	13	7:25 AM	0	0	0	0	0	7:25 AM	0	0	0	0	0
7:30 AM	3	1	1	2	7	7:30 AM	0	0	0	0	0	7:30 AM	0	0	0	0	0
7:35 AM	3	1	3	0	7	7:35 AM	0	0	0	0	0	7:35 AM	0	0	0	0	0
7:40 AM	1	0	5	0	6	7:40 AM	0	0	0	0	0	7:40 AM	0	0	0	0	0
7:45 AM	3	0	4	1	8	7:45 AM	0	0	0	0	0	7:45 AM	0	0	0	0	0
7:50 AM	3	0	5	1	9	7:50 AM	0	0	0	0	0	7:50 AM	0	0	0	0	0
7:55 AM	1	0	3	0	4	7:55 AM	0	0	0	0	0	7:55 AM	1	0	0	0	1
8:00 AM	7	0	6	0	13	8:00 AM	0	0	0	0	0	8:00 AM	0	0	0	0	0
8:05 AM	3	0	2	0	5	8:05 AM	0	0	0	0	0	8:05 AM	0	0	0	0	0
8:10 AM	2	0	2	0	4	8:10 AM	0	0	0	0	0	8:10 AM	0	0	0	0	0
8:15 AM	5	0	1	0	6	8:15 AM	0	0	0	0	0	8:15 AM	0	0	0	0	0
8:20 AM	3	0	4	2	9	8:20 AM	0	0	0	0	0	8:20 AM	0	0	0	0	0
8:25 AM	3	0	1	0	4	8:25 AM	0	0	0	0	0	8:25 AM	0	0	0	0	0
8:30 AM	2	0	5	0	7	8:30 AM	0	0	0	0	0	8:30 AM	0	0	0	0	0
8:35 AM	3	0	4	0	7	8:35 AM	0	0	0	0	0	8:35 AM	0	0	0	0	0
8:40 AM	4	0	5	3	12	8:40 AM	0	0	0	0	0	8:40 AM	0	0	0	1	1
8:45 AM	2	0	4	0	6	8:45 AM	0	0	0	0	0	8:45 AM	0	0	0	0	0
8:50 AM	4	1	2	0	7	8:50 AM	0	0	0	0	0	8:50 AM	0	0	0	0	0
8:55 AM	2	0	2	0	4	8:55 AM	0	0	0	0	0	8:55 AM	0	0	0	3	3
Count Total	69	3	78	17	167	Count Total	0	0	0	0	0	Count Total	3	0	0	8	11
Peak Hour	29	2	40	12	83	Peak Hour	0	0	0	0	0	Peak Hour	3	0	0	4	7



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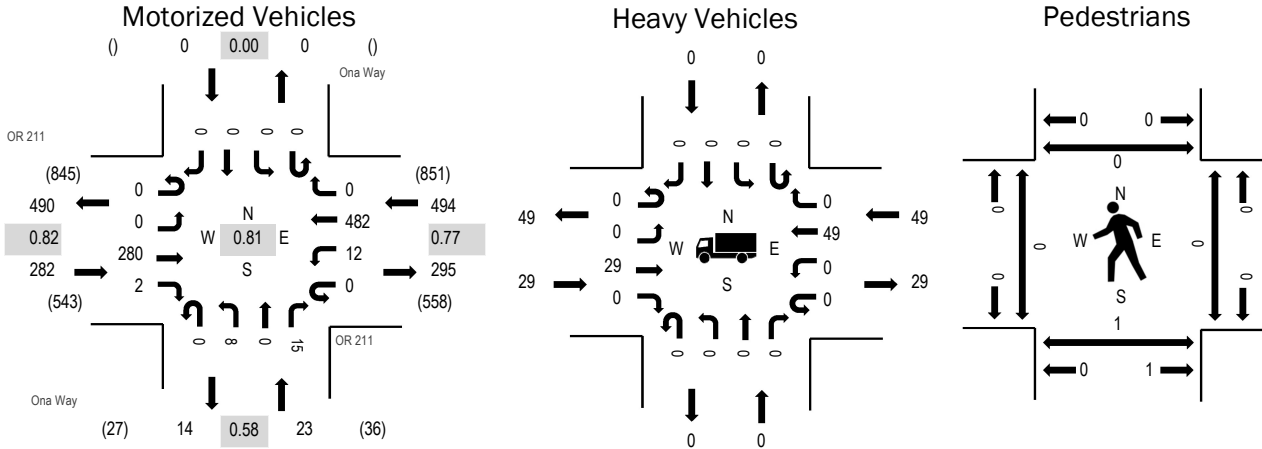
Location: 4 Ona Way & OR 211 AM

Date: Tuesday, September 21, 2021

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

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

Peak Hour



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	10.3%	0.82
WB	9.9%	0.77
NB	0.0%	0.58
SB	0.0%	0.00
All	9.8%	0.81

Traffic Counts - Motorized Vehicles

Interval Start Time	OR 211 Eastbound				OR 211 Westbound				Ona Way Northbound				Ona Way Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
7:00 AM	0	0	20	0	0	1	39	0	0	2	0	0	0	0	0	0	62	799
7:05 AM	0	0	32	0	0	0	35	0	0	0	0	2	0	0	0	0	69	792
7:10 AM	0	0	31	0	0	0	42	0	0	1	0	0	0	0	0	0	74	779
7:15 AM	0	0	26	0	0	0	39	0	0	1	0	1	0	0	0	0	67	747
7:20 AM	0	0	20	0	0	1	48	0	0	1	0	1	0	0	0	0	71	736
7:25 AM	0	0	30	0	0	2	58	0	0	1	0	3	0	0	0	0	94	721
7:30 AM	0	0	25	0	0	1	51	0	0	1	0	3	0	0	0	0	81	678
7:35 AM	0	0	20	0	0	0	31	0	0	1	0	0	0	0	0	0	52	650
7:40 AM	0	0	9	0	0	2	36	0	0	0	0	1	0	0	0	0	48	647
7:45 AM	0	0	28	1	0	1	43	0	0	0	0	2	0	0	0	0	75	656
7:50 AM	0	0	22	0	0	1	29	0	0	0	0	2	0	0	0	0	54	623
7:55 AM	0	0	17	1	0	3	31	0	0	0	0	0	0	0	0	0	52	629
8:00 AM	0	0	30	0	0	2	22	0	0	1	0	0	0	0	0	0	55	631
8:05 AM	0	0	26	0	0	1	29	0	0	0	0	0	0	0	0	0	56	
8:10 AM	0	0	9	0	0	1	31	0	0	0	0	1	0	0	0	0	42	
8:15 AM	0	0	26	0	0	1	29	0	0	0	0	0	0	0	0	0	56	
8:20 AM	0	0	24	1	0	1	28	0	0	0	0	2	0	0	0	0	56	
8:25 AM	0	0	15	1	0	1	33	0	0	1	0	0	0	0	0	0	51	
8:30 AM	0	0	21	0	0	1	31	0	0	0	0	0	0	0	0	0	53	
8:35 AM	0	0	25	1	0	0	20	0	0	2	0	1	0	0	0	0	49	
8:40 AM	0	0	13	0	0	0	41	0	0	2	0	1	0	0	0	0	57	
8:45 AM	0	0	13	1	0	0	28	0	0	0	0	0	0	0	0	0	42	
8:50 AM	0	0	26	1	0	0	32	0	0	0	0	1	0	0	0	0	60	
8:55 AM	0	0	28	0	0	0	25	0	0	0	0	1	0	0	0	0	54	
Count Total	0	0	536	7	0	20	831	0	0	14	0	22	0	0	0	0	1,430	
Peak Hour	0	0	280	2	0	12	482	0	0	8	0	15	0	0	0	0	799	

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

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	0	0	2	0	2	7:00 AM	0	0	0	0	0	7:00 AM	0	0	0	0	0
7:05 AM	2	0	3	0	5	7:05 AM	0	0	0	0	0	7:05 AM	0	0	0	0	0
7:10 AM	2	0	3	0	5	7:10 AM	0	0	0	0	0	7:10 AM	0	0	0	0	0
7:15 AM	0	0	5	0	5	7:15 AM	0	0	0	0	0	7:15 AM	0	0	0	0	0
7:20 AM	1	0	6	0	7	7:20 AM	0	0	0	0	0	7:20 AM	0	1	0	0	1
7:25 AM	10	0	6	0	16	7:25 AM	0	0	0	0	0	7:25 AM	0	0	0	0	0
7:30 AM	2	0	3	0	5	7:30 AM	0	0	0	0	0	7:30 AM	0	0	0	0	0
7:35 AM	3	0	3	0	6	7:35 AM	1	0	0	0	1	7:35 AM	0	0	0	0	0
7:40 AM	1	0	4	0	5	7:40 AM	0	0	0	0	0	7:40 AM	0	0	0	0	0
7:45 AM	4	0	4	0	8	7:45 AM	0	0	0	0	0	7:45 AM	0	0	0	0	0
7:50 AM	3	0	6	0	9	7:50 AM	0	0	0	0	0	7:50 AM	0	0	0	0	0
7:55 AM	1	0	4	0	5	7:55 AM	0	0	0	0	0	7:55 AM	0	0	0	0	0
8:00 AM	9	0	4	0	13	8:00 AM	0	0	0	0	0	8:00 AM	0	0	0	0	0
8:05 AM	2	0	4	0	6	8:05 AM	0	0	0	0	0	8:05 AM	0	0	0	0	0
8:10 AM	3	0	3	0	6	8:10 AM	0	0	0	0	0	8:10 AM	0	0	0	0	0
8:15 AM	6	0	0	0	6	8:15 AM	0	0	0	0	0	8:15 AM	0	0	0	0	0
8:20 AM	3	0	4	0	7	8:20 AM	0	0	0	0	0	8:20 AM	0	0	0	0	0
8:25 AM	4	0	6	0	10	8:25 AM	0	0	0	0	0	8:25 AM	0	0	0	0	0
8:30 AM	2	0	3	0	5	8:30 AM	0	0	0	0	0	8:30 AM	0	0	0	0	0
8:35 AM	4	0	3	0	7	8:35 AM	0	0	0	0	0	8:35 AM	0	0	0	0	0
8:40 AM	3	0	7	0	10	8:40 AM	0	0	0	0	0	8:40 AM	0	0	0	0	0
8:45 AM	5	0	5	0	10	8:45 AM	1	0	0	0	1	8:45 AM	0	0	0	1	1
8:50 AM	2	0	4	0	6	8:50 AM	0	0	0	0	0	8:50 AM	0	0	0	0	0
8:55 AM	2	0	1	0	3	8:55 AM	0	0	0	0	0	8:55 AM	0	0	0	3	3
Count Total	74	0	93	0	167	Count Total	2	0	0	0	2	Count Total	0	1	0	4	5
Peak Hour	29	0	49	0	78	Peak Hour	1	0	0	0	1	Peak Hour	0	1	0	0	1



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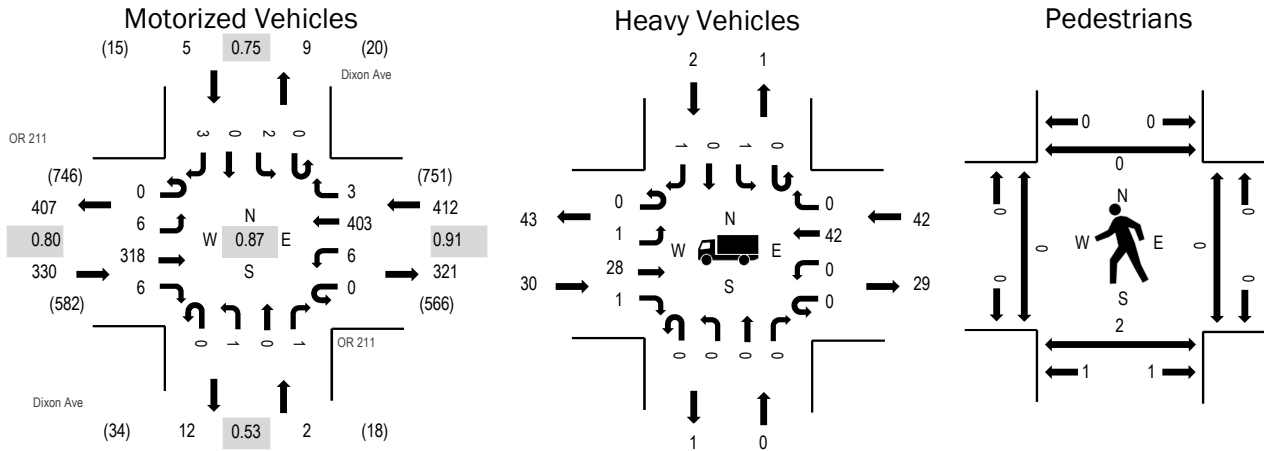
Location: 5 Dixon Ave & OR 211 AM

Date: Tuesday, September 21, 2021

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

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

Peak Hour



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	9.1%	0.80
WB	10.2%	0.91
NB	0.0%	0.53
SB	40.0%	0.75
All	9.9%	0.87

Traffic Counts - Motorized Vehicles

Interval Start Time	OR 211 Eastbound				OR 211 Westbound				Dixon Ave Northbound			Dixon Ave Southbound				Total	Rolling Hour	
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru			Right
7:00 AM	0	0	21	0	0	0	38	0	0	0	0	0	0	0	0	0	59	749
7:05 AM	0	1	29	0	0	0	37	0	0	0	0	0	0	0	0	0	67	748
7:10 AM	0	1	28	1	0	1	36	0	0	0	0	1	0	0	0	0	68	732
7:15 AM	0	0	36	0	0	0	24	1	0	0	0	0	0	0	0	1	62	723
7:20 AM	0	0	26	0	0	0	38	0	0	0	0	0	0	0	0	0	64	724
7:25 AM	0	0	25	0	0	1	45	1	0	0	0	0	0	0	0	0	72	704
7:30 AM	0	1	46	3	0	0	28	0	0	0	0	0	0	0	0	0	78	683
7:35 AM	0	1	28	0	0	0	35	1	0	0	0	0	0	0	0	0	65	641
7:40 AM	0	0	6	0	0	1	41	0	0	0	0	0	0	0	0	1	49	616
7:45 AM	0	0	31	1	0	1	30	0	0	0	0	0	0	1	0	1	65	627
7:50 AM	0	1	25	1	0	1	25	0	0	0	0	0	0	1	0	0	54	620
7:55 AM	0	1	17	0	0	1	26	0	0	1	0	0	0	0	0	0	46	613
8:00 AM	0	2	20	1	0	0	34	0	0	0	0	0	0	1	0	0	58	617
8:05 AM	0	1	19	1	0	0	28	0	0	0	0	2	0	0	0	0	51	
8:10 AM	0	1	19	0	0	1	35	1	0	1	0	0	0	1	0	0	59	
8:15 AM	0	2	23	2	0	0	28	3	0	1	0	2	0	1	1	0	63	
8:20 AM	0	0	14	2	0	0	25	0	0	1	0	1	0	1	0	0	44	
8:25 AM	0	0	28	0	0	0	20	0	0	1	1	1	0	0	0	0	51	
8:30 AM	0	0	15	0	0	0	19	0	0	0	0	1	0	0	1	0	36	
8:35 AM	0	0	12	2	0	0	24	0	0	0	0	0	0	0	0	2	40	
8:40 AM	0	0	23	1	0	1	34	0	0	1	0	0	0	0	0	0	60	
8:45 AM	0	0	15	0	0	2	38	0	0	1	0	1	0	0	0	1	58	
8:50 AM	0	0	28	2	0	0	16	0	0	0	0	1	0	0	0	0	47	
8:55 AM	0	0	15	4	0	1	29	0	0	0	0	0	0	1	0	0	50	
Count Total	0	12	549	21	0	11	733	7	0	7	1	10	0	7	2	6	1,366	
Peak Hour	0	6	318	6	0	6	403	3	0	1	0	1	0	2	0	3	749	

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

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	1	0	3	0	4	7:00 AM	0	0	0	0	0	7:00 AM	0	0	0	0	0
7:05 AM	2	0	3	0	5	7:05 AM	0	0	0	0	0	7:05 AM	0	0	0	0	0
7:10 AM	1	0	1	0	2	7:10 AM	0	0	0	0	0	7:10 AM	0	1	0	0	1
7:15 AM	1	0	4	0	5	7:15 AM	0	0	0	0	0	7:15 AM	0	1	0	0	1
7:20 AM	1	0	6	0	7	7:20 AM	0	0	0	0	0	7:20 AM	0	0	0	0	0
7:25 AM	6	0	2	0	8	7:25 AM	0	0	0	0	0	7:25 AM	0	0	0	0	0
7:30 AM	7	0	0	0	7	7:30 AM	0	0	0	0	0	7:30 AM	0	0	0	0	0
7:35 AM	3	0	6	0	9	7:35 AM	0	0	0	0	0	7:35 AM	0	0	0	0	0
7:40 AM	0	0	4	1	5	7:40 AM	0	0	0	0	0	7:40 AM	0	0	0	0	0
7:45 AM	3	0	5	0	8	7:45 AM	0	0	0	0	0	7:45 AM	0	0	0	0	0
7:50 AM	4	0	6	1	11	7:50 AM	0	0	0	0	0	7:50 AM	0	0	0	0	0
7:55 AM	1	0	2	0	3	7:55 AM	0	0	0	0	0	7:55 AM	0	0	0	0	0
8:00 AM	7	0	5	0	12	8:00 AM	0	0	0	0	0	8:00 AM	0	0	0	0	0
8:05 AM	5	0	2	0	7	8:05 AM	0	0	0	0	0	8:05 AM	0	0	0	0	0
8:10 AM	1	0	3	1	5	8:10 AM	0	0	0	0	0	8:10 AM	0	0	0	0	0
8:15 AM	6	1	4	0	11	8:15 AM	0	0	0	0	0	8:15 AM	0	0	0	0	0
8:20 AM	3	0	3	0	6	8:20 AM	0	0	0	0	0	8:20 AM	0	0	0	0	0
8:25 AM	5	1	2	0	8	8:25 AM	0	0	0	0	0	8:25 AM	0	0	0	0	0
8:30 AM	2	0	4	0	6	8:30 AM	0	0	0	0	0	8:30 AM	0	0	0	0	0
8:35 AM	2	0	3	1	6	8:35 AM	0	0	0	0	0	8:35 AM	0	0	0	0	0
8:40 AM	4	0	5	0	9	8:40 AM	0	0	0	0	0	8:40 AM	0	0	0	0	0
8:45 AM	3	0	4	0	7	8:45 AM	0	0	0	0	0	8:45 AM	0	0	0	0	0
8:50 AM	3	0	2	0	5	8:50 AM	0	0	0	0	0	8:50 AM	0	0	0	0	0
8:55 AM	2	0	1	0	3	8:55 AM	0	0	0	0	0	8:55 AM	0	0	0	0	0
Count Total	73	2	80	4	159	Count Total	0	0	0	0	0	Count Total	0	2	0	0	2
Peak Hour	30	0	42	2	74	Peak Hour	0	0	0	0	0	Peak Hour	0	2	0	0	2





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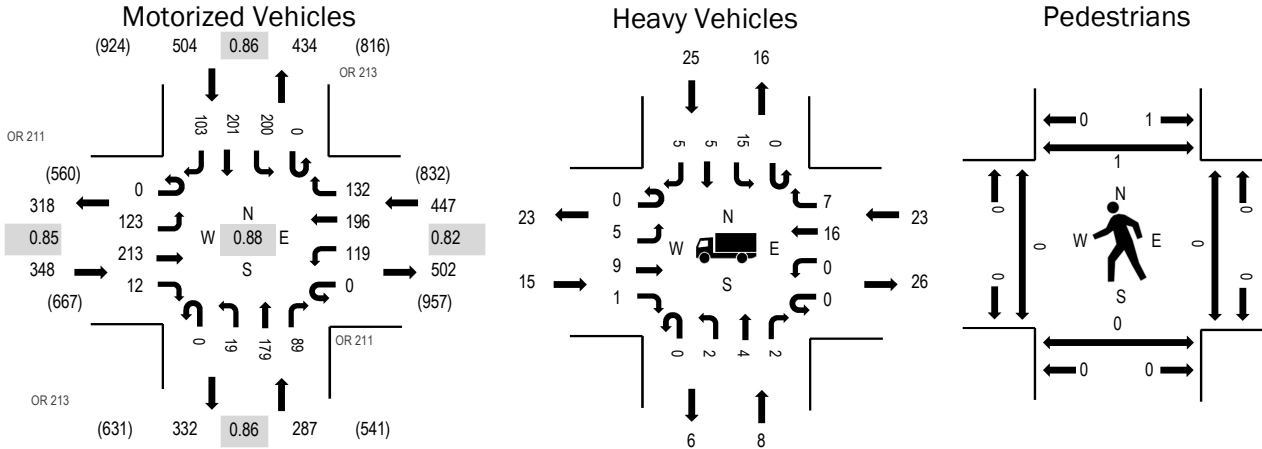
Location: 1 OR 213 & OR 211 PM

Date: Tuesday, September 21, 2021

Peak Hour: 04:30 PM - 05:30 PM

Peak 15-Minutes: 05:10 PM - 05:25 PM

Peak Hour



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	4.3%	0.85
WB	5.1%	0.82
NB	2.8%	0.86
SB	5.0%	0.86
All	4.5%	0.88

Traffic Counts - Motorized Vehicles

Interval Start Time	OR 211 Eastbound				OR 211 Westbound				OR 213 Northbound				OR 213 Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
4:00 PM	0	7	22	1	0	5	20	15	0	1	13	6	0	13	17	9	129	1,450
4:05 PM	0	12	18	0	0	12	12	8	0	0	17	11	0	12	12	3	117	1,455
4:10 PM	0	10	14	2	0	6	14	6	0	1	10	5	0	16	18	4	106	1,457
4:15 PM	0	4	11	1	0	8	21	12	0	0	22	8	0	11	17	10	125	1,512
4:20 PM	0	9	23	2	0	10	13	11	0	0	18	5	0	11	21	5	128	1,534
4:25 PM	0	9	20	1	0	5	12	12	0	0	6	4	0	15	10	9	103	1,550
4:30 PM	0	8	17	1	0	8	21	12	0	1	17	7	0	13	21	5	131	1,586
4:35 PM	0	9	21	0	0	14	9	17	0	0	13	2	0	17	10	12	124	1,559
4:40 PM	0	8	12	1	0	5	18	9	0	4	12	10	0	9	16	7	111	1,532
4:45 PM	0	10	21	1	0	2	13	11	0	0	11	5	0	19	17	6	116	1,544
4:50 PM	0	14	12	1	0	9	16	8	0	2	21	13	0	11	14	9	130	1,535
4:55 PM	0	6	20	3	0	9	14	8	0	0	17	8	0	17	17	11	130	1,524
5:00 PM	0	16	16	0	0	8	23	11	0	2	12	8	0	16	12	10	134	1,514
5:05 PM	0	8	15	1	0	5	10	10	0	3	18	6	0	14	22	7	119	
5:10 PM	0	19	20	1	0	25	16	12	0	1	9	12	0	14	22	10	161	
5:15 PM	0	7	24	3	0	11	30	11	0	2	11	5	0	21	15	7	147	
5:20 PM	0	10	22	0	0	12	8	11	0	3	19	9	0	30	14	6	144	
5:25 PM	0	8	13	0	0	11	18	12	0	1	19	4	0	19	21	13	139	
5:30 PM	0	10	15	1	0	9	8	6	0	1	12	10	0	16	13	3	104	
5:35 PM	0	6	16	1	0	13	9	10	0	1	9	2	0	13	11	6	97	
5:40 PM	0	10	16	1	0	11	16	11	0	2	10	9	0	10	21	6	123	
5:45 PM	0	8	12	0	0	4	9	13	0	3	13	8	0	13	20	4	107	
5:50 PM	0	10	21	1	0	9	19	3	0	2	16	13	0	13	11	1	119	
5:55 PM	0	7	18	0	0	8	8	17	0	0	10	6	0	19	17	10	120	
Count Total	0	225	419	23	0	219	357	256	0	30	335	176	0	362	389	173	2,964	
Peak Hour	0	123	213	12	0	119	196	132	0	19	179	89	0	200	201	103	1,586	

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

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	4	3	4	1	12	4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	0	0
4:05 PM	2	0	1	2	5	4:05 PM	0	0	0	0	0	4:05 PM	0	0	0	0	0
4:10 PM	2	1	1	3	7	4:10 PM	0	0	0	0	0	4:10 PM	0	0	0	0	0
4:15 PM	1	2	5	3	11	4:15 PM	0	0	0	0	0	4:15 PM	0	0	0	0	0
4:20 PM	1	0	2	2	5	4:20 PM	0	0	0	0	0	4:20 PM	0	0	0	0	0
4:25 PM	0	0	3	0	3	4:25 PM	0	0	0	0	0	4:25 PM	0	0	0	0	0
4:30 PM	4	1	1	1	7	4:30 PM	0	0	0	0	0	4:30 PM	0	0	0	0	0
4:35 PM	3	1	2	5	11	4:35 PM	0	0	0	0	0	4:35 PM	0	0	0	0	0
4:40 PM	0	2	3	1	6	4:40 PM	0	0	0	0	0	4:40 PM	0	0	0	0	0
4:45 PM	2	0	1	2	5	4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	1	1
4:50 PM	1	1	1	3	6	4:50 PM	0	0	0	0	0	4:50 PM	0	0	0	0	0
4:55 PM	1	0	0	1	2	4:55 PM	0	0	0	0	0	4:55 PM	0	0	0	0	0
5:00 PM	1	3	4	2	10	5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0
5:05 PM	0	0	0	5	5	5:05 PM	0	0	0	0	0	5:05 PM	0	0	0	0	0
5:10 PM	1	0	3	0	4	5:10 PM	0	0	0	0	0	5:10 PM	0	0	0	0	0
5:15 PM	1	0	4	3	8	5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0
5:20 PM	0	0	0	1	1	5:20 PM	0	0	0	0	0	5:20 PM	0	0	0	0	0
5:25 PM	1	0	4	1	6	5:25 PM	0	0	0	0	0	5:25 PM	0	0	0	0	0
5:30 PM	0	1	1	0	2	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0
5:35 PM	0	0	2	0	2	5:35 PM	0	0	0	0	0	5:35 PM	0	0	1	0	1
5:40 PM	1	0	0	0	1	5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0
5:45 PM	0	0	0	4	4	5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0
5:50 PM	1	0	0	0	1	5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0
5:55 PM	2	1	1	1	5	5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0
Count Total	29	16	43	41	129	Count Total	0	0	0	0	0	Count Total	0	0	1	1	2
Peak Hour	15	8	23	25	71	Peak Hour	0	0	0	0	0	Peak Hour	0	0	0	1	1



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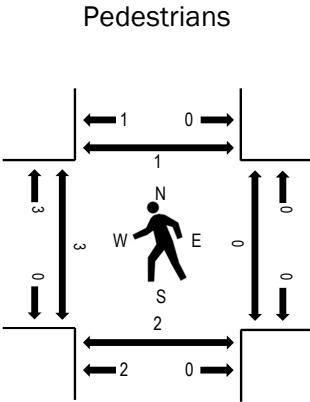
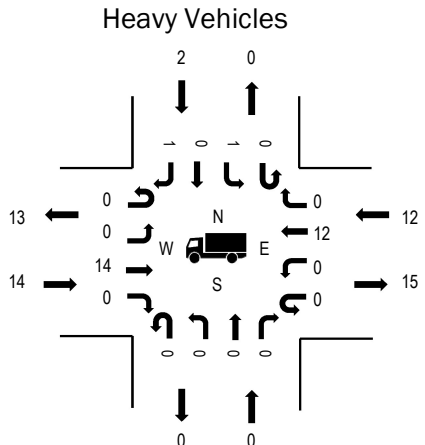
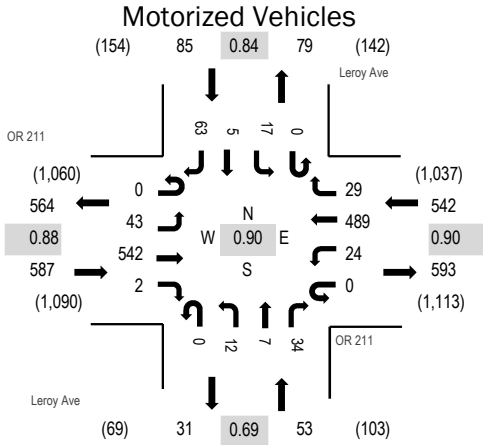
Location: 2 Leroy Ave & OR 211 PM

Date: Tuesday, September 21, 2021

Peak Hour: 04:55 PM - 05:55 PM

Peak 15-Minutes: 05:10 PM - 05:25 PM

**Peak Hour**



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	2.4%	0.88
WB	2.2%	0.90
NB	0.0%	0.69
SB	2.4%	0.84
All	2.2%	0.90

**Traffic Counts - Motorized Vehicles**

Interval Start Time	OR 211 Eastbound				OR 211 Westbound				Leroy Ave Northbound				Leroy Ave Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
4:00 PM	0	2	38	1	0	1	39	2	0	1	0	6	0	1	0	5	96	1,129
4:05 PM	0	4	43	0	0	2	38	2	0	1	0	4	0	2	1	3	100	1,145
4:10 PM	0	2	37	0	0	5	38	4	0	1	0	2	0	1	0	3	93	1,128
4:15 PM	0	4	34	0	1	2	44	1	0	0	0	4	0	2	0	6	98	1,164
4:20 PM	0	0	36	1	0	1	28	1	0	1	0	4	0	0	0	4	76	1,172
4:25 PM	0	4	39	0	0	4	32	2	0	0	0	0	0	0	0	4	85	1,213
4:30 PM	0	2	35	0	0	2	39	3	0	0	0	3	0	1	0	2	87	1,240
4:35 PM	0	0	45	1	0	1	42	2	0	3	0	2	0	0	0	8	104	1,246
4:40 PM	0	3	40	0	0	3	36	2	0	0	0	5	0	0	1	4	94	1,235
4:45 PM	0	6	34	1	0	3	30	5	0	1	0	1	0	0	0	4	85	1,251
4:50 PM	0	2	37	1	0	3	33	5	0	2	1	3	0	2	1	5	95	1,262
4:55 PM	0	3	45	0	0	1	43	5	0	1	0	8	0	5	0	5	116	1,267
5:00 PM	0	4	51	0	0	0	42	1	0	3	0	2	0	0	3	6	112	1,255
5:05 PM	0	3	38	1	0	3	28	1	0	0	1	3	0	0	0	5	83	
5:10 PM	0	1	54	0	0	0	53	5	0	2	0	3	0	2	0	9	129	
5:15 PM	0	4	45	0	0	4	41	4	0	0	1	2	0	1	0	4	106	
5:20 PM	0	8	56	0	0	1	43	0	0	0	0	2	0	1	0	6	117	
5:25 PM	0	5	46	0	0	1	44	3	0	1	1	2	0	2	0	7	112	
5:30 PM	0	5	44	0	0	2	31	2	0	0	2	3	0	1	0	3	93	
5:35 PM	0	4	33	0	0	4	43	2	0	1	0	2	0	0	0	4	93	
5:40 PM	0	2	50	0	0	3	38	3	0	2	0	1	0	2	1	8	110	
5:45 PM	0	0	38	0	0	4	41	0	0	0	1	4	0	2	1	5	96	
5:50 PM	0	4	42	1	0	1	42	3	0	2	1	2	0	1	0	1	100	
5:55 PM	0	1	50	0	0	2	35	2	0	0	1	4	0	4	1	4	104	
Count Total	0	73	1,010	7	1	53	923	60	0	22	9	72	0	30	9	115	2,384	
Peak Hour	0	43	542	2	0	24	489	29	0	12	7	34	0	17	5	63	1,267	

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

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	1	0	3	0	4	4:00 PM	0	0	1	0	1	4:00 PM	0	0	0	0	0
4:05 PM	2	0	0	0	2	4:05 PM	0	0	0	0	0	4:05 PM	0	0	0	0	0
4:10 PM	2	0	3	0	5	4:10 PM	0	0	0	0	0	4:10 PM	0	0	0	0	0
4:15 PM	2	0	1	2	5	4:15 PM	0	0	0	0	0	4:15 PM	0	0	0	0	0
4:20 PM	0	0	2	0	2	4:20 PM	0	0	0	0	0	4:20 PM	0	0	0	2	2
4:25 PM	1	0	4	0	5	4:25 PM	0	0	0	0	0	4:25 PM	0	0	0	0	0
4:30 PM	0	0	2	0	2	4:30 PM	0	0	0	0	0	4:30 PM	0	0	0	0	0
4:35 PM	5	0	2	0	7	4:35 PM	0	0	0	0	0	4:35 PM	0	0	0	3	3
4:40 PM	3	0	2	0	5	4:40 PM	0	0	0	0	0	4:40 PM	2	0	0	1	3
4:45 PM	2	0	2	1	5	4:45 PM	0	0	0	0	0	4:45 PM	0	2	0	0	2
4:50 PM	2	0	2	0	4	4:50 PM	0	0	0	0	0	4:50 PM	0	0	0	0	0
4:55 PM	1	0	1	1	3	4:55 PM	0	0	0	0	0	4:55 PM	0	0	0	0	0
5:00 PM	3	0	4	0	7	5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	1	1
5:05 PM	1	0	0	0	1	5:05 PM	0	0	0	0	0	5:05 PM	2	2	0	0	4
5:10 PM	2	0	2	0	4	5:10 PM	0	0	0	0	0	5:10 PM	0	0	0	0	0
5:15 PM	1	0	1	1	3	5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0
5:20 PM	2	0	0	0	2	5:20 PM	0	0	0	0	0	5:20 PM	0	0	0	0	0
5:25 PM	0	0	2	0	2	5:25 PM	0	0	0	0	0	5:25 PM	0	0	0	0	0
5:30 PM	1	0	1	0	2	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0
5:35 PM	0	0	1	0	1	5:35 PM	0	0	0	0	0	5:35 PM	0	0	0	0	0
5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0
5:45 PM	1	0	0	0	1	5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0
5:50 PM	2	0	0	0	2	5:50 PM	0	0	0	0	0	5:50 PM	1	0	0	0	1
5:55 PM	2	0	2	0	4	5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0
Count Total	36	0	37	5	78	Count Total	0	0	1	0	1	Count Total	5	4	0	7	16
Peak Hour	14	0	12	2	28	Peak Hour	0	0	0	0	0	Peak Hour	3	2	0	1	6



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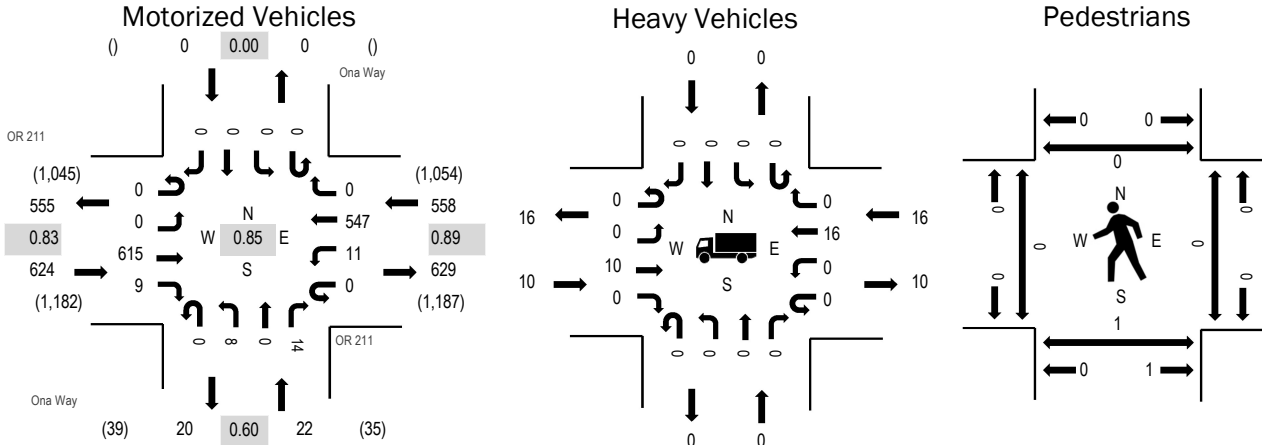
Location: 4 Ona Way & OR 211 PM

Date: Tuesday, September 21, 2021

Peak Hour: 04:55 PM - 05:55 PM

Peak 15-Minutes: 05:10 PM - 05:25 PM

Peak Hour



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	1.6%	0.83
WB	2.9%	0.89
NB	0.0%	0.60
SB	0.0%	0.00
All	2.2%	0.85

Traffic Counts - Motorized Vehicles

Interval Start Time	OR 211 Eastbound				OR 211 Westbound				Ona Way Northbound				Ona Way Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
4:00 PM	0	0	42	0	0	0	44	0	0	0	0	0	0	0	0	0	86	1,074
4:05 PM	0	0	52	1	0	0	34	0	0	1	0	0	0	0	0	0	88	1,093
4:10 PM	0	0	51	0	0	1	36	0	0	0	0	1	0	0	0	0	89	1,083
4:15 PM	0	0	33	0	0	3	56	0	0	0	0	1	0	0	0	0	93	1,116
4:20 PM	0	0	49	2	0	1	34	0	0	0	0	0	0	0	0	0	86	1,138
4:25 PM	0	0	43	2	0	0	30	0	0	1	0	2	0	0	0	0	78	1,171
4:30 PM	0	0	45	2	0	1	46	0	0	1	0	0	0	0	0	0	95	1,197
4:35 PM	0	0	50	0	0	0	49	0	0	1	0	3	0	0	0	0	103	1,185
4:40 PM	0	0	50	1	0	0	42	0	0	0	0	0	0	0	0	0	93	1,178
4:45 PM	0	0	39	1	0	1	35	0	0	0	0	1	0	0	0	0	77	1,184
4:50 PM	0	0	39	0	0	0	43	0	0	0	0	1	0	0	0	0	83	1,192
4:55 PM	0	0	51	0	0	0	52	0	0	0	0	0	0	0	0	0	103	1,204
5:00 PM	0	0	53	0	0	1	49	0	0	1	0	1	0	0	0	0	105	1,197
5:05 PM	0	0	43	0	0	1	32	0	0	0	0	2	0	0	0	0	78	
5:10 PM	0	0	58	0	0	0	60	0	0	2	0	2	0	0	0	0	122	
5:15 PM	0	0	57	1	0	2	52	0	0	0	0	3	0	0	0	0	115	
5:20 PM	0	0	70	3	0	0	43	0	0	0	0	3	0	0	0	0	119	
5:25 PM	0	0	49	0	0	0	52	0	0	2	0	1	0	0	0	0	104	
5:30 PM	0	0	50	2	0	3	28	0	0	0	0	0	0	0	0	0	83	
5:35 PM	0	0	42	1	0	2	49	0	0	1	0	1	0	0	0	0	96	
5:40 PM	0	0	52	0	0	1	45	0	0	1	0	0	0	0	0	0	99	
5:45 PM	0	0	42	0	0	0	42	0	0	1	0	0	0	0	0	0	85	
5:50 PM	0	0	48	2	0	1	43	0	0	0	0	1	0	0	0	0	95	
5:55 PM	0	0	56	0	0	3	37	0	0	0	0	0	0	0	0	0	96	
Count Total	0	0	1,164	18	0	21	1,033	0	0	12	0	23	0	0	0	0	2,271	
Peak Hour	0	0	615	9	0	11	547	0	0	8	0	14	0	0	0	0	1,204	

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

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	1	0	4	0	5	4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	0	0
4:05 PM	3	1	1	0	5	4:05 PM	0	0	0	0	0	4:05 PM	0	0	0	0	0
4:10 PM	3	0	2	0	5	4:10 PM	0	0	0	0	0	4:10 PM	0	0	0	1	1
4:15 PM	1	0	5	0	6	4:15 PM	0	0	0	0	0	4:15 PM	0	0	0	0	0
4:20 PM	1	0	2	0	3	4:20 PM	0	0	0	0	0	4:20 PM	0	0	0	0	0
4:25 PM	1	0	5	0	6	4:25 PM	0	0	0	0	0	4:25 PM	0	0	0	0	0
4:30 PM	1	0	1	0	2	4:30 PM	0	0	0	0	0	4:30 PM	0	0	0	0	0
4:35 PM	4	0	2	0	6	4:35 PM	0	0	0	0	0	4:35 PM	0	0	0	0	0
4:40 PM	5	0	2	0	7	4:40 PM	0	0	0	0	0	4:40 PM	0	0	0	0	0
4:45 PM	2	0	3	0	5	4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	0
4:50 PM	2	0	1	0	3	4:50 PM	0	0	0	0	0	4:50 PM	0	1	0	0	1
4:55 PM	2	0	2	0	4	4:55 PM	0	0	0	0	0	4:55 PM	0	0	0	0	0
5:00 PM	1	0	4	0	5	5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0
5:05 PM	2	0	0	0	2	5:05 PM	0	0	0	0	0	5:05 PM	0	0	0	0	0
5:10 PM	1	0	2	0	3	5:10 PM	0	0	0	0	0	5:10 PM	0	0	0	0	0
5:15 PM	1	0	2	0	3	5:15 PM	0	0	0	0	0	5:15 PM	0	1	0	0	1
5:20 PM	1	0	0	0	1	5:20 PM	0	0	0	0	0	5:20 PM	0	0	0	0	0
5:25 PM	0	0	3	0	3	5:25 PM	0	0	0	0	0	5:25 PM	0	0	0	0	0
5:30 PM	1	0	1	0	2	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0
5:35 PM	0	0	1	0	1	5:35 PM	0	0	0	0	0	5:35 PM	0	0	0	0	0
5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0
5:45 PM	1	0	1	0	2	5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0
5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0
5:55 PM	2	0	1	0	3	5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0
Count Total	36	1	45	0	82	Count Total	0	0	0	0	0	Count Total	0	2	0	1	3
Peak Hour	10	0	16	0	26	Peak Hour	0	0	0	0	0	Peak Hour	0	1	0	0	1



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

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	1	0	4	0	5	4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	0	0
4:05 PM	1	0	1	0	2	4:05 PM	0	0	0	0	0	4:05 PM	0	0	1	0	1
4:10 PM	2	0	2	0	4	4:10 PM	0	0	0	0	0	4:10 PM	0	0	0	0	0
4:15 PM	3	0	2	0	5	4:15 PM	0	0	0	0	0	4:15 PM	0	0	0	0	0
4:20 PM	1	0	2	0	3	4:20 PM	0	1	0	0	1	4:20 PM	0	0	0	0	0
4:25 PM	0	0	4	0	4	4:25 PM	0	0	0	0	0	4:25 PM	0	0	0	0	0
4:30 PM	0	0	3	0	3	4:30 PM	0	0	0	0	0	4:30 PM	0	2	0	0	2
4:35 PM	5	0	1	0	6	4:35 PM	0	0	0	0	0	4:35 PM	0	0	0	0	0
4:40 PM	2	0	3	1	6	4:40 PM	1	0	0	0	1	4:40 PM	0	2	0	0	2
4:45 PM	2	0	1	1	4	4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	0
4:50 PM	2	0	2	1	5	4:50 PM	0	0	0	0	0	4:50 PM	0	0	0	0	0
4:55 PM	1	0	0	0	1	4:55 PM	0	0	0	0	0	4:55 PM	1	0	0	0	1
5:00 PM	2	0	5	0	7	5:00 PM	0	0	0	0	0	5:00 PM	0	2	0	0	2
5:05 PM	3	0	0	0	3	5:05 PM	0	0	0	0	0	5:05 PM	0	0	0	0	0
5:10 PM	2	0	2	0	4	5:10 PM	0	0	0	0	0	5:10 PM	0	0	0	0	0
5:15 PM	1	0	3	0	4	5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0
5:20 PM	1	0	1	0	2	5:20 PM	0	0	0	0	0	5:20 PM	0	0	0	0	0
5:25 PM	0	0	2	1	3	5:25 PM	0	0	0	0	0	5:25 PM	0	0	0	0	0
5:30 PM	1	0	1	0	2	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0
5:35 PM	0	0	0	0	0	5:35 PM	0	0	0	0	0	5:35 PM	0	0	0	0	0
5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0
5:50 PM	2	0	1	0	3	5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0
5:55 PM	2	0	1	0	3	5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0
Count Total	34	0	41	4	79	Count Total	1	1	0	0	2	Count Total	1	6	1	0	8
Peak Hour	13	0	15	1	29	Peak Hour	0	0	0	0	0	Peak Hour	1	2	0	0	3



SEASONAL TREND TABLE (Updated: 7/20/2021) <sup>1</sup>																									Seasonal Trend
TREND	1-Jan	15-Jan	1-Feb	15-Feb	1-Mar	15-Mar	1-Apr	15-Apr	1-May	15-May	1-Jun	15-Jun	1-Jul	15-Jul	1-Aug	15-Aug	1-Sep	15-Sep	1-Oct	15-Oct	1-Nov	15-Nov	1-Dec	15-Dec	Peak Period Factor
INTERSTATE URBANIZED	1.0672	1.0684	1.0822	1.1160	1.0605	1.0050	0.9923	0.9796	0.8781	0.9767	0.9615	0.9463	0.9517	0.9571	0.9551	0.9531	0.9674	0.9816	0.9850	0.9884	1.0045	1.0206	1.0322	1.0438	0.9463
INTERSTATE NONURBANIZED	1.2426	1.2883	1.3750	1.4616	1.2645	1.0673	1.0382	1.0092	0.9798	0.9504	0.9005	0.8506	0.8322	0.8139	0.8221	0.8302	0.8719	0.9135	0.9441	0.9747	1.0178	1.0608	1.1123	1.1638	0.8139
COMMUTER	1.0850	1.0875	1.1183	1.1492	1.0880	1.0268	1.0014	0.9759	0.9705	0.9650	0.9503	0.9355	0.9470	0.9585	0.9509	0.9433	0.9528	0.9623	0.9614	0.9604	0.9938	1.0272	1.0474	1.0676	0.9355
COASTAL DESTINATION	1.1885	1.1712	1.2001	1.2289	1.1242	1.0194	1.0316	1.0437	1.0080	0.9723	0.9347	0.8972	0.8612	0.8252	0.8205	0.8159	0.8686	0.9214	0.9689	1.0164	1.0660	1.1156	1.1580	1.2005	0.8159
COASTAL DESTINATION ROUTE	1.3445	1.3248	1.4108	1.4968	1.2858	1.0747	1.0911	1.1076	1.0274	0.9473	0.8941	0.8409	0.7820	0.7231	0.7218	0.7205	0.8016	0.8827	0.9669	1.0511	1.1133	1.1754	1.2480	1.3206	0.7205
AGRICULTURE	1.4583	1.4827	1.5763	1.6700	1.4596	1.2492	1.1487	1.0482	0.9747	0.9011	0.8579	0.8146	0.8058	0.7970	0.7922	0.7873	0.7772	0.7670	0.8288	0.8905	0.9947	1.0989	1.2462	1.3934	0.7670
RECREATIONAL SUMMER	1.5848	1.6474	1.7861	1.9247	1.6595	1.3942	1.2973	1.2004	1.0517	0.9029	0.8256	0.7484	0.7018	0.6552	0.6708	0.6864	0.7393	0.7922	0.8898	0.9874	1.1242	1.2610	1.3965	1.5320	0.6552
RECREATIONAL SUMMER WINTER	0.8736	0.8525	0.9330	1.0135	1.0146	1.0158	1.1492	1.2825	1.1763	1.0700	0.9760	0.8821	0.8005	0.7190	0.7305	0.7420	0.8897	1.0374	1.2010	1.3645	1.5212	1.6778	1.8312	1.0847	0.7190
RECREATIONAL WINTER	0.6997	0.6389	0.6561	0.6733	0.7219	0.7704	1.0580	1.3455	1.3746	1.4038	1.2832	1.1625	0.9985	0.8344	0.8600	0.8857	1.0560	1.2262	1.4100	1.5937	1.8758	2.1580	1.5328	0.9076	0.6389
SUMMER	1.2151	1.2357	1.3129	1.3901	1.2520	1.1139	1.0620	1.0100	0.9718	0.9336	0.8976	0.8615	0.8457	0.8299	0.8354	0.8410	0.8743	0.9077	0.9357	0.9638	1.0273	1.0908	1.1322	1.1737	0.8299
SUMMER < 2500	1.3035	1.3186	1.3817	1.4448	1.2869	1.1289	1.0598	0.9906	0.9480	0.9053	0.8720	0.8387	0.8237	0.8086	0.8229	0.8373	0.8616	0.8859	0.9233	0.9607	1.0428	1.1249	1.2016	1.2783	0.8086

- \* Seasonal Trend Table factors are based on previous year ATR data. The table is updated yearly.
- \* Grey shading indicates months where seasonal factor is greater than or less than 30%
- \* February 2019 snow event causing lower seasonal factors

<sup>1</sup>Seasonal Trend Table: The 2020 table is based on 2019 values due to the irregularity caused by the Covid epidemic shutdown during the 2020 count year.

Site id	HWY	MP	DIR	HS	Description	2017	2018	2019	2039	RSQ	Straightline	Compound	
3434	160	16.08	1		0.02 mile north of Woodburn-Estacada Highway (OR211)			11000	15500	MODEL	2.05%	1.73%	2.11%
3435	160	16.12	1		0.02 mile south of Woodburn-Estacada Highway (OR211)			6000	8600	MODEL	2.17%	1.82%	
3450	161	11.26	1		0.05 mile west of Cascade Highway South (OR213)			6100	8800	MODEL	2.21%	1.85%	
3451	161	11.36	1		0.05 mile east of Cascade Highway South (OR213)			12600	18800	MODEL	2.46%	2.02%	2.42%
3452	161	12.25	1		0.09 mile east of LeRoy Avenue			13600	20600	MODEL	2.57%	2.10%	

## 4. In-Process Data



Transportation Impact Analysis

# Cascade Place Multi-Family

Molalla, Oregon

August 2021

## Transportation Impact Analysis

# Cascade Place Multi-Family

Molalla, Oregon

Prepared For:

**I&E Construction**

9550 SE Clackamas Rd

Clackamas, OR 97015

(503) 807-5048

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Project No. 26752

August 2021



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- Appendix B Existing Year 2021 Conditions Traffic Analysis Worksheets
- Appendix C ODOT Crash Data
- Appendix D Year 2022 Background Conditions Traffic Analysis Worksheets
- Appendix E Year 2022 Total Conditions Traffic Analysis Worksheets
- Appendix F Signal Warrant Analysis Worksheets

Section 1  
Executive Summary

## EXECUTIVE SUMMARY

I&E Construction proposes to develop up to 151 multi-family units, known as Cascade Place, on an approximately 6.8-acre lot south of the Cascade Center commercial development on OR 211 in Molalla, Oregon. The multi-family units will replace the previously-approved 557 storage units within the Cascade Center commercial development. The site will be accessed via a southward extension of Leroy Avenue across OR 211, which is currently under construction as part of the Cascade Center commercial development. The anticipated build-out year is 2022.

The results of this study indicate that the proposed Cascade Place Multi-Family development can be constructed while maintaining acceptable traffic operations and safety at the study intersections, assuming provision of the recommended mitigation measures.

## FINDINGS

### Year 2021 Existing Conditions

- A 2.5-percent annual growth rate was applied to the raw turning movement volumes collected at the study intersections in fall 2018 to estimate the existing year 2021 turning movement volumes.
- All of the study intersections currently meet ODOT mobility targets during the weekday AM and PM peak hours, with the exception of the OR 211/Molalla Avenue intersection—the v/c ratios on the eastbound and westbound OR 211 approaches currently exceed the ODOT mobility target of 0.90 during the weekday PM peak hour.
- A review of historical crash data did not reveal any patterns or trends in the site vicinity that require mitigation associated with this project.

### Year 2022 Background Traffic Conditions

- A 2.5-percent annual growth rate was applied to the existing traffic volumes to account for regional growth in the area.
- The City of Molalla identified the following in-process developments for inclusion in the year 2022 background traffic volumes:
  - Cascade Center commercial development
  - Colima Apartments
  - Center Market
- The *City of Molalla Transportation System Plan* identifies the future need to signalize the OR 211/Leroy Avenue intersection. The traffic signal was identified to provide motor vehicle capacity at the intersection to serve anticipated traffic growth and also serves as a north-

south pedestrian crossing opportunity linking residents south of OR 211 with Molalla River Middle School to the north. Signalization is not currently funded.

- The Cascade Center commercial development will improve OR 211 to a three-lane section along the site frontage, including exclusive left turn lanes in either direction of OR 211 at Leroy Avenue. These improvements were incorporated into the year 2022 background traffic conditions analysis as being constructed prior to build-out of the multi-family units.
- The Cascade Center commercial development will provide a Rectangular Rapid Flashing Beacon (RRFB) for the crosswalk on the west leg of the improved OR 211/Leroy Avenue intersection.
- The Cascade Center commercial development will provide several improvements to the OR 211/Molalla Avenue intersection, including signalization. These improvements were incorporated into the year 2022 background traffic conditions analysis as being constructed prior to build-out of the multi-family units.
- Each of the study intersections is forecast to continue meeting ODOT mobility targets during the weekday AM and PM peak hours, with the exception of the northbound left turn at OR 211/Leroy Avenue, which is projected to experience a v/c ratio above the ODOT mobility target of 0.95 during the weekday PM peak hour, and northbound approach delays are projected to reach Level of Service “F”.

### Proposed Development Plan

- The proposed 151 multi-family units are expected to generate approximately 822 weekday net new trips, of which 51 (13 in, 38 out) will occur during the AM peak hour and 66 (40 in, 26 out) will occur during the PM peak hour.
- The housing site was previously approved for development into 557 storage units as part of the prior Cascade Center commercial development. After reducing the apartment trip generation by the number of trips associated with the approved storage units, the proposed 151 multi-family units are expected to generate approximately 722 weekday net new trips impacting the transportation system, of which 43 (9 in, 34 out) will occur during the AM peak hour and 55 (34 in, 21 out) will occur during the PM peak hour.

### Year 2022 Total Traffic Conditions

- Each of the study intersections is forecast to continue meeting ODOT mobility targets during the weekday AM and PM peak hours, with the exception of the northbound left turn at OR 211/Leroy Avenue, which is projected to experience a v/c ratio above the ODOT mobility standard of 0.95 during the weekday AM and PM peak hours, and northbound approach delays are projected to reach Level of Service “F”.

## Traffic Signal and Turn Lane Considerations

- Per the MUTCD volume-based signal warrants and the estimated 24-hour volume profile of the OR 211/Leroy Avenue intersection, the traffic volume-based signal warrants are not projected to be met at the intersection in conjunction with site development. The number of northbound PM peak hour trips at the intersection is not projected to meet ODOT's threshold for signalization after site development.

## 95<sup>th</sup>-Percentile Queueing Analysis

- The proposed storage lengths at the study intersections are expected to accommodate each of the 95<sup>th</sup>-percentile queues in the AM and PM peak hours under 2022 total traffic conditions.

## RECOMMENDATIONS

The following are recommended in conjunction with site redevelopment:

- Given the stop-controlled northbound and southbound Leroy Avenue approaches at OR 211 are forecast to operate at Level of Service "F" prior to and after build-out of the proposed Cascade Place multi-family development, we recommend the applicant work with the City to determine what proportionate share contribution (if any) is appropriate for future signalization improvements at OR 211/Leroy Avenue.
- All landscaping, signage, and utilities near the site access points should be placed and maintained to provide adequate sight distance.

Additional details of the study methodology, findings, and recommendations are provided within this report.

## Section 2 Introduction

## INTRODUCTION

### PROJECT DESCRIPTION

I&E Construction proposes to develop up to 151 multi-family units on an approximately 6.8-acre lot south of the Cascade Center commercial development on OR 211. Figure 1 illustrates the site vicinity. The site will be served via a southward extension of Leroy Avenue across OR 211, which is currently being constructed by the Cascade Center commercial development. The multi-family units, known as Cascade Place, will replace the previously-approved 557 storage units within the Cascade Center commercial development. The anticipated build-out year is 2022. Figure 2 illustrates the proposed site plan.

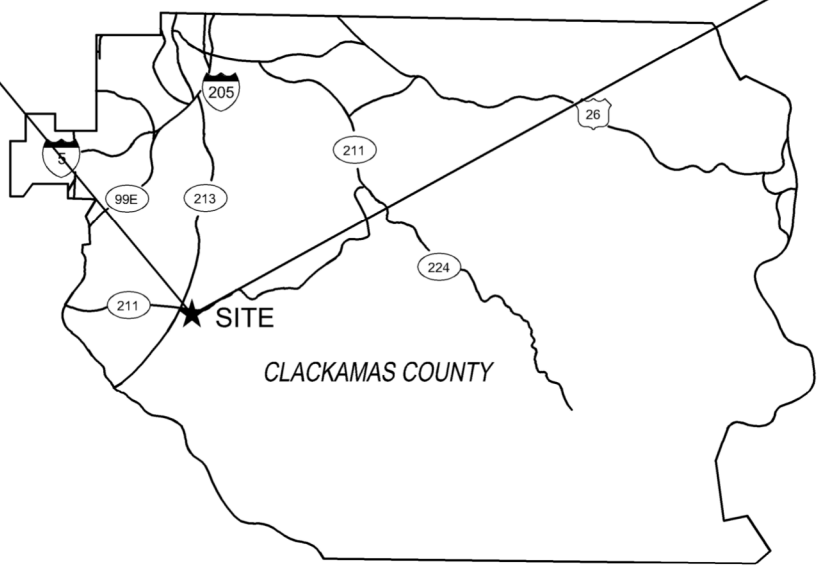
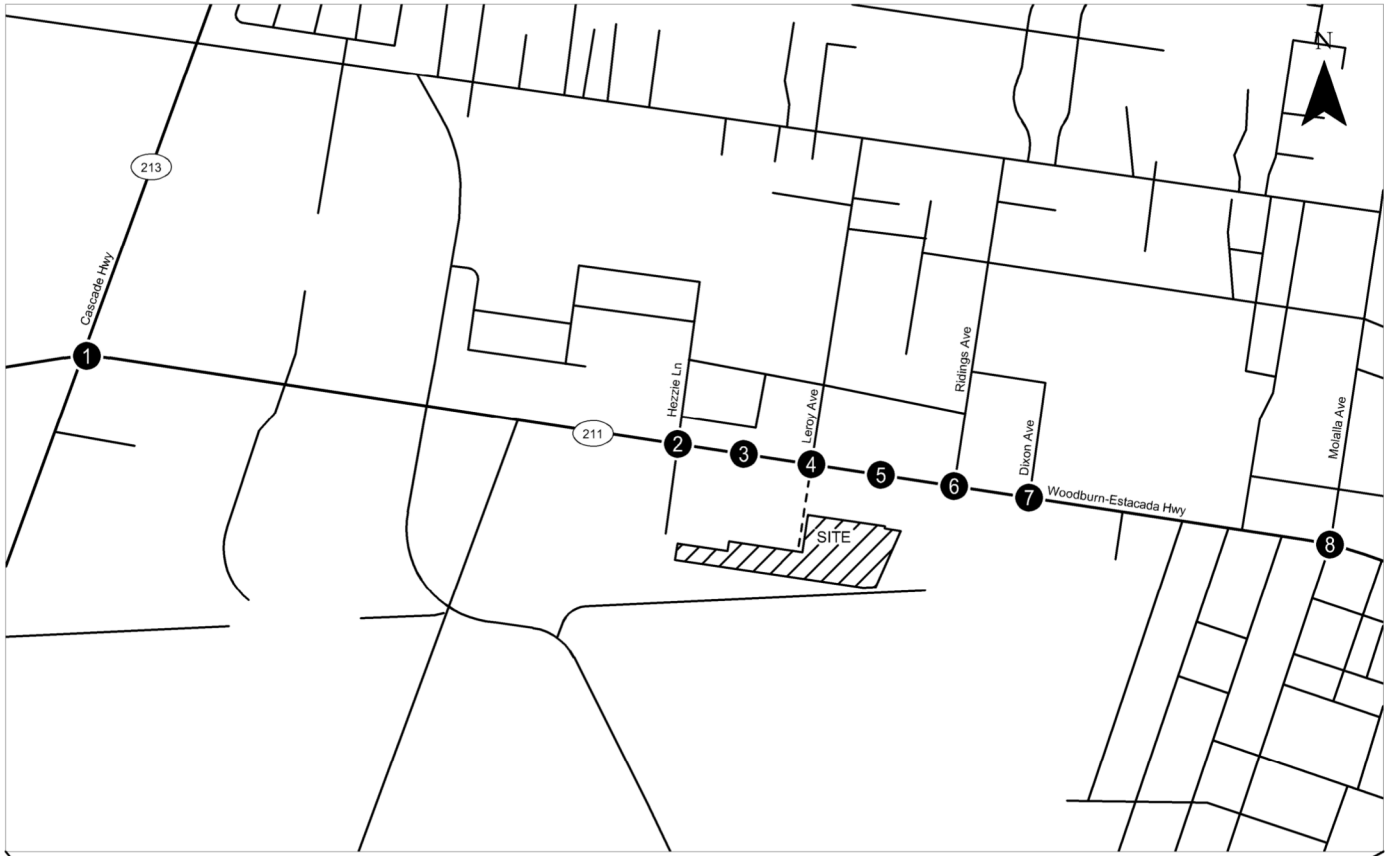
### SCOPE OF THE REPORT

This analysis determines the transportation-related impacts associated with the proposed Cascade Place multi-family development and was prepared in accordance with the City of Molalla and Oregon Department of Transportation (ODOT) requirements for traffic impact studies. The study intersections and scope of this project were selected in consultation with City and ODOT staff. Operational analyses were performed at these intersections:

1. OR 211 (Woodburn-Estacada Highway/Main Street)/OR 213 (Cascade Highway)
2. OR 211 (Woodburn-Estacada Highway/Main Street)/Hezzie Lane
3. OR 211 (Woodburn-Estacada Highway/Main Street)/West Cascade Center Site Access
4. OR 211 (Woodburn-Estacada Highway/Main Street)/Leroy Avenue
5. OR 211 (Woodburn-Estacada Highway/Main Street)/East Cascade Center Site Access
6. OR 211 (Woodburn-Estacada Highway/Main Street)/Ridings Ave
7. OR 211 (Woodburn-Estacada Highway/Main Street)/Dixon Avenue/Lowe Rd
8. OR 211 (Woodburn-Estacada Highway/Main Street)/Molalla Avenue

This report evaluates these transportation issues:

- Existing year 2021 land-use and transportation-system conditions within the site vicinity during the weekday AM and PM peak hours;
- Developments and transportation improvements planned in the study area;
  - Forecast year 2022 background traffic conditions (without the proposed development) during the weekday AM and PM peak hours;
- Trip generation and distribution estimates for the proposed Cascade Place development;
- Forecast year 2022 (including the proposed development) total traffic conditions during the weekday AM and PM peak hours with build-out of the site;
- Traffic signal and turn lane considerations; and
- On-site traffic operations and circulation.



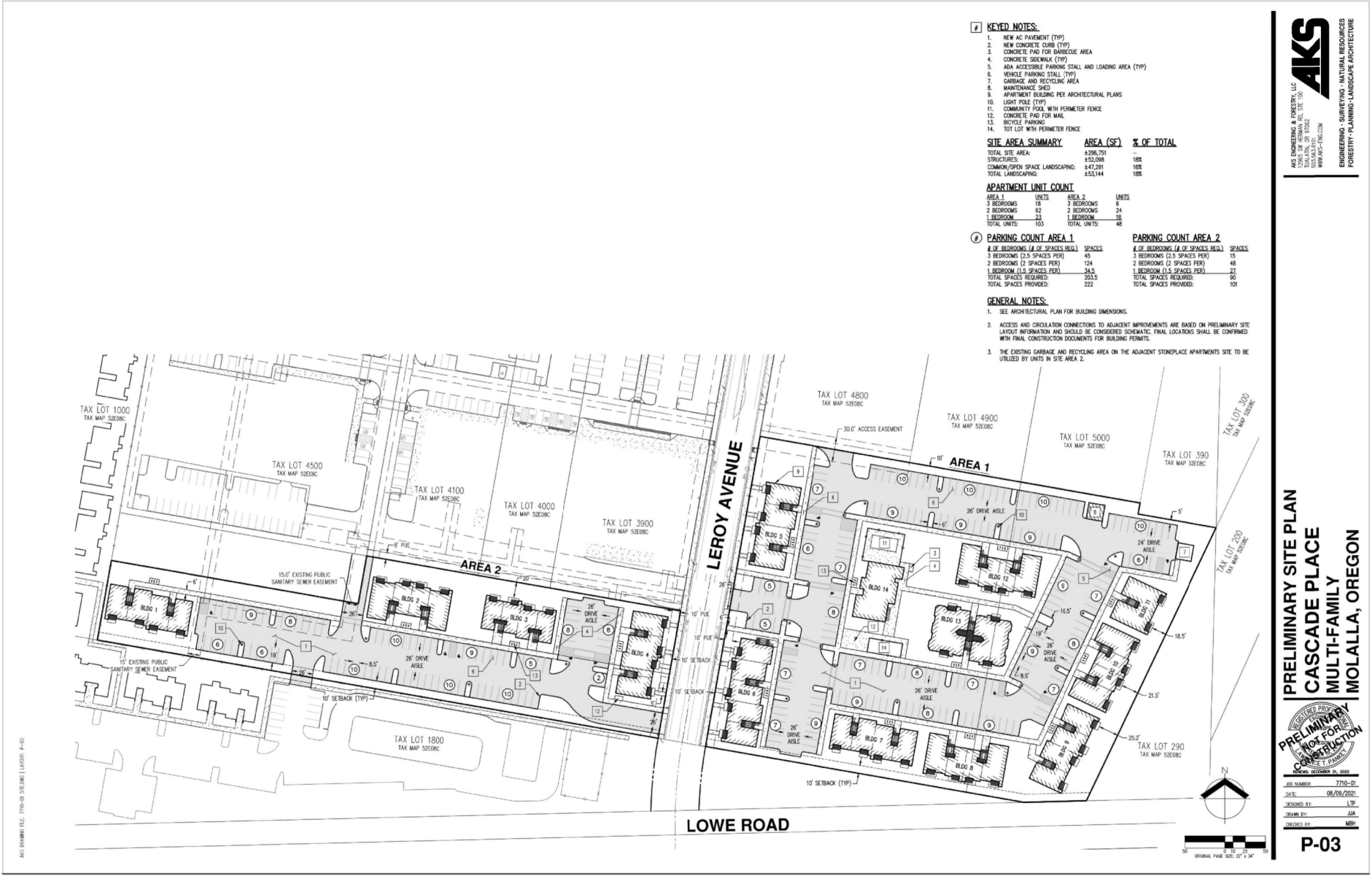
Site Vicinity Map  
Molalla, Oregon

Figure  
1

H:\26\26752 - Cascade Center MultiFamily\Figs\26752\_figs.dwg Aug 09, 2021 - 1:04pm - zbugg Layout Tab: 01 Site: Vicinity



H:\26\26752 - Cascade Center Multi-Family\Figs\26752\_figs.dwg Aug 09, 2021 - 3:17pm - zbugg Layout Tab: 02 Site Plan



- KEYED NOTES:**
1. NEW AC PAVEMENT (TYP)
  2. NEW CONCRETE CURB (TYP)
  3. CONCRETE PAD FOR BARBECUE AREA
  4. CONCRETE SIDEWALK (TYP)
  5. ADA ACCESSIBLE PARKING STALL AND LOADING AREA (TYP)
  6. VEHICLE PARKING STALL (TYP)
  7. GARAGE AND RECYCLING AREA
  8. MAINTENANCE SHED
  9. APARTMENT BUILDING PER ARCHITECTURAL PLANS
  10. LIGHT POLE (TYP)
  11. COMMUNITY POOL WITH PERIMETER FENCE
  12. CONCRETE PAD FOR MAIL
  13. BICYCLE PARKING
  14. TOT LOT WITH PERIMETER FENCE

**SITE AREA SUMMARY**

	AREA (SF)	% OF TOTAL
TOTAL SITE AREA:	4,296,751	100%
STRUCTURES:	452,088	10%
COMMON/OPEN SPACE LANDSCAPING:	442,291	10%
TOTAL LANDSCAPING:	853,144	18%

**APARTMENT UNIT COUNT**

AREA 1	UNITS	AREA 2	UNITS
3 BEDROOMS	18	3 BEDROOMS	8
2 BEDROOMS	62	2 BEDROOMS	24
1 BEDROOM	22	1 BEDROOM	18
<b>TOTAL UNITS:</b>	<b>102</b>	<b>TOTAL UNITS:</b>	<b>48</b>

**PARKING COUNT AREA 1**

# OF BEDROOMS (# OF SPACES REQ.)	SPACES
3 BEDROOMS (2.5 SPACES PER)	45
2 BEDROOMS (2 SPACES PER)	124
1 BEDROOM (1.5 SPACES PER)	34.5
<b>TOTAL SPACES REQUIRED:</b>	<b>203.5</b>
<b>TOTAL SPACES PROVIDED:</b>	<b>222</b>

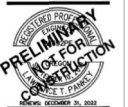
**PARKING COUNT AREA 2**

# OF BEDROOMS (# OF SPACES REQ.)	SPACES
3 BEDROOMS (2.5 SPACES PER)	15
2 BEDROOMS (2 SPACES PER)	48
1 BEDROOM (1.5 SPACES PER)	27
<b>TOTAL SPACES REQUIRED:</b>	<b>90</b>
<b>TOTAL SPACES PROVIDED:</b>	<b>101</b>

- GENERAL NOTES:**
1. SEE ARCHITECTURAL PLAN FOR BUILDING DIMENSIONS.
  2. ACCESS AND CIRCULATION CONNECTIONS TO ADJACENT IMPROVEMENTS ARE BASED ON PRELIMINARY SITE LAYOUT INFORMATION AND SHOULD BE CONSIDERED SYMBIOTIC. FINAL LOCATIONS SHALL BE CONFIRMED WITH FINAL CONSTRUCTION DOCUMENTS FOR BUILDING PERMITS.
  3. THE EXISTING GARAGE AND RECYCLING AREA ON THE ADJACENT STONEPLACE APARTMENTS SITE TO BE UTILIZED BY UNITS IN SITE AREA 2.



**PRELIMINARY SITE PLAN  
CASCADE PLACE  
MULTI-FAMILY  
MOLALLA, OREGON**



DATE: 08/09/2021  
DESIGNED BY: LTP  
DRAWN BY: JAA  
CHECKED BY: MBI

**P-03**

Site plan provided by AKS on 8/9/2021

Proposed Site Plan  
Molalla, Oregon

Figure  
2

Section 3  
Existing Conditions

## EXISTING CONDITIONS

The existing conditions analysis identifies the site conditions and current operational and geometric characteristics of the roadways within the study area. These conditions will be compared with future conditions later in this report.

Kittelson & Associates, Inc. (KAI) staff visited and inventoried the proposed development site and surrounding study area in July 2021. At that time, KAI collected information regarding site conditions, adjacent land uses, existing traffic operations, and transportation facilities in the study area.

## SITE CONDITIONS AND ADJACENT LAND USES

The proposed Cascade Place site is within the City of Molalla limits, is currently vacant, and is zoned for commercial use (C-2), which currently permits multi-family use. Adjacent land uses are predominantly residential and include the Stoneplace Apartments to the west and south. Northwest Self Storage borders the site to the east. Molalla River Middle School is located approximately one block north of OR 211 on the west side of Leroy Avenue.

## TRANSPORTATION FACILITIES

Table 1 lists the existing transportation facilities and roadways in the study area.

**Table 1. Existing Transportation Facilities**

Roadway	Functional Classification <sup>1</sup>	Lanes	Posted Speed	Sidewalks	Bicycle Lanes	On-Street Parking
OR 211	Arterial (W of Molalla Forest Rd) Major Collector (E of Molalla Forest Rd)	2	45 mph (W of OR 213) 35 mph (OR 213 to Thelander Ln) 25 mph (E of Thelander Ln)	Partial <sup>2</sup>	Partial <sup>3</sup>	No
OR 213	Arterial	2-3	45 mph (N of OR 211) 40 mph (S of OR 211)	East Side	Yes	No
Hezzie Lane	Neighborhood Street	2	Not Posted	Both Sides	No	No
Leroy Avenue	Major Collector	2	Not Posted	Both Sides	No	Yes
Ridings Avenue	Local Street	2	25 mph	No	No	Yes
Dixon Avenue	Local Street	2	Not Posted	No	No	Yes
Molalla Avenue	Arterial	2	25 mph	Both Sides	No	Yes

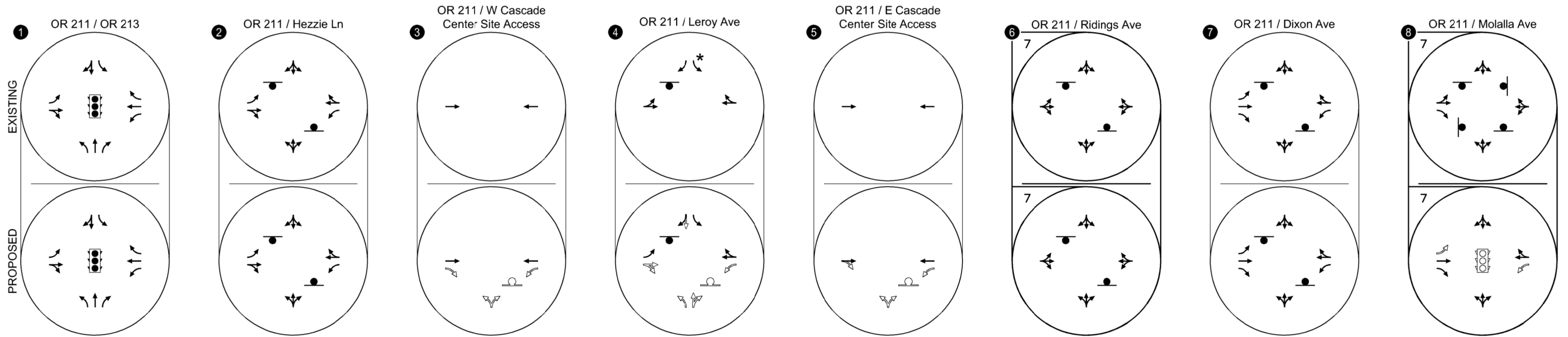
<sup>1</sup>Per City of Molalla Transportation System Plan (Reference 1)

<sup>2</sup>Sidewalks are provided on the north side from OR 213 to Commercial Parkway and east of Hezzie Lane. Sidewalks are provided on the south side along the Stoneplace Apartments frontage and east of Ridings Avenue. Sidewalks are currently under construction along the Cascade Center site frontage of OR 211 (both sides).

<sup>3</sup>Bike lanes are provided west of Commercial Parkway, and paved shoulders are provided in some other areas of the corridor.

## Roadway Facilities

Figure 3 illustrates the existing lane configurations and traffic control devices at the study intersections, as well as the lane configurations and traffic control that will be in place upon completion of the Cascade Center frontage improvements along OR 211 that are currently under construction. All access to the



\*Sufficient roadway width is currently available for a separate left turn lane

- STOP SIGN
- TRAFFIC SIGNAL
- EXISTING
- FUTURE (TO BE BUILT BY CASCADE CENTER COMMERCIAL DEVELOPMENT)

Existing and Future Lane Configurations and Traffic Control Devices Molalla, Oregon

Figure 3

multi-family units will be provided via a southward extension of Leroy Avenue across the intersection with OR 211 (Woodburn-Estacada Highway/Main Street. Leroy Avenue may be extended southward to Lowe Road as part of a future development by others.

### Pedestrian and Bicycle Facilities

Sidewalks are provided on the north side of OR 211 from OR 213 to Commercial Parkway and east of Hezzie Lane. Sidewalks are provided on the south side along the Stoneplace Apartments frontage and east of Ridings Avenue. Sidewalks will be added/improved on both sides of OR 211 as part of the Cascade Center commercial development frontage improvements. The Cascade Center commercial development will provide a Rectangular Rapid Flashing Beacon (RRFB) at the crosswalk on the west leg of the improved OR 211/Leroy Avenue intersection. Bike lanes are provided on OR 211 west of Commercial Parkway, and paved shoulders are provided in some other areas of the corridor.

### Transit Facilities

Local bus service is provided by South Clackamas Transportation District, which operates the Molalla City Route and the Molalla to Clackamas Community College route, both of which stop at OR 211/Leroy Avenue (Reference 2). The stops are located on the west side of the OR 211/Leroy Avenue intersection (westbound) and just upstream of the future east Cascade Center site access (eastbound). Molalla City service is provided Monday through Friday from 7:30 AM to 5:35 PM and Saturday from 9:35 AM to 3:45 PM, and Molalla to Clackamas Community College service is provided Monday through Friday from 5:06 AM to 8:25 PM and Saturday from 7:09 AM to 4:55 PM. Headways are approximately 60 minutes on the Molalla City route and 30 minutes on the Molalla to Clackamas Community College route.

## TRAFFIC VOLUMES AND PEAK HOUR OPERATIONS

Turning movement count data were collected at the study intersections (except Ridings Avenue) in October 2018 when school was in session. Counts were performed on a typical mid-week day from 7:00 to 9:00 AM and from 4:00 to 6:00 PM. The system-wide peak hours were identified as 7:00 to 8:00 AM and 4:15 to 5:15 PM. Due to the ongoing effects of the COVID-19 pandemic on traffic volumes, no new turning movement count data were collected for these locations. Instead, the October 2018 turning movement volumes were grown by 2.5 percent annual growth to estimate year 2021 traffic volumes.

At the request of ODOT, the OR 211/Ridings Avenue intersection was added to the study intersections formerly included in the Cascade Center commercial development TIA. As no pre-COVID-19 traffic count data is available at this location, new turning movement count data were collected in July 2021 and then balanced with the COVID- and seasonally-adjusted traffic volumes at OR 211/Leroy Avenue. *Appendix "A" contains the traffic count worksheets used in this study.*

## Seasonal Adjustment

The ODOT Analysis Procedures Manual (APM), Chapter 5 describes how to develop existing year volumes (Reference 3). The nearest ODOT Automated Traffic Recorder (ATR) to the site is 03-014, which is located on OR 211 approximately 12 miles east of the site. This ATR is likely too far away from the development site to provide a meaningful seasonal adjustment, and traffic volumes there are likely more recreational and less influenced by commuter patterns.

The ODOT ATR Characteristic Table was used to identify an ATR with a similar volume, geometry, and seasonal trend to the development site. ATR 24-001 was selected due to its 2018 AADT (12,500) being similar to the 2018 AADT on OR 211 near the site (13,700), as well as having a similar geometry (two lanes) and seasonal trend (commuter pattern). Table 2 displays the percent of AADT experienced during the peak month (typically July through September) and the count month (October) for ATR 24-001. The years shaded in dark grey represent the highest and lowest values and were removed from the average percent of AADT calculation per the APM.

**Table 2. ODOT ATR 24-001 (Characteristic) Percent of AADT by Year**

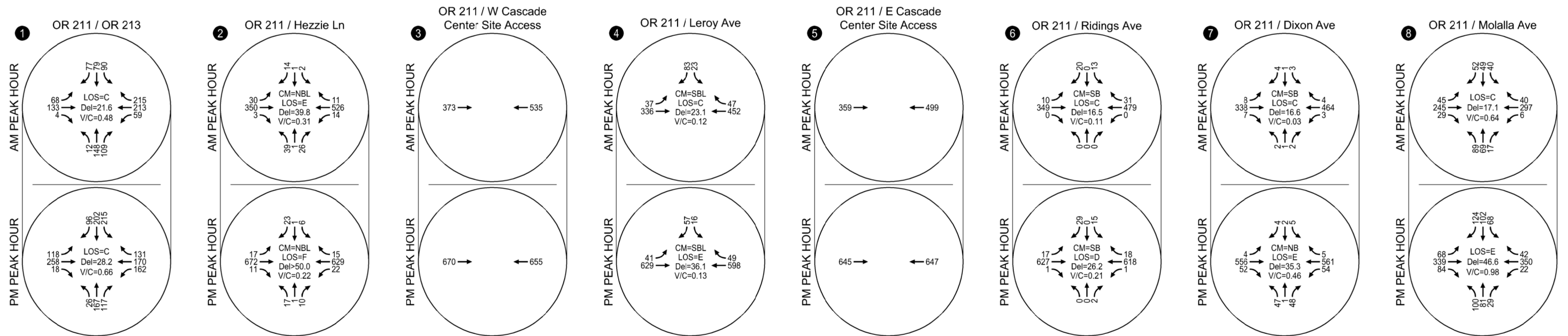
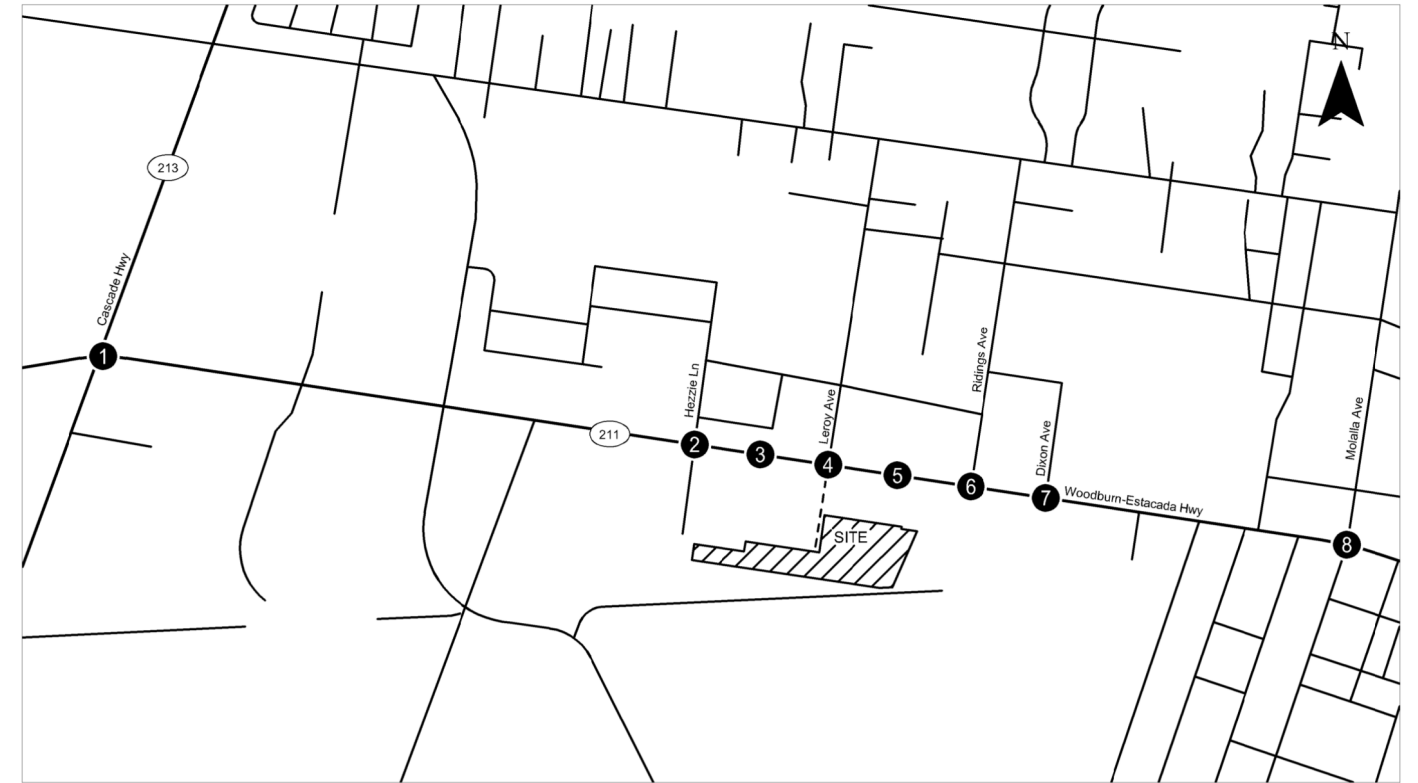
Year	2019	2018	2017	2016	2015
Peak Month	112	107	113	109	110
Count Month (October)	110	107	107	103	105

The seasonal adjustment was then calculated as  $(112 + 109 + 110) / (107 + 107 + 105) = 1.038$  and applied to mainline traffic volumes along OR 211 and OR 213. Figure 4 provides a summary of the seasonally-adjusted turning movement counts at the study intersections.

## Current Intersection Operations

All traffic operations analyses described in this report were performed in accordance with the procedures stated in the *Highway Capacity Manual, 6<sup>th</sup> Edition* (Reference 4). Each of the study intersections is under the maintenance and jurisdiction of ODOT. The Oregon Highway Plan (Reference 5), Policy 1F establishes mobility targets for state highways based on volume-to-capacity ratio. Within the study area, OR 211 is a Regional Highway with a posted speed limit of 35 mph or less, which corresponds to a mobility target of 0.90. To meet ODOT mobility targets, signalized intersections must not exceed an overall v/c ratio of 0.90. At unsignalized intersections, approaches on OR 211 must not exceed a v/c ratio of 0.90, and approaches on public side streets must not exceed a v/c ratio of 0.95.

Figure 4 summarizes the operations analysis for the study intersections under the weekday AM and PM peak hour existing traffic conditions. Each of the study intersections currently meets ODOT mobility targets during the weekday AM and PM peak hours, with the exception of the OR 211/Molalla Avenue intersection—the v/c ratios on the eastbound and westbound OR 211 approaches currently exceed the ODOT mobility target of 0.90 during the weekday PM peak hour. *Appendix “B” includes the level-of-service worksheets under year 2021 existing traffic conditions.*



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CM = CRITICAL MOVEMENT (UNSIGNALIZED)  
 LOS = CRITICAL MOVEMENT LEVEL OF SERVICE (SIGNALIZED)/  
 CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALIZED)  
 Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED)/  
 CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)  
 V/C = CRITICAL VOLUME-TO-CAPACITY RATIO

Year 2021 Existing Traffic Conditions  
 Weekday AM and PM Peak Hours  
 Molalla, Oregon

Figure  
 4

## Traffic Safety

ODOT-reported crash data was reviewed for the most recent five-year period, from January 1, 2015 through December 31, 2019. Table 3 summarizes the crash data at the study intersections. In addition to the crash types, intersection crash rates were calculated and compared to statewide crash rate performance thresholds following the ODOT *Analysis Procedures Manual* (Reference 3). For this analysis, the observed crash rate was calculated and compared with the 90<sup>th</sup> percentile crash rates for urban intersections by traffic control and 3 versus 4-legged configurations (as appropriate). None of the observed crash rates exceed the respective critical crash rates.

**Table 3. Summary of Reported Crash Data (January 1, 2015 through December 31, 2019)**

Intersection	Crash Severity			Crash Type					Total Crashes	Crash Rate <sup>2</sup>	Statewide 90 <sup>th</sup> -Percentile Crash Rate by Config/Traffic Control	Critical Crash Rate <sup>2</sup>
	Fatal	Injury	PDO <sup>1</sup>	Angle	Rear End	Turning	Pedestrian	Fixed Object				
OR 211/OR 213	0	6	11	3	4	10	0	0	17	0.598	0.860	0.708
OR 211/Hezzie Ln	0	1	3	0	0	3	1	0	4	0.165	0.408	0.367
OR 211/Leroy Ave	0	6	0	0	4	2	0	0	6	0.252	0.293	0.274
OR 211/Ridings Ave	0	4	1	0	2	3	0	0	5	0.206	0.408	0.273
OR 211/Dixon Ave	0	1	1	0	0	2	0	0	2	0.087	0.408	0.372
OR 211/Molalla Ave	0	4	8	4	3	3	1	1	12	0.502	*	*

<sup>1</sup>Property Damage Only

<sup>2</sup>Per million entering vehicles

\*No data provided for all-way stop-controlled intersections; the intersection will be signalized as part of the Cascade Center commercial development.

ODOT maintains a ranking of intersections with potential safety issues known as the Safety Priority Index System (SPIS). Based upon a 2019 analysis, none of the study intersections ranked within the top five percent of the highest-scoring intersections in Region 1 (Reference 6).

No other crash trends were identified at the study intersections.

*Appendix "C" contains the reported crash data from ODOT.*



Section 4  
Transportation Impact Analysis

## TRANSPORTATION IMPACT ANALYSIS

The transportation impact analysis identifies how the study area's transportation system will operate in the year the proposed development is expected to be fully built, year 2022. The impact of traffic generated by the proposed Cascade Place multi-family development during the typical weekday AM and PM peak hours was examined as follows:

- Background conditions were developed by applying a 2.5-percent annual growth rate to the year 2021 traffic volumes to account for regional growth in the site vicinity.
- Site-generated trips were estimated for build-out of the site.
- Site trip-distribution patterns were derived considering the existing traffic patterns and the major trip origins and destinations in the study area.
- Site-generated trips were assigned to the study intersections and site accesses.
- Year 2022 (build-out year of the Cascade Place multi-family development) total traffic conditions were analyzed at each of the study intersections and site-access points during the weekday AM and PM peak hours.
- On-site circulation issues and site-access operations were evaluated.
- Traffic signal warrant and turn lane needs were evaluated where appropriate.

## YEAR 2022 BACKGROUND TRAFFIC CONDITIONS

The year 2022 background traffic analysis identifies how the study area's transportation system will operate without the proposed Cascade Place multi-family development. This analysis includes traffic attributed to planned developments within the study area and to general growth in the region but does not include traffic from the proposed multi-family units.

### Background Traffic Growth

The year 2022 background traffic volumes were developed by applying a 2.5-percent annual growth rate to the year 2021 existing traffic volumes shown in Figure 4. This growth rate was identified from population and employment data in the Molalla TSP. Figure 6 displays the resulting 2022 background traffic volumes.

### In-Process Developments

The following approved in-process developments were identified by City of Molalla staff for inclusion in the year 2022 background traffic conditions analysis:

- Cascade Center commercial development
- Colima Apartments

- Center Market

Additionally, the following transportation improvements will be constructed by the Cascade Center commercial development prior to year 2022:

- widen OR 211 to a three-lane section along the site frontage, including exclusive left turn lanes in either direction of OR 211 at Leroy Avenue;
- modify the OR 211/Molalla Avenue intersection, including signalization and provision of exclusive left turn lanes on the eastbound and westbound OR 211 approaches; and
- provide a RRFB installation for the crosswalk on the west leg of the improved OR 211/Leroy Avenue intersection.

These improvements were incorporated into the year 2022 background traffic conditions analysis.

### Operations Analysis

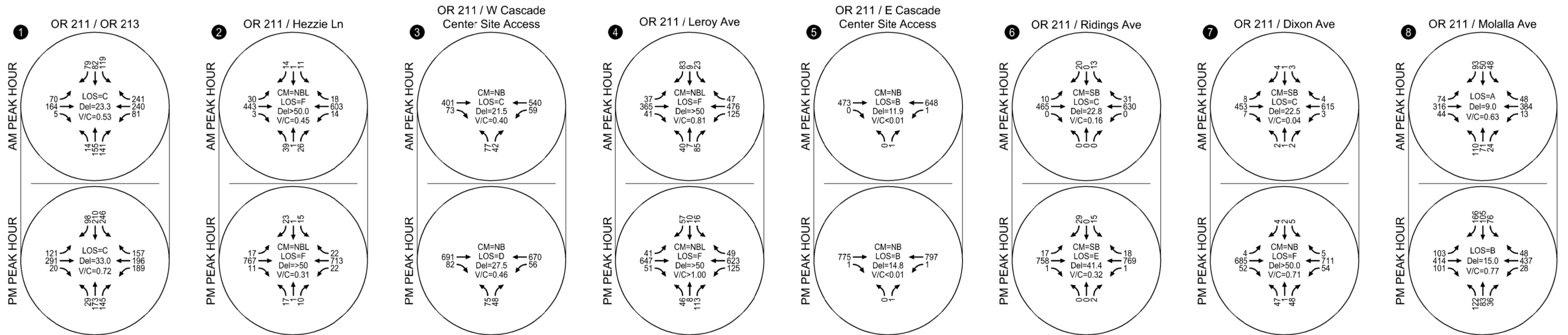
The weekday AM and PM peak-hour turning-movement volumes shown in Figure 5 were used to conduct an operational analysis at each study intersection to determine the year 2022 background traffic levels of service. Each of the study intersections are expected to continue meeting ODOT mobility targets, with the following exception:

- The northbound left turn at OR 211/Leroy Avenue is projected to experience a v/c ratio above the ODOT mobility target of 0.95 during the weekday PM peak hour (the left-turn movement is projected to operate over-capacity), and projected northbound delays are expected to reach Level of Service "F".<sup>1</sup>

*Appendix "D" contains the year 2022 background traffic level-of-service worksheets.*

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<sup>1</sup> Per ODOT's request, we assumed two-stage gap acceptance for left turns from the unsignalized site accesses east and west of Leroy Avenue. However, we did not assume two-stage gap acceptance at Leroy Avenue due to the exclusive left turn lanes being striped in both directions of OR 211, as well as the considerable left turn volume from OR 211.



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CM = CRITICAL MOVEMENT (UNSIGNALIZED)  
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Year 2022 Background Traffic Conditions  
 Weekday AM and PM Peak Hours  
 Molalla, Oregon

Figure  
 5

## PROPOSED DEVELOPMENT PLAN

I&E Construction proposes to develop up to 151 multi-family units on the study site, to be accessed via a southward extension of Leroy Avenue across OR 211, which is currently being constructed by the Cascade Center commercial development. The anticipated build-out year is 2022. The multi-family units will replace the previously-approved 557 storage units on the site, reflected in the August 2019 Cascade Center Commercial Development TIA and June 2020 Addendum.

### Trip Generation

The projected weekday daily, AM, and PM peak-hour vehicle trip ends for the proposed development were based on fitted equation trip rates in the *Trip Generation Manual, 10<sup>th</sup> Edition* (Reference 7). Table 4 summarizes the anticipated number of trips that will be generated by the proposed Cascade Place multi-family units. As the 557 storage units approved as part of the Cascade Center commercial development will be replaced by the proposed 151 multi-family units, the trips associated with the storage units have been deducted from the overall trip generation (because the storage unit trips were included in the 2022 background traffic volumes).

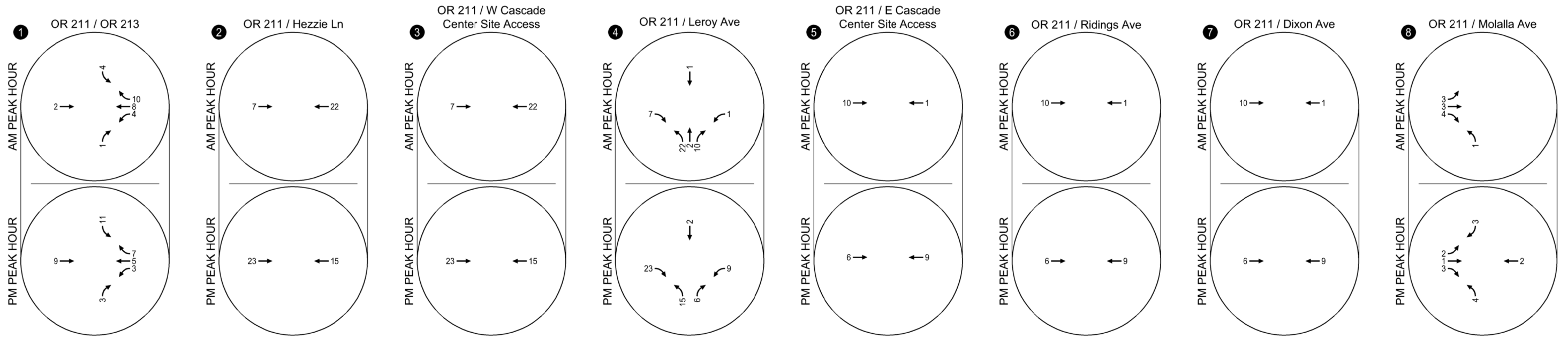
As shown, the proposed development is expected to generate approximately 722 weekday net new trips, of which 43 (9 in, 34 out) will occur during the AM peak hour and 55 (34 in, 21 out) will occur during the PM peak hour.

**Table 4. Trip Generation**

Land Use	ITE Code	Size	Weekday Daily	Weekday AM Peak Hour Trips			Weekday PM Peak Hour Trips		
				Total	In	Out	Total	In	Out
<b>Proposed Multi-Family Units</b>									
Multi-Family Housing (Mid-Rise)	221	151	822	51	13	38	66	40	26
<b>Planned Storage Units - To Be Removed</b>									
Mini-Warehouse	151	557	100	8	4	4	11	6	5
<b>Proposed Net New Trips</b>									
			722	43	9	34	55	34	21

### Site Trip Distribution/Trip Assignment

The site-generated trips were distributed onto the study area roadway system according to the existing traffic patterns, as well as general population centers within the area. The estimated site-generated trips were assigned to the network by distributing the trips shown in Table 5 according to the trip distribution pattern shown in Figure 6. Figure 6 illustrates the site-generated trips that are expected to use the roadway system during the weekday AM and PM peak hours.



Net New Site-Generated Trips  
Weekday AM and PM Peak Hours  
Molalla, Oregon

Figure  
6

## YEAR 2022 TOTAL TRAFFIC CONDITIONS

The total traffic conditions analysis forecasts how the study area's transportation system will operate with the traffic generated by the proposed Cascade Place multi-family development. The year 2022 background traffic volumes for the weekday AM and PM peak hours (shown in Figure 5) were added to the site-generated trips (shown in Figure 6) to arrive at the year 2022 total traffic volumes that are shown in Figure 7.

### Intersection Operations

The weekday AM and PM peak hour turning-movement volumes shown in Figure 7 were used to conduct an operational analysis at each study intersection to determine the year 2022 total traffic levels of service. The results of the total traffic analysis shown in Figure 7 indicate that all of the study intersections are expected to continue meeting ODOT mobility targets, with the following exception:

- The northbound left turn at OR 211/Leroy Avenue is projected to experience a v/c ratio above the ODOT mobility target of 0.95 during the weekday AM and PM peak hours, and projected northbound delays are expected to reach Level of Service "F".<sup>2</sup> The northbound left-turn demand is projected to exceed capacity even if a 60-minute analysis period (peak hour factor of 1.0) is assumed.

*Appendix "E" contains the year 2022 total traffic level-of-service worksheets.*

## TRAFFIC SIGNAL AND TURN LANE CONSIDERATIONS

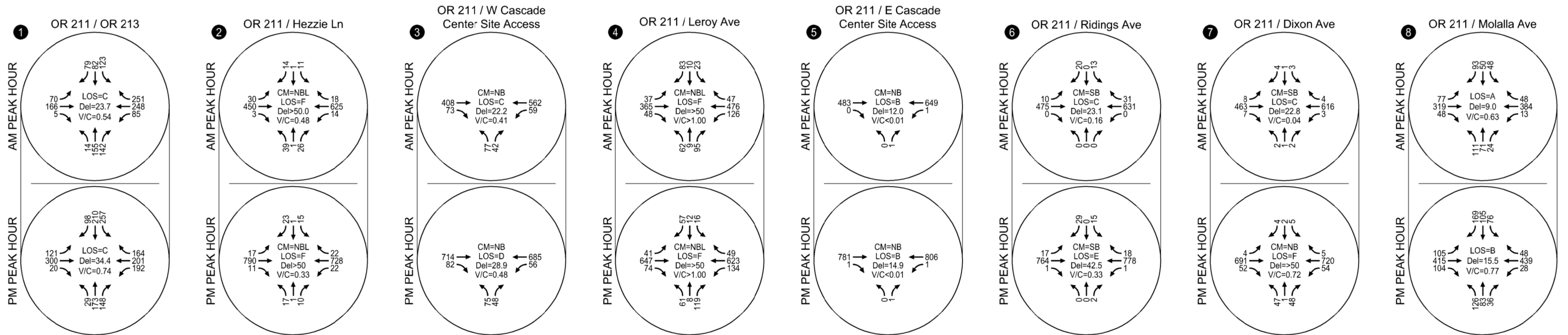
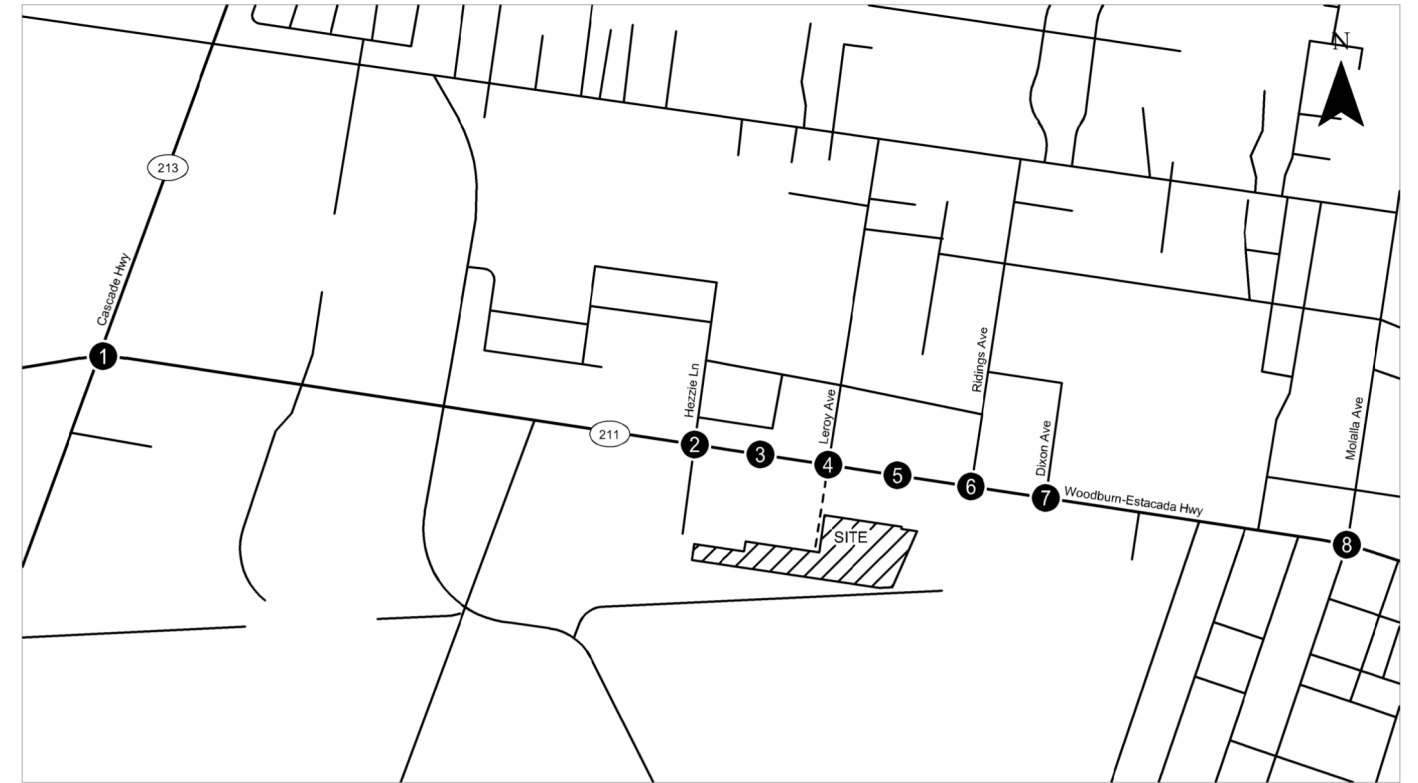
The Molalla TSP identifies an anticipated need for future signalization of the OR 211/Leroy Avenue intersection. This section of the report provides an assessment of potential intersection signalization and turn lane considerations associated with the proposed Cascade Place development.

### MUTCD Signal Warrants

The *Manual on Uniform Traffic Control Devices* (MUTCD, Reference 8) identifies nine warrants for traffic signal installation. The first two volume-based warrants (#1-Eight Hour and #2-Four Hour) were evaluated based on the future traffic volumes at OR 211/Leroy Avenue. Weekday daily 24-hour volume profiles were estimated based on a 16-hour traffic volume count at the OR 211/Leroy Avenue intersection collected in October 2018.

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<sup>2</sup> Per ODOT's request, we assumed two-stage gap acceptance for left turns from the unsignalized site accesses east and west of Leroy Avenue. However, we did not assume two-stage gap acceptance at Leroy Avenue due to the exclusive left turn lanes being striped in both directions of OR 211, as well as the considerable left turn volume from OR 211.



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Year 2022 Total Traffic Conditions  
 Weekday AM and PM Peak Hours  
 Molalla, Oregon

Figure  
 7



The 16-hour counts were seasonally-adjusted and grown to year 2022 background traffic conditions assuming 2.5 percent annual growth. Daily trip profiles for shopping center (for the Cascade Center commercial development and other retail in-process volumes) and multi-family (for Cascade Place and multi-family in-process volumes) were estimated from the *Trip Generation Manual, 10<sup>th</sup> Edition* (Reference 7) and added to the counts to estimate the year 2022 background and total traffic volumes. Per the *ODOT Analysis Procedures Manual* (Reference 3), right turns from the northbound and southbound approaches were discounted by 85 percent of the capacity of the shared through-right turn lane. Table 5 displays the results of the traffic signal warrant analysis. As shown, the OR 211/Leroy Avenue intersection is not forecast to meet the volume-based signal warrants with site build-out.

**Table 5. MUTCD Signal Warrant Analysis Results**

Scenario	Warrant	
	Warrant #1: Eight Hour	Warrant #2: Four Hour
2021 Existing	No	No
2022 Background	No	No
2022 Total	No	No

At the request of City of Molalla, we estimated the remaining capacity on the northbound Leroy Avenue approach at OR 211 after additional background and site-generated trips were assigned to the intersection. The City previously identified a threshold of 95 weekday PM peak hour trips on northbound Leroy Avenue (excluding right turns) as the point where signalization would be needed. Table 6 compares this threshold with the northbound volume on Leroy Avenue forecast for the year 2022 background and total traffic conditions.

**Table 6. Summary of City Traffic Signalization Threshold at OR 211/Leroy Avenue**

	Northbound PM Peak Hour Volume (vehicles per hour)
Threshold to Meet Signal Warrants	95
Year 2022 Background Conditions (Before Multi-Family Units)	54
Year 2022 Total Conditions (after Multi-Family Units)	69
Trips Remaining Prior to Warrant Thresholds Being Met	26

As shown, the OR 211/Leroy Avenue intersection is forecast to remain below the 95-trip threshold after the proposed Cascade Place multi-family development is constructed and occupied.

Given the stop-controlled northbound and southbound Leroy Avenue approaches at OR 211 are forecast to operate at Level of Service “F” prior to and after build-out of the proposed Cascade Place multi-family development, we recommend the applicant work with the City to determine what proportionate share contribution (if any) is appropriate for future signalization improvements at OR 211/Leroy Avenue. *Appendix “F” includes the signal warrant analysis worksheets.*

## ODOT Turn Lane Criteria

The ODOT *Analysis Procedures Manual* identifies volume-based turn lane criteria at unsignalized intersections (Reference 3). The ODOT right turn lane criteria are forecast to be satisfied on eastbound OR 211 at Leroy Avenue under year 2022 background conditions (after build-out of the Cascade Center commercial development) if the intersection remains unsignalized; however, constructing a right turn lane would increase the north-south crosswalk distance and would not be needed for intersection capacity if the intersection becomes signalized. As such, we do not recommend construction of an eastbound right turn lane at the OR 211/Leroy Avenue intersection at this time.

## ON-SITE CIRCULATION/SITE-ACCESS OPERATIONS

The Cascade Place multi-family development will not modify the Cascade Center site accesses on OR 211 and will not provide any new site accesses on OR 211. We refer the City and ODOT to the civil engineering design plans for the Cascade Center commercial development frontage improvements on OR 211 for stopping and intersection sight distance triangles at these accesses. Landscaping, signage, and utilities near the site accesses, internal intersections, and frontage should be placed and maintained to allow adequate site distance per applicable City and ODOT standards.

### Crosswalk Demand at OR 211/Leroy Avenue

Pedestrian demand (including children accessing the school to the north of OR 211) is expected to increase at the mid-block crosswalk on the west leg of OR 211/Leroy Avenue after development of the Cascade Place multi-family units. Based on the October 2018 pedestrian demand at the mid-block crosswalk of OR 211 at Hezzie Lane and the relative size of the Cascade Place multi-family units (151 units) to the Stoneplace Apartments complex (96 units) near OR 211/Hezzie Lane, we estimate the demand at OR 211/Leroy Avenue will increase by approximately 10 pedestrians/hour during the weekday AM peak hour and 6 pedestrians/hour during the weekday PM peak hour. These estimates do not include any demand shifted from the mid-block crosswalk at OR 211/Hezzie Lane to OR 211/Leroy Avenue. North-south pedestrian crossings of OR 211 at Leroy Avenue will be facilitated by the RRFB pedestrian crossing treatment and new crosswalk to be constructed on the west leg of the improved OR 211/Leroy Avenue intersection by the Cascade Center commercial development.

### 95<sup>th</sup>-percentile Queuing Analysis

95<sup>th</sup>-percentile queues at the study intersections were analyzed in Synchro for the weekday AM and PM peak hours for the existing year 2021, 2022 background, and 2022 total conditions. Table 6 displays the results. As shown, all but one of the existing and proposed turn lane storage lengths are expected to accommodate the 95<sup>th</sup>-percentile queues under 2022 total traffic conditions. The southbound left-turn 95<sup>th</sup>-percentile queue at OR 211/OR 213 is expected to exceed the striped storage length by 2022 background conditions, but the queue can still be accommodated by the upstream two-way left-turn lane. No additional mitigation measures are recommended to address 95<sup>th</sup>-percentile queues at the study intersections.

**Table 7. Summary of 95<sup>th</sup>-percentile Queues**

Intersection	Movement	Storage (ft)	AM Peak Hour 95 <sup>th</sup> -percentile Queue (ft)			PM Peak Hour 95 <sup>th</sup> -percentile Queue (ft)			Adequate Storage Provided?
			2021 Existing	2022 Background	2022 Total	2021 Existing	2022 Background	2022 Total	
1: OR 213/ OR 211	EB L	290	50	75	75	100	150	150	Yes
	EB T/R	>500	50	75	100	225	275	300	Yes
	WB L	330	50	75	75	150	200	200	Yes
	WB T	>400	100	125	150	125	175	175	Yes
	WB R	240	100	125	150	100	125	150	Yes
	NB L	250	25	25	25	50	50	50	Yes
	NB T	>400	75	100	100	125	175	175	Yes
	NB R	270	75	100	100	100	150	150	Yes
	SB L	310*	75	100	100	175	225	250	Yes
SB T/R	>400	75	100	100	200	225	250	Yes	
2: OR 211/ Hezzie Ln	EB L	210	25	25	25	25	25	25	Yes
	WB L	180	<25	25	25	25	25	25	Yes
	NB L	50	50	50	75	25	50	50	Yes
	NB T/R	>50	25	25	25	25	25	25	Yes
	SB L/T/R	>100	25	25	25	25	50	50	Yes
3: OR 211/ W Site Access	EB R	100		<25	<25		<25	<25	Yes
	WB L	75		25	25		25	25	Yes
	NB L/R	150		50	50		75	75	Yes
4: OR 211/ Leroy Ave	EB L	100	25	25	25	25	25	25	Yes
	WB L	100		25	25		25	25	Yes
	NB L	220		100	175		150	200	Yes
	NB T/R	220		25	50		75	75	Yes
	SB L**	100**	25	50	50	25	50	50	Yes
SB T/R	>500	25	50	50	25	50	50	Yes	
5: OR 211/ E Site Access	WB L	70		<25	<25		<25	<25	Yes
	NB L/R	25		<25	<25		<25	<25	Yes
6: OR 211/ Ridings Ave	EB L/T/R	>400	<25	<25	<25	25	25	<25	Yes
	WB L/T/R	>400	<25	<25	<25	<25	<25	<25	Yes
	NB L/T/R	>400	<25	<25	<25	<25	<25	<25	Yes
	SB L/T/R	>400	25	25	25	25	50	50	Yes
6: OR 211/ Dixon Ave	EB L	100	<25	<25	<25	<25	<25	<25	Yes
	EB R	130	<25	<25	<25	<25	<25	<25	Yes
	WB L	170	<25	<25	<25	25	25	25	Yes
	NB L/T/R	125	<25	25	25	75	100	125	Yes
	SB L/T/R	>75	25	25	25	25	25	25	Yes
7: OR 211/ Molalla Ave	EB L	120		25	25		75	75	Yes
	EB T	>350	100	50	50	325	175	175	Yes
	EB R	180	25	25	25	25	50	50	Yes
	WB L	200		25	25		25	25	Yes
	WB T/R	>300	125	100	100	300	225	225	Yes
	NB L/T/R	>250	50	75	75	100	150	150	Yes
	SB L/T/R	>250	50	75	75	150	200	225	Yes

\*Additional storage available in two-way left-turn lane (over 425 feet)

\*\*Sufficient roadway width is currently available for a separate left turn lane. The left turn queues for existing and background conditions are shown to provide a baseline for assessment of queues after site build-out.

## Section 5 Conclusions and Recommendations

## CONCLUSIONS AND RECOMMENDATIONS

The results of the traffic impact analysis indicate that the proposed Cascade Place multi-family development can be constructed while maintaining acceptable study intersection operations as long as the appropriate mitigations are in place. The findings of this analysis and our recommendations are discussed below.

### FINDINGS

#### Year 2021 Existing Conditions

- A 2.5-percent annual growth rate was applied to the raw turning movement volumes collected at the study intersections in fall 2018 to estimate the existing year 2021 turning movement volumes.
- All of the study intersections currently meet ODOT mobility targets during the weekday AM and PM peak hours, with the exception of the OR 211/Molalla Avenue intersection—the v/c ratios on the eastbound and westbound OR 211 approaches currently exceed the ODOT mobility target of 0.90 during the weekday PM peak hour.
- A review of historical crash data did not reveal any patterns or trends in the site vicinity that require mitigation associated with this project.

#### Year 2022 Background Traffic Conditions

- A 2.5-percent annual growth rate was applied to the existing traffic volumes to account for regional growth in the area.
- The City of Molalla identified the following in-process developments for inclusion in the year 2022 background traffic volumes:
  - Cascade Center commercial development
  - Colima apartments
  - Center Market
- The *City of Molalla Transportation System Plan* identifies the future need to signalize the OR 211/Leroy Avenue intersection. The traffic signal was identified to provide motor vehicle capacity at the intersection to serve anticipated traffic growth and also serves as a north-south pedestrian crossing opportunity linking residents south of OR 211 with Molalla River Middle School to the north. Signalization is not currently funded.
- The Cascade Center commercial development will improve OR 211 to a three-lane section along the site frontage, including exclusive left turn lanes in either direction of OR 211 at Leroy Avenue. These improvements were incorporated into the year 2022 background traffic conditions analysis as being constructed prior to build-out of the multi-family units.

- The Cascade Center commercial development will provide a Rectangular Rapid Flashing Beacon (RRFB) for the crosswalk on the west leg of the improved OR 211/Leroy Avenue intersection.
- The Cascade Center commercial development will provide several improvements to the OR 211/Molalla Avenue intersection, including signalization. These improvements were incorporated into the year 2022 background traffic conditions analysis as being constructed prior to build-out of the multi-family units.
- Each of the study intersections is forecast to continue meeting ODOT mobility targets during the weekday AM and PM peak hours, with the exception of the northbound left turn at OR 211/Leroy Avenue, which is projected to experience a v/c ratio above the ODOT mobility target of 0.95 during the weekday PM peak hour, and northbound approach delays are projected to reach Level of Service “F”.

### Proposed Development Plan

- The proposed 151 multi-family units are expected to generate approximately 822 weekday net new trips, of which 51 (13 in, 38 out) will occur during the AM peak hour and 66 (40 in, 26 out) will occur during the PM peak hour.
- The housing site was previously approved for development into 557 storage units as part of the prior Cascade Center commercial development. After reducing the apartment trip generation by the number of trips associated with the approved storage units, the proposed 151 multi-family units are expected to generate approximately 722 weekday net new trips impacting the transportation system, of which 43 (9 in, 34 out) will occur during the AM peak hour and 55 (34 in, 21 out) will occur during the PM peak hour.

### Year 2022 Total Traffic Conditions

- Each of the study intersections is forecast to continue meeting ODOT mobility targets during the weekday AM and PM peak hours, with the exception of the northbound left turn at OR 211/Leroy Avenue, which is projected to experience a v/c ratio above the ODOT target of 0.95 during the weekday AM and PM peak hours, and northbound approach delays are projected to reach Level of Service “F”.

### Traffic Signal and Turn Lane Considerations

- Per the MUTCD volume-based signal warrants and the estimated 24-hour volume profile of the OR 211/Leroy Avenue intersection, the traffic volume-based signal warrants are not projected to be met at the intersection in conjunction with site development. The number of northbound PM peak hour trips at the intersection is not projected to meet the City’s threshold for signalization after site development.

## 95<sup>th</sup>-Percentile Queueing Analysis

- The proposed storage lengths at the study intersections are expected to accommodate each of the 95<sup>th</sup>-percentile queues in the AM and PM peak hours under 2022 total traffic conditions.

## RECOMMENDATIONS

The following are recommended in conjunction with site redevelopment:

- Given the stop-controlled northbound and southbound Leroy Avenue approaches at OR 211 are forecast to operate at Level of Service “F” prior to and after build-out of the proposed Cascade Place multi-family development, we recommend the applicant work with the City to determine what proportionate share contribution (if any) is appropriate for future signalization improvements at OR 211/Leroy Avenue.
- All landscaping, signage, and utilities near the site access points should be placed and maintained to provide adequate sight distance.

Section 6  
References



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## REFERENCES

1. City of Molalla, OR. *City of Molalla Transportation System Plan*. 2018.
2. South Clackamas Transportation District. "Routes & Schedules." 2018. < <http://sctd.org/routes.html>>.
3. Oregon Department of Transportation (ODOT). *Analysis Procedures Manual, Version 2*. 2018.
4. Transportation Research Board of the National Academies. *Highway Capacity Manual, 6<sup>th</sup> Edition*. 2015.
5. Oregon Department of Transportation (ODOT). *Oregon Highway Plan*. 1999.
6. Oregon Department of Transportation (ODOT). Region 1 SPIS Sites – By Score. 2019.
7. Institute of Transportation Engineers. *Trip Generation, 10<sup>th</sup> Edition*. 2017.
8. Federal Highway Administration. *Manual on Uniform Traffic Control Devices*. 2009 Edition. 2009.

## Memorandum

To: Gerald Fisher, PE  
From: Todd E. Mobley, PE  
Terrington Smith, EI  
Date: January 31, 2020  
Subject: Colima Apartments – Transportation Impact Study Addendum #1



RENEWS: 12/21/2020

## Introduction

This memorandum is written to address comments received from the City of Molalla regarding the Transportation Impact Study (TIS) prepared for the subject project<sup>1</sup> and serves as an addendum to the TIS. There are three primary areas of concern that are each addressed in the sections below. They are 1) the trip generation calculations for the apartments, 2) the inclusion of trips from developments that are approved but not yet constructed, and 3) the operation of the intersection of Highway 211 at Leroy Avenue.

## Trip Generation

In the TIS, trip generation was done using data from the 10<sup>th</sup> Edition of the Trip Generation Manual, published by the Institute of Transportation Engineers (ITE). The study used land-use code 221, *Multifamily Housing (Mid-Rise)*. This is the correct land-use code, although the TIS used the subcategory of “Dense Multi-Use Urban”, which is one of three subcategories. After consultation with the Oregon Department of Transportation (ODOT), it was requested that we use the subcategory “General Urban/Suburban” for the calculation.

Table 1 below shows a summary of the new trip generation results and detailed calculations are included in the attached technical appendix. An updated Figure 2 showing the site trips is attached in the Technical Appendix.

Table 1: Trip Generation Summary

	ITE Code	Units	Morning Peak Hour			Evening Peak Hour			Weekday Total	
			In	Out	Total	In	Out	Total		
Existing Conditions										
Single-Family Detached Housing	210	1	0	1	1	1	0	1	10	
Proposed Development										
Multifamily Housing (Mid-Rise)	221	36	3	10	13	10	6	16	196	
<b>Net New Site Trips</b>			<b>3</b>	<b>9</b>	<b>12</b>	<b>9</b>	<b>6</b>	<b>15</b>	<b>186</b>	

<sup>1</sup> Colima Apartments, Transportation Impact Study dated November 11, 2019

The assignment of the project-generated trips to the study area intersection, including the intersection of Highway 211 at Leroy Avenue, is shown in an updated version of Figure 2 in the attached technical appendix.

## In-Process Trips

Trips from developments that are approved but not yet constructed are referred to as “in-process” trips. Comments from the City of Molalla also requested that trips from the following developments be specifically included in this addendum.

1. Twin Meadows Subdivision
2. Bear Creek Subdivision
3. McEachran Subdivision
4. Hezzie Lane Subdivision
5. Tractor Supply Company
6. Cascade Center

Trips from projects 2, 5, and 6 were taken directly from the Transportation Impact Studies prepared for those projects. According to City staff, projects 1, 3, and 4 were not required to prepare a TIS. For these projects trip generation was calculated using the ITE manual. For the four subdivisions above, the number of unbuilt or unoccupied homes were inventoried in the field and used to assess in-process trips.

In-process trips were added to the 2022 background traffic volumes. An updated version of Figure 4 showing the background traffic volumes that include the in-process development as well as an updated version of Figure 5 showing the sum of background traffic plus site trips from the proposed Colima Apartments are in the attached technical appendix.

## Updated Capacity Analysis

The capacity analysis from the original study intersections was updated to include the in-process trips and updated trip generation of the site. As mentioned in the original TIS, ODOT’s operational standard for the study intersections is a maximum volume to capacity (v/c) ratio of 0.90.

The results of the analysis are shown in Table 2 on the following page. Detailed reports of the capacity analysis are attached in the technical appendix.



Table 2: Capacity Analysis Summary

	AM Peak Hour			PM Peak Hour		
	LOS	Delay (s)	v / c	LOS	Delay (s)	v / c
<b>Highway 213 at Highway 211</b>						
2019 Existing Conditions	D	38	0.49	D	45	0.66
2022 Background Conditions	D	39	0.53	D	49	0.69
2022 Buildout Conditions	D	39	0.53	D	49	0.71
<b>Highway 213 at Crompton's Lane</b>						
2019 Existing Conditions	A	0	0.00	A	10	0.00
2022 Background Conditions	A	0	0.00	B	10	0.00
2022 Buildout Conditions	B	13	0.00	B	10	0.01

The capacity analysis shows that the study intersections are projected to operate acceptably through buildout of the proposed development with the updated trip generation and in-process volumes included. In general, the intersection operation is largely the same as what was reported in the original TIS.

## Highway 211 at Leroy Avenue

Of particular concern in the comments received is the intersection of Highway 211 at Leroy Avenue and when a traffic signal will be warranted at the intersection. It is our understanding that the Cascade Center project will construct the south leg of the intersection, but signaling the intersection is not a requirement of Cascade Center.

As part of this addendum, the intersection was re-examined to determine if signal warrants are met upon completion of the Colima Apartments. A warrant analysis was done using the year 2020 total traffic volumes found in Figure 7 of the Cascade Center transportation impact analysis along with the project-generated trips associated with the Colima Apartments. Figure 2 in the attached technical appendix shows an updated version the site trip distribution and assignment through the intersection for the morning and evening peak hours.

The need for a traffic signal at this intersection is driven primarily by traffic volumes entering the intersection. Traffic signal warrants require minimum thresholds to be met for both the major street (Highway 211) *and* the minor street (Leroy Avenue). Through traffic on Highway 211 is high enough to meet the thresholds, but the northbound traffic on Leroy Avenue will not meet the thresholds. This is due primarily to ODOT requirements that dictate the northbound right-turning trips not be included in the analysis.

Table 3 below shows the northbound traffic on Leroy Avenue with all in-process trips accounted for (including Cascade Center) and the Colima Apartments.



Table 3: Leroy Avenue Traffic Volumes

	Northbound PM Peak Hour Volume
Threshold to Meet Signal Warrants	95
2022 Buildout Conditions	53
<b>Trips Remaining</b>	<b>42</b>

As shown in the table above, the volumes on Leroy Avenue will not be sufficient to meet traffic signal warrants with the Colima Apartments project in place. It is also important to note that the apartments are not expected to add additional trips to Leroy Avenue (see Figure 2 in the attached technical appendix).

## Summary & Conclusions

Updated trip generation calculations show the development is projected to generate a net increase of 12 trips in the morning peak hour and 15 trips in the evening peak hour. In-process trips from surrounding developments within the City of Molalla were quantified and included in the 2022 background traffic volumes.

The original study intersections (Highway 213 at Highway 211 and Highway 213 at Crompton’s Lane) were re-analyzed with the increased trip generation and in-process trips included. The operational analysis shows that both intersections are expected to operate acceptably upon completion and occupancy of the Colima Apartments.

Signal warrants were examined at the intersection of Highway 211 at Leroy Avenue. Due to insufficient traffic volumes on Leroy Avenue, signal warrants at the intersection were not met regardless of the Colima Apartments. A signal would be warranted at this intersection once 42 PM peak hour trips are added to the northbound approach of Leroy Avenue, but the trips generated by the Colima Apartments will not contribute to the northbound approach and therefore do not contribute toward the need for a traffic signal at the intersection.



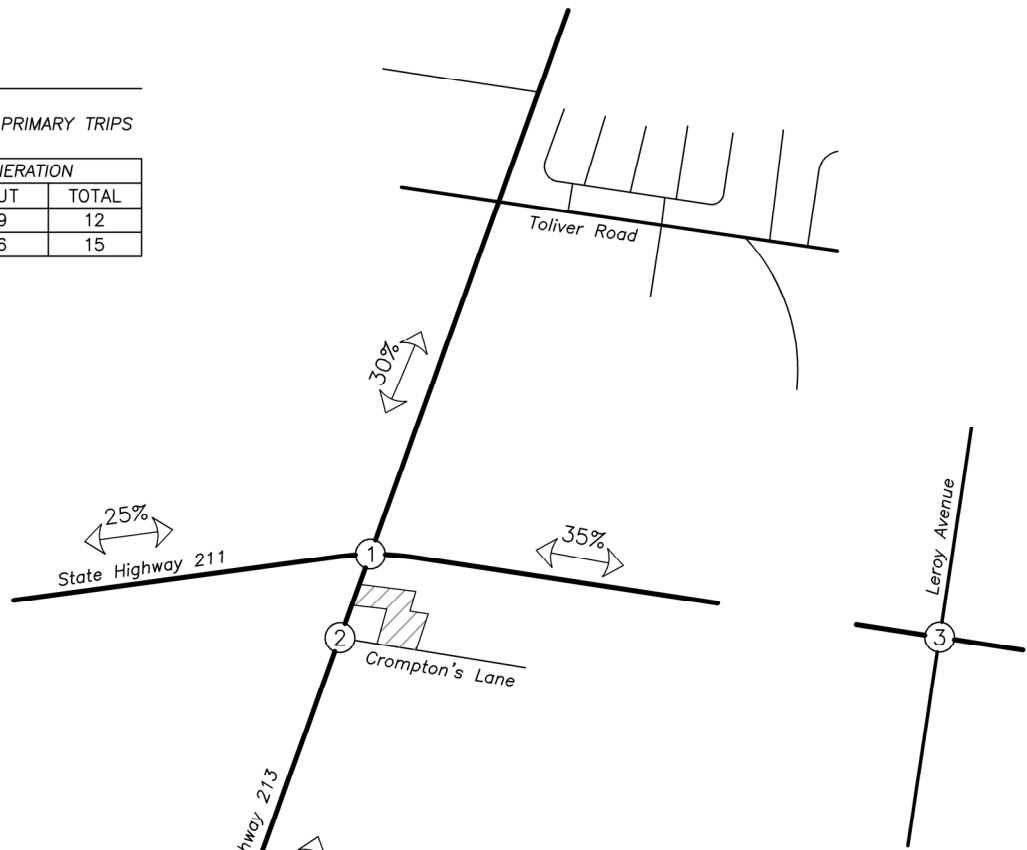
TECHNICAL APPENDIX



LEGEND

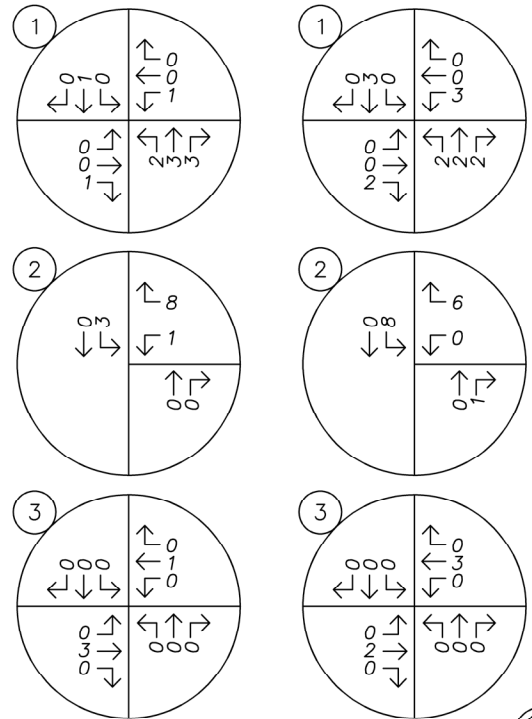
XX% PERCENT OF PRIMARY TRIPS

PRIMARY TRIP GENERATION			
	IN	OUT	TOTAL
AM	3	9	12
PM	9	6	15

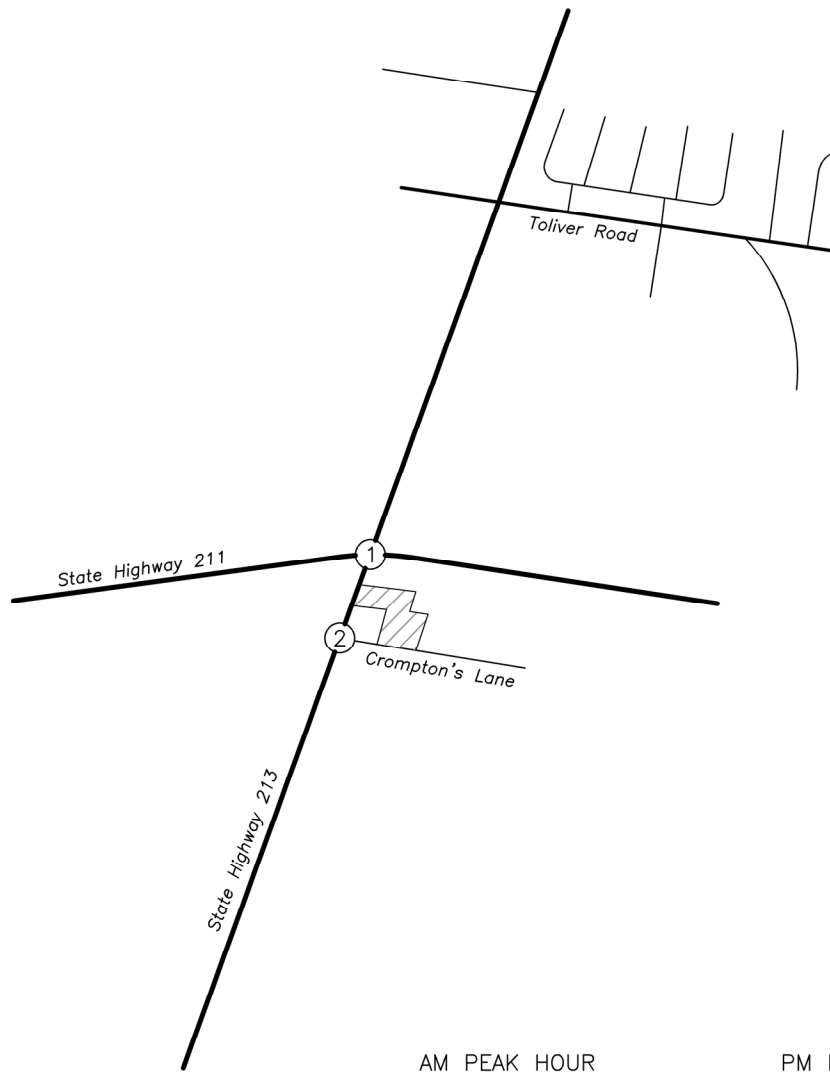


AM PEAK HOUR

PM PEAK HOUR

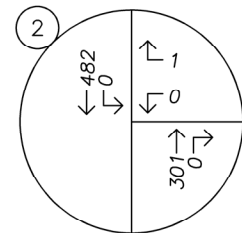
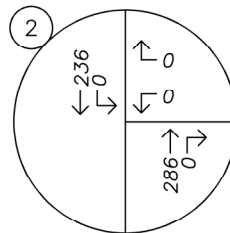
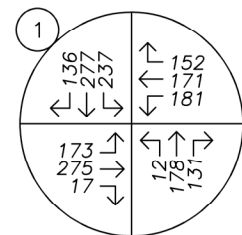
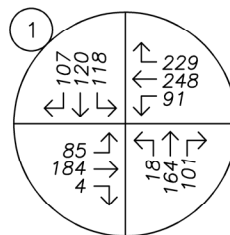


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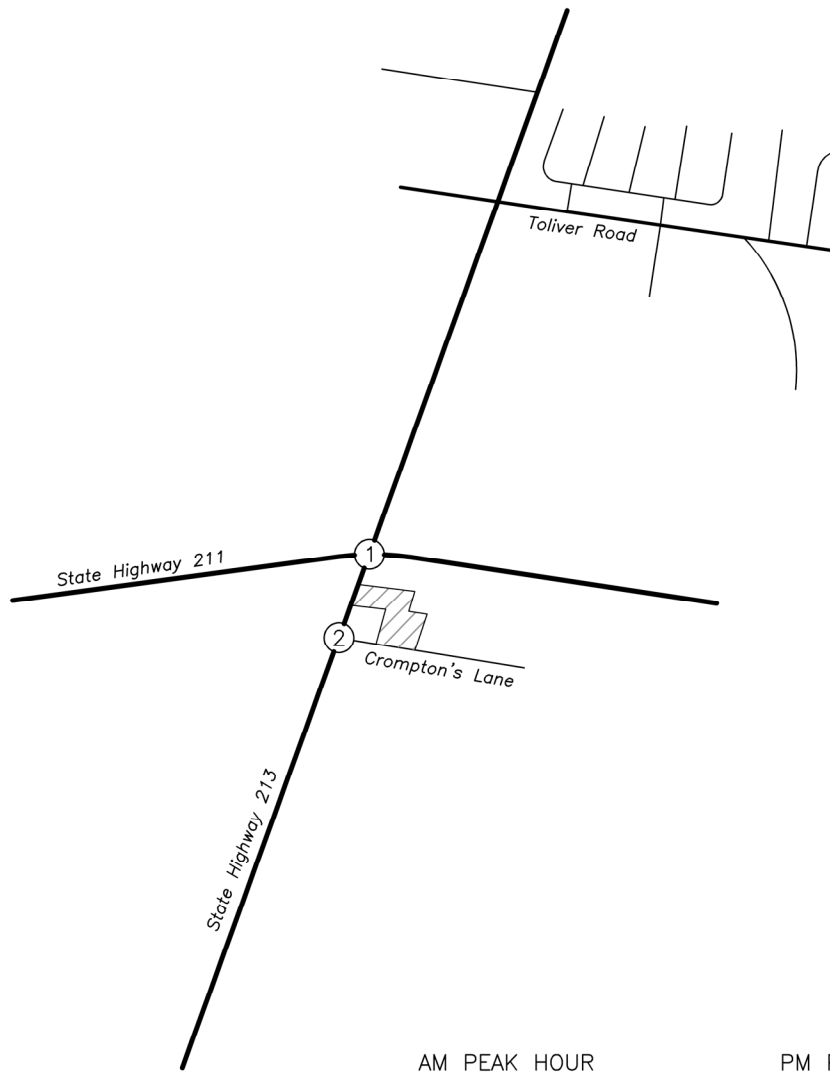
AM PEAK HOUR

PM PEAK HOUR



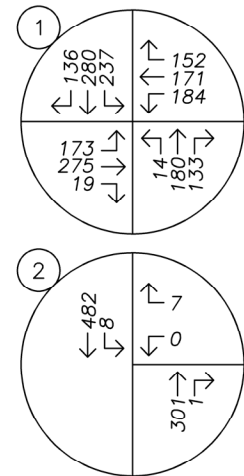
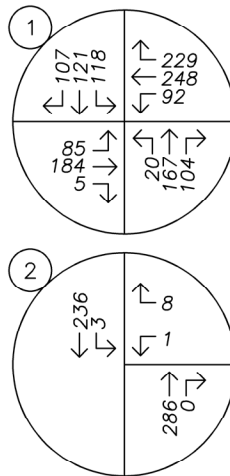
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AM PEAK HOUR

PM PEAK HOUR



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Colima Apartments Addendum

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 Report File: \...\Addendum EXAM.pdf

Scenario 1 2019 Existing AM  
 1/30/2020

**Intersection Analysis Summary**

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Hwy 213 @ Hwy 211	Signalized	HCM 6th Edition	NB Thru	0.491	37.7	D
2	Highway 213 at Crompton's Lane	Two-way stop	HCM 6th Edition	NB Thru	0.003	0.0	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

## Colima Apartments Addendum

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Scenario 1 2019 Existing AM

Report File: \...\Addendum EXAM.pdf

1/30/2020

**Turning Movement Volume: Detail**

ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume	
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
1	Hwy 213 @ Hwy 211	Final Base	18	158	80	93	114	101	82	159	4	75	226	203	1313	
		Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		<b>Future Total</b>	<b>18</b>	<b>158</b>	<b>80</b>	<b>93</b>	<b>114</b>	<b>101</b>	<b>82</b>	<b>159</b>	<b>4</b>	<b>75</b>	<b>226</b>	<b>203</b>	<b>1313</b>	

ID	Intersection Name	Volume Type	Northbound		Southbound		Westbound		Total Volume
			Thru	Right	Left	Thru	Left	Right	
2	Highway 213 at Crompton's Lane	Final Base	248	0	0	205	0	0	453
		Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0
		<b>Future Total</b>	<b>248</b>	<b>0</b>	<b>0</b>	<b>205</b>	<b>0</b>	<b>0</b>	<b>453</b>

Colima Apartments Addendum

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 Report File: \...\Addendum EXPM.pdf

Scenario 1 2019 Existing PM  
 1/30/2020

**Intersection Analysis Summary**

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Hwy 213 @ Hwy 211	Signalized	HCM 6th Edition	WB Right	0.657	44.6	D
2	Highway 213 @ Crompton's Lane	Two-way stop	HCM 6th Edition	WB Right	0.001	9.8	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Colima Apartments Addendum

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Scenario 1 2019 Existing PM

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1/30/2020

**Turning Movement Volume: Detail**

ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
1	Hwy 213 @ Hwy 211	Final Base	11	170	110	205	266	130	165	246	17	161	150	128	1759
		Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		<b>Future Total</b>	<b>11</b>	<b>170</b>	<b>110</b>	<b>205</b>	<b>266</b>	<b>130</b>	<b>165</b>	<b>246</b>	<b>17</b>	<b>161</b>	<b>150</b>	<b>128</b>	<b>1759</b>

ID	Intersection Name	Volume Type	Northbound		Southbound		Westbound		Total Volume
			Thru	Right	Left	Thru	Left	Right	
2	Highway 213 @ Crompton's Lane	Final Base	262	0	0	433	0	1	696
		Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0
		<b>Future Total</b>	<b>262</b>	<b>0</b>	<b>0</b>	<b>433</b>	<b>0</b>	<b>1</b>	<b>696</b>

Colima Apartments Addendum

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 Report File: \...\Addendum BGAM.pdf

Scenario 2 2022 Background AM  
 1/30/2020

**Intersection Analysis Summary**

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Hwy 213 @ Hwy 211	Signalized	HCM 6th Edition	NB Thru	0.528	38.6	D
2	Highway 213 at Crompton's Lane	Two-way stop	HCM 6th Edition	NB Thru	0.003	0.0	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

## Colima Apartments Addendum

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Scenario 2 2022 Background AM

Report File: \...\Addendum BGAM.pdf

1/30/2020

**Turning Movement Volume: Detail**

ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
1	Hwy 213 @ Hwy 211	Final Base	18	161	82	95	116	103	83	163	4	77	231	208	1341
		Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	3	19	23	4	4	2	21	0	14	17	21	128
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		<b>Future Total</b>	<b>18</b>	<b>164</b>	<b>101</b>	<b>118</b>	<b>120</b>	<b>107</b>	<b>85</b>	<b>184</b>	<b>4</b>	<b>91</b>	<b>248</b>	<b>229</b>	<b>1469</b>

ID	Intersection Name	Volume Type	Northbound		Southbound		Westbound		Total Volume
			Thru	Right	Left	Thru	Left	Right	
2	Highway 213 at Crompton's Lane	Final Base	264	0	0	218	0	0	482
		Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	22	0	0	18	0	0	40
		Net New Trips	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0
		<b>Future Total</b>	<b>286</b>	<b>0</b>	<b>0</b>	<b>236</b>	<b>0</b>	<b>0</b>	<b>522</b>

Colima Apartments Addendum

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 Report File: \...\Addendum BGPM.pdf

Scenario 2 2022 Background PM  
 1/30/2020

**Intersection Analysis Summary**

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Hwy 213 @ Hwy 211	Signalized	HCM 6th Edition	WB Right	0.694	49.0	D
2	Highway 213 @ Crompton's Lane	Two-way stop	HCM 6th Edition	WB Right	0.001	10.0	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.



## Colima Apartments Addendum

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Scenario 2 2022 Background PM

Report File: \...\Addendum BGPM.pdf

1/30/2020

**Turning Movement Volume: Detail**

ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
1	Hwy 213 @ Hwy 211	Final Base	12	174	113	210	272	133	169	252	17	165	153	131	1801
		Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	4	18	27	5	3	4	23	0	16	18	21	139
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		<b>Future Total</b>	<b>12</b>	<b>178</b>	<b>131</b>	<b>237</b>	<b>277</b>	<b>136</b>	<b>173</b>	<b>275</b>	<b>17</b>	<b>181</b>	<b>171</b>	<b>152</b>	<b>1940</b>

ID	Intersection Name	Volume Type	Northbound		Southbound		Westbound		Total Volume
			Thru	Right	Left	Thru	Left	Right	
2	Highway 213 @ Crompton's Lane	Final Base	279	0	0	461	0	1	741
		Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	22	0	0	21	0	0	43
		Net New Trips	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0
		<b>Future Total</b>	<b>301</b>	<b>0</b>	<b>0</b>	<b>482</b>	<b>0</b>	<b>1</b>	<b>784</b>

Colima Apartments Addendum

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 Report File: \...\Addendum BOAM.pdf

Scenario 3 2022 Buildout AM  
 1/30/2020

**Intersection Analysis Summary**

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Hwy 213 @ Hwy 211	Signalized	HCM 6th Edition	NB Thru	0.532	39.2	D
2	Highway 213 at Crompton's Lane	Two-way stop	HCM 6th Edition	WB Left	0.002	12.6	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

## Colima Apartments Addendum

Vistro File: \\...\Addendum Colima AM.vistro

Scenario 3 2022 Buildout AM

Report File: \\...\Addendum BOAM.pdf

1/30/2020

**Turning Movement Volume: Detail**

ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
1	Hwy 213 @ Hwy 211	Final Base	18	161	82	95	116	103	83	163	4	77	231	208	1341
		Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	3	19	23	4	4	2	21	0	14	17	21	128
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	2	3	3	0	1	0	0	0	1	1	0	0	11
		<b>Future Total</b>	<b>20</b>	<b>167</b>	<b>104</b>	<b>118</b>	<b>121</b>	<b>107</b>	<b>85</b>	<b>184</b>	<b>5</b>	<b>92</b>	<b>248</b>	<b>229</b>	<b>1480</b>

ID	Intersection Name	Volume Type	Northbound		Southbound		Westbound		Total Volume
			Thru	Right	Left	Thru	Left	Right	
2	Highway 213 at Crompton's Lane	Final Base	264	0	0	218	0	0	482
		Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	22	0	0	18	0	0	40
		Net New Trips	0	0	0	0	0	0	0
		Other	0	0	3	0	1	8	12
		<b>Future Total</b>	<b>286</b>	<b>0</b>	<b>3</b>	<b>236</b>	<b>1</b>	<b>8</b>	<b>534</b>

Colima Apartments Addendum

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 Report File: \...\Addendum BOPM.pdf

Scenario 3 2022 Buildout PM  
 1/30/2020

**Intersection Analysis Summary**

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Hwy 213 @ Hwy 211	Signalized	HCM 6th Edition	NB Thru	0.713	48.7	D
2	Highway 213 @ Crompton's Lane	Two-way stop	HCM 6th Edition	WB Right	0.011	10.1	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

## Colima Apartments Addendum

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Scenario 3 2022 Buildout PM

Report File: \...\Addendum BOPM.pdf

1/30/2020

**Turning Movement Volume: Detail**

ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
1	Hwy 213 @ Hwy 211	Final Base	12	174	113	210	272	133	169	252	17	165	153	131	1801
		Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	4	18	27	5	3	4	23	0	16	18	21	139
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	2	2	2	0	3	0	0	0	2	3	0	0	14
		<b>Future Total</b>	<b>14</b>	<b>180</b>	<b>133</b>	<b>237</b>	<b>280</b>	<b>136</b>	<b>173</b>	<b>275</b>	<b>19</b>	<b>184</b>	<b>171</b>	<b>152</b>	<b>1954</b>

ID	Intersection Name	Volume Type	Northbound		Southbound		Westbound		Total Volume
			Thru	Right	Left	Thru	Left	Right	
2	Highway 213 @ Crompton's Lane	Final Base	279	0	0	461	0	1	741
		Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	22	0	0	21	0	0	43
		Net New Trips	0	0	0	0	0	0	0
		Other	0	1	8	0	0	6	15
		<b>Future Total</b>	<b>301</b>	<b>1</b>	<b>8</b>	<b>482</b>	<b>0</b>	<b>7</b>	<b>799</b>

# 5. Crash Data













161: WOODBURN-ESTACADA

Highway 161 ALL ROAD TYPES, MP 11.2 to 11.38 01/01/2015 to 12/31/2019, Both Add and Non-Add mileage

1 - 4 of 4 Crash records shown.

SER#	P	R	J	S	W	DATE	COUNTY	RD#	FC	CONN#	RD CHAR	INT-TYPE	SPCL USE	MOVE	A	S	INJ	G	E	LICNS	PED	ERROR	ACT	EVENT	CAUSE				
INVEST	E	A	U	I	C	O	CITY	COMPNT	FIRST STREET	DIRECT	(MEDIAN)	INT-REL	OFFRD	WTHR	CRASH	TRLR	QTY	MOVE											
RD DPT	E	L	G	N	H	R	URBAN AREA	MLG	TYP	SECOND STREET	LOCTN	LEGS	TRAF-	RNDBT	SURF	COLL	OWNER	FROM	PRTC	INJ	G	E	LICNS	PED					
UNLOC?	D	C	S	V	L	K	LONG	MILEPNT	LRS		(#LANES)	CONTL	DRVWY	LIGHT	SVRTY	V#	TYPE	TO	P#	TYPE	SVRTY	E	X	RES	LOC				
04638	N	N	N	N		11/04/2017	CLACKAMAS	1	16		STRGHT	Y	N	UNK	S-1STOP	01	NONE	9	STRGHT							10			
NONE						SA		MN	0		UN	(NONE)	UNKNOWN	N	UNK	SS-O	N/A		W	-E						000	00		
N						12P	MOLALLA UA	11.28			03	0	N	DAY	PDO		PSNGR	CAR	01	DRVR	NONE	00	Unk	UNK		000	000	00	
N						45 9 2.27	-122 36 25.08			016100100S00																			
																	02	NONE	9	STOP							011	00	
																	N/A		W	-E							000	000	00
																	PSNGR	CAR	01	DRVR	NONE	00	Unk	UNK		000	000	00	
02749	N	N	N	N		08/07/2018	CLACKAMAS	1	16		INTER	CROSS	N	CLR	ANGL-STP	01	NONE	9	TURN-L							29			
NONE						TU		MN	0		E		TRF SIGNAL	N	DRY	TURN	N/A		N	-E						000	00		
N						3P	MOLALLA UA	11.31			05	0	N	DAY	PDO		PSNGR	CAR	01	DRVR	NONE	00	Unk	UNK		000	000	00	
N						45 9 2.53	-122 36 22.92			016100100S00																			
																	02	NONE	9	STOP							011	00	
																	N/A		W	-E							000	000	00
																	PSNGR	CAR	01	DRVR	NONE	00	Unk	UNK		000	000	00	
04140	N	N	N	N		08/28/2016	CLACKAMAS	1	16		ALLEY		N	CLR	ANGL-OTH	01	NONE	9	STRGHT							02			
CITY						SU		MN	0		UN	(NONE)	NONE	N	DRY	TURN	N/A		W	-E						000	00		
N						10P	MOLALLA UA	11.34			04		N	DARK	PDO		PSNGR	CAR	01	DRVR	NONE	00	Unk	UNK		000	000	00	
N						45 9 2.37	-122 36 20.64			016100100S00		(02)																	
																	02	NONE	9	TURN-L							018	00	
																	N/A		S	-W							000	000	00
																	PSNGR	CAR	01	DRVR	NONE	00	Unk	UNK		000	000	00	
04136	N	N	N	N		10/07/2015	CLACKAMAS	1	16		STRGHT		N	RAIN	S-1STOP	01	NONE	0	STRGHT							29			
NONE						WE		MN	0		UN	(NONE)	UNKNOWN	N	WET	REAR	PRVTE		E	-W						000	00		
N						12P	MOLALLA UA	11.37			04		N	DAY	PDO		PSNGR	CAR	01	DRVR	NONE	67	M	OR-Y		026	000	29	
N						45 9 2.11	-122 36 18.38			016100100S00		(02)																	
																	02	NONE	0	STOP									
																	PRVTE		E	-W							011	00	
																	PSNGR	CAR	01	DRVR	NONE	21	F	OR-Y		000	000	00	
																	02	NONE	0	STOP									
																	PRVTE		E	-W							011	00	
																	PSNGR	CAR	02	PSNG	NO<5	01	F			000	000	00	

Driveway Crash - east of intersection turning from south side (Gas Station)





















## 6. Signal Warrants



# Traffic Signal Warrant Analysis



Project: 21160 - Home First Molalla  
 Date: 10/5/2021  
 Scenario: Year 2023 Background Plus Site Conditions (AM Peak Hour)

Major Street:	OR 211	Minor Street:	S Ona Way
Number of Lanes:	1	Number of Lanes:	1
PM Peak Hour Volumes:	1156	PM Peak Hour Volumes:	20

**Warrant Used:**

    X     100 percent of standard warrants used  
           70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

Number of Lanes for Moving Traffic on Each Approach:		ADT on Major St. (total of both approaches)		ADT on Minor St. (higher-volume approach)	
<u>Major St.</u>	<u>Minor St.</u>	<u>100% Warrants</u>	<u>70% Warrants</u>	<u>100% Warrants</u>	<u>70% Warrants</u>
<b>WARRANT 1, CONDITION A</b>					
1	1	8,850	6,200	2,650	1,850
2 or more	1	10,600	7,400	2,650	1,850
2 or more	2 or more	10,600	7,400	3,550	2,500
1	2 or more	8,850	6,200	3,550	2,500
<b>WARRANT 1, CONDITION B</b>					
1	1	13,300	9,300	1,350	950
2 or more	1	15,900	11,100	1,350	950
2 or more	2 or more	15,900	11,100	1,750	1,250
1	2 or more	13,300	9,300	1,750	1,250

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

	Approach Volumes	Minimum Volumes	Is Signal Warrant Met?
<b>Warrant 1</b>			
<i>Condition A: Minimum Vehicular Volume</i>			
Major Street	11,560	8,850	
Minor Street*	200	2,650	<b>No</b>
<i>Condition B: Interruption of Continuous Traffic</i>			
Major Street	11,560	13,300	
Minor Street*	200	1,350	<b>No</b>
<i>Combination Warrant</i>			
Major Street	11,560	10,640	
Minor Street*	200	2,120	<b>No</b>

\* Minor street right-turning traffic volumes excluded from calculation

# Traffic Signal Warrant Analysis



Project: 21160 - Home First Molalla  
 Date: 10/5/2021  
 Scenario: Year 2023 Background Plus Site Conditions (PM Peak Hour)

Major Street:	OR 211	Minor Street:	S Ona Way
Number of Lanes:	1	Number of Lanes:	1
PM Peak Hour Volumes:	1660	PM Peak Hour Volumes:	18

Warrant Used:  
 100 percent of standard warrants used  
 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

Number of Lanes for Moving Traffic on Each Approach:		ADT on Major St. (total of both approaches)		ADT on Minor St. (higher-volume approach)	
<u>Major St.</u>	<u>Minor St.</u>	<u>100% Warrants</u>	<u>70% Warrants</u>	<u>100% Warrants</u>	<u>70% Warrants</u>
<b>WARRANT 1, CONDITION A</b>					
1	1	8,850	6,200	2,650	1,850
2 or more	1	10,600	7,400	2,650	1,850
2 or more	2 or more	10,600	7,400	3,550	2,500
1	2 or more	8,850	6,200	3,550	2,500
<b>WARRANT 1, CONDITION B</b>					
1	1	13,300	9,300	1,350	950
2 or more	1	15,900	11,100	1,350	950
2 or more	2 or more	15,900	11,100	1,750	1,250
1	2 or more	13,300	9,300	1,750	1,250

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

	Approach Volumes	Minimum Volumes	Is Signal Warrant Met?
<b>Warrant 1</b>			
<i>Condition A: Minimum Vehicular Volume</i>			
Major Street	16,600	8,850	
Minor Street*	180	2,650	<b>No</b>
<i>Condition B: Interruption of Continuous Traffic</i>			
Major Street	16,600	13,300	
Minor Street*	180	1,350	<b>No</b>
<i>Combination Warrant</i>			
Major Street	16,600	10,640	
Minor Street*	180	2,120	<b>No</b>

\* Minor street right-turning traffic volumes excluded from calculation

# Traffic Signal Warrant Analysis



Project: 21160 - Home First Molalla  
 Date: 10/5/2021  
 Scenario: Year 2023 Background Plus Site Conditions (AM Peak Hour)

Major Street:	OR 211	Minor Street:	Site Access Driveway
Number of Lanes:	1	Number of Lanes:	1
PM Peak Hour Volumes:	1164	PM Peak Hour Volumes:	5

**Warrant Used:**

    X     100 percent of standard warrants used  
           70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

Number of Lanes for Moving Traffic on Each Approach:		ADT on Major St. (total of both approaches)		ADT on Minor St. (higher-volume approach)	
<u>Major St.</u>	<u>Minor St.</u>	<u>Warrants</u>	<u>Warrants</u>	<u>Warrants</u>	<u>Warrants</u>
<b>WARRANT 1, CONDITION A</b>					
1	1	8,850	6,200	2,650	1,850
2 or more	1	10,600	7,400	2,650	1,850
2 or more	2 or more	10,600	7,400	3,550	2,500
1	2 or more	8,850	6,200	3,550	2,500
<b>WARRANT 1, CONDITION B</b>					
1	1	13,300	9,300	1,350	950
2 or more	1	15,900	11,100	1,350	950
2 or more	2 or more	15,900	11,100	1,750	1,250
1	2 or more	13,300	9,300	1,750	1,250

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

	Approach Volumes	Minimum Volumes	Is Signal Warrant Met?
<b>Warrant 1</b>			
<i>Condition A: Minimum Vehicular Volume</i>			
Major Street	11,640	8,850	
Minor Street*	50	2,650	<b>No</b>
<i>Condition B: Interruption of Continuous Traffic</i>			
Major Street	11,640	13,300	
Minor Street*	50	1,350	<b>No</b>
<i>Combination Warrant</i>			
Major Street	11,640	10,640	
Minor Street*	50	2,120	<b>No</b>

\* Minor street right-turning traffic volumes excluded from calculation



# Traffic Signal Warrant Analysis



Project: 21160 - Home First Molalla  
 Date: 10/5/2021  
 Scenario: Year 2023 Background Plus Site Conditions (PM Peak Hour)

Major Street:	OR 211	Minor Street:	Site Access Driveway
Number of Lanes:	1	Number of Lanes:	1
PM Peak Hour Volumes:	1664	PM Peak Hour Volumes:	3

**Warrant Used:**

- 100 percent of standard warrants used
- 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

Number of Lanes for Moving Traffic on Each Approach:		ADT on Major St. (total of both approaches)		ADT on Minor St. (higher-volume approach)	
<u>Major St.</u>	<u>Minor St.</u>	<u>100% Warrants</u>	<u>70% Warrants</u>	<u>100% Warrants</u>	<u>70% Warrants</u>
<b>WARRANT 1, CONDITION A</b>					
1	1	8,850	6,200	2,650	1,850
2 or more	1	10,600	7,400	2,650	1,850
2 or more	2 or more	10,600	7,400	3,550	2,500
1	2 or more	8,850	6,200	3,550	2,500
<b>WARRANT 1, CONDITION B</b>					
1	1	13,300	9,300	1,350	950
2 or more	1	15,900	11,100	1,350	950
2 or more	2 or more	15,900	11,100	1,750	1,250
1	2 or more	13,300	9,300	1,750	1,250

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

	Approach Volumes	Minimum Volumes	Is Signal Warrant Met?
<b>Warrant 1</b>			
<i>Condition A: Minimum Vehicular Volume</i>			
Major Street	16,640	8,850	
Minor Street*	30	2,650	<b>No</b>
<i>Condition B: Interruption of Continuous Traffic</i>			
Major Street	16,640	13,300	
Minor Street*	30	1,350	<b>No</b>
<i>Combination Warrant</i>			
Major Street	16,640	10,640	
Minor Street*	30	2,120	<b>No</b>

\* Minor street right-turning traffic volumes excluded from calculation

# Traffic Signal Warrant Analysis



Project: 21160 - Home First Molalla  
 Date: 10/5/2021  
 Scenario: Year 2023 Background Plus Site Conditions (AM Peak Hour)

Major Street:	OR 211	Minor Street:	Leroy Avenue
Number of Lanes:	1	Number of Lanes:	1
PM Peak Hour Volumes:	1153	PM Peak Hour Volumes:	95

Warrant Used:  
 100 percent of standard warrants used  
 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

Number of Lanes for Moving Traffic on Each Approach:		ADT on Major St. (total of both approaches)		ADT on Minor St. (higher-volume approach)	
Major St.	Minor St.	100% Warrants	70% Warrants	100% Warrants	70% Warrants
<b>WARRANT 1, CONDITION A</b>					
1	1	8,850	6,200	2,650	1,850
2 or more	1	10,600	7,400	2,650	1,850
2 or more	2 or more	10,600	7,400	3,550	2,500
1	2 or more	8,850	6,200	3,550	2,500
<b>WARRANT 1, CONDITION B</b>					
1	1	13,300	9,300	1,350	950
2 or more	1	15,900	11,100	1,350	950
2 or more	2 or more	15,900	11,100	1,750	1,250
1	2 or more	13,300	9,300	1,750	1,250

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

	Approach Volumes	Minimum Volumes	Is Signal Warrant Met?
<b>Warrant 1</b>			
<i>Condition A: Minimum Vehicular Volume</i>			
Major Street	11,530	8,850	
Minor Street*	950	2,650	<b>No</b>
<i>Condition B: Interruption of Continuous Traffic</i>			
Major Street	11,530	13,300	
Minor Street*	950	1,350	<b>No</b>
<i>Combination Warrant</i>			
Major Street	11,530	10,640	
Minor Street*	950	2,120	<b>No</b>

\* Minor street right-turning traffic volumes excluded from calculation

# Traffic Signal Warrant Analysis



Project: 21160 - Home First Molalla  
 Date: 10/5/2021  
 Scenario: Year 2023 Background Plus Site Conditions (PM Peak Hour)

Major Street:	OR 211	Minor Street:	Leroy Avenue
Number of Lanes:	1	Number of Lanes:	1
PM Peak Hour Volumes:	1634	PM Peak Hour Volumes:	119

Warrant Used:  
    X     100 percent of standard warrants used  
           70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

Number of Lanes for Moving Traffic on Each Approach:		ADT on Major St. (total of both approaches)		ADT on Minor St. (higher-volume approach)	
<u>Major St.</u>	<u>Minor St.</u>	<u>100% Warrants</u>	<u>70% Warrants</u>	<u>100% Warrants</u>	<u>70% Warrants</u>
<b>WARRANT 1, CONDITION A</b>					
1	1	8,850	6,200	2,650	1,850
2 or more	1	10,600	7,400	2,650	1,850
2 or more	2 or more	10,600	7,400	3,550	2,500
1	2 or more	8,850	6,200	3,550	2,500
<b>WARRANT 1, CONDITION B</b>					
1	1	13,300	9,300	1,350	950
2 or more	1	15,900	11,100	1,350	950
2 or more	2 or more	15,900	11,100	1,750	1,250
1	2 or more	13,300	9,300	1,750	1,250

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

	Approach Volumes	Minimum Volumes	Is Signal Warrant Met?
<b>Warrant 1</b>			
<i>Condition A: Minimum Vehicular Volume</i>			
Major Street	16,340	8,850	
Minor Street*	1,190	2,650	<b>No</b>
<i>Condition B: Interruption of Continuous Traffic</i>			
Major Street	16,340	13,300	
Minor Street*	1,190	1,350	<b>No</b>
<i>Combination Warrant</i>			
Major Street	16,340	10,640	
Minor Street*	1,190	2,120	<b>No</b>

\* Minor street right-turning traffic volumes excluded from calculation

# Traffic Signal Warrant Analysis



Project: 21160 - Home First Molalla  
 Date: 10/5/2021  
 Scenario: Year 2023 Background Plus Site Conditions (AM Peak Hour)

Major Street:	OR 211	Minor Street:	Dixon Avenue
Number of Lanes:	1	Number of Lanes:	1
PM Peak Hour Volumes:	1215	PM Peak Hour Volumes:	4

Warrant Used:  
 100 percent of standard warrants used  
 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

Number of Lanes for Moving Traffic on Each Approach:		ADT on Major St. (total of both approaches)		ADT on Minor St. (higher-volume approach)	
<u>Major St.</u>	<u>Minor St.</u>	<u>100% Warrants</u>	<u>70% Warrants</u>	<u>100% Warrants</u>	<u>70% Warrants</u>
<b>WARRANT 1, CONDITION A</b>					
1	1	8,850	6,200	2,650	1,850
2 or more	1	10,600	7,400	2,650	1,850
2 or more	2 or more	10,600	7,400	3,550	2,500
1	2 or more	8,850	6,200	3,550	2,500
<b>WARRANT 1, CONDITION B</b>					
1	1	13,300	9,300	1,350	950
2 or more	1	15,900	11,100	1,350	950
2 or more	2 or more	15,900	11,100	1,750	1,250
1	2 or more	13,300	9,300	1,750	1,250

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

	Approach Volumes	Minimum Volumes	Is Signal Warrant Met?
<b>Warrant 1</b>			
<i>Condition A: Minimum Vehicular Volume</i>			
Major Street	12,150	8,850	
Minor Street*	40	2,650	<b>No</b>
<i>Condition B: Interruption of Continuous Traffic</i>			
Major Street	12,150	13,300	
Minor Street*	40	1,350	<b>No</b>
<i>Combination Warrant</i>			
Major Street	12,150	10,640	
Minor Street*	40	2,120	<b>No</b>

\* Minor street right-turning traffic volumes excluded from calculation

# Traffic Signal Warrant Analysis



Project: 21160 - Home First Molalla  
 Date: 10/5/2021  
 Scenario: Year 2023 Background Plus Site Conditions (PM Peak Hour)

Major Street:	OR 211	Minor Street:	Dixon Avenue
Number of Lanes:	1	Number of Lanes:	1
PM Peak Hour Volumes:	1630	PM Peak Hour Volumes:	48

**Warrant Used:**

    X     100 percent of standard warrants used  
           70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

Number of Lanes for Moving Traffic on Each Approach:		ADT on Major St. (total of both approaches)		ADT on Minor St. (higher-volume approach)	
<u>Major St.</u>	<u>Minor St.</u>	<u>100% Warrants</u>	<u>70% Warrants</u>	<u>100% Warrants</u>	<u>70% Warrants</u>
<b>WARRANT 1, CONDITION A</b>					
1	1	8,850	6,200	2,650	1,850
2 or more	1	10,600	7,400	2,650	1,850
2 or more	2 or more	10,600	7,400	3,550	2,500
1	2 or more	8,850	6,200	3,550	2,500
<b>WARRANT 1, CONDITION B</b>					
1	1	13,300	9,300	1,350	950
2 or more	1	15,900	11,100	1,350	950
2 or more	2 or more	15,900	11,100	1,750	1,250
1	2 or more	13,300	9,300	1,750	1,250

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

	Approach Volumes	Minimum Volumes	Is Signal Warrant Met?
<b>Warrant 1</b>			
<i>Condition A: Minimum Vehicular Volume</i>			
Major Street	16,300	8,850	
Minor Street*	480	2,650	<b>No</b>
<i>Condition B: Interruption of Continuous Traffic</i>			
Major Street	16,300	13,300	
Minor Street*	480	1,350	<b>No</b>
<i>Combination Warrant</i>			
Major Street	16,300	10,640	
Minor Street*	480	2,120	<b>No</b>

\* Minor street right-turning traffic volumes excluded from calculation

## 7. Left-Turn Lane Warrants

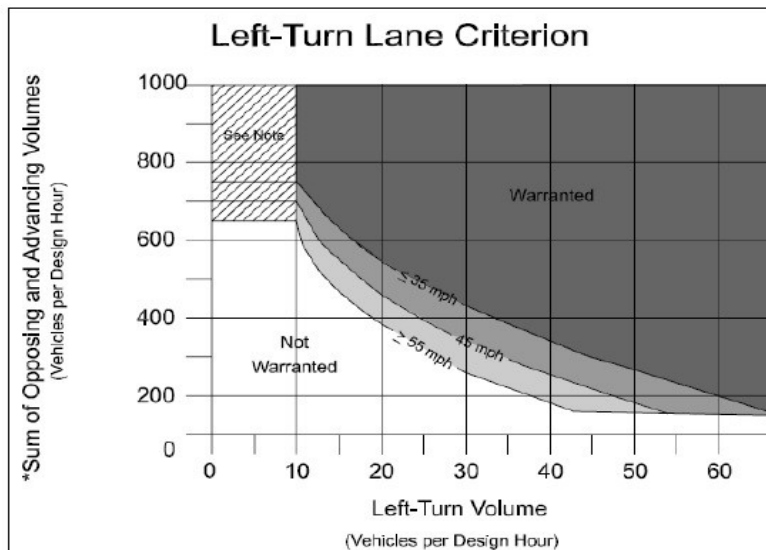




Project: 21160 - Home First Molalla  
 Intersection: OR 211 & S Ona Way (WBL)  
 Date: 10/5/2021  
 Scenario: Year 2023 Background Plus Site Conditions

Speed? 35 mph

<b>AM Peak Hour</b>		<b>PM Peak Hour</b>	
Left-Turn Volume	16	Left-Turn Volume	14
Approaching DHV	710	Approaching DHV	780
# of Advancing Through Lanes	1	# of Advancing Through Lanes	1
Opposing DHV	447	Opposing DHV	880
# of Opposing Through Lanes	1	# of Opposing Through Lanes	1
<b>O+A DHV</b>	<b>1157</b>	<b>O+A DHV</b>	<b>1660</b>
Lane Needed?	<b>Yes</b>	Lane Needed?	<b>Yes</b>



Source: Oregon DOT Analysis Procedures Manual 2008

**\*(Advancing Vol/ # of Advancing Through Lanes)+  
 (Opposing Vol/ # of Opposing Through Lanes)**

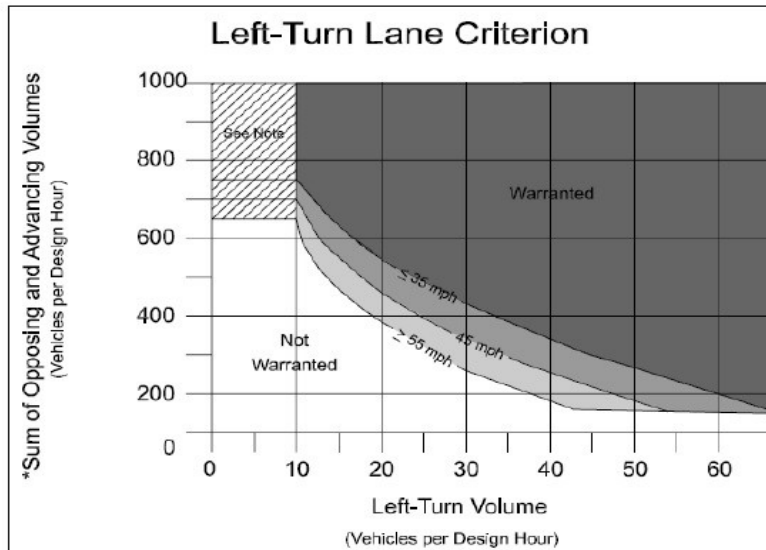
Note: The criterion is not met from zero to ten left turn vehicles per hour, but careful consideration should be given to installing a left turn lane due to the increased potential for accidents in the through lanes. While the turn volumes are low, the adverse safety and operational impacts may require installation of a left turn. The final determination will be based on a field study.



Project: 21160 - Home First Molalla  
 Intersection: OR 211 & Site Access Driveway (WBL)  
 Date: 10/5/2021  
 Scenario: Year 2023 Background Plus Site Conditions

Speed? 35 mph

<b>AM Peak Hour</b>		<b>PM Peak Hour</b>	
Left-Turn Volume	2	Left-Turn Volume	5
Approaching DHV	707	Approaching DHV	775
# of Advancing Through Lanes	1	# of Advancing Through Lanes	1
Opposing DHV	457	Opposing DHV	889
# of Opposing Through Lanes	1	# of Opposing Through Lanes	1
<b>O+A DHV</b>	<b>1164</b>	<b>O+A DHV</b>	<b>1664</b>
Lane Needed?	<b>No</b>	Lane Needed?	<b>No</b>



Source: Oregon DOT Analysis Procedures Manual 2008

**\*(Advancing Vol/ # of Advancing Through Lanes)+  
 (Opposing Vol/ # of Opposing Through Lanes)**

Note: The criterion is not met from zero to ten left turn vehicles per hour, but careful consideration should be given to installing a left turn lane due to the increased potential for accidents in the through lanes. While the turn volumes are low, the adverse safety and operational impacts may require installation of a left turn. The final determination will be based on a field study.

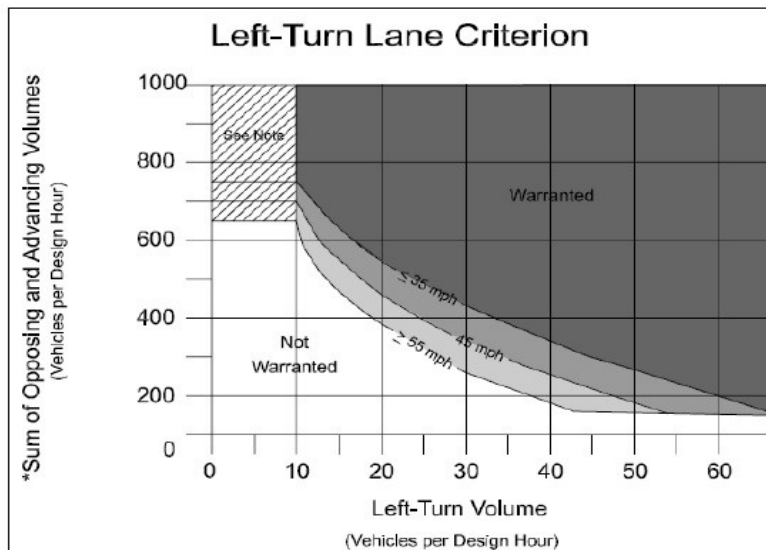




Project: 21160 - Home First Molalla  
 Intersection: OR 211 & Leroy Avenue (WBL)  
 Date: 10/5/2021  
 Scenario: Year 2023 Background Plus Site Conditions

Speed? 35 mph

<b>AM Peak Hour</b>		<b>PM Peak Hour</b>	
Left-Turn Volume	126	Left-Turn Volume	134
Approaching DHV	677	Approaching DHV	808
# of Advancing Through Lanes	1	# of Advancing Through Lanes	1
Opposing DHV	438	Opposing DHV	772
# of Opposing Through Lanes	1	# of Opposing Through Lanes	1
<b>O+A DHV</b>	<b>1115</b>	<b>O+A DHV</b>	<b>1580</b>
Lane Needed?	<b>Yes</b>	Lane Needed?	<b>Yes</b>



Source: Oregon DOT Analysis Procedures Manual 2008

**\*(Advancing Vol/ # of Advancing Through Lanes)+  
 (Opposing Vol/ # of Opposing Through Lanes)**

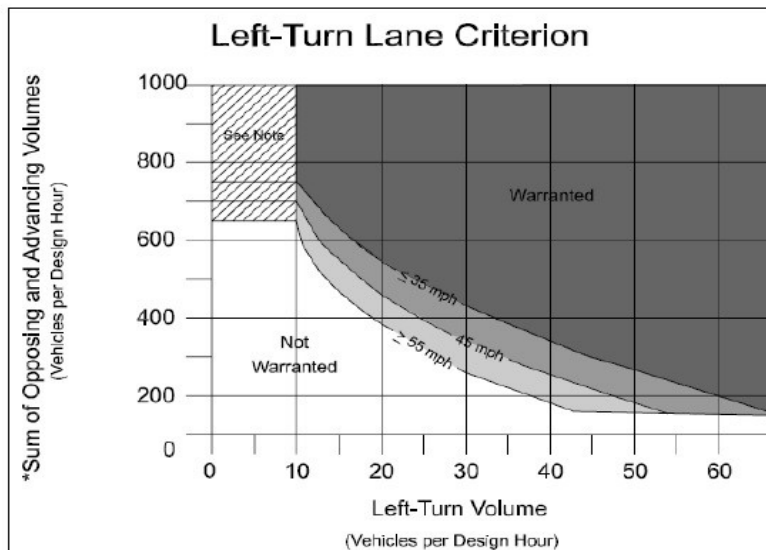
Note: The criterion is not met from zero to ten left turn vehicles per hour, but careful consideration should be given to installing a left turn lane due to the increased potential for accidents in the through lanes. While the turn volumes are low, the adverse safety and operational impacts may require installation of a left turn. The final determination will be based on a field study.



Project: 21160 - Home First Molalla  
 Intersection: OR 211 & Leroy Avenue (EBL)  
 Date: 10/5/2021  
 Scenario: Year 2023 Background Plus Site Conditions

Speed? 35 mph

<b>AM Peak Hour</b>		<b>PM Peak Hour</b>	
Left-Turn Volume	38	Left-Turn Volume	54
Approaching DHV	476	Approaching DHV	826
# of Advancing Through Lanes	1	# of Advancing Through Lanes	1
Opposing DHV	551	Opposing DHV	674
# of Opposing Through Lanes	1	# of Opposing Through Lanes	1
<b>O+A DHV</b>	<b>1027</b>	<b>O+A DHV</b>	<b>1500</b>
Lane Needed?	<b>Yes</b>	Lane Needed?	<b>Yes</b>



Source: Oregon DOT Analysis Procedures Manual 2008

**\*(Advancing Vol/ # of Advancing Through Lanes)+  
 (Opposing Vol/ # of Opposing Through Lanes)**

Note: The criterion is not met from zero to ten left turn vehicles per hour, but careful consideration should be given to installing a left turn lane due to the increased potential for accidents in the through lanes. While the turn volumes are low, the adverse safety and operational impacts may require installation of a left turn. The final determination will be based on a field study.

## 8. LOS Description





## LEVEL OF SERVICE

Level of service is used to describe the quality of traffic flow. Levels of service A to C are considered good, and rural roads are usually designed for level of service C. Urban streets and signalized intersections are typically designed for level of service D. Level of service E is considered to be the limit of acceptable delay. For unsignalized intersections, level of service E is generally considered acceptable. Here is a more complete description of levels of service:

*Level of service A:* Very low delay at intersections, with all traffic signal cycles clearing and no vehicles waiting through more than one signal cycle. On highways, low volume and high speeds, with speeds not restricted by other vehicles.

*Level of service B:* Operating speeds beginning to be affected by other traffic; short traffic delays at intersections. Higher average intersection delay than for level of service A resulting from more vehicles stopping.

*Level of service C:* Operating speeds and maneuverability closely controlled by other traffic; higher delays at intersections than for level of service B due to a significant number of vehicles stopping. Not all signal cycles clear the waiting vehicles. This is the recommended design standard for rural highways.

*Level of service D:* Tolerable operating speeds; long traffic delays occur at intersections. The influence of congestion is noticeable. At traffic signals many vehicles stop, and the proportion of vehicles not stopping declines. The number of signal cycle failures, for which vehicles must wait through more than one signal cycle, are noticeable. This is typically the design level for urban signalized intersections.

*Level of service E:* Restricted speeds, very long traffic delays at traffic signals, and traffic volumes near capacity. Flow is unstable so that any interruption, no matter how minor, will cause queues to form and service to deteriorate to level of service F. Traffic signal cycle failures are frequent occurrences. For unsignalized intersections, level of service E or better is generally considered acceptable.

*Level of service F:* Extreme delays, resulting in long queues which may interfere with other traffic movements. There may be stoppages of long duration, and speeds may drop to zero. There may be frequent signal cycle failures. Level of service F will typically result when vehicle arrival rates are greater than capacity. It is considered unacceptable by most drivers.



*LEVEL OF SERVICE CRITERIA  
FOR SIGNALIZED INTERSECTIONS*

LEVEL OF SERVICE	CONTROL DELAY PER VEHICLE (Seconds)
A	<10
B	10-20
C	20-35
D	35-55
E	55-80
F	>80

*LEVEL OF SERVICE CRITERIA  
FOR UNSIGNALIZED INTERSECTIONS*

LEVEL OF SERVICE	CONTROL DELAY PER VEHICLE (Seconds)
A	<10
B	10-15
C	15-25
D	25-35
E	35-50
F	>50
























# 9. Intersection Capacity Reports



# HCM Signalized Intersection Capacity Analysis

## 1: OR 213 & OR 211

10/06/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	79	157	10	74	213	223	16	235	92	105	123	102
Future Volume (vph)	79	157	10	74	213	223	16	235	92	105	123	102
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1421	1482		1484	1562	1328	1614	1699	1444	1458	1431	
Flt Permitted	0.43	1.00		0.60	1.00	1.00	0.59	1.00	1.00	0.36	1.00	
Satd. Flow (perm)	650	1482		937	1562	1328	1010	1699	1444	558	1431	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	94	187	12	88	254	265	19	280	110	125	146	121
RTOR Reduction (vph)	0	2	0	0	0	192	0	0	78	0	24	0
Lane Group Flow (vph)	94	197	0	88	254	73	19	280	32	125	243	0
Heavy Vehicles (%)	17%	17%	17%	12%	12%	12%	3%	3%	3%	14%	14%	14%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8		8	4		
Actuated Green, G (s)	26.7	20.3		24.1	19.0	19.0	21.7	19.9	19.9	32.0	25.2	
Effective Green, g (s)	28.7	21.3		26.1	20.0	20.0	23.7	20.9	20.9	33.0	26.2	
Actuated g/C Ratio	0.40	0.29		0.36	0.28	0.28	0.33	0.29	0.29	0.46	0.36	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
Lane Grp Cap (vph)	336	436		383	431	366	353	490	416	355	517	
v/s Ratio Prot	c0.03	0.13		0.02	c0.16		0.00	c0.16		c0.04	0.17	
v/s Ratio Perm	0.08			0.06		0.06	0.02		0.02	0.12		
v/c Ratio	0.28	0.45		0.23	0.59	0.20	0.05	0.57	0.08	0.35	0.47	
Uniform Delay, d1	14.4	20.8		15.7	22.6	20.1	16.6	21.9	18.7	12.4	17.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	0.5		0.2	1.7	0.2	0.0	1.3	0.1	0.4	0.5	
Delay (s)	14.7	21.3		16.0	24.4	20.3	16.6	23.3	18.8	12.9	18.3	
Level of Service	B	C		B	C	C	B	C	B	B	B	
Approach Delay (s)		19.2			21.4			21.7			16.5	
Approach LOS		B			C			C			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			20.0	HCM 2000 Level of Service				B				
HCM 2000 Volume to Capacity ratio			0.51									
Actuated Cycle Length (s)			72.4	Sum of lost time (s)				16.0				
Intersection Capacity Utilization			50.0%	ICU Level of Service				A				
Analysis Period (min)			15									
c Critical Lane Group												

# HCM 6th Signalized Intersection Summary

1: OR 213 & OR 211

10/06/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	79	157	10	74	213	223	16	235	92	105	123	102
Future Volume (veh/h)	79	157	10	74	213	223	16	235	92	105	123	102
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1518	1518	1518	1586	1586	1586	1709	1709	1709	1559	1559	1559
Adj Flow Rate, veh/h	94	187	12	88	254	265	19	280	110	125	146	121
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	17	17	17	12	12	12	3	3	3	14	14	14
Cap, veh/h	382	439	28	471	490	415	334	399	338	347	231	192
Arrive On Green	0.08	0.31	0.29	0.08	0.31	0.31	0.04	0.23	0.23	0.10	0.29	0.28
Sat Flow, veh/h	1446	1411	91	1511	1586	1344	1628	1709	1448	1485	788	653
Grp Volume(v), veh/h	94	0	199	88	254	265	19	280	110	125	0	267
Grp Sat Flow(s),veh/h/ln	1446	0	1502	1511	1586	1344	1628	1709	1448	1485	0	1441
Q Serve(g_s), s	2.5	0.0	6.2	2.2	7.7	9.9	0.5	8.8	3.7	3.4	0.0	9.4
Cycle Q Clear(g_c), s	2.5	0.0	6.2	2.2	7.7	9.9	0.5	8.8	3.7	3.4	0.0	9.4
Prop In Lane	1.00		0.06	1.00		1.00	1.00		1.00	1.00		0.45
Lane Grp Cap(c), veh/h	382	0	467	471	490	415	334	399	338	347	0	423
V/C Ratio(X)	0.25	0.00	0.43	0.19	0.52	0.64	0.06	0.70	0.33	0.36	0.00	0.63
Avail Cap(c_a), veh/h	533	0	1207	554	1193	1011	464	1110	941	477	0	1035
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.1	0.0	16.0	11.9	16.6	17.4	15.9	20.6	18.6	14.2	0.0	18.1
Incr Delay (d2), s/veh	0.2	0.0	0.5	0.1	0.6	1.2	0.1	1.7	0.4	0.5	0.0	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	2.0	0.6	2.5	2.8	0.2	3.3	1.1	1.0	0.0	2.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.3	0.0	16.5	12.0	17.3	18.6	16.0	22.2	19.0	14.6	0.0	19.3
LnGrp LOS	B	A	B	B	B	B	B	C	B	B	A	B
Approach Vol, veh/h		293			607			409			392	
Approach Delay, s/veh		15.2			17.1			21.1			17.8	
Approach LOS		B			B			C			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.8	22.2	6.3	21.2	8.9	22.1	9.9	17.7				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	7.0	46.0	6.0	41.0	10.0	43.0	10.0	37.0				
Max Q Clear Time (g_c+I1), s	4.2	8.2	2.5	11.4	4.5	11.9	5.4	10.8				
Green Ext Time (p_c), s	0.1	2.3	0.0	1.1	0.1	5.1	0.1	1.9				

## Intersection Summary

HCM 6th Ctrl Delay	17.9
HCM 6th LOS	B

## Notes

User approved pedestrian interval to be less than phase max green.



Intersection						
Int Delay, s/veh	0.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	351	3	15	605	10	19
Future Vol, veh/h	351	3	15	605	10	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	10	10	10	10	0	0
Mvmt Flow	433	4	19	747	12	23

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	437	0	1220
Stage 1	-	-	-	-	435
Stage 2	-	-	-	-	785
Critical Hdwy	-	-	4.2	-	6.4
Critical Hdwy Stg 1	-	-	-	-	5.4
Critical Hdwy Stg 2	-	-	-	-	5.4
Follow-up Hdwy	-	-	2.29	-	3.5
Pot Cap-1 Maneuver	-	-	1081	-	201
Stage 1	-	-	-	-	657
Stage 2	-	-	-	-	453
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1081	-	195
Mov Cap-2 Maneuver	-	-	-	-	195
Stage 1	-	-	-	-	657
Stage 2	-	-	-	-	439

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	16.3
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	355	-	-	1081	-
HCM Lane V/C Ratio	0.101	-	-	0.017	-
HCM Control Delay (s)	16.3	-	-	8.4	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0.1	-

HCM 6th TWSC  
3: Home First Driveway & OR 211

10/06/2021

Intersection						
Int Delay, s/veh	0					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	370	0	0	620	1	0
Future Vol, veh/h	370	0	0	620	1	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	10	10	10	10	0	0
Mvmt Flow	457	0	0	765	1	0

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	457	0	1222
Stage 1	-	-	-	-	457
Stage 2	-	-	-	-	765
Critical Hdwy	-	-	4.2	-	6.4
Critical Hdwy Stg 1	-	-	-	-	5.4
Critical Hdwy Stg 2	-	-	-	-	5.4
Follow-up Hdwy	-	-	2.29	-	3.5
Pot Cap-1 Maneuver	-	-	1063	-	200
Stage 1	-	-	-	-	642
Stage 2	-	-	-	-	463
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1063	-	200
Mov Cap-2 Maneuver	-	-	-	-	200
Stage 1	-	-	-	-	642
Stage 2	-	-	-	-	463

Approach	EB	WB	NB
HCM Control Delay, s	0	0	23.1
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	200	-	-	1063	-
HCM Lane V/C Ratio	0.006	-	-	-	-
HCM Control Delay (s)	23.1	-	-	0	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection												
Int Delay, s/veh	4.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	36	358	0	13	449	68	1	0	4	40	1	99
Future Vol, veh/h	36	358	0	13	449	68	1	0	4	40	1	99
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	9	9	9	9	9	9	50	50	50	11	11	11
Mvmt Flow	44	437	0	16	548	83	1	0	5	49	1	121

Major/Minor	Major1		Major2		Minor1		Minor2					
Conflicting Flow All	631	0	-	437	0	0	1208	1188	437	1150	1147	590
Stage 1	-	-	-	-	-	-	525	525	-	622	622	-
Stage 2	-	-	-	-	-	-	683	663	-	528	525	-
Critical Hdwy	4.19	-	-	4.19	-	-	7.6	7	6.7	7.21	6.61	6.31
Critical Hdwy Stg 1	-	-	-	-	-	-	6.6	6	-	6.21	5.61	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.6	6	-	6.21	5.61	-
Follow-up Hdwy	2.281	-	-	2.281	-	-	3.95	4.45	3.75	3.599	4.099	3.399
Pot Cap-1 Maneuver	919	-	0	1086	-	-	128	153	530	168	191	491
Stage 1	-	-	0	-	-	-	458	458	-	459	465	-
Stage 2	-	-	0	-	-	-	370	393	-	518	515	-
Platoon blocked, %		-			-	-						
Mov Cap-1 Maneuver	919	-	-	1086	-	-	90	140	530	156	175	491
Mov Cap-2 Maneuver	-	-	-	-	-	-	90	140	-	156	175	-
Stage 1	-	-	-	-	-	-	429	429	-	430	454	-
Stage 2	-	-	-	-	-	-	272	384	-	481	483	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	0.8		0.2		18.7		31.4	
HCM LOS					C		D	

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	268	919	-	1086	-	-	302
HCM Lane V/C Ratio	0.023	0.048	-	0.015	-	-	0.565
HCM Control Delay (s)	18.7	9.1	0	8.4	-	-	31.4
HCM Lane LOS	C	A	A	A	-	-	D
HCM 95th %tile Q(veh)	0.1	0.1	-	0	-	-	3.3

HCM 6th TWSC  
5: S Lowe Road & OR 211

10/06/2021

Intersection												
Int Delay, s/veh	0.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑	↗	↖	↗			↕			↕	
Traffic Vol, veh/h	8	399	8	8	506	4	1	0	1	3	0	4
Future Vol, veh/h	8	399	8	8	506	4	1	0	1	3	0	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	80	-	120	145	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	9	9	9	10	10	10	0	0	0	40	40	40
Mvmt Flow	9	459	9	9	582	5	1	0	1	3	0	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	587	0	0	468	0	0	1082	1082	459	1085	1089	585
Stage 1	-	-	-	-	-	-	477	477	-	603	603	-
Stage 2	-	-	-	-	-	-	605	605	-	482	486	-
Critical Hdwy	4.19	-	-	4.2	-	-	7.1	6.5	6.2	7.5	6.9	6.6
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.5	5.9	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.5	5.9	-
Follow-up Hdwy	2.281	-	-	2.29	-	-	3.5	4	3.3	3.86	4.36	3.66
Pot Cap-1 Maneuver	954	-	-	1053	-	-	197	219	606	165	184	446
Stage 1	-	-	-	-	-	-	573	559	-	426	433	-
Stage 2	-	-	-	-	-	-	488	491	-	500	493	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	954	-	-	1053	-	-	192	215	606	162	181	446
Mov Cap-2 Maneuver	-	-	-	-	-	-	192	215	-	162	181	-
Stage 1	-	-	-	-	-	-	568	554	-	422	429	-
Stage 2	-	-	-	-	-	-	479	487	-	494	489	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.2			0.1			17.4			19.6		
HCM LOS							C			C		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	292	954	-	-	1053	-	-	255
HCM Lane V/C Ratio	0.008	0.01	-	-	0.009	-	-	0.032
HCM Control Delay (s)	17.4	8.8	-	-	8.4	-	-	19.6
HCM Lane LOS	C	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0.1

# HCM Signalized Intersection Capacity Analysis

## 1: OR 213 & OR 211

10/06/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	149	257	15	144	237	160	23	216	108	242	243	124	
Future Volume (vph)	149	257	15	144	237	160	23	216	108	242	243	124	
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95		
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1599	1669		1583	1667	1417	1614	1699	1444	1583	1582		
Flt Permitted	0.35	1.00		0.40	1.00	1.00	0.47	1.00	1.00	0.40	1.00		
Satd. Flow (perm)	595	1669		660	1667	1417	803	1699	1444	664	1582		
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	
Adj. Flow (vph)	169	292	17	164	269	182	26	245	123	275	276	141	
RTOR Reduction (vph)	0	2	0	0	0	138	0	0	89	0	15	0	
Lane Group Flow (vph)	169	307	0	164	269	44	26	245	34	275	402	0	
Heavy Vehicles (%)	4%	4%	4%	5%	5%	5%	3%	3%	3%	5%	5%	5%	
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		
Protected Phases	5	2		1	6		3	8		7	4		
Permitted Phases	2			6		6	8		8	4			
Actuated Green, G (s)	30.2	20.7		26.0	18.6	18.6	23.4	21.5	21.5	37.2	30.3		
Effective Green, g (s)	32.2	21.7		28.0	19.6	19.6	25.4	22.5	22.5	38.2	31.3		
Actuated g/C Ratio	0.40	0.27		0.35	0.24	0.24	0.32	0.28	0.28	0.48	0.39		
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5		
Lane Grp Cap (vph)	369	451		326	406	345	283	476	404	449	616		
v/s Ratio Prot	c0.06	c0.18		0.05	0.16		0.00	0.14		c0.09	c0.25		
v/s Ratio Perm	0.12			0.12		0.03	0.03		0.02	0.20			
v/c Ratio	0.46	0.68		0.50	0.66	0.13	0.09	0.51	0.09	0.61	0.65		
Uniform Delay, d1	16.7	26.2		19.3	27.4	23.7	19.1	24.3	21.3	14.1	20.1		
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.7	3.8		0.9	3.6	0.1	0.1	0.7	0.1	2.1	2.2		
Delay (s)	17.3	30.0		20.2	31.0	23.8	19.2	25.0	21.4	16.2	22.3		
Level of Service	B	C		C	C	C	B	C	C	B	C		
Approach Delay (s)		25.5			26.0			23.5			19.9		
Approach LOS		C			C			C			B		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			23.5									HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.68										
Actuated Cycle Length (s)			80.3									Sum of lost time (s)	16.0
Intersection Capacity Utilization			64.6%									ICU Level of Service	C
Analysis Period (min)			15										
c Critical Lane Group													

# HCM 6th Signalized Intersection Summary

1: OR 213 & OR 211

10/06/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	149	257	15	144	237	160	23	216	108	242	243	124
Future Volume (veh/h)	149	257	15	144	237	160	23	216	108	242	243	124
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1695	1695	1695	1682	1682	1682	1709	1709	1709	1682	1682	1682
Adj Flow Rate, veh/h	169	292	17	164	269	182	26	245	123	275	276	141
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	4	4	4	5	5	5	3	3	3	5	5	5
Cap, veh/h	413	426	25	398	445	377	270	353	299	452	347	177
Arrive On Green	0.12	0.27	0.25	0.11	0.26	0.26	0.04	0.21	0.21	0.17	0.33	0.32
Sat Flow, veh/h	1615	1586	92	1602	1682	1425	1628	1709	1448	1602	1049	536
Grp Volume(v), veh/h	169	0	309	164	269	182	26	245	123	275	0	417
Grp Sat Flow(s),veh/h/ln	1615	0	1679	1602	1682	1425	1628	1709	1448	1602	0	1585
Q Serve(g_s), s	4.7	0.0	10.8	4.6	9.2	7.0	0.8	8.7	4.8	8.1	0.0	15.6
Cycle Q Clear(g_c), s	4.7	0.0	10.8	4.6	9.2	7.0	0.8	8.7	4.8	8.1	0.0	15.6
Prop In Lane	1.00		0.06	1.00		1.00	1.00		1.00	1.00		0.34
Lane Grp Cap(c), veh/h	413	0	451	398	445	377	270	353	299	452	0	524
V/C Ratio(X)	0.41	0.00	0.69	0.41	0.60	0.48	0.10	0.69	0.41	0.61	0.00	0.80
Avail Cap(c_a), veh/h	497	0	1207	414	1132	960	372	994	842	453	0	1019
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.8	0.0	21.5	15.2	21.0	20.3	19.1	24.0	22.5	15.2	0.0	20.0
Incr Delay (d2), s/veh	0.5	0.0	1.4	0.5	1.0	0.7	0.1	1.8	0.7	2.1	0.0	2.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.0	4.1	1.6	3.4	2.2	0.3	3.4	1.6	2.8	0.0	5.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.3	0.0	22.8	15.7	22.0	21.0	19.2	25.8	23.2	17.2	0.0	22.1
LnGrp LOS	B	A	C	B	C	C	B	C	C	B	A	C
Approach Vol, veh/h		478			615			394			692	
Approach Delay, s/veh		20.2			20.0			24.6			20.2	
Approach LOS		C			C			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.3	21.5	6.9	25.6	11.6	21.3	15.0	17.5				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	7.0	46.0	6.0	41.0	10.0	43.0	10.0	37.0				
Max Q Clear Time (g_c+I1), s	6.6	12.8	2.8	17.6	6.7	11.2	10.1	10.7				
Green Ext Time (p_c), s	0.0	3.7	0.0	1.8	0.2	4.5	0.0	1.8				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay			20.9									
HCM 6th LOS			C									
<b>Notes</b>												
User approved pedestrian interval to be less than phase max green.												

Intersection						
Int Delay, s/veh	0.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	743	11	13	661	10	17
Future Vol, veh/h	743	11	13	661	10	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	2	3	3	0	0
Mvmt Flow	874	13	15	778	12	20

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	887	0	1689 881
Stage 1	-	-	-	-	881 -
Stage 2	-	-	-	-	808 -
Critical Hdwy	-	-	4.13	-	6.4 6.2
Critical Hdwy Stg 1	-	-	-	-	5.4 -
Critical Hdwy Stg 2	-	-	-	-	5.4 -
Follow-up Hdwy	-	-	2.227	-	3.5 3.3
Pot Cap-1 Maneuver	-	-	759	-	104 349
Stage 1	-	-	-	-	408 -
Stage 2	-	-	-	-	442 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	759	-	100 349
Mov Cap-2 Maneuver	-	-	-	-	100 -
Stage 1	-	-	-	-	408 -
Stage 2	-	-	-	-	427 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	28.9
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	182	-	-	759	-
HCM Lane V/C Ratio	0.175	-	-	0.02	-
HCM Control Delay (s)	28.9	-	-	9.8	0
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	0.6	-	-	0.1	-

HCM 6th TWSC  
3: Home First Driveway & OR 211

10/06/2021

Intersection						
Int Delay, s/veh	0					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	759	1	0	674	0	0
Future Vol, veh/h	759	1	0	674	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	2	3	3	0	0
Mvmt Flow	893	1	0	793	0	0

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	894	0	1687
Stage 1	-	-	-	-	894
Stage 2	-	-	-	-	793
Critical Hdwy	-	-	4.13	-	6.4
Critical Hdwy Stg 1	-	-	-	-	5.4
Critical Hdwy Stg 2	-	-	-	-	5.4
Follow-up Hdwy	-	-	2.227	-	3.5
Pot Cap-1 Maneuver	-	-	755	-	104
Stage 1	-	-	-	-	403
Stage 2	-	-	-	-	449
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	755	-	104
Mov Cap-2 Maneuver	-	-	-	-	104
Stage 1	-	-	-	-	403
Stage 2	-	-	-	-	449

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	755	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-



HCM 6th TWSC  
4: OR 211 & Leroy Avenue

10/06/2021

Intersection												
Int Delay, s/veh	6.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	52	655	2	29	591	35	15	8	41	21	6	76
Future Vol, veh/h	52	655	2	29	591	35	15	8	41	21	6	76
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	0	0	0	2	2	2
Mvmt Flow	58	728	2	32	657	39	17	9	46	23	7	84

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	696	0	0	730	0	0	1631	1605	729	1614	1587	677
Stage 1	-	-	-	-	-	-	845	845	-	741	741	-
Stage 2	-	-	-	-	-	-	786	760	-	873	846	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.1	6.5	6.2	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.5	4	3.3	3.518	4.018	3.318
Pot Cap-1 Maneuver	900	-	-	874	-	-	82	106	426	84	108	453
Stage 1	-	-	-	-	-	-	360	382	-	408	423	-
Stage 2	-	-	-	-	-	-	388	417	-	345	378	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	900	-	-	874	-	-	55	89	426	61	91	453
Mov Cap-2 Maneuver	-	-	-	-	-	-	55	89	-	61	91	-
Stage 1	-	-	-	-	-	-	321	341	-	364	398	-
Stage 2	-	-	-	-	-	-	292	392	-	268	337	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.7			0.4			55.3			55.8		
HCM LOS							F			F		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	139	900	-	-	874	-	-	178
HCM Lane V/C Ratio	0.512	0.064	-	-	0.037	-	-	0.643
HCM Control Delay (s)	55.3	9.3	0	-	9.3	-	-	55.8
HCM Lane LOS	F	A	A	-	A	-	-	F
HCM 95th %tile Q(veh)	2.4	0.2	-	-	0.1	-	-	3.7

HCM 6th TWSC  
5: S Lowe Road & OR 211

10/06/2021

Intersection												
Int Delay, s/veh	7.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	585	82	41	566	1	64	5	46	4	0	6
Future Vol, veh/h	8	585	82	41	566	1	64	5	46	4	0	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	80	-	120	145	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	3	3	3	0	0	0	13	13	13
Mvmt Flow	9	665	93	47	643	1	73	6	52	5	0	7

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	644	0	0	758	0	0	1424	1421	665	1497	1514	644
Stage 1	-	-	-	-	-	-	683	683	-	738	738	-
Stage 2	-	-	-	-	-	-	741	738	-	759	776	-
Critical Hdwy	4.12	-	-	4.13	-	-	7.1	6.5	6.2	7.23	6.63	6.33
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.23	5.63	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.23	5.63	-
Follow-up Hdwy	2.218	-	-	2.227	-	-	3.5	4	3.3	3.617	4.117	3.417
Pot Cap-1 Maneuver	941	-	-	849	-	-	115	138	464	95	113	454
Stage 1	-	-	-	-	-	-	442	452	-	393	408	-
Stage 2	-	-	-	-	-	-	411	427	-	383	392	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	941	-	-	849	-	-	108	129	464	78	106	454
Mov Cap-2 Maneuver	-	-	-	-	-	-	108	129	-	78	106	-
Stage 1	-	-	-	-	-	-	438	447	-	389	386	-
Stage 2	-	-	-	-	-	-	382	404	-	332	388	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			0.6			90.3			30.1		
HCM LOS							F			D		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	157	941	-	-	849	-	-	155
HCM Lane V/C Ratio	0.832	0.01	-	-	0.055	-	-	0.073
HCM Control Delay (s)	90.3	8.9	-	-	9.5	-	-	30.1
HCM Lane LOS	F	A	-	-	A	-	-	D
HCM 95th %tile Q(veh)	5.5	0	-	-	0.2	-	-	0.2

# HCM Signalized Intersection Capacity Analysis

## 1: OR 213 & OR 211

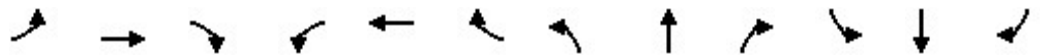
10/06/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	83	185	11	96	242	252	19	249	120	131	130	107	
Future Volume (vph)	83	185	11	96	242	252	19	249	120	131	130	107	
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93		
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1421	1483		1484	1562	1328	1614	1699	1444	1458	1431		
Flt Permitted	0.36	1.00		0.52	1.00	1.00	0.59	1.00	1.00	0.35	1.00		
Satd. Flow (perm)	541	1483		820	1562	1328	997	1699	1444	530	1431		
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	
Adj. Flow (vph)	99	220	13	114	288	300	23	296	143	156	155	127	
RTOR Reduction (vph)	0	2	0	0	0	221	0	0	101	0	23	0	
Lane Group Flow (vph)	99	231	0	114	288	79	23	296	42	156	259	0	
Heavy Vehicles (%)	17%	17%	17%	12%	12%	12%	3%	3%	3%	14%	14%	14%	
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		
Protected Phases	5	2		1	6		3	8		7	4		
Permitted Phases	2			6		6	8		8	4			
Actuated Green, G (s)	28.0	21.3		25.2	19.9	19.9	24.1	22.2	22.2	37.4	30.5		
Effective Green, g (s)	30.0	22.3		27.2	20.9	20.9	26.1	23.2	23.2	38.4	31.5		
Actuated g/C Ratio	0.38	0.28		0.34	0.26	0.26	0.33	0.29	0.29	0.49	0.40		
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5		
Lane Grp Cap (vph)	291	418		335	413	351	352	498	424	389	570		
v/s Ratio Prot	c0.03	0.16		0.03	c0.18		0.00	c0.17		c0.06	0.18		
v/s Ratio Perm	0.10			0.09		0.06	0.02		0.03	0.14			
v/c Ratio	0.34	0.55		0.34	0.70	0.23	0.07	0.59	0.10	0.40	0.45		
Uniform Delay, d1	16.8	24.1		18.5	26.2	22.7	18.0	23.9	20.3	12.6	17.4		
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.5	1.3		0.4	4.7	0.2	0.1	1.6	0.1	0.5	0.4		
Delay (s)	17.4	25.4		18.9	30.9	23.0	18.0	25.5	20.4	13.1	17.9		
Level of Service	B	C		B	C	C	B	C	C	B	B		
Approach Delay (s)		23.0			25.6			23.5			16.2		
Approach LOS		C			C			C			B		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			22.5									HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.57										
Actuated Cycle Length (s)			79.0									Sum of lost time (s)	16.0
Intersection Capacity Utilization			54.3%									ICU Level of Service	A
Analysis Period (min)			15										
c Critical Lane Group													

# HCM 6th Signalized Intersection Summary

1: OR 213 & OR 211

10/06/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↷		↶	↷	↷	↶	↷	↷	↶	↷	↷
Traffic Volume (veh/h)	83	185	11	96	242	252	19	249	120	131	130	107
Future Volume (veh/h)	83	185	11	96	242	252	19	249	120	131	130	107
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1518	1518	1518	1586	1586	1586	1709	1709	1709	1559	1559	1559
Adj Flow Rate, veh/h	99	220	13	114	288	300	23	296	143	156	155	127
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	17	17	17	12	12	12	3	3	3	14	14	14
Cap, veh/h	353	455	27	444	518	439	331	407	345	346	246	202
Arrive On Green	0.08	0.32	0.31	0.08	0.33	0.33	0.04	0.24	0.24	0.11	0.31	0.30
Sat Flow, veh/h	1446	1419	84	1511	1586	1344	1628	1709	1448	1485	793	649
Grp Volume(v), veh/h	99	0	233	114	288	300	23	296	143	156	0	282
Grp Sat Flow(s),veh/h/ln	1446	0	1503	1511	1586	1344	1628	1709	1448	1485	0	1442
Q Serve(g_s), s	2.9	0.0	8.2	3.2	9.9	12.8	0.7	10.5	5.5	4.8	0.0	11.1
Cycle Q Clear(g_c), s	2.9	0.0	8.2	3.2	9.9	12.8	0.7	10.5	5.5	4.8	0.0	11.1
Prop In Lane	1.00		0.06	1.00		1.00	1.00		1.00	1.00		0.45
Lane Grp Cap(c), veh/h	353	0	482	444	518	439	331	407	345	346	0	448
V/C Ratio(X)	0.28	0.00	0.48	0.26	0.56	0.68	0.07	0.73	0.41	0.45	0.00	0.63
Avail Cap(c_a), veh/h	479	0	1069	499	1056	895	437	983	833	424	0	917
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.6	0.0	18.1	13.2	18.3	19.3	17.7	23.2	21.3	15.5	0.0	19.7
Incr Delay (d2), s/veh	0.3	0.0	0.6	0.2	0.7	1.4	0.1	1.9	0.6	0.7	0.0	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	2.7	1.0	3.3	3.7	0.2	4.1	1.8	1.5	0.0	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.9	0.0	18.6	13.4	19.0	20.7	17.8	25.1	21.9	16.2	0.0	20.8
LnGrp LOS	B	A	B	B	B	C	B	C	C	B	A	C
Approach Vol, veh/h		332			702			462				438
Approach Delay, s/veh		17.2			18.8			23.7				19.2
Approach LOS		B			B			C				B
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.6	25.2	6.7	24.5	9.2	25.6	11.5	19.7				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	7.0	46.0	6.0	41.0	10.0	43.0	10.0	37.0				
Max Q Clear Time (g_c+I1), s	5.2	10.2	2.7	13.1	4.9	14.8	6.8	12.5				
Green Ext Time (p_c), s	0.1	2.8	0.0	1.2	0.1	5.8	0.1	2.2				

## Intersection Summary

HCM 6th Ctrl Delay	19.8
HCM 6th LOS	B

## Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	0.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	433	3	16	690	10	20
Future Vol, veh/h	433	3	16	690	10	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	10	10	10	10	0	0
Mvmt Flow	535	4	20	852	12	25

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	539	0	1429
Stage 1	-	-	-	-	537
Stage 2	-	-	-	-	892
Critical Hdwy	-	-	4.2	-	6.4
Critical Hdwy Stg 1	-	-	-	-	5.4
Critical Hdwy Stg 2	-	-	-	-	5.4
Follow-up Hdwy	-	-	2.29	-	3.5
Pot Cap-1 Maneuver	-	-	990	-	150
Stage 1	-	-	-	-	590
Stage 2	-	-	-	-	404
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	990	-	144
Mov Cap-2 Maneuver	-	-	-	-	144
Stage 1	-	-	-	-	590
Stage 2	-	-	-	-	389

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	19.6
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	283	-	-	990	-
HCM Lane V/C Ratio	0.131	-	-	0.02	-
HCM Control Delay (s)	19.6	-	-	8.7	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.4	-	-	0.1	-

Intersection						
Int Delay, s/veh	0					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	453	0	0	705	1	0
Future Vol, veh/h	453	0	0	705	1	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	10	10	10	10	0	0
Mvmt Flow	559	0	0	870	1	0

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	559	0	1429
Stage 1	-	-	-	-	559
Stage 2	-	-	-	-	870
Critical Hdwy	-	-	4.2	-	6.4
Critical Hdwy Stg 1	-	-	-	-	5.4
Critical Hdwy Stg 2	-	-	-	-	5.4
Follow-up Hdwy	-	-	2.29	-	3.5
Pot Cap-1 Maneuver	-	-	973	-	150
Stage 1	-	-	-	-	576
Stage 2	-	-	-	-	413
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	973	-	150
Mov Cap-2 Maneuver	-	-	-	-	150
Stage 1	-	-	-	-	576
Stage 2	-	-	-	-	413

Approach	EB	WB	NB
HCM Control Delay, s	0	0	29.2
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	150	-	-	973	-
HCM Lane V/C Ratio	0.008	-	-	-	-
HCM Control Delay (s)	29.2	-	-	0	-
HCM Lane LOS	D	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

HCM 6th TWSC  
4: OR 211 & Leroy Avenue

10/06/2021

Intersection												
Int Delay, s/veh	32.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Vol, veh/h	38	385	48	126	478	71	62	9	95	42	10	105
Future Vol, veh/h	38	385	48	126	478	71	62	9	95	42	10	105
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	9	9	9	9	9	9	5	5	5	11	11	11
Mvmt Flow	46	470	59	154	583	87	76	11	116	51	12	128

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	670	0	0	529	0	0	1597	1570	500	1590	1556	627
Stage 1	-	-	-	-	-	-	592	592	-	935	935	-
Stage 2	-	-	-	-	-	-	1005	978	-	655	621	-
Critical Hdwy	4.19	-	-	4.19	-	-	7.15	6.55	6.25	7.21	6.61	6.31
Critical Hdwy Stg 1	-	-	-	-	-	-	6.15	5.55	-	6.21	5.61	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.15	5.55	-	6.21	5.61	-
Follow-up Hdwy	2.281	-	-	2.281	-	-	3.545	4.045	3.345	3.599	4.099	3.399
Pot Cap-1 Maneuver	888	-	-	1004	-	-	84	109	565	83	108	468
Stage 1	-	-	-	-	-	-	487	489	-	307	332	-
Stage 2	-	-	-	-	-	-	287	325	-	440	465	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	888	-	-	1004	-	-	~ 46	88	565	~ 51	87	468
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 46	88	-	~ 51	87	-
Stage 1	-	-	-	-	-	-	462	464	-	291	281	-
Stage 2	-	-	-	-	-	-	169	275	-	324	441	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.7			1.7			201.9			85		
HCM LOS							F			F		

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	46	385	888	-	-	1004	-	-	51	339
HCM Lane V/C Ratio	1.644	0.329	0.052	-	-	0.153	-	-	1.004	0.414
HCM Control Delay (s)	\$ 508.9	18.9	9.3	-	-	9.2	-	-	255.2	22.9
HCM Lane LOS	F	C	A	-	-	A	-	-	F	C
HCM 95th %tile Q(veh)	7.5	1.4	0.2	-	-	0.5	-	-	4.4	2

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

HCM 6th TWSC  
5: S Lowe Road/Dixon Avenue & OR 211

10/06/2021

Intersection												
Int Delay, s/veh	0.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑	↗	↖	↑	↗		↕			↕	
Traffic Vol, veh/h	8	526	8	8	654	4	1	0	1	3	0	4
Future Vol, veh/h	8	526	8	8	654	4	1	0	1	3	0	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	80	-	120	145	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	9	9	9	10	10	10	0	0	0	40	40	40
Mvmt Flow	9	605	9	9	752	5	1	0	1	3	0	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	757	0	0	614	0	0	1398	1398	605	1401	1405	755
Stage 1	-	-	-	-	-	-	623	623	-	773	773	-
Stage 2	-	-	-	-	-	-	775	775	-	628	632	-
Critical Hdwy	4.19	-	-	4.2	-	-	7.1	6.5	6.2	7.5	6.9	6.6
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.5	5.9	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.5	5.9	-
Follow-up Hdwy	2.281	-	-	2.29	-	-	3.5	4	3.3	3.86	4.36	3.66
Pot Cap-1 Maneuver	823	-	-	928	-	-	119	142	501	97	116	353
Stage 1	-	-	-	-	-	-	477	481	-	340	358	-
Stage 2	-	-	-	-	-	-	394	411	-	412	419	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	823	-	-	928	-	-	116	139	501	95	114	353
Mov Cap-2 Maneuver	-	-	-	-	-	-	116	139	-	95	114	-
Stage 1	-	-	-	-	-	-	472	476	-	336	354	-
Stage 2	-	-	-	-	-	-	385	407	-	407	414	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			0.1			24.4			28.2		
HCM LOS							C			D		
























Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	188	823	-	-	928	-	-	163
HCM Lane V/C Ratio	0.012	0.011	-	-	0.01	-	-	0.049
HCM Control Delay (s)	24.4	9.4	-	-	8.9	-	-	28.2
HCM Lane LOS		C	A	-	-	A	-	D
HCM 95th %tile Q(veh)		0	0	-	-	0	-	0.2



# HCM Signalized Intersection Capacity Analysis

## 1: OR 213 & OR 211

10/06/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	156	297	18	174	269	188	26	228	141	281	257	130
Future Volume (vph)	156	297	18	174	269	188	26	228	141	281	257	130
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1599	1669		1583	1667	1417	1614	1699	1444	1583	1583	
Flt Permitted	0.31	1.00		0.32	1.00	1.00	0.40	1.00	1.00	0.39	1.00	
Satd. Flow (perm)	520	1669		534	1667	1417	674	1699	1444	645	1583	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	177	338	20	198	306	214	30	259	160	319	292	148
RTOR Reduction (vph)	0	2	0	0	0	159	0	0	114	0	14	0
Lane Group Flow (vph)	177	356	0	198	306	55	30	259	46	319	426	0
Heavy Vehicles (%)	4%	4%	4%	5%	5%	5%	3%	3%	3%	5%	5%	5%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8		8	4		
Actuated Green, G (s)	32.3	22.7		28.1	20.6	20.6	26.5	23.4	23.4	39.1	31.0	
Effective Green, g (s)	34.3	23.7		30.1	21.6	21.6	28.5	24.4	24.4	40.1	32.0	
Actuated g/C Ratio	0.41	0.28		0.36	0.26	0.26	0.34	0.29	0.29	0.48	0.38	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
Lane Grp Cap (vph)	347	469		296	427	363	273	491	417	437	600	
v/s Ratio Prot	c0.06	c0.21		c0.07	0.18		0.01	0.15		c0.10	0.27	
v/s Ratio Perm	0.14			0.17		0.04	0.03		0.03	c0.25		
v/c Ratio	0.51	0.76		0.67	0.72	0.15	0.11	0.53	0.11	0.73	0.71	
Uniform Delay, d1	17.5	27.7		20.5	28.6	24.3	19.0	25.1	22.0	15.4	22.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.9	6.6		5.1	5.3	0.1	0.1	0.8	0.1	5.7	3.6	
Delay (s)	18.5	34.3		25.6	33.8	24.4	19.1	25.9	22.1	21.1	25.8	
Level of Service	B	C		C	C	C	B	C	C	C	C	
Approach Delay (s)		29.1			28.8			24.1			23.8	
Approach LOS		C			C			C			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			26.4		HCM 2000 Level of Service					C		
HCM 2000 Volume to Capacity ratio			0.77									
Actuated Cycle Length (s)			84.3		Sum of lost time (s)					16.0		
Intersection Capacity Utilization			71.9%		ICU Level of Service					C		
Analysis Period (min)			15									
c	Critical Lane Group											

# HCM 6th Signalized Intersection Summary

1: OR 213 & OR 211

10/06/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	156	297	18	174	269	188	26	228	141	281	257	130
Future Volume (veh/h)	156	297	18	174	269	188	26	228	141	281	257	130
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1695	1695	1695	1682	1682	1682	1709	1709	1709	1682	1682	1682
Adj Flow Rate, veh/h	177	338	20	198	306	214	30	259	160	319	292	148
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	4	4	4	5	5	5	3	3	3	5	5	5
Cap, veh/h	401	466	28	381	490	415	237	373	316	420	343	174
Arrive On Green	0.11	0.29	0.28	0.11	0.29	0.29	0.05	0.22	0.22	0.15	0.33	0.31
Sat Flow, veh/h	1615	1585	94	1602	1682	1425	1628	1709	1448	1602	1052	533
Grp Volume(v), veh/h	177	0	358	198	306	214	30	259	160	319	0	440
Grp Sat Flow(s),veh/h/ln	1615	0	1679	1602	1682	1425	1628	1709	1448	1602	0	1586
Q Serve(g_s), s	5.3	0.0	13.7	6.0	11.3	9.0	1.0	10.0	7.0	10.7	0.0	18.6
Cycle Q Clear(g_c), s	5.3	0.0	13.7	6.0	11.3	9.0	1.0	10.0	7.0	10.7	0.0	18.6
Prop In Lane	1.00		0.06	1.00		1.00	1.00		1.00	1.00		0.34
Lane Grp Cap(c), veh/h	401	0	494	381	490	415	237	373	316	420	0	518
V/C Ratio(X)	0.44	0.00	0.73	0.52	0.62	0.52	0.13	0.69	0.51	0.76	0.00	0.85
Avail Cap(c_a), veh/h	464	0	1099	381	1031	873	322	905	767	420	0	928
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.4	0.0	22.8	16.2	22.0	21.2	20.7	25.8	24.6	17.7	0.0	22.7
Incr Delay (d2), s/veh	0.6	0.0	1.5	1.0	1.0	0.7	0.2	1.7	0.9	7.5	0.0	3.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	0.0	5.3	2.1	4.3	2.9	0.4	4.0	2.3	4.4	0.0	6.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.9	0.0	24.3	17.2	23.0	22.0	20.8	27.6	25.6	25.2	0.0	25.7
LnGrp LOS	B	A	C	B	C	C	C	C	C	C	A	C
Approach Vol, veh/h		535			718			449			759	
Approach Delay, s/veh		21.5			21.1			26.4			25.5	
Approach LOS		C			C			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.0	25.1	7.3	27.4	12.2	24.9	15.0	19.7				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	7.0	46.0	6.0	41.0	10.0	43.0	10.0	37.0				
Max Q Clear Time (g_c+I1), s	8.0	15.7	3.0	20.6	7.3	13.3	12.7	12.0				
Green Ext Time (p_c), s	0.0	4.4	0.0	1.8	0.2	5.2	0.0	2.2				

### Intersection Summary

HCM 6th Ctrl Delay	23.5
HCM 6th LOS	C

### Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	0.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	861	12	14	756	10	18
Future Vol, veh/h	861	12	14	756	10	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	2	3	3	0	0
Mvmt Flow	1013	14	16	889	12	21

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	0	0	1027	0
Stage 1	-	-	-	1020
Stage 2	-	-	-	921
Critical Hdwy	-	-	4.13	-
Critical Hdwy Stg 1	-	-	-	5.4
Critical Hdwy Stg 2	-	-	-	5.4
Follow-up Hdwy	-	-	2.227	-
Pot Cap-1 Maneuver	-	-	672	-
Stage 1	-	-	-	351
Stage 2	-	-	-	391
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	-	-	672	-
Mov Cap-2 Maneuver	-	-	-	70
Stage 1	-	-	-	351
Stage 2	-	-	-	373

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	39.4
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	137	-	-	672	-
HCM Lane V/C Ratio	0.24	-	-	0.025	-
HCM Control Delay (s)	39.4	-	-	10.5	0
HCM Lane LOS	E	-	-	B	A
HCM 95th %tile Q(veh)	0.9	-	-	0.1	-

HCM 6th TWSC  
3: Home First Driveway & OR 211

10/06/2021

Intersection						
Int Delay, s/veh	0					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	878	1	0	770	0	0
Future Vol, veh/h	878	1	0	770	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	2	3	3	0	0
Mvmt Flow	1033	1	0	906	0	0

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	0	0	1034	0
Stage 1	-	-	-	1034
Stage 2	-	-	-	906
Critical Hdwy	-	-	4.13	-
Critical Hdwy Stg 1	-	-	-	5.4
Critical Hdwy Stg 2	-	-	-	5.4
Follow-up Hdwy	-	-	2.227	-
Pot Cap-1 Maneuver	-	-	668	-
Stage 1	-	-	-	346
Stage 2	-	-	-	398
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	-	-	668	-
Mov Cap-2 Maneuver	-	-	-	73
Stage 1	-	-	-	346
Stage 2	-	-	-	398

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	668	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

HCM 6th TWSC  
4: OR 211 & Leroy Avenue

10/06/2021

Intersection												
Int Delay, s/veh	50.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Vol, veh/h	54	695	74	134	632	37	61	8	119	22	12	80
Future Vol, veh/h	54	695	74	134	632	37	61	8	119	22	12	80
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	0	0	0	2	2	2
Mvmt Flow	60	772	82	149	702	41	68	9	132	24	13	89

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	743	0	0	854	0	0	2005	1974	813	2025	1995	723
Stage 1	-	-	-	-	-	-	933	933	-	1021	1021	-
Stage 2	-	-	-	-	-	-	1072	1041	-	1004	974	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.1	6.5	6.2	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.5	4	3.3	3.518	4.018	3.318
Pot Cap-1 Maneuver	864	-	-	785	-	-	~45	63	382	43	60	426
Stage 1	-	-	-	-	-	-	322	348	-	285	314	-
Stage 2	-	-	-	-	-	-	269	310	-	291	330	-
Platoon blocked, %		-	-	-	-	-						
Mov Cap-1 Maneuver	864	-	-	785	-	-	~23	48	382	~20	45	426
Mov Cap-2 Maneuver	-	-	-	-	-	-	~23	48	-	~20	45	-
Stage 1	-	-	-	-	-	-	300	324	-	265	254	-
Stage 2	-	-	-	-	-	-	163	251	-	172	307	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	1.8	\$ 421.8	139
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	23	266	864	-	-	785	-	-	20	202
HCM Lane V/C Ratio	2.947	0.53	0.069	-	-	0.19	-	-	1.222	0.506
HCM Control Delay (s)	\$ 1231.6	32.9	9.5	-	-	10.7	-	-	\$ 553.6	39.8
HCM Lane LOS	F	D	A	-	-	B	-	-	F	E
HCM 95th %tile Q(veh)	8.6	2.9	0.2	-	-	0.7	-	-	3.3	2.6

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

HCM 6th TWSC  
5: S Lowe Road/Dixon Avenue & OR 211

10/06/2021

Intersection												
Int Delay, s/veh	27.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑	↗	↖	↗			↕			↕	
Traffic Vol, veh/h	8	733	86	43	751	1	67	5	48	4	0	6
Future Vol, veh/h	8	733	86	43	751	1	67	5	48	4	0	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	80	-	120	145	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	3	3	3	0	0	0	13	13	13
Mvmt Flow	9	833	98	49	853	1	76	6	55	5	0	7

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	854	0	0	931	0	0	1806	1803	833	1883	1901	854
Stage 1	-	-	-	-	-	-	851	851	-	952	952	-
Stage 2	-	-	-	-	-	-	955	952	-	931	949	-
Critical Hdwy	4.12	-	-	4.13	-	-	7.1	6.5	6.2	7.23	6.63	6.33
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.23	5.63	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.23	5.63	-
Follow-up Hdwy	2.218	-	-	2.227	-	-	3.5	4	3.3	3.617	4.117	3.417
Pot Cap-1 Maneuver	785	-	-	731	-	-	~62	80	372	51	65	343
Stage 1	-	-	-	-	-	-	358	379	-	298	324	-
Stage 2	-	-	-	-	-	-	313	341	-	306	325	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	785	-	-	731	-	-	~57	74	372	39	60	343
Mov Cap-2 Maneuver	-	-	-	-	-	-	~57	74	-	39	60	-
Stage 1	-	-	-	-	-	-	354	375	-	295	302	-
Stage 2	-	-	-	-	-	-	286	318	-	254	321	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.6	\$ 387.3	55.1
HCM LOS			F	F
























Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	87	785	-	-	731	-	-	83
HCM Lane V/C Ratio	1.567	0.012	-	-	0.067	-	-	0.137
HCM Control Delay (s)	\$ 387.3	9.6	-	-	10.3	-	-	55.1
HCM Lane LOS	F	A	-	-	B	-	-	F
HCM 95th %tile Q(veh)	10.9	0	-	-	0.2	-	-	0.5

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

# HCM Signalized Intersection Capacity Analysis

## 1: OR 213 & OR 211

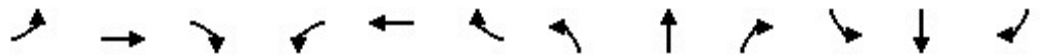
10/06/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	83	187	11	97	246	257	19	249	120	133	130	107
Future Volume (vph)	83	187	11	97	246	257	19	249	120	133	130	107
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1421	1483		1484	1562	1328	1614	1699	1444	1458	1431	
Flt Permitted	0.36	1.00		0.52	1.00	1.00	0.59	1.00	1.00	0.35	1.00	
Satd. Flow (perm)	532	1483		812	1562	1328	997	1699	1444	530	1431	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	99	223	13	115	293	306	23	296	143	158	155	127
RTOR Reduction (vph)	0	2	0	0	0	225	0	0	101	0	23	0
Lane Group Flow (vph)	99	234	0	115	293	81	23	296	42	158	259	0
Heavy Vehicles (%)	17%	17%	17%	12%	12%	12%	3%	3%	3%	14%	14%	14%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8		8	4		
Actuated Green, G (s)	28.2	21.5		25.4	20.1	20.1	24.2	22.3	22.3	37.5	30.6	
Effective Green, g (s)	30.2	22.5		27.4	21.1	21.1	26.2	23.3	23.3	38.5	31.6	
Actuated g/C Ratio	0.38	0.28		0.35	0.27	0.27	0.33	0.29	0.29	0.49	0.40	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
Lane Grp Cap (vph)	288	420		333	415	353	351	499	424	388	570	
v/s Ratio Prot	c0.03	0.16		0.03	c0.19		0.00	c0.17		c0.06	0.18	
v/s Ratio Perm	0.10			0.09		0.06	0.02		0.03	0.14		
v/c Ratio	0.34	0.56		0.35	0.71	0.23	0.07	0.59	0.10	0.41	0.45	
Uniform Delay, d1	16.9	24.2		18.5	26.3	22.8	18.0	23.9	20.4	12.7	17.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.5	1.3		0.5	5.0	0.2	0.1	1.6	0.1	0.5	0.4	
Delay (s)	17.4	25.4		18.9	31.3	23.0	18.1	25.5	20.4	13.2	17.9	
Level of Service	B	C		B	C	C	B	C	C	B	B	
Approach Delay (s)		23.1			25.8			23.6			16.2	
Approach LOS		C			C			C			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			22.6	HCM 2000 Level of Service				C				
HCM 2000 Volume to Capacity ratio			0.57									
Actuated Cycle Length (s)			79.3	Sum of lost time (s)				16.0				
Intersection Capacity Utilization			54.6%	ICU Level of Service				A				
Analysis Period (min)			15									
c Critical Lane Group												

# HCM 6th Signalized Intersection Summary

1: OR 213 & OR 211

10/06/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	83	187	11	97	246	257	19	249	120	133	130	107
Future Volume (veh/h)	83	187	11	97	246	257	19	249	120	133	130	107
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1518	1518	1518	1586	1586	1586	1709	1709	1709	1559	1559	1559
Adj Flow Rate, veh/h	99	223	13	115	293	306	23	296	143	158	155	127
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	17	17	17	12	12	12	3	3	3	14	14	14
Cap, veh/h	350	460	27	444	524	444	330	405	343	345	247	202
Arrive On Green	0.08	0.32	0.31	0.08	0.33	0.33	0.04	0.24	0.24	0.11	0.31	0.30
Sat Flow, veh/h	1446	1420	83	1511	1586	1344	1628	1709	1448	1485	793	649
Grp Volume(v), veh/h	99	0	236	115	293	306	23	296	143	158	0	282
Grp Sat Flow(s),veh/h/ln	1446	0	1503	1511	1586	1344	1628	1709	1448	1485	0	1442
Q Serve(g_s), s	2.9	0.0	8.4	3.3	10.2	13.2	0.7	10.7	5.6	4.9	0.0	11.3
Cycle Q Clear(g_c), s	2.9	0.0	8.4	3.3	10.2	13.2	0.7	10.7	5.6	4.9	0.0	11.3
Prop In Lane	1.00		0.06	1.00		1.00	1.00		1.00	1.00		0.45
Lane Grp Cap(c), veh/h	350	0	487	444	524	444	330	405	343	345	0	449
V/C Ratio(X)	0.28	0.00	0.48	0.26	0.56	0.69	0.07	0.73	0.42	0.46	0.00	0.63
Avail Cap(c_a), veh/h	474	0	1055	497	1042	883	433	970	822	418	0	905
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.6	0.0	18.2	13.3	18.4	19.4	18.0	23.6	21.6	15.8	0.0	20.0
Incr Delay (d2), s/veh	0.3	0.0	0.6	0.2	0.7	1.4	0.1	1.9	0.6	0.7	0.0	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	2.8	1.0	3.5	3.9	0.2	4.2	1.8	1.5	0.0	3.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.0	0.0	18.7	13.5	19.1	20.9	18.1	25.5	22.2	16.5	0.0	21.0
LnGrp LOS	B	A	B	B	B	C	B	C	C	B	A	C
Approach Vol, veh/h		335			714			462			440	
Approach Delay, s/veh		17.3			18.9			24.1			19.4	
Approach LOS		B			B			C			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.7	25.7	6.7	24.8	9.3	26.1	11.7	19.9				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	7.0	46.0	6.0	41.0	10.0	43.0	10.0	37.0				
Max Q Clear Time (g_c+I1), s	5.3	10.4	2.7	13.3	4.9	15.2	6.9	12.7				
Green Ext Time (p_c), s	0.1	2.8	0.0	1.2	0.1	5.9	0.1	2.2				

## Intersection Summary

HCM 6th Ctrl Delay	20.0
HCM 6th LOS	B

## Notes

User approved pedestrian interval to be less than phase max green.



Intersection						
Int Delay, s/veh	0.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	437	3	16	700	10	20
Future Vol, veh/h	437	3	16	700	10	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	50	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	10	10	10	10	0	0
Mvmt Flow	540	4	20	864	12	25

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	544	0	1446 542
Stage 1	-	-	-	-	542 -
Stage 2	-	-	-	-	904 -
Critical Hdwy	-	-	4.2	-	6.4 6.2
Critical Hdwy Stg 1	-	-	-	-	5.4 -
Critical Hdwy Stg 2	-	-	-	-	5.4 -
Follow-up Hdwy	-	-	2.29	-	3.5 3.3
Pot Cap-1 Maneuver	-	-	986	-	147 544
Stage 1	-	-	-	-	587 -
Stage 2	-	-	-	-	398 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	986	-	144 544
Mov Cap-2 Maneuver	-	-	-	-	144 -
Stage 1	-	-	-	-	587 -
Stage 2	-	-	-	-	390 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	19.7
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	282	-	-	986	-
HCM Lane V/C Ratio	0.131	-	-	0.02	-
HCM Control Delay (s)	19.7	-	-	8.7	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	0.4	-	-	0.1	-

HCM 6th TWSC  
3: Home First Driveway & OR 211

10/06/2021

Intersection						
Int Delay, s/veh	0.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	453	4	2	705	11	5
Future Vol, veh/h	453	4	2	705	11	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	10	10	10	10	0	0
Mvmt Flow	559	5	2	870	14	6

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	564	0	1436
Stage 1	-	-	-	-	562
Stage 2	-	-	-	-	874
Critical Hdwy	-	-	4.2	-	6.4
Critical Hdwy Stg 1	-	-	-	-	5.4
Critical Hdwy Stg 2	-	-	-	-	5.4
Follow-up Hdwy	-	-	2.29	-	3.5
Pot Cap-1 Maneuver	-	-	969	-	149
Stage 1	-	-	-	-	575
Stage 2	-	-	-	-	412
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	969	-	149
Mov Cap-2 Maneuver	-	-	-	-	284
Stage 1	-	-	-	-	575
Stage 2	-	-	-	-	411

Approach	EB	WB	NB
HCM Control Delay, s	0	0	16.5
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	332	-	-	969	-
HCM Lane V/C Ratio	0.059	-	-	0.003	-
HCM Control Delay (s)	16.5	-	-	8.7	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Intersection												
Int Delay, s/veh	33.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Vol, veh/h	38	390	48	126	480	71	62	9	95	42	10	105
Future Vol, veh/h	38	390	48	126	480	71	62	9	95	42	10	105
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	9	9	9	9	9	9	5	5	5	11	11	11
Mvmt Flow	46	476	59	154	585	87	76	11	116	51	12	128

Major/Minor	Major1		Major2		Minor1		Minor2					
Conflicting Flow All	672	0	0	535	0	0	1605	1578	506	1598	1564	629
Stage 1	-	-	-	-	-	-	598	598	-	937	937	-
Stage 2	-	-	-	-	-	-	1007	980	-	661	627	-
Critical Hdwy	4.19	-	-	4.19	-	-	7.15	6.55	6.25	7.21	6.61	6.31
Critical Hdwy Stg 1	-	-	-	-	-	-	6.15	5.55	-	6.21	5.61	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.15	5.55	-	6.21	5.61	-
Follow-up Hdwy	2.281	-	-	2.281	-	-	3.545	4.045	3.345	3.599	4.099	3.399
Pot Cap-1 Maneuver	887	-	-	998	-	-	83	108	560	82	106	466
Stage 1	-	-	-	-	-	-	484	486	-	306	332	-
Stage 2	-	-	-	-	-	-	287	324	-	437	463	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	887	-	-	998	-	-	~ 46	87	560	~ 50	85	466
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 46	87	-	~ 50	85	-
Stage 1	-	-	-	-	-	-	459	461	-	290	281	-
Stage 2	-	-	-	-	-	-	168	274	-	321	439	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	1.7	202	87.9
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	46	381	887	-	-	998	-	-	50	335
HCM Lane V/C Ratio	1.644	0.333	0.052	-	-	0.154	-	-	1.024	0.419
HCM Control Delay (s)	\$ 508.9	19.1	9.3	-	-	9.3	-	-	264.8	23.3
HCM Lane LOS	F	C	A	-	-	A	-	-	F	C
HCM 95th %tile Q(veh)	7.5	1.4	0.2	-	-	0.5	-	-	4.5	2

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

HCM 6th TWSC  
5: S Lowe Road/Dixon Avenue & OR 211

10/06/2021

Intersection												
Int Delay, s/veh	0.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↙	↑	↗	↙	↗			↕			↕	
Traffic Vol, veh/h	8	531	8	8	656	4	1	0	1	3	0	4
Future Vol, veh/h	8	531	8	8	656	4	1	0	1	3	0	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	80	-	120	145	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	9	9	9	10	10	10	0	0	0	40	40	40
Mvmt Flow	9	610	9	9	754	5	1	0	1	3	0	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	759	0	0	619	0	0	1405	1405	610	1408	1412	757
Stage 1	-	-	-	-	-	-	628	628	-	775	775	-
Stage 2	-	-	-	-	-	-	777	777	-	633	637	-
Critical Hdwy	4.19	-	-	4.2	-	-	7.1	6.5	6.2	7.5	6.9	6.6
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.5	5.9	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.5	5.9	-
Follow-up Hdwy	2.281	-	-	2.29	-	-	3.5	4	3.3	3.86	4.36	3.66
Pot Cap-1 Maneuver	822	-	-	924	-	-	118	141	498	96	115	352
Stage 1	-	-	-	-	-	-	474	479	-	339	357	-
Stage 2	-	-	-	-	-	-	393	410	-	410	417	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	822	-	-	924	-	-	115	138	498	94	113	352
Mov Cap-2 Maneuver	-	-	-	-	-	-	115	138	-	94	113	-
Stage 1	-	-	-	-	-	-	469	474	-	335	353	-
Stage 2	-	-	-	-	-	-	384	406	-	405	412	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			0.1			24.5			28.4		
HCM LOS							C			D		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	187	822	-	-	924	-	-	162
HCM Lane V/C Ratio	0.012	0.011	-	-	0.01	-	-	0.05
HCM Control Delay (s)	24.5	9.4	-	-	8.9	-	-	28.4
HCM Lane LOS		C	A	-	-	A	-	D
HCM 95th %tile Q(veh)		0	0	-	-	0	-	0.2

# HCM Signalized Intersection Capacity Analysis

1: OR 213 & OR 211

10/06/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	156	301	18	175	272	191	26	228	141	287	257	130
Future Volume (vph)	156	301	18	175	272	191	26	228	141	287	257	130
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1599	1669		1583	1667	1417	1614	1699	1444	1583	1583	
Flt Permitted	0.31	1.00		0.31	1.00	1.00	0.40	1.00	1.00	0.39	1.00	
Satd. Flow (perm)	513	1669		524	1667	1417	674	1699	1444	645	1583	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	177	342	20	199	309	217	30	259	160	326	292	148
RTOR Reduction (vph)	0	2	0	0	0	161	0	0	114	0	14	0
Lane Group Flow (vph)	177	360	0	199	309	56	30	259	46	326	426	0
Heavy Vehicles (%)	4%	4%	4%	5%	5%	5%	3%	3%	3%	5%	5%	5%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8		8	4		
Actuated Green, G (s)	32.4	22.8		28.2	20.7	20.7	26.6	23.5	23.5	39.2	31.1	
Effective Green, g (s)	34.4	23.8		30.2	21.7	21.7	28.6	24.5	24.5	40.2	32.1	
Actuated g/C Ratio	0.41	0.28		0.36	0.26	0.26	0.34	0.29	0.29	0.48	0.38	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
Lane Grp Cap (vph)	345	470		293	428	363	273	492	418	436	601	
v/s Ratio Prot	c0.06	c0.22		c0.07	0.19		0.01	0.15		c0.10	0.27	
v/s Ratio Perm	0.14			0.17		0.04	0.03		0.03	c0.25		
v/c Ratio	0.51	0.77		0.68	0.72	0.15	0.11	0.53	0.11	0.75	0.71	
Uniform Delay, d1	17.6	27.8		20.6	28.6	24.3	19.0	25.1	22.0	15.5	22.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.0	7.0		5.6	5.6	0.1	0.1	0.8	0.1	6.5	3.5	
Delay (s)	18.6	34.8		26.2	34.2	24.4	19.1	25.9	22.1	22.0	25.8	
Level of Service	B	C		C	C	C	B	C	C	C	C	
Approach Delay (s)		29.5			29.1			24.1			24.2	
Approach LOS		C			C			C			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			26.7		HCM 2000 Level of Service					C		
HCM 2000 Volume to Capacity ratio			0.78									
Actuated Cycle Length (s)			84.5		Sum of lost time (s)					16.0		
Intersection Capacity Utilization			72.5%		ICU Level of Service					C		
Analysis Period (min)			15									
c	Critical Lane Group											

# HCM 6th Signalized Intersection Summary

1: OR 213 & OR 211

10/06/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	156	301	18	175	272	191	26	228	141	287	257	130
Future Volume (veh/h)	156	301	18	175	272	191	26	228	141	287	257	130
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1695	1695	1695	1682	1682	1682	1709	1709	1709	1682	1682	1682
Adj Flow Rate, veh/h	177	342	20	199	309	217	30	259	160	326	292	148
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	4	4	4	5	5	5	3	3	3	5	5	5
Cap, veh/h	399	470	27	379	493	418	236	374	317	419	343	174
Arrive On Green	0.11	0.30	0.28	0.11	0.29	0.29	0.05	0.22	0.22	0.15	0.33	0.31
Sat Flow, veh/h	1615	1586	93	1602	1682	1425	1628	1709	1448	1602	1052	533
Grp Volume(v), veh/h	177	0	362	199	309	217	30	259	160	326	0	440
Grp Sat Flow(s),veh/h/ln	1615	0	1679	1602	1682	1425	1628	1709	1448	1602	0	1586
Q Serve(g_s), s	5.3	0.0	14.0	6.1	11.5	9.2	1.0	10.1	7.0	11.0	0.0	18.7
Cycle Q Clear(g_c), s	5.3	0.0	14.0	6.1	11.5	9.2	1.0	10.1	7.0	11.0	0.0	18.7
Prop In Lane	1.00		0.06	1.00		1.00	1.00		1.00	1.00		0.34
Lane Grp Cap(c), veh/h	399	0	497	379	493	418	236	374	317	419	0	517
V/C Ratio(X)	0.44	0.00	0.73	0.52	0.63	0.52	0.13	0.69	0.50	0.78	0.00	0.85
Avail Cap(c_a), veh/h	462	0	1093	379	1025	869	321	900	762	419	0	923
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.4	0.0	22.8	16.3	22.1	21.3	20.8	26.0	24.8	18.0	0.0	22.9
Incr Delay (d2), s/veh	0.6	0.0	1.5	1.0	1.0	0.7	0.2	1.7	0.9	8.7	0.0	3.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	0.0	5.4	2.1	4.3	2.9	0.4	4.0	0.1	4.7	0.0	6.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.0	0.0	24.3	17.3	23.1	22.0	21.0	27.7	25.7	26.7	0.0	25.9
LnGrp LOS	B	A	C	B	C	C	C	C	C	C	A	C
Approach Vol, veh/h		539			725			449			766	
Approach Delay, s/veh		21.6			21.2			26.5			26.2	
Approach LOS		C			C			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.0	25.4	7.3	27.5	12.2	25.2	15.0	19.8				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	7.0	46.0	6.0	41.0	10.0	43.0	10.0	37.0				
Max Q Clear Time (g_c+I1), s	8.1	16.0	3.0	20.7	7.3	13.5	13.0	12.1				
Green Ext Time (p_c), s	0.0	4.4	0.0	1.8	0.2	5.3	0.0	2.2				

## Intersection Summary

HCM 6th Ctrl Delay	23.8
HCM 6th LOS	C

## Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	0.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	871	12	14	763	10	18
Future Vol, veh/h	871	12	14	763	10	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	50	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	2	3	3	0	0
Mvmt Flow	1025	14	16	898	12	21

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	1039	0	1962
Stage 1	-	-	-	-	1032
Stage 2	-	-	-	-	930
Critical Hdwy	-	-	4.13	-	6.4
Critical Hdwy Stg 1	-	-	-	-	5.4
Critical Hdwy Stg 2	-	-	-	-	5.4
Follow-up Hdwy	-	-	2.227	-	3.5
Pot Cap-1 Maneuver	-	-	665	-	70
Stage 1	-	-	-	-	347
Stage 2	-	-	-	-	387
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	665	-	68
Mov Cap-2 Maneuver	-	-	-	-	68
Stage 1	-	-	-	-	347
Stage 2	-	-	-	-	378

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	40.8
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	133	-	-	665	-
HCM Lane V/C Ratio	0.248	-	-	0.025	-
HCM Control Delay (s)	40.8	-	-	10.6	-
HCM Lane LOS	E	-	-	B	-
HCM 95th %tile Q(veh)	0.9	-	-	0.1	-

HCM 6th TWSC  
 3: Home First Driveway & OR 211

10/06/2021

Intersection						
Int Delay, s/veh	0.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	878	11	5	770	7	3
Future Vol, veh/h	878	11	5	770	7	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	2	3	3	0	0
Mvmt Flow	1033	13	6	906	8	4

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	1046	0	1958 1040
Stage 1	-	-	-	-	1040 -
Stage 2	-	-	-	-	918 -
Critical Hdwy	-	-	4.13	-	6.4 6.2
Critical Hdwy Stg 1	-	-	-	-	5.4 -
Critical Hdwy Stg 2	-	-	-	-	5.4 -
Follow-up Hdwy	-	-	2.227	-	3.5 3.3
Pot Cap-1 Maneuver	-	-	661	-	71 282
Stage 1	-	-	-	-	344 -
Stage 2	-	-	-	-	392 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	661	-	70 282
Mov Cap-2 Maneuver	-	-	-	-	198 -
Stage 1	-	-	-	-	344 -
Stage 2	-	-	-	-	388 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	22.5
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	217	-	-	661	-
HCM Lane V/C Ratio	0.054	-	-	0.009	-
HCM Control Delay (s)	22.5	-	-	10.5	-
HCM Lane LOS	C	-	-	B	-
HCM 95th %tile Q(veh)	0.2	-	-	0	-



HCM 6th TWSC  
4: OR 211 & Leroy Avenue

10/06/2021

Intersection												
Int Delay, s/veh	53											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Vol, veh/h	54	698	74	134	637	37	61	8	119	22	12	80
Future Vol, veh/h	54	698	74	134	637	37	61	8	119	22	12	80
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	0	0	0	2	2	2
Mvmt Flow	60	776	82	149	708	41	68	9	132	24	13	89

Major/Minor	Major1		Major2		Minor1		Minor2					
Conflicting Flow All	749	0	0	858	0	0	2015	1984	817	2035	2005	729
Stage 1	-	-	-	-	-	-	937	937	-	1027	1027	-
Stage 2	-	-	-	-	-	-	1078	1047	-	1008	978	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.1	6.5	6.2	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.5	4	3.3	3.518	4.018	3.318
Pot Cap-1 Maneuver	860	-	-	783	-	-	~44	62	380	42	59	423
Stage 1	-	-	-	-	-	-	320	346	-	283	312	-
Stage 2	-	-	-	-	-	-	267	308	-	290	329	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	860	-	-	783	-	-	~22	47	380	~19	44	423
Mov Cap-2 Maneuver	-	-	-	-	-	-	~22	47	-	~19	44	-
Stage 1	-	-	-	-	-	-	298	322	-	263	253	-
Stage 2	-	-	-	-	-	-	162	249	-	171	306	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	1.8	\$ 446	148
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	22	263	860	-	-	783	-	-	19	199
HCM Lane V/C Ratio	3.081	0.537	0.07	-	-	0.19	-	-	1.287	0.514
HCM Control Delay (s)	\$ 1304.7	33.5	9.5	-	-	10.7	-	-	\$ 596.4	40.8
HCM Lane LOS	F	D	A	-	-	B	-	-	F	E
HCM 95th %tile Q(veh)	8.7	2.9	0.2	-	-	0.7	-	-	3.4	2.6

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

HCM 6th TWSC  
5: S Lowe Road/Dixon Avenue & OR 211

10/06/2021

Intersection												
Int Delay, s/veh	27.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑	↗	↖	↗			↕			↕	
Traffic Vol, veh/h	8	736	86	43	756	1	67	5	48	4	0	6
Future Vol, veh/h	8	736	86	43	756	1	67	5	48	4	0	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	80	-	120	145	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	3	3	3	0	0	0	13	13	13
Mvmt Flow	9	836	98	49	859	1	76	6	55	5	0	7

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	860	0	0	934	0	0	1815	1812	836	1892	1910	860
Stage 1	-	-	-	-	-	-	854	854	-	958	958	-
Stage 2	-	-	-	-	-	-	961	958	-	934	952	-
Critical Hdwy	4.12	-	-	4.13	-	-	7.1	6.5	6.2	7.23	6.63	6.33
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.23	5.63	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.23	5.63	-
Follow-up Hdwy	2.218	-	-	2.227	-	-	3.5	4	3.3	3.617	4.117	3.417
Pot Cap-1 Maneuver	781	-	-	729	-	-	~61	79	370	50	64	340
Stage 1	-	-	-	-	-	-	356	378	-	295	322	-
Stage 2	-	-	-	-	-	-	311	338	-	305	324	-
Platoon blocked, %		-	-	-	-	-						
Mov Cap-1 Maneuver	781	-	-	729	-	-	~56	73	370	38	59	340
Mov Cap-2 Maneuver	-	-	-	-	-	-	~56	73	-	38	59	-
Stage 1	-	-	-	-	-	-	352	373	-	291	300	-
Stage 2	-	-	-	-	-	-	284	315	-	253	320	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.6	\$ 396	56.6
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	86	781	-	-	729	-	-	81
HCM Lane V/C Ratio	1.586	0.012	-	-	0.067	-	-	0.14
HCM Control Delay (s)	\$ 396	9.7	-	-	10.3	-	-	56.6
HCM Lane LOS	F	A	-	-	B	-	-	F
HCM 95th %tile Q(veh)	11	0	-	-	0.2	-	-	0.5

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

# 10. Intersection Queuing Analysis



Queuing and Blocking Report  
Background Conditions Year 2023

09/29/2021

Intersection: 1: OR 213 & OR 211

Movement	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	TR	L	T	R	L	T	R	L	TR
Maximum Queue (ft)	111	207	109	267	234	50	215	56	182	272
Average Queue (ft)	38	92	53	110	84	9	93	16	71	87
95th Queue (ft)	81	176	100	204	166	31	175	43	150	204
Link Distance (ft)		942		2610			896			954
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	260		340		225	275		260	205	
Storage Blk Time (%)		0		1	0		0		1	0
Queuing Penalty (veh)		0		2	0		0		4	0

Intersection: 2: S Ona Way & OR 211

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	79	43
Average Queue (ft)	9	17
95th Queue (ft)	46	40
Link Distance (ft)	183	691
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Home First Driveway & OR 211

Movement	NB
Directions Served	LR
Maximum Queue (ft)	21
Average Queue (ft)	1
95th Queue (ft)	11
Link Distance (ft)	157
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 4: OR 211 & Leroy Avenue

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (ft)	62	4	86	13	208	208
Average Queue (ft)	17	0	31	0	80	80
95th Queue (ft)	48	3	69	6	164	170
Link Distance (ft)		1496		1282	281	516
Upstream Blk Time (%)					0	
Queuing Penalty (veh)					0	
Storage Bay Dist (ft)	100		100			
Storage Blk Time (%)			0			
Queuing Penalty (veh)			1			

Intersection: 5: S Lowe Road/Dixon Avenue & OR 211

Movement	EB	WB	NB	SB
Directions Served	L	L	LTR	LTR
Maximum Queue (ft)	52	28	22	48
Average Queue (ft)	6	1	2	9
95th Queue (ft)	29	13	12	36
Link Distance (ft)			335	674
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	80	145		
Storage Blk Time (%)	0			
Queuing Penalty (veh)	0			

Network Summary

Network wide Queuing Penalty: 8
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Queuing and Blocking Report  
Background Conditions Year 2023

09/29/2021

Intersection: 1: OR 213 & OR 211

Movement	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	TR	L	T	R	L	T	R	L	TR
Maximum Queue (ft)	176	260	170	290	167	46	206	87	293	460
Average Queue (ft)	59	140	88	130	59	14	93	27	129	158
95th Queue (ft)	125	242	147	226	115	36	169	65	243	336
Link Distance (ft)		942		2610			896			954
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	260		340		225	275		260	205	
Storage Blk Time (%)		1		1			0		6	3
Queuing Penalty (veh)		1		4			0		23	8

Intersection: 2: S Ona Way & OR 211

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	144	59
Average Queue (ft)	19	21
95th Queue (ft)	92	48
Link Distance (ft)	183	691
Upstream Blk Time (%)	0	
Queuing Penalty (veh)	3	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Home First Driveway & OR 211

Movement	WB
Directions Served	LT
Maximum Queue (ft)	77
Average Queue (ft)	6
95th Queue (ft)	57
Link Distance (ft)	1496
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 4: OR 211 & Leroy Avenue

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (ft)	64	13	94	39	296	155
Average Queue (ft)	21	1	42	0	175	62
95th Queue (ft)	51	7	75	3	342	118
Link Distance (ft)		1496		1282	281	516
Upstream Blk Time (%)					27	
Queuing Penalty (veh)					0	
Storage Bay Dist (ft)	100		100			
Storage Blk Time (%)	0		0			
Queuing Penalty (veh)	0		3			

Intersection: 5: S Lowe Road/Dixon Avenue & OR 211

Movement	EB	WB	NB	SB
Directions Served	L	L	LTR	LTR
Maximum Queue (ft)	30	52	170	47
Average Queue (ft)	4	19	55	11
95th Queue (ft)	21	44	122	39
Link Distance (ft)			335	674
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	80	145		
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 41
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Intersection: 1: OR 213 & OR 211

Movement	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	TR	L	T	R	L	T	R	L	TR
Maximum Queue (ft)	121	181	125	236	188	61	244	54	155	210
Average Queue (ft)	35	83	49	100	80	10	87	17	65	83
95th Queue (ft)	83	160	99	188	148	35	161	43	127	166
Link Distance (ft)		942		2610			896			954
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	260		340		225	275		260	205	
Storage Blk Time (%)				0	0		0		0	0
Queuing Penalty (veh)				1	0		0		0	0

Intersection: 2: S Ona Way & OR 211

Movement	WB	NB
Directions Served	L	LR
Maximum Queue (ft)	44	43
Average Queue (ft)	6	15
95th Queue (ft)	30	37
Link Distance (ft)		691
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	50	
Storage Blk Time (%)	0	
Queuing Penalty (veh)	2	

Intersection: 3: Home First Driveway & OR 211

Movement	WB	NB
Directions Served	L	LR
Maximum Queue (ft)	12	33
Average Queue (ft)	0	10
95th Queue (ft)	6	32
Link Distance (ft)		422
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	100	
Storage Blk Time (%)		
Queuing Penalty (veh)		



Intersection: 4: OR 211 & Leroy Avenue

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (ft)	64	4	92	4	254	191
Average Queue (ft)	14	0	34	0	77	66
95th Queue (ft)	43	0	73	3	179	136
Link Distance (ft)		1496		1282	542	516
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	100		100			
Storage Blk Time (%)			0			
Queuing Penalty (veh)			1			

Intersection: 5: S Lowe Road/Dixon Avenue & OR 211

Movement	EB	WB	NB	SB
Directions Served	L	L	LTR	LTR
Maximum Queue (ft)	43	30	21	52
Average Queue (ft)	6	3	1	7
95th Queue (ft)	28	17	10	33
Link Distance (ft)			457	674
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	80	145		
Storage Blk Time (%)	0			
Queuing Penalty (veh)	0			

Network Summary

Network wide Queuing Penalty: 5
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Intersection: 1: OR 213 & OR 211

Movement	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	TR	L	T	R	L	T	R	L	TR
Maximum Queue (ft)	143	281	216	252	161	61	191	80	296	461
Average Queue (ft)	61	141	95	130	65	14	96	28	143	158
95th Queue (ft)	120	233	176	216	120	41	173	64	257	324
Link Distance (ft)		942		2610			896			954
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	260		340		225	275		260	205	
Storage Blk Time (%)		1		1					5	4
Queuing Penalty (veh)		1		2					22	11

Intersection: 2: S Ona Way & OR 211

Movement	WB	NB
Directions Served	L	LR
Maximum Queue (ft)	31	43
Average Queue (ft)	7	17
95th Queue (ft)	27	40
Link Distance (ft)		691
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	50	
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Intersection: 3: Home First Driveway & OR 211

Movement	WB	NB
Directions Served	L	LR
Maximum Queue (ft)	31	36
Average Queue (ft)	3	9
95th Queue (ft)	18	31
Link Distance (ft)		338
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	100	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: OR 211 & Leroy Avenue

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (ft)	56	25	90	80	364	185
Average Queue (ft)	21	1	40	3	134	64
95th Queue (ft)	48	10	72	34	297	138
Link Distance (ft)		1496		1282	782	758
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	100		100			
Storage Blk Time (%)			0	0		
Queuing Penalty (veh)			0	0		

Intersection: 5: S Lowe Road/Dixon Avenue & OR 211

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	R	L	TR	LTR	LTR
Maximum Queue (ft)	40	4	55	10	152	66
Average Queue (ft)	5	0	19	0	58	11
95th Queue (ft)	25	3	49	8	124	43
Link Distance (ft)				885	486	835
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	80	120	145			
Storage Blk Time (%)						
Queuing Penalty (veh)						

Network Summary

Network wide Queuing Penalty: 38
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## Memorandum

To: **Tim Lawler, Green Light – Home First LLC**

From: **Nick Mesler, EIT**  
**Jennifer Danziger, PE**

Date: **December 23, 2021**

Subject: **OR-211 & Leroy Avenue Signal Warrant Analysis Memorandum**



RENEWS: 12 / 31 / 2021

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## Introduction

The purpose of this memorandum is to document the results from the signal warrant analyses conducted for the intersection of OR-211 & Leroy Avenue within the City of Molalla. This warrant analysis was conducted in support of the nearby Home First – Molalla affordable housing development.

## Background Information

The City of Molalla has an estimated population of 10,228 according to the US Census Bureau, which exceeds the minimum requirement for an intersection that lies within the built-up area of an isolated community having a population of less than 10,000. Not only does the City of Molalla's population estimate exceed 10,000, but there is also unincorporated development directly surrounding the city that would be additionally included in this analysis. Therefore, the 70% warrant for communities having a population less than 10,000 is not applicable at this intersection in any of the analyses.

OR-211 is classified as an Arterial and District Highway. OR-211 has a posted speed limit of 35 mph. Leroy Avenue is classified as a Local Street. Leroy Avenue has a speed limit of 25 mph. Therefore, the 70% warrant for high-speed roadways (40 mph minimum) is not applicable at this intersection in any of the analyses.

## Analysis Methodology

The Manual on Uniform Traffic Control Devices (MUTCD, 2009) Chapter 4C. Traffic Control Signal Needs Studies is the governing document that serves as a guide to determine whether a signal should be installed at an intersection. The MUTCD analysis criteria associated with a signal warrant and the applicability of each analysis criteria at the subject intersection are described below:

### 1. Warrant 1, Eight-Hour Vehicular Volume

The Minimum Vehicular Volume, Condition A, is intended for application at locations where a large volume of intersecting traffic is the principal reason to consider installing a traffic control signal.

The Interruption of Continuous Traffic, Condition B, is intended for application at locations where Condition A is not satisfied and where the traffic volume on a major street is so heavy that traffic on a minor intersecting street suffers excessive delay or conflict in entering or crossing the major street.

It is intended that Warrant 1 be treated as a single warrant. If Condition A is satisfied, then Warrant 1 is satisfied and analyses of Condition B and the combination of Conditions A and B are not needed. Similarly, if Condition B is satisfied, then Warrant 1 is satisfied and an analysis of the combination of Conditions A and B is not needed

*Traffic volumes are a relevant analysis criterion.*

### 2. Warrant 2, Four-Hour Vehicular Volume

The Four-Hour Vehicular Volume signal warrant conditions are intended to be applied where the volume of intersecting traffic is the principal reason to consider installing a traffic control signal.

*Traffic volumes are a relevant analysis criterion.*

### 3. Warrant 3, Peak Hour

The Peak Hour signal warrant is intended for use at a location where traffic conditions are such that for a minimum of 1 hour of an average day, the minor-street traffic suffers undue delay when entering or crossing the major street.

*Traffic volumes are a relevant analysis criterion.*

### 4. Warrant 4, Pedestrian Volume

The Pedestrian Volume signal warrant is intended for application where the traffic volume on a major street is so heavy that pedestrians experience excessive delay in crossing the major street.

*Pedestrian volumes are a relevant analysis criterion.*

### 5. Warrant 5, School Crossing

The School Crossing signal warrant is intended for application where the fact that schoolchildren cross the major street is the principal reason to consider installing a traffic control signal. For the purposes of this warrant, the word "schoolchildren" includes elementary through high school students.

*School-age pedestrian volumes are a relevant analysis criterion.*



6. Warrant 6, Coordinated Signal System

Progressive movement in a coordinated signal system sometimes necessitates installing traffic control signals at intersections where they would not otherwise be needed in order to maintain proper platooning of vehicles.

*There are no signals located within a half mile of the intersection and all signals in the city operate independently of each other; therefore, coordinated signals are not a relevant analysis criterion.*

7. Warrant 7, Crash Experience

The Crash Experience signal warrant conditions are intended for application where the severity and frequency of crashes are the principal reasons to consider installing a traffic control signal.

*Crash history is a relevant analysis criterion.*

8. Warrant 8, Roadway Network

Installing a traffic control signal at some intersections might be justified to encourage concentration and organization of traffic flow on a roadway network.

*This warrant allows for consideration of other traffic volume thresholds for the intersection of major routes. Traffic volumes are a relevant analysis criterion.*

9. Warrant 9, Intersection Near a Grade Crossing

The Intersection Near a Grade Crossing signal warrant is intended for use at a location where none of the conditions described in the other eight traffic signal warrants are met, but the proximity to the intersection of a grade crossing on an intersection approach controlled by a STOP or YIELD sign is the principal reason to consider installing a traffic control signal

*There are no railroads located within at least a mile of this intersection; therefore, rail grade crossing is not a relevant analysis criterion.*



# Signal Warrant Analysis

## 1. Warrant 1, Eight-Hour Vehicular Volume

The need for a traffic control signal shall be considered if an engineering study finds that one of the following conditions exist for each of any 8 hours of an average day:

- A. The vehicles per hour given in both of the 100 percent columns of Condition A in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection; or

*As shown in the attached Warrant 1 analysis, none of the 16-hour count periods along the minor street are projected to meet or exceed 150 vehicles on the minor street under any scenario. Therefore, this criterion is not met.*

- B. The vehicles per hour given in both of the 100 percent columns of Condition B in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection.

*As shown in the attached Warrant 1 analysis, two (2) of the 16-hour count periods along the minor street are projected to meet or exceed 75 vehicles on the minor street under Background Year 2023 and Buildout Year 2023 conditions. However, this falls short of the 8-hour requirement. Therefore, this criterion is not met.*

In applying each condition, the major-street and minor-street volumes shall be for the same 8 hours. On the minor street, the higher volume shall not be required to be on the same approach during each of these 8 hours

The need for a traffic control signal shall be considered if an engineering study finds that both of the following conditions exist for each of any 8 hours of an average day:

- A. The vehicles per hour given in both of the 80 percent columns of Condition A in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection; and

*As shown in the attached Warrant 1 analysis, none of the 16-hour count periods along the minor street are projected to meet or exceed 120 (80% of 150) vehicles on the minor street under any scenario. Therefore, this criterion is not met.*

- B. The vehicles per hour given in both of the 80 percent columns of Condition B in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection.

*As shown in the attached Warrant 1 analysis, six (6) of the 16-hour count periods along the minor street are projected to meet or exceed 60 (80% of 75) vehicles on the minor street under Background Year 2023 and seven (7) of the 16-hour count period under Buildout Year 2023 conditions. However, this falls short of the 8-hour requirement. Therefore, this criterion is not met.*



These major-street and minor-street volumes shall be for the same 8 hours for each condition; however, the 8 hours satisfied in Condition A shall not be required to be the same 8 hours satisfied in Condition B. On the minor street, the higher volume shall not be required to be on the same approach during each of the 8 hours.

*It should be further noted that as stated above, the 80% warrants shall both be met during the same hours. Since none of the Condition A 80% hours are met, none of the hours for this criterion are met.*

## 2. Warrant 2, Four-Hour Vehicular Volume

The need for a traffic control signal shall be considered if an engineering study finds that, for each of any 4 hours of an average day, the plotted points representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor-street approach (one direction only) all fall above the applicable curve in Figure 4C-1 for the existing combination of approach lanes. On the minor street, the higher volume shall not be required to be on the same approach during each of these 4 hours.

*As shown in the attached Warrant 2 analysis, only one (1) of the 16-hour count periods (11:00 AM to 12:00 PM) along the minor street are projected to meet or exceed the minimum 80 vehicles on the minor street under the Background Year 2023 and Buildout Year 2023 scenarios. Therefore, this criterion is not met.*

## 3. Warrant 3, Peak Hour

This signal warrant shall be applied only in unusual cases, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

The need for a traffic control signal shall be considered if an engineering study finds that the criteria in either of the following two categories are met:

- A. If all three of the following conditions exist for the same 1 hour (any four consecutive 15-minute periods) of an average day:

1. The total stopped time delay experienced by the traffic on one minor-street approach (one direction only) controlled by a STOP sign equals or exceeds: 4 vehicle-hours for a one-lane approach or 5 vehicle-hours for a two-lane approach; and

*Based on the analysis provided in the Home First – Molalla TIS (prepared by Lancaster Moble, October 5, 2021), the total delay experienced by the highest volume approach, the northbound approach, during the evening peak hour was an average of 446 seconds per vehicle for the northbound approach. For a total northbound approach volume of 188 vehicles, this equates to 23 hours of delay. Therefore, this criterion is met.*

2. The volume on the same minor-street approach (one direction only) equals or exceeds 100 vehicles per hour for one moving lane of traffic or 150 vehicles per hour for two moving lanes; and

*As shown in the attached Warrant 3 analysis, none of the 16-hour count periods along the minor street are projected to meet or exceed 100 vehicles on the minor street under any scenario. Therefore, this criterion is not met.*





3. The total entering volume serviced during the hour equals or exceeds 650 vehicles per hour for intersections with three approaches or 800 vehicles per hour for intersections with four or more approaches.

*As shown in the attached Warrant 3 analysis, 12 or more of the 16-hour count periods at the intersection are projected to meet or exceed 800 vehicles under any scenario. Therefore, this portion of the criterion is met; however, all three of these conditions are required to be met in order to meet Warrant 3. Therefore, this criterion is not met.*

- B. The plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor-street approach (one direction only) for 1 hour (any four consecutive 15-minute periods) of an average day falls above the applicable curve in Figure 4C-3 for the existing combination of approach lanes.

*As shown in the attached Warrant 3 analysis, none of the 16-hour count periods along the minor street are identified to fall above the applicable curve under any scenario. Therefore, this criterion is not met.*

#### 4. Warrant 4, Pedestrian Volume

The need for a traffic control signal at an intersection or midblock crossing shall be considered if an engineering study finds that one of the following criteria is met:

- A. For each of any 4 hours of an average day, the plotted points representing the vehicles per hour on the major street (total of both approaches) and the corresponding pedestrians per hour crossing the major street (total of all crossings) all fall above the curve in Figure 4C-5; or

*As shown in the attached volume data, none of the 16-hour count periods at the intersection are identified to exceed 107 pedestrian crossings per hour. Although pedestrian volumes will likely increase with area development and new connections, they are still likely to be well below this threshold. For comparison, the pedestrian volumes at the intersection of OR-211 and Molalla Avenue in the heart of downtown were measured to be a maximum of 11 pedestrians in any crosswalk during the morning and evening peak periods. Therefore, this criterion is not met.*

- B. For 1 hour (any four consecutive 15-minute periods) of an average day, the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding pedestrians per hour crossing the major street (total of all crossings) falls above the curve in Figure 4C-7.

*As shown in the attached volume data, none of the 16-hour count periods at the intersection are identified to exceed 133 pedestrian crossings per hour. Although pedestrian volumes will likely increase with area development and new connections, they are still likely to be well below this threshold. For comparison, the pedestrian volumes at the intersection of OR-211 and Molalla Avenue in the heart of downtown were measured to be a maximum of 11 pedestrians in any crosswalk during the morning and evening peak periods. Therefore, this criterion is not met.*



## 5. Warrant 5, School Crossing

The need for a traffic control signal shall be considered when an engineering study of the frequency and adequacy of gaps in the vehicular traffic stream as related to the number and size of groups of schoolchildren at an established school crossing across the major street shows that the number of adequate gaps in the traffic stream during the period when the schoolchildren are using the crossing is less than the number of minutes in the same period (see Section 7A.03) and there are a minimum of 20 schoolchildren during the highest crossing hour.

*As shown in the attached volume data, none of the 16-hour count periods at the intersection are identified to exceed 20 pedestrian crossings per hour. Although pedestrian volumes will likely increase with area development and new connections, they are still likely to be well below this threshold. For comparison, the pedestrian volumes at the intersection of OR-211 and Molalla Avenue in the heart of downtown were measured to be a maximum of 11 pedestrians in any crosswalk during the morning and evening peak periods. Therefore, this criterion is not met.*

## 6. Warrant 6, Coordinated Signal System

*As noted previously, the criterion for this warrant does not apply.*

## 7. Warrant 7, Crash Experience

The need for a traffic control signal shall be considered if an engineering study finds that all of the following criteria are met:

- a. Adequate trial of alternatives with satisfactory observance and enforcement has failed to reduce the crash frequency; and

*No significant crash history or safety concerns has been previously identified at this intersection; therefore, no trials for crash mitigation have been conducted. Therefore, this criterion is not applicable.*

- b. Five or more reported crashes, of types susceptible to correction by a traffic control signal, have occurred within a 12-month period, each crash involving personal injury or property damage apparently exceeding the applicable requirements for a reportable crash; and

*As provided in the Home First – Molalla TIS (prepared by Lancaster Mobley, October 5, 2021), there were eight (8) collisions at the subject intersection over a five-year period. This is less than the five collisions per year requirement; therefore, this criterion is not met.*

- c. For each of any 8 hours of an average day, the vehicles per hour (vph) given in both of the 80 percent columns of Condition A in Table 4C-1 (see Section 4C.02), or the vph in both of the 80 percent columns of Condition B in Table 4C-1 exists on the major-street and the higher-volume minor-street approach, respectively, to the intersection, or the volume of pedestrian traffic is not less than 80 percent of the requirements specified in the Pedestrian Volume warrant. These major-street and minor-street volumes shall be for the same 8 hours. On the minor street, the higher volume shall not be required to be on the same approach during each of the 8 hours.

*As demonstrated in Warrants 1 and 4, none of the timeframes within the 16-hour study period were identified to meet the 80% criteria for any scenario; therefore, this criterion is not met.*



## 8. Warrant 8, Roadway Network

The need for a traffic control signal shall be considered if an engineering study finds that the common intersection of two or more major routes meets one or both of the following criteria:

- a. The intersection has a total existing, or immediately projected, entering volume of at least 1,000 vehicles per hour during the peak hour of a typical weekday and has 5-year projected traffic volumes, based on an engineering study, that meet one or more of Warrants 1, 2, and 3 during an average weekday; or
- b. The intersection has a total existing or immediately projected entering volume of at least 1,000 vehicles per hour for each of any 5 hours of a non-normal business day (Saturday or Sunday).

A major route as used in this signal warrant shall have at least one of the following characteristics:

- A. It is part of the street or highway system that serves as the principal roadway network for through traffic flow.
- B. It includes rural or suburban highways outside, entering, or traversing a city.
- C. It appears as a major route on an official plan, such as a major street plan in an urban area traffic and transportation study.

*Leroy Avenue does not qualify as a major route as it classified as a local street in the City of Molalla Transportation System Plan. Additionally, although several timeframes exceed an entering volume of 1,000 vehicles, none of these met any of the warrants. Therefore, this criterion is not met.*

## 9. Warrant 9, Intersection Near a Grade Crossing

*As noted previously, the criterion for this warrant does not apply.*

## Conclusion & Recommendation

The purpose of this memorandum is to document the results from the signal warrant analysis conducted for the intersection of OR-211 & Leroy Avenue within the City of Molalla. This warrant analysis was conducted in support of the Home First – Molalla development application.

As shown in the previous analysis section, the intersection does not meet any analysis criteria. Therefore, signalized control at the intersection of OR-211 & Leroy Avenue does not meet the standard MUTCD guidance. Therefore, it is not recommended to install a signal at this intersection with the construction of the proposed development project.



INTERSECTION INFORMATION					
City:	Molalla	Condition:	Existing Conditions (Adjusted Volumes)		
Population:	10,113				
Intersection Location: (Rural/Urban)	Rural				
Major Street Name:	OR-211	Minor Street Name:	Leroy Avenue		
Number of Moving Lanes for Each Approach:	1	Number of Moving Lanes for Each Approach:	1		
Speed:	35 mph	Speed:	25 mph		
Street Width:	24 ft	Street Width:	40 ft		
Direction:	EB WB	Direction:	NB SB		
Hour Beginning:		Hour Beginning:			
12:00 AM		12:00 AM			
1:00 AM		1:00 AM			
2:00 AM		2:00 AM			
3:00 AM		3:00 AM			
4:00 AM		4:00 AM			
5:00 AM	110 271	5:00 AM	0 3		
6:00 AM	270 398	6:00 AM	0 9		
7:00 AM	394 454	7:00 AM	3 35		
8:00 AM	345 449	8:00 AM	10 24		
9:00 AM	364 430	9:00 AM	19 19		
10:00 AM	415 503	10:00 AM	9 15		
11:00 AM	415 563	11:00 AM	26 25		
12:00 PM	469 548	12:00 PM	13 22		
1:00 PM	474 523	1:00 PM	16 14		
2:00 PM	538 626	2:00 PM	14 40		
3:00 PM	602 649	3:00 PM	16 43		
4:00 PM	664 657	4:00 PM	29 31		
5:00 PM	605 556	5:00 PM	23 29		
6:00 PM	500 373	6:00 PM	11 29		
7:00 PM	312 227	7:00 PM	17 23		
8:00 PM	250 226	8:00 PM	11 8		
9:00 PM		9:00 PM			
10:00 PM		10:00 PM			
11:00 PM		11:00 PM			
24-hour Total	6,727 7,453	24-hour Total	217 369		

**Warrants Evaluted:**

- Warrant 1, 8-Hour Vehicular Volume - Evaluated for Conditions A & B
- Warrant 2 , 4-Hour Vehicular Volume - Evaluated
- Warrant 3, Peak Hour - Evaluated for Conditions A-2, A-3 (A-1 needs to be evaluated separately), and Condition B
- Warrant 4, Pedestrian Volume - Not Analyzed
- Warrant 5, School Crossing - Not Analyzed
- Warrant 6, Coordinated Signal System - Not Analyzed
- Warrant 7, Accident Experience - Not Analyzed
- Warrant 8, Roadway Network - Not Analyzed
- Warrant 9, Intersection Near a Grade Crossing - Not Analyzed

**WARRANT 1, 8-HOUR VEHICULAR VOLUME**

	MAJOR			MINOR			<u>A</u>	<u>B</u>	<u>A or B</u>	<u>80% A&amp;B</u>
	EB	WB	Total	NB	SB	Max				
4:00 PM	664	657	1,321	29	31	31	N	N	N	N
3:00 PM	602	649	1,251	16	43	43	N	N	N	N
2:00 PM	538	626	1,164	14	40	40	N	N	N	N
5:00 PM	605	556	1,161	23	29	29	N	N	N	N
12:00 PM	469	548	1,017	13	22	22	N	N	N	N
11:00 AM	415	563	978	26	25	26	N	N	N	N
1:00 PM	474	523	997	16	14	16	N	N	N	N
10:00 AM	415	503	918	9	15	15	N	N	N	N
6:00 PM	500	373	873	11	29	29	N	N	N	N
7:00 AM	394	454	848	3	35	35	N	N	N	N
9:00 AM	364	430	794	19	19	19	N	N	N	N
8:00 AM	345	449	794	10	24	24	N	N	N	N

**Warrant Requirements:**

Major Street Lanes: 1  
 Minor Street Lanes: 1

**CONDITION A - Minimum Vehicular Volume**

Minimum Volume on Combined Major Street Approaches: 500  
 Minimum Volume on Higher Minor Street Approach: 150

**CONDITION B - Interruption of Continuous Traffic**

Minimum Volume on Combined Major Street Approaches: 750  
 Minimum Volume on Higher Minor Street Approach: 75

IS CONDITION A OF SIGNAL WARRANT 1 MET? NO  
 IS CONDITION B OF SIGNAL WARRANT 1 MET? NO  
 IS COMBINATION OF A OR B MET? NO  
 IS 80% OF CONDITION A AND CONDITION B MET? NO

Note: Signal Warrant 1 is met if either Condition A or Condition B is met.

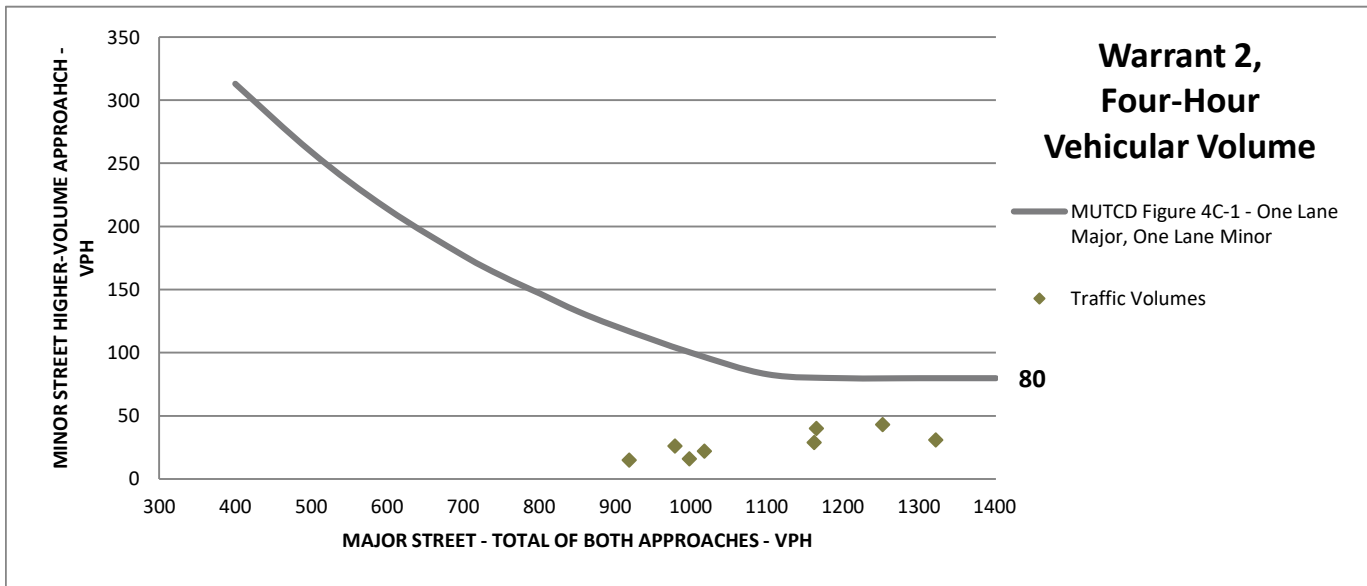
**WARRANT 2, FOUR HOUR VEHICULAR VOLUME**

	MAJOR			MINOR			Calculated Threshold	
	EB	WB	Total	NB	SB	Max		
4:00 PM	664	657	1,321	29	31	31	80	N
3:00 PM	602	649	1,251	16	43	43	80	N
2:00 PM	538	626	1,164	14	40	40	80	N
5:00 PM	605	556	1,161	23	29	29	80	N
12:00 PM	469	548	1,017	13	22	22	97	N
11:00 AM	415	563	978	26	25	26	104	N
1:00 PM	474	523	997	16	14	16	101	N
10:00 AM	415	503	918	9	15	15	117	N

**Warrant Requirements:**

Major Street Lanes: 1  
 Minor Street Lanes: 1

**IS SIGNAL WARRANT 2 MET? NO**



**WARRANT 3, PEAK HOUR VEHICULAR VOLUME**

	MAJOR			MINOR		Max	Calculated Threshold (B)	<u>A-2&amp;3</u>	<u>B</u>
	EB	WB	Total	NB	SB				
4:00 PM	664	657	1,321	29	31	31	122	N	N
3:00 PM	602	649	1,251	16	43	43	136	N	N
2:00 PM	538	626	1,164	14	40	40	154	N	N
5:00 PM	605	556	1,161	23	29	29	155	N	N

**Warrant Requirements:**

Major Street Lanes: 1  
 Minor Street Lanes: 1

**CONDITION A-1 - Stopped Delay**

Cannot be evaluated based on volumes alone. Condition met if traffic on one minor-street approach (one direction only) controlled by STOP sign equals or exceeds: 4 vehicle-hours for a one-lane approach or 5 vehicle-hours for a two-lane approach.

**CONDITION A-2 - Minor Street Volume**

Minimum Volume on Higher Minor Street Approach: 100

**CONDITION A-3 - Total Approach Volume**

Minimum Volume of Total Approaches: 800

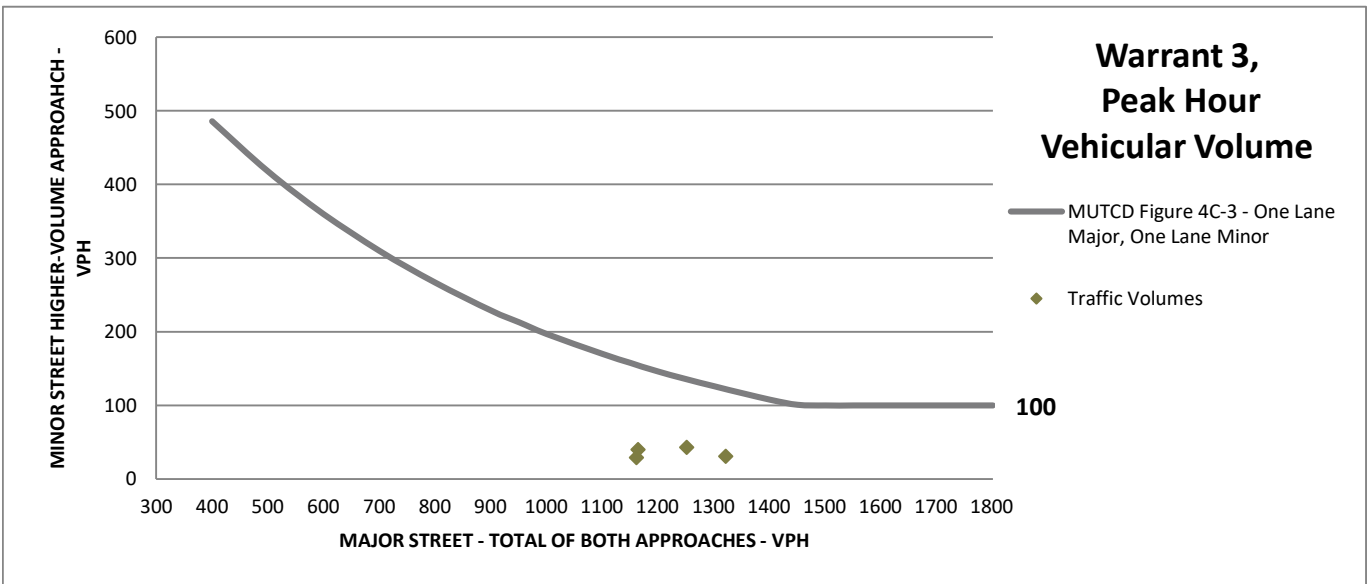
**CONDITION B - Plot of Minor Street Volume (high vol approach) vs. Major Street Volume (Both approaches)**

**ARE CONDITIONS A-2 AND A-3 OF SIGNAL WARRANT 3 MET? NO**

Note: All 3 subsections of Condition A must be met to warrant signal.

**IS CONDITION B OF SIGNAL WARRANT 3 MET? NO**

Note: Signal Warrant 3 is met if either Condition A or Condition B is met.



INTERSECTION INFORMATION					
City:	Molalla	Condition:	Background Conditions		
Population:	10,113				
Intersection Location: (Rural/Urban)	Rural				
Major Street Name:	OR-211	Minor Street Name:	Leroy Avenue		
Number of Moving Lanes for Each Approach:	1	Number of Moving Lanes for Each Approach:	1		
Speed:	35 mph	Speed:	25 mph		
Street Width:	24 ft	Street Width:	40 ft		
Direction:	EB WB	Direction:	NB SB		
Hour Beginning:		Hour Beginning:			
12:00 AM		12:00 AM			
1:00 AM		1:00 AM			
2:00 AM		2:00 AM			
3:00 AM		3:00 AM			
4:00 AM		4:00 AM			
5:00 AM	146 358	5:00 AM	56 10		
6:00 AM	313 491	6:00 AM	56 16		
7:00 AM	443 550	7:00 AM	59 44		
8:00 AM	392 545	8:00 AM	66 32		
9:00 AM	412 525	9:00 AM	76 27		
10:00 AM	465 601	10:00 AM	65 23		
11:00 AM	465 664	11:00 AM	83 33		
12:00 PM	516 622	12:00 PM	50 29		
1:00 PM	522 596	1:00 PM	53 21		
2:00 PM	589 704	2:00 PM	51 48		
3:00 PM	656 728	3:00 PM	53 51		
4:00 PM	720 736	4:00 PM	66 38		
5:00 PM	659 630	5:00 PM	60 36		
6:00 PM	549 439	6:00 PM	48 36		
7:00 PM	352 286	7:00 PM	54 30		
8:00 PM	287 285	8:00 PM	48 14		
9:00 PM		9:00 PM			
10:00 PM		10:00 PM			
11:00 PM		11:00 PM			
24-hour Total	7,486 8,760	24-hour Total	944 488		

**Warrants Evaluted:**

- Warrant 1, 8-Hour Vehicular Volume - Evaluated for Conditions A & B
- Warrant 2 , 4-Hour Vehicular Volume - Evaluated
- Warrant 3, Peak Hour - Evaluated for Conditions A-2, A-3 (A-1 needs to be evaluated separately), and Condition B
- Warrant 4, Pedestrian Volume - Not Analyzed
- Warrant 5, School Crossing - Not Analyzed
- Warrant 6, Coordinated Signal System - Not Analyzed
- Warrant 7, Accident Experience - Not Analyzed
- Warrant 8, Roadway Network - Not Analyzed
- Warrant 9, Intersection Near a Grade Crossing - Not Analyzed



**WARRANT 1, 8-HOUR VEHICULAR VOLUME**

	MAJOR			MINOR			<u>A</u>	<u>B</u>	<u>A or B</u>	<u>80% A&amp;B</u>
	EB	WB	Total	NB	SB	Max				
4:00 PM	720	736	1,456	66	38	66	N	N	N	N
3:00 PM	656	728	1,384	53	51	53	N	N	N	N
2:00 PM	589	704	1,293	51	48	51	N	N	N	N
5:00 PM	659	630	1,289	60	36	60	N	N	N	N
11:00 AM	465	664	1,129	83	33	83	N	Y	Y	N
12:00 PM	516	622	1,138	50	29	50	N	N	N	N
1:00 PM	522	596	1,118	53	21	53	N	N	N	N
10:00 AM	465	601	1,066	65	23	65	N	N	N	N
7:00 AM	443	550	993	59	44	59	N	N	N	N
6:00 PM	549	439	988	48	36	48	N	N	N	N
9:00 AM	412	525	937	76	27	76	N	Y	Y	N
8:00 AM	392	545	937	66	32	66	N	N	N	N

**Warrant Requirements:**

Major Street Lanes: 1  
 Minor Street Lanes: 1

**CONDITION A - Minimum Vehicular Volume**

Minimum Volume on Combined Major Street Approaches: 500  
 Minimum Volume on Higher Minor Street Approach: 150

**CONDITION B - Interruption of Continuous Traffic**

Minimum Volume on Combined Major Street Approaches: 750  
 Minimum Volume on Higher Minor Street Approach: 75

IS CONDITION A OF SIGNAL WARRANT 1 MET? NO  
 IS CONDITION B OF SIGNAL WARRANT 1 MET? NO  
 IS COMBINATION OF A OR B MET? NO  
 IS 80% OF CONDITION A AND CONDITION B MET? NO

Note: Signal Warrant 1 is met if either Condition A or Condition B is met.

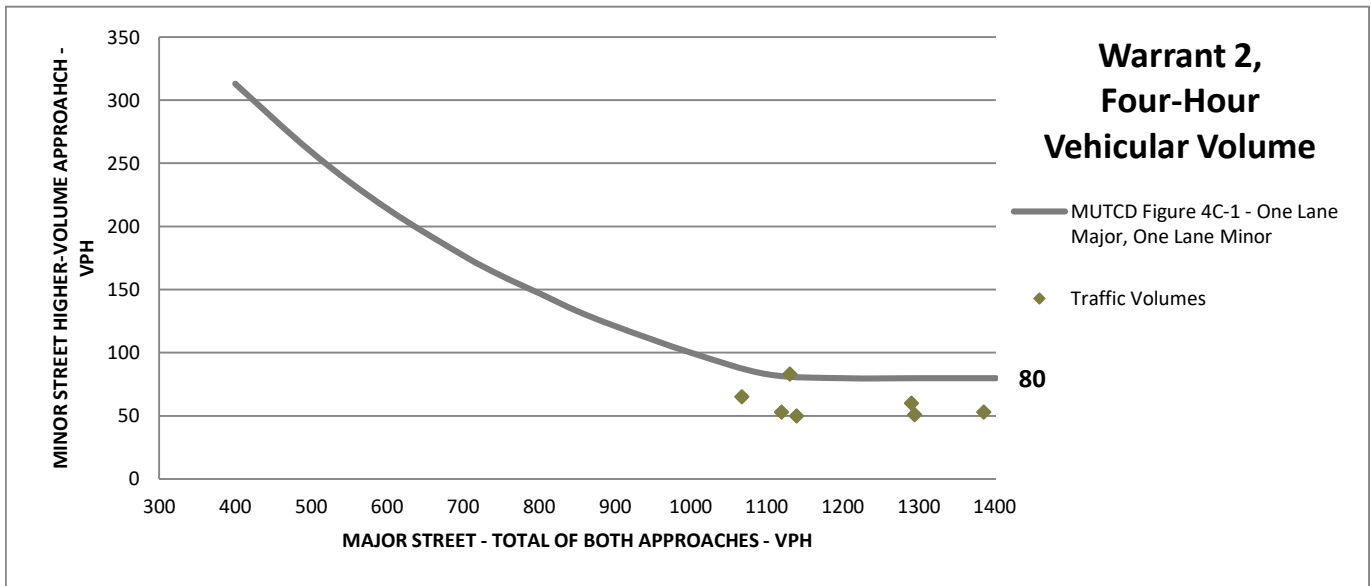
**WARRANT 2, FOUR HOUR VEHICULAR VOLUME**

	MAJOR			MINOR			Calculated Threshold	
	EB	WB	Total	NB	SB	Max		
4:00 PM	720	736	1,456	66	38	66	80	N
3:00 PM	656	728	1,384	53	51	53	80	N
2:00 PM	589	704	1,293	51	48	51	80	N
5:00 PM	659	630	1,289	60	36	60	80	N
11:00 AM	465	664	1,129	83	33	83	80	Y
12:00 PM	516	622	1,138	50	29	50	80	N
1:00 PM	522	596	1,118	53	21	53	80	N
10:00 AM	465	601	1,066	65	23	65	88	N

**Warrant Requirements:**

Major Street Lanes: 1  
 Minor Street Lanes: 1

**IS SIGNAL WARRANT 2 MET? NO**



**WARRANT 3, PEAK HOUR VEHICULAR VOLUME**

	MAJOR			MINOR		Max	Calculated Threshold (B)	<u>A-2&amp;3</u>	<u>B</u>
	EB	WB	Total	NB	SB				
4:00 PM	720	736	1,456	66	38	66	100	N	N
3:00 PM	656	728	1,384	53	51	53	111	N	N
2:00 PM	589	704	1,293	51	48	51	127	N	N
5:00 PM	659	630	1,289	60	36	60	128	N	N

**Warrant Requirements:**

Major Street Lanes: 1  
 Minor Street Lanes: 1

**CONDITION A-1 - Stopped Delay**

Cannot be evaluated based on volumes alone. Condition met if traffic on one minor-street approach (one direction only) controlled by STOP sign equals or exceeds: 4 vehicle-hours for a one-lane approach or 5 vehicle-hours for a two-lane approach.

**CONDITION A-2 - Minor Street Volume**

Minimum Volume on Higher Minor Street Approach: 100

**CONDITION A-3 - Total Approach Volume**

Minimum Volume of Total Approaches: 800

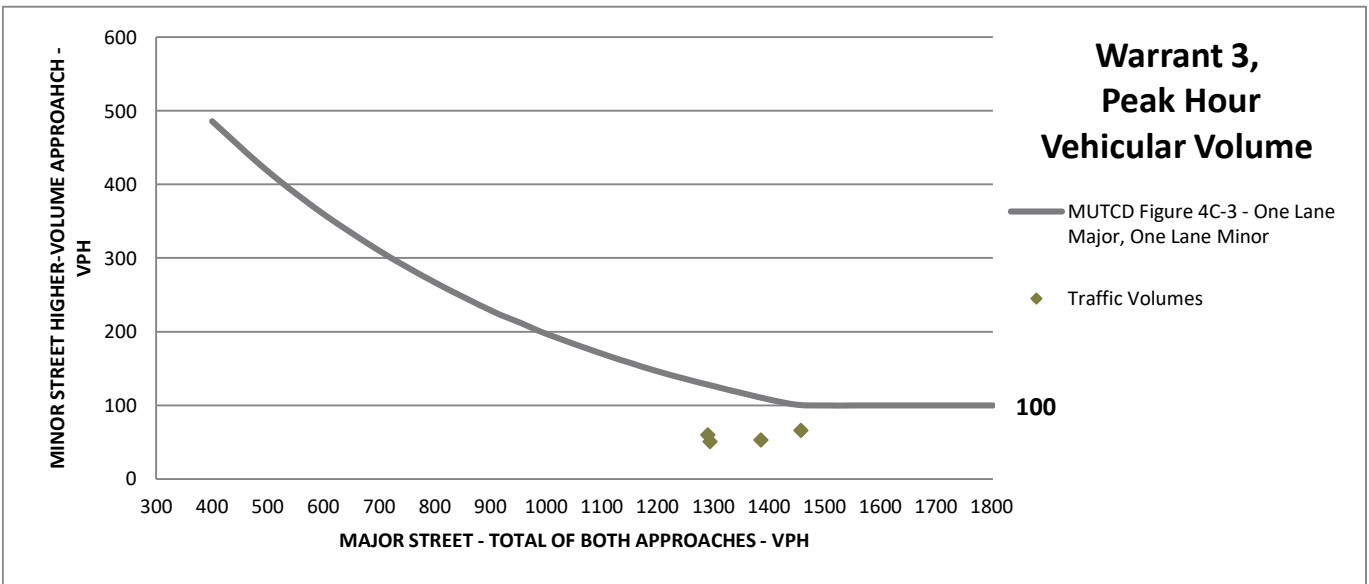
**CONDITION B - Plot of Minor Street Volume (high vol approach) vs. Major Street Volume (Both approaches)**

**ARE CONDITIONS A-2 AND A-3 OF SIGNAL WARRANT 3 MET? NO**

Note: All 3 subsections of Condition A must be met to warrant signal.

**IS CONDITION B OF SIGNAL WARRANT 3 MET? NO**

Note: Signal Warrant 3 is met if either Condition A or Condition B is met.



INTERSECTION INFORMATION					
City:	Molalla	Condition:	Buildout Conditions		
Population:	10,113				
Intersection Location: (Rural/Urban)	Rural				
Major Street Name:	OR-211	Minor Street Name:	Leroy Avenue		
Number of Moving Lanes for Each Approach:	1	Number of Moving Lanes for Each Approach:	1		
Speed:	35 mph	Speed:	25 mph		
Street Width:	24 ft	Street Width:	40 ft		
Direction:	EB WB	Direction:	NB SB		
Hour Beginning:		Hour Beginning:			
12:00 AM		12:00 AM			
1:00 AM		1:00 AM			
2:00 AM		2:00 AM			
3:00 AM		3:00 AM			
4:00 AM		4:00 AM			
5:00 AM	151 360	5:00 AM	59 15		
6:00 AM	318 493	6:00 AM	59 21		
7:00 AM	448 552	7:00 AM	62 49		
8:00 AM	397 547	8:00 AM	69 37		
9:00 AM	417 527	9:00 AM	79 32		
10:00 AM	470 603	10:00 AM	68 28		
11:00 AM	470 666	11:00 AM	86 38		
12:00 PM	521 624	12:00 PM	53 34		
1:00 PM	527 598	1:00 PM	56 26		
2:00 PM	594 706	2:00 PM	54 53		
3:00 PM	661 730	3:00 PM	56 56		
4:00 PM	725 738	4:00 PM	69 43		
5:00 PM	664 632	5:00 PM	63 41		
6:00 PM	554 441	6:00 PM	51 41		
7:00 PM	357 288	7:00 PM	57 35		
8:00 PM	292 287	8:00 PM	51 19		
9:00 PM		9:00 PM			
10:00 PM		10:00 PM			
11:00 PM		11:00 PM			
24-hour Total	7,566 8,792	24-hour Total	992 568		

**Warrants Evaluted:**

- Warrant 1, 8-Hour Vehicular Volume - Evaluated for Conditions A & B
- Warrant 2 , 4-Hour Vehicular Volume - Evaluated
- Warrant 3, Peak Hour - Evaluated for Conditions A-2, A-3 (A-1 needs to be evaluated separately), and Condition B
- Warrant 4, Pedestrian Volume - Not Analyzed
- Warrant 5, School Crossing - Not Analyzed
- Warrant 6, Coordinated Signal System - Not Analyzed
- Warrant 7, Accident Experience - Not Analyzed
- Warrant 8, Roadway Network - Not Analyzed
- Warrant 9, Intersection Near a Grade Crossing - Not Analyzed

**WARRANT 1, 8-HOUR VEHICULAR VOLUME**

	MAJOR			MINOR			<u>A</u>	<u>B</u>	<u>A or B</u>	<u>80% A&amp;B</u>
	EB	WB	Total	NB	SB	Max				
4:00 PM	725	738	1,463	69	43	69	N	N	N	N
3:00 PM	661	730	1,391	56	56	56	N	N	N	N
2:00 PM	594	706	1,300	54	53	54	N	N	N	N
5:00 PM	664	632	1,296	63	41	63	N	N	N	N
11:00 AM	470	666	1,136	86	38	86	N	Y	Y	N
12:00 PM	521	624	1,145	53	34	53	N	N	N	N
1:00 PM	527	598	1,125	56	26	56	N	N	N	N
10:00 AM	470	603	1,073	68	28	68	N	N	N	N
7:00 AM	448	552	1,000	62	49	62	N	N	N	N
6:00 PM	554	441	995	51	41	51	N	N	N	N
9:00 AM	417	527	944	79	32	79	N	Y	Y	N
8:00 AM	397	547	944	69	37	69	N	N	N	N

**Warrant Requirements:**

Major Street Lanes: 1  
 Minor Street Lanes: 1

**CONDITION A - Minimum Vehicular Volume**

Minimum Volume on Combined Major Street Approaches: 500  
 Minimum Volume on Higher Minor Street Approach: 150

**CONDITION B - Interruption of Continuous Traffic**

Minimum Volume on Combined Major Street Approaches: 750  
 Minimum Volume on Higher Minor Street Approach: 75

IS CONDITION A OF SIGNAL WARRANT 1 MET? NO  
 IS CONDITION B OF SIGNAL WARRANT 1 MET? NO  
 IS COMBINATION OF A OR B MET? NO  
 IS 80% OF CONDITION A AND CONDITION B MET? NO

Note: Signal Warrant 1 is met if either Condition A or Condition B is met.

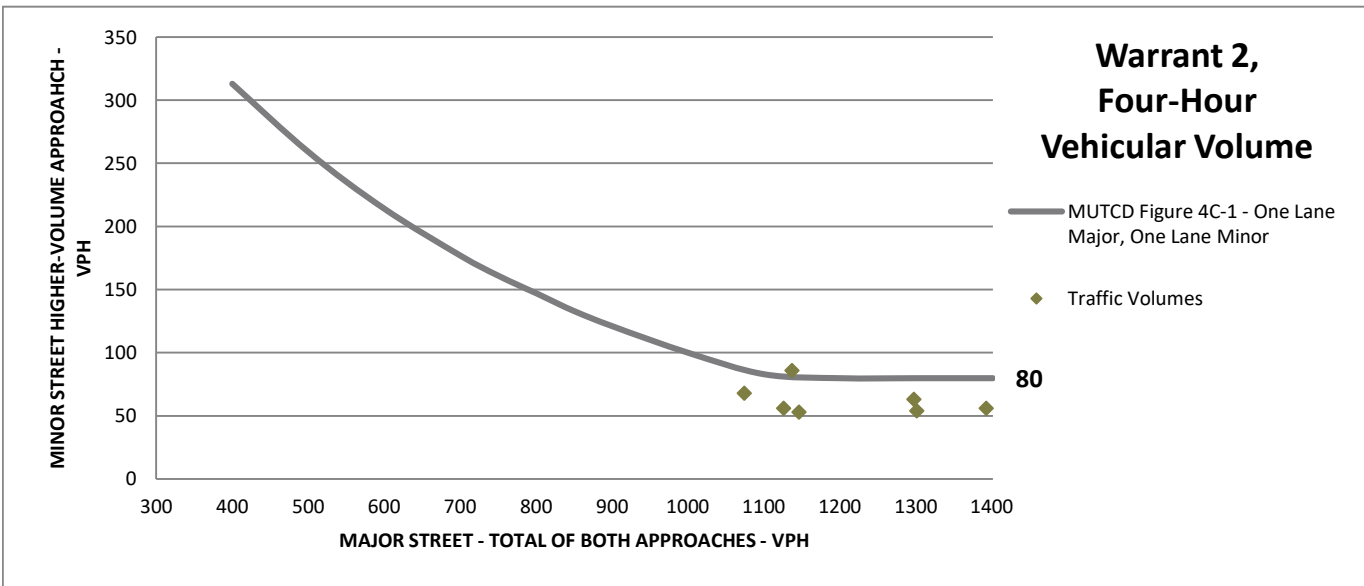
**WARRANT 2, FOUR HOUR VEHICULAR VOLUME**

	MAJOR			MINOR			Calculated Threshold	
	EB	WB	Total	NB	SB	Max		
4:00 PM	725	738	1,463	69	43	69	80	N
3:00 PM	661	730	1,391	56	56	56	80	N
2:00 PM	594	706	1,300	54	53	54	80	N
5:00 PM	664	632	1,296	63	41	63	80	N
11:00 AM	470	666	1,136	86	38	86	80	Y
12:00 PM	521	624	1,145	53	34	53	80	N
1:00 PM	527	598	1,125	56	26	56	80	N
10:00 AM	470	603	1,073	68	28	68	87	N

**Warrant Requirements:**

Major Street Lanes: 1  
 Minor Street Lanes: 1

**IS SIGNAL WARRANT 2 MET? NO**



**WARRANT 3, PEAK HOUR VEHICULAR VOLUME**

	MAJOR			MINOR		Max	Calculated Threshold (B)	<u>A-2&amp;3</u>	<u>B</u>
	EB	WB	Total	NB	SB				
4:00 PM	725	738	1,463	69	43	69	100	N	N
3:00 PM	661	730	1,391	56	56	56	110	N	N
2:00 PM	594	706	1,300	54	53	54	126	N	N
5:00 PM	664	632	1,296	63	41	63	127	N	N

**Warrant Requirements:**

Major Street Lanes: 1  
 Minor Street Lanes: 1

**CONDITION A-1 - Stopped Delay**

Cannot be evaluated based on volumes alone. Condition met if traffic on one minor-street approach (one direction only) controlled by STOP sign equals or exceeds: 4 vehicle-hours for a one-lane approach or 5 vehicle-hours for a two-lane approach.

**CONDITION A-2 - Minor Street Volume**

Minimum Volume on Higher Minor Street Approach: 100

**CONDITION A-3 - Total Approach Volume**

Minimum Volume of Total Approaches: 800

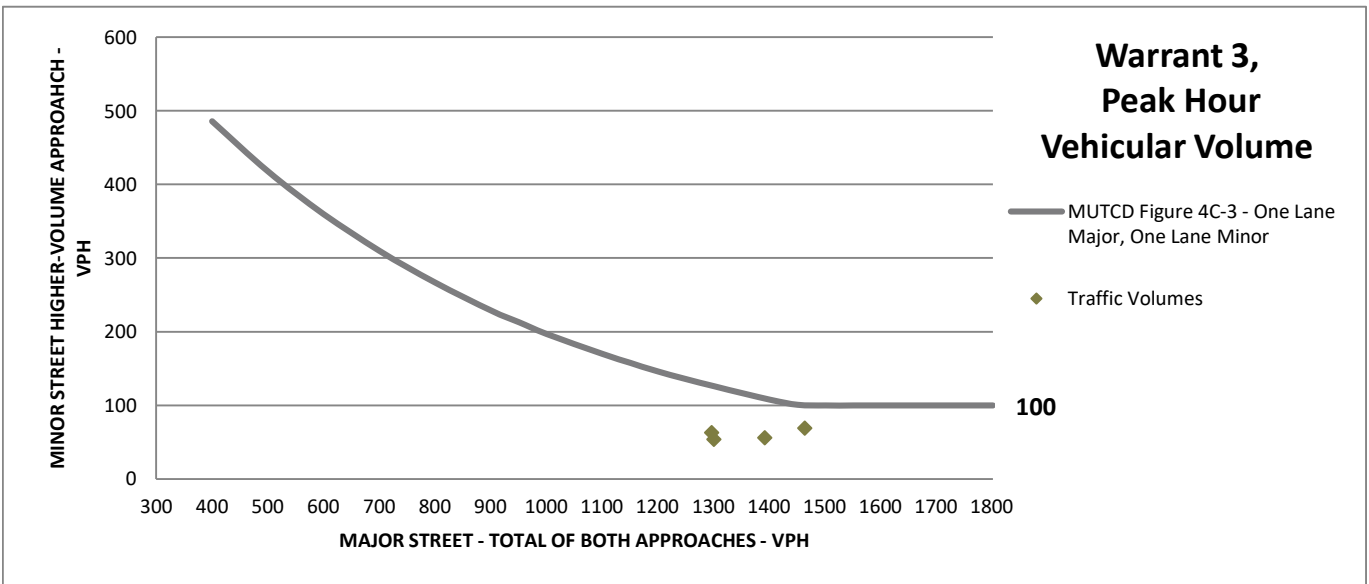
**CONDITION B - Plot of Minor Street Volume (high vol approach) vs. Major Street Volume (Both approaches)**

**ARE CONDITIONS A-2 AND A-3 OF SIGNAL WARRANT 3 MET? NO**

Note: All 3 subsections of Condition A must be met to warrant signal.

**IS CONDITION B OF SIGNAL WARRANT 3 MET? NO**

Note: Signal Warrant 3 is met if either Condition A or Condition B is met.

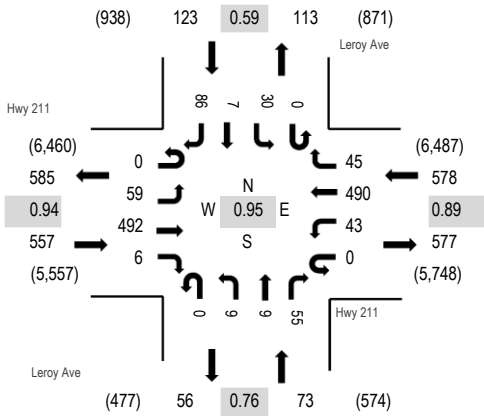




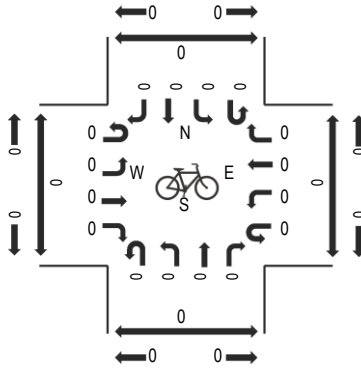
(303) 216-2439  
www.alltrafficdata.net

**Location:** 1 Leroy Ave & Hwy 211 AM  
**Date:** Wednesday, December 15, 2021  
**Peak Hour:** 03:15 PM - 04:15 PM  
**Peak 15-Minutes:** 03:30 PM - 03:45 PM

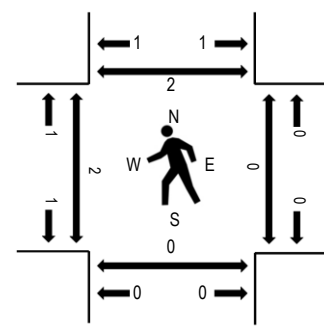
**Peak Hour - Motorized Vehicles**



**Peak Hour - Bicycles**



**Peak Hour - Pedestrians**



Note: Total study counts contained in parentheses.

**Traffic Counts - Motorized Vehicles**

Interval Start Time	Hwy 211 Eastbound				Hwy 211 Westbound				Leroy Ave Northbound				Leroy Ave Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
5:00 AM	0	0	20	0	0	0	44	0	0	0	0	0	0	0	0	2	66	329	0	0	0	0
5:15 AM	0	0	11	0	0	0	52	0	0	0	0	0	0	1	0	5	69	391	0	0	0	0
5:30 AM	0	1	25	0	0	0	56	2	0	0	0	0	0	1	0	7	92	447	0	0	0	0
5:45 AM	0	1	30	0	0	0	64	3	0	0	0	0	0	0	0	4	102	518	0	0	0	1
6:00 AM	0	4	38	0	0	0	78	3	0	0	0	0	0	1	0	4	128	583	0	0	0	0
6:15 AM	0	2	41	0	0	0	75	3	0	0	0	0	0	1	0	3	125	631	0	0	0	0
6:30 AM	0	1	54	0	0	0	91	6	0	0	0	1	0	4	0	6	163	775	0	0	0	0
6:45 AM	0	5	70	0	0	1	72	5	0	0	0	0	0	1	0	13	167	835	0	0	0	0
7:00 AM	0	7	57	0	0	1	81	15	0	0	0	1	0	4	0	10	176	849	2	0	0	0
7:15 AM	0	12	76	0	0	3	89	25	0	1	1	1	0	14	1	46	269	859	0	0	0	0
7:30 AM	0	6	84	1	0	0	101	12	0	0	0	1	0	7	0	11	223	764	0	0	1	1
7:45 AM	0	6	66	2	0	0	87	5	0	0	0	1	0	2	0	12	181	731	0	0	0	0
8:00 AM	0	2	58	0	0	4	96	10	0	1	0	1	0	6	0	8	186	733	0	0	0	0
8:15 AM	0	3	71	1	0	1	81	5	0	0	1	2	0	1	1	7	174	734	0	0	0	0
8:30 AM	0	3	64	2	0	2	98	7	0	2	0	1	0	4	0	7	190	721	0	0	0	0
8:45 AM	0	5	69	0	0	5	71	8	0	1	3	2	0	5	2	12	183	720	0	0	0	0
9:00 AM	0	2	73	1	0	9	86	4	0	0	0	2	0	2	1	7	187	726	0	0	0	0
9:15 AM	0	3	57	2	0	3	68	3	0	4	0	5	0	6	0	10	161	741	1	0	0	1
9:30 AM	0	3	74	0	0	5	88	3	0	3	1	3	0	3	0	6	189	775	0	0	0	0
9:45 AM	0	3	75	2	0	5	79	1	0	7	0	4	0	1	2	10	189	790	0	0	0	0
10:00 AM	0	3	92	1	0	6	84	2	0	1	0	3	0	5	0	5	202	818	0	0	0	1
10:15 AM	0	2	72	1	0	3	92	1	0	1	1	12	0	2	0	8	195	827	0	0	0	0
10:30 AM	0	4	76	1	0	8	95	4	0	1	0	3	0	1	2	9	204	857	0	0	0	0
10:45 AM	0	1	81	0	0	5	108	4	0	1	2	8	0	1	1	5	217	878	0	0	0	0
11:00 AM	0	3	74	1	0	8	99	3	0	6	2	4	0	4	1	6	211	901	0	0	0	0
11:15 AM	0	4	72	2	0	9	113	4	0	2	0	5	0	3	2	9	225	940	0	0	0	1
11:30 AM	0	7	77	0	0	9	95	6	0	3	1	10	0	5	1	11	225	950	0	0	0	0
11:45 AM	0	7	87	1	0	3	113	5	0	5	2	8	0	3	1	5	240	968	2	0	0	0
12:00 PM	0	4	85	0	0	10	123	9	0	2	0	6	0	4	0	7	250	972	2	0	0	0
12:15 PM	0	2	90	2	0	6	102	8	0	3	0	10	0	1	1	10	235	948	1	0	1	0
12:30 PM	0	9	85	1	0	7	107	9	0	5	0	9	0	6	0	5	243	944	0	0	0	0
12:45 PM	0	4	109	2	0	10	89	7	0	1	0	5	0	6	0	11	244	936	2	0	1	0
1:00 PM	0	8	82	2	0	6	106	4	0	2	0	8	0	0	1	7	226	938	1	0	0	2
1:15 PM	0	4	89	3	0	7	109	5	0	1	0	8	0	3	0	2	231	944	0	0	0	1



1:30 PM	0	2	96	1	0	7	91	7	0	3	2	10	0	1	1	14	235	1,010	1	0	0	0
1:45 PM	0	9	102	1	0	8	99	5	0	4	1	7	0	4	2	4	246	1,043	0	0	0	0
2:00 PM	0	11	88	0	1	6	91	9	0	0	3	9	0	6	1	7	232	1,133	0	0	0	0
2:15 PM	0	9	106	0	0	12	118	7	0	3	2	7	0	11	0	22	297	1,179	2	0	0	1
2:30 PM	0	7	104	0	0	11	118	6	0	2	0	6	0	5	0	9	268	1,212	4	0	1	0
2:45 PM	0	9	111	1	0	11	150	10	0	1	1	16	0	5	5	16	336	1,293	1	0	0	0
3:00 PM	0	10	79	1	0	5	131	10	0	0	3	16	0	3	1	19	278	1,278	2	0	0	2
3:15 PM	0	16	121	2	0	9	129	18	0	1	2	13	0	6	2	11	330	1,331	1	0	0	0
3:30 PM	0	18	124	1	0	17	108	12	0	1	2	13	0	17	0	36	349	1,321	0	0	0	2
3:45 PM	0	14	116	1	0	7	131	7	0	3	1	13	0	4	3	21	321	1,273	0	0	0	0
4:00 PM	0	11	131	2	0	10	122	8	0	4	4	16	0	3	2	18	331	1,293	1	0	0	0
4:15 PM	0	16	117	0	0	11	132	7	0	4	2	9	0	7	0	15	320	1,297	3	0	0	1
4:30 PM	0	10	119	1	0	13	117	5	0	3	1	9	0	8	2	13	301	1,274	2	0	0	0
4:45 PM	0	13	133	2	0	7	132	13	0	4	2	11	0	4	0	20	341	1,234	2	0	0	0
5:00 PM	0	15	132	2	0	11	121	7	0	3	0	15	0	10	1	18	335	1,138	4	0	0	0
5:15 PM	0	11	118	2	0	7	121	6	0	2	4	11	0	4	0	11	297	1,056	0	0	0	1
5:30 PM	0	7	111	2	0	7	99	5	0	2	2	12	0	3	0	11	261	990	0	0	0	1
5:45 PM	0	7	100	2	0	9	85	9	0	3	3	11	0	4	2	10	245	924	2	0	0	0
6:00 PM	0	7	108	0	0	7	89	11	0	1	1	11	0	3	1	14	253	862	0	0	0	0
6:15 PM	0	10	102	0	0	9	71	11	0	0	3	12	0	4	1	8	231	745	0	0	0	0
6:30 PM	0	3	98	2	0	8	54	4	0	0	1	8	0	8	3	6	195	666	0	0	0	0
6:45 PM	0	10	76	2	0	2	69	6	0	1	2	6	0	4	0	5	183	594	0	0	0	0
7:00 PM	0	5	58	0	0	5	47	4	0	2	0	6	0	4	1	4	136	545	0	0	0	0
7:15 PM	0	4	74	1	0	6	42	6	0	2	1	6	0	4	0	6	152	554	0	0	0	0
7:30 PM	0	4	55	3	0	7	35	5	0	0	0	5	0	3	3	3	123	524	0	0	0	0
7:45 PM	0	8	50	1	0	2	44	4	0	5	4	5	0	3	1	7	134	504	0	0	0	0
8:00 PM	0	5	65	1	0	9	51	3	0	1	1	4	0	0	2	3	145	458	1	0	0	0
8:15 PM	0	3	47	0	0	4	53	3	0	3	0	4	0	0	1	4	122		0	0	0	1
8:30 PM	0	3	43	1	0	0	35	8	0	2	1	1	0	1	1	7	103		0	0	0	0
8:45 PM	0	8	33	0	0	1	34	4	0	0	1	1	0	2	0	4	88		0	0	0	0
Count Total	0	396	5,101	60	1	364	5,711	411	0	113	64	397	0	249	53	636	13,556		37	0	4	17
Peak Hour	0	59	492	6	0	43	490	45	0	9	9	55	0	30	7	86	1,331		2	0	0	2

## CHAPTER 4C. TRAFFIC CONTROL SIGNAL NEEDS STUDIES

### Section 4C.01 Studies and Factors for Justifying Traffic Control Signals

#### Standard:

- 01 An engineering study of traffic conditions, pedestrian characteristics, and physical characteristics of the location shall be performed to determine whether installation of a traffic control signal is justified at a particular location.
- 02 The investigation of the need for a traffic control signal shall include an analysis of factors related to the existing operation and safety at the study location and the potential to improve these conditions, and the applicable factors contained in the following traffic signal warrants:
- Warrant 1, Eight-Hour Vehicular Volume
  - Warrant 2, Four-Hour Vehicular Volume
  - Warrant 3, Peak Hour
  - Warrant 4, Pedestrian Volume
  - Warrant 5, School Crossing
  - Warrant 6, Coordinated Signal System
  - Warrant 7, Crash Experience
  - Warrant 8, Roadway Network
  - Warrant 9, Intersection Near a Grade Crossing
- 03 The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

#### Support:

- 04 Sections 8C.09 and 8C.10 contain information regarding the use of traffic control signals instead of gates and/or flashing-light signals at highway-rail grade crossings and highway-light rail transit grade crossings, respectively.
- Guidance:*
- 05 A traffic control signal should not be installed unless one or more of the factors described in this Chapter are met.
- 06 A traffic control signal should not be installed unless an engineering study indicates that installing a traffic control signal will improve the overall safety and/or operation of the intersection.
- 07 A traffic control signal should not be installed if it will seriously disrupt progressive traffic flow.
- 08 The study should consider the effects of the right-turn vehicles from the minor-street approaches. Engineering judgment should be used to determine what, if any, portion of the right-turn traffic is subtracted from the minor-street traffic count when evaluating the count against the signal warrants listed in Paragraph 2.
- 09 Engineering judgment should also be used in applying various traffic signal warrants to cases where approaches consist of one lane plus one left-turn or right-turn lane. The site-specific traffic characteristics should dictate whether an approach is considered as one lane or two lanes. For example, for an approach with one lane for through and right-turning traffic plus a left-turn lane, if engineering judgment indicates that it should be considered a one-lane approach because the traffic using the left-turn lane is minor, the total traffic volume approaching the intersection should be applied against the signal warrants as a one-lane approach. The approach should be considered two lanes if approximately half of the traffic on the approach turns left and the left-turn lane is of sufficient length to accommodate all left-turn vehicles.
- 10 Similar engineering judgment and rationale should be applied to a street approach with one through/left-turn lane plus a right-turn lane. In this case, the degree of conflict of minor-street right-turn traffic with traffic on the major street should be considered. Thus, right-turn traffic should not be included in the minor-street volume if the movement enters the major street with minimal conflict. The approach should be evaluated as a one-lane approach with only the traffic volume in the through/left-turn lane considered.
- 11 At a location that is under development or construction and where it is not possible to obtain a traffic count that would represent future traffic conditions, hourly volumes should be estimated as part of an engineering study for comparison with traffic signal warrants. Except for locations where the engineering study uses the satisfaction of Warrant 8 to justify a signal, a traffic control signal installed under projected conditions should have an engineering study done within 1 year of putting the signal into stop-and-go operation to determine if the signal is justified. If not justified, the signal should be taken out of stop-and-go operation or removed.
- 12 For signal warrant analysis, a location with a wide median, even if the median width is greater than 30 feet, should be considered as one intersection.

## Option:

- 13 At an intersection with a high volume of left-turn traffic from the major street, the signal warrant analysis may be performed in a manner that considers the higher of the major-street left-turn volumes as the “minor-street” volume and the corresponding single direction of opposing traffic on the major street as the “major-street” volume.
- 14 For signal warrants requiring conditions to be present for a certain number of hours in order to be satisfied, any four sequential 15-minute periods may be considered as 1 hour if the separate 1-hour periods used in the warrant analysis do not overlap each other and both the major-street volume and the minor-street volume are for the same specific one-hour periods.
- 15 For signal warrant analysis, bicyclists may be counted as either vehicles or pedestrians.

## Support:

- 16 When performing a signal warrant analysis, bicyclists riding in the street with other vehicular traffic are usually counted as vehicles and bicyclists who are clearly using pedestrian facilities are usually counted as pedestrians.

## Option:

- 17 Engineering study data may include the following:
- A. The number of vehicles entering the intersection in each hour from each approach during 12 hours of an average day. It is desirable that the hours selected contain the greatest percentage of the 24-hour traffic volume.
  - B. Vehicular volumes for each traffic movement from each approach, classified by vehicle type (heavy trucks, passenger cars and light trucks, public-transit vehicles, and, in some locations, bicycles), during each 15-minute period of the 2 hours in the morning and 2 hours in the afternoon during which total traffic entering the intersection is greatest.
  - C. Pedestrian volume counts on each crosswalk during the same periods as the vehicular counts in Item B and during hours of highest pedestrian volume. Where young, elderly, and/or persons with physical or visual disabilities need special consideration, the pedestrians and their crossing times may be classified by general observation.
  - D. Information about nearby facilities and activity centers that serve the young, elderly, and/or persons with disabilities, including requests from persons with disabilities for accessible crossing improvements at the location under study. These persons might not be adequately reflected in the pedestrian volume count if the absence of a signal restrains their mobility.
  - E. The posted or statutory speed limit or the 85<sup>th</sup>-percentile speed on the uncontrolled approaches to the location.
  - F. A condition diagram showing details of the physical layout, including such features as intersection geometrics, channelization, grades, sight-distance restrictions, transit stops and routes, parking conditions, pavement markings, roadway lighting, driveways, nearby railroad crossings, distance to nearest traffic control signals, utility poles and fixtures, and adjacent land use.
  - G. A collision diagram showing crash experience by type, location, direction of movement, severity, weather, time of day, date, and day of week for at least 1 year.
- 18 The following data, which are desirable for a more precise understanding of the operation of the intersection, may be obtained during the periods described in Item B of Paragraph 17:
- A. Vehicle-hours of stopped time delay determined separately for each approach.
  - B. The number and distribution of acceptable gaps in vehicular traffic on the major street for entrance from the minor street.
  - C. The posted or statutory speed limit or the 85<sup>th</sup>-percentile speed on controlled approaches at a point near to the intersection but unaffected by the control.
  - D. Pedestrian delay time for at least two 30-minute peak pedestrian delay periods of an average weekday or like periods of a Saturday or Sunday.
  - E. Queue length on stop-controlled approaches.

**Section 4C.02 Warrant 1, Eight-Hour Vehicular Volume**

## Support:

- 01 The Minimum Vehicular Volume, Condition A, is intended for application at locations where a large volume of intersecting traffic is the principal reason to consider installing a traffic control signal.
- 02 The Interruption of Continuous Traffic, Condition B, is intended for application at locations where Condition A is not satisfied and where the traffic volume on a major street is so heavy that traffic on a minor intersecting street suffers excessive delay or conflict in entering or crossing the major street.
- 03 It is intended that Warrant 1 be treated as a single warrant. If Condition A is satisfied, then Warrant 1 is satisfied and analyses of Condition B and the combination of Conditions A and B are not needed. Similarly, if Condition B is satisfied, then Warrant 1 is satisfied and an analysis of the combination of Conditions A and B is not needed.

**Standard:**

- 04 The need for a traffic control signal shall be considered if an engineering study finds that one of the following conditions exist for each of any 8 hours of an average day:
- A. The vehicles per hour given in both of the 100 percent columns of Condition A in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection;
  - B. The vehicles per hour given in both of the 100 percent columns of Condition B in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection.

In applying each condition the major-street and minor-street volumes shall be for the same 8 hours. On the minor street, the higher volume shall not be required to be on the same approach during each of these 8 hours.

Option:

- 05 If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, the traffic volumes in the 70 percent columns in Table 4C-1 may be used in place of the 100 percent columns.

Guidance:

- 06 The combination of Conditions A and B is intended for application at locations where Condition A is not satisfied and Condition B is not satisfied and should be applied only after an adequate trial of other alternatives that could cause less delay and inconvenience to traffic has failed to solve the traffic problems.

**Standard:**

- 07 The need for a traffic control signal shall be considered if an engineering study finds that both of the following conditions exist for each of any 8 hours of an average day:
- A. The vehicles per hour given in both of the 80 percent columns of Condition A in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection; and
  - B. The vehicles per hour given in both of the 80 percent columns of Condition B in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection.

These major-street and minor-street volumes shall be for the same 8 hours for each condition; however, the 8 hours satisfied in Condition A shall not be required to be the same 8 hours satisfied in Condition B. On the minor street, the higher volume shall not be required to be on the same approach during each of the 8 hours.

**Table 4C-1. Warrant 1, Eight-Hour Vehicular Volume**

**Condition A—Minimum Vehicular Volume**

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100% <sup>a</sup>	80% <sup>b</sup>	70% <sup>c</sup>	56% <sup>d</sup>	100% <sup>a</sup>	80% <sup>b</sup>	70% <sup>c</sup>	56% <sup>d</sup>
1	1	500	400	350	280	150	120	105	84
2 or more	1	600	480	420	336	150	120	105	84
2 or more	2 or more	600	480	420	336	200	160	140	112
1	2 or more	500	400	350	280	200	160	140	112

**Condition B—Interruption of Continuous Traffic**

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100% <sup>a</sup>	80% <sup>b</sup>	70% <sup>c</sup>	56% <sup>d</sup>	100% <sup>a</sup>	80% <sup>b</sup>	70% <sup>c</sup>	56% <sup>d</sup>
1	1	750	600	525	420	75	60	53	42
2 or more	1	900	720	630	504	75	60	53	42
2 or more	2 or more	900	720	630	504	100	80	70	56
1	2 or more	750	600	525	420	100	80	70	56

<sup>a</sup> Basic minimum hourly volume

<sup>b</sup> Used for combination of Conditions A and B after adequate trial of other remedial measures

<sup>c</sup> May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

<sup>d</sup> May be used for combination of Conditions A and B after adequate trial of other remedial measures when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

Option:

- 08 If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, the traffic volumes in the 56 percent columns in Table 4C-1 may be used in place of the 80 percent columns.

### **Section 4C.03 Warrant 2, Four-Hour Vehicular Volume**

Support:

- 01 The Four-Hour Vehicular Volume signal warrant conditions are intended to be applied where the volume of intersecting traffic is the principal reason to consider installing a traffic control signal.

**Standard:**

- 02 **The need for a traffic control signal shall be considered if an engineering study finds that, for each of any 4 hours of an average day, the plotted points representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor-street approach (one direction only) all fall above the applicable curve in Figure 4C-1 for the existing combination of approach lanes. On the minor street, the higher volume shall not be required to be on the same approach during each of these 4 hours.**

Option:

- 03 If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, Figure 4C-2 may be used in place of Figure 4C-1.

### **Section 4C.04 Warrant 3, Peak Hour**

Support:

- 01 The Peak Hour signal warrant is intended for use at a location where traffic conditions are such that for a minimum of 1 hour of an average day, the minor-street traffic suffers undue delay when entering or crossing the major street.

**Standard:**

- 02 **This signal warrant shall be applied only in unusual cases, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.**
- 03 **The need for a traffic control signal shall be considered if an engineering study finds that the criteria in either of the following two categories are met:**
- A. **If all three of the following conditions exist for the same 1 hour (any four consecutive 15-minute periods) of an average day:**
    1. **The total stopped time delay experienced by the traffic on one minor-street approach (one direction only) controlled by a STOP sign equals or exceeds: 4 vehicle-hours for a one-lane approach or 5 vehicle-hours for a two-lane approach; and**
    2. **The volume on the same minor-street approach (one direction only) equals or exceeds 100 vehicles per hour for one moving lane of traffic or 150 vehicles per hour for two moving lanes; and**
    3. **The total entering volume serviced during the hour equals or exceeds 650 vehicles per hour for intersections with three approaches or 800 vehicles per hour for intersections with four or more approaches.**
  - B. **The plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor-street approach (one direction only) for 1 hour (any four consecutive 15-minute periods) of an average day falls above the applicable curve in Figure 4C-3 for the existing combination of approach lanes.**

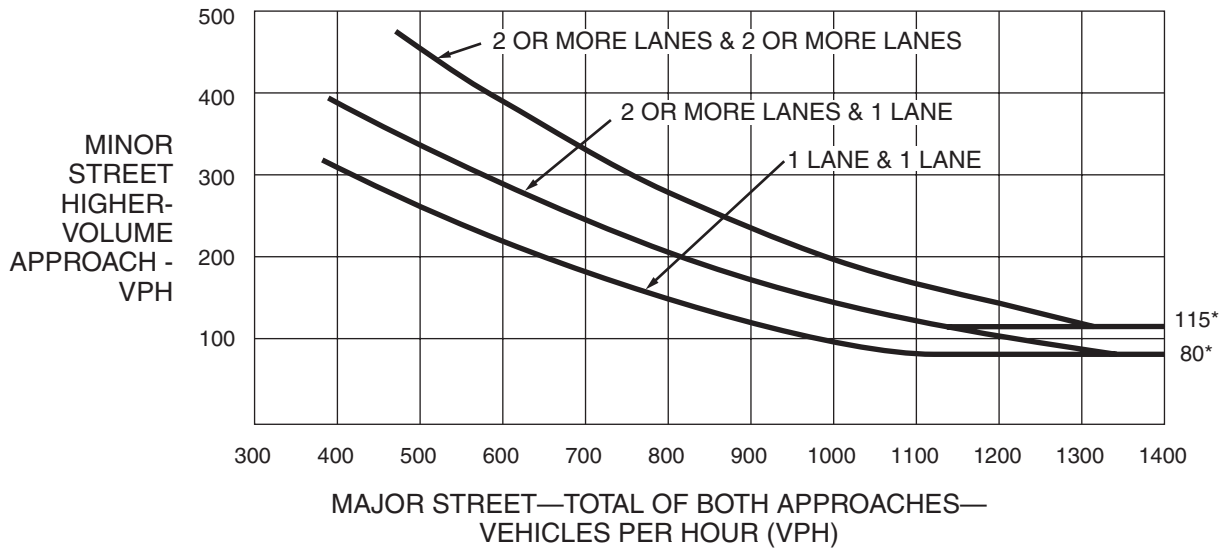
Option:

- 04 If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, Figure 4C-4 may be used in place of Figure 4C-3 to evaluate the criteria in the second category of the Standard.
- 05 If this warrant is the only warrant met and a traffic control signal is justified by an engineering study, the traffic control signal may be operated in the flashing mode during the hours that the volume criteria of this warrant are not met.

*Guidance:*

- 06 *If this warrant is the only warrant met and a traffic control signal is justified by an engineering study, the traffic control signal should be traffic-actuated.*

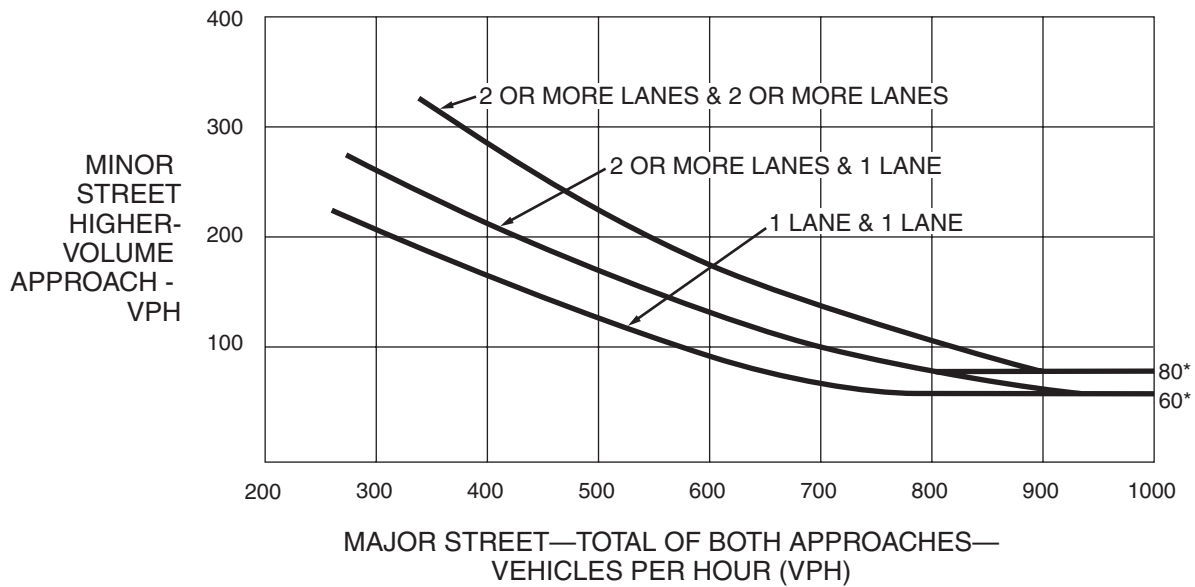
**Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume**



\*Note: 115 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 80 vph applies as the lower threshold volume for a minor-street approach with one lane.

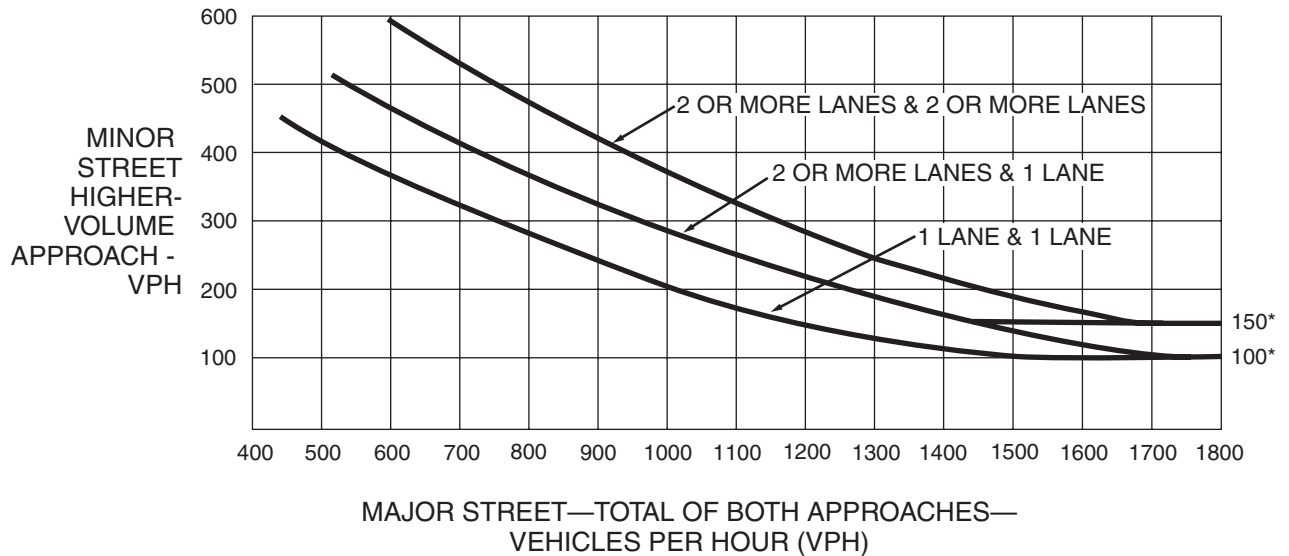
**Figure 4C-2. Warrant 2, Four-Hour Vehicular Volume (70% Factor)**

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



\*Note: 80 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 60 vph applies as the lower threshold volume for a minor-street approach with one lane.

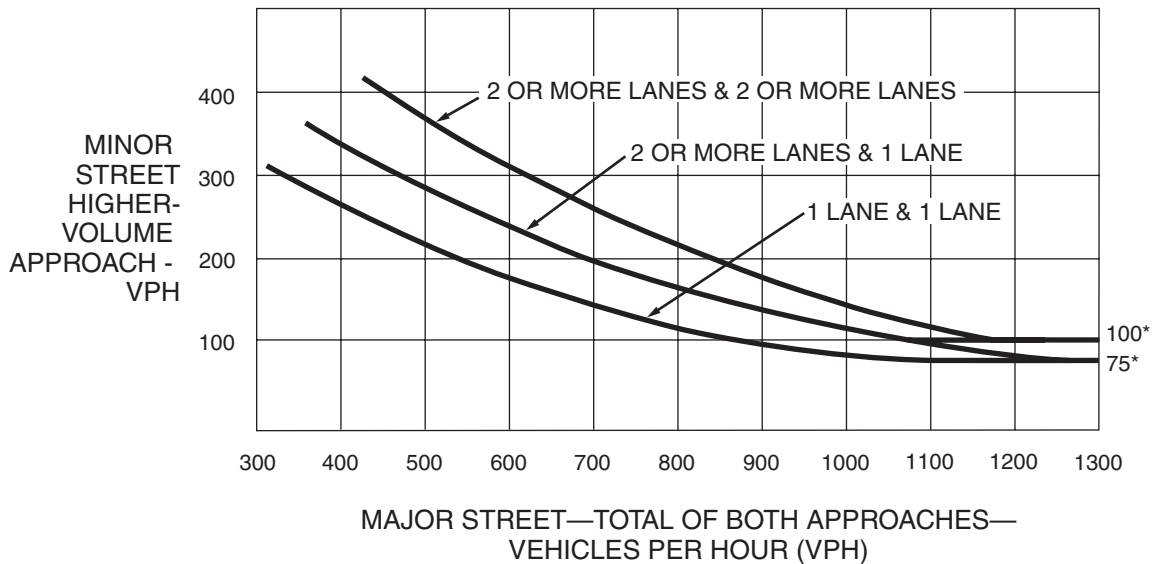
**Figure 4C-3. Warrant 3, Peak Hour**



\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

### Section 4C.05 Warrant 4, Pedestrian Volume

#### Support:

- 01 The Pedestrian Volume signal warrant is intended for application where the traffic volume on a major street is so heavy that pedestrians experience excessive delay in crossing the major street.

#### Standard:

- 02 **The need for a traffic control signal at an intersection or midblock crossing shall be considered if an engineering study finds that one of the following criteria is met:**
- A. For each of any 4 hours of an average day, the plotted points representing the vehicles per hour on the major street (total of both approaches) and the corresponding pedestrians per hour crossing the major street (total of all crossings) all fall above the curve in Figure 4C-5; or
  - B. For 1 hour (any four consecutive 15-minute periods) of an average day, the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding pedestrians per hour crossing the major street (total of all crossings) falls above the curve in Figure 4C-7.

#### Option:

- 03 If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 35 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, Figure 4C-6 may be used in place of Figure 4C-5 to evaluate Criterion A in Paragraph 2, and Figure 4C-8 may be used in place of Figure 4C-7 to evaluate Criterion B in Paragraph 2.

#### Standard:

- 04 **The Pedestrian Volume signal warrant shall not be applied at locations where the distance to the nearest traffic control signal or STOP sign controlling the street that pedestrians desire to cross is less than 300 feet, unless the proposed traffic control signal will not restrict the progressive movement of traffic.**
- 05 **If this warrant is met and a traffic control signal is justified by an engineering study, the traffic control signal shall be equipped with pedestrian signal heads complying with the provisions set forth in Chapter 4E.**

#### Guidance:

- 06 *If this warrant is met and a traffic control signal is justified by an engineering study, then:*
- A. *If it is installed at an intersection or major driveway location, the traffic control signal should also control the minor-street or driveway traffic, should be traffic-actuated, and should include pedestrian detection.*
  - B. *If it is installed at a non-intersection crossing, the traffic control signal should be installed at least 100 feet from side streets or driveways that are controlled by STOP or YIELD signs, and should be pedestrian-actuated. If the traffic control signal is installed at a non-intersection crossing, at least one of the signal faces should be over the traveled way for each approach, parking and other sight obstructions should be prohibited for at least 100 feet in advance of and at least 20 feet beyond the crosswalk or site accommodations should be made through curb extensions or other techniques to provide adequate sight distance, and the installation should include suitable standard signs and pavement markings.*
  - C. *Furthermore, if it is installed within a signal system, the traffic control signal should be coordinated.*

#### Option:

- 07 The criterion for the pedestrian volume crossing the major street may be reduced as much as 50 percent if the 15th-percentile crossing speed of pedestrians is less than 3.5 feet per second.
- 08 A traffic control signal may not be needed at the study location if adjacent coordinated traffic control signals consistently provide gaps of adequate length for pedestrians to cross the street.

### Section 4C.06 Warrant 5, School Crossing

#### Support:

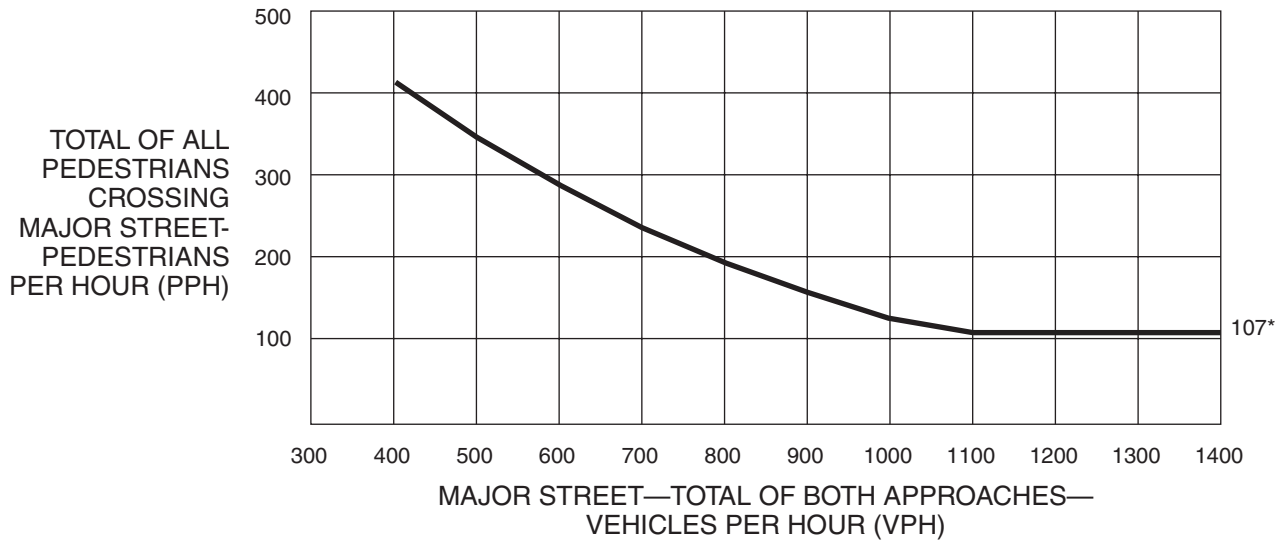
- 01 The School Crossing signal warrant is intended for application where the fact that schoolchildren cross the major street is the principal reason to consider installing a traffic control signal. For the purposes of this warrant, the word “schoolchildren” includes elementary through high school students.

#### Standard:

- 02 **The need for a traffic control signal shall be considered when an engineering study of the frequency and adequacy of gaps in the vehicular traffic stream as related to the number and size of groups of schoolchildren at an established school crossing across the major street shows that the number of adequate gaps in the traffic stream during the period when the schoolchildren are using the crossing is less than the number of minutes in the same period (see Section 7A.03) and there are a minimum of 20 schoolchildren during the highest crossing hour.**

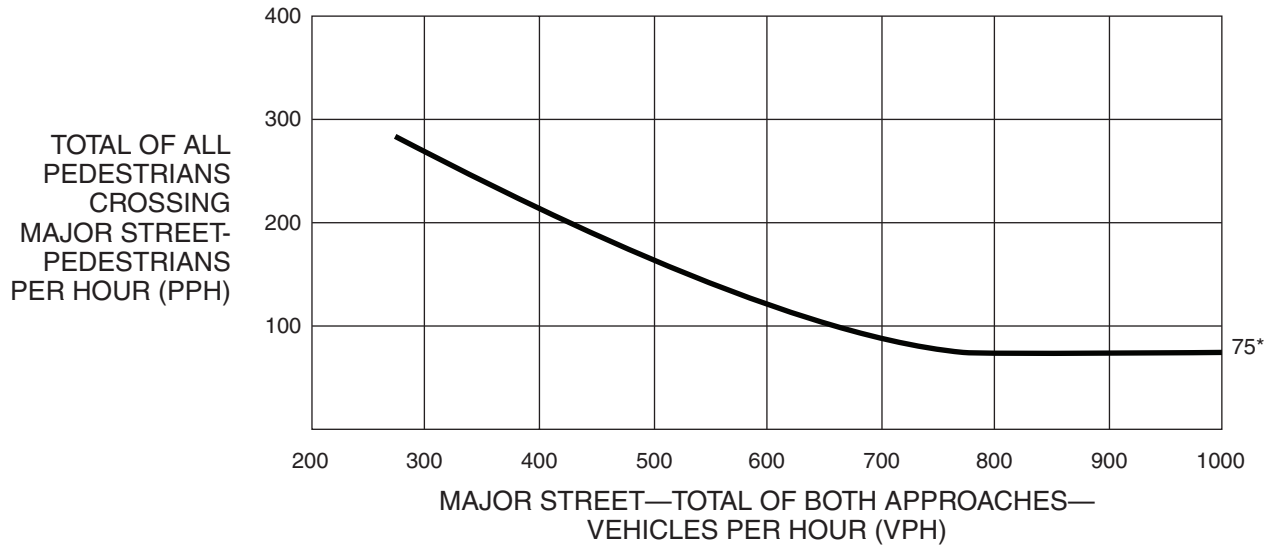


**Figure 4C-5. Warrant 4, Pedestrian Four-Hour Volume**



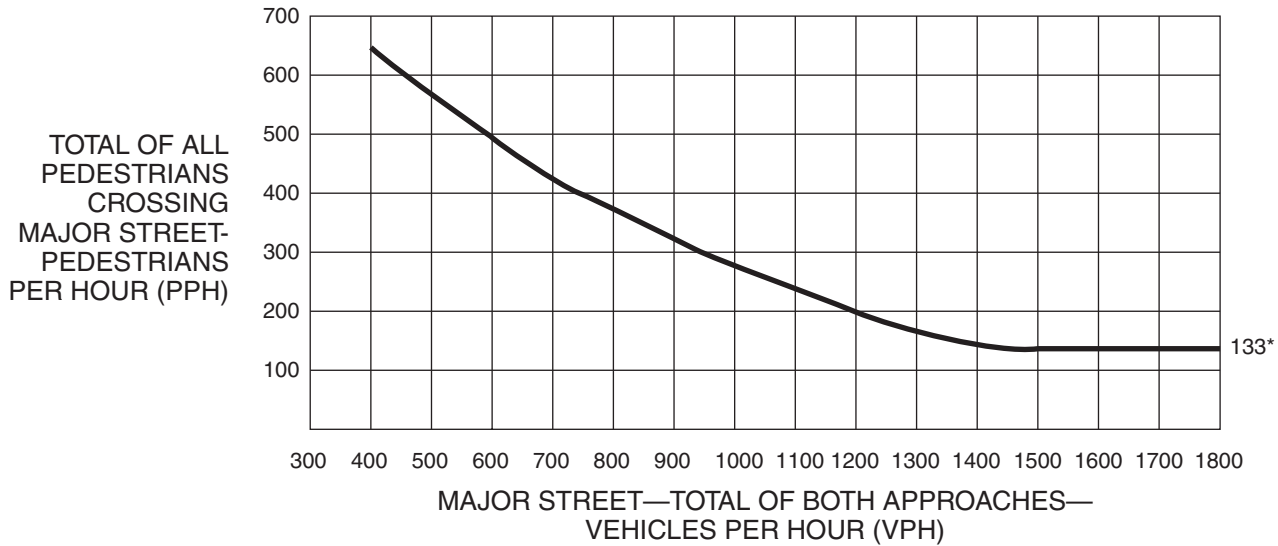
\*Note: 107 pph applies as the lower threshold volume.

**Figure 4C-6. Warrant 4, Pedestrian Four-Hour Volume (70% Factor)**



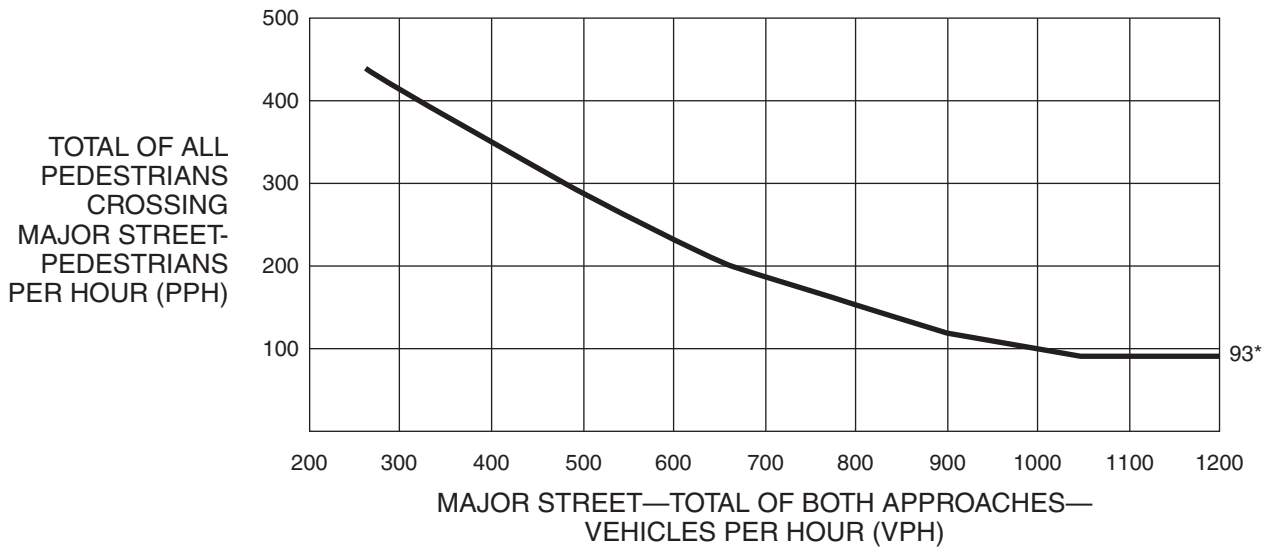
\*Note: 75 pph applies as the lower threshold volume.

**Figure 4C-7. Warrant 4, Pedestrian Peak Hour**



\*Note: 133 pph applies as the lower threshold volume.

**Figure 4C-8. Warrant 4, Pedestrian Peak Hour (70% Factor)**



\*Note: 93 pph applies as the lower threshold volume.

- 03 **Before a decision is made to install a traffic control signal, consideration shall be given to the implementation of other remedial measures, such as warning signs and flashers, school speed zones, school crossing guards, or a grade-separated crossing.**
- 04 **The School Crossing signal warrant shall not be applied at locations where the distance to the nearest traffic control signal along the major street is less than 300 feet, unless the proposed traffic control signal will not restrict the progressive movement of traffic.**

*Guidance:*

- 05 *If this warrant is met and a traffic control signal is justified by an engineering study, then:*
- A. *If it is installed at an intersection or major driveway location, the traffic control signal should also control the minor-street or driveway traffic, should be traffic-actuated, and should include pedestrian detection.*
  - B. *If it is installed at a non-intersection crossing, the traffic control signal should be installed at least 100 feet from side streets or driveways that are controlled by STOP or YIELD signs, and should be pedestrian-actuated. If the traffic control signal is installed at a non-intersection crossing, at least one of the signal faces should be over the traveled way for each approach, parking and other sight obstructions should be prohibited for at least 100 feet in advance of and at least 20 feet beyond the crosswalk or site accommodations should be made through curb extensions or other techniques to provide adequate sight distance, and the installation should include suitable standard signs and pavement markings.*
  - C. *Furthermore, if it is installed within a signal system, the traffic control signal should be coordinated.*

#### **Section 4C.07 Warrant 6, Coordinated Signal System**

**Support:**

- 01 Progressive movement in a coordinated signal system sometimes necessitates installing traffic control signals at intersections where they would not otherwise be needed in order to maintain proper platooning of vehicles.

**Standard:**

- 02 **The need for a traffic control signal shall be considered if an engineering study finds that one of the following criteria is met:**
- A. **On a one-way street or a street that has traffic predominantly in one direction, the adjacent traffic control signals are so far apart that they do not provide the necessary degree of vehicular platooning.**
  - B. **On a two-way street, adjacent traffic control signals do not provide the necessary degree of platooning and the proposed and adjacent traffic control signals will collectively provide a progressive operation.**

*Guidance:*

- 03 *The Coordinated Signal System signal warrant should not be applied where the resultant spacing of traffic control signals would be less than 1,000 feet.*

#### **Section 4C.08 Warrant 7, Crash Experience**

**Support:**

- 01 The Crash Experience signal warrant conditions are intended for application where the severity and frequency of crashes are the principal reasons to consider installing a traffic control signal.

**Standard:**

- 02 **The need for a traffic control signal shall be considered if an engineering study finds that all of the following criteria are met:**
- A. **Adequate trial of alternatives with satisfactory observance and enforcement has failed to reduce the crash frequency; and**
  - B. **Five or more reported crashes, of types susceptible to correction by a traffic control signal, have occurred within a 12-month period, each crash involving personal injury or property damage apparently exceeding the applicable requirements for a reportable crash; and**
  - C. **For each of any 8 hours of an average day, the vehicles per hour (vph) given in both of the 80 percent columns of Condition A in Table 4C-1 (see Section 4C.02), or the vph in both of the 80 percent columns of Condition B in Table 4C-1 exists on the major-street and the higher-volume minor-street approach, respectively, to the intersection, or the volume of pedestrian traffic is not less than 80 percent of the requirements specified in the Pedestrian Volume warrant. These major-street and minor-street volumes shall be for the same 8 hours. On the minor street, the higher volume shall not be required to be on the same approach during each of the 8 hours.**

Option:

- 03 If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, the traffic volumes in the 56 percent columns in Table 4C-1 may be used in place of the 80 percent columns.

#### **Section 4C.09 Warrant 8, Roadway Network**

Support:

- 01 Installing a traffic control signal at some intersections might be justified to encourage concentration and organization of traffic flow on a roadway network.

**Standard:**

- 02 **The need for a traffic control signal shall be considered if an engineering study finds that the common intersection of two or more major routes meets one or both of the following criteria:**

- A. **The intersection has a total existing, or immediately projected, entering volume of at least 1,000 vehicles per hour during the peak hour of a typical weekday and has 5-year projected traffic volumes, based on an engineering study, that meet one or more of Warrants 1, 2, and 3 during an average weekday; or**
- B. **The intersection has a total existing or immediately projected entering volume of at least 1,000 vehicles per hour for each of any 5 hours of a non-normal business day (Saturday or Sunday).**

- 03 **A major route as used in this signal warrant shall have at least one of the following characteristics:**

- A. **It is part of the street or highway system that serves as the principal roadway network for through traffic flow.**
- B. **It includes rural or suburban highways outside, entering, or traversing a city.**
- C. **It appears as a major route on an official plan, such as a major street plan in an urban area traffic and transportation study.**

#### **Section 4C.10 Warrant 9, Intersection Near a Grade Crossing**

Support:

- 01 The Intersection Near a Grade Crossing signal warrant is intended for use at a location where none of the conditions described in the other eight traffic signal warrants are met, but the proximity to the intersection of a grade crossing on an intersection approach controlled by a STOP or YIELD sign is the principal reason to consider installing a traffic control signal.

*Guidance:*

- 02 *This signal warrant should be applied only after adequate consideration has been given to other alternatives or after a trial of an alternative has failed to alleviate the safety concerns associated with the grade crossing. Among the alternatives that should be considered or tried are:*
- A. *Providing additional pavement that would enable vehicles to clear the track or that would provide space for an evasive maneuver, or*
  - B. *Reassigning the stop controls at the intersection to make the approach across the track a non-stopping approach.*

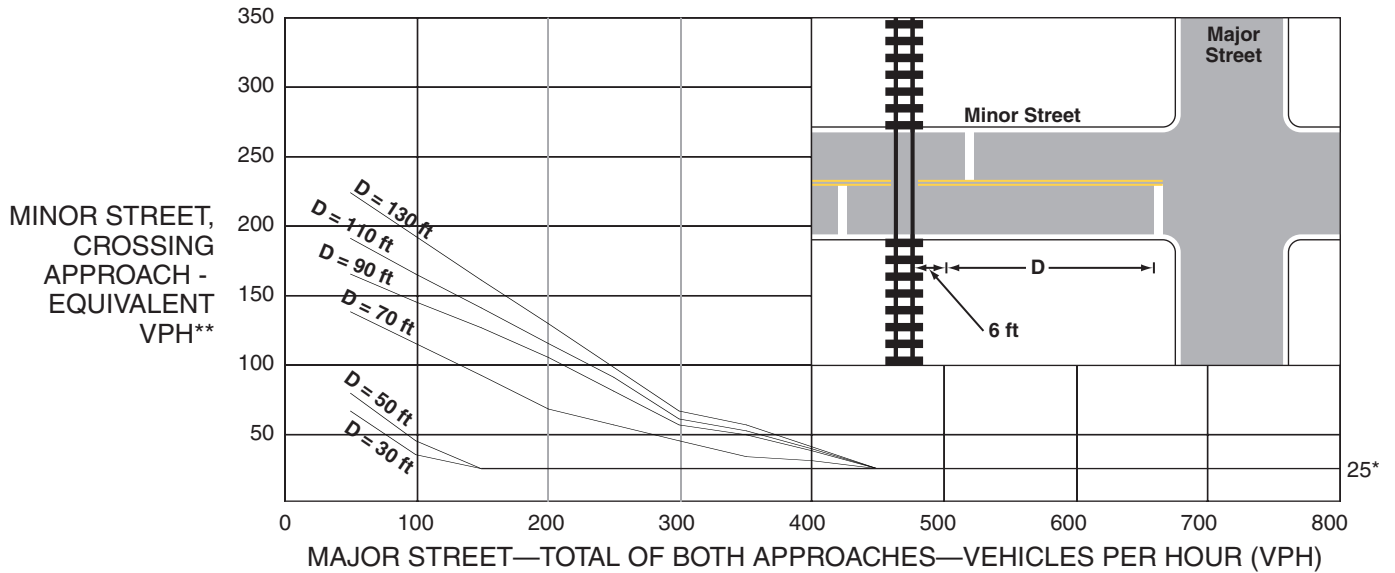
**Standard:**

- 03 **The need for a traffic control signal shall be considered if an engineering study finds that both of the following criteria are met:**
- A. **A grade crossing exists on an approach controlled by a STOP or YIELD sign and the center of the track nearest to the intersection is within 140 feet of the stop line or yield line on the approach; and**
  - B. **During the highest traffic volume hour during which rail traffic uses the crossing, the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the minor-street approach that crosses the track (one direction only, approaching the intersection) falls above the applicable curve in Figure 4C-9 or 4C-10 for the existing combination of approach lanes over the track and the distance D, which is the clear storage distance as defined in Section 1A.13.**

*Guidance:*

- 04 *The following considerations apply when plotting the traffic volume data on Figure 4C-9 or 4C-10:*
- A. *Figure 4C-9 should be used if there is only one lane approaching the intersection at the track crossing location and Figure 4C-10 should be used if there are two or more lanes approaching the intersection at the track crossing location.*

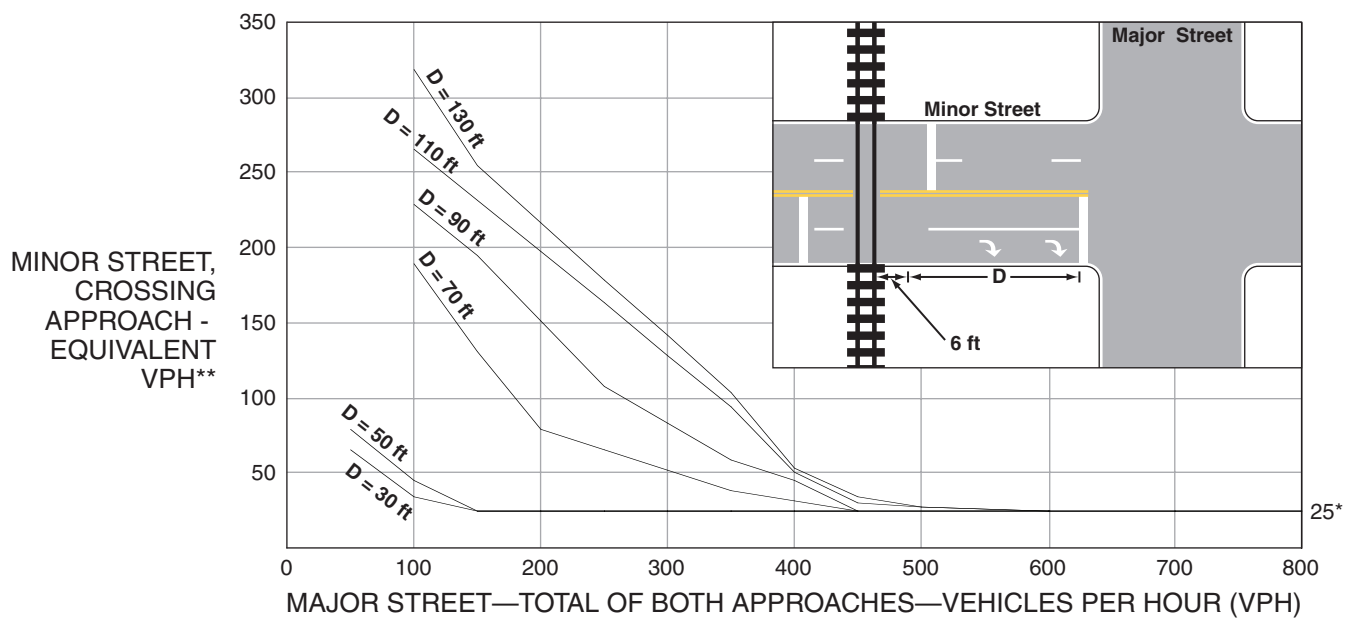
**Figure 4C-9. Warrant 9, Intersection Near a Grade Crossing (One Approach Lane at the Track Crossing)**



\* 25 vph applies as the lower threshold volume

\*\* VPH after applying the adjustment factors in Tables 4C-2, 4C-3, and/or 4C-4, if appropriate

**Figure 4C-10. Warrant 9, Intersection Near a Grade Crossing (Two or More Approach Lanes at the Track Crossing)**



\* 25 vph applies as the lower threshold volume

\*\* VPH after applying the adjustment factors in Tables 4C-2, 4C-3, and/or 4C-4, if appropriate

- B. After determining the actual distance  $D$ , the curve for the distance  $D$  that is nearest to the actual distance  $D$  should be used. For example, if the actual distance  $D$  is 95 feet, the plotted point should be compared to the curve for  $D = 90$  feet.
- C. If the rail traffic arrival times are unknown, the highest traffic volume hour of the day should be used.

Option:

- 05 The minor-street approach volume may be multiplied by up to three adjustment factors as provided in Paragraphs 6 through 8.
- 06 Because the curves are based on an average of four occurrences of rail traffic per day, the vehicles per hour on the minor-street approach may be multiplied by the adjustment factor shown in Table 4C-2 for the appropriate number of occurrences of rail traffic per day.
- 07 Because the curves are based on typical vehicle occupancy, if at least 2% of the vehicles crossing the track are buses carrying at least 20 people, the vehicles per hour on the minor-street approach may be multiplied by the adjustment factor shown in Table 4C-3 for the appropriate percentage of high-occupancy buses.
- 08 Because the curves are based on tractor-trailer trucks comprising 10% of the vehicles crossing the track, the vehicles per hour on the minor-street approach may be multiplied by the adjustment factor shown in Table 4C-4 for the appropriate distance and percentage of tractor-trailer trucks.

**Standard:**

- 09 **If this warrant is met and a traffic control signal at the intersection is justified by an engineering study, then:**
  - A. The traffic control signal shall have actuation on the minor street;
  - B. Preemption control shall be provided in accordance with Sections 4D.27, 8C.09, and 8C.10; and
  - C. The grade crossing shall have flashing-light signals (see Chapter 8C).

*Guidance:*

- 10 *If this warrant is met and a traffic control signal at the intersection is justified by an engineering study, the grade crossing should have automatic gates (see Chapter 8C).*

**Table 4C-2. Warrant 9, Adjustment Factor for Daily Frequency of Rail Traffic**

Rail Traffic per Day	Adjustment Factor
1	0.67
2	0.91
3 to 5	1.00
6 to 8	1.18
9 to 11	1.25
12 or more	1.33

**Table 4C-3. Warrant 9, Adjustment Factor for Percentage of High-Occupancy Buses**

% of High-Occupancy Buses* on Minor-Street Approach	Adjustment Factor
0%	1.00
2%	1.09
4%	1.19
6% or more	1.32

\* A high-occupancy bus is defined as a bus occupied by at least 20 people.

**Table 4C-4. Warrant 9, Adjustment Factor for Percentage of Tractor-Trailer Trucks**

% of Tractor-Trailer Trucks on Minor-Street Approach	Adjustment Factor	
	D less than 70 feet	D of 70 feet or more
0% to 2.5%	0.50	0.50
2.6% to 7.5%	0.75	0.75
7.6% to 12.5%	1.00	1.00
12.6% to 17.5%	2.30	1.15
17.6% to 22.5%	2.70	1.35
22.6% to 27.5%	3.28	1.64
More than 27.5%	4.18	2.09

## Memorandum

To: **Tim Lawler**  
**Green Light – Home First, LLC**

From: **Myla Cross**  
**Nick Mesler, EIT**  
**Jennifer Danziger, PE**

Date: **October 22, 2021**

Subject: **Home First Molalla - Parking Analysis**



Digitally signed by Jennifer Danziger  
Date: 2021.10.22 13:57:39-07'00'

RENEWS: 12/31/2021

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## Introduction

The property located at 1000 W Main Street in southwest Molalla, Oregon has been proposed for redevelopment. The proposed Home First affordable housing development will redevelop the existing single family residential property, providing 60 units in mid-rise, three-story buildings, an office space less than 500 square feet and 124 standard parking spaces. The applicant seeks to reduce the City of Molalla's off-street parking requirements due to inherent characteristics of the proposed type of development: affordable housing.

The purpose of this memorandum is to provide an analysis of the average parking demand expected by the proposed project. The analysis will demonstrate that the affordable housing development can operate efficiently with less than the required parking level established by the City of Molalla.

## Location Description

The housing development is proposed for construction on the south side of OR 211 (W Main Street) between S Ona Way and N Hezzie Lane. The project intends to redevelop the approximately 3.00-acre site on Map No. 52E08C Tax Lot 1500. The existing use is a single-family residence.

OR-211 is classified as an Arterial by the City of Molalla and a District Highway by the Oregon Department of Transportation (ODOT). It is a two-lane roadway and has a posted speed limit of 35 mph. Sidewalks and curbs are partially available on both side of the street, but ODOT is upgrading pedestrian and bike facilities along this section of the highway. On-street parking is prohibited on both sides. The roadway will be widened to a three-lane cross-section, with a two-way left-turn-lane by the proposed project.

The intersection of OR 211 at the project driveway is a three-legged intersection that is stop-controlled for the northbound approach. Each approach currently has one shared lane for all turning movements. The westbound approach will include a dedicated left-turn lane as part of the planned OR 211 widening to be conducted by the proposed project.

Figure 1 displays a vicinity map of the project site, with the project site outlined in yellow and the City of Molalla outlined in green. A site plan depicting the proposed project is provided as an attachment.



Figure 1: Project Location (image from Google Earth)

## City of Molalla Parking Requirements

Per Section 12-3.5.030.A of the Molalla's Municipal Code, a minimum of 2 off-street parking automobile parking spaces must be provided for 2-bedroom, multifamily units, a minimum of 2.5 off-street parking spaces must be provided for 3-bedroom, multifamily units, and a minimum of 1 off-street parking space must be provided per 500 square feet of office space.

Per Section Per Section 12-3.5.030.C, parking standards different from the standard may be proposed for review and action by a Planning Official. The proposal must consist of a written request and parking analysis. At a minimum, the parking analysis must assess the average parking demand and available supply for existing and proposed uses on the subject site, opportunities for shared parking with other uses in the vicinity; existing public parking in the vicinity; transportation options existing or planned near the site, such as frequent bus service, carpools, or private shuttles; and other relevant factors.

The proposed affordable housing development will include 60 units in three-story buildings and less than 500 square-feet of office space. Thirty (30) of the proposed units will be 2-bedroom apartments and the other 30 will be 3-bedroom apartments. Based on the requirements of City's Municipal Code, the development is required to provide 135 parking spaces for the residential use and 1 parking space for office component.

Affordable housing typically has lower vehicle ownership rates than multifamily housing without any income restrictions as there is a correlation between income level and vehicle ownership rates. The barrier to multiple vehicle ownership is more difficult at lower income rates. Thus, the demand for parking at the site will be less than what is required by the city.





Within the vicinity of the project site, there is no existing public parking available as parking is prohibited on OR 211. Of the three bus routes that serve the City of Molalla, two have bus stops that are located just over ½-mile from the project site. Headways are roughly one hour for both routes.

## Parking Analysis

To estimate the parking demand that could be generated by the proposed development, parking generation rates from the *ITE Parking Generation Manual*<sup>1</sup> were used. Data from the land use code 223 - Affordable Housing and 715 – Single Tenant Office Building is used to estimate the proposed site’s parking generation. To be highly conservative, two different scenarios are presented for 223 – Affordable Housing, one scenario estimates parking demand based on the number of dwelling units and the other scenario based on the total number of bedrooms in the proposed development.

Parking demand estimates were based on the number of dwelling units using the affordable housing rate and for a single-tenant office building (the building management office) are reported in Table 1.

**Table 1: Parking Generation Based on Dwelling Units**

ITE Code	Independent Variable	Average Rate	85 <sup>th</sup> Percentile Rate	Average Parking Demand	85 <sup>th</sup> Percentile Parking Demand
223 – Affordable Housing	60 Dwelling Units	0.99	1.33	59	80
715 – Single Tenant Office Building	< 500 Square Feet	3.10	3.65	2	2
Total				61	82

Based on the parking demand rates reported in the *ITE Parking Generation Manual*, the affordable housing development is projected to utilize 61 parking spaces at average parking demand and utilize 82 parking spaces at the 85<sup>th</sup> percentile parking demand when the parking demand is based on the number of dwelling units. The proposed 124 spaces will greatly exceed the average and 85<sup>th</sup> percentile peak parking demand expected at the site.

The per-unit parking generation analysis approach is consistent with the approved trip generation analysis for the proposed project, which is also based on the number of dwelling units. However, to parallel the City’s municipal code, a parking demand estimate based on the proposed number of bedrooms using the affordable housing rate is reported in Table 2.

**Table 2: Parking Generation Based on Bedrooms**

ITE Code	Independent Variable	Average Rate	85 <sup>th</sup> Percentile Rate	Average Parking Demand	85 <sup>th</sup> Percentile Parking Demand
223 – Affordable Housing	150 Bedrooms	0.54	0.82	81	123

<sup>1</sup> Institute of Transportation Engineers (ITE), Parking Generation Manual, 5<sup>th</sup> Edition,



Based on the parking demand rates reported in the *ITE Parking Generation Manual*, the affordable housing element of the project is projected to utilize 81 parking spaces at average peak parking demand and utilize 123 parking spaces at the 85<sup>th</sup> percentile parking demand when basing the parking demand on the number of bedrooms.

The proposed 124 spaces will exceed the average and 85<sup>th</sup> percentile potential parking demand at the project site. Under the City's Municipal Code, the office space is only required to have a minimum of one parking space constructed due to its size. Thus, the proposed number of parking spaces to be provided is anticipated to meet the 85<sup>th</sup> percentile parking demand. The 85<sup>th</sup> percentile parking demand rate is considered to be a conservative estimation of parking demand, whereas the average is more indicative of the most likely parking demand scenario. The proposed development can be expected to have sufficient off-street parking spaces in this situation.

## Conclusion

Based on the parking demand analysis, the conservative, worst-case scenario parking demand for the proposed development is a total of 124 parking spaces. However, it is more likely that the parking demand will be closer to 82 parking spaces. The proposed development will include the construction of 124 off-street parking spaces. Therefore, it is expected that the proposed development will have sufficient off-street parking spaces to accommodate worst-case scenario peak parking demand.

If you have any questions regarding this analysis or need further assistance, please don't hesitate to call us.



### **17-3.5.030 Automobile Parking**

#### **C. Exceptions and Reductions to Off-Street Parking.**

1. There is no minimum number of required automobile parking spaces for uses within the Central Commercial C-1 zone.
2. The applicant may propose a parking standard that is different than the standard under subsections A.1 and 2, for review and action by the Planning Official through a Type I or II procedure. The applicant's proposal shall consist of a written request and a parking analysis prepared by a qualified professional. The parking analysis, at a minimum, shall assess the average parking demand and available supply for existing and proposed uses on the subject site; opportunities for shared parking with other uses in the vicinity; existing public parking in the vicinity; transportation options existing or planned near the site, such as frequent bus service, carpools, or private shuttles; and other relevant factors. This parking analysis applies to a request in the reduction or an increase in parking ratios.
3. The Planning Official, through a Type II procedure, may reduce the off-street parking standards of Table 17-3.5.030.A for sites with one or more of the following features:
  - a. Sites containing or adjacent to a bus stop with frequent transit service, whose frontage is improved with a bus stop waiting shelter consistent with the standards of the applicable transit provider, are allowed a 20 percent reduction to the standard number of automobile parking spaces.
  - b. Space being dedicated for a transit facility such as a park-and-ride, bus pull-out, or other transit facility: Allow up to a 10 percent reduction in the number of automobile parking spaces.
  - c. Site has dedicated parking spaces for carpool or vanpool vehicles: Allow up to a 10 percent reduction to the standard number of automobile parking spaces.
  - d. Site has dedicated parking spaces for motorcycles, scooters, or electric carts: Allow reductions to the standard dimensions for parking spaces.
  - e. Site has more than the minimum number of required bicycle parking spaces: Allow up to a 10 percent reduction to the number of automobile parking spaces.
  - f. Site has off-street parking or other public parking in the vicinity of the site.
4. The number of required off-street parking spaces may be reduced through the provision of shared parking, pursuant to subsection E.
5. The Planning Official through a Type I procedure may reduce the off-street parking standards of Table 3.5.030.A by one parking space for every two on-street parking spaces located adjacent to the subject site, provided the parking spaces meet the dimensional standards of subsection F.
6. The Planning Official, through a Type I procedure, may allow property owners of existing nonresidential development to replace up to 10 percent of existing parking spaces with bus shelters and other pedestrian and transit amenities located adjacent to streets with existing or planned transit routes.

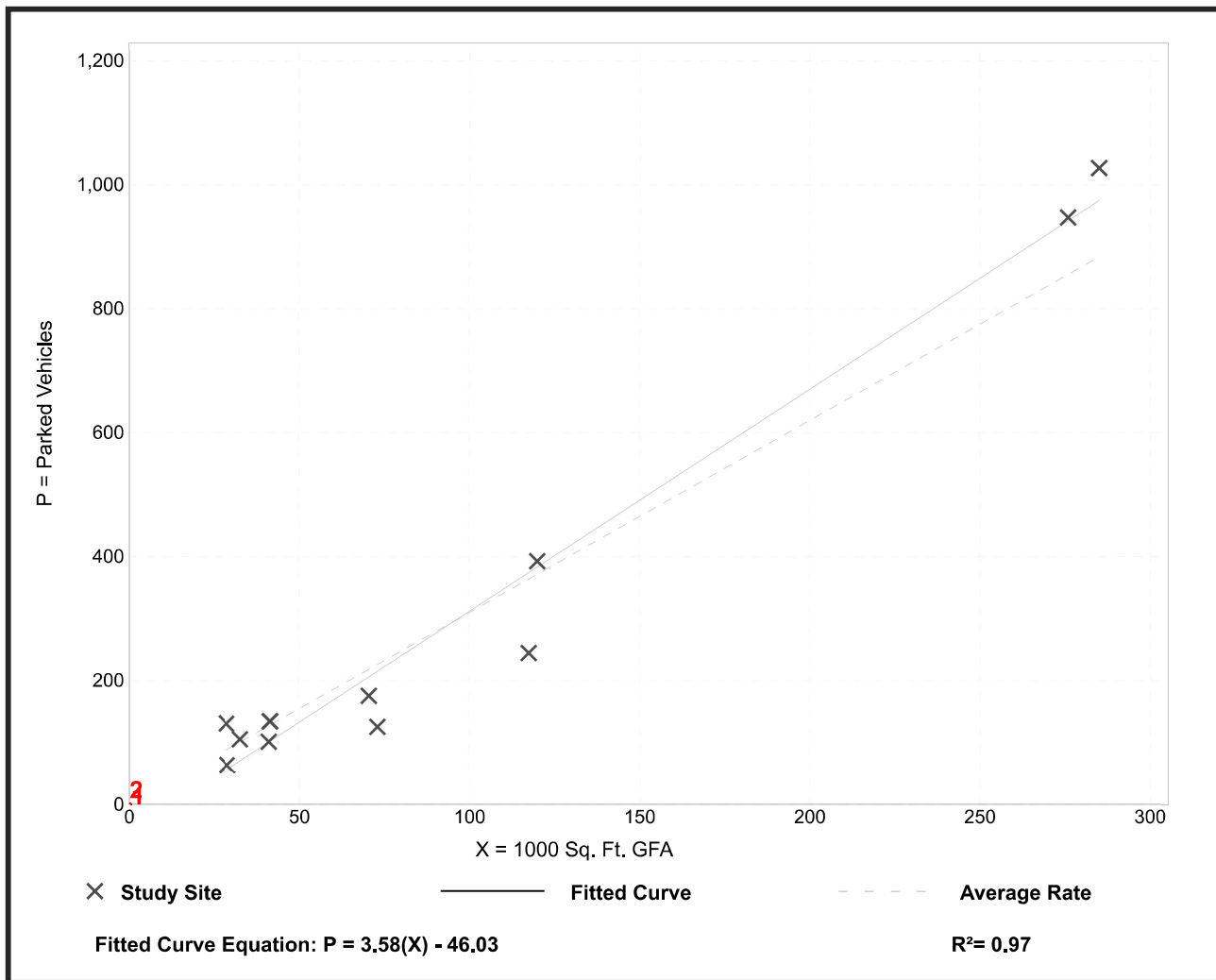
# Single Tenant Office Building (715)

**Peak Period Parking Demand vs: 1000 Sq. Ft. GFA**  
**On a: Weekday (Monday - Friday)**  
**Setting/Location: General Urban/Suburban**  
**Peak Period of Parking Demand: 10:00 a.m. - 4:00 p.m.**  
 Number of Studies: 12  
 Avg. 1000 Sq. Ft. GFA: 96

## Peak Period Parking Demand per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	33rd / 85th Percentile	95% Confidence Interval	Standard Deviation (Coeff. of Variation)
3.10	1.72 - 4.57	2.48 / 3.65	***	0.68 (22%)

## Data Plot and Equation



*Parking Generation Manual, 5th Edition* • Institute of Transportation Engineers

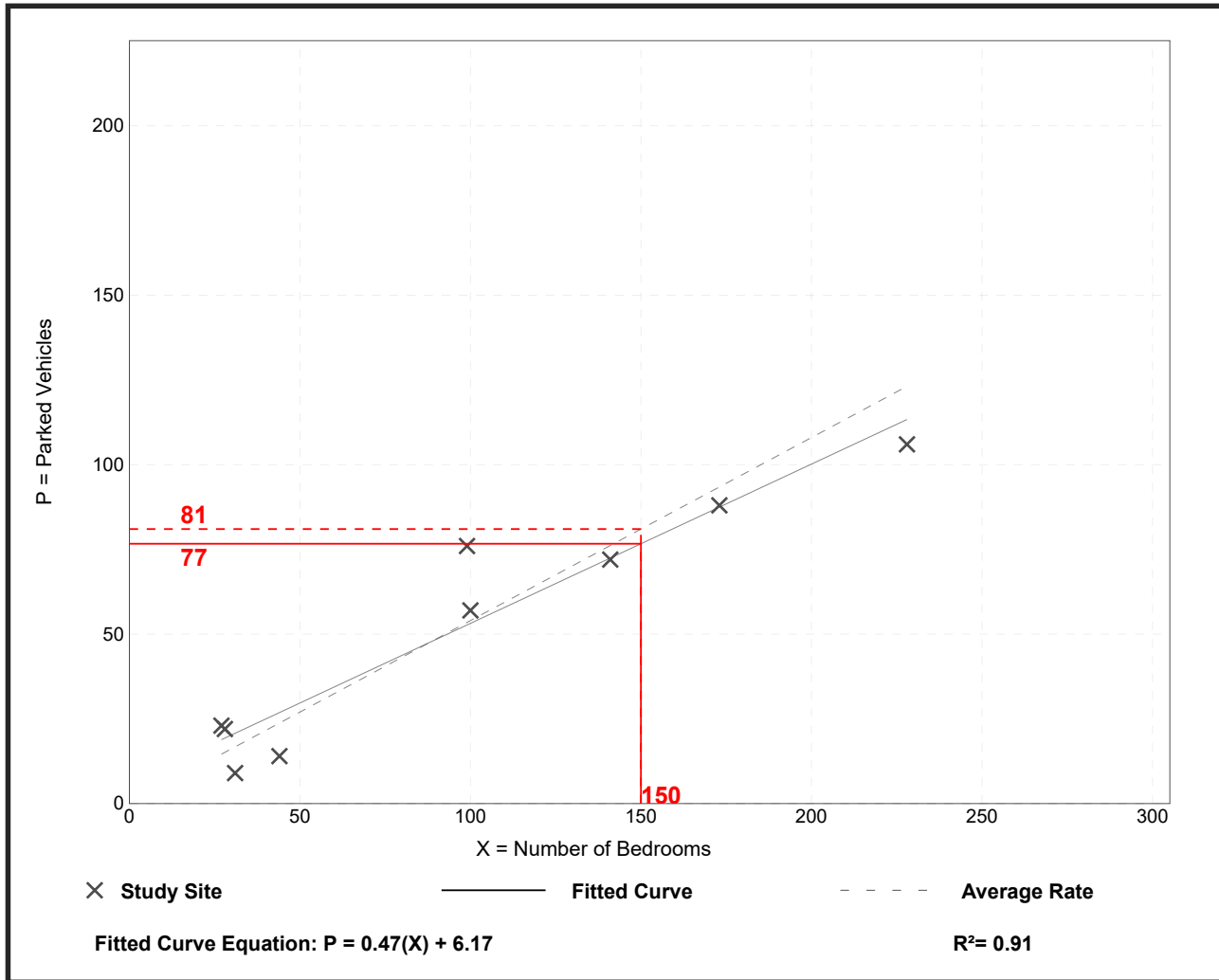
# Affordable Housing - Income Limits (223)

**Peak Period Parking Demand vs: Bedrooms**  
**On a: Weekday (Monday - Friday)**  
**Setting/Location: General Urban/Suburban**  
**Peak Period of Parking Demand: 10:00 p.m. - 5:00 a.m.**  
 Number of Studies: 9  
 Avg. Num. of Bedrooms: 97

## Peak Period Parking Demand per Bedroom

Average Rate	Range of Rates	33rd / 85th Percentile	95% Confidence Interval	Standard Deviation (Coeff. of Variation)
0.54	0.29 - 0.85	0.48 / 0.82	***	0.14 (26%)

## Data Plot and Equation



*Parking Generation Manual, 5th Edition* • Institute of Transportation Engineers

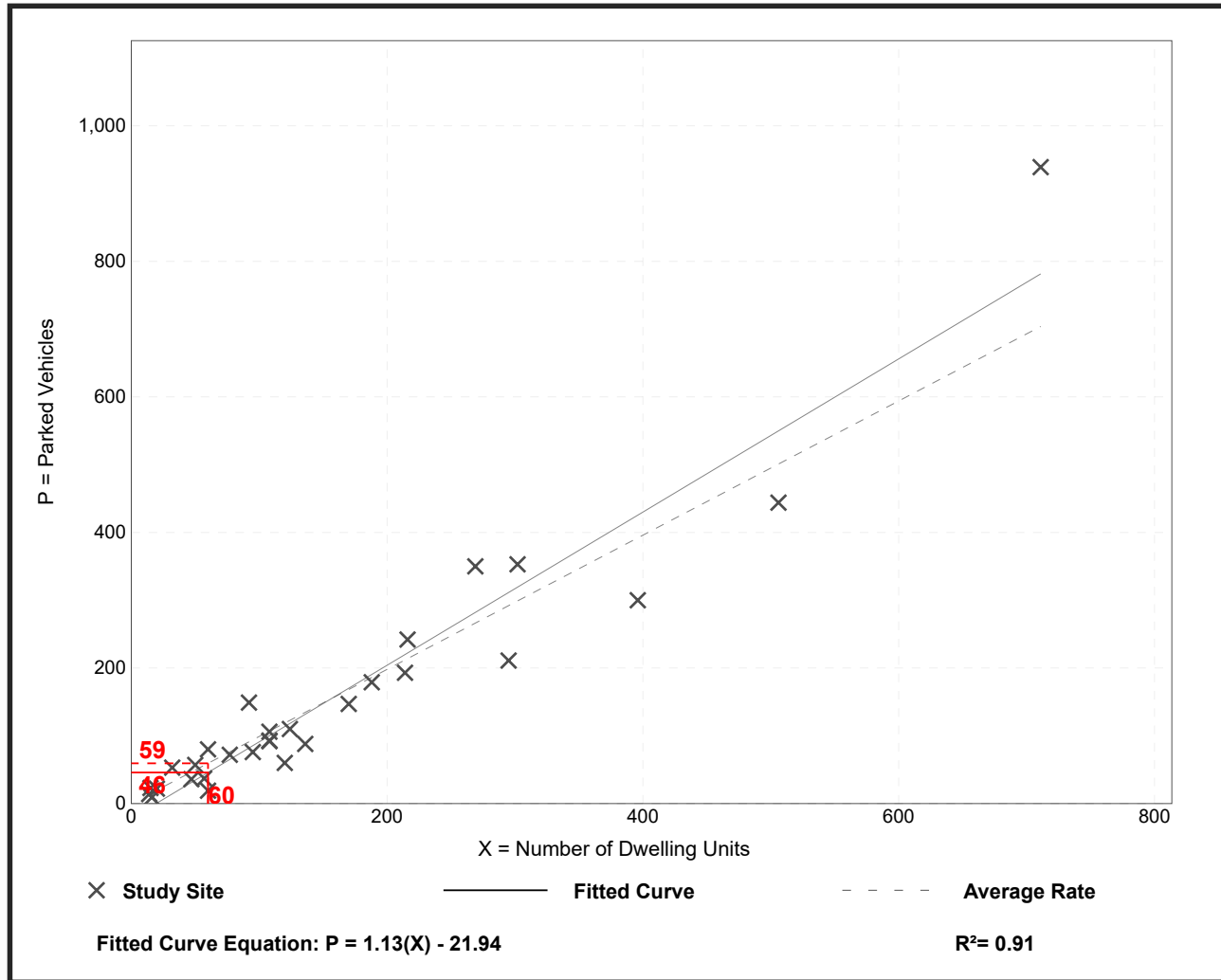
# Affordable Housing - Income Limits (223)

**Peak Period Parking Demand vs: Dwelling Units**  
**On a: Weekday (Monday - Friday)**  
**Setting/Location: General Urban/Suburban**  
**Peak Period of Parking Demand: 10:00 p.m. - 5:00 a.m.**  
 Number of Studies: 29  
 Avg. Num. of Dwelling Units: 159

## Peak Period Parking Demand per Dwelling Unit

Average Rate	Range of Rates	33rd / 85th Percentile	95% Confidence Interval	Standard Deviation (Coeff. of Variation)
0.99	0.32 - 1.66	0.85 / 1.33	0.89 - 1.09	0.27 (27%)

## Data Plot and Equation



*Parking Generation Manual, 5th Edition* • Institute of Transportation Engineers



## Exhibit C:

*Molalla Public Works Comments*





**Public Works Department**

117 N Molalla Avenue

PO Box 248

Molalla, Oregon 97038

Phone: (503) 829-6855

Fax: (503) 829-3676

February 11, 2022

TO: Mac Corthell, Community Development Director  
Dan Zinder, Planning Director  
Julie Larson, Planning Specialist

FROM: Sam Miller, Sr. Engineer Tech.

**RE: 1000 W Main Street – Affordable Apartments (SDR07-2021)**

Based on a review of the materials submitted, Staff has prepared the following comments. These comments are applicable to the subject application; any subsequent modifications may require amendments and/or additions. These conditions do not include requirements already set forth in the municipal code.

**CONDITIONS**

1. Specific Requirements To This Site:

A. Street:

1. The proposed 60 unit affordable housing development will not require a traffic impact analysis update. Applicant has prepared and submitted a Transportation Impact Study for the proposed development and receives City approval with this site design review. Proposed development does not meet signal threshold at the OR 211/Leroy intersection and therefore no signal improvements will be required.
2. OR 211: OR 211 (W Main Street) is an arterial street under Oregon Department of Transportation (ODOT) jurisdiction. Applicant will be required to meet all requirements of the Transportation System Master Plan (TSP), ODOT, and ADA and access requirements as determined by ODOT. In addition to its own frontage, the Applicant will be collaborating with the City to complete frontage improvements along the adjacent LDS Church property to the east (974 W MAIN ST). In order to design the center turn lane consistent with ODOT standards, the roadway will need to be widened to connect the left turn lane from Ona Way to the left turn lane at Hezzie Lane. If required during design review, additional striping and pavement tapers may be required as necessary.
3. Applicant will be required to construct half street improvements and right of way donation as necessary to be consistent with the Transportation System Plan adopted cross section for OR-211/OR-213 which includes a 14ft Center/turn lane, 12ft travel lane, 2ft bike buffer, 5ft bike lane, 6 1/2ft sidewalk, 1 1/2ft back of sidewalk buffer. Planter strip along both frontages to be developed in consistency with neighboring development "Stoneplace Apartments" to the east. Dedication of right-of-way is required as necessary to accommodate these improvements.

4. Right-of-way Dedications/Donations: If right of way dedication fronts streets under the jurisdiction of the City of Molalla, Applicant shall submit dedication on formats approved by the Public Works Department. On ODOT rights of way, applicant will be required to donate sufficient right-of-way along variable width improvements and construct sidewalk widening to ODOT standards. ODOT requires donations of right-of-way to follow the requirements of Chapter 5.322. Developer Mitigation Donation in the ODOT Right-of-Way Manual. Applicant is advised that donation must be completed and recorded prior to submission of final plat or final partition plat in order for Public Works to process plat documents.
  5. Access to public streets shall be limited to the location identified on the application materials or as required by ODOT. All accesses shall be constructed in such a manner as to eliminate turning conflicts. The proposed width for access shall meet ODOT Standards.
  6. Applicant will be required to dedicate a 10-foot-wide public utility easement fronting the public right-of-way if one does not exist. Applicant shall provide proof s existing dedication.
  7. Roadway lighting is required on all new developments. Applicant shall be required to install roadway lighting. Location and number shall be determined during design review (MMC 17-3.6.020). Illumination within the ODOT right of way must be in accordance with AASHTO illumination standards and the ODOT Lighting Policy and Guidelines, which states that local jurisdictions must enter into an Intergovernmental Agreement (IGA) with ODOT wherein the local jurisdiction is responsible for installation, maintenance, operation, and energy costs.
  8. An ODOT Miscellaneous Permit must be obtained for all work in the highway right of way. When the total value of improvements within the ODOT right of way is estimated to be \$100,000 or more, an agreement with ODOT is required to address the transfer of ownership of the improvement to ODOT. An Intergovernmental Agreement (IGA) is required for agreements involving local governments and a Cooperative Improvement Agreement (CIA) is required for private sector agreements. The agreement shall address the work standards that must be followed, maintenance responsibilities, and compliance with ORS 276.071, which includes State of Oregon prevailing wage requirements.
  9. Transportation SDC's – In accordance with MMC 13.14 this design review does increase the impacts to the public improvement facility and is therefore not exempt from transportation SDC charges. SDC's shall be calculated in accordance with the SDC methodology.
- B. Storm- in Accordance with MMC 17-3.6.050 Storm Drainage and Surface Water Management:
1. Applicant proposes to collect and detain all stormwater onsite and discharge to Bear

Creek drainage. Connection to Bear Creek drainage is water of the state and shall comply with all DEQ requirements. Onsite private storm system shall comply with plumbing code requirements. The detention and flow control facilities shall be reviewed, permitted, and inspected by Public Works. The onsite storm conveyance system shall be reviewed and inspected by Clackamas County Building under a plumbing permit. The connection to water of the state (Bear Creek Drainage) shall be reviewed and permitted by DEQ including water quality requirements. in Accordance with MMC 13.13 Surface Water Management.

2. Stormwater SDC's – In accordance with MMC 13.14 this design review does increase the impacts to the public improvement facility and is therefore not exempt from stormwater SDC charges. SDC's shall be calculated in accordance with the SDC methodology.
- C. Sanitary- in accordance with MMC 17-3.6.040 Sanitary Sewer Service Improvements:
1. A 12-inch sanitary main exists on OR Hwy 211/W Main Street. Sanitary main approx. 13.50 feet deep near proposed site and will serve this development to the south by gravity system.
  2. Sanitary sewer designs require review by Oregon Department of Environmental Quality. Applicant shall be responsible for submission of plans to state agency and all associated fees. Applicant's Engineer will be required to submit final report to DEQ and provide a copy of the report to the City.
  3. Sanitary SDC's – In accordance with MMC 13.14 this design review does increase the impacts to the public improvement facility and is therefore not exempt from sanitary SDC charges. SDC's shall be calculated in accordance with the SDC methodology.
- D. Water- in accordance with MMC 17-3.6.040 Water Service Improvements:
1. A 12-inch water main exists on OR Hwy 211/W Main Street and will serve this development. Extensions for fire protection may be required and all public water lines shall be within a public waterline easement on formats approved by the Public Works Department. In accordance with MMC 13.04 Water.
  2. Should Fire Department regulations require additional fire flow that results in looping the water line through the site, then applicants engineer shall coordinate with Public Works for the extension of a public water line, and dedication of easements.
  3. Water SDC's – In accordance with MMC 13.14 this design review does increase the impacts to the public improvement facility and is therefore not exempt from water SDC charges. SDC's shall be calculated in accordance with the SDC methodology.
- E. Parks:

1. Parks SDC's – In accordance with MMC 13.70.110 this low-income residential development is exempt from parks SDC charges.
- F. Franchise Utility Services:
1. All utilities to the project shall be served underground services. No overhead crossings of public right of way shall be approved by the city (MMC 17-3.6.060).

## **DESIGN REQUIREMENTS & POLICIES**

1. General Requirements:
  - A. For residential development projects, No building permit may be issued until all required public facility improvements are in place and approved by the City Engineer, or otherwise bonded, in conformance with the provision of the Code and the Public Works Design Standards in accordance with MMC 17-3.6 Public Facilities. All public facilities shall be completed and accepted by the Public Works Department prior to issuance of final occupancy.
  - B. From the materials submitted, it appears that the storm drain, domestic water and sanitary sewer facilities will be obtained from main line connections and/or extensions. Separate engineering drawings reflecting the installation of these public utilities will be required.
  - C. No construction of, or connection to, any existing or proposed public utility/improvements will be permitted until all plans are approved by Staff, all fees have been paid, all necessary permits, bonding, right-of-way and easements have been obtained and approved by staff, and Staff is notified a minimum of 24 hours in advance.
  - D. Staff reserves the right to require revisions/modifications to the public improvement construction plans and completed street improvements, if additional modifications or expansion of the sight distance onto adjacent streets is required.
  - E. All public utility/improvement plans submitted for review shall be based upon a 22"x 34" format and shall be prepared in accordance with the City of Molalla Public Work's Standards.
  - F. All survey monuments on the subject site or that may be subject to disturbance within the construction area, or the construction of any off-site improvements shall be adequately referenced and protected prior to commencement of any construction activity. If the survey monuments are disturbed, moved, relocated or destroyed as a result of any construction, the project shall, at its cost, retain the services of a registered professional land surveyor in the State of Oregon to restore the monument to its original condition and file the necessary surveys as required by Oregon State law. A copy of any recorded survey shall be submitted to Staff.
  - G. Plans submitted for review shall meet the requirements described in Section 1 of the Molalla Standard Specifications for Public Works Construction.
  - H. The applicant shall contact the Oregon Water Resources Department and inform them of any existing wells located on the subject site. Any existing well shall be limited to irrigation purposes only. Proper separation, in conformance with applicable State standards, shall be maintained between irrigation systems, public water systems, and public sanitary systems. Should the project abandon any existing wells, they shall be properly abandoned in conformance with State standards and supply the City with a copy of the final document.

- I. All utilities will be stubbed out to the far end of each street for future extension. The project shall utilize existing water, sewer, and storm water 'stub-outs' wherever possible. Water for domestic and fire protection shall be looped through the proposed site. Any 'stub-outs' determined to be not needed for the proposed development or any future development of the subject property shall be abandoned in accordance with the Molalla Standard Specifications for Public Works Construction.
- J. All public improvement designs shall meet the requirements of the Molalla Standard Specifications for Public Works Construction as amended by the Public Works Director.
- K. General Easements – A 10-foot-wide public utility easement shall be dedicated to the City adjacent to all public right-of-way and no structures are allowed to encroach into the easement. Applicant shall be required to submit a legal description and exhibit map for review and sign City easements. Once completed, applicant will be required to record easements with the County Recorder's Office and return the original document to the City prior to final occupancy.
- L. General Wetland Requirements – The applicant will be required to provide Public Works with a letter of concurrence from the Department of State Lands regarding any wetlands on the subject property.
- M. General Erosion Control – The applicant shall install, operate, and maintain adequate erosion control measures in conformance with the standards adopted by the City of Molalla and DEQ during the construction of any public/private utility and building improvements until such time as approved permanent vegetative materials have been installed. Applicant or Applicant's Contractor shall be responsible for all erosion control requirements under the 1200-C permit and shall coordinate directly with DEQ for questions related to 1200-C permit compliance.

## Exhibit D:

*Molalla Fire Department Comments*



# Molalla Rural Fire Protection District #73

P.O. Box 655 • Molalla, OR 97038  
320 N Molalla Ave. Molalla, OR 97038

Telephone: 503-829-2200  
Fax: 503-829-5794

Preliminary Comments for 1000 West Main  
January 22, 2022

- 1) Hydrants shall have a 4-inch storz quick connect. The most common mistake is to install 5-inch. No landscaping within 3 feet. Of any hydrant. 4 feet for electrical. Clear space in front of hydrants shall be not less than 26 feet in width for a length of not less than 40 feet. See Section D103.1 of the OFC
- 2) It appears that only one FDC will be used for the complex. Please review section 912 of the OFC for FDC Locations. Please submit friction loss report for this single FDC to assure that the most hydraulically demanding area is being served correctly.
- 3) Look at height of units at the sidewall/roof intersection. If 30 feet or more, see section D 105 of the OFC
- 4) Double check turning radius. 24/48 for 20-foot-wide access road and larger. 44/56 for anything less than a 20-foot access road.
- 5) Please submit striping plan for no parking areas for approval.
- 6) Please provide locations of Mail box installations.
- 6) Please provide car port foot prints on plans and check for obstruction of access roads.
- 7) Address signs as per other apartments in Molalla. See 872 West Main St. for examples.
- 8) Knox Boxes shall be provided at the main office and at each riser room. Height of the Knox box not to exceed 80 inches from grade to the top of the box.
- 9) Please look at sump pump size in vault. 5GPM may be a bit small for this area.
- 10) Please indicate Turn-a-round area on plans and how it will be striped.

*The above comments are based solely on the site plan provided. Molalla Fire reserves the right to review and comment on the plans that are to be submitted for full review or revisions to plans that have already been reviewed.*

*Review of submitted plans is not an approval of omissions, oversights or authorization of non-compliance with any regulations of this agency or of the regulations of any other agency. This decision should not be considered a precedent setting recommendation, as we will review each project on a case by case basis.*

Micahel C. Penunuri



**Exhibit E:**  
*ODOT Comments*





# Oregon

Kate Brown, Governor

## Department of Transportation

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ODOT #12009

## ODOT Response

<b>Project Name:</b> Affordable Housing 1000 W Main St	<b>Applicant:</b> Green Light- Home First Development
<b>Jurisdiction:</b> City of Molalla	<b>State Highway:</b> OR 211
<b>Site Address:</b> 1000 W Main St	

The site of this proposed land use action is adjacent to W Main St (OR 211). ODOT has permitting authority for this facility and an interest in ensuring that this proposed land use is compatible with its safe and efficient operation. **Please direct the applicant to the District Contact indicated below to determine permit requirements and obtain application information.**

### COMMENTS/FINDINGS

The applicant proposes a 60 unit affordable housing development adjacent to OR 211 with an access to the highway. Affordable housing is a high priority for the State of Oregon and it is encouraging to see this type of quality housing being built in Molalla. The development will be constructing significant improvements along OR 211 including adding a center turn lane, bicycle lanes and sidewalk. As noted in ODOT's pre-application comments, there would be a gap in sidewalk facilities between this development and the new Cascade Center Shopping Mall in front of the church property. ODOT recognizes and appreciates the City of Molalla working in partnership with the developer to include construction of sidewalks in front of the church property as part of this project.

Due to the 35mph posted speed and the City's Transportation System Plan cross section, a center left turn lane will be required to provide safe access to the development. In order to design the center turn lane consistent with ODOT standards, the roadway will need to be widened to connect the left turn lane from Ona Way to connect to the left turn lane at Hezzie Lane.

ODOT recommends that the City require the half street improvements and right of way donation as necessary to be consistent with the Transportation System Plan adopted cross section which includes a 14ft turn lane, 12ft travel lane, 2ft bike buffer, 5ft bike lane, 6 1/2ft sidewalk, 1 1/2ft back of sidewalk buffer. The applicant's narrative incorrectly states, "The applicant is also proposing to install half street improvements along the road frontage including 10ft center turn lane, and 11ft travel lane, 6 ft bike lane, 6in curb, planter strip, and a 6ft sidewalk." They are proposing to donate 11ft of right of way to ODOT. Based on the discrepancy from the TSP cross section, it may be best for the city to not specify the amount of right of way donation in the conditions of approval.

The TSP cross section is included below:



OR 213 and OR 211 –  
Other than Downtown  
District

### Center Turn Lane (68-foot ROW, 52-foot Paved Width)

ODOT has reviewed the Lancaster/Mobley Signal Warrant Analysis for the OR 211/Leroy St intersection and concurs with the recommendation no to install a signal at this time

All alterations within the State highway right of way are subject to the ODOT Highway Design Manual (HDM) standards. Alterations along the State highway but outside of ODOT right-of-way may also be subject to ODOT review pending its potential impact to safe operation of the highway. If proposed alterations deviate from ODOT standards a Design Exception Request must be prepared by a licensed engineer for review by ODOT Technical Services. Preparation of a Design Exception request does not guarantee its ultimate approval. Until more detailed plans have been reviewed, ODOT cannot make a determination whether design elements will require a Design Exception.

Note: Design Exception Requests may take up to 3 months to process.

All ODOT permits and approvals must reach 100% plans before the District Contact will sign-off on a local jurisdiction Building Permit, or other necessary requirement prior to construction. The City should not issue the Occupancy Permit until all improvements in the State highway have been completed and accepted by ODOT.

### ODOT RECOMMENDED LOCAL CONDITIONS OF APPROVAL

#### Frontage Improvements and Right of Way

- Curb, sidewalk, buffered bike lane and road widening for a center turn lane shall be constructed as necessary to be consistent with Molalla Transportation System Plan, ODOT and ADA standards.
- Right of way donated to ODOT as necessary to accommodate the planned cross section shall be provided. The deed must be to the State of Oregon, Oregon Department of Transportation. The ODOT District contact will assist in coordinating the transfer. ODOT should provide verification to the local jurisdiction that this requirement has been fulfilled. The property owner must be the signatory for the deed and will be responsible for a certified environmental assessment of the site prior to transfer of property to the Department.

Note: It may take up to **3 months** to transfer ownership of property to ODOT.

#### Access to the State Highway

- A State Highway Approach Road Permit from ODOT for access to the state highway for the proposed use is required. Truck turning templates shall be provided as needed to ensure vehicles can enter and exit the approach safely. Site access to the state highway is regulated by OAR

734.51. For application information go to <http://www.oregon.gov/ODOT/HWY/ACCESSMGT/Pages/Application-Forms.aspx>.

Note: It may take **2 to 3 months** to process a State Highway Approach Road Permit.

Permits and Agreements to Work in State Right of Way

An ODOT Miscellaneous Permit must be obtained for all work in the highway right of way. When the total value of improvements within the ODOT right of way is estimated to be \$100,000 or more, an agreement with ODOT is required to address the transfer of ownership of the improvement to ODOT. An Intergovernmental Agreement (IGA) is required for agreements involving local governments and a Cooperative Improvement Agreement (CIA) is required for private sector agreements. The agreement shall address the work standards that must be followed, maintenance responsibilities, and compliance with ORS 276.071, which includes State of Oregon prevailing wage requirements.

Note: If a CIA is required, it may take up to **6 months** to process.

Illumination within the ODOT right of way must be in accordance with AASHTO illumination standards and the ODOT Lighting Policy and Guidelines, which states that local jurisdictions must enter into an Intergovernmental Agreement (IGA) with ODOT wherein the local jurisdiction is responsible for installation, maintenance, operation, and energy costs.

An ODOT Miscellaneous Permit is required for connection to state highway drainage facilities. Connection will only be considered if the site’s drainage naturally enters ODOT right of way. The applicant must provide ODOT District with a preliminary drainage plan showing impacts to the highway right of way.

A drainage study prepared by an Oregon Registered Professional Engineer is usually required by ODOT if:

1. Total peak runoff entering the highway right of way is greater than 1.77 cubic feet per second; or
2. The improvements create an increase of the impervious surface area greater than 10,758 square feet.

**Please send a copy of the Land Use Notice to:**

[ODOT\\_R1\\_DevRev@odot.oregon.gov](mailto:ODOT_R1_DevRev@odot.oregon.gov)

Development Review Planner: Marah Danielson	503.731.8258, marah.b.danielson@odot.oregon.gov
Traffic Contact: Avi Tayar, P.E.	503.731.8221 Abraham.tayar@odot.oregon.gov
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