



City of Tualatin

www.tualatinoregon.gov

**"NECESSARY PARTIES"
MARKED BELOW**

NOTICE OF APPLICATION SUBMITTAL

- ANNEXATION
- CONDITIONAL USE PERMIT
- PLAN TEXT AMENDMENT
- ARCHITECTURAL REVIEW
- PLAN MAP AMENDMENT
- OTHER:

CASE/FILE: AR18-0001 (Community Development Dept.: Planning Division)

PROPOSAL	Tualatin Valley Fire & Rescue (TVF&R) is proposing to develop a new fire station, Station 39, on a 1.16 acre lot on SW McEwan Road. The new station will be approximately 9,500 square feet and will include a 600 square foot community room and 33 parking spaces. The building will house firefighters and have a 2 space parking bay for emergencies apparatus. A conditional use permit was recently approved for the use of a fire station on the site (CUP 17-0002).
-----------------	---

PROPERTY	<input type="checkbox"/> n/a	Name of Application	TVF&R STATION 39			
		Street Address	Adjacent to 7100 SW McEwan Road			
		Tax Map and Lot No(s).	2S113DD01601			
		Planning District	Light Manufacturing (ML)	Overlays <input type="checkbox"/>	NRPO <input type="checkbox"/>	Flood Plain <input type="checkbox"/>
		Previous Applications	CUP 17-0002	Additional Applications:		CIO INDUSTRIAL

DATES	Receipt of application	4/20/2018	Deemed Complete	5/18/2018	CONTACT	Name: Matt Straite
	Notice of application submittal			5/22/2018		Title: CONTRACT PLANNER
	Project Status / Development Review meeting			5/15/2018		E-mail: MISTRAITE@tualatin.gov
	Comments due for staff report			6/6/2018		Phone: 503-691-3020
	Public meeting: <input type="checkbox"/> ARB <input type="checkbox"/> TPC <input checked="" type="checkbox"/> n/a					Notes: You may view the application materials through this City web page: www.tualatinoregon.gov/projects
	City Council (CC)			<input checked="" type="checkbox"/> n/a		

- | | | |
|--|--|--|
| <p>City Staff</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> City Manager <input checked="" type="checkbox"/> Building Official <input checked="" type="checkbox"/> Chief of Police <input checked="" type="checkbox"/> City Attorney <input checked="" type="checkbox"/> City Engineer <input checked="" type="checkbox"/> Community Development Director <input checked="" type="checkbox"/> Community Services Director <input checked="" type="checkbox"/> Economic Development liaison <input checked="" type="checkbox"/> Engineering Associate* <input checked="" type="checkbox"/> Finance Director <input checked="" type="checkbox"/> GIS technician(s) <input checked="" type="checkbox"/> IS Manager <input checked="" type="checkbox"/> Operations Director* <input checked="" type="checkbox"/> Parks and Recreation Coordinator <input checked="" type="checkbox"/> Planning Manager <input checked="" type="checkbox"/> Street/Sewer Supervisor <input checked="" type="checkbox"/> Water Supervisor <p>Neighboring Cities</p> <ul style="list-style-type: none"> <input type="checkbox"/> Durham <input type="checkbox"/> King City Planning Commission <input checked="" type="checkbox"/> Lake Oswego <input checked="" type="checkbox"/> Rivergrove PC <input type="checkbox"/> Sherwood Planning Dept. <input type="checkbox"/> Tigard Community Development Dept. | <ul style="list-style-type: none"> <input type="checkbox"/> Wilsonville Planning Division <p>Counties</p> <ul style="list-style-type: none"> <input type="checkbox"/> Clackamas County Dept. of Transportation and Development <input checked="" type="checkbox"/> Washington County Dept. of Land Use and Transportation (ARs) <input type="checkbox"/> Washington County Long Range Planning (LRP) (Annexations) <p>Regional Government</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Metro <p>School Districts</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Lake Oswego School Dist. 7J <input type="checkbox"/> Sherwood SD 88J <input type="checkbox"/> Tigard-Tualatin SD 23J (TTSD) <input type="checkbox"/> West Linn-Wilsonville SD 3J <p>State Agencies</p> <ul style="list-style-type: none"> <input type="checkbox"/> Oregon Dept. of Aviation <input type="checkbox"/> Oregon Dept. of Environmental Quality (DEQ) <input type="checkbox"/> Oregon Dept. of Land Conservation and Development (DLCD) (via proprietary notice) <input checked="" type="checkbox"/> Oregon Dept. of State Lands: Wetlands Program <input checked="" type="checkbox"/> Oregon Dept. of Transportation (ODOT) Region 1 | <ul style="list-style-type: none"> <input type="checkbox"/> ODOT Maintenance Dist. 2A <input type="checkbox"/> ODOT Rail Division <input type="checkbox"/> OR Dept. of Revenue <p>Utilities</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Republic Services <input checked="" type="checkbox"/> Clean Water Services (CWS) <input checked="" type="checkbox"/> Comcast [cable]* <input checked="" type="checkbox"/> Frontier Communications [phone] <input checked="" type="checkbox"/> Northwest Natural [gas] <input checked="" type="checkbox"/> Portland General Electric (PGE) <input checked="" type="checkbox"/> TriMet <input checked="" type="checkbox"/> Tualatin Valley Fire & Rescue (TVF&R) <input checked="" type="checkbox"/> United States Postal Service (USPS) (Washington; 18850 SW Teton Ave.) <input type="checkbox"/> USPS (Clackamas) <input checked="" type="checkbox"/> Washington County Consolidated Communications Agency (WCCCA) <p>Additional Parties</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Tualatin Citizen Involvement Organization (CIO) |
|--|--|--|

*Paper Copies

- 1.032: Burden of Proof
- 31.071 Architectural Review Procedure
- 31.074 Architectural Review Application Review Process
- 31.077 Quasi-Judicial Evidentiary Hearing Procedures
- Metro Code 3.09.045 Annexation Review Criteria
- 32.030 Criteria for Review of Conditional Uses
- 33.020 Conditions for Granting a Variance that is not a Sign or a Wireless Communication Facility
- 33.022 Criteria for Granting a Sign Variance
- 33.024 Criteria for Granting a Minor Variance
- 33.025 Criteria for Granting a Variance
- 34.200 Tree Cutting on Private Property without Architectural Review, Subdivision or Partition Approval, or Tree Removal Permit Prohibited
- 34.210 Application for Architectural Review, Subdivision or Partition Review, or Permit
- 34.230 Criteria (tree removal)
- 35.060 Conditions for Granting Reinstatement of Nonconforming Use
- 36.160 Subdivision Plan Approval
- 36.230 Review Process (partitioning)
- 36.330 Review Process (property line adjustment)
- 37.030 Criteria for Review (IMP)
- 40.030 Conditional Uses Permitted (RL)
- 40.060 Lot Size for Conditional Uses (RL)
- 40.080 Setback Requirements for Conditional Uses (RL)
- 41.030 Conditional Uses Permitted (RML)
- 41.050 Lot Size for Conditional Uses (RML)
- 41.070 Setback Requirements for Conditional Uses (RML)
- 42.030 Conditional Uses Permitted (RMH)
- 42.050 Lot Size for Conditional Uses (RMH)
- 42.070 Setback Requirements for Conditional Uses (RMH)
- 43.030 Conditional Uses Permitted (RH)
- 43.060 Lot Size for Conditional Uses (RH)
- 43.090 Setback Requirements for Conditional Uses (RH)
- 44.030 Conditional Uses Permitted (RH-HR)
- 44.050 Lot Size for Conditional Uses (RH-HR)
- 44.070 Setback Requirements for Conditional Uses (RH-HR)
- 49.030 Conditional Uses (IN)
- 49.040 Lot Size for Permitted and Conditional Uses (IN)
- 49.060 Setback Requirements for Conditional Uses (IN)
- 50.020 Permitted Uses (CO)
- 50.030 Central Urban Renewal Plan – Additional Permitted Uses and Conditional Uses (CO)
- 50.040 Conditional Uses (CO)
- 52.030 Conditional Uses (CR)
- 53.050 Conditional Uses (CC)
- 53.055 Central Urban Renewal Area – Conditional Uses (CC)
- 54.030 Conditional Uses (CG)
- 56.030 Conditional Uses (MC)
- 56.045 Lot Size for Conditional Uses (MC)
- 57.030 Conditional Uses (MUCOD)
- 60.040 Conditional Uses (ML)
- 60.041 Restrictions on Conditional Uses (ML)
- 61.030 Conditional Uses (MG)
- 61.031 Restrictions on Conditional Uses (MG)
- 62.030 Conditional Uses (MP)
- 62.031 Restrictions on Conditional Uses (MP)
- 64.030 Conditional Uses (MBP)
- 64.050 Lot Size for Permitted and Conditional Uses (MBP)
- 64.065 Setback Requirements for Conditional Uses (MBP)
- 68.030 Criteria for Designation of a Landmark
- 68.060 Demolition Criteria
- 68.070 Relocation Criteria
- 68.100 Alteration and New Construction Criteria
- 68.110 Alteration and New Construction Approval Process
- 73.130 Standards
- 73.160 Standards
- 73.190 Standards – Single-Family and Multi-Family Uses
- 73.220 Standards
- 73.227 Standards
- 73.230 Landscaping Standards
- 73.300 Landscape Standards – Multi-Family Uses
- 73.310 Landscape Standards – Commercial, Industrial, Public and Semi-Public Uses
- 73.320 Off-Street Parking Lot Landscaping Standards
- 73.470 Standards
- 73.500 Standards

Tualatin Valley Fire & Rescue Station 39



Architectural Review Application

Submitted by: Tualatin Valley Fire & Rescue (TVF&R)
11945 SW 70th Avenue
Tigard, OR 97223
503-649-8577

Prepared by: Angelo Planning Group (APG)
921 SW Washington Street, Suite 468
Portland, OR 97205
503-224-6974



April 2018 (Updated May 2018)

This page intentionally left blank

Project Team

Applicant:	Chief Mark Havener Tualatin Valley Fire & Rescue (TVF&R) 11945 SW 70th Avenue Tigard, OR 97223 Phone: 503-649-8577 Email: Mark.Havener@tvfr.com
Land Use Planning:	Frank Angelo, Principal Angelo Planning Group 921 SW Washington Street, Suite 468 Portland, OR 97205 Phone: 503-227-3664 Email: fangelo@angeloplanning.com
Architect:	Michael Bonn, AIA Ankrom Mosian Architects 38 NW Davis Street #300 Portland, OR 97209 Phone: 503-245-7100 Email: MichaelB@ankrommoisan.com
Civil Engineering	Bruce Baldwin AKS Engineering 12965 SW Herman Road #100 Tualatin, OR 97062 Phone: 503-563-6151 Email: bruce@aks-eng.com
Transportation Engineering	Todd Mobley Lancaster Engineering 321 SW 4 th Avenue Portland, OR 97204 Phone: 503-248-0313 Email: todd@lancasterengineering.com

This page intentionally left blank

Development Application Summary Information

Site Address	Adjacent to 7100 SW McEwan Rd, Tualatin, OR 97062
Tax Lot ID	2S1 13DD TL 1601
Current Zoning	Light Manufacturing (ML)
Applications Submitted	Architectural Review
Site Size	1.16 acres

This page intentionally left blank

Contents

Section 1: Project Information..... 1

General Description.....1

Site and Context.....1

Technical Details.....1

Neighborhood and Community Outreach.....1

Project Schedule.....2

Section 2: Tualatin Development Code. 5

Conditional Use Approval Criteria (TDC 32.030)5

 Section 8.020 General Government Services.5

TDC Chapter 73: Community Design Standards.....5

 Section 73.010 Purpose.6

 Section 73.020 Findings and Objectives for the Architectural Review Process.7

ARCHITECTURAL REVIEW BOARD.....8

 [Section 73.030 – 73.037 omitted from excerpt].....8

ARCHITECTURAL REVIEW APPROVAL.....8

 Section 73.040 Architectural Review Plan Approval Required.8

 Section 73.050 Criteria and Standards.....9

 Section 73.055 Conditions Placed on Architectural Review Approvals.10

 Section 73.056 Time Limit on Approval.12

OCCUPANCY.....13

 Section 73.095 Occupancy Requirements.13

LANDSCAPE AND BUILDING MAINTENANCE.....13

 Section 73.100 Landscaping Installation and Maintenance.....13

DESIGN STANDARDS.....14

 Section 73.110 Site Planning - Multi-family Uses.14

 Section 73.120 Objectives.....14

 Section 73.130 Standards.14

 Section 73.140 Site Planning - Commercial, Industrial, Public and Semi-Public Uses.14

 Section 73.150 Objectives.....14

 Section 73.160 Standards.17

 Section 73.170 Structure Design – Single-family and Multi-family Uses.21

 Section 73.180 Objectives – Single-family and Multi-family Uses.21

 Section 73.190 Standards – Single-family and Multi-family Uses.....21

 Section 73.200 Structure Design - Commercial, Industrial, Public and Semi-Public Uses.21

 Section 73.210 Objectives.....21

 Section 73.220 Standards.23

 Section 73.221 Purpose and Objectives.....23

 Section 73.222 Fence Standards.24

Section 73.225 Mixed Solid Waste and Source Separated Recyclables Storage Areas for New or Expanded Multi-Unit Residential, Including Townhouses, Commercial, Industrial, Public and Semi-Public Development.	24
Section 73.226 Objectives.	24
Section 73.227 Standards.	25
LANDSCAPING	30
Section 73.230 Landscaping Standards.	30
Section 73.231 Landscape Guide-lines for the Central Design District.	30
Section 73.240 Landscaping General Provisions.	30
Section 73.250 Tree Preservation.	32
Section 73.260 Tree and Plant Specifications.	33
Section 73.270 Grading.	35
Section 73.280 Irrigation System Required.	35
Section 73.290 Re-vegetation in Un-landscaped Areas.	35
Section 73.300 Landscape Standards - Multi-family Uses.	36
Section 73.310 Landscape Standards - Commercial, Industrial, Public and Semi-Public Uses.	36
OFF-STREET PARKING LOT LANDSCAPING	37
Section 73.320 Off-Street Parking Lot Landscaping Standards.	37
Section 73.330 Parking Lot Landscaping - Multi-family Uses.	37
Section 73.350 Off-Street Parking Lot Landscape Island Requirements - Multi-Family Uses.	37
Section 73.360 Off-Street Parking Lot Landscape Islands - Commercial, Industrial, Public, and Semi-Public Uses.	37
Section 73.370 Off-Street Parking and Loading.	39
Section 73.380 Off-Street Parking Lots.	44
Section 73.390 Off-Street Loading Facilities.	46
Section 73.400 Access.	46
Section 73.410 Street Tree Plan.	50
Section 73.450 Wireless Communication Facility and Wireless Communication Facility Attached Site Design.	50
Section 73.460 Objectives.	50
Section 73.470 Standards.	50
Section 73.480 Wireless Communication Facility and Wire-less Communication Facility Attached Structure Design.	50
Section 73.490 Objectives.	50
Section 73.500 Standards.	51
Section 73.510 Setbacks.	51
Section 73.600 Central Design District Design Guidelines.	51
Section 73.610 Design Guidelines.	51
TDC Chapter 74: Public Improvement Requirements	51
Section 74.010 Purpose.	51
Section 74.020 Authority.	51
IMPROVEMENTS	51
Section 74.110 Phasing of Improvements.	51
Section 74.120 Public Improvements.	52
Section 74.130 Private Improvements.	52
Section 74.140 Construction Timing.	52
RIGHT-OF-WAY	52

Section 74.210 Minimum Street Right-of-Way Widths.	52
Section 74.220 Parcels Excluded from Development.	54
<i>EASEMENTS AND TRACTS</i>	54
Section 74.310 Greenway, Natural Area, Bike, and Pedestrian Path Dedications and Easements.	54
Section 74.320 Slope Easements.	54
Section 74.330 Utility Easements.	55
Section 74.340 Watercourse Easements.	55
Section 74.350 Tracts.....	55
<i>TRANSPORTATION</i>	56
Section 74.410 Future Street Extensions.	56
Section 74.420 Street Improvements.	56
Section 74.425 Street Design Standards.	59
Section 74.430 Streets, Modifications of Requirements in Cases of Unusual Conditions.	60
Section 74.440 Streets, Traffic Study Required.	61
Section 74.450 Bikeways and Pedestrian Paths.....	62
Section 74.460 Accessways in Residential, Commercial and Industrial Subdivisions and Partitions.....	62
Section 74.470 Street Lights.	62
Section 74.475 Street Names.....	63
Section 74.480 Street Signs.	63
Section 74.485 Street Trees.....	63
<i>UTILITIES</i>	63
Section 74.610 Water Service.....	63
Section 74.620 Sanitary Sewer Service.	64
Section 74.630 Storm Drainage System.....	64
Section 74.640 Grading.....	65
Section 74.650 Water Quality, Storm Water Detention and Erosion Control.	65
Section 74.660 Underground.....	66
Section 74.670 Existing Structures.....	66
Section 74.700 Removal, Destruction or Injury of Trees.	67
Section 74.705 Street Tree Removal Permit.....	67
Section 74.706 Street Tree Fees.	68
Section 74.707 Street Tree Voluntary Planting.....	69
Section 74.708 Street Tree Emergencies.	69
Section 74.710 Open Ground.....	69
Section 74.715 Attachments to Trees.....	70
Section 74.720 Protection of Trees During Construction.	70
Section 74.725 Maintenance Responsibilities.	70
Section 74.730 Notice of Violation.	70
Section 74.735 Trimming by City.	71
Section 74.740 Prohibited Trees.....	71
Section 74.745 Cutting and Planting Specifications.....	71
Section 74.750 Removal or Treatment by City.	71
Section 74.755 Appeal of Permit Denial.	72
Section 74.760 Penalties.....	72
Section 74.765 Street Tree Species and Planting Locations.	72

List of Exhibits

Exhibit 1: Pre-application Request and Form

Exhibit 2: Station 39 Architectural Review Submittal Plan Set (under separate cover)

Exhibit 3: Preliminary Stormwater Report (under separate cover)

Exhibit 4: Clean Water Service (CWS) Service Provider Letter

Exhibit 5: Washington County Assessor Map

Exhibit 6: Neighborhood/Developer Meeting Notice and Materials

Exhibit 7: Traffic Impact Study (under separate cover)

Exhibit 8: City of Tualatin Notice of Adoption (Resolution No. 5358-18)

Section 1: Project Information

General Description

Tualatin Valley Fire & Rescue (TVF&R) is seeking Architectural Review approval from the City of Tualatin to construct a new fire station (Station 39) on tax lot 1601, located on SW McEwan Road, south of SW Boones Ferry Road (see Figure 1).

Tualatin City Council held two public hearings: the first on April 9, 2018 and the final on April 23, 2018. The staff recommendation was for City Council to consider the staff report and supporting attachments and direct staff to prepare a resolution that conforms with Council direction. On April 23, Tualatin City Council adopted Resolution No. 5358-18 (File No. CUP-17-0002) granting a Conditional Use Permit for the proposed fire station (see Exhibit 8).

Site and Context

The site is a new tax lot approximately 1.16 acres in size (see Exhibit 5).¹ The site for Station 39 is zoned Light Industrial (ML), as shown in Figure 2. The site has frontage on SW McEwan and is surrounded on three sides by U-Haul, a storage facility permitted in the ML zone. Additional storage facilities are located across SW McEwan from the subject site. Other prominent features around the site include Interstate 5 to the west with commercial shopping area beyond that; and the P&W rail line to the south and east with additional light manufacturing and residential areas zoned for medium-high density dwellings.

Technical Details

The proposed building will be a single-story, hip roofed fire station approximately 9,500 square feet and will include a 600-square foot community room. The building will house the station's firefighters and have an interior two-space parking bay for fire trucks and necessary emergency apparatus. There are 12 staff and 21 public (33 total) parking spaces proposed on-site to serve the fire station and community room. Station 39 will include 24-hour staffing starting with four persons per shift and ultimately grow to six-person shifts.²

The building will look similar to TVF&R Station 55 which is currently under construction in the City of West Linn. The primary exterior building materials will consist of brick masonry veneer, metal wall panels, and precast concrete. Other materials include metal clad wood windows, steel apparatus bay doors, standing seam metal roofing, and hollow metal and aluminum entrance doors.

Neighborhood and Community Outreach

A formal Neighborhood/Developer Meeting was held on November 7, 2017. The meeting was held at Juanita Pohl Center at 8513 SW Tualatin Road. TVF&R representatives reviewed the proposed project, the need for the new station, and described the architectural features at the meeting. The audience asked a number of questions. Additional information on the Neighborhood/Developer Meeting,

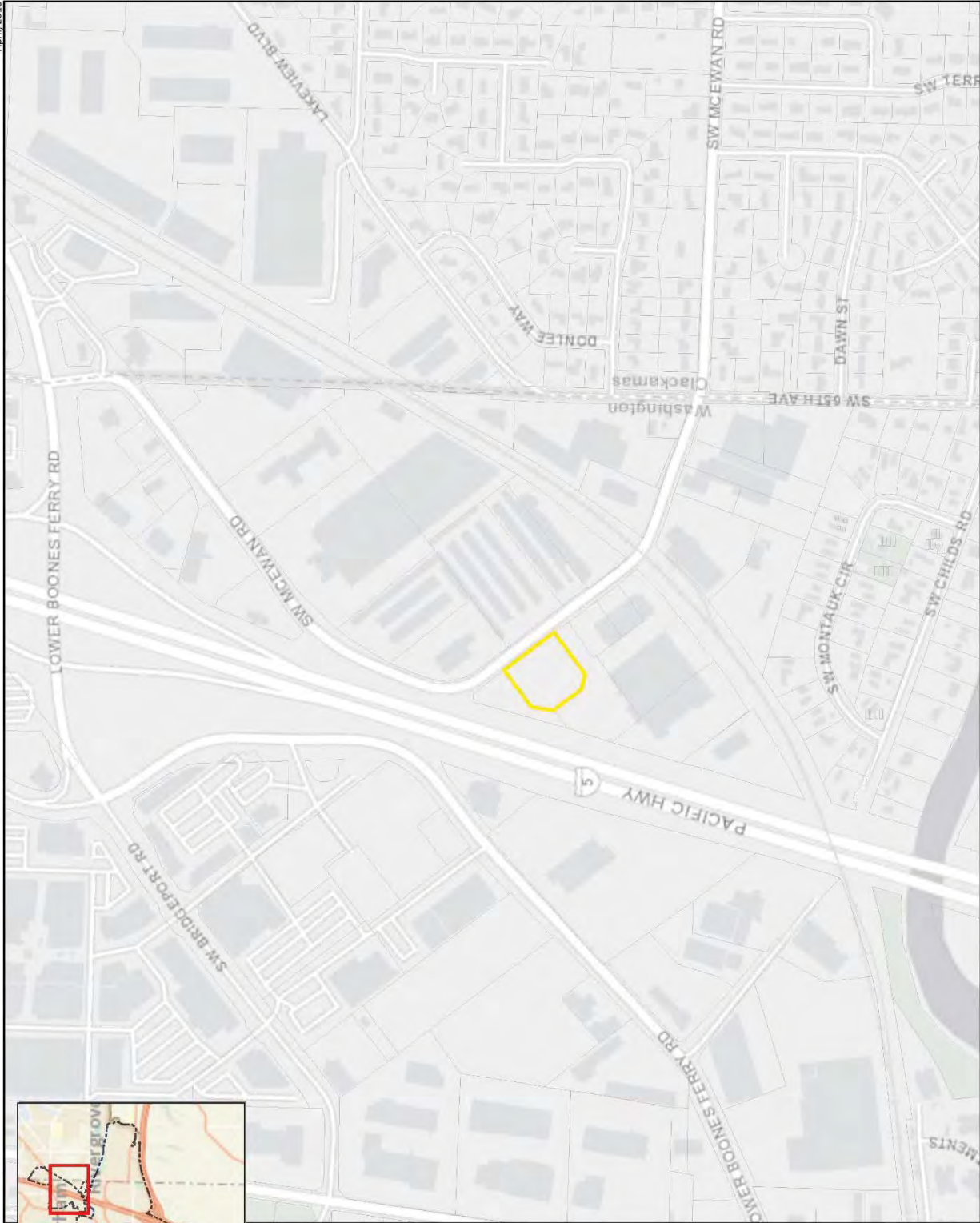
¹ On May 4, 2017, the Washington County Circuit Court granted plaintiffs (TVF&R) Motion for Entry of an Order of Immediate Possession. Accordingly, as of May 5, 2017, TVFR has immediate legal possession of the property, and as such may proceed with moving forward with its project.

² The maximum occupancy (six staff) is used in the transportation impact study as evaluated found in the Conditional Use Application Submittal
http://destinyhosted.com/tualadocs/2018/CCREG/20180409_773/2607_Combined%20file%20for%20web.pdf.

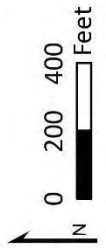
including the list of recipients for the mailed notice, and presentation materials, can be found in Exhibit 6.

Project Schedule

Assuming Architectural Review approval in early summer, construction of Station 39 could begin in the fall of 2018 with occupancy and operation by the end of 2019.



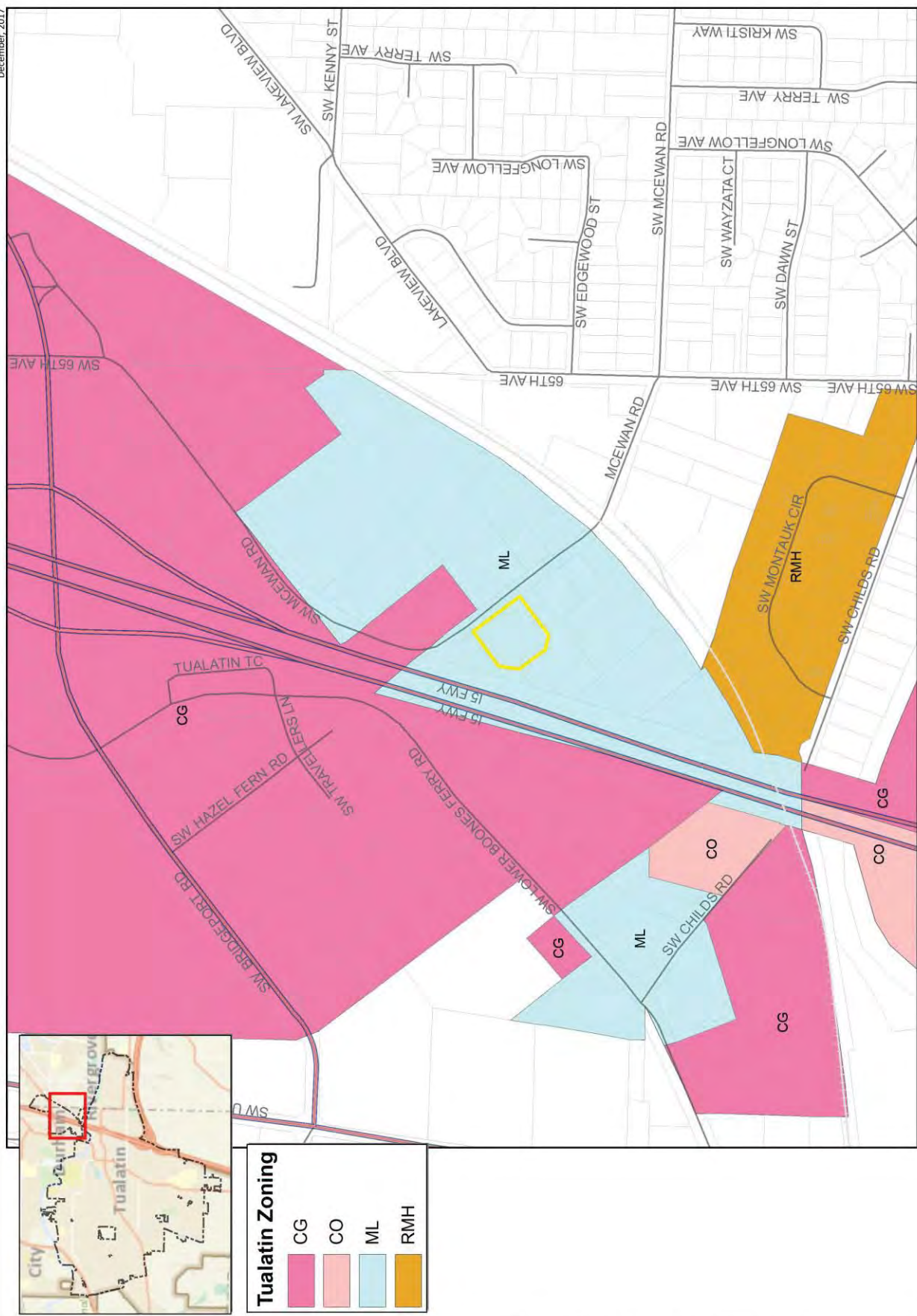
Station 39



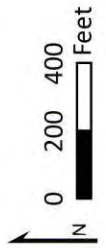
**TVF&R Station 39
Vicinity Map**

**Figure
1**

Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3501 Feet Intl
Data Sources:



Tualatin Zoning	
	CG
	CO
	ML
	RMH



**Tualatin Zoning
TVF&R Station 39**

**Figure
2**

Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Sources:

Section 2: Tualatin Development Code.

Conditional Use Approval Criteria (TDC 32.030)

Response: Tualatin City Council held the first public hearing on April 9, 2018. The staff recommendation was for City Council to consider the staff report and supporting attachments and direct staff to prepare a resolution that conforms with Council direction. A second and final evidentiary hearing is scheduled for April 23, 2018, where it is anticipated the City Council will grant Conditional Use approval to construct Station 39.

The Conditional Use Application materials, including application exhibits are available at the City of Tualatin's website, found at the following address.

http://destinyhosted.com/agenda_publish.cfm?id=88252&mt=ALL&get_month=4&get_year=2018&dsp=agm&seq=2607&rev=0&ag=770&ln=12063&nseq=2611&nrev=0&pseq=&prev=#ReturnTo12063

Section 8.020 General Government Services.

This category includes a variety of dissimilar uses from general offices to public works shops. The objectives for the location of these uses are to:

- (1) Locate, when possible, general government offices in the Urban Renewal Area, preferably in a common building on the City's proposed Civic Center site.*
- (2) Locate facilities such as the City's Operations Center in the City's western industrial area.*

Response: The proposed fire station falls under the use "Public, Semi-Public, and Miscellaneous Land Use." More specifically it falls under the category of "General Government Services" because it's not categorized more specifically elsewhere in the Chapter. TVF&R as a government service requires presence in multiple locations to provide effective fire protection. As such, it's not possible to maximize fire protection services by locating the facility in an Urban Renewal Area, the Civic Center site, or the Operations Center in the western industrial area. The proposed location is necessary to increase fire protection coverage for areas east of I-5.

TDC Chapter 34: Special Regulations

Section 34.230 Criteria.

The Community Development Director shall consider the following criteria when approving, approving with conditions, or denying a request to cut trees.

- (1) An applicant must satisfactorily demonstrate that any of the following criteria are met:*
 - (a) The tree is diseased, and*
 - (i) The disease threatens the structural integrity of the tree; or*
 - (ii) The disease permanently and severely diminishes the esthetic value of the tree; or*
 - (iii) The continued retention of the tree could result in other trees being infected with a disease that threatens either their structural integrity or esthetic value.*

Response: This project is proposing to meet the criteria of TDC Section (1)(c) below; as such, this criteria does not apply. As described in more detail to the response to TDC Section (1)(c), the proposed tree removal is necessary to accommodate a new fire station at the site.

Notwithstanding, a Tree Preservation Plan has been prepared in conformance with the required plan requirements (Sheet C3 in Exhibit 2). None of the on-site trees were found to have a disease that would necessitate removal.

(b) The tree represents a hazard which may include but not be limited to:

(i) The tree is in danger of falling;

(ii) Substantial portions of the tree are in danger of falling.

Response: This project is proposing to meet the criteria of TDC Section (1)(c) below; as such, this criteria does not apply. As described in more detail to the response to TDC Section (1)(c), the proposed tree removal is necessary to accommodate a new fire station at the site.

(c) It is necessary to remove the tree to construct proposed improvements based on Architectural Review approval, building permit, or approval of a Subdivision or Partition Review.

Response: This project is requesting approval to remove 26 trees on the subject property as part of this Architectural Review. In addition, this project is proposing to remove two trees within the public right-of-way in order to accommodate a new sidewalk that meets the street design standards for SW McEwan Road.

Tree removal is necessary to accommodate the new fire station. The subject property is a portion of a larger, existing lot that was acquired by TVF&R to site a fire station necessary for the health, safety, and welfare of the fire district. TVF&R made a deliberate effort to acquire the minimum amount land that would be necessary to meet the station's design and scheduled program, as well as meeting Tualatin's development standards. The result of acquiring the minimum amount of land necessary is that trees on the larger property, of which the parcel was previously a part of, would be preserved.

A Tree Preservation Plan has been prepared in conformance with the required plan requirements (Sheet C3 in Exhibit 2). The Tree Preservation Plan includes a table that shows a detailed tree inventory and assessment of trees located on-site and adjacent to the site.

(2) If none of the conditions in TDC 34.240(1) are met, the Community Development Director shall evaluate the condition of each tree based on the following criteria. A tree given a rating of one on a factor will not be required to be retained.

Response: As noted in the response to TDC 34.240(1)(c) above, this project is proposing to remove the trees in order to site a new fire station at the site.

TDC Chapter 73: Community Design Standards

Section 73.010 Purpose.

To provide a process and definable standards to improve the aesthetic quality of the City's physical development.

Response: TVF&R submits this application narrative to address the relevant community design standards that apply to this project: TVF&R Station 39.

Section 73.020 Findings and Objectives for the Architectural Review Process.

(1) The City Council finds that excessive uniformity, dissimilarity, inappropriateness, or poor quality of design in the exterior appearance of structures and the lack of proper attention to site development and landscaping, in the business, commercial, industrial, and certain residential areas of the City hinders the harmonious development of the City; impairs the desirability of residence, investment or occupation in the City; limits the opportunity to attain the optimum use and value of land and improvements; adversely affects the stability and value of property; produces degeneration of property in such areas with attendant deterioration of conditions affecting the peace, health and welfare of the City; and destroys a proper relationship between the taxable value of property and the cost of municipal services therefore.

(2) The City Council declares that the purposes and objectives of community design standards are to:

(a) Encourage originality, flexibility and innovation in site planning and development, including the architecture, landscaping and graphic design of development.

(b) Discourage monotonous, drab, unsightly, dreary and inharmonious development.

Response: TVF&R Station 39 is intended to provide critical public safety services for the City of Tualatin and other surrounding jurisdictions. The site has been selected for its proximity in relation other existing fire stations and its access to nearby arterial street network. The station includes quality building materials designed to make it visually pleasing while also integrating with the surrounding industrial area.

(c) Promote the City's natural beauty and visual character and charm by ensuring that structures and other improvements are properly related to their sites, and to surrounding sites and structures, with due regard to the aesthetic qualities of the natural terrain, natural environment, and landscaping. Exterior appearances of structures and other improvements should enhance these qualities.

Response: As noted above, the station is located in an industrial area which are typically designed to be more functional than aesthetically pleasing. Notwithstanding, the station includes quality building materials that seek to balance visual appeal with the surrounding area.

(d) Encourage site planning and development to incorporate bikeways, pedestrian facilities, greenways, wetlands, and other natural features of the environment and provide incentives for dedication of access easements and property to the public through shift of residential density, system development charge credits, landscaping credits and setback allowances.

Response: As described in more detail to the relevant sections below, this project has been designed to meet all relevant criteria for bikeways, pedestrian facilities, greenways, wetlands, and other natural features.

(e) Protect and enhance the City's appeal to tourists and visitors and thus support and stimulate business and industry and promote the desirability of investment and occupancy in business, commercial and industrial properties.

Response: This project is proposing a new fire station which will provide critical public safety services to the surrounding area, and by extension support business, industry, and investment for the City.

(f) Stabilize and improve property values and prevent blighted areas and thus increase tax revenues.

Response: A fire station at this location will support and enhance property values by providing critical public safety services in close proximity to existing and future development.

(g) Achieve the beneficial influence of pleasant environments for living and working on behavioral patterns and thus decrease the cost of governmental services.

Response: A fire station at this location will provide more efficient delivery of critical public safety services by adding additional service and response capability to this portion of the City.

(h) Foster civic pride and community spirit so as to improve the quality and quantity of citizen participation in local government and in community growth, change and improvement.

(i) Sustain the comfort, health, safety, tranquility and contentment of residents and attract new residents by reason of the City's favorable environment and thus pro-mote and protect the peace, health and welfare of the City.

Response: A fire station at this location will provide the opportunity to serve both existing and projected growth in the City and will improve the health and safety of existing and future residents and businesses by providing emergency service capability to this portion of the City.

(j) Determine the appropriate yard setbacks, building heights, minimum lot sizes when authorized to do so by City ordinance.

Response: The fire station will comply with the noted development standards in (j).

ARCHITECTURAL REVIEW BOARD

[Section 73.030 – 73.037 omitted from excerpt]

Response: The Architectural Review Board is responsible for reviewing commercial buildings (50,000 square feet and larger), industrial buildings (150,000 square feet and larger), multi-family housing (100 units and above) or other projects as requested by the Community Development Director. This project is not proposing any of the listed uses and the Community Development Director has not requested ARB review; therefore, these regulations do not apply.

ARCHITECTURAL REVIEW APPROVAL

Section 73.040 Architectural Review Plan Approval Required.

(1) Except for an addition or alteration to an existing single-family dwelling when it results in less than a 35% expansion of the structure's existing footprint or less than a 35% alteration of an existing wall plane or only affects the wall plane of the side of the dwelling located in a side yard where the side yard of the dwelling abuts the side yard of an adjacent dwelling, as permitted by these standards, no new building, condominium, townhouse, single family dwelling, addition or alteration to an existing single-family dwelling when it results in a 35% or more expansion of the structure's existing footprint or a new second or higher story or a 35% or more alteration of an existing wall plane (except for the wall plane of a side of the dwelling located in a side yard where the side yard of the dwelling abuts the side yard of an adjacent dwelling), manufactured dwelling park, small-lot subdivision, landscape improvement (excluding greenways, parks and other Parks and Recreation Department road side improvements), parking lot improvement or expansion, above ground public utility facility (sewer or water pump stations, pressure reading stations and water reservoir), electrical substation, above ground natural gas

pumping station, installation of decorative lighting (e.g. neon), exterior painting, awnings, murals, wireless communication facility, attached wireless communication facility or exterior major remodeling shall occur until the architectural review plan required under [TDC 31.071](#) has been reviewed and approved by the Community Development Director and City Engineer or their designees, or by the Architectural Review Board or City Council for conformity with applicable standards or criteria.

Response: This project is proposing to construct a new building – Station 39 – which will serve as an office, living space, and apparatus storage for TVF&R personnel and equipment as well as a community meeting room that will be available for use by residents in the City. Therefore, the review process and approval criteria for architectural review apply.

(2) No new single-family dwelling or addition or alteration to an existing single-family dwelling when it results in a 35% or more expansion of the structure's existing footprint or a new second or higher story or a 35% or more alteration of an existing wall plane (except for the wall plane of a side of the dwelling located in a side yard where the side yard of the dwelling abuts the side yard of an adjacent dwelling), as permitted by these standards, shall occur until the architectural review application under [TDC 31.071\(7\)](#) has been reviewed and approved by the Community Development Director or their designee for conformity with the applicable standards or criteria.

Response: This project is not proposing a new single-family dwelling or addition or alteration; therefore, the architectural review applications under TCD 31.071(7) do not apply.

(3) Construction, site development and landscaping shall be carried out in substantial accord with the approved architectural review plan or application. Review of the proposed architectural review plan or application and any changes thereto shall be conducted in accordance with [TDC Chapter 31](#).

Response: A Fire Station is permitted as a Conditional Use in the Light Manufacturing (ML) zone, which requires a neighborhood/developer meeting, application notice, and conditional use review. Prior to submitting this architectural review application, TVF&R conducted a neighborhood/developer meeting on November 7, 2017 in accordance with the regulations of TDC 31.063 and 31.064 (see Exhibit 6). In addition, and as noted in the responses to Section 31.071 above, TVF&R has submitted all the relevant materials as detailed in TCD 31.071 and 31.072.

Section 73.050 Criteria and Standards.

(1) In exercising or performing his or her powers, duties, or functions, the Community Development Director shall determine whether there is compliance with the following:

(a) The proposed site development, including the site plan, architecture, landscaping, parking and graphic design, is in conformance with the standards of this and other applicable City ordinances insofar as the location, height, and appearance of the proposed development are involved;

Response:

(b) The proposed design of the development is compatible with the design of other developments in the general vicinity; and

(c) The location, design, size, color and materials of the exterior of all structures are compatible with the proposed development and appropriate to the design character of other developments in the vicinity.

Response: As noted above, the station is located in an industrial area which are typically designed to be more functional than aesthetically pleasing. Notwithstanding, the station includes quality building materials that seek to balance visual appeal with the surrounding area.

(2) In making his or her determination of compliance with the above requirements, the Community Development Director shall be guided by the objectives and standards set forth in this chapter. If the architectural review plan includes utility facilities or public utility facilities, then the City Engineer shall determine whether those aspects of the proposed plan comply with applicable standards.

Response: This project is proposing a new fire station which is subject to the architectural review standards set forth in Chapter 73. This project is also proposing public improvements to SW McEwan Road, including connections to existing public utility facilities. As such, this application will also be subject to review by the City Engineer. Responses that show how this application conforms to the public facility standards are provided below.

(3) In determining compliance with the requirements set forth, the Community Development Director shall consider the effect of his or her action on the availability and cost of needed housing. The Community Development Director shall not use the requirements of this section to exclude needed housing types. However, consideration of these factors shall not prevent the Community Development Director from imposing conditions of approval necessary to meet the requirements of this section. The costs of such conditions shall not unduly increase the cost of housing beyond the minimum necessary to achieve the purposes of this Code. As part of the Architectural Review process, the Community Development Director has no authority to reduce dwelling unit densities.

Response: This project is not a housing project and is being constructed on Industrially-zoned property.

(4) As part of Architectural Review, the property owner may apply for approval to remove trees, in addition to those exemptions allowed in [TDC 34.200\(3\)](#), by submitting information concerning proposed tree removal, pursuant to [TDC 34.210\(1\)](#). The granting or denial of a tree removal permit shall be based on the criteria in [TDC 34.230](#).

Response: This project is requesting approval to remove 26 trees on the subject property as part of this Architectural Review. Tree removal is necessary to accommodate the new fire station. In addition, this project is proposing to remove two trees within the public right-of-way in order to accommodate a new sidewalk and meet the street design standards required for SW McEwan Road.

A Tree Preservation Plan has been prepared in conformance with the required plan requirements (Sheet C3 in Exhibit 2). The Tree Preservation Plan includes a table that shows a detailed tree inventory and assessment of trees located on-site and adjacent to the site. Tree protection fences will be provided to protect trees located off-site.

(5) Conflicting Standards. In addition to the MUCOD requirements, the requirements in TDC Chapter 73 (Community Design Standards) and other applicable Chapters apply. If TDC Chapters [57](#), [73](#) and other applicable Chapters, conflict or are different, they shall be resolved in accordance with [TDC 57.200\(2\)](#).

Response: This project is not located in the Mixed Use Commercial Overlay District; therefore, there is not potential conflict with standards.

Section 73.055 Conditions Placed on Architectural Review Approvals.

(1) An architectural review approval may include restrictions and conditions. These restrictions and conditions shall be reasonably conceived to:

- (a) Protect the public from the potentially deleterious effects of the proposal;*
- (b) Fulfill the need for public facilities and services created by the proposal, or increased or in part attributable to the proposal;*
- (c) Further the implementation of the requirements of the Tualatin Development Code.*

Response: The applicant understands that Conditions of Approval may be placed on the overall approval of Station 39.

(2) The following types of conditions are specifically contemplated by subsection (1) of this section and the listing below is illustrative only and not a limitation of the authority granted by this section.

- (a) Development Schedule--A reasonable time schedule may be placed on construction activities associated with the proposed development, or portion of the development.*
- (b) Dedications, Reservation--Dedication or reservation of land, or the granting of an easement for park, open space, rights-of-way, bicycle or pedestrian paths, Greenway, Natural Area, Other Natural Area, riverbank, the conveyance of title or easements to the City or a non-profit conservation organization, or a homeowners' association.*
- (c) Construction and Maintenance Guarantees--Security from the property owners in such an amount that will assure compliance with approval granted.*
- (d) Plan Modifications--Changes in the design or intensity of the proposed development, or in proposed construction methods or practices, necessary to assure compliance with this chapter.*
- (e) Off-Site Improvements--Improvements in public utility facilities not located on the project site where necessary to assure adequate capacity and where service demand will be created or increased by the proposed development if the cost of providing services to others will be increased as a result of the development. The costs of such improvements may be paid for in full while allowing for recovery of costs from users on other development sites, or they may be prorated to the proposed development in proportion to the service demand projected to be created or increased by the project. For development on land where the Industrial Business Park Overlay District is applied, conditions of approval may be included to address the impact, or the cumulative impact, of the development generated by the underlying ML or MG District uses and the Overlay District uses, including but not limited to the traffic impacts generated by non-industrial uses. For development on land where the Mixed Use Commercial Overlay District (MUCOD) is applied, conditions of approval may be included to address the impact, or the cumulative impact, of the development generated by the underlying CG District uses and the MUCOD uses, including but not limited to the traffic impacts generated by noncommercial uses.*
- (f) Other Approvals--Evaluation, inspections or approval by other agencies, jurisdictions, public utilities, or consultants, may be required for all or any part of the proposed development.*
- (g) Access Limitation--The number, location and design of street accesses to a proposed development may be limited or specified where necessary to maintain the capacity of streets to carry traffic safely, provided that sufficient access to the development is maintained.*

(h) Public Utility Facilities--Must be constructed in accordance with the City's Public Works Construction Code. [Ord. 743-88 §24, 3/28/88; Ord. 862-92 §51, 3/23/92; Ord. 933-94 §46, 11/28/94; Ord. 979-97 §50, 7/14/97; Ord. 1040-99 §10, 12/13/99; Ord. 1062.00, §21, 12/11/00; Ord. 1062-00, 1/3/01]

Response: The applicant understands that Conditions of Approval that address these factors may be placed on the overall approval of Station 39.

Section 73.056 Time Limit on Approval.

Architectural Review approvals shall expire after two years unless:

(1) A building, or grading permit submitted in conjunction with a building permit application, has been issued and substantial construction has taken place pursuant to the permit and an inspection has been performed by a member of the Building Division; or

(2) The Architectural Review (AR) applicant requests in writing an extension and the City approves it. If the Community Development Director and the City Engineer or their designees approved the AR, then the Community Development Director and City Engineer shall decide upon the extension request. If the Architectural Review Board (ARB) approved the AR, then the ARB shall decide upon the extension request. The applicant shall provide notice of extension request to past recipients of the AR notice of application and post a sign pursuant to [TDC 31.064](#). Before approving an extension, the deciding party shall find the request meets these criteria:

(a) The applicant submitted a written extension request prior to the original date.

(b) There have been no significant changes in any conditions, ordinances, regulations or other regulations or other standards of the City or applicable agencies that affect the previously approved project so as to warrant its resubmittal for AR.

(c) If the previously approved application included a special study, the applicant provided with the extension a status report that shows no significant changes on the site or within the vicinity of the site. A letter from a recognized professional also would satisfy this criterion if it states that conditions have not changed after the original approval and that no new study is warranted.

(d) If the AR applicant neglected site maintenance and allowed the site to become blighted, the deciding party shall factor this into its decision.

(e) The deciding party shall grant no more than a single one-year extension for an AR approval.

(f) If the Community Development Director and City Engineer or their designees are the deciding party, then they shall decide within thirty (30) days of receipt of the request. If the ARB is the deciding party, then the ARB shall decide within sixty (60) days of receipt of the request. If the deciding party fails to decide within the applicable time period, the decision shall default to approval.

(3) The Architectural review approval was granted on or after January 1, 2007 through September 30, 2009. In those cases approval shall be extended to December 31, 2012. Such approval shall not be eligible for extension under [TDC 73.056\(2\)](#). This subsection (3) shall terminate on January 2, 2013, without further action of the City Council. [Ord. 862-92, §51, 3/23/92; Ord. 904-93, §44, 9/13/93; Ord. 1291-09 §1, 10/26/09; Ord. 1324-11 §1, 06/13/11; Ord. 1333-11 §4, 9/12/11]

Response: The applicant understands that there is a two-year time limitation on the Architectural Review approval. The District intends to move forward with site preparation and building construction in a timely manner, before the two-year limitation.

OCCUPANCY

Section 73.095 Occupancy Requirements.

(1) Except as allowed by Subsection (2), all landscaping and exterior improvements required as part of the Community Development Director's, Architectural Review Board's or City Council's approval shall be completed in addition to Fire and Life Safety, and Engineering/Building Department requirements prior to the issuance of any certificate of occupancy.

Response: The applicant understands that all landscaping and exterior improvements are required to be completed prior to the issuance of a certificate of occupancy.

(2) A temporary certificate of occupancy may be issued by the Building Official prior to the complete installation of all required on-site landscaping, landscaping in the public right-of-way and on-site exterior improvements if security equal to 110 percent of the cost of the landscaping and exterior improvements, as determined by the Community Development Director, is filed with the City, assuring such installation within a time specified by the Community Development Director, but not to exceed 6 months after granting of temporary occupancy. The applicant shall provide a list of uncompleted items along with specific cost estimates of on-site landscaping and on-site exterior improvements, including materials and installation to the satisfaction of the Community Development Director prior to approval of the security. "Security" may consist of a corporate surety bond issued by a surety company authorized to transact business in the State of Oregon, a cash deposit, an assignment of bank funds, an irrevocable letter of credit, cash in escrow or a certified check; and the form shall meet with the approval of the City Attorney. If installation of the on-site landscaping or other on-site exterior improvements is not completed within the period specified by the Community Development Director, the security may be used by the City to complete the installation. Upon completion of the installation, any portion of the remaining security deposited with the City shall be returned to the party posting the security. The final landscape and exterior improvement inspection shall be made by the Planning Department prior to the return of any securities. Any portion of the plan not installed, not installed properly, or not properly maintained shall cause the inspection to be postponed until the project is completed, or shall cause the security to be used by the City. [Ord. 637-84, §14, 6/11/84; Ord. 862-92, §51, 3/23/92]

Response: The applicant understands that a security equal to 110 percent of the cost of landscaping and exterior improvements is required to issue a temporary certificate of occupancy prior to completing landscaping and exterior improvements.

LANDSCAPE AND BUILDING MAINTENANCE

Section 73.100 Landscaping Installation and Maintenance.

(1) All landscaping approved through the Architectural Review Process shall be continually maintained, including necessary watering, weeding, pruning and replacement, in a manner substantially similar to that originally approved through the Architectural Review Process, unless subsequently altered with Community Development Director approval.

Response: TVF&R will be responsible for on-going maintenance of the new landscaping proposed as part of this application. As noted on Sheet L2.0 in Exhibit 2, all plant materials will be guaranteed for one full growing season or one year, whichever is longer.

(2) All building exterior improvements approved through the Architectural Review Process shall be continually maintained including necessary painting and repair so as to remain substantially similar to original approval through the Architectural Review Process, unless subsequently altered with Community Development Director approval. [Ord. 862-92, § 51, 3/23/92; Ord. 904-93, § 45, 9/13/93]

Response: TVF&R will be responsible for maintaining the building exterior improvements proposed as part of this application.

DESIGN STANDARDS

Section 73.110 Site Planning - Multi-family Uses.

Section 73.120 Objectives.

[Sections (1)-(18) omitted from excerpt]

Section 73.130 Standards.

[Section (1)-(8) omitted from excerpt]

Response: This project is not proposing a multi-family use; therefore, these standards do not apply.

Section 73.140 Site Planning - Commercial, Industrial, Public and Semi-Public Uses.

Purpose. The purpose of commercial, industrial, public and semi-public site planning design objectives is to implement the purposes and objectives of [TDC 73.020\(2\)](#) by focusing on the placement, design and relationship of proposed site elements such as buildings, vehicular parking and circulation areas, bikeways and bike parking, accessways, walkways, buffer areas and landscaping.

Response: As described in the responses to the objectives and standards below, the proposed project meets the site planning purpose for public and semi-public uses.

Section 73.150 Objectives.

All commercial, industrial, public and semi-public projects should strive to meet the following objectives to the maximum extent practicable. Architects and developers should consider these elements in designing new projects. In the Central Design District, the Design Guidelines of [TDC 73.610](#) shall be considered. In the case of conflicts between objectives, the proposal shall provide a desirable balance between the objectives. Site elements shall be placed and designed, to the maximum extent practicable, to:

Response: As provided in more detail below, the proposed fire station will meet the objectives of public and semi-public use site planning.

(1) Provide convenient walkways and crosswalks which separate pedestrians from vehicles and link primary building entries to parking areas, other on-site buildings and the public right-of-way.

Response: This project is proposing a paved walkway around the perimeter of the building – except for where driveways provide access to the garage at the rear of the building (see Sheet L1.0 in Exhibit 2). The paved walkway will connect to all building entrances as well as to the proposed sidewalks along the

property frontage on SW McEwan Road. The paved walkways will also provide access to the parking areas on the north and west portions of the lot.

(2) Avoid barriers to disabled individuals.

Response: This project is proposing two ADA compliant parking spaces, located near the main entrance to the community room. The ADA compliant parking spaces will have access to the main entrance to the fire station portion of the building via a paved walkway around the building perimeter (see Sheet L1.0 in Exhibit 2). As shown on The Floor Plan Sheet in Exhibit 1, all areas within the building will be accessible.

(3) Locate and design drive-through facilities in a manner which does not conflict with pedestrian routes or other vehicular circulation and minimizes adverse impacts on adjacent properties.

Response: The fire apparatus garage is designed to allow fire apparatus to drive through the facility. Ingress to and egress from the garage and the lot will not require backward movement of the fire apparatus. The parking area and driveways are designed to connect with the garage, allowing for forward movement through the facility. It won't be necessary for the fire apparatus to make turning movements out of the garage. There will also be unobstructed visual clearance to the north and south where the driveways cross the proposed sidewalk, allowing for high visibility between vehicles or fire apparatus and pedestrian movement on the sidewalk.

(4) Break up parking areas with landscaping (trees, shrubs and walkways) and buildings to lessen the overall impact of large paved areas.

Response: As shown in Sheet L1.0 in Exhibit 2, trees and landscape islands/strips are located on the outer perimeter of the parking lot to help reduce the overall size and visual impact of the parking area.

(5) Utilize landscaping in parking areas to direct and control vehicular movement patterns, screen headlights from adjacent properties and streets, and lessen the visual dominance of pavement coverage.

Response: As shown on Sheet L1.0 in Exhibit 2, the entire perimeter of the subject property, except for the frontage along SW McEwan Road, will be landscaped with a variety of shrubs to screen headlights from adjacent property. As noted above, the trees and landscape islands/strips are located to reduce the overall size and visual impact of the parking area.

(6) Provide vehicular connections to adjoining sites.

Response: This project is not proposing to provide vehicular connections to the U-Haul Facility, the only adjoining site. The adjoining site currently has access to SW McEwan and provides comprehensive internal network for vehicular access. In fact, a vehicular connection to the adjoining U-Haul facility may create vehicular conflicts between fire apparatus and the multitude of vehicles accessing the U-Haul facility. Internal vehicular movement and site egress/ingress at the U-Haul facility experience relatively higher volumes of traffic because it provides self-storage and rental equipment to the general public. Prohibiting any volume of traffic on the subject property from the adjoining site will allow for relatively unobstructed movement of fire apparatus, particularly when it's necessary for emergency situations.

(7) Emphasize entry drives into commercial complexes and industrial park developments with special design features, such as landscaped medians, water features and sculptures.

Response: The proposed project is not a commercial complex or industrial park development; therefore, this standard does not apply.

(8) Locate, within parking lots, pedestrian amenities and/or landscaping in areas which are not used for vehicle maneuvering and parking.

Response: Except for enclosures for trash, propane, generators, and fuel, all areas not used for vehicle parking or maneuvering will have pedestrian walkways or will be landscaped with trees, groundcover, and shrubs (see Sheet L1.0 in Exhibit 2).

(9) Encourage outdoor seating areas which provide shade during summer and sun during winter, trash receptacles and other features for pedestrian use. Plantings with a variety of textures and color are encouraged.

Response: A patio area is proposed at the rear of the building, outside the station's primary living area. The patio area will be partially covered by the building roof and will be separated from the employee parking area by a landscape strip with trees and ground cover. The primary trash enclosure is located in the employee parking area near the patio area.

(10) Create opportunities for, or areas of, visual and aesthetic interest for occupants and visitors to the site.

Response: The portion of the lot fronting SW McEwan Road will be landscaped with trees and ground cover to provide a visually pleasing and soft presentation (see Sheet L1.0 in Exhibit 2). Similarly, the building materials have been selected to balance the natural landscaped area with the surrounding industrial uses and features a mix of brick veneer, metal paneling, and window glazing on the building and garage doors (see The Elevations Sheets in Exhibit 2).

(11) Conserve, protect and restore fish and wildlife habitat areas, and maintain or create visual and physical corridors to adjacent fish and wildlife habitat areas.

Response: The proposed project is not in or adjacent to a fish and wildlife habitat area; therefore, this standard does not apply.

(12) Provide safe pathways for pedestrians to move from parking areas to building entrances.

Response: As shown on Sheet L1.0 in Exhibit 2, a pathway around the circumference of the building and adjacent to the parking areas will be provided. The pathway will provide connections between the parking areas, all the entrances around proposed fire station, and the proposed sidewalks along SW McEwan Road.

(13) Design the location of buildings and the orientation of building entrances for commercial, public and semi-public uses such as churches, schools and hospitals to provide adequate pedestrian circulation between buildings and to provide preferential access for pedestrians to existing or planned transit stops and transit stations.

Response: As shown on The Floor Plan Sheet in Exhibit 2, the proposed fire station will include a community room, located in the northern corner of the building, closest to the proposed public parking area and SW McEwan Road. The entrance to the community room will be accessible from the public parking area. In addition, the proposed ADA compliant handicap parking spaces will be located closest to the community room entrance.

(14) Provide accessways between commercial, public and semi-public development and publicly-owned land intended for general public use; arterial and collector streets where a transit stop and/or a bike lane is provided or designated; and abutting residential, commercial and semi-public property.

Response: This project is not proposing an accessway to adjacent properties. Access to adjacent properties will be provided by proposed sidewalks along SW McEwan Road.

(15) Provide accessways between industrial development and abutting greenways where a bikeway or pedestrian path is provided or designated.

Response: The proposed project is not located adjacent to or near a greenway; therefore, this standard does not apply.

(16) Accessways should be designed and located in a manner which does not restrict or inhibit opportunities for developers of adjacent properties to connect with an accessway, and provide continuity from property to property for pedestrians and bicyclists to use the accessway.

Response: This project is not proposing an accessway; therefore, this standard does not apply.

(17) Provide preferential parking for carpool and vanpools to encourage employees to participate in carpools and vanpools.

Response: This project is proposing two parking areas; a general public parking area, and a staff parking area. The staff parking area has been designed to adequately accommodate the anticipated full staffing at the site; twelve parking spaces are provided to accommodate a shift of six TVF&R staff.

(18) Screen elements such as mechanical and electrical equipment, above ground sewer or water pump stations, pressure reading stations and water reservoirs from view.

Response: As shown on The Floor Plan Sheet and Sheet 009 in Exhibit 2, the propane/generator/fueling storage areas and trash enclosures will be screened from view by a combination of brick above concrete bases and powder-coated chain link fences with slats.

(19) Parking structure exteriors and underground parking should be designed to be harmonious with surrounding buildings and architecturally compatible with the treatment of buildings they serve.

Response: This project is not proposing a parking structure or underground parking as part of this project; therefore, this standard does not apply.

(20) When a fish and wildlife habitat area abuts or is on the subject property the applicant and decision authority for a development application should consider locating buildings farther away from the fish and wildlife habitat area.

Response: The proposed project is not in or adjacent to a fish and wildlife habitat area; therefore, this standard does not apply.

Section 73.160 Standards.

The following standards are minimum requirements for commercial, industrial, public and semi-public development, and it is expected that development proposals shall meet or exceed these minimum requirements.

(1) Pedestrian and Bicycle Circulation.

(a) For commercial, public and semi-public uses:

(i) a walkway shall be provided between the main entrance to the building and any abutting public right-of-way of an arterial or collector street where a transit stop is designated or provided. The walkway shall be a minimum of 6 feet wide and shall be constructed of concrete, asphalt, or a pervious surface such as pavers or grasscrete, but not gravel or woody material, and be ADA compliant, if applicable;

Response: The proposed fire station is not located adjacent to arterial or collector street where a transit stop is designated or provided; therefore, this standard does not apply. Notwithstanding, as shown on Sheet L1.0 in Exhibit 2, a walkway is proposed between SW McEwan Road and the entrances to the community room as well as the main office and living quarters. The walkways will be six feet in width and will be paved with concrete.

(ii) walkways shall be provided between the main building entrances and other on-site buildings and accessways. The walkways shall be a minimum of 6 feet wide and shall be constructed of concrete, asphalt, or a pervious surface such as pavers or grasscrete, but not gravel or woody material, and be ADA compliant, if applicable;

Response: This project is not proposing multiple on-site buildings or accessways; therefore, this standard does not apply.

(iii) walkways through parking areas, drive aisles, and loading areas shall be visibly raised and of a different appearance than the adjacent paved vehicular areas;

Response: This project is not proposing a walkway through a parking area, drive aisle, or loading area; therefore, this standard does not apply. Notwithstanding, walkways are proposed adjacent to the public and employee parking areas, between the parking area and the fire station building.

(iv) accessways shall be provided as a connection from the development's internal bikeways and walkways to all of the following locations that apply: abutting arterial or collector streets upon which transit stops or bike lanes are provided or designated; abutting undeveloped residential or commercial areas; adjacent undeveloped sites where an agreement to provide an accessway connection exists; and to abutting publicly-owned land intended for general public use, including schools;

(v) fences or gates which prevent pedestrian and bike access shall not be allowed at the entrance to or exit from any accessway.

Response: This project is not proposing an accessway as part of this application; therefore, this standard does not apply.

(vi) bikeways shall be provided which link building entrances and bike facilities on the site with the adjoining public right-of-way and accessways.

Response: This project is not proposing a bikeway as part of this project; therefore, this standard does not apply.

(vii) Outdoor Recreation Access Routes shall be provided between the development's walkway and bikeway circulation system and parks, bikeways and greenways where a bike or pedestrian path is designated.

Response: This project is not proposing an outdoor recreation access route as part of this project; therefore, this standard does not apply.

(b) For Industrial Uses:

Response: The proposed fire station is not an industrial use; therefore, this standard does not apply.

(c) Curb ramps shall be provided wherever a walkway or accessway crosses a curb.

Response: A curb ramp is proposed near the ADA compliant parking spaces to provide a transition from the parking area to the walkway network. There are no other curb ramps proposed as part of this application.

(d) Accessways shall be a minimum of 8 feet wide and constructed in accordance with the Public Works Construction Code if they are public accessways, and if they are private access-ways they shall be constructed of asphalt, concrete or a pervious surface such as pervious asphalt or concrete, pavers or grasscrete, but not gravel or woody material, and be ADA compliant, if applicable.

(e) Accessways to undeveloped parcels or undeveloped transit facilities need not be constructed at the time the subject property is developed. In such cases the applicant for development of a parcel adjacent to an undeveloped parcel shall enter into a written agreement with the City guaranteeing future performance by the applicant and any successors in interest of the property being developed to construct an accessway when the adjacent undeveloped parcel is developed. The agreement shall be subject to the City's re-view and approval.

Response: This project is not proposing an accessway as part of this application; therefore, this standard does not apply.

(f) Where a bridge or culvert would be necessary to span a designated greenway or wetland to provide a connection to a bike or pedestrian path, the City may limit the number and location of accessways to reduce the impact on the greenway or wetland.

Response: This project is not proposing a bridge or culvert; therefore, this standard does not apply.

(g) Accessways shall be constructed, owned and maintained by the property owner.

Response: This project is not proposing an accessway as part of this application; therefore, this standard does not apply.

(2) Drive-up Uses.

Response: This project is not proposing a drive-up use; therefore, this standard does not apply.

(3) Safety and Security.

(a) Locate windows and provide lighting in a manner which enables tenants, employees and police to watch over pedestrian, parking and loading areas.

Response: As shown in The Site Lighting sheet, in Exhibit 2, the public and employee parking areas will be lit at night to allow for high visibility into the areas.

(b) In commercial, public and semi-public development and where possible in industrial development, locate windows and provide lighting in a manner which enables surveillance of interior activity from the public right-of-way.

Response: As shown on the Floor Plan and Elevations sheets in Exhibit 2, there will be windows in the main office and community room areas that will face SW McEwan Road, allowing for surveillance of TVF&R spaces that are used to interact with the general public (i.e. the office and community areas).

(c) Locate, orient and select on-site lighting to facilitate surveillance of on-site activities from the public right-of-way without shining into public rights-of-way or fish and wildlife habitat areas.

Response: As shown in The Site Lighting sheet, in Exhibit 2, the public and employee parking areas will be lit at night to allow for high visibility into the areas.

(d) Provide an identification system which clearly locates buildings and their entries for patrons and emergency services.

Response: As shown on The Elevations Sheets in Exhibit 2, the frontage of the fire station facing SW McEwan Road will have markings to indicate the building is Tualatin Valley Fire & Rescue Station 39. The markings will be of a size and contrast from the building materials to be easily visible from the street. The markings will be located on the building to intuitively indicate the location of the primary entrance to the office area.

(e) Shrubs in parking areas must not exceed 30 inches in height. Tree canopies must not extend below 8 feet measured from grade.

Response: The proposed landscaped materials will meet this standard. Shrubs on the outside perimeter of the parking area will not exceed 30 inches. At full maturity, the proposed tree canopies will exceed eight feet in height.

(f) Above ground sewer or water pumping stations, pressure reading stations, water reservoirs, electrical substations, and above ground natural gas pumping stations shall provide a minimum 6' tall security fence or wall.

Response: This project is not proposing any of the uses listed in section (f); therefore, this standard does not apply.

(4) Service, Delivery and Screening.

(a) On and above grade electrical and mechanical equipment such as transformers, heat pumps and air conditioners shall be screened with sight obscuring fences, walls or landscaping.

Response: As shown on Floor Plan and Elevations sheets in Exhibit 2, there will be an enclosure around the proposed propane, generator, and fuel equipment. The enclosure will be screened on all sides with a combination of materials including brick and slatted cyclone fencing.

(b) Outdoor storage, excluding mixed solid waste and source separated recyclables storage areas listed under [TDC 73.227](#), shall be screened with a sight obscuring fence, wall, berm or dense evergreen landscaping.

Response: This project is not proposing an outdoor storage area; therefore, this standard does not apply.

(c) Above ground pumping stations, pressure reading stations, water reservoirs; electrical substations, and above ground natural gas pumping stations shall be screened with sight-obscuring fences or walls and landscaping.

Response: This project is not proposing any of the uses listed in section (c); therefore, this standard does not apply.

(5) [The Federal Americans with Disabilities Act \(ADA\)](#) applies to development in the City of Tualatin. Although TDC, Chapter 73 does not include the [Oregon Structural Specialty Code's \(OSSC\) accessibility standards](#) as requirements to be reviewed during the Architectural Review process, compliance with the [OSSC](#) is a requirement at the Building Permit step. It is strongly recommended all materials submitted for Architectural Review show compliance with the [OSSC](#).

Response: This project has been designed to comply with applicable OSSC requirements.

(6) (a) All industrial, institutional, retail and office development on a transit street designated in [TDC Chapter 11 \(Figure 11-5\)](#) shall provide either a transit stop pad on-site, or an on-site or public sidewalk connection to a transit stop along the subject property's frontage on the transit street.

(b) In addition to (a) above, new retail, office and institutional uses abutting major transit stops as designated in [TDC Chapter 11 \(Figure 11-5\)](#) shall:

[Subsections (i)-(v) omitted from excerpt]

Response: This project is not proposing an industrial, institutional, retail, or office development; therefore, this standard does not apply.

Section 73.170 Structure Design – Single-family and Multi-family Uses.

[Sections (1)-(2) omitted from excerpt]

Section 73.180 Objectives – Single-family and Multi-family Uses.

[Sections (1)-(2) omitted from excerpt]

Section 73.190 Standards – Single-family and Multi-family Uses.

[Sections (1)-(2) omitted from excerpt]

Response: This project is not proposing a single-family or multi-family use; therefore, these standards do not apply.

Section 73.200 Structure Design - Commercial, Industrial, Public and Semi-Public Uses.

Purpose. The purpose of commercial, industrial, public and semi-public building design objectives and standards is to implement the purpose and objectives of [TDC 73.020\(2\)](#) and are intended to promote functional, safe, innovative and attractive buildings which are compatible with the surrounding environment. This concerns the building form including the articulation of walls and roof design, materials, colors, placement of elements such as windows, doors, mechanical equipment and identification features. [Ord. 705-86, §6, 9/8/86]

Response: As noted in the responses to TDC 73.020(2) above, this project will meet the purpose of structural design for architectural review.

Section 73.210 Objectives.

All commercial, industrial, public and semi-public projects should strive to meet the following objectives to the maximum extent practicable. Architects and developers should consider these elements in

designing new projects. In the Central Design District, the Design Guidelines of [TDC 73.610](#) shall be considered. In case of conflicts between objectives, the proposal shall provide a desirable balance between the objectives. Buildings shall be designed, to the maximum extent practicable, to:

(1) Minimize disruption of natural site features such as topography, trees and water features.

Response: The tax lot on which the fire station is proposed was acquired by TVF&R as small subset of a two larger tax lots. The acquired tax lot was the minimum necessary size to accommodate the proposed fire station and meet the City's development standards. By sizing the acquired tax lot to the minimum necessary, TVF&R was able to preserve natural site features on the adjacent properties.

(2) Provide a composition of building elements which is cohesive and responds to use needs, site context, land form, a sense of place and identity, safety, accessibility and climatic factors. Utilize functional building elements such as arcades, awnings, entries, windows, doors, lighting, reveals, accent features and roof forms, whenever possible, to accomplish these objectives.

Response: As noted above, the station is located in an industrial area which are typically designed to be more functional than aesthetically pleasing. Notwithstanding, the station includes quality building materials that seek to balance visual appeal with the surrounding area.

(3) Where possible, locate loading and service areas so that impacts upon surrounding areas are minimized. In industrial development loading docks should be oriented inward to face other buildings or other loading docks. In commercial areas loading docks should face outward towards the public right-of-way or perimeter of the site or both.

Response: This project is not proposing a loading or service area; therefore, this objective does not apply.

(4) Enhance energy efficiency in commercial and industrial development through the use of landscape and architectural elements such as arcades, sunscreens, lattice, trellises, roof overhangs and window orientation.

Response: The proposed fire station incorporates the latest best practices for energy efficiency by using quality materials.

(5) Locate and design entries and loading/service areas in consideration of climatic conditions such as prevailing winds, sun and driving rains.

Response: The main entries to the fire station are located to provide the most direct access to the visitor and staff parking areas as well as SW McEwan Road.

(6) Give consideration to organization, design and placement of windows as viewed on each elevation having windows. Surveillance over parking areas from the inside, as well as visual surveillance from the outside in, should be considered in window placement.

Response: As shown on Floor Plan and Elevations Sheets in Exhibit 2, there will be windows in the main office and community room areas that will face SW McEwan Road, allowing for surveillance of TVF&R spaces that are used to interact with the general public (i.e. the office and community areas).

(7) Select building materials which contribute to the project's identity, form and function, as well as to the surrounding environment.

(8) Select colors in consideration of lighting conditions and the context under which the structure is viewed, the ability of the material to absorb, reflect or transmit light and the color's functional role (e.g., to identify and attract business, aesthetic reasons, image-building).

Response: The primary exterior building materials will consist of brick masonry veneer, metal wall panels, and precast concrete. Other materials include metal clad wood windows, steel apparatus bay doors, standing seam metal roofing, and hollow metal and aluminum entrance doors.

(9) Where possible, locate windows and provide lighting in a manner which enables tenants, employees and police to watch over pedestrian, parking and loading areas.

(10) Where practicable locate windows and provide lighting in a manner which enables surveillance of interior activity from the public right-of-way or other public areas. [Ord. 904-93, §51, 9/13/93; Ord. 1097-02, 2/11/02]

Response: As noted above, windows to the main office and community room areas will face SW McEwan Road, allowing surveillance of TVF&R spaces that are used to interact with the general public.

Section 73.220 Standards.

The following standards are minimum requirements for commercial, industrial, public and semi-public development and it is expected that development proposals shall meet or exceed these minimum requirements.

(1) Safety and Security.

(a) Locate, orient and select on-site lighting to facilitate surveillance of on-site activities from the public right-of-way or other public areas without shining into public rights-of-way or fish and wildlife habitat areas.

Response: As shown in the Site Lighting sheet in Exhibit 2, the public and employee parking areas will be lit to allow for high visibility into the areas.

(b) Provide an identification system which clearly identifies and locates buildings and their entries.

Response: As shown on The Elevations Sheets in Exhibit 1, the frontage of the fire station facing SW McEwan Road will have markings to indicate the building is Tualatin Valley Fire & Rescue Station 39. The markings will be of a size and contrast from the building materials to be easily visible from the street. The markings will be located on the building to intuitively indicate the location of the primary entrance to the office area.

(c) Shrubs in parking areas shall not exceed 30 inches in height, and tree canopies must not extend below 8 feet measured from grade, except for parking structures and underground parking where this provision shall not apply.

Response: As shown on Sheet L1.0 in Exhibit 2, the selection of proposed landscaped materials will meet this standard. Shrubs on the outside perimeter of the parking area will not exceed 30 inches. At full maturity, the proposed tree canopies will exceed eight feet in height.

Section 73.221 Purpose and Objectives.

[Sections (1)-(2) omitted from excerpt]

Section 73.222 Fence Standards.

Response: The proposed fire station is not located in the RL or RML Planning District; therefore, these standards do not apply.

Section 73.225 Mixed Solid Waste and Source Separated Recyclables Storage Areas for New or Expanded Multi-Unit Residential, Including Townhouses, Commercial, Industrial, Public and Semi-Public Development.

Purpose. The purpose of mixed solid waste and source separated recyclables storage areas objectives and standards is to implement the purposes and objectives of [TDC 73.020\(2\)](#). The objectives and standards are intended to be flexible, easy and efficient to administer, and allow creativity. [Ord. 898-93, §6, 6/14/93. Ord. 1025-99, §39, 7/26/99; Ord. 1097-02, 2/11/02]

Section 73.226 Objectives.

All new or expanded multi-family, including townhouses, commercial, industrial, public and semi-public projects should strive to meet the following objectives to the maximum extent practicable. Architects and developers should consider these elements in designing new projects. In the Central Design District, the Design Guidelines of [TDC 73.610](#) shall be considered. In the case of conflicts between objectives, the proposal shall provide a desirable balance between the objectives. Townhouses may necessitate a different balancing than multi-family developments such as apartments. Mixed solid waste and source separated recyclable storage areas shall be designed to the maximum extent practicable, to:

(1) Screen elements such as garbage and recycling containers from view.

Response: As shown on The Floor Plan Sheet and Elevations Sheets, the trash enclosure will be screened from view by a combination of brick over concrete base and powder coated fencing with slats. Slight modifications to the design of the trash enclosure will be incorporated based on direction from Republic Services, however the screening and materials will remain unchanged.

(2) Ensure storage areas are centrally located and easy to use.

Response: As shown on Sheet L1.0, the trash enclosure will be located in the employee parking area, where it will be readily accessible to TVF&R employees.

(3) Meet dimensional and access requirements for haulers.

Response: The access lane that provides access to the trash enclosure will be approximately 25 feet wide or wider. Plan sets in Exhibit 2 show the trash enclosure will have two openings – 4’6” and 9’ wide – to allow access to the garbage and recycling bins. Based on direction from Republic Services, the trash enclosure will be redesigned to have a single opening approximately 18’-8” wide to allow access to the garbage and recycling bins.

(4) Designed to mitigate the visual impacts of storage areas.

Response: The materials for the trash enclosure will mimic the building materials on the fire station building, allowing the enclosure to be less visibly obtrusive.

(5) Provide adequate storage for mixed solid waste and source separated recyclables.

(6) Improve the efficiency of collection of mixed solid waste and source separated recyclables. [Ord. 898-93, §7, 6/14/93. Ord. 1025-99, §40, 7/26/99; Ord. 1097-02, 2/11/02]

Response: Plan sets in Exhibit 2 show the trash enclosure will be approximately 157 square feet in size. Based on the direction received from Republic Services, the trash enclosure redesign will be approximately 130 square feet in size, large enough to accommodate two 2-yard dumpsters – one for waste and one for recyclables – and multiple smaller bins as necessary to help separate recyclables.

Section 73.227 Standards.

The following standards are minimum requirements for mixed solid waste and source separated recyclables storage areas. To provide for flexibility in designing functional storage areas, this section provides four different methods to meet the objectives of providing adequate storage for mixed solid waste and source separated recyclables and improving the efficiency of collection. An applicant shall choose and implement one of the following four methods to demonstrate compliance: 1) minimum standards; 2) waste assessment; 3) comprehensive recycling plan; or 4) franchised hauler review, as more fully described in subsections (2), (3), (4) and (5) of this section.

Response: This project is proposing to meet the minimum standards method, as described in more detail to below.

(1) The mixed solid waste and source separated recyclables storage standards shall apply to all new or expanded multi-family residential developments containing five or more units and to new or expanded commercial, industrial, public and semi-public development.

Response: This project is proposing a new public/semi-public development; therefore, these standards apply.

(2) Minimum Standards Method. This method specifies a minimum storage area requirement based on the size and general use category of the new or expanded development. This method is most appropriate when specific use of a new or expanded development is not known. It provides specific dimensional standards for the minimum size of storage areas by general use category.

(a) The size and location of the storage area(s) shall be indicated on the site plan. Compliance with the requirements set forth below are reviewed through the Architectural Review process.

Response: The size of the trash enclosure is shown on The Floor Plan Sheet in Exhibit 2. Based on the direction received from Republic Services, the trash enclosure redesign will be approximately 130 square feet in size, large enough to accommodate two 2-yard dumpsters – one for waste and one for recyclables – and multiple smaller bins as necessary to help separate recyclables. The trash enclosure will be located at the end of the staff parking area shown on the site plan in Exhibit 2.

(i) The storage area requirement is based on the area encompassed by predominant use(s) of the building (e.g., residential, office, retail, wholesale/warehouse/manufacturing, educational/institutional or other) as well as the area encompassed by other distinct uses. If a building has more than one use and that use occupies 20 percent or less of the gross leasable area (GLA) of the building, the GLA occupied by that use shall be counted toward the floor area of the predominant use(s). If a building has more than one use and that use occupies more than 20 percent of the GLA of the building, then the storage area requirement for the whole building shall be the sum of the area of each use.

Response: The predominant use of the building will be a fire station and the secondary use will be a community room available for the general public's use. The fire station and the community room will be operated by TVF&R and not be available for lease.

(ii) Storage areas for multiple uses on a single site may be combined and shared.

Response: The trash enclosure located at the end of the staff parking area will be shared for both uses in the building.

(iii) The specific requirements are based on an assumed storage area height of 4 feet for mixed solid waste and source separated recyclables. Vertical storage higher than 4 feet, but no higher than 7 feet may be used to accommodate the same volume of storage in a reduced floor space (potential reduction of 43 percent of specific requirements). Where vertical or stacked storage is proposed, submitted plans shall include drawings to illustrate the layout of the storage area and dimensions for containers.

Response: The trash enclosure will be approximately seven feet in height and will not be covered.

(iv) Multi-family residential developments containing 5-10 units shall provide a minimum storage area of 50 square feet. Multi-family residential developments containing more than 10 units shall provide 50 square feet plus an additional 5 square feet per unit for each unit above 10.

Response: This project is not proposing a multi-family residential development; therefore, this standard does not apply.

(v) Commercial, industrial, public and semi-public developments shall provide a minimum storage area of 10 square feet plus: Office - 4 square feet/1000 square feet gross leasable area (GLA); Retail - 10 square feet/1000 square feet GLA; Wholesale/ Warehouse/ Manufacturing - 6 square feet/1000 square feet GLA; Educational and institutional - 4 square feet/1000 square feet GLA; and other - 4 square feet/1000 square feet GLA.

Response: The fire station and community room will not be available for lease. Notwithstanding, the trash enclosure will be approximately 130 square feet in size after the redesign, large enough to accommodate multiple bins.

(3) Waste Assessment Method. This method tailors the storage area size to a waste assessment and management program for the specific user of a new or expanded building. It is most appropriate when the specific use of a building is known and the type and volume of mixed solid waste to be generated can be estimated. A pre-application conference is required if the waste assessment method is proposed. The applicant shall obtain a waste assessment form from the Planning Department. The form shall be used to estimate the volumes of both mixed solid waste and source separated recyclables generated. From this information, the applicant can design a specific management, storage and collection system.

Techniques such as a compactor or cardboard baler may be implemented to minimize the square footage of the storage area. If this method of compliance is selected the waste assessment form shall be completed and submitted as part of the Architectural Review application. The plans must identify the size and location of interior, or exterior storage area(s) or both, specialized equipment to be used, and collection schedule required to accommodate the volumes of waste projected in the waste assessment. The application shall demonstrate that the mixed solid waste and source separated recyclable volumes expected to be generated can be stored in less space than required by the Minimum Standards Method. If the application does not demonstrate that the waste assessment method requires less space, through the Architectural Review process the minimum standards method may be required. The waste assessment method shall be reviewed and approved as part of the Architectural Review process.

Response: This project is proposing to meet minimum standard method above; therefore, this standard does not apply.

(4) Comprehensive Recycling Plan Method. The comprehensive recycling plan method is most appropriate when an applicant has independently developed a comprehensive recycling plan which addresses mixed solid waste and source separated recyclable collection and storage for the proposed use. This method can be used when a comprehensive recycling plan has been developed for a specific development. It is most suited to uses such as hospitals, schools and industrial developments. The comprehensive recycling plan shall be submitted at the time plans are submitted for Architectural Review. The applicant shall submit plans and text that show how mixed solid waste and source separated recyclables generated by the proposed development will be served under a comprehensive recycling plan.

The application shall also demonstrate that the mixed solid waste and source separated recyclables volumes expected to be generated can be stored in less space than is required by the Minimum Standards Method. If the application does not demonstrate that the comprehensive recycling plan method requires less space, through the Architectural Review process the minimum standards method may be required. The comprehensive recycling plan method shall be reviewed and approved as part of the Architectural Review process.

Response: This project is proposing to meet minimum standard method above; therefore, this standard does not apply.

(5) Franchised Hauler Review Method. The franchised hauler review method provides for a coordinated review of the pro-posed site plan by the franchised hauler serving the subject property. This method can be used when there are unique conditions associated with the site, use, or waste stream that make compliance with any of the three other methods impracticable. The objective of this method is to match a specific hauler program (types of equipment, frequency of collection, etc.) to the unique characteristic(s) of the site or development. The applicant shall coordinate with the franchised hauler to develop a plan for storage and collection of mixed solid waste and source separated recyclables to be generated. A narrative describing how the proposed site meets one or more unique conditions, plus site plan and architectural drawings showing the size and location of storage area(s) required to accommodate anticipated volumes shall be submitted for Architectural Review. Additionally, a letter from the franchised hauler shall be submitted with the application that de-scribes the level of service to be provided by the hauler, including any special equipment and collection frequency, which will keep the storage area from exceeding its capacity. For purposes of this subsection the following constitute unique conditions:

[Section (a)-(c) omitted from excerpt]

Response: This project is proposing to meet minimum standard method above; therefore, this standard does not apply.

(6) Location, Design and Access Standards for Storage Areas. The following location, design and access standards are applicable for storage areas:

(a) Location Standards

(i) To encourage its use, the storage area for source separated recyclables may be co-located with the storage area for mixed solid waste.

Response: The trash enclosure will be able to accommodate a combination of three bins for garbage and recyclables.

(ii) Indoor and outdoor storage areas shall comply with Building and Fire Code requirements.

Response: The outdoor trash enclosure will be designed and constructed to comply with Building and Fire Code requirements.

(iii) Storage area space requirements can be satisfied with a single location or multiple locations, and can combine both interior and exterior locations.

Response: One outdoor trash enclosure – with multiple receptacles for garbage and recyclables – is proposed in the employee parking area, located at the back of the fire station.

(iv) Exterior storage areas shall not be located within a required front yard setback or in a yard adjacent to a public or private street.

Response: The proposed outdoor trash enclosure will be located in the employee parking area behind the proposed fire station, outside of the front yard setback. There is only one frontage of the property that faces a public or private street – SW McEwan Road – and the trash enclosure will be visually obstructed from it by the fire station building.

(v) Exterior storage areas shall be located in central and visible locations on the site to enhance security for users.

Response: The proposed outdoor trash enclosure area's location in the lit employee parking area, outside of the station dayroom area, will allow for adequate visibility from fire station staff.

(vi) Exterior storage areas can be located in a parking area, if the proposed use provides parking spaces required through the Architectural Review process. Storage areas shall be appropriately screened according to [TDC 73.227\(6\)\(b\)\(iii\)](#).

Response: As noted in the responses above, the proposed outdoor trash enclosure is located in the employee parking area.

(vii) Storage areas shall be accessible for collection vehicles and located so that the storage area will not obstruct pedestrian or vehicle traffic movement on site or on public streets adjacent to the site.

Response: The proposed outdoor trash enclosure will be located at the end of the employee parking area. The outdoor trash enclosure is located so that it won't obstruct on-site vehicle or pedestrian movement. The parking area will be accessible to collection vehicles.

(b) Design Standards

(i) The dimensions of the storage area shall accommodate containers consistent with current methods of local collection at the time of Architectural Review approval.

Response: Plan sets in Exhibit 2 show the trash enclosure will be approximately 157 square feet in size. Based on the direction received from Republic Services, the trash enclosure redesign will be approximately 130 square feet in size, large enough to accommodate two 2-yard dumpsters – one for waste and one for recyclables – and multiple smaller bins as necessary to help separate recyclables.

(ii) Storage containers shall meet Fire Code standards and be made and covered with water proof materials or situated in a covered area.

Response: The outdoor trash enclosure will be designed and constructed to comply with Fire Code requirements. In addition, the outdoor trash enclosure will be covered.

(iii) Exterior storage areas shall be enclosed by a sight obscuring fence or wall at least 6 feet in height. In multi-family, commercial, public and semi-public developments evergreen plants shall be placed around the enclosure walls, excluding the gate or entrance openings. Gate openings for haulers shall be a minimum of 10 feet wide and shall be capable of being secured in a closed and open position. A separate pedestrian access shall also be provided in multi-family, commercial, public and semi-public developments.

Response: As shown on Floor Plan and Elevations Sheets in Exhibit 2, the garbage and recycling bins will be enclosed in an outdoor storage area. The enclosure will be constructed with brick on concrete base on three sides and a powder-coated chain link fencing with slats opening on the side facing the parking area. In addition, the area around the trash enclosure will be landscaped on three side to provide additional screening. The trash enclosure will have a single 18-8” opening to allow access to the garbage and recycling bins.

(iv) Exterior storage areas shall have either a concrete or asphalt floor surface.

Response: The floor surface of the storage area will be constructed with concrete.

(v) Storage areas and containers shall be clearly labeled to indicate the type of material accepted.

Response: A sign will be placed on the trash enclosure to indicate its use. In addition, the trash and recycling bins will be marked to indicate which bins are used for trash and which bins are used for recycling.

(c) Access Standards

(i) Access to storage areas can be limited for security reasons. However, the storage areas shall be accessible to users at convenient times of the day, and to hauler personnel on the day and approximate time they are scheduled to provide hauler service.

Response: The outdoor trash enclosure will be secured at all times for increased security. TVF&R staff and the local hauler will be the only entities that will have access to the enclosure. TVF&R staff will be responsible for maintaining the trash enclosure area.

(ii) Storage areas shall be designed to be easily accessible to hauler trucks and equipment, considering paving, grade, gate clearance and vehicle access. A minimum of 10 feet horizontal clearance and 8 feet vertical clearance is required if the storage area is covered.

Response: As shown on Sheet L1.0 in Exhibit 2, hauler trucks will be able to access the outdoor trash enclosure through the on-site parking area. The parking area is designed accommodate large vehicles, including fire-fighting apparatus and large hauler trucks.

(iii) Storage areas shall be accessible to collection vehicles without requiring backing out of a driveway onto a public street. If only a single access point is available to the storage area, adequate turning radius shall be provided to allow vehicles to safely exit the site in a forward motion. [Ord. 898-93, §8, 6/4/93]

Response: This project is proposing two driveways that will connect to SW McEwan Road, however only one driveway will provide access to the parking areas and outdoor trash enclosure. The other driveway will provide egress access to the parking garage where the fire apparatuses will be stored. The parking area where the trash enclosure will be located will feature a drive aisle over 25 feet in width. The

parking area will also include a paved area that extends from the main drive aisle and provides access to the station garage. The paved area is approximately 30 feet wide and 45 feet long and will provide adequate area for hauler vehicles to turn around so that they can exit the parking area in a forward movement.

LANDSCAPING

Section 73.230 Landscaping Standards.

Purpose.

The purpose of this section is to establish standards for landscaping within Tualatin in order to enhance the environmental and aesthetic quality of the City:

- (1) By encouraging the retention and protection of existing trees and requiring the planting of trees in new developments;*
- (2) By using trees and other landscaping materials to temper the effects of the sun, wind, noise, and air pollution.*
- (3) By using trees and other landscaping materials to define spaces and the uses of specific areas; and*
- (4) Through the use of trees and other landscaping materials as a unifying element within the urban environment. [Ord. 705-86, §6, Sept. 8, 1986]*

Section 73.231 Landscape Guide-lines for the Central Design District.

[Section (1)-(2) omitted from excerpt]

Response: The proposed fire station is not located in the Central Design District; therefore, these standards do not apply.

Section 73.240 Landscaping General Provisions.

(1) The following standards are minimum requirements.

(2) The minimum area requirement for landscaping for conditional uses for RL, RML, RMH, RH and RH/HR Planning Districts, listed in [TDC 40.030](#), [41.030](#), [42.030](#), [43.030](#) and [44.030](#), excluding [40.030\(3\)](#), [40.030 \(4\)\(j\)](#), [40.030 \(4\)\(m\)](#), [40.030 \(4\)\(n\)](#) and [41.030\(2\)](#) shall be twenty-five (25) percent of the total area to be developed. When a dedication is granted in accordance with the planning district provisions on the subject property for a fish and wildlife habitat area, the minimum area requirement for landscaping shall be twenty (20) percent of the total area to be developed as determined through the AR process.

Response: The proposed fire station is not located in an RL, RML, RMH, RH or RH/HR Planning District; therefore, this standard does not apply.

(3) The minimum area requirement for landscaping for uses in CO, CR, CC, CG, ML and MG Planning Districts shall be fifteen (15) percent of the total land area to be developed, except within the Core Area Parking District, where the minimum area requirement for landscaping shall be 10 percent. When a dedication is granted in accordance with the planning district provisions on the subject property for a fish and wildlife habitat area, the minimum area requirement for landscaping may be reduced by 2.5 percent from the minimum area requirement as determined through the AR process.

Response: The proposed fire station is located in the ML Planning District and not within the Core Area Parking District; therefore, a minimum landscape requirement of 15 percent applies. This project is not proposing to provide a dedication for a fish and wildlife habitat in the area. As shown on Sheet L1.0 in Exhibit 1, the site will be landscaped.

(4) The minimum area requirement for landscaping for uses in IN, CN, CO/MR, MC and MP Planning Districts shall be twenty-five (25) percent of the total land area to be developed. When a dedication is granted in accordance with the planning district provisions on the subject property for a fish and wildlife habitat area, the minimum area requirement for landscaping may be reduced by 2.5 percent from the minimum area requirement as determined through the AR process.

Response: The proposed fire station is not located in an IN, CN, CO/MR, MC, or MP Planning District; therefore, this standard does not apply.

(5) The minimum area requirement for landscaping for uses in the Industrial Business Park Overlay Planning District and the Manufacturing Business Park Planning District shall be twenty (20) percent of the total land area to be developed.

Response: The proposed fire station is not located in an Industrial Business Park Overlay Planning District or Manufacturing Business Park Planning District; therefore, this standard does not apply.

(6) The minimum area requirement for landscaping for approved Industrial Master Plans shall be 20% of the total land area to be developed.

Response: This project is not proposing an Industrial Master Plan; therefore, this standard does not apply.

(7) For properties within the Hedges Creek Wetland Protection District which have signed the "Wetlands Mitigation Agreement", the improved or unimproved wetland buffer area may reduce the required landscaping to 12.5 percent as long as all other landscape requirements are met.

Response: This project is not within the Hedges Creek Wetland Protection District; therefore, this standard does not apply.

(8) Developments not in a Low Density Residential (RL) or Manufacturing Park (MP) Planning District, but which abut an RL or MP Planning District shall provide and perpetually maintain dense, evergreen landscaped buffers between allowed uses in the district and the adjacent Low Density Residential (RL) or Manufacturing Park (MP) Planning District as approved through the Architectural Review process.

Response: This project is not adjacent to an RL or MP Planning District; therefore, this standard does not apply.

(9) Yards adjacent to public streets, except as described in the Hedges Creek Wetlands Mitigation Agreement, [TDC 73.240\(7\)](#), shall be planted to lawn or live groundcover and trees and shrubs and be perpetually maintained in a manner providing a park-like character to the property as approved through the Architectural Review process.

Response: As shown on Sheet L1.0 in Exhibit 2, the yard facing SW McEwan Road will be landscaped with a lawn area and trees. All landscaping on the property will be maintained by TVF&R.

(10) Yards not adjacent to public streets or Low Density Residential (RL) or Manufacturing Park (MP) Planning Districts shall be planted with trees, shrubs, grass or other live groundcover, and maintained

consistent with a landscape plan indicating areas of future expansion, as approved through the Architectural Review process.

Response: As shown on Sheet L1.0 in Exhibit 2, the northern and western yards will be landscaped with a combination of trees and shrubs. The southern portion of the property, will be landscaped with grass and shrubs. All landscaping on the property will be maintained by TVF&R.

(11) Any required landscaped area shall be designed, constructed, installed, and maintained so that within three years the ground shall be covered by living grass or other plant materials. (The foliage crown of trees shall not be used to meet this requirement.) A maximum of 10% of the landscaped area may be covered with un-vegetated areas of bark chips, rock or stone. Disturbed soils are encouraged to be amended to an original or higher level of porosity to regain infiltration and stormwater storage capacity.

Response: Proposed landscaping has been designed to provide maximum coverage on the site by combining a variety of 20 shrubs and 3 types of groundcovers in addition to general lawn areas. As indicated on Sheet L1.0 in Exhibit 2, the shrubs and groundcovers will be spaced three on center to ensure coverage is achieved.

(12) In the MP District, wetland buffer areas up to 50 feet in width may be counted toward the required percentage of site landscaping, subject to the following:

Response: This project is not located in the MP District; therefore, this standard does not apply.

(13) Landscape plans for required landscaped areas that include fences should carefully integrate any fencing into the plan to guide wild animals toward animal crossings under, over, or around transportation corridors.

Response: A fence is proposed around the perimeter of the fires station (see Sheet C4 in Exhibit 4). The proposed landscaping will be located on the interior of the perimeter fence, providing a partial screen to from the fire station.

Section 73.250 Tree Preservation.

(1) Trees and other plant materials to be retained shall be identified on the landscape plan and grading plan.

Response: This project is not proposing to retain any trees on the property. However, it should be noted that the property was previously part of an existing, larger lot. The subject property is a portion of that existing, larger lot and was acquired by TVF&R in order to site a fire station necessary for the health, safety, and welfare of its fire district. In doing so, TVF&R made a deliberate effort to acquire only as much as was necessary to preserve existing on-site trees from the larger lite, while also meeting the station's design and Tualatin's development standards.

(2) During the construction process:

(a) The owner or the owner's agents shall provide above and below ground protection for existing trees and plant materials identified to remain.

Response: As shown Sheets C3 and L2.0 in Exhibit 2, tree protection and construction fences will be used to protect existing trees located adjacent to the subject property.

(b) Trees and plant materials identified for preservation shall be protected by chain link or other sturdy fencing placed around the tree at the drip line.

Response: As indicated in the notes on Sheet L2.0 in Exhibit 2, chain link fencing or approved equal will be used as a tree protection device.

(c) If it is necessary to fence within the drip line, such fencing shall be specified by a qualified arborist as defined in [TDC 31.060](#).

Response: As indicated in the notes on Sheet L2.0 in Exhibit 2, authorization by the project arborist is required for any work within the tree protection area.

(d) Neither top soil storage nor construction material storage shall be located within the drip line of trees designated to be preserved.

Response: Top soil storage and construction material storage will not occur within the tree protection area.

(e) Where site conditions make necessary a grading, building, paving, trenching, boring, digging, or other similar encroachment upon a preserved tree's drip-line area, such grading, paving, trenching, boring, digging, or similar encroachment shall only be permitted under the direction of a qualified arborist. Such direction must assure that the health needs of trees within the preserved area can be met.

Response: As noted above, a project arborist's authorization will be required before any work is conducted within the tree protection area.

(f) Tree root ends shall not remain exposed.

Response: Tree root ends will not remain exposed.

(3) Landscaping under preserved trees shall be compatible with the retention and health of said tree.

Response: Proposed landscaping has been selected to meet the applicable standards of the latest edition of "American Association of Nurserymen Standards" and will be certified as free from hazardous insects, disease, and noxious weeds that may disturb existing trees.

(4) When it is necessary for a preserved tree to be removed in accordance with [TDC 34.210](#) the landscaped area surrounding the tree or trees shall be maintained and replanted with trees that relate to the present landscape plan, or if there is no landscape plan, then trees that are complementary with existing, nearby landscape materials. Native trees are encouraged

(5) Pruning for retained deciduous shade trees shall be in accordance with National Arborist Association "Pruning Standards For Shade Trees," revised 1979.

(6) Except for impervious surface areas, one hundred percent (100%) of the area preserved under any tree or group of trees retained in the landscape plan (as approved through the Architectural Review process) shall apply directly to the percentage of landscaping required for a development.

Response: As noted above, this project is not proposing to retain any on-site trees; therefore, these standards do not apply.

Section 73.260 Tree and Plant Specifications.

(1) *The following specifications are minimum standards for trees and plants:*

(a) *Deciduous Trees: Deciduous shade and ornamental trees shall be a minimum one and one-half inch (1 1/2") caliper measured six inches (6") above ground, balled and burlapped. Bare root trees will be acceptable to plant during their dormant season. Trees shall be characteristically shaped specimens.*

(b) *Coniferous Trees. Coniferous trees shall be a minimum five feet (5') in height above ground, balled and burlapped. Bare root trees will be acceptable to plant during their dormant season. Trees shall be well branched and characteristically shaped specimens.*

(c) *Evergreen and Deciduous Shrubs. Evergreen and deciduous shrubs shall be at least one (1) to five (5) gallon size. Shrubs shall be characteristically branched. Side of shrub with best foliage shall be oriented to public view.*

(d) *Groundcovers. Groundcovers shall be fully rooted and shall be well branched or leafed. English ivy (Hedera helix) is considered a high maintenance material which is detrimental to other landscape materials and buildings and is therefore prohibited.*

(e) *Lawns. Lawns shall consist of grasses, including sod, or seeds of acceptable mix within the local landscape industry. Lawns shall be 100 percent coverage and weed free.*

Response: As indicated on the Plant List on Sheet L1.0 in Exhibit 2, all proposed trees, shrubs, groundcovers, and lawns will meet the minimum standards.

(2) *Landscaping shall be installed in accordance with the provisions of Sunset New Western Garden Book (latest edition), Lane Publishing Company, Menlo Park, California or the American Nurserymen Association Standards (latest edition).*

Response: Proposed landscaping will be installed according to this standard.

(3) *The following guidelines are suggested to ensure the longevity and continued vigor of plant materials:*

(a) *Select and site permanent landscape materials in such a manner as to produce a hardy and drought-resistant landscaped area.*

(b) *Consider soil type and depth, spacing, exposure to sun and wind, slope and contours of the site, building walls and overhangs, and compatibility with existing native vegetation preserved on the site or in the vicinity.*

Response: The proposed landscaping has been prepared by a registered landscape architect and has been designed with plantings that are appropriate for site conditions to ensure they reach full maturity.

(4) *All trees and plant materials shall be healthy, disease-free, damage-free, well-branched stock, characteristic of the species.*

Response: All new landscaping will be acquired through a professional nursery to ensure that plantings will be healthy so that they can reach maturity.

(5) *All plant growth in landscaped areas of developments shall be controlled by pruning, trimming or otherwise so that:*

(a) *It will not interfere with designated pedestrian or vehicular access; and*

(b) *It will not constitute a traffic hazard because of reduced visibility.*

Response: TVF&R will be responsible for maintaining all landscaping on the property and will ensure that it won't interfere with pedestrian or vehicular access.

Section 73.270 Grading.

(1) After completion of site grading, top-soil is to be restored to exposed cut and fill areas to provide a suitable base for seeding and planting.

Response: As shown on Sheet C2 in Exhibit 2, the proposed site grading is generally minimal. The site is relatively flat and will only require minor grading to accommodate the proposed fire station.

(2) All planting areas shall be graded to provide positive drainage.

Response: Proposed grading will not substantially change the general slope of the site. All planting areas have been designed to integrate the natural slope of the site and direct excess water away from the building and into the proposed stormwater network.

(3) Neither soil, water, plant materials nor mulching materials shall be allowed to wash across roadways or walkways.

Response: Proposed landscaping will be bounded by curbs or the paved on-site pedestrian network so as to ensure that landscape materials will not wash across roadways or walkways.

(4) Impervious surface drainage shall be directed away from pedestrian walkways, dwelling units, buildings, outdoor private and shared areas and landscape areas except where the landscape area is a water quality facility.

Response: As shown on Sheet C4 in Exhibit 2, storm sewer catch basins are proposed at strategic locations to capture and redirect surface drainage from parking areas.

Section 73.280 Irrigation System Required.

Except for townhouse lots, landscaped areas shall be irrigated with an automatic underground or drip irrigation system.

Response: The landscaped areas will be irrigated to ensure plantings are watered on a regular basis so that they reach full maturity.

Section 73.290 Re-vegetation in Un-landscaped Areas.

The purpose of this section is to ensure erosion protection, and in appropriate areas to encourage soil amendment, for those areas not included within the landscape percentage requirements so native plants will be established, and trees will not be lost.

(1) Where vegetation has been removed or damaged in areas not affected by the landscaping requirements and that are not to be occupied by structures or other improvements, vegetation shall be replanted.

Response: All areas of the subject property will either be landscaped with trees, shrubs, and groundcovers, or occupied by the fire station, parking areas, and pedestrian walkway network.

(2) Plant materials shall be watered at intervals sufficient to ensure survival and growth for a minimum of two growing seasons.

Response: All plant materials will be guaranteed for one full growing season or one year, whichever is longer.

(3) The use of native plant materials is encouraged to reduce irrigation and maintenance demands.

Response: Plant materials have been selected to conform with all applicable standards of the latest edition of “American Association of Nurserymen Standards” and

(4) Disturbed soils should be amended to an original or higher level of porosity to regain infiltration and stormwater storage capacity. [Ord. 1224-06 §27, 11/13/06]

Response: All topsoil on-site will be verified as to whether it will be conducive to proper plant growth. In the case it's not alternative imported topsoil will be provided.

Section 73.300 Landscape Standards - Multi-family Uses.

All areas within a development, including townhouses, not occupied by buildings, parking spaces, driveways, drive aisles, pedestrian areas, or undisturbed natural areas shall be landscaped. Townhouse developments may include hard surfaces in outdoor areas such as patios and storage areas as determined in the Architectural Review process. [Ord. 1025-99, §43, 7/2/99]

Response: This project is not proposing a multi-family use; therefore, this standard does not apply.

Section 73.310 Landscape Standards - Commercial, Industrial, Public and Semi-Public Uses.

(1) A minimum 5-foot-wide landscaped area must be located along all building perimeters which are viewable by the general public from parking lots or the public right-of-way, excluding loading areas, bicycle parking areas and pedestrian egress/ingress locations. Pedestrian amenities such as landscaped plazas and arcades may be substituted for this requirement. This requirement shall not apply where the distance along a wall between two vehicle or pedestrian access openings (such as entry doors, garage doors, carports and pedestrian corridors) is less than 8 feet.

Response: Only the northern and eastern portions of the proposed fire station will be visible to the general public; the northern wall faces the visitor parking area and the eastern wall faces SW McEwan Road. The southern and western portions of the proposed fire station will not be visible to the general public; the western wall faces the employee parking area and the southern wall faces a stormwater retention area. Except for the entrances to community room, main office, and garage access, the northern and eastern perimeters of the building will include a landscape strip between the building and pedestrian pathways.

(2) Areas exclusively for pedestrian use that are developed with pavers, bricks, etc., and contain pedestrian amenities, such as benches, tables with umbrellas, children's play areas, shade trees, canopies, etc., may be included as part of the site landscape area requirement.

Response: This project is proposing a patio area located outside the dayroom, behind the fire station. As such, the patio area has been counted towards the site landscape area requirement.

(3) All areas not occupied by buildings, parking spaces, driveways, drive aisles, pedestrian areas or undisturbed natural areas shall be landscaped.

Response: This project is proposing to landscape all areas that won't be used by pedestrian or vehicles for internal circulation.

OFF-STREET PARKING LOT LANDSCAPING

Section 73.320 Off-Street Parking Lot Landscaping Standards.

(1) General Provisions. In addition to the goals stated in [TDC 73.110](#) and [73.140](#), the goals of the off-street parking lot standards are to create shaded areas in parking lots, to reduce glare and heat buildup, provide visual relief within paved parking areas, emphasize circulation patterns, reduce the total number of spaces, reduce the impervious surface area and stormwater runoff and enhance the visual environment. The design of the off-street parking area shall be the responsibility of the developer and should consider visibility of signage, traffic circulation, comfortable pedestrian access, and aesthetics. Trees shall not be cited as a reason for applying for or granting a variance on placement of signs.

Response: The proposed parking areas have been designed to integrate with the proposed landscaping and provide a natural, aesthetically pleasing environment. Trees are proposed at regular intervals to break up the visual appearance of the parking area and to maximize tree canopy coverage over impervious surfaces.

(2) Application. Off-street parking lot landscaping standards shall apply to any surface vehicle parking or circulation area. [Ord. 904-93, §59, 9/13/93; Ord. 1224-06 §28, 11/13/06]

Response: This project is proposing a parking lot with parking areas for the general public and TVF&R staff. As such, these requirements apply.

Section 73.330 Parking Lot Landscaping - Multi-family Uses.

Response: This project is not proposing a multi-family use; therefore, these standards do not apply.

Section 73.350 Off-Street Parking Lot Landscape Island Requirements - Multi-Family Uses.

Response: This project is not proposing a multi-family use; therefore, these standards do not apply.

Section 73.360 Off-Street Parking Lot Landscape Islands - Commercial, Industrial, Public, and Semi-Public Uses.

(1) A minimum of 25 square feet per parking stall shall be improved with landscape island areas. They may be lower than the surrounding parking surface to allow them to receive stormwater run-off and function as water quality facilities as well as parking lot landscaping. They shall be protected from vehicles by curbs, but the curbs may have spaces to allow drainage into the islands. They shall be dispersed throughout the parking area [see [TDC 73.380\(3\)](#)]. They shall be planted with groundcover or shrubs that will completely cover the island area within 3 years. They shall be planted with deciduous shade trees when needed to meet the parking lot shade tree requirements. Native plant materials are encouraged. Landscape square footage requirements shall not apply to parking structures and underground parking.

Response: A total of 33 parking spaces are proposed, which requires a minimum of 825 square feet of landscape island areas. As shown on Sheet L1.0 in Exhibit 2, landscaped islands are proposed in the general public parking areas. The landscaped islands will provide more than 1,000 square feet of plantings. The landscaped islands will be separated from the parking areas by curbs.

(2) Landscaped island areas with deciduous parking lot shade trees shall be a minimum of 5 feet in width (from inside of curb to curb).

Response: The proposed parking landscape islands will be approximately ten feet or wider, exceeding this requirement.

(3) A minimum of one deciduous shade tree shall be provided for every four (4) parking spaces to lessen the adverse impacts of glare, reduce heat from paved surfaces, and to emphasize circulation patterns. Required shade trees shall be uniformly distributed throughout the parking lot (see [TDC 73.380\(3\)](#)), except that within the Central Design District landscape islands and shade trees may be placed to frame views of the Tualatin Commons water feature or identified architectural focal elements. The trees shall meet the requirements of [TDC 73.360\(7\)](#). Parking lot shade tree requirements shall not apply to parking structures and underground parking.

Response: A total of 17 deciduous trees will be planted to provide shade to the parking area. The location and spacing of the trees are shown on Sheet L1.0 in Exhibit 2.

(4) Landscape islands shall be utilized at aisle ends to protect parked vehicles from moving vehicles and emphasize vehicular circulation patterns. Landscape island location requirements shall not apply to parking structures and under-ground parking.

Response: One parking aisle is proposed as part of this application and will have landscaping islands located at the end of the aisle as well as where the aisle bends around the back of the fire station between the public and staff parking areas.

(5) Required plant material in landscape islands shall achieve 90 percent coverage within three years. Native shrubs and trees are encouraged.

Response: The proposed landscaping has been prepared by a registered landscape architect and has been designed with plantings that are appropriate for site conditions to ensure they reach full maturity.

(6) (a) Except as in (b) below, site access from the public street shall be defined with a landscape area not less than 5 feet in width on each side and extend 25 feet back from the property line for commercial, public, and semi-public development with 12 or more parking spaces and extend 30 feet back from the property line for industrial development, except for parking structures and under-ground parking which shall be determined through the Architectural Review process.

Response: The access to the main parking area will include landscape areas on both sides of the drive aisle and will be wider than 5 feet and extend more than 50 back from the property line.

(b) In the Central Design District where driveway access is on local streets, not collectors or arterials, and the building(s) on the property is(are) less than 5,000 square feet in gross floor area, or parking is the only use on the property, site access from the public street shall be defined with a landscape area not less than 5 feet in width on each side and extend 5 feet back from the property line, except for parking structures and underground parking which shall be determined through the Architectural Review process.

Response: The proposed fire station is not within the Central Design District; therefore, this standard does not apply.

(7) Deciduous shade trees shall meet the following criteria:

(a) Reach a mature height of 30 feet or more;

(b) Cast moderate to dense shade in summer;

- (c) Long lived, i.e., over 60 years;
- (d) Do well in an urban environment:
 - (i) Pollution tolerant.
 - (ii) Tolerant of direct and reflected heat.
- (e) Require little maintenance:
 - (i) Mechanically strong.
 - (ii) Insect- and disease-resistant.
 - (iii) Require little pruning.
- (f) Be resistant to drought conditions;
- (g) Be barren of fruit production.

Response: The proposed landscaping has been prepared by a registered landscape architect and has been designed with plantings that are appropriate for site conditions to ensure they reach full maturity.

Section 73.370 Off-Street Parking and Loading.

(1) General Provisions.

(a) At the time of establishment of a new structure or use, or change in use, or change in use of an existing structure, within any planning district of the City, off-street parking spaces, off-street vanpool and carpool parking spaces for commercial, institutional and industrial uses, off-street bicycle parking, and off-street loading berths shall be as provided in this and following sections, unless greater requirements are otherwise established by the conditional use permit or the Architectural Review process, based upon clear findings that a greater number of spaces are necessary at that location for protection of public health, safety and welfare or that a lesser number of vehicle parking spaces will be sufficient to carry out the objectives of this section. In the Central Design District, the Design Guidelines of [TDC 73.610](#) shall be considered. In case of conflicts between guidelines or objectives in TDC Chapter 73, the proposal shall provide a balance.

Response: As described in further detail to individual standards below, this project will provide the necessary off-street parking spaces to meet the requirements of this section.

(b) At the time of enlargement of an existing multi-family residential, commercial, institutional or industrial structure or use, TDC 73.370 shall apply to the existing and enlarged structure or use.

Response: This project is not proposing to enlarge an existing structure; therefore, this standard does not apply.

(c) Except where otherwise specified, the floor area measured shall be the gross floor area of the building primary to the function of the particular use of the property other than space devoted to off-street parking or loading.

(d) Where employees are specified, the term shall apply to all persons, including proprietors, working on the premises during the peak shift.

(e) Calculations to determine the number of required parking spaces and loading berths shall be rounded to the nearest whole number.

Response: Calculations for the minimum number of required parking spaces have been rounded to the nearest whole number.

(f) If the use of a property changes, thereby increasing off-street parking or loading requirements, the increased parking/loading area shall be provided prior to commencement of the new use.

Response: This project is proposing to build a fire station on a newly created parcel and will be the first use of the property; therefore, this standard does not apply.

(g) Parking and loading requirements for structures not specifically listed herein shall be determined by the Community Development Director, based upon requirements of comparable uses listed.

Response: This project is proposing to build a fire station with an attached community room, which is not specifically listed as a use with associated parking requirements. Notwithstanding, the most comparable use to a fire station would be a general office, which requires 2.7 spaces per 1,000 square feet of gross floor area. The most comparable use to a community room would be a library/reading room, which requires 1 space per 400 square feet of public area. The overall building is approximately 9,500 square feet, of which approximately 600 square feet is dedicated to the community room. As such, the fire station use would require 24 parking spaces and the community room use would require 2 parking spaces. This project is proposing 33 parking spaces, which is more than adequate to serve the site.

(h) When several uses occupy a single structure, the total requirements for off-street parking may be the sum of the requirements of the several uses computed separately or be computed in accordance with TDC 73.370(1)(m), Joint Use Parking.

Response: This project is proposing two uses within a single structure; a fire station and community room. Calculations for the minimum parking requirements have been calculated to reflect the combined minimum requirement.

(i) Off-street parking spaces for dwellings shall be located on the same lot with the dwelling. Other required parking spaces may be located on a separate parcel, provided the parcel is not greater than five hundred (500) feet from the entrance to the building to be served, measured along the shortest pedestrian route to the building. The applicant must prove that the parking located on another parcel is functionally located and that there is safe vehicular and pedestrian access to and from the site. The parcel upon which parking facilities are located shall be in the same ownership as the structure.

Response: This project is not proposing a dwelling; therefore, this standard does not apply.

(j) Required parking spaces shall be available for the parking of operable passenger automobiles of residents, customers, patrons and employees and shall not be used for storage of vehicles or materials or for the parking of trucks used in conducting the business.

Response: The proposed parking lot is separated into two areas; a public parking area for visitors and an employee parking area for TVF&R staff. None of the proposed parking spaces will be used as long-term vehicle or material storage. Fire apparatus will be stored in within the station garage and not in the parking areas.

(k) Institution of on-street parking, where none is previously provided, shall not be done solely for the purpose of relieving crowded parking lots in commercial or industrial planning districts.

Response: This project is not proposing on-street parking; therefore, this standard does not apply.

(l) Parking facilities may be shared by users on adjacent parcels if the following standards are met:

Response: This project is not proposing a shared parking facility with an adjacent property; therefore, this standard does not apply.

(m) Joint Use Parking. Joint use of parking spaces may occur where two or more separate developments or multiple uses in a development are able to jointly use some or all of the same required parking spaces because their parking demands occur at different times. Joint use of parking spaces may be allowed if the following standards are met:

Response: The parking area will be jointly used by TVF&R staff and the people attending meetings held at the community room.

(i) There shall be no substantial conflict in the principal operating hours of the buildings or uses for which the joint use parking is proposed. Future change of use, such as expansion of a building or establishment of hours of operation which conflict with or affect a joint use parking agreement are prohibited, unless approval is obtained through the Architectural Review process;

Response: At full-staffing, Station 39 will house six firefighters per shift, with shifts covering 24 hours a day. The parking area has been designed to accommodate a shift change of 12 firefighters while still providing more than adequate parking accommodations for when the community room is in use. It should also be noted that the community room will only be used as-needed and will not be used on a regular basis.

(ii) The joint use parking spaces shall be located no more than 500 feet from a building or use to be served by the joint use parking;

Response: The proposed parking area is located adjacent to the building.

(iii) The number and location of parking spaces, hours of use and changes in operating hours of uses subject to joint use shall be approved through the Architectural Review process;

Response: This application is requesting approval for 33 parking spaces located adjacent to the proposed fire station.

(iv) Legal documentation, to the satisfaction of the City Attorney, shall be submitted verifying the joint use parking between the separate developments. Joint use parking agreements may include provisions covering maintenance, liability, hours of use and cross easements; and

(v) The City Attorney approved legal documentation shall be recorded by the applicant at the Washington or Clackamas County Recorder's Office and a copy of the recorded document submitted to the Planning Department prior to issuance of a building permit.

Response: The joint use parking area will be solely owned and operated by TVF&R. Parking spaces will be available to people attending meetings at the community room. As such, this project is not proposing documentation specifying maintenance, liability, and hours of use.

(vi) Areas in the Natural Resource Protection Overlay District, Other Natural Areas identified in [Figure 3-4](#) of the Parks and Recreation Master Plan, or a Clean Water Services Vegetated Corridor would be better protected.

Response: This project is not located in the Natural Resource Protection Overlay District, Other Natural Areas; therefore, this standard does not apply.

(n) Bicycle parking facilities shall include long-term parking that consists of covered, secure stationary racks, lockable enclosures, or rooms (indoor or outdoor) in which the bicycle is stored and short-term parking provided by secure stationary racks (covered or not covered), which accommodate a bicyclist's lock securing the frame and both wheels. The Community Development Director, their designee, or the Architectural Review Board may approve a form of bicycle parking not specified in these provisions but that meets the needs of long-term and/or short-term parking pursuant to Section 73.370.

Response: Short-term bicycle parking is proposed near the entrance to the community room. Long-term bicycle parking can be accommodated in the TVF&R living quarters or general storage areas in the fire station

(o) Each bicycle parking space shall be at least 6 feet long and 2 feet wide, and overhead clearance in covered areas shall be at least 7 feet, unless a lower height is approved through the Architectural Review process.

Response: As shown on the Site Plan sheet in Exhibit 2, short-term bicycle parking spaces have been designed to meet the dimensional standards of this requirement.

(p) A 5-foot-wide bicycle maneuvering area shall be provided beside or between each row of bicycle parking. It shall be constructed of concrete, asphalt or a pervious surface such as pavers or grasscrete, but not gravel or woody material, and be maintained.

(q) Access to bicycle parking shall be provided by an area at least 3 feet in width. It shall be constructed of concrete, asphalt or a pervious surface such as pavers or grasscrete, but not gravel or woody material, and be maintained.

Response: As shown on the Site Plan sheet in Exhibit 2, a bicycle maneuvering area is proposed adjacent to the bicycle parking areas and will be constructed with a concrete surface.

(r) Required bicycle parking shall be located in convenient, secure, and well-lighted locations approved through the Architectural Review process. Lighting, which may be provided, shall be deflected to not shine or create glare into street rights-of-way or fish and wildlife habitat areas.

Response: The short-term bicycle parking will be located between the fire station and the public parking area, adjacent to the community room entrance where it will be most visible. It will be indirectly lit by a combination of parking lot and building lighting as shown on The Site Lighting sheet in Exhibit 2.

(s) Long-term bicycle parking facilities may be provided inside a building in suitable secure and accessible locations.

Response: As noted above, long-term bicycle parking can be accommodated in the TVF&R living quarters or general storage areas in the fire station. The living quarters portion of the fire station is secured for the general safety of TVF&R staff. In addition, the station will have 24-hour staffing, reducing the likelihood of theft.

(t) Bicycle parking may be provided within the public right-of-way in the Core Area Parking District subject to approval of the City Engineer and provided it meets the other requirements for bicycle parking.

Response: This project is not located within the Core Area Parking District; therefore, this standard does not apply.

(u) Bicycle parking areas and facilities shall be identified with appropriate signing as specified in the Manual on Uniform Traffic Control Devices (MUTCD) (latest edition). At a minimum, bicycle parking signs shall be located at the main entrance and at the location of the bicycle parking facilities.

Response: Signage will be placed to identify the location of bicycle parking facilities.

(v) Required bicycle parking spaces shall be provided at no cost to the bicyclist, or with only a nominal charge for key deposits, etc. This shall not preclude the operation of private for-profit bicycle parking businesses.

Response: Proposed bicycle parking spaces located outside the building will be available to the general public for short-term bicycle parking at no cost.

(w) Parking on existing residential, commercial and industrial development may be redeveloped as a transit facility as a way to encourage the development of transit supportive facilities such as bus stops and pullouts, bus shelters and park and ride stations. Parking spaces converted to such uses in conjunction with the transit agency and approved through the Architectural Review process will not be required to be replaced.

Response: This project is a new use and does have existing parking facilities available to convert for transit supportive uses; therefore, this standard does not apply.

(x) Required vanpool and carpool parking shall meet the 9-foot parking stall standards in [Figure 73-1](#) and be identified with appropriate signage.

Response: This project is not proposing a vanpool or carpool parking space. The parking area has been designed to accommodate the anticipated full-staffing of six firefighters per shift.

(2) Off-Street Parking Provisions.

(a) The following are the minimum and maximum requirements for off-street motor vehicle parking in the City, except for minimum parking requirements for the uses in TDC 73.370(2)(a) (Residential Uses: iii, iv, v, vi, vii; Places of Public Assembly: I, ii, iv; Commercial Amusements: I, ii; and Commercial: I, ii, xi, xii, xiv) within the Core Area Parking District (CAPD). Minimum standards for off-street motor vehicle parking for the uses in 73.370(2) (a) Residential Uses: iii, iv, v, vi, vii; Places of Public Assembly: I, ii, iv; Commercial Amusements: I, ii; and Commercial: I, ii, xi, xii, xiv in the CAPD are in TDC 73.370(2)(b). The maximum requirements are divided into Zone A and Zone B, as shown on the Tualatin Parking Zone Map, [Figure 73-3](#). The following are exempt from calculation of maximum parking requirements: parking structures; fleet parking; parking for vehicles for sale, lease or rent; car/vanpool parking; dedicated valet parking; and user-paid parking.

USE	MINIMUM MOTOR VEHICLE PARKING REQUIREMENT	MAXIMUM MOTOR VEHICLE PARKING REQUIREMENT	BICYCLE PARKING REQUIREMENT	PERCENTAGE OF BICYCLE PARKING TO BE COVERED
Places of Public Assembly:				
(i) Library, reading room	1.00 space per 400 sq. ft. of public area	None	2, or 1.5 spaces per 1,000 gross sq. ft., whichever is greater	10
Commercial				

(vi) General office	2.70 spaces per 1,000 sq. ft. of gross floor area	Zone A: 3.4 spaces per 1,000 sq. ft. gross floor area Zone B: 4.1 spaces per 1,000 sq. ft. gross floor area	2, or 0.50 spaces per 1,000 gross sq. ft. whichever is greater	First 10 spaces or 40%, whichever is greater
---------------------	---	--	--	--

Response: This project is proposing to build a fire station with an attached community room, which is not specifically listed as a use with associated parking requirements. Notwithstanding, the most comparable use to a fire station would be a general office, which requires 2.7 spaces per 1,000 square feet of gross floor area. The most comparable use to a community room would be a library/reading room, which requires 1 space per 400 square feet of public area. The overall building is approximately 9,500 square feet, of which approximately 600 square feet is dedicated to the community room. As such, the fire station use would require 24 parking spaces and the community room use would require 2 parking spaces. This project is proposing 33 parking spaces, which is more than adequate to serve the site.

(b) The following are the minimum requirements for off-street motor vehicle parking in the Core Area Parking District (CAPD) for the uses in TDC 73.370(2)(a)(Residential Uses: iii, iv, v, vi, vii; Places of Public Assembly: i, ii, iv; Commercial Amusements: i, ii; and Commercial: i, ii, xi, xii, xiv).

Response: This project is not located within the Core Area Parking District; therefore, these standards do not apply.

(3) Off-Street Vanpool and Carpool Parking Provisions.

The minimum number of off-street Vanpool and Carpool parking for commercial, institutional and industrial uses is as follows:

<i>Number of Required Parking Spaces</i>	<i>Number of Vanpool or Carpool Spaces</i>
<i>0 to 10</i>	<i>1</i>
<i>10 to 25</i>	<i>2</i>
<i>26 and greater</i>	<i>1 for each 25 spaces</i>

Response: This project is not proposing a vanpool or carpool parking space. The parking area has been designed to accommodate the anticipated full-staffing of six firefighters per shift.

Section 73.380 Off-Street Parking Lots.

A parking lot, whether an accessory or principal use, intended for the parking of automobiles or trucks, shall comply with the following:

(1) Off-street parking lot design shall comply with the dimensional standards set forth in [Figure 73-1](#) of this section, except for parking structures and underground parking where stall length and width requirements for a standard size stall shall be reduced by .5 feet and vehicular access at the entrance if gated shall be a minimum of 18 feet in width.

Response: The proposed parking lot has been designed to meet the dimensional standards in Figure 73-1.

(2) Parking stalls for sub-compact vehicles shall not exceed 35 percent of the total parking stalls required by [TDC 73.370\(2\)](#). Stalls in excess of the number required by [TDC 73.370\(2\)](#) can be sub-compact stalls.

Response: This project is not proposing sub-compact parking spaces; therefore, this standard does not apply.

(3) Off-street parking stalls shall not exceed eight continuous spaces in a row without a landscape separation, except for parking structures and underground parking. For parking lots within the Central Design District that are designed to frame views of the central water feature or identified architectural focal elements as provided in [TDC 73.350\(3\)](#), this requirement shall not apply and the location of parking lot landscape islands shall be determined through the Architectural Review process.

Response: The proposed parking stalls will not exceed eight continuous spaces in a row. The parking row near the northern portion of the property will have 13 parking stalls that are separated by a landscape island, which will provide relief in the parking area.

(4) Parking lot drive aisles shall be constructed of asphalt or concrete, including pervious concrete. Parking stalls shall be constructed of asphalt or concrete, or a pervious surface such as pavers or grasscrete, but not gravel or woody material. Drive aisles and parking stalls shall be maintained adequately for all-weather use and drained to avoid water flow across sidewalks. Pervious surfaces such as pervious concrete, pavers and grasscrete, but not gravel or woody material, are encouraged for parking stalls in or abutting the Natural Resource Protection Overlay District, Other Natural Areas identified in [Figure 3-4](#) of the Parks and Recreation Master Plan, or in a Clean Water Services Vegetated Corridor. Parking lot landscaping shall be provided pursuant to the requirements of [TDC 73.350](#) and [TDC 73.360](#). Walkways in parking lots shall be provided pursuant to [TDC 73.160](#).

Response: The parking lot, including drive aisles and parking stalls, will be constructed of concrete. They have been designed to allow for proper drainage so as to prevent flooding in the parking areas.

(5) Except for parking to serve residential uses, parking areas adjacent to or within residential planning districts or adjacent to residential uses shall be designed to minimize disturbance of residents.

Response: The proposed fire station is not located in or adjacent to a residential planning district; therefore, this standard does not apply.

(6) Artificial lighting, which may be provided, shall be deflected to not shine or create glare in a residential planning district, an adjacent dwelling, street right-of-way in such a manner as to impair the use of such way or a Natural Resource Protection Overlay District, Other Natural Areas identified in [Figure 3-4](#) of the Parks and Recreation Master Plan, or a Clean Water Services Vegetated Corridor.

Response: The proposed fire station is not located in or adjacent to a residential planning district; therefore, this standard does not apply.

(7) Groups of more than 4 parking spaces shall be so located and served by driveways that their use will require no backing movements or other maneuvering within a street right-of-way other than an alley.

Response: As shown on Sheet L1.0 in Exhibit 2, all off-street parking stalls will be accessible via a drive aisle. None of the proposed parking stall will require a backing movement within a street right-of-way.

(8) Service drives to off-street parking areas shall be designed and constructed to facilitate the flow of traffic, provide maximum safety of traffic access and egress, and maximum safety of pedestrians and vehicular traffic on the site.

Response: This project is not proposing a service drive; therefore, this standard does not apply.

(9) Parking bumpers or wheel stops or curbing shall be provided to prevent cars from encroaching on the street right-of-way, adjacent landscaped areas, or adjacent pedestrian walkways.

Response: As shown on Sheet L1.0 in Exhibit 2, wheel stops will be provided to prevent cars from encroaching on adjacent landscaped areas and pedestrian walkways. No parking stalls are proposed that will face the street right-of-way.

(10) Disability parking spaces and accessibility shall be provided in accordance with applicable federal and state requirements.

Response: As shown on Sheet L1.0 in Exhibit 2, two ADA compliant parking spaces are proposed in the public parking area. The ADA compliant spaces will be located closest to the community room entrance and will be marked to indicate their use.

(11) On-site drive aisles without parking spaces, which provide access to parking areas with regular spaces or with a mix of regular and sub-compact spaces, shall have a minimum width of 22 feet for two-way traffic and 12 feet for one-way traffic. On-site drive aisles without parking spaces, which provide access to parking areas with only sub-compact spaces, shall have a minimum width of 20 feet for two-way traffic and 12 feet for one-way traffic.

Response: Drive aisles in the proposed parking area will be approximately 25 feet in width to allow for two-way traffic.

Section 73.390 Off-Street Loading Facilities.

[Sections (1)-(7) omitted from excerpt]

Response: This project is not proposing a loading berth as part of this application. This project is proposing a fire station, which is considered a public/semi-public use. However, fire stations are a distinct use and with specific and targeted functions; namely to provide fire protective services. Fire stations do not require regular or semi-regular deliveries of goods or supplies in sufficient enough quantity to justify a loading berth.

Section 73.400 Access.

(1) The provision and maintenance of vehicular and pedestrian ingress and egress from private property to the public streets as stipulated in this Code are continuing requirements for the use of any structure or parcel of real property in the City of Tualatin. Access management and spacing standards are provided in this section of the TDC and TDC Chapter 75. No building or other permit shall be issued until scale plans are presented that show how the ingress and egress requirement is to be fulfilled. If the owner or occupant of a lot or building changes the use to which the lot or building is put, thereby increasing ingress and egress requirements, it shall be unlawful and a violation of this code to begin or maintain such altered use until the required increase in ingress and egress is provided.

Response: This project is proposing two driveways that will connect to SW McEwan Road, however only one driveway will provide access to the parking areas and outdoor trash enclosure. The other driveway will provide egress access to the parking garage where the fire apparatuses will be stored.

(2) Owners of two or more uses, structures, or parcels of land may agree to utilize jointly the same ingress and egress when the combined ingress and egress of both uses, structures, or parcels of land

satisfies their combined requirements as designated in this code; provided that satisfactory legal evidence is presented to the City Attorney in the form of deeds, easements, leases or contracts to establish joint use. Copies of said deeds, easements, leases or contracts shall be placed on permanent file with the City Recorder.

Response: This project is not proposing to use joint access; therefore, this standard does not apply.

(3) Joint and Cross Access.

Response: This project is not proposing to use joint access; therefore, these standards does not apply.

(4) Requirements for Development on Less than the Entire Site.

Response: This project is proposing to develop the entire site; therefore, these standards do not apply.

(5) Lots that front on more than one street may be required to locate motor vehicle accesses on the street with the lower functional classification as determined by the City Engineer.

Response: The subject property has frontage on one street – SW McEwan Road; therefore, this standard does not apply.

(6) Except as provided in [TDC 53.100](#), all ingress and egress shall connect directly with public streets.

Response: As shown on Sheet L1.0 in Exhibit 2, this project is proposing two access points from the property onto SW McEwan Road. One access point will provide ingress and egress to the parking areas for the general public and TVF&R employees. The same access point will provide ingress for fire apparatus. The second access point will strictly provide egress for fire apparatus from the station garage.

(7) Vehicular access for residential uses shall be brought to within 50 feet of the ground floor entrances or the ground floor landing of a stairway, ramp or elevator leading to dwelling units.

Response: This project is not proposing a residential use; therefore, this standard does not apply.

(8) To afford safe pedestrian access and egress for properties within the City, a sidewalk shall be constructed along all street frontage, prior to use or occupancy of the building or structure proposed for said property. The sidewalks required by this section shall be constructed to City standards, except in the case of streets with inadequate right-of-way width or where the final street design and grade have not been established, in which case the sidewalks shall be constructed to a design and in a manner approved by the City Engineer. Sidewalks approved by the City Engineer may include temporary sidewalks and sidewalks constructed on private property; provided, however, that such sidewalks shall provide continuity with sidewalks of adjoining commercial developments existing or proposed. When a sidewalk is to adjoin a future street improvement, the sidewalk construction shall include construction of the curb and gutter section to grades and alignment established by the City Engineer.

Response: As shown on Sheet L1.0 in Exhibit 2, this project proposing to construct a sidewalk along the majority of the property frontage on SW McEwan Road.

(9) The standards set forth in this Code are minimum standards for access and egress and may be increased through the Architectural Review process in any particular instance where the standards provided herein are deemed insufficient to protect the public health, safety, and general welfare.

Response: TVF&R understands that minimum access and egress standards may be increased as part of Architectural Review. This project has been designed to meet the minimum requirements, which TVF&R believes is sufficient to protect the public health, safety, and general welfare.

(10) Minimum access requirements for residential uses:

Response: This project is not proposing a residential use; therefore, this standard does not apply.

(11) Minimum Access Requirements for Commercial, Public and Semi-Public Uses.

In the Central Design District, when driveway access is on local streets, not collectors or arterials and the building(s) on the property is(are) less than 5,000 square feet in gross floor area, or parking is the only use on the property, ingress and egress shall not be less than 24 feet. In all other cases, ingress and egress for commercial uses shall not be less than the following:

<i>Required Parking Spaces</i>	<i>Minimum Number Required</i>	<i>Minimum Pavement Width</i>	<i>Minimum Pavement Walkways, Etc.</i>
<i>1-99</i>	<i>1</i>	<i>32 feet for first 50 feet from ROW, 24' thereafter</i>	<i>Curbs required; walkway 1 side only</i>
<i>100-249</i>	<i>2</i>	<i>32 feet for first 50 feet from ROW, 24' thereafter</i>	<i>Curbs required; walkway 1 side only</i>
<i>Over 250</i>	<i>As required by City Engineer</i>	<i>As required by City Engineer</i>	<i>As required by City Engineer</i>

Response: As noted above, this project is proposing two driveways that will connect to SW McEwan Road, however only one driveway will provide access to the parking areas. The other driveway will provide egress access to the parking garage where the fire apparatuses will be stored. The parking area will also include a paved area that extends from the main drive aisle and provides access to the station garage. The paved area is approximately 30 feet wide and 50 feet long and will provide adequate area.

(12) Minimum Access Requirements for Industrial Uses.

Ingress and egress for industrial uses shall not be less than the following:

Response: This project is not proposing an industrial use; therefore, this standard does not apply.

(13) One-way Ingress or Egress.

When approved through the Architectural Review process, one-way ingress or egress may be used to satisfy the requirements of Subsections (7), (8), and (9). However, the hard surfaced pavement of one-way drives shall not be less than 16 feet for multi-family residential, commercial, or industrial uses.

Response: This project is not proposing a one-way ingress or egress to satisfy the requirements of Subsections (7), (8), or (9); therefore, this standard does not apply.

(14) Maximum Driveway Widths and Other Requirements.

(a) Unless otherwise provided in this chapter, maximum driveway widths shall not exceed 40 feet.

Response: The proposed driveway width for main parking area is approximately 25 feet and the proposed driveway width for fire station garage is approximately 40 feet.

(b) Except for townhouse lots, no driveways shall be constructed within 5 feet of an adjacent property line, except when two adjacent property owners elect to provide joint access to their respective properties, as provided by Subsection (2).

Response: As shown on Sheet L1.0 in Exhibit 2, the driveway closest to adjacent property line will be over 20 feet away.

(c) There shall be a minimum distance of 40 feet between any two adjacent driveways on a single property unless a lesser distance is approved by the City Engineer.

Response: The two proposed driveways will be over 45 feet apart.

(15) Distance between Driveways and Intersections.

Except for single-family dwellings, the minimum distance between driveways and intersections shall be as provided below. Distances listed shall be measured from the stop bar at the intersection.

(a) At the intersection of collector or arterial streets, driveways shall be located a minimum of 150 feet from the intersection.

Response: The proposed driveways will be located over 2,000 feet away from the intersection with Lower Boones Ferry Road and over 1,200 feet away from the intersection with Lakeview Boulevard.

(b) At the intersection of two local streets, driveways shall be located a minimum of 30 feet from the intersection.

Response: The proposed driveways will be located over 2,000 feet away from the intersection with Lower Boones Ferry Road and over 1,200 feet away from the intersection with Lakeview Boulevard.

(c) If the subject property is not of sufficient width to allow for the separation between driveway and intersection as provided, the driveway shall be constructed as far from the intersection as possible, while still maintaining the 5-foot setback between the driveway and property line as required by TDC 73.400(14)(b).

Response: As noted in the responses above, the proposed driveways will not be located within the minimum distance from a street intersection.

(d) When considering a public facilities plan that has been submitted as part of an Architectural Review plan in accordance with [TDC 31.071\(6\)](#), the City Engineer may approve the location of a driveway closer than 150 feet from the intersection of collector or arterial streets, based on written findings of fact in support of the decision. The written approval shall be incorporated into the decision of the City Engineer for the utility facilities portion of the Architectural Review plan under the process set forth in [TDC 31.071](#) through [31.077](#).

Response: This project is not requesting approval of a driveway located within 150 feet from the intersection of a collector or arterial street; therefore, this standard does not apply.

(16) Vision Clearance Area.

(a) Local Streets - A vision clearance area for all local street intersections, local street and driveway intersections, and local street or driveway and railroad intersections shall be that triangular area formed by the right-of-way lines along such lots and a straight line joining the right-of-way lines at points which are 10 feet from the intersection point of the right-of-way lines, as measured along such lines (see [Figure 73-2](#) for illustration).

Response: This project is not located adjacent to a local street; therefore, this standard does not apply.

(b) Collector Streets - A vision clearance area for all collector/arterial street intersections, collector/arterial street and local street intersections, and collector/arterial street and railroad intersections shall be that triangular area formed by the right-of-way lines along such lots and a straight line joining the right-of-way lines at points which are 25 feet from the intersection point of the right-of-way lines, as measured along such lines. Where a driveway intersects with a collector/arterial street, the distance measured along the driveway line for the triangular area shall be 10 feet (see [Figure 73-2](#) for illustration).

Response: Both driveway connections to SW McEwan Road – a collector street – will be free of visual obstructions within the vision clearance area.

(c) Vertical Height Restriction - Except for items associated with utilities or publicly owned structures such as poles and signs and existing street trees, no vehicular parking, hedge, planting, fence, wall structure, or temporary or permanent physical obstruction shall be permitted between 30 inches and 8 feet above the established height of the curb in the clear vision area (see [Figure 73-2](#) for illustration).

Response: Both driveway connections to SW McEwan Road – a collector street – will be free of visual obstructions within the vision clearance area.

(17) Major driveways, as defined in 31.060, in new residential and mixed-use areas are required to connect with existing or planned streets except where prevented by topography, rail lines, freeways, pre-existing development or leases, easements or covenants, or other barriers.

Response: This project is not within a new residential or mixed-use area; therefore, this standard does not apply.

Section 73.410 Street Tree Plan.

A person who desires to plant a street tree shall comply with [TDC 74.765](#), which comprises the street tree plan.

Response: This project is proposing to plant two street trees. As noted in the responses to TDC 74.765 below, this project will comply with the street tree requirements.

Section 73.450 Wireless Communication Facility and Wireless Communication Facility Attached Site Design.

Section 73.460 Objectives.

[Section (1)-(9) omitted from excerpt]

Section 73.470 Standards.

[Section (1)-(9) omitted from excerpt]

Section 73.480 Wireless Communication Facility and Wire-less Communication Facility Attached Structure Design.

Section 73.490 Objectives.

[Section (1)-(5) omitted from excerpt]

Section 73.500 Standards.

[Section (1)-(6) omitted from excerpt]

Section 73.510 Setbacks.

[Section (1)-(3) omitted from excerpt]

Response: This project is not proposing a wireless communication facility; therefore, these standards do not apply.

Section 73.600 Central Design District Design Guidelines.

[Section (1)-(2) omitted from excerpt]

Section 73.610 Design Guidelines.

[Section (1)-(41) omitted from excerpt]

Response: This project is not located within the Central Design District; therefore, these standards do not apply.

TDC Chapter 74: Public Improvement Requirements

Section 74.010 Purpose.

The City's Community Plan sets forth the requirements for providing adequate transportation and utility systems to serve the community's present and future needs. Land development without adequate transportation and utility systems will adversely affect the overall economic growth of the City and cause undue damage to the public health and welfare of its citizens. Consequently, the City finds that it is in the public interest to require land development to meet the following improvement requirements. [Ord. 895-93, § 14, 5/24/93]

Section 74.020 Authority.

(1) The City Engineer may develop standard forms, including but not limited to deeds, easements, interim access agreements, escrow agreements, street improvement agreements, subdivision compliance agreements and agreements to dedicate right-of-way, to include the contents and warranties when they are submitted, and the procedure for implementation necessary to carry out the purpose of this chapter.

(2) Easements submitted on a final plat or on a separate easement form shall be subject to this chapter.

(3) Supervision of Planting. The Parks & Recreation Director has jurisdiction over all trees, plants and shrubs planted or growing in or upon the public rights-of-way of the City and their planting, removal, care, maintenance and protection. The Parks & Recreation Director shall enforce these provisions. [Ord. 635-84, § 40, 6/11/84 and Ord. 895-93, § 14, 5/24/93; Ord. 963-96, § 7, 6/24/96]

IMPROVEMENTS

Section 74.110 Phasing of Improvements.

The applicant may build the development in phases. If the development is to be phased the applicant shall submit a phasing plan to the City Engineer for approval with the development application. The timing and extent or scope of public improvements and the conditions of development shall be

determined by the City Council on subdivision applications and by the City Engineer on other development applications. [Ord. 895-93, 5/24/1993]

Response: The applicant is not proposing to construct public facilities in phases; therefore, this standard does not apply.

Section 74.120 Public Improvements.

(1) Except as specially provided, all public improvements shall be installed at the expense of the applicant. All public improvements installed by the applicant shall be constructed and guaranteed as to workmanship and material as required by the Public Works Construction Code prior to acceptance by the City. No work shall be undertaken on any public improvement until after the construction plans have been approved by the City Engineer and a Public Works Permit issued and the required fees paid.

Response: All public improvements proposed as part of this project will be installed by TVF&R in accordance with the Public Works Construction Code.

(2) In accordance with the Tualatin Basin Program for fish and wildlife habitat the City intends to minimize or eliminate the negative affects of public streets by modifying right-of-way widths and street improvements when appropriate. The City Engineer is authorized to modify right-of-way widths and street improvements to address the negative affects on fish and wildlife habitat. [Ord. 895-93, 5/24/1993; Ord. 1224-06 §35, 11/13/06]

Response: The proposed project is not located within a fish and wildlife habitat; therefore, this standard does not apply.

Section 74.130 Private Improvements.

All private improvements shall be in-stalled at the expense of the applicant. The property owner shall retain maintenance responsibilities over all private improvements. [Ord. 895-93, 5/24/1993]

Response: The applicant will be responsible for proposed utility facilities located within the subject property.

Section 74.140 Construction Timing.

(1) All the public improvements required under this chapter shall be completed and accepted by the City prior to the issuance of a Certificate of Occupancy; or, for subdivision and partition applications, in accordance with the requirements of the Subdivision regulations.

(2) All private improvements required under this chapter shall be approved by the City prior to the issuance of a Certificate of Occupancy; or for subdivision and partition applications, in accordance with the requirements of the Subdivision regulations. [Ord. 895-93, 5/24/1993]

Response: The applicant understands that all public and private improvements required under TDC Chapter 74 must be complete prior to receiving a Certificate of Occupancy.

RIGHT-OF-WAY

Section 74.210 Minimum Street Right-of-Way Widths.

The width of streets in feet shall not be less than the width required to accommodate a street improvement needed to mitigate the impact of a proposed development. In cases where a street is required to be improved according to the standards of the TDC, the width of the right-of-way shall not

be less than the minimums indicated in TDC Chapter 74, Public Improvement Requirements, [Figures 74-2A through 74-2G](#).

(1) For subdivision and partition applications, wherever existing or future streets adjacent to property proposed for development are of inadequate right-of-way width the additional right-of-way necessary to comply with TDC Chapter 74, Public Improvement Requirements, [Figures 74-2A through 74-2G](#) shall be shown on the final subdivision or partition plat prior to approval of the plat by the City. This right-of-way dedication shall be for the full width of the property abutting the roadway and, if required by the City Engineer, additional dedications shall be provided for slope and utility easements if deemed necessary.

Response: The proposed project is not part of a subdivision or partition application; therefore, this standard does not apply.

(2) For development applications other than subdivisions and partitions, wherever existing or future streets adjacent to property proposed for development are of inadequate right-of-way width, the additional right-of-way necessary to comply with TDC Chapter 74, Public Improvement Requirements, [Figures 74-2A through 74-2G](#) of the Tualatin Community Plan shall be dedicated to the City for use by the public prior to issuance of any building permit for the proposed development. This right-of-way dedication shall be for the full width of the property abutting the roadway and, if required by the City Engineer, additional dedications shall be provided for slope and utility easements if deemed necessary.

Response: The applicant understands that additional right-of-way along SW McEwan Road may need to be dedicated, consistent with Figures 74-2A through 74-2G, in order to comply with TDC Chapter 74. As shown in Sheet C4 in Exhibit 2, this project is proposing to provide one foot of right-of-way dedication. The dedication will increase the right-of-way to 37 feet from centerline.

(3) For development applications that will impact existing streets not adjacent to the applicant's property, and to construct necessary street improvements to mitigate those impacts would require additional right-of-way, the applicant shall be responsible for obtaining the necessary right-of-way from the property owner. A right-of-way dedication deed form shall be obtained from the City Engineer and upon completion returned to the City Engineer for acceptance by the City. On subdivision and partition plats the right-of-way dedication shall be accepted by the City prior to acceptance of the final plat by the City. On other development applications the right-of-way dedication shall be accepted by the City prior to issuance of building permits. The City may elect to exercise eminent domain and condemn necessary off-site right-of-way at the applicant's request and expense. The City Council shall determine when condemnation proceedings are to be used.

Response: A transportation impact study was prepared and evaluated potential impacts by the proposed station on SW McEwan Road and nearby transportation facilities (see Exhibit 7). The study found that the proposed development is projected to generate 12 site trips during the morning peak hour and 4 site trips during the evening peak hour. No significant trends or crash patterns were identified at any of the study intersections. Accordingly, no specific mitigation is recommended.

(4) If the City Engineer deems that it is impractical to acquire the additional right-of-way as required in subsections (1)-(3) of this section from both sides of the center-line in equal amounts, the City Engineer may require that the right-of-way be dedicated in a manner that would result in unequal dedication from each side of the road. This requirement will also apply to slope and utility easements as discussed in [TDC 74.320](#) and [74.330](#). The City Engineer's recommendation shall be presented to the City Council in

the preliminary plat approval for subdivisions and partitions, and in the recommended decision on all other development applications, prior to finalization of the right-of-way dedication requirements.

Response: The applicant understands that the City Engineer may require unequal right-of-way dedication as part of the proposed project.

(5) Whenever a proposed development is bisected by an existing or future road or street that is of inadequate right-of-way width according to TDC Chapter 74, Public Improvement Requirements, [Figures 74-2A through 74-2G](#), additional right-of-way shall be dedicated from both sides or from one side only as determined by the City Engineer to bring the road right-of-way in compliance with this section.

Response: The proposed project is not bisected by an existing or future road or street; therefore, this standard does not apply.

(6) When a proposed development is adjacent to or bisected by a street proposed in [TDC Chapter 11](#), Transportation Plan ([Figure 11-3](#)) and no street right-of-way exists at the time the development is proposed, the entire right-of-way as shown in TDC Chapter 74, Public Improvement Requirements, [Figures 74-2A through 74-2G](#) shall be dedicated by the applicant. The dedication of right-of-way required in this subsection shall be along the route of the road as determined by the City. [Ord. 895-93, 5/24/1993; Ord. 933-94 §50, 11/28/94; Ord. 979-97 §52, 7/14/97; Ord. 1026-99 §98, 8/9/99; Ord. 1354-13 §17, 02/25/13]

Response: The proposed project is not bisected by a street identified in Figure 11-3; therefore, this standard does not apply.

Section 74.220 Parcels Excluded from Development.

On subdivision development applications which include land partitioned off or having adjusted property lines from the original parcel, but do not include the original parcel, the applicant shall be responsible for obtaining any necessary right-of-way from the owner of the original parcel if the right-of-way is needed to accommodate street improvements required of the applicant. The applicant shall submit a completed right-of-way dedication deed to the City Engineer for acceptance. The right-of-way dedication shall be accepted by the City prior to the City approving the final subdivision plat. [Ord. 895-93, 5/24/1993; Ord. 933-94, § 49, 11/28/94]

Response: The proposed project is not part of a subdivision application; therefore, this standard does not apply.

EASEMENTS AND TRACTS

Section 74.310 Greenway, Natural Area, Bike, and Pedestrian Path Dedications and Easements.

[Sections (1) – (3) omitted from excerpt]

Response: There are no areas on or near the subject property that are dedicated for Greenway or Natural Area purposes. This project is not proposing an easement or dedication for bike or pedestrian facilities. Bike and pedestrian facilities will be accommodated within the right-of-way on SW McEwan Road, which provides access to the subject property and surrounding sites. As such, the standards in Section 74.310 do not apply.

Section 74.320 Slope Easements.

[Sections (1)-(3) omitted from excerpt]

Response: This project is not proposing any slope easements as part of this project. As shown on Sheet C2 in Exhibit 2, the site is relatively flat, and a minimal amount of grading is proposed. As such, the standards in Section 74.320 do not apply.

Section 74.330 Utility Easements.

(1) Utility easements for water, sanitary sewer and storm drainage facilities, telephone, television cable, gas, electric lines and other public utilities shall be granted to the City.

Response: This project is proposing a public utility easement along the SW McEwan property frontage. The public utility easement will be eight feet in width (see Sheet C4 in Exhibit 2).

(2) For subdivision and partition applications, the on-site public utility easement dedication area shall be shown to be dedicated to the City on the final subdivision or partition plat prior to approval of the plat by the City; and

(3) For subdivision and partition applications which require off-site public utility easements to serve the proposed development, a utility easement shall be granted to the City prior to approval of the final plat by the City. The City may elect to exercise eminent domain and condemn necessary off-site public utility easements at the applicant's request and expense. The City Council shall determine when condemnation proceedings are to be used.

Response: This application is not proposing a subdivision or partition; therefore, this standard does not apply.

(4) For development applications other than subdivisions and partitions, and for both on-site and off-site easement areas, a utility easement shall be granted to the City; building permits shall not be issued for the development prior to acceptance of the easement by the City. The City may elect to exercise eminent domain and condemn necessary off-site public utility easements at the applicant's request and expense. The City Council shall determine when condemnation proceedings are to be used.

Response: This application is proposing a public utility easement along the property frontage as shown on Sheet C4 in Exhibit 2. The applicant understands that utility easements are required to be submitted to the City in order to receive building permits.

(5) The width of the public utility easement shall meet the requirements of the Public Works Construction Code. All subdivisions and partitions shall have a 6-foot public utility easement adjacent to the street and a 5-foot public utility easement adjacent to all side and rear lot lines. [Ord. 895-93, 5/24/1993; Ord. 933-94, § 52, 11/28/94]

Response: The proposed public utility easement will be eight feet wide along the property frontage (see Sheet C4 in Exhibit 2). Public utility easements dedicated as part of this project will be in conformance with the requirements of the Public Works Construction Code.

Section 74.340 Watercourse Easements.

[Section (1)-(4) omitted from excerpt]

Response: This project is not proposing a watercourse easement as part of this application; therefore, these standards do not apply.

Section 74.350 Tracts.

A dedicated tract or easement will be required when access to public improvements for operation and maintenance is required, as determined by the City Engineer. Access for maintenance vehicles shall be constructed of an all-weather driving surface capable of carrying a 50,000-pound vehicle. The width of the tract or easement shall be 15-feet in order to accommodate City maintenance vehicles. In subdivisions and partitions, the tract shall be dedicated to the City on the final plat. In any other development, an access easement shall be granted to the City and recorded prior to issuance of a building permit. [Ord. 895-93, 5/24/1993; Ord. 933-94, § 54, 11/28/94]

Response: This application is not proposing a dedicated tract or easement for access to public improvements for operation and maintenance;

TRANSPORTATION

Section 74.410 Future Street Extensions.

[Section (1)-(5) omitted from excerpt]

Response: This project is not proposing a street extension as part of this project; therefore, these standards do not apply.

Section 74.420 Street Improvements.

When an applicant proposes to develop land adjacent to an existing or proposed street, including land which has been excluded under [TDC 74.220](#), the applicant should be responsible for the improvements to the adjacent existing or proposed street that will bring the improvement of the street into conformance with the Transportation Plan ([TDC Chapter 11](#)), [TDC 74.425](#) (Street Design Standards), and the City's Public Works Construction Code, subject to the following provisions:

(1) For any development proposed within the City, roadway facilities within the right-of-way described in [TDC 74.210](#) shall be improved to standards as set out in the Public Works Construction Code.

Response: As shown on Sheet C4 in Exhibit 2, this project is proposing half-street improvements on SW McEwan Road along the property frontage. Improvements to SW McEwan Road include a one-foot right-of-way dedication, six-foot wide sidewalks, planter strips adjacent to the street, and a curbed street improvement with a bicycle lane and travel lane.

(2) The required improvements may include the rebuilding or the reconstruction of any existing facilities located within the right-of-way adjacent to the proposed development to bring the facilities into compliance with the Public Works Construction Code.

Response: As shown in Sheet C1 in Exhibit 2, the existing transportation facilities on SW McEwan Road is currently improved with travel lanes and unimproved yards in the right-of-way, but do not include sidewalks, planter strips, or marked bicycle facilities. This project is proposing to improve the transportation facilities along the property frontage to bring the street into conformance with existing standards.

(3) The required improvements may include the construction or rebuilding of off-site improvements which are identified to mitigate the impact of the development.

Response: A transportation impact study was prepared and evaluated potential impacts on nearby transportation facilities (Exhibit 7). No significant trends or crash patterns were identified at any of the study intersections. Accordingly, no specific mitigation is recommended.

(4) Where development abuts an existing street, the improvement required shall apply only to that portion of the street right-of-way located between the property line of the parcel proposed for development and the centerline of the right-of-way, plus any additional pavement beyond the centerline deemed necessary by the City Engineer to ensure a smooth transition between a new improvement and the existing roadway (half-street improvement). Additional right-of-way and street improvements and off-site right-of-way and street improvements may be required by the City to mitigate the impact of the development. The new pavement shall connect to the existing pavement at the ends of the section being improved by tapering in accordance with the Public Works Construction Code.

Response: Unless otherwise deemed necessary by the City Engineer, half-street improvements on SW McEwan Road will be completed in conformance with these standards. As noted in the transportation impact study in Exhibit 7, no off-site right-of-way or street improvements were recommended.

(5) If additional improvements are required as part of the Access Management Plan of the City, [TDC Chapter 75](#), the improvements shall be required in the same manner as the half-street improvement requirements.

Response: The proposed project does not have additional improvements required as part of the Access Management Plan; therefore, this standard does not apply.

(6) All required street improvements shall include curbs, sidewalks with appropriate buffering, storm drainage, street lights, street signs, street trees, and, where designated, bikeways and transit facilities.

Response: As shown in Sheet C4, in Exhibit 2, this project is proposing to improve SW McEwan Road adjacent to the subject property with six-foot wide sidewalks, planter strips that are six feet or wider in width, standard curb and gutter, and a bicycle lane and automotive travel lane. As shown in Sheet L1.0 in Exhibit 2, there will be two trees planted in the planter strips.

(7) For subdivision and partition applications, the street improvements required by TDC Chapter 74 shall be completed and accepted by the City prior to signing the final subdivision or partition plat, or prior to releasing the security provided by the applicant to assure completion of such improvements or as otherwise specified in the development application approval.

Response: This project is not proposing a subdivision or partition; therefore, these standards do not apply.

(8) For development applications other than subdivisions and partitions, all street improvements required by this section shall be completed and accepted by the City prior to the issuance of a Certificate of Occupancy.

Response: The applicant understands that all improvements to SW McEwan Road must be completed prior to the issuance of a Certificate of Occupancy.

(9) In addition to land adjacent to an existing or proposed street, the requirements of this section shall apply to land separated from such a street only by a railroad right-of-way.

Response: There is no railroad right-of-way adjacent to the subject property; therefore, this standard does not apply.

(10) Streets within, or partially within, a proposed development site shall be graded for the entire right-of-way width and constructed and surfaced in accordance with the Public Works Construction Code.

Response: There are no streets that are within or partially within the proposed development; therefore, this standard does not apply.

(11) Existing streets which abut the proposed development site shall be graded, constructed, reconstructed, surfaced or repaired as necessary in accordance with the Public Works Construction Code and [TDC Chapter 11](#), Transportation Plan, and [TDC 74.425](#) (Street Design Standards).

Response: As shown in Sheet C4 in Exhibit 2, SW McEwan Road, which is adjacent to the subject property, will be improved with asphalt concrete in conformance with all standards.

(12) Sidewalks with appropriate buffering shall be constructed along both sides of each internal street and at a minimum along the development side of each external street in accordance with the Public Works Construction Code.

Response: This project is proposing half-street improvements to SW McEwan Road, an external street, that includes a planter strip that will act as a buffer between the street and the proposed sidewalk. The planter strip will vary in width and will be six feet or wider. There are no internal streets proposed as part of this project.

(13) The applicant shall comply with the requirements of the Oregon Department of Transportation (ODOT), Tri-Met, Washington County and Clackamas County when a proposed development site is adjacent to a roadway under any of their jurisdictions, in addition to the requirements of this chapter.

Response: SW McEwan Road is within the City of Tualatin and under the City's jurisdiction. The road is not directly subject to other jurisdiction's requirements; therefore, this standard does not apply.

(14) The applicant shall construct any required street improvements adjacent to parcels excluded from development, as set forth in [TDC 74.220](#) of this chapter.

Response: As noted in the response to TDC 74.220 above, the proposed project is not part of a subdivision application; therefore, this standard does not apply.

(15) Except as provided in [TDC 74.430](#), whenever an applicant proposes to develop land with frontage on certain arterial streets and, due to the access management provisions of [TDC Chapter 75](#), is not allowed direct access onto the arterial, but instead must take access from another existing or future public street thereby providing an alternate to direct arterial access, the applicant shall be required to construct and place at a minimum street signage, a sidewalk, street trees and street lights along that portion of the arterial street adjacent to the applicant's property. The three certain arterial streets are S.W. Tualatin-Sherwood Road, S.W. Pacific Highway (99W) and S.W. 124th Avenue. In addition, the applicant may be required to construct and place on the arterial at the intersection of the arterial and an existing or future public non-arterial street warranted traffic control devices (in accordance with the Manual on Uniform Traffic Control Devices, latest edition), pavement markings, street tapers and turning lanes, in accordance with the Public Works Construction Code.

Response: This project is not proposing to develop land with frontage on the three arterial streets identified in this section; therefore, this standard does not apply.

(16) The City Engineer may determine that, although concurrent construction and placement of the improvements in (14) and (15) of this section, either individually or collectively, are impractical at the time of development, the improvements will be necessary at some future date. In such a case, the applicant shall sign a written agreement guaranteeing future performance by the applicant and any

successors in interest of the property being developed. The agreement shall be subject to the City's approval.

Response: Standards in (14) and (15) above do not apply to this application; therefore, this standard does not apply.

(17) Intersections should be improved to operate at a level of service of at least D and E for signalized and unsignalized intersections, respectively.

Response: A transportation impact study was prepared and evaluated potential impacts on nearby transportation facilities (Exhibit 7). No significant trends or crash patterns were identified at any of the study intersections. Accordingly, no specific mitigation is recommended.

(18) Pursuant to requirements for off-site improvements as conditions of development approval in [TDC 73.055\(2\)\(e\)](#) and [TDC 36.160\(8\)](#), proposed multi-family residential, commercial, or institutional uses that are adjacent to a major transit stop will be required to comply with the City's Mid-Block Crossing Policy. [Ord. 895-93, 5/24/1993; Ord. 933-94 §56, 11/28/94; Ord. 1026-99 §100, 8/9/99; Ord.1103-02, 3/25/02; Ord. 1224-06 §36, 11/13/06; Ord. 1354-13 §19, 02/25/13]

Response: The proposed development is not located adjacent to a major transit stop; therefore, this standard does not apply.

Section 74.425 Street Design Standards.

(1) Street design standards are based on the functional and operational characteristics of streets such as travel volume, capacity, operating speed, and safety. They are necessary to ensure that the system of streets, as it develops, will be capable of safely and efficiently serving the traveling public while also accommodating the orderly development of adjacent lands.

(2) The proposed street design standards are shown in Figures 72A through 72G. The typical roadway cross sections comprise the following elements: right-of-way, number of travel lanes, bicycle and pedestrian facilities, and other amenities such as landscape strips. These figures are intended for planning purposes for new road construction, as well as for those locations where it is physically and economically feasible to improve existing streets.

Response: SW McEwan Road is designated as a collector street. As such, proposed improvements to SW McEwan Road will conform with the street design standards for a collector street classification.

(3) In accordance with the Tualatin Basin Program for fish and wildlife habitat it is the intent of Figures 74-2A through 74-2G to allow for modifications to the standards when deemed appropriate by the City Engineer to address fish and wildlife habitat.

Response: This project is not requesting a modification to the street design standards; therefore, this standard does not apply.

(4) All streets shall be designed and constructed according to the preferred standard. The City Engineer may reduce the requirements of the preferred standard based on specific site conditions, but in no event will the requirement be less than the minimum standard. The City Engineer shall take into consideration the following factors when deciding whether the site conditions warrant a reduction of the preferred standard:

(a) Arterials:

- (i) Whether adequate right-of-way exists*
- (ii) Impacts to properties adjacent to right-of-way*
- (iii) Current and future vehicle traffic at the location*
- (iv) Amount of heavy vehicles (buses and trucks).*

(b) Collectors:

- (i) Whether adequate right-of-way exists*
- (ii) Impacts to properties adjacent to right-of-way*
- (iii) Amount of heavy vehicles (buses and trucks)*
- (iv) Proximity to property zoned manufacturing or industrial.*

(c) Local Streets:

(i) Local streets proposed within areas which have environmental constraints and/or sensitive areas and will not have direct residential access may utilize the minimum design standard. When the minimum design standard is allowed, the City Engineer may determine that no parking signs are required on one or both sides of the street. [Ord. 1354-13 §35, 02/25/13]

Response: This project is proposing to construct a six-foot sidewalk and six-foot planter strip within the public right-of-way on SW McEwan Road, along the property frontage. The sidewalk and planter strip will be constructed in conformance with Tualatin’s street design standards. TVF&R is not requesting modifications to alter or reduce the street design standards as part of this application.

Section 74.430 Streets, Modifications of Requirements in Cases of Unusual Conditions.

(1) When, in the opinion of the City Engineer, the construction of street improvements in accordance with [TDC 74.420](#) would result in the creation of a hazard, or would be impractical, or would be detrimental to the City, the City Engineer may modify the scope of the required improvement to eliminate such hazardous, impractical, or detrimental results. Examples of conditions requiring modifications to improvement requirements include but are not limited to horizontal alignment, vertical alignment, significant stands of trees, fish and wildlife habitat areas, the amount of traffic generated by the proposed development, timing of the development or other conditions creating hazards for pedestrian, bicycle or motor vehicle traffic. The City Engineer may determine that, although an improvement may be impractical at the time of development, it will be necessary at some future date. In such cases, a written agreement guaranteeing future performance by the applicant in installing the required improvements must be signed by the applicant and approved by the City.

(2) When the City Engineer determines that modification of the street improvement requirements in [TDC 74.420](#) is warranted pursuant to subsection (1) of this section, the City Engineer shall prepare written findings of modification. The City Engineer shall forward a copy of said findings and description of modification to the applicant, or his authorized agent, as part of the Utility Facilities Review for the proposed development, as provided by [TDC 31.072](#). The decision of the City Engineer may be appealed to the City Council in accordance with [TDC 31.076 and 31.077](#).

(3) To accommodate bicyclists on streets prior to those streets being upgraded to the full standards, an interim standard may be implemented by the City. These interim standards include reduction in motor vehicle lane width to 10 feet [the minimum specified in AASHTO’s A Policy on Geo-metric Design of

Highways and Streets (1990)], a reduction of bike lane width to 4-feet (as measured from the longitudinal gutter joint to the centerline of the bike lane stripe), and a paint-striped separation 2 to 4 feet wide in lieu of a center turn lane. Where available roadway width does not provide for these minimums, the roadway can be signed for shared use by bicycle and motor vehicle travel. When width constraints occur at an intersection, bike lanes should terminate 50 feet from the intersection with appropriate signing. [Ord. 895-93, 5/24/1993; Ord. 1124-02, 12/9/02; Ord. 1224-06 §37, 11/13/06]

Response: This project is proposing half-street improvements to SW McEwan Road along the property's frontage. The sidewalk and planter strip are designed in conformance with Tualatin's street design standards. TVF&R does not anticipate the street improvements will result in the creation of a hazard or would be impractical or detrimental to the City. However, TVF&R would consider adjustments to the proposed street design should the City Engineer determine such conditions exist.

Section 74.440 Streets, Traffic Study Required.

(1) The City Engineer may require a traffic study to be provided by the applicant and furnished to the City as part of the development approval process as provided by this Code, when the City Engineer determines that such a study is necessary in connection with a proposed development project in order to:

(a) Assure that the existing or proposed transportation facilities in the vicinity of the proposed development are capable of accommodating the amount of traffic that is expected to be generated by the proposed development, and/or

(b) Assure that the internal traffic circulation of the proposed development will not result in conflicts between on-site parking movements and/or on-site loading movements and/or on-site traffic movements, or impact traffic on the adjacent streets.

Response: A transportation impact study was prepared and the evaluated potential impacts by the proposed station on SW McEwan Road and nearby transportation facilities (see Exhibit 7).

(2) The required traffic study shall be completed prior to the approval of the development application.

Response: The transportation impact study was prepared prior to, and submitted with, the conditional use application (CUP 17-0002).

(3) The traffic study shall include, at a minimum:

(a) an analysis of the existing situation, including the level of service on adjacent and impacted facilities.

(b) an analysis of any existing safety deficiencies.

(c) proposed trip generation and distribution for the proposed development.

(d) projected levels of service on adjacent and impacted facilities.

(e) recommendation of necessary improvements to ensure an acceptable level of service for roadways and a level of service of at least D and E for signalized and unsignalized intersections respectively, after the future traffic impacts are considered.

(f) The City Engineer will determine which facilities are impacted and need to be included in the study.

(g) The study shall be conducted by a registered engineer.

Response: The study was prepared by Lancaster Engineering, a firm specializing in transportation engineering and planning with registered engineering professionals. The study reviewed selected vicinity streets, study intersections, transit, and traffic counts; analyzed site trip generation and trip distribution; conducted a safety analysis, including crash data analysis, sight distance analysis, warrant analysis, and driveway width analysis; and conducted an operational analysis.

(4) The applicant shall implement all or a portion of the improvements called for in the traffic study as determined by the City Engineer. [Ord. 895-93, 5/24/1993; Ord. 1103-02, 3/25/02]

Response: The study found that the proposed development is projected to generate 12 site trips during the morning peak hour and 4 site trips during the evening peak hour. No significant trends or crash patterns were identified at any of the study intersections. Accordingly, no specific mitigation is recommended.

Section 74.450 Bikeways and Pedestrian Paths.

(1) Where proposed development abuts or contains an existing or proposed bikeway, pedestrian path, or multi-use path, as set forth in [TDC Chapter 11](#), Transportation [Figure 11-4](#), the City may require that a bikeway, pedestrian path, or multi-use path be constructed, and an easement or dedication provided to the City.

Response: This project is not proposing a bikeway, pedestrian path, or multi-use path as part of this application. Figure 11-4 identifies SW McEwan Road as part of the City's Bicycle and Pedestrian Plan and indicates the street should include bike lanes and sidewalks. As shown on Sheet C4 in Exhibit 2, this project is proposing to improve SW McEwan Road with sidewalks and striped bike lanes along the property's frontage.

(2) Where required, bikeways and pedestrian paths shall be provided as follows:

(a) Bike and pedestrian paths shall be constructed and surfaced in accordance with the Public Works Construction Code.

Response: This application is not proposing a bike path or pedestrian path as part of this project; therefore, this standard does not apply.

(b) The applicant shall install the striping and signing of the bike lanes and shared roadway facilities, where designated. [Ord. 895-93, 5/24/1993; Ord. 933-94, § 57, 11/28/94; Ord. 1354-13 §21, 02/25/13]

Response: This project is proposing a six-foot wide bicycle lane as part of this application. The bike lane will be striped along the property's frontage

Section 74.460 Accessways in Residential, Commercial and Industrial Subdivisions and Partitions.

[Sections (1)-(9) omitted from excerpt]

Response: This project is not proposing a subdivision or partition; therefore, these standards do not apply.

Section 74.470 Street Lights.

[Sections (1)-(2) omitted from excerpt]

Response: This project is not proposing to install street lights as part of this application; therefore, this standard does not apply.

Section 74.475 Street Names.

[Sections (1)-(2) omitted from excerpt]

Response: The proposed fire station will be located adjacent to SW McEwan Road, an existing street. This project is not proposing a new street, nor is it proposing to rename an existing street; therefore, these standards do not apply.

Section 74.480 Street Signs.

[Sections (1)-(3) omitted from excerpt]

Response: The proposed fire station is not located at or near a street intersection, nor is it proposing a subdivision or partition plat; therefore, these standards does not apply.

Section 74.485 Street Trees.

(1) Prior to approval of a residential subdivision or partition final plat, the applicant shall pay the City a non-refundable fee equal to the cost of the purchase and installation of street trees. The location, placement, and cost of the trees shall be determined by the City. This sum shall be calculated on the interior and exterior streets as indicated on the final subdivision or partition plat.

(2) In nonresidential subdivisions and partitions street trees shall be planted by the owners of the individual lots as development occurs.

Response: This project is not proposing a residential subdivision or partition plat; therefore, this standard does not apply.

(3) The Street Tree Ordinance specifies the species of tree which is to be planted and the spacing between trees. [Ord. 895-93, 5/24/1993; Ord. 1192-05, 7/25/05]

Response: The species and spacing of proposed street trees will be in conformance with the Street Tree Ordinance.

UTILITIES

Section 74.610 Water Service.

(1) Water lines shall be installed to serve each property in accordance with the Public Works Construction Code. Water line construction plans shall be submitted to the City Engineer for review and approval prior to construction.

Response: As shown on Sheet C4 in Exhibit 2, this application is proposing a fire service connection and a domestic water connection line that will connect with the existing public water main under SW McEwan Road. Water line designs will be in conformance with the Public Works Construction Code.

(2) If there are undeveloped properties adjacent to the subject site, public water lines shall be extended by the applicant to the common boundary line of these properties. The lines shall be sized to provide service to future development, in accordance with the City's Water System Master Plan, [TDC Chapter 12](#).

Response: The property to the north, south, and west of the proposed fire station is currently developed by U-Haul with its own water line connections. As such, this project is not proposing to extend the water lines beyond the connection to the proposed fire station.

(3) As set forth in [TDC Chapter 12, Water Service](#), the City has three water service levels. All development applicants shall be required to connect the proposed development site to the service level in which the development site is located. If the development site is located on a boundary line between two service levels the applicant shall be required to connect to the service level with the higher reservoir elevation. The applicant may also be required to install or provide pressure reducing valves to supply appropriate water pressure to the properties in the proposed development site. [Ord. 895-93, 5/24/1993; Ord. 933-94, § 59, 11/28/94]

Response: The proposed water line connections will connect to the City's existing public water main.

Section 74.620 Sanitary Sewer Service.

(1) Sanitary sewer lines shall be installed to serve each property in accordance with the Public Works Construction Code. Sanitary sewer construction plans and calculations shall be submitted to the City Engineer for review and approval prior to construction.

Response: As shown on Sheet C4 in Exhibit 2, this project is proposing a six-inch sanitary sewer connection line that will connect with the existing sanitary sewer main under SW McEwan Road. A new manhole will be installed where the sanitary sewer lines connects with the public sanitary sewer main. Sanitary sewer line designs will be in conformance with the Public Works Construction Code.

(2) If there are undeveloped properties adjacent to the proposed development site which can be served by the gravity sewer system on the proposed development site, the applicant shall extend public sanitary sewer lines to the common boundary line with these properties. The lines shall be sized to convey flows to include all future development from all up stream areas that can be expected to drain through the lines on the site, in accordance with the City's Sanitary Sewer System Master Plan, [TDC Chapter 13](#). [Ord. 895-93, 5/24/1993; Ord. 933-94, § 60, 11/28/94]

Response: The property to the north, south, and west of the proposed fire station is currently developed by U-Haul with its own sanitary sewer connections. As such, this project is not proposing to extend the sanitary sewer lines beyond the connection to the proposed fire station.

Section 74.630 Storm Drainage System.

(1) Storm drainage lines shall be installed to serve each property in accordance with City standards. Storm drainage construction plans and calculations shall be submitted to the City Engineer for review and approval prior to construction.

Response: As shown on Sheet C4 in Exhibit 2, this project is proposing a storm drainage system that will collect and redirect stormwater runoff to an on-site infiltration facility via storm sewer catch basins and underground stormwater lines (see Sheet C4 in Exhibit 2).

(2) The storm drainage calculations shall confirm that adequate capacity exists to serve the site. The discharge from the development shall be analyzed in accordance with the City's Storm and Surface Water Regulations.

Response: A stormwater report has been prepared as part of this application and is provided in Exhibit 3.

(3) If there are undeveloped properties adjacent to the proposed development site which can be served by the storm drainage system on the proposed development site, the applicant shall extend storm drainage lines to the common boundary line with these properties. The lines shall be sized to convey expected flows to include all future development from all up stream areas that will drain through the lines on the site, in accordance with the Tualatin Drainage Plan in [TDC Chapter 14](#). [Ord. 895-93, 5/24/1993; Ord. 933-94, § 61, 11/28/94; Ord. 952-95, § 2, 10/23/95]

Response: The property to the north, south, and west of the proposed fire station is currently developed by U-Haul with its own stormwater drainage system. As such, this project is not proposing to extend the storm drainage lines beyond the subject property.

Section 74.640 Grading.

(1) Development sites shall be graded to minimize the impact of storm water runoff onto adjacent properties and to allow adjacent properties to drain as they did before the new development.

Response: As shown on Sheet C2, the site will have minimal grading to accommodate the proposed fire station. Site grading will allow for stormwater runoff to channel from the highest points at the north of the subject property and around to the southern portion of the subject property where water will be discharged into two drywell infiltration facilities. The grading and stormwater design has been designed to prevent stormwater runoff onto the adjacent property.

(2) A development applicant shall submit a grading plan showing that all lots in all portions of the development will be served by gravity drainage from the building crawl spaces; and that this development will not affect the drainage on adjacent properties. The City Engineer may require the applicant to remove all excess material from the development site. [Ord. 895-93, 5/24/1993]

Response: As noted in the response above, site grading has been designed to direct the flow of stormwater runoff from the highest point at the northern portion of the subject property down to the lowest point at the southern portion of the subject property, where the infiltration facilities will be located.

Section 74.650 Water Quality, Storm Water Detention and Erosion Control.

The applicant shall comply with the water quality, storm water detention and erosion control requirements in the Surface Water Management Ordinance. If required:

(1) On subdivision and partition development applications, prior to approval of the final plat, the applicant shall arrange to construct a permanent on-site water quality facility and storm water detention facility and submit a design and calculations indicating that the requirements of the Surface Water Management Ordinance will be satisfied and obtain a Stormwater Connection Permit from Clean Water Services; or

Response: The section does apply. The applicant recognizes that CWS will be the final review authority for the stormwater connection permit.

(2) On all other development applications, prior to issuance of any building permit, the applicant shall arrange to construct a permanent on-site water quality facility and storm water detention facility and submit a design and calculations indicating that the requirements of the Surface Water Management Ordinance will be met and obtain a Stormwater Connection Permit from Clean Water Services.

Response: As shown on Sheet C4, this project is proposing two permanent on-site drywell infiltration facilities as part of this application. As indicated in the stormwater report found in Exhibit 3, the drywell infiltration facilities have been designed to accommodate the anticipated stormwater runoff on the subject property. TVF&R will manage all stormwater runoff on-site and is not proposing to connect to stormwater main. As such, a Stormwater Connection Permit from CWS does not apply.

(3) For on-site private and regional non-residential public facilities, the applicant shall submit a stormwater facility agreement, which will include an operation and maintenance plan provided by the City, for the water quality facility for the City's review and approval. The applicant shall submit an erosion control plan prior to issuance of a Public Works Permit. No construction or disturbing of the site shall occur until the erosion control plan is approved by the City and the required measures are in place and approved by the City. [Ord. 895-93, 5/24/1993; Ord. 952-95, § 3, 10/23/95; Ord. 1070-01, 4/9/01; Ord. 1327-11 §1; 6/27/11]

Response: TVF&R understands that a stormwater facility agreement that includes an operation and maintenance plan may be required.

Section 74.660 Underground.

(1) All utility lines including, but not limited to, those required for gas, electric, communication, lighting and cable television services and related facilities shall be placed underground. Surface-mounted transformers, surface-mounted connection boxes and meter cabinets may be placed above ground. Temporary utility service facilities, high capacity electric and communication feeder lines, and utility transmission lines operating at 50,000 volts or above may be placed above ground. The applicant shall make all necessary arrangements with all utility companies to provide the underground services. The City reserves the right to approve the location of all surface-mounted transformers.

Response: This project is proposing to remove a single overhead wire on the subject property (see Sheet C1 in Exhibit 2). Power to the fire station will be provided by underground power utilities. As shown on Sheet C4 in Exhibit 2, all utilities along the property frontage will be placed underground.

(2) Any existing overhead utilities may not be upgraded to serve any proposed development. If existing overhead utilities are not adequate to serve the proposed development, the applicant shall, at their own expense, provide an underground system. The applicant shall be responsible for obtaining any off-site deeds and/or easements necessary to provide utility service to this site; the deeds and/or easements shall be submitted to the City Engineer for acceptance by the City prior to issuance of the Public Works Permit. [Ord. 895-93, 5/24/1993]

Response: As shown on Sheet C1 in Exhibit 2, there is an existing overhead wire that connects with the subject property. As noted above, the overhead wire is proposed to be removed and power will be provided by underground power lines.

Section 74.670 Existing Structures.

(1) Any existing structures requested to be retained by the applicant on a proposed development site shall be connected to all available City utilities at the expense of the applicant.

Response: Except for the overhead line, which is proposed to be removed, there are no other existing utility structures on the site.

(2) The applicant shall convert any existing overhead utilities serving existing structures to underground utilities, at the expense of the applicant.

Response: This project is proposing to remove the existing overhead power line. Power to the fire station will be provided via underground utilities.

(3) The applicant shall be responsible for continuing all required street improvements adjacent to the existing structure, within the boundaries of the proposed development site. [Ord. 895-93, 5/24/1993]

Response: As noted above, there are no other existing utility structures on the site.

Section 74.700 Removal, Destruction or Injury of Trees.

It is unlawful for a person, without a written permit from the Operations Director, to remove, destroy, break or injure a tree, plant or shrub, that is planted or growing in or upon a public right-of-way within the City, or cause, authorize, or procure a person to do so, authorize or procure a person to injure, misuse or remove a device set for the protection of any tree, in or upon a public right-of-way. [Ord. 963-96, § 9, 6/24/96. Ord. 1079-01, § 1, 7/23/01; Ord. 1079-01, 7/23/01]

Response: This project is requesting to remove two trees within right-of-way to accommodate improvement to SW McEwan Road (see Sheet C2 and C3 in Exhibit 2). As noted in the Detailed Tree Inventory and Assessment Report on Sheet C3, the two trees proposed to be removed have crooked bases, one which is 95% dead. Tree removal is necessary to construct sidewalks in conformance with City design standards.

Section 74.705 Street Tree Removal Permit.

(1) A person who desires to remove or destroy a tree, as defined in [TDC 31.060](#), in or upon public right-of-way shall make application to the Operations Director on City forms.

Response: This project is requesting to remove two trees within the public right-of-way as part of this application.

(2) The applicant must provide:

(a) the applicant's name and contact information and if applicable that of the applicant's contractor;

(b) the number and species of all street trees the applicant desires to remove;

(c) a clear description of the street trees' the applicant desires to remove;

(d) the date of removal;

(e) the reason(s) for removal; and

(f) other information as the Operations Director deems necessary.

Response: As indicated in the Detailed Tree Inventory and Assessment Report on Sheet C3, the two trees proposed to be removed have crooked bases, one of which is 95% dead. The tree inventory and assessment were completed by a certified arborist.

(3) Upon the Operations Director approving the removal of a street tree, the applicant or designated contractor shall replace each removed tree on a one-for-one basis by fulfilling the following requirements:

(a) Remove both the tree and stump prior to planting a replacement tree, or re-quest the City to remove the tree and stump and pay the applicable fee(s) established in [TDC 74.706](#); and

Response: The applicant will remove both the tree and stump to accommodate proposed sidewalk and planter strip improvements on SW McEwan Road. Two trees are proposed to be planted in the planter strip along the southern portion of the property frontage to replace the two trees that will be removed.

(b) Replace the removed tree by planting a species of street tree permitted by Schedule A of the TDC Chapter 74 within the time period specified in writing by the Operations Director; or, the applicant may request within sixty (60) days of the permit approval date that the City replace the street tree and pay the applicable fee(s) established in [TDC 74.706](#). If an applicant opts for the City to plant the replacement tree, the Operations Department may plant the tree on its usual tree-planting schedule. Planting done by the applicant or designated contractor shall comply with all applicable TDC sections and any additional requirements imposed by the Operations Director.

Response: The species of the proposed street tree replacements will be Shademaster Honeylocust, which is authorized under Schedule A.

(c) The applicant shall comply with all applicable TDC sections and additional requirements imposed by the Operations Director. The Operations Director may:

(d) waive the one-for-one replacement requirement if he or she determines that the replacement would:

(i) conflict with public improvements or utility facilities, including but not limited to fire hydrants, water meters and pipes, lighting fixtures, traffic control signs; private improvements or utility facilities – including but not limited to driveways and power, gas, telephone, cable television lines; or, minimum vision clearance;

(ii) interfere with the existing canopy of adjacent trees, the maturation of the crown of the proposed replacement tree, or both;

(A) cause a conflict by planting trees too close to each other, hurting their health;

(iii) limit the selection of species from Schedule A: and;

(iv) direct how to plant replacement tree(s).

Response: This project is not requesting a waiver for the one-for-one replacement requirement; therefore, these standards do not apply.

(e) a person who fails to comply with TDC 74.705 shall pay an enforcement fee and a restoration fee to the City of Tualatin, as set forth in [TDC 34.220\(3\)](#), in addition to civil penalties in [TDC 31.111](#). [Ord. 963-96, § 9, 6/24/96. Ord. 1079-01, § 2, 7/23/01; Ord. 1279-09 §3, 3/23/09]

Response: TVF&R will comply with applicable regulations in TDC 75.705.

Section 74.706 Street Tree Fees.

A person who applies to remove a street tree under [TDC 74.705](#) shall pay all costs incurred by the City as reflected in the applicable fees listed in the city of Tualatin Fee Schedule. City actions and associated fees include but are not limited to inspection of a street tree requested for removal, removal of a street tree, removal of a stump, planting of a street tree, and inspection(s) to determine if the applicant has fulfilled permit requirements. [Ord. 1279-09 §4, 3/23/09]

Response: The applicant is proposing to remove and replace the street trees. As such, there is no need for the City of Tualatin to provide services for tree removal, stump grinding, or tree replanting, for which there are associated fees.

Section 74.707 Street Tree Voluntary Planting.

A person who desires to plant a tree in or upon a public right-of-way may plant or have the City plant a species of street tree permitted by TDC Chapter 74 Schedule A without a City permit, if the tree is not a re-planting for a tree that the person has removed. Such a person may submit a request to the City with payment of fee(s) so that the City may plant a street tree. If a stump exists where a street tree is to be planted, the person shall remove the stump or pay a fee to the City as established in [TDC 74.706](#) so that the City may remove the stump on behalf of the person. In all instances, a person who desires to plant a tree shall comply with other applicable TDC sections and any additional requirements of the Operations Director. [Ord. 1279-09 §5, 3/23/09]

Response: This project is proposing to plant two trees within the right-of-way as part of this architectural review application; as such, this standard does not apply.

Section 74.708 Street Tree Emergencies.

(1) If emergency conditions occur that require the immediate cutting or removal of street trees to avoid danger or hazard to persons or property, the Operations Director shall issue emergency permits without payment of fees and formal applications. If the Operations Director is unavailable, the adjacent property owners may proceed to cut the trees without permits to the extent necessary to eliminate the immediate danger or hazard. If a street tree is cut under this section without filing of an application with the Operations Director, the person doing so shall report the action to the Operations Director within two City business days without payment of fee and shall provide such information and evidence as may be reasonably required by the Operations Director to explain and justify the removal.

(2) In all instances, a person who removes a street tree as a result of an emergency must replace it within sixty (60) days of notifying the Operations Director. The City reserves the right to waive this requirement.

(3) A person who fails to comply with TDC 74.708 shall pay an enforcement fee and a restoration fee to the City of Tualatin, as set forth in [TDC 34.220\(3\)](#), in addition to civil penalties in [TDC 31.111](#).

(4) If no emergency is found to exist, no person shall cut or remove a street tree without complying with the requirement of the Tualatin Development Code. [Ord. 1279-09 §6, 3/23/09]

Response: This project is not proposing to remove the street trees due to an emergency condition or need; therefore, these standards do not apply.

Section 74.710 Open Ground.

When impervious material or substance is laid down or placed in or upon a public right-of-way near a tree, at least nine square feet of open ground for a tree up to three inches in diameter shall be provided about the base of the trunk of each tree. [Ord. 963-96, § 9, 6/24/96]

Response: As shown on Sheet L1.0 in Exhibit 2, the two proposed street trees will be planted in a planter strip between the sidewalk and paved roadway. The planter strip will be 6 feet wide and approximately 90 feet long.

Section 74.715 Attachments to Trees.

It is unlawful for a person to attach or keep attached a rope, wire, chain, sign or other device to a tree, plant or shrub in or upon a public right-of-way or to the guard or stake intended for the protection of such tree, except as a support for a tree, plant or shrub. [Ord. 963-96, § 9, 6/24/96]

Response: Except for vertical stakes to support planted trees, this project is not proposing to attach any of the listed attachments.

Section 74.720 Protection of Trees During Construction.

(1) During the erection, repair, alteration or removal of a building or structure, it is unlawful for the person in charge of such erection, repair, alteration or removal to leave a tree in or upon a public right-of-way in the vicinity of the building or structure without a good and sufficient guard or protectors to prevent injury to the tree arising out of or by reason of such erection, repair, alteration or removal.

(2) Excavations and driveways shall not be placed within six feet of a tree in or upon a public right-of-way without written permission from the City Engineer. During excavation or construction, the person shall guard the tree within six feet and all building material or other debris shall be kept at least four feet from any tree. [Ord. 963-96, § 9, 6/24/96]

Response: This project is proposing to remove and replace the only two trees within the public right-of-way; therefore, this standard does not apply.

Section 74.725 Maintenance Responsibilities.

Trees, shrubs or plants standing in or upon a public right-of-way, on public or private grounds that have branches projecting into the public street or sidewalk shall be kept trimmed by the owner of the property adjacent to or in front of where such trees, shrubs or plants are growing so that:

(1) The lowest branches are not less than 12 feet above the surface of the street, and are not be less than 14 feet above the surface of streets designated as state highways.

(2) The lowest branches are not less than eight feet above the surface of a sidewalk or footpath.

(3) No plant, tree, bush or shrub shall be more than 24 inches in height in the triangular area at the street or highway corner of a corner lot, or the alley-street intersection of a lot, such an area defined by a line across the corner between the points on the street right-of-way line measured 10 feet back from the corner, and extending the line to the street curbs or, if there are no curbs, then to that portion of the street or alley used for vehicular traffic.

(4) Newly planted trees may remain untrimmed if they do not interfere with street traffic or persons using the sidewalk or obstruct the light of a street electric lamp.

(5) Maintenance responsibilities of the property owner include repair and upkeep of the sidewalk in accordance with the City Sidewalk Maintenance Ordinance. [Ord. 963-96, § 9, 6/24/96]

Response: TVF&R will be responsible for the health and maintenance of the propose street trees.

Section 74.730 Notice of Violation.

When the owner, lessee, occupant or person in charge of private grounds neglects or refuses to trim a tree, shrub or plant as provided in [TDC 74.725](#), the Operations Director shall cause a written notice to trim such tree or trees, shrubs or plants to be served upon such owner, lessee, occupant or person in

charge, within 10 days after the giving the notice; and if the owner, lessee or occupant or person in charge fails to do so, the person shall be guilty of violating this ordinance and subject to the penalties in [TDC 74.760](#). The notice shall be served upon the owner, lessee, occupant or person in charge either by "Certified Mail-Return Receipt Requested", or by posting the same notice on the property or near to the trees, shrubs or plants to be trimmed. [Ord. 963-96, § 9, 6/24/96. Ord. 1079-01, § 3, 7/23/01]

Response: TVF&R understands that a notice of violation may be issued for neglectful landscaping maintenance.

Section 74.735 Trimming by City.

If the owner, lessee, occupant or person in charge of the property fails and neglects to trim the trees, shrubs or plants within 10 days after service of the notice in [TDC 74.730](#), the Operations Director shall trim the trees, shrubs or plants. Such trimming by the City does not act to relieve such owner, lessee, occupant or person in charge of responsibility for violating this Chapter. [Ord. 963-96, § 9, 6/24/96. Ord. 1079-01, § 4, 7/23/01]

Response: TVF&R understands that the City may conduct landscape maintenance after a notice of violation has been issued.

Section 74.740 Prohibited Trees.

It is unlawful for a person to plant a tree within the right-of-way of the City of Tualatin that is not in conformance with Schedule A. Any tree planted subsequent to adoption of this Chapter not in compliance with [Schedule A](#) shall be removed at the expense of the property owner. [Ord. 963-96, § 9, 6/24/96]

Response: The two proposed street trees are Shademaster Honeylocusts, which are listed in Schedule A.

Section 74.745 Cutting and Planting Specifications.

The following regulations are established for the planting, trimming and care of trees in or upon the public right-of-way of the City.

(1) When trees are cut down, the stump shall be removed to a depth of six inches below the surface of the ground or finish grade of the street, whichever is of greater depth.

Response: The two trees in the right-of-way will be removed in accordance with this standard.

(2) Trees shall be planted in accordance with [Schedule A](#), except when a greater density is allowed under a special permit from the Operations Director. [Ord. 963-96, § 9, 6/24/96. Ord. 1079-01, § 5, 7/23/01]

Response: The two proposed street trees are Shademaster Honeylocusts, which are listed in Schedule A.

Section 74.750 Removal or Treatment by City.

The Operations Director may remove or cause or order to be removed a tree, plant or shrub, planted or growing in or upon a public right-of-way which by its nature causes an unsafe condition or is injurious to sewers or public improvements, or is affected with an injurious fungus disease, insect or other pest. When, in the opinion of the Operations Director, trimming or treatment of a tree or shrub located on private grounds, but having branches extending over a public right-of-way is necessary, the Operations Director may trim or treat such a branch or branches, or cause or order branches to be trimmed or treated. [Ord. 963-96, § 9, 6/24/96; Ord. 1079-01, § 6, 7/23/01]

Response: As indicated in the Detailed Tree Inventory and Assessment Report on Sheet C3, the two trees proposed to be removed have crooked bases, one of which is 95% dead. The tree inventory and assessment was completed by a certified arborist.

Section 74.755 Appeal of Permit Denial.

When application for a permit under this Chapter is denied by the Operations Director, an order is issued by the Operations Director directing certain trees, shrubs or plants to be trimmed or removed, or a permit is granted by the Operations Director containing conditions which the applicant deems unreasonable, the applicant may appeal to the Council in writing and filed with the City Recorder within 10 City business days after the denial of the permit sought or the making of the order the appellant deems unreasonable. After hearing, the Council may either grant or deny the application, rescind or modify the order from which the appeal was taken. [Ord. 963-96, § 9, 6/24/96. Ord. 1079-01, § 7, 7/23/01]

Response: TVF&R understands that a permit denial may be appealed for additional review.

Section 74.760 Penalties.

A person who violates this ordinance or fails to trim a tree or shrub for which notice to do so was provided, shall, upon conviction, be fined not more than \$100.00. [Ord. 963-96, § 9, 6/24/96]

Response: TVF&R understands that a violation of this ordinance may result in a fine.

Section 74.765 Street Tree Species and Planting Locations.

All trees, plants or shrubs planted in the right-of-way of the City shall conform in species and location and in accordance with the street tree plan in Schedule A. If the Operations Director determines that none of the species in Schedule A is appropriate or finds appropriate a species not listed, the Director may substitute an unlisted species. [Ord. 963-96, § 9, 6/24/96; Ord. 1279-09 §7, 3/23/09]

Response: The two proposed street trees are Shademaster Honeylocusts, which are listed in Schedule A.

ADDITIONAL SURFACE WATER MANAGEMENT STANDARDS

3-5-200 Downstream Protection Requirement.

Each new development is responsible for mitigating the impacts of that development upon the public storm water quantity system. The development may satisfy this requirement through the use of any of the following techniques, subject to the limitations and requirements in [TMC 3-5-210](#):

(1) Construction of permanent on-site stormwater quantity detention facilities designed in accordance with this title;

Response: As described in more detail within the Preliminary Stormwater Report (Exhibit 3), this project is proposing to infiltrate stormwater utilizing drywells and an underground infiltration trench for all on-site stormwater runoff. Since no stormwater runoff is proposed to leave the site, stormwater quality detention facilities are not required for on-site stormwater runoff.

(2) Enlargement of the downstream conveyance system in accordance with this title and the Public Works Construction Code;

Response: As noted in the response above, this project is proposing to infiltrate stormwater utilizing drywells and an underground infiltration trench.

This project is proposing construction of a small amount of additional impervious surface with the required street frontage improvements. A downstream analysis has been performed in accordance with City and CWS standards and determined that the additional runoff generated by this additional runoff is negligible and does not require any enlargement of downstream conveyance systems.

(3) The payment of a Storm and Surface Water Management System Development Charge, which includes a water quantity component designated to meet these requirements.

Response: Any required Storm and Surface Water Management System Development Charges will be paid at the time of building permit issuance.

3-5-210 Review of Downstream System.

For new development other than the construction of a single-family house or duplex, plans shall document review by the design engineer of the downstream capacity of any existing storm drainage facilities impacted by the proposed development. That review shall extend downstream to a point where the impacts to the water surface elevation from the development will be insignificant, or to a point where the conveyance system has adequate capacity, as determined by the City Engineer.

To determine the point at which the downstream impacts are insignificant or the drainage system has adequate capacity, the design engineer shall submit an analysis using the following guidelines:

(1) evaluate the downstream drainage system for at least ¼ mile;

(2) evaluate the downstream drainage system to a point at which the runoff from the development in a build out condition is less than 10 percent of the total runoff of the basin in its current development status. Developments in the basin that have been approved may be considered in place and their conditions of approval to exist if the work has started on those projects;

(3) evaluate the downstream drainage system throughout the following range of storms: 2, 5, 10, 25 year;

(4) The City Engineer may modify items 1, 2, 3 to require additional information to determine the impacts of the development or to delete the provision of unnecessary information.

Response: As described in more detail within the Preliminary Stormwater Report (Exhibit 3), this project is proposing to infiltrate stormwater utilizing drywells and an underground infiltration trench for all on-site stormwater runoff. Since no stormwater runoff is proposed to leave the site, stormwater quality detention facilities are not required for on-site stormwater runoff.

This project is proposing construction of a small amount of additional impervious surface with the required street frontage improvements. A downstream analysis has been performed in accordance with City and CWS standards. Stormwater runoff from the street frontage improvements is conveyed southeast via the existing curb and gutter, then to an existing ditch, and then to an existing ten inch diameter culvert that discharges into ODOT Railroad right-of-way. At the point where the runoff from the street frontage improvements discharges into ODOT right-of-way, the project's increased runoff for the 25-year even accounts for approximately 5% of the total basin flows. No downstream deficiencies

were identified. A visual inspection was performed from the project discharge to a point ¼ miles downstream and no downstream impacts to structures were identified.

If the increase in surface waters leaving a development will cause or contribute to damage from flooding, then the identified capacity deficiency shall be corrected prior to development or the development must construct onsite detention. To determine if the runoff from the development will cause or contribute to damage from flooding the City Engineer will consider the following factors:

- (1) The potential for or extent of flooding or other adverse impacts from the run-off of the development on downstream properties;*
- (2) The potential for or extent of possibility of inverse condemnation claims;*
- (3) Incremental impacts of runoff from the subject and other developments in the basin; and*
- (4) Other factors that may be relevant to the particular situation.*

The purpose of the City Engineer's review is to protect the City and its inhabitants from the impacts or damage caused by runoff from development while recognizing all appropriate limitations on exactions from the development. [Ord. 846-91 §21, 10/28/1991; Ord. 972-97 §1, 2/24/1997]

Response: As described in more detail within the Preliminary Stormwater Report (Exhibit 3), this project is proposing to infiltrate stormwater utilizing drywells and an underground infiltration trench for all on-site stormwater runoff. Since no stormwater runoff is proposed to leave the site, stormwater quality detention facilities are not required for on-site stormwater runoff.

This project is proposing construction of a small amount of additional impervious surface with the required street frontage improvements. A downstream analysis has been performed in accordance with City and CWS standards and determined that the additional runoff generated by this additional runoff is negligible and does not require any enlargement of downstream conveyance systems.

3-5-220 Criteria for Requiring On-Site Detention to be Constructed.

The City shall determine whether the onsite facility shall be constructed. If the onsite facility is constructed, the development shall be eligible for a credit against Storm and Surface Water System Development Charges, as provided in City ordinance.

On-site facilities shall be constructed when any of the following conditions exist:

- (1) There is an identified downstream deficiency, as defined in [TMC 3-5-210](#), and detention rather than conveyance system enlargement is determined to be the more effective solution.*
- (2) There is an identified regional detention site within the boundary of the development.*
- (3) There is a site within the boundary of the development which would qualify as a regional detention site under criteria or capital plan adopted by the Unified Sewerage Agency.*
- (4) The site is located in the Hedges Creek Subbasin as identified in the Tualatin Drainage Plan and surface water runoff from the site flows directly or indirectly into the Wetland Protected Area (WPA) as defined in [TDC 71.020](#). Properties located within the Wetland Protection District as described in [TDC 71.010](#), or within the portion of the subbasin east of SW Tualatin Road are excepted from the on-site detention facility requirement. [Ord. 846-91 §22, 10/28/1991; Ord. 952-95 § 4, 10/23/1995]*

Response: As described in more detail within the Preliminary Stormwater Report (Exhibit 3), this project is proposing to infiltrate stormwater utilizing drywells and an underground infiltration trench for all on-site stormwater runoff. Since no stormwater runoff is proposed to leave the site, stormwater quality detention facilities are not required for on-site stormwater runoff.

This project is proposing construction of a small amount of additional impervious surface with the required street frontage improvements. A downstream analysis has been performed in accordance with City and CWS standards and determined that the additional runoff generated by this additional runoff is negligible and does not require any enlargement of downstream conveyance systems.

3-5-230 On-Site Detention Design Criteria.

(1) Unless designed to meet the requirements of an identified downstream deficiency as defined in [TMC 3-5.210](#), stormwater quantity onsite detention facilities shall be designed to capture run-off so the run-off rates from the site after development do not exceed predevelopment conditions, based upon a 25-year, 24-hour return storm.

(2) When designed to meet the requirements of an identified downstream deficiency as defined in [TMC 3-5.210](#), stormwater quantity on-site detention facilities shall be designed such that the peak runoff rates will not exceed predevelopment rates for the 2 through 100 year storms, as required by the determined downstream deficiency.

(3) Construction of on-site detention shall not be allowed as an option if such a detention facility would have an adverse effect upon receiving waters in the basin or subbasin in the event of flooding, or would increase the likelihood or severity of flooding problems downstream of the site. [Ord. 846-91 §23, 10/28/1991]

As described in more detail within the Preliminary Stormwater Report (Exhibit 3), this project is proposing to infiltrate stormwater utilizing drywells and an underground infiltration trench for all on-site stormwater runoff. Since no stormwater runoff is proposed to leave the site, there are no impacts to downstream conveyance facilities. The on-site facility is designed to infiltrate the 100-year storm event.

This project is proposing construction of a small amount of additional impervious surface with the required street frontage improvements. A downstream analysis has been performed in accordance with City and CWS standards and determined that the additional runoff generated by this additional runoff is negligible and does not require any enlargement of downstream conveyance systems.

3-5-240 On-Site Detention Design Method.

(1) The procedure for determining the detention quantities is set forth in Section 4.4 Retention/Detention Facility Analysis and Design, King County, Washington, Surface Water Design Manual, January, 1990, except subchapters 4.4.5 Tanks, 4.4.6 Vaults and Figure 4.4.4G Permanent Surface Water Control Pond Sign. This reference shall be used for procedure only. The design criteria shall be as noted herein. Engineers desiring to utilize a procedure other than that set forth herein shall obtain City approval prior to submitting calculations utilizing the proposed procedure.

(2) For single family and duplex residential subdivisions, stormwater quantity detention facilities shall be sized for the impervious areas to be created by the subdivision, including all residences on individual lots at a rate of 2640 square feet of impervious surface area per dwelling unit, plus all roads which are assessed a surface water management monthly fee under Unified Sewerage Agency rules. Such facilities shall be constructed as a part of the subdivision public improvements. Construction of a single family or duplex residence on an existing lot of record is not required to construct stormwater quantity detention facilities.

(3) All developments other than single family and duplex, whether residential, multi-family, commercial, industrial, or other uses, the sizing of stormwater quantity detention facilities shall be based on the impervious area to be created by the development, including structures and all roads and impervious areas which are assessed a surface water management monthly fee under Unified Sewerage Agency rules. Impervious surfaces shall be determined based upon building permits, construction plans, site visits or other appropriate methods deemed reliable by City. [Ord. 846-91 §24, 10/28/1991]

Response: This project is not proposing on-site detention; therefore, this section is not applicable.

3-5-250 Floodplain Design Standards.

[Sections (1)-(5) omitted from excerpt]

Response: This project is not located within the 100-year flood plain; therefore, this section is not applicable.

3-5-260 Floodway Design Standards.

[Sections (1)-(3) omitted from excerpt]

Response: This project is not located within the 100-year flood plain; therefore, this section is not applicable.

3-5-280 Placement of Water Quality Facilities.

Title III specifies that certain properties shall install water quality facilities for the purpose of removing phosphorous. No such water quality facilities shall be constructed within the defined area of existing or created wetlands unless a mitigation action, approved by the City, is constructed to replace the area used for the water quality facility. [Ord. 846-91 §28, 10/28/1991; Ord. 972-97 § 3, 2/24/1997; Ord. 1068-01 §2, 3/26/2001; Ord. 1068-01, 03/26/2001]

Response: This project is not located within the 100-year flood plain; therefore, this section is not applicable.

PERMANENT ON-SITE WATER QUALITY FACILITIES

3-5-290 Purpose of Title.

The purpose of this title is to require new development and other activities which create impervious surfaces to construct or fund on-site or off-site permanent water quality facilities to reduce the amount of phosphorous entering the storm and surface water system. [Ord. 846-91 §29, 10/28/1991]

Response: This project is proposing that all on-site stormwater runoff be conveyed to an on-site sedimentation manhole prior to discharging stormwater into an underground infiltration system. No on-site stormwater runoff is being conveyed to surface waters.

A negligible amount of additional stormwater runoff from required street frontage improvements will be conveyed to the existing downstream stormwater system. Construction of a water quality facility for this small amount of flows is impractical due to right-of-way constraints; therefore, this project is proposing to pay a fee-in-lieu for water quality for this small area.

3-5-300 Application of Title.

Title III of this Chapter shall apply to all activities which create new or additional impervious surfaces, except as provided in [TMC 3-5.310](#). [Ord. 846-91 §30, 10/28/1991]

Response: This project is proposing to create new impervious surfaces and does not qualify as an exception under TMC 3-5.310; therefore, this section applies.

3-5-310 Exceptions.

(1) Those developments with application dates prior to July 1, 1990, are exempt from the requirements of Title III. The application date shall be defined as the date on which a complete application for development approval is accepted by the City in accordance with City regulations.

(2) Construction of one and two family (duplex) dwellings are exempt from the requirements of Title III.

(3) Sewer lines, water lines, utilities or other land development that will not directly increase the amount of storm water run-off or pollution leaving the site once construction has been completed and the site is either restored to or not altered from its approximate original condition are exempt from the requirements of Title III. [Ord. 846-91 §31, 10/28/1991]

Response: This project is proposing to construct a new fire station at the subject property and does not qualify for an exception.

3-5-320 Definitions.

(1) "Stormwater Quality Control Facility" refers to any structure or drainage way that is designed, constructed and maintained to collect and filter, retain, or detain surface water run-off during and after a storm event for the purpose of water quality improvement. It may also include, but is not limited to, existing features such as constructed wetlands, water quality swales, low impact development approaches ("LIDA"), and ponds which are maintained as stormwater quality control facilities.

(2) "Low impact development approaches" or "LIDA: means stormwater facilities constructed utilizing low impact development approaches used to temporarily store, route or filter run-off for the purpose of improving water quality. Examples include; but are not limited to, Porous Pavement, Green Roofs, Infiltration Planters/Rain Gardens, Flow-Through Planters, LIDA Swales, Vegetated Filter Strips, Vegetated Swales, Extended Dry Basins, Constructed Water Quality Wetland, Conveyance and Stormwater Art, and Planting Design and Habitats.

(3) "Water Quality Swale" means a vegetated natural depression, wide shallow ditch, or constructed facility used to temporarily store, route or filter run-off for the purpose of improving water quality.

(4) "Existing Wetlands" means those areas identified and delineated as set forth in the Federal Manual for Identifying the Delineating Jurisdictional Wetlands, January, 1989, or as amended, by a qualified wetlands specialist.

(5) "Created Wetlands" means those wetlands developed in an area previously identified as a non-wetland to replace, or mitigate wetland destruction or displacement.

(6) "Constructed Wetlands" means those wetlands developed as a water quality or quantity facility, subject to change and maintenance as such. These areas must be clearly defined and/or separated from existing or created wetlands. This separation shall preclude a free and open connection to such other wetlands. [Ord. 846-91 §32, 10/28/1991; Ord. 1319-11 §1, 3/28/2011]

3-5-330 Permit Required.

Except as provided in [TMC 3-5-310](#), no person shall cause any change to improved or unimproved real property that will, or is likely to, increase the rate or quantity of run-off or pollution from the site without first obtaining a permit from the City and following the conditions of the permit. [Ord. 846-91 §33, 10/28/1991]

Response: This project is proposing that all on-site stormwater runoff be conveyed to an on-site sedimentation manhole prior to discharging stormwater into an underground infiltration system. No on-site stormwater runoff is being conveyed to surface waters.

A negligible amount of additional stormwater runoff from required street frontage improvements will be conveyed to the existing downstream stormwater system. Construction of a water quality facility for this small amount of flows is impractical due to right-of-way constraints; therefore, this project is proposing to pay a fee-in-lieu for water quality for this small area.

3-5-340 Facilities Required.

For new development, subject to the exemptions of [TMC 3-5-310](#), no permit for construction, or land development, or plat or site plan shall be approved unless the conditions of the plat, plan or permit approval require permanent stormwater quality control facilities in accordance with this Title III. [Ord. 846-91 §34, 10/28/1991; Ord. 1323-11 §1, 6/13/2011]

Response: This project is proposing that all on-site stormwater runoff be conveyed to an on-site sedimentation manhole prior to discharging stormwater into an underground infiltration system. No on-site stormwater runoff is being conveyed to surface waters.

3-5-345 Inspection Reports.

The property owner or person in control of the property shall submit inspection reports annually to the City for the purpose of ensuring maintenance activities occur according to the operation and maintenance plan submitted for an approved permit or architectural review. [Ord. 1319-11§6, 3/28/2011]

Response: TVF&R will submit annual inspection reports in accordance with City requirements.

3-5-350 Phosphorous Removal Standard.

The stormwater quality control facilities shall be designed to remove 65 percent of the phosphorous from the runoff from 100 percent of the newly constructed impervious surfaces. Impervious surfaces

shall include pavement, buildings, public and private roadways, and all other surfaces with similar runoff characteristics. [Ord. 846-91 §35, 10/28/1991]

Response: This project is proposing that all on-site stormwater runoff be conveyed to an on-site sedimentation manhole prior to discharging stormwater into an underground infiltration system. Since no surface water is leaving the site, this requirement is not applicable.

A negligible amount of additional stormwater runoff from required street frontage improvements will be conveyed to the existing downstream stormwater system. Construction of a water quality facility for this small amount of flows is impractical due to right of way constraints; therefore, this project is proposing to pay a fee in lieu of water quality for this small area.

3-5-360 Design Storm.

The stormwater quality control facilities shall be designed to meet the removal efficiency of [TMC 3-5-350](#) for a mean summertime storm event totaling 0.36 inches of precipitation falling in four hours with an average return period of 96 hours. [Ord. 846-91 §36, 10/28/1991]

Response: This project is proposing that all on-site stormwater runoff be conveyed to an on-site sedimentation manhole prior to discharging stormwater into an underground infiltration system. Since no surface water is leaving the site, this requirement is not applicable.

A negligible amount of additional stormwater runoff from required street frontage improvements will be conveyed to the existing downstream stormwater system. Construction of a water quality facility for this small amount of flows is impractical due to right of way constraints; therefore, this project is proposing to pay a fee in lieu of water quality for this small area.

3-5-370 Design Requirements.

The removal efficiency in [TDC Chapter 35](#) specifies only the design requirements and are not intended as a basis for performance evaluation or compliance determination of the stormwater quality control facility installed or constructed pursuant to this Title III. [Ord. 846-91 §37, 10/28/1991]

Response: This project is proposing that all on-site stormwater runoff be conveyed to an on-site sedimentation manhole prior to discharging stormwater into an underground infiltration system. Since no surface water is leaving the site, this requirement is not applicable.

A negligible amount of additional stormwater runoff from required street frontage improvements will be conveyed to the existing downstream stormwater system. Construction of a water quality facility for this small amount of flows is impractical due to right of way constraints; therefore, this project is proposing to pay a fee in lieu of water quality for this small area.

3-5-380 Criteria for Granting Exemptions to Construction of On-Site Water Quality Facilities.

On-site facilities shall be constructed as required by [OAR 340-41-455](#), unless otherwise approved by the City on a case by case basis due to the size of the development, topography, or other factors causing the City to determine that the construction of onsite permanent stormwater treatment systems is impracticable or undesirable. Determinations by the City may be based upon, but not limited to, consideration of the following factors:

Site topography, geological stability, hazards to public safety, accessibility for maintenance, environmental impacts to sensitive areas, size of the site and development, existence of a more efficient and effective regional site within the basin capable of serving the site, and consistency with sub-basin master plan.

A regional public facility may be constructed to serve private non-residential development provided:

- (1) The facility serves more than one lot; and*
- (2) All owners sign a stormwater facility agreement; and*
- (3) Treatment accommodates reasonable worst case impervious area for full build-out, stormwater equivalent to existing or proposed roof area is privately treated in LIDA facilities, and any detention occurs on each lot. [Ord. 846-91 §38, 10/28/1991; Ord. 1323-11 §2, 06/13/2011]*

Response: An on-site stormwater facility is proposed with this development; therefore, this section is not applicable.

3-5-390 Facility Permit Approval.

A stormwater quality control facility permit shall be approved only if the following are met:

- (1) The plat, site plan, or permit application includes plans and a certification prepared by an Oregon registered, professional engineer that the proposed stormwater quality control facilities have been designed in accordance with criteria expected to achieve removal efficiencies for total phosphorous required by this Title III. Clean Water Services Design and Construction Standards shall be used in preparing the plan for the water quality facility; and*
- (2) The plat, site plan, or permit application shall be consistent with the areas used to determine the removal required in [TMC 3-5-350](#); and*
- (3) A financial assurance, or equivalent security acceptable to the City, is provided by the applicant which assures that the stormwater quality control facilities are constructed according to the plans established in the plat, site plan, or permit approval. The financial assurance may be combined with our financial assurance requirements imposed by the City; and*
- (4) A stormwater facility agreement identifies who will be responsible for assuring the long term compliance with the operation and maintenance plan. [Ord. 846-91 §39, 10/28/1991; Ord. 1323-11 §3, 06/13/2011]*

Response: The items in the section above will be met prior to the issuance of a stormwater connection permit by the City and CWS.

3-5-400 System Development Charge.

If under [TMC 3-5-380](#), an on-site facility will not be constructed, the Storm and Surface Water System Development Charge shall be paid. [Ord. 846-91 §40, 10/28/1991]

Response: This project is proposing a stormwater facility to treat all on-site stormwater runoff; therefore, a Storm and Surface Water System Development Charge is not required for this runoff.

A negligible amount of additional stormwater runoff from required street frontage improvements will be conveyed to the existing downstream stormwater system. Construction of a water quality facility for

this small amount of flows is impractical due to right of way constraints; therefore, this project will pay a System Development Charge for this runoff.

Exhibit 1: Pre-application Request and Form



MEMORANDUM

TVF&R Station 39 Pre-Application Conference Request

DATE September 11, 2017
TO City of Tualatin
FROM Frank Angelo, APG
CC Siobhan Kirk, TVF&R
Jennifer Jenkins, Ankrom Mosian Architects
Michael Bonn, Ankrom Moisan Architects
Bruce Baldwin, AKS
Todd Mobley, Lancaster Engineering
Jamin Kimmel, APG

Tualatin Valley Fire & Rescue is proposing to develop a new fire station (Station 39) on SW McEwan Road south of SW Boones Ferry Road. The new station will be approximately 9,500 square feet and will include a 600-square foot community room. The building will house the station's firefighters and have an interior two-space parking bay for fire trucks and necessary emergency apparatus. There are 36 parking spaces proposed on-site to serve the fire station and community room. Station 39 will include 24-hour staffing starting with 4 persons per shift and ultimately growing to 6 person shifts. The building will look similar to TVF&R Station 55 which is currently under construction in the City of West Linn.

Questions for the Pre-Application Conference

1. Describe the Conditional Use and Architectural review standards, review procedures and schedule.
2. Discuss Neighborhood Meeting requirements.
3. Identify Transportation Assessments that will be required (if any).
4. Describe CWS review requirements.

Attachments: Pre-Application Conference Form
Station 39 Preliminary Site Plan
Station 39 Preliminary Building Elevations
Pre-Application Fee (provided separately)



City of Tualatin

COMMUNITY DEVELOPMENT PLANNING DIVISION

Pre-Application Meeting Request

The purpose of the Scoping and Pre-Application meetings is to offer early assistance in the land use and permitting process. This includes thoughtful feedback on preliminary design direction and visioning, outlining expectations, and to assist the applicant in attaining a complete application at first submittal.

PROJECT DESCRIPTION

Project name/title: TVF&R Station 39

What is the primary purpose of this pre-application meeting (What would you like to accomplish)? (Attach additional sheets if needed.)

- Review Station 39 site plan

- Discuss site issues

- Determine review processes & standards

PROPERTY INFORMATION

Property address/location(s): Adjacent to
7100 SW McEwan, Tualatin, OR 97062

Tax map and tax lot no.(s): 2S 113DD TL 1600/1700

Zoning: ML

PROPERTY OWNER/HOLDER INFORMATION

Name(s): Tualatin Valley Fire & Rescue
c/o Siobhan Kirk

Address: 11945 SW 70th Ave Phone: 503.649.8577

City/state: Tigard, OR Zip: 97223

APPLICANT INFORMATION

Name: Angelo Planning Group

Address: 921 SW Washington St Phone: 503.649.8577

City/state: Portland, OR Zip: 97205

Contact person: Frank Angelo

Phone: 503.227.3664 Email: fangelo@angeloplanning.com

Pre-application Conference Information

All of the information identified on this form is required and must be submitted to the Planning Division with this application. Conferences are scheduled subject to availability and a minimum of two weeks after receiving this application and all materials. Pre-application conferences are one (1) hour long and are typically held on Mondays between the hours of 3-4 p.m. or Wednesdays between 2-4 p.m.

If more than four (4) people are expected to attend the pre-application conference in your group, please inform the City in advance so that alternate room arrangements can be made to accommodate the group.

REQUIRED SUBMITTAL ELEMENTS

(Note: Requests will not be accepted without the required submittal elements)

- A complete application form and accompanying fee.
- 1 hard copy and an electronic set of the following:**
 - Preliminary site and building plans, drawn to scale, showing existing and proposed features. (Plans do not need to be professionally prepared; just accurate and reliable.)
 - A detailed narrative description of the proposal that clearly identifies the location, existing and proposed uses, and any proposed construction.
 - A list of all questions or issues the applicant would like the City to address.

FOR STAFF USE ONLY

Case No.: _____

Related Case No.(s): _____

Application fee: _____

Application accepted: _____

By: _____ Date: _____

Date of pre-app: _____

Time of pre-app: _____

Planner assigned to pre-app: _____

What type of development are you proposing? (Check all that apply)

Industrial Commercial Residential Institutional Mixed-use

Please provide a brief description of your project: (Attach additional sheets if needed.) Please include description of existing uses and structures in addition to what is proposed.

Construct a new TVF&R fire station (Station 39). Will include a community room.

Are you familiar with the development process in Washington or Clackamas County or Tualatin?

Yes No

If yes, please identify an example project:

TVF&R Station 34 in Tualatin

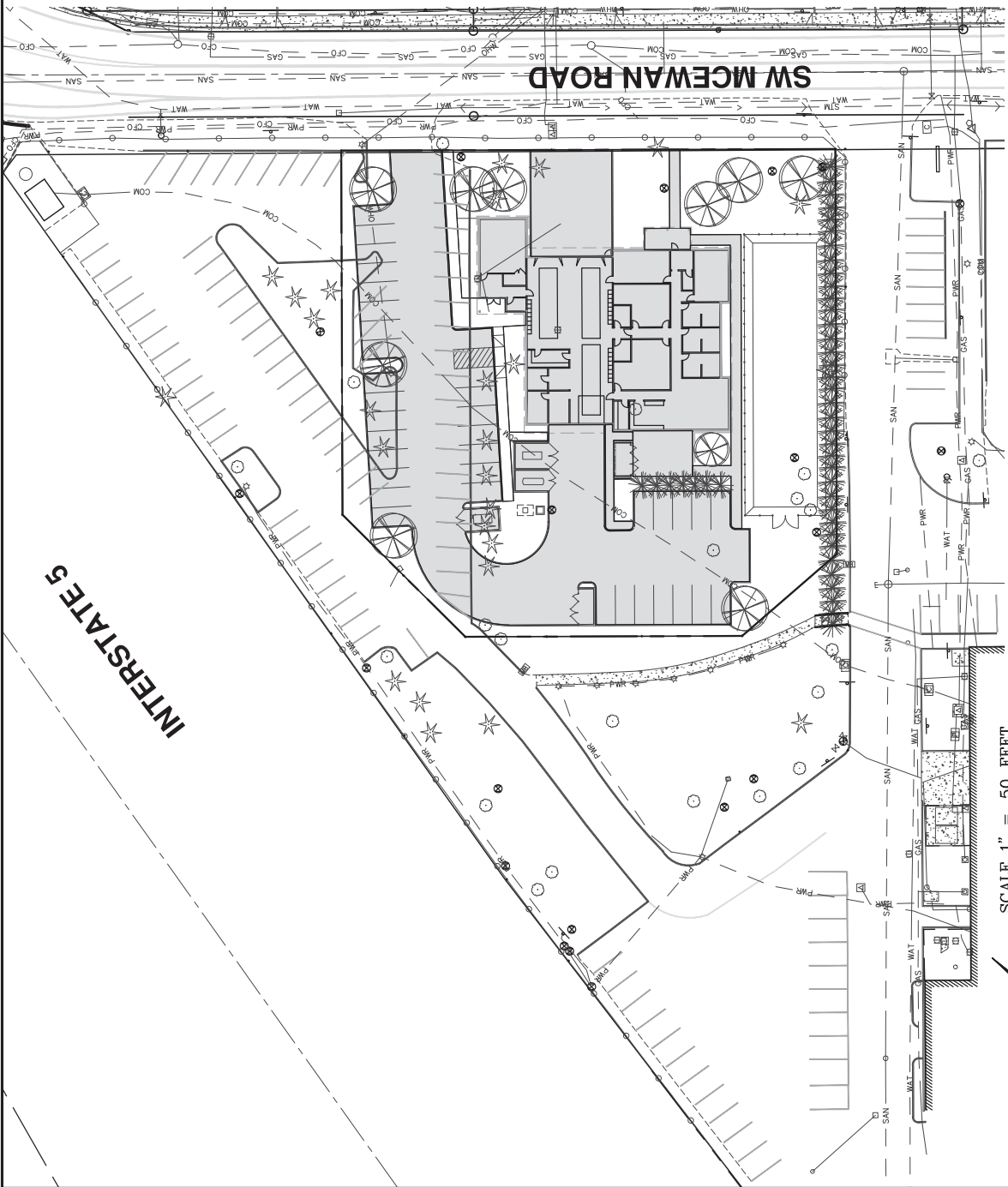
Are you familiar with the sections of the Tualatin Development Code (TDC) that pertain to your proposed development?

Yes No

Is the property under enforcement action? If yes, please attached a notice of the violation.

Please provide the names of City, TVF&R, CWS, and County staff with whom you have already discussed this proposal:

Scoping meeting held with City staff on March 6, 2016



INTERSTATE 5

SW MCEWAN ROAD

SCALE 1" = 50 FEET



NOTE: SCALE BAR ACCURATE WHEN PLOTTED ON 11"x17" SHEET



DATE: 09/07/2017

EXHIBIT

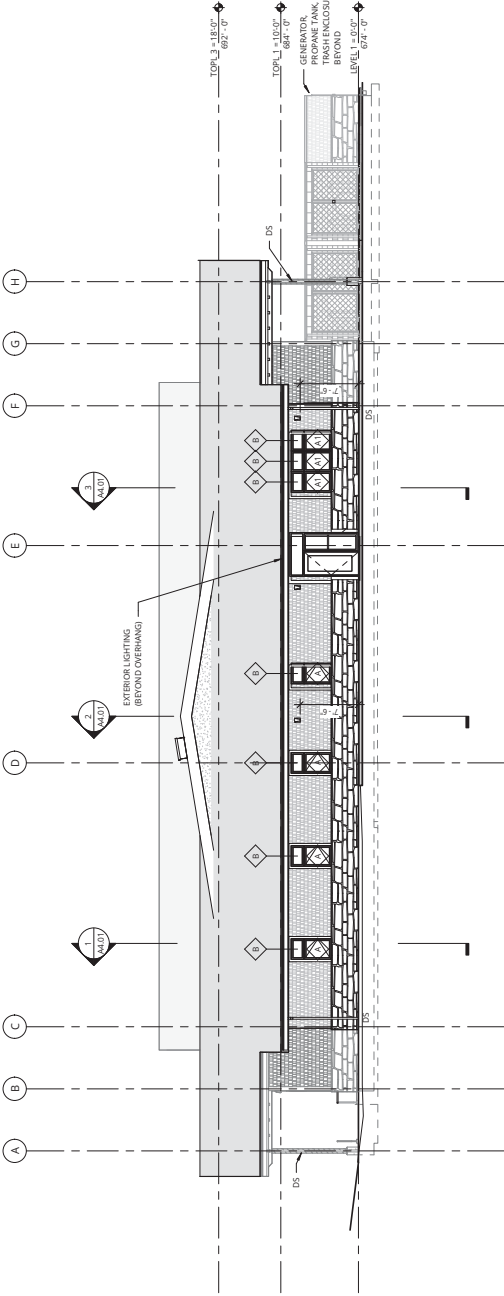
SITE FIT PLAN

TVFR STATION 39	AKS
AKS ENGINEERING & FORESTRY, LLC	DRWN: LJP
12965 SW HERMAN RD, STE 100	CHKD: BRB
TUALATIN, OR 97062	AKS JOB: 4756
P: 503.563.6151 F: 503.563.6152 aks-eng.com	

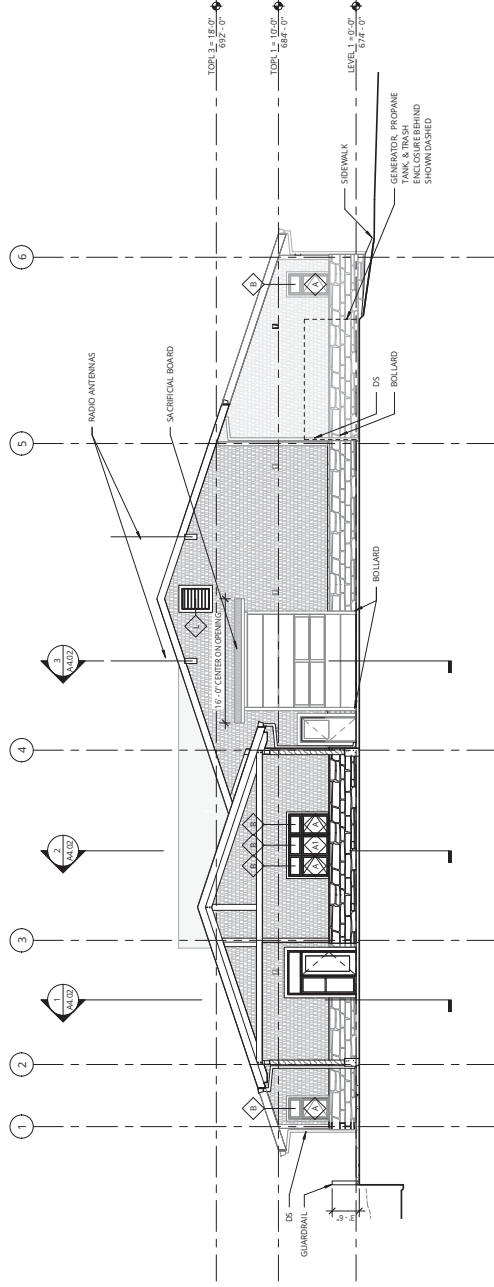
GENERAL NOTES - EXTERIOR ELEVATIONS

- EXTERIOR ELEVATIONS REFER TO SHEET A0.01 FOR "PROJECT NOTES" APPLICABLE TO ALL PORTIONS OF THE WORK (OR PROJECT DATUM) PERTAINING TO SET LEVEL (OR PROJECT DATUM).
- SEE SHEET A1.2.1 FOR WINDOW SCHEDULE.
- SEE SHEET A1.2.2 FOR DOOR SCHEDULE.
- SEE SHEET A1.2.3 FOR DOOR LOCATIONS AND TYPES.
- SEE ENLARGED ELEVATIONS AND WALL SECTIONS FOR ADDITIONAL EXTERIOR ENVELOPE DETAILS.

- MATERIALS LEGEND:**
- FIBER CEMENT SHINGLES SIDING
 - SMULATED STONE
 - EXPOSED TIMBER FRAMING
 - ASPHALT ROOF SHINGLES
 - EXTERIOR LIGHTING
 - DOWNPOUT



2 WEST ELEVATION
1/8" = 1'-0"



1 SOUTH ELEVATION
1/8" = 1'-0"

Ankrom Moisan
38 NW DAVIS ST., SUITE 300
PORTLAND, OR 97209
P 503.441.7149
1500 5TH AVE., SUITE 300
PORTLAND, OR 97201
T 503.576.1600
© ANKROM MOISAN ARCHITECTS, INC.



TV&R Station 55 - Rosemont
20790 Hidden Springs Rd
West Linn, OR 97068
Tualatin Valley Fire & Rescue

REVISION	DATE	REASON FOR ISSUE

S & W EXTERIOR ELEVATIONS

CONSTRUCTION SET

DATE	REVISION	SHEET NUMBER
06/16/17		160420
		A3.12

SCALE: As indicated

**Exhibit 2: Station 39 Architectural Review Submittal Plan Set
(under separate cover)**

Exhibit 3: Preliminary Stormwater Report (under separate cover)

Exhibit 4: Clean Water Service (CWS) Service Provider Letter

Sensitive Area Pre-Screening Site Assessment

1. Jurisdiction: Tualatin

2. Property Information (example 1S234AB01400)

Tax lot ID(s): 2S 113DD TL 1601

3. Owner Information

Name: Siobhan Kirk

Company: Tualatin Valley Fire & Rescue

Address: 11945 SW 70th Avenue

City, State, Zip: Tigard, OR 97223

Phone/Fax: 503-649-8577

E-Mail: _____

OR Site Address: Adjacent to 7100 SW McEwan

City, State, Zip: Tualatin, OR 97062

Nearest Cross Street: SW McEwan & Lower Boones Ferry Rd.

4. Development Activity (check all that apply)

- Addition to Single Family Residence (rooms, deck, garage)
 Lot Line Adjustment Minor Land Partition
 Residential Condominium Commercial Condominium
 Residential Subdivision Commercial Subdivision
 Single Lot Commercial Multi Lot Commercial
 Other New fire station

5. Applicant Information

Name: Frank Angelo

Company: Angelo Planning Group

Address: 921 SW Washington Ave. Suite 468

City, State, Zip: Portland, OR 97205

Phone/Fax: 503-649-8577

E-Mail: fangelo@angeloplanning.com

6. Will the project involve any off-site work? Yes No Unknown

Location and description of off-site work _____

7. Additional comments or information that may be needed to understand your project Site plan and tax map are attached.

This application does NOT replace Grading and Erosion Control Permits, Connection Permits, Building Permits, Site Development Permits, DEQ 1200-C Permit or other permits as issued by the Department of Environmental Quality, Department of State Lands and/or Department of the Army COE. All required permits and approvals must be obtained and completed under applicable local, state, and federal law.

By signing this form, the Owner or Owner's authorized agent or representative, acknowledges and agrees that employees of Clean Water Services have authority to enter the project site at all reasonable times for the purpose of inspecting project site conditions and gathering information related to the project site. I certify that I am familiar with the information contained in this document, and to the best of my knowledge and belief, this information is true, complete, and accurate.

Print/Type Name Frank Angelo

Print/Type Title Principal

Signature _____

Date Oct. 18, 2017

FOR DISTRICT USE ONLY

Sensitive areas potentially exist on site or within 200' of the site. **THE APPLICANT MUST PERFORM A SITE ASSESSMENT PRIOR TO ISSUANCE OF A SERVICE PROVIDER LETTER.** If Sensitive Areas exist on the site or within 200 feet on adjacent properties, a Natural Resources Assessment Report may also be required.

Based on review of the submitted materials and best available information Sensitive areas do not appear to exist on site or within 200' of the site. This Sensitive Area Pre-Screening Site Assessment does NOT eliminate the need to evaluate and protect water quality sensitive areas if they are subsequently discovered. This document will serve as your Service Provider letter as required by Resolution and Order 17-05, Section 3.02.1. All required permits and approvals must be obtained and completed under applicable local, State, and federal law.

Based on review of the submitted materials and best available information the above referenced project will not significantly impact the existing or potentially sensitive area(s) found near the site. This Sensitive Area Pre-Screening Site Assessment does NOT eliminate the need to evaluate and protect additional water quality sensitive areas if they are subsequently discovered. This document will serve as your Service Provider letter as required by Resolution and Order 17-05, Section 3.02.1. All required permits and approvals must be obtained and completed under applicable local, state and federal law.

This Service Provider Letter is not valid unless _____ CWS approved site plan(s) are attached.

The proposed activity does not meet the definition of development or the lot was platted after 9/9/95 ORS 92.040(2). NO SITE ASSESSMENT OR SERVICE PROVIDER LETTER IS REQUIRED.

Reviewed by Chuck Marshall

Date 10/31/17

Once complete, email to: SPLReview@cleanwaterservices.org • Fax: (503) 681-4439

OR mail to: SPL Review, Clean Water Services, 2550 SW Hillsboro Highway, Hillsboro, Oregon 97123

SE 1/4 SE 1/4 SECTION 13 T2S R1W W.M.

WASHINGTON COUNTY OREGON

SCALE 1"=100'

2S | 13DD

KENNY STREET

CANCELLED TAX LOTS
300, 1900-01

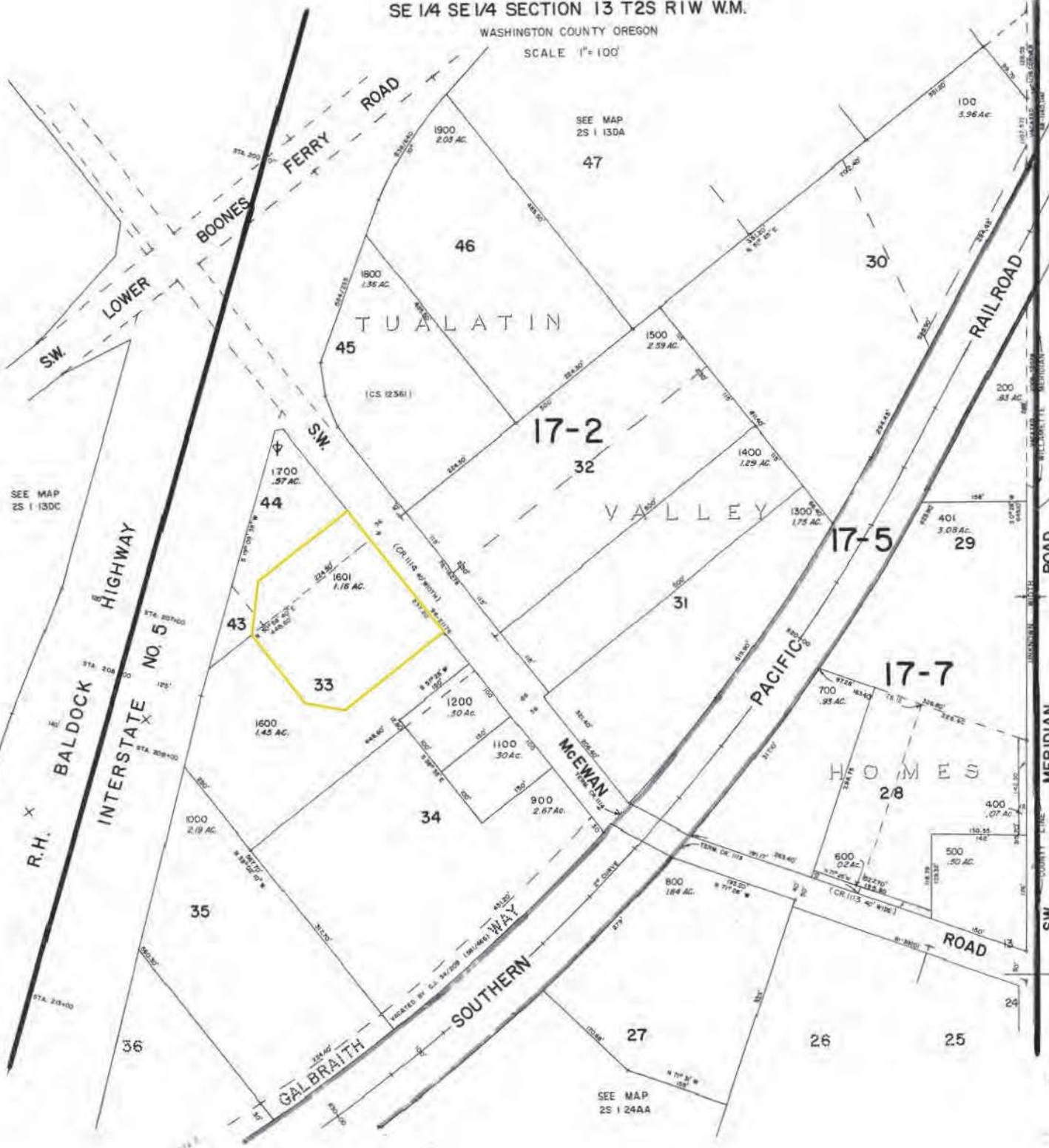
COUNTY

LAKEVIEW BOULEVARD

EDGEWOOD STREET

CLACKAMAS

LAKE OSWEGO
TUALATIN
2S | 13DD



SEE MAP
2S | 13DC

INTERSTATE
NO. 5

BALDOCK
HIGHWAY

BOONES
FERRY
ROAD

GALBRAITH
WAY

MC EWAN
WAY

PACIFIC
RAILROAD

TUALATIN
VALLEY

HOMES

SEE MAP
2S | 13DA

FOR ASSESSMENT
PURPOSES ONLY
DO NOT RELY ON
FOR ANY OTHER USE

SEE MAP
2S | 24AA

5-5-01

Exhibit 5: Washington County Assessor Map

SE 1/4 SE 1/4 SECTION 13 T2S R1W W.M.

WASHINGTON COUNTY OREGON

SCALE 1"=100'

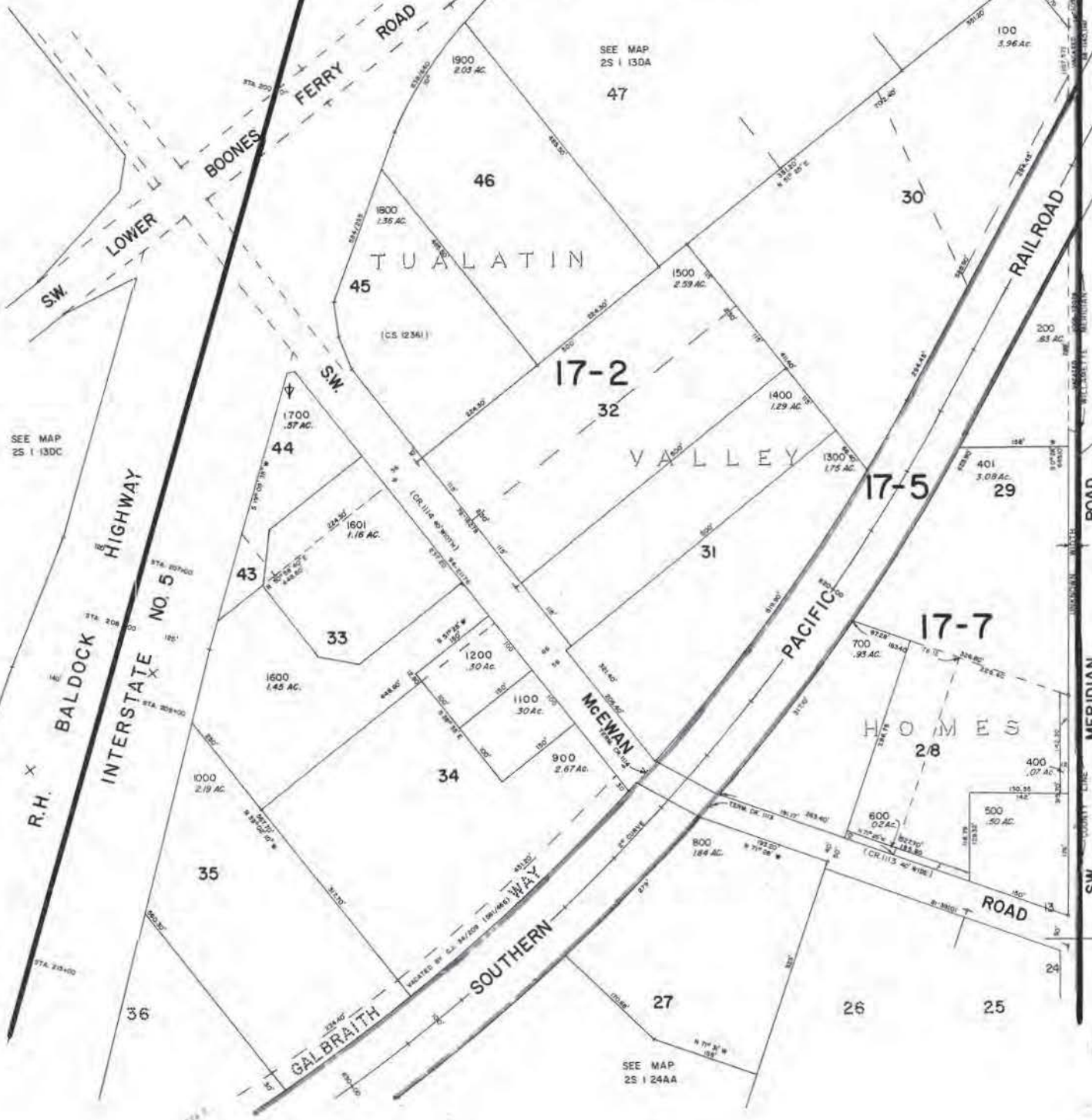
2S | 13DD

KENNY STREET

COUNTY

CLACKAMAS

LAKE OSWEGO
TUALATIN
2S | 13DD



SEE MAP 2S | 13DC

SEE MAP 2S | 13DA

SEE MAP 2S | 24AA

FOR ASSESSMENT PURPOSES ONLY DO NOT RELY ON FOR ANY OTHER USE

CANCELLED TAX LOT 300,190-01

R.H. BALDOCK

INTERSTATE NO. 5

GALBRAITH ROAD

SOUTHERN ROAD

MC EWAN ROAD

PACIFIC RAILROAD

ROAD

EDGEWOOD STREET

LAKEVIEW BOULEVARD

SW LOWER

SW

SW

ROAD

RAILROAD

BOONES FERRY ROAD

TUALATIN VALLEY

VALLEY

HOMES

BALDOCK HIGHWAY

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

SW

Exhibit 6: Neighborhood/Developer Meeting Notice and Materials

**NEIGHBORHOOD/DEVELOPER MEETING
AFFIDAVIT OF MAILING**

STATE OF OREGON)
) SS
COUNTY OF WASHINGTON)

I, Clinton Possee, being first duly sworn, depose and say:

That on the 24 day of October, 2017, I served upon the persons shown on Exhibit "A," attached hereto and by this reference incorporated herein, a copy of the Notice of Neighborhood/Developer meeting marked Exhibit "B," attached hereto and by this reference incorporated herein, by mailing to them a true and correct copy of the original hereof. I further certify that the addresses shown on said Exhibit "A" are their regular addresses as determined from the books and records of the Washington County and/or Clackamas County Departments of Assessment and Taxation Tax Rolls, and that said envelopes were placed in the United States Mail with postage fully prepared thereon.



Signature

SUBSCRIBED AND SWORN to before me this 29th day of November, 2017.





Notary Public for Oregon
My commission expires:

RE: TVF + B Station 39



Dear Resident/Property Owner,

Tualatin Valley Fire & Rescue (TVF&R) is proposing to develop a new fire station (Station 39) on SW McEwan Road south of SW Boones Ferry Road. The new station will be approximately 7,500 square feet and include a 600-square foot community room. The building will house the station's firefighters and have an interior two-space parking bay for fire trucks and necessary emergency apparatus. Station 39 will include 24-hour staffing starting with 4 persons per shift and ultimately growing to 6-person shifts.

The 1.16-acre site is within the City of Tualatin's Light Manufacturing Planning District (ML). New fire stations are permitted in the ML Planning District through a Conditional Use Permit and Architectural Review. The Conditional Use will require submittal of an application to the City for review and approval by the City Council. A pre-application conference was held for the project on September 20, 2017. Following Conditional Use review an Architectural Review application will be submitted for construction of the new station. This application will be reviewed by staff.

As specific engineering and site plans are being prepared and before submitting the application for the necessary reviews and approvals, we would like to discuss the proposal with the surrounding property owners and residents. In accordance with City requirements, we are conducting a Neighborhood Meeting on the following date and at the following location:

Tuesday, November 7th, 2017

6:00 – 7:00 pm

Juanita Pohl Center

8513 SW Tualatin Road

Tualatin, Oregon 97062

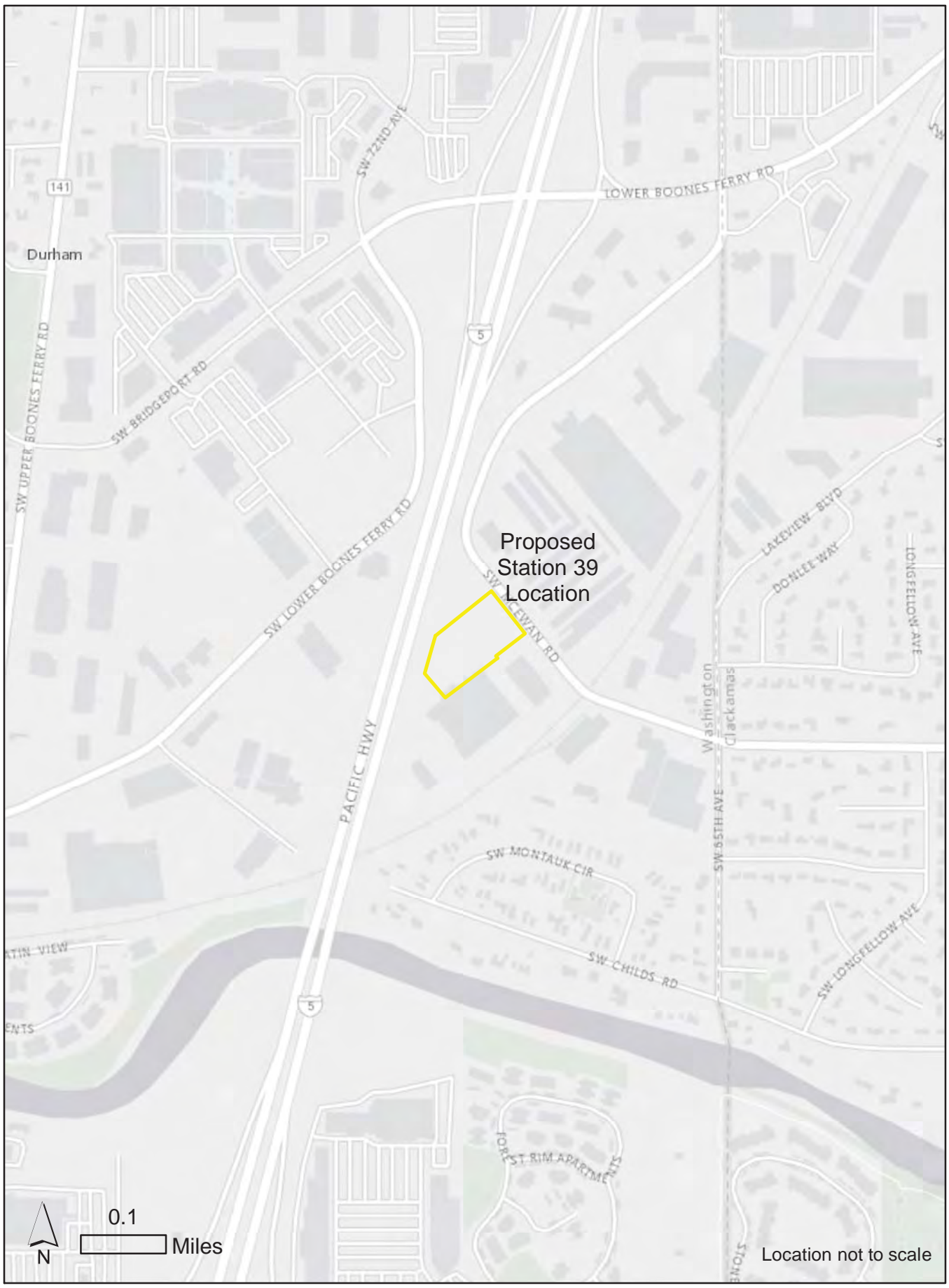
We look forward to discussing the proposal with you. Please feel free to contact the project's development application representative, at 503-227-3664 or fangelo@angeloplanning.com if you have any questions.

Sincerely,

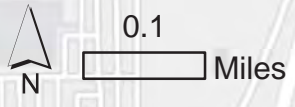
A handwritten signature in black ink, appearing to read 'Frank Angelo'.

Frank Angelo, Principal

Attachment: Vicinity/Location Map



Proposed
Station 39
Location



Location not to scale

NEIGHBORHOOD / DEVELOPER MEETING
CERTIFICATION OF SIGN POSTING

<p>NOTICE</p> <p>NEIGHBORHOOD / DEVELOPER MEETING</p> <p>__/__/2010 __:__.m.</p> <p>SW _____</p> <p>503-____-____</p>	18"
24"	

In addition to the requirements of TDC 31.064(2) quoted earlier in the packet, the 18" x 24" sign that the applicant provides must display the meeting date, time, and address and a contact phone number. The block around the word "NOTICE" must remain **orange** composed of the **RGB color values Red 254, Green 127, and Blue 0**. Additionally, the potential applicant must provide a flier (or flyer) box on or near the sign and fill the box with brochures reiterating the meeting info and summarizing info about the potential project, including mention of anticipated land use application(s). Staff has a Microsoft PowerPoint 2007 template of this sign design available through the Planning Division homepage at < www.tualatinoregon.gov/planning/land-use-application-sign-templates >.

As the applicant for the TVE+R Station 39 project, I hereby certify that on this day, October 24, 2017 sign(s) was/were posted on the subject property in accordance with the requirements of the Tualatin Development Code and the Community Development Department - Planning Division.

Applicant's Name: Clinton Daxsee, Angela Planning Group
(PLEASE PRINT)

Applicant's Signature: [Signature]

Date: 11/29/17

TVF&R Station 39 Neighborhood/Developer Meeting Notice Sign posted on site.





MEMORANDUM

TVF&R Station 39 Neighborhood Meeting Notes

DATE November 9, 2017
TO Project Team
FROM Frank Angelo, APG
CC

The Station 39 Neighborhood Meeting for the land use application was held on Tuesday, November 7, 2017 at the Juanita Pohl Center, 8513 SW Tualatin Road, Tualatin, Oregon 97062. The meeting Agenda, Sign-in Sheet and Illustrations presented at the meeting are attached to this meeting summary.

Project team attendance:

- TVF&R: Assistant Chief Havener, Siobhan Kirk
- APG: Frank Angelo
- Ankrom Moisan Architects: Michael Bonn
- AKS: Bruce Baldwin
- Lancaster Engineering: Todd Mobley

City of Tualatin Staff in attendance:

- Charles Benson, Planner

Frank Angelo introduced the Neighborhood Meeting and turned it over to Assistant Chief Havener to introduce the project and discuss the site selection, project funding and station operations.

Frank Angelo reviewed the land use application process and schedule for application submittal, noting the following.

- Tonight's meeting is a part of the city's land use application process. We are preparing a Conditional Use first, then an Architectural Review 2 land use application to demonstrate how the project complies with the City's CU Review Criteria.
- The Conditional Use application will address the use of the property and be presented at a City Council public hearing.

- The second application will follow Conditional Use approval and will be the Architectural Review application.
- The AR application will demonstrate how the project meets the City's design requirements and standards.
- The AR application will be reviewed and approved by staff. The application does not require review/approval by the Planning Commission.
- We expect to file the Conditional Use application in November.
- You received direct notice of tonight's meeting because you are within 1000' of the project site. Following submittal of the CU application you will receive notice of the Planning Commission hearing date/time.

Michael Bonn, Ankrom Moisan Architects, reviewed the site plan and building design elements.

- Michael provided an overview of site design considerations and key features.
- Stepped through the site plan, access to the site, on-site circulation, stormwater treatment, and landscaping.
- Station 39 will be similar in design to Station 55 currently under construction in West Linn.
- Staffing will be 4 full-time staff (24-hour shifts) with room to expand to 6 full-time staff.
- Michael noted the 600 sf Community Room and its availability to the residents for meetings.

Questions from the audience:

1. Discuss the landscaping that will be provided.
2. Question regarding the location of the driveway to SW McEwen and its proximity to the existing cell tower.
3. Where is the station in relation to the Legacy Medical office?
4. Has the design considered flooding and debris flows from Scoggins Dam?
5. Where is this site in relation to the Lake Oswego Fire District boundary?
6. Is there an agreement (Mutual Aid Agreement) between TVF&R and LOFD?
7. Is the building being constructed to address emergency preparedness? Design will include seismic enhancements.
8. Will TVF&R assist with HazMat calls?

The meeting adjourned at 7:00pm.

Attachments: Meeting Agenda; Sign-In Sheet; Project Illustrations



**Tualatin Valley Fire & Rescue Station 39
Neighborhood / Developer Meeting
Tuesday, November 7th, 2017
6:00 – 7:00 pm
Juanita Pohl Center
8513 SW Tualatin Road
Tualatin, Oregon 97062**

Agenda

1. Welcome / Meeting Overview – Frank Angelo, Angelo Planning Group
2. Introduction from TVF&R – Assistant Chief Mark Havener
3. Land Use Application – Frank Angelo
4. Site Plan– Michael Bonn, Ankrom Moisan Architects
5. Audience Questions / Comments – All

TVF&R Station 39 Neighborhood Meeting

November 7, 2017

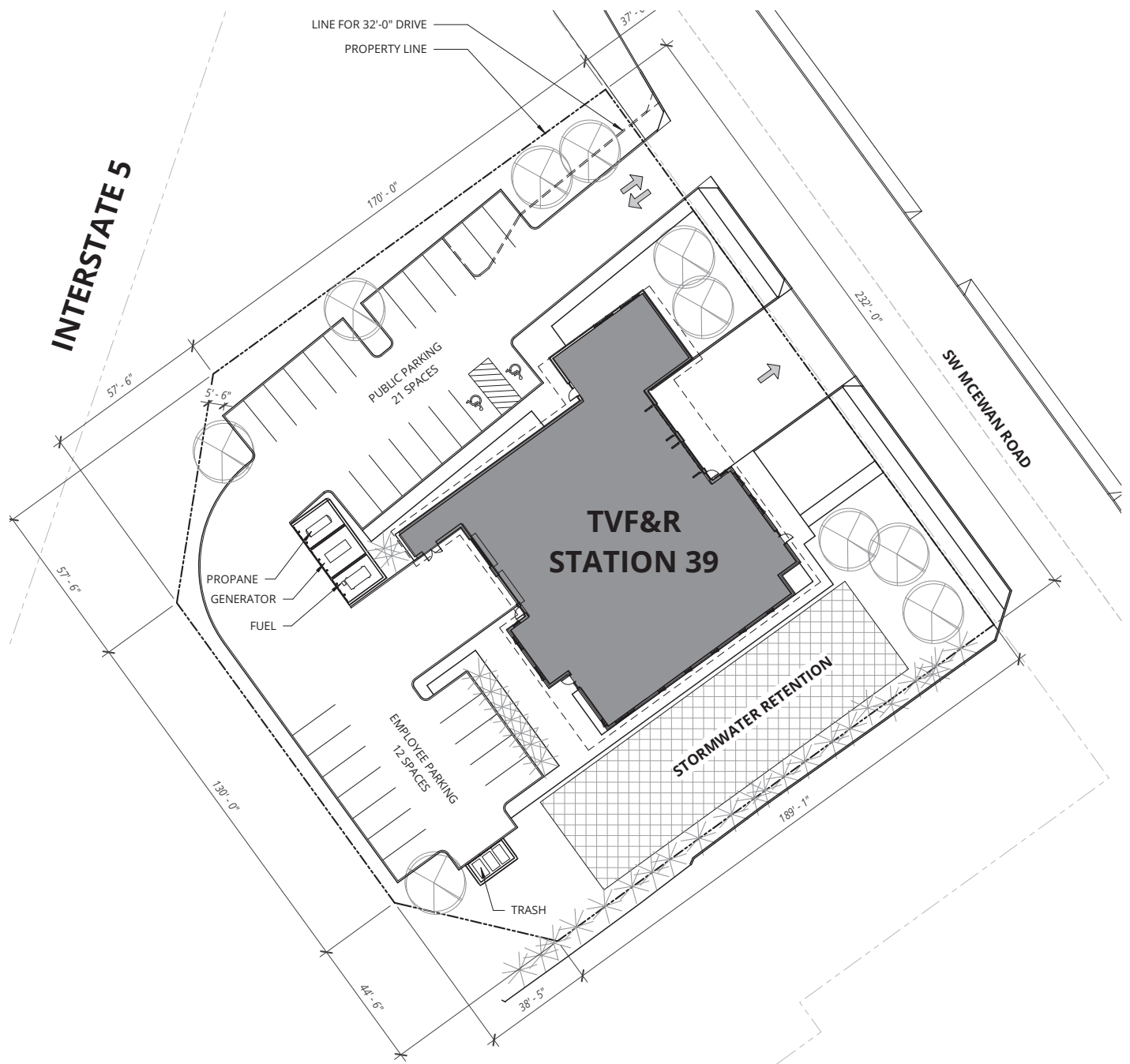
6:00 pm – 7:00 pm

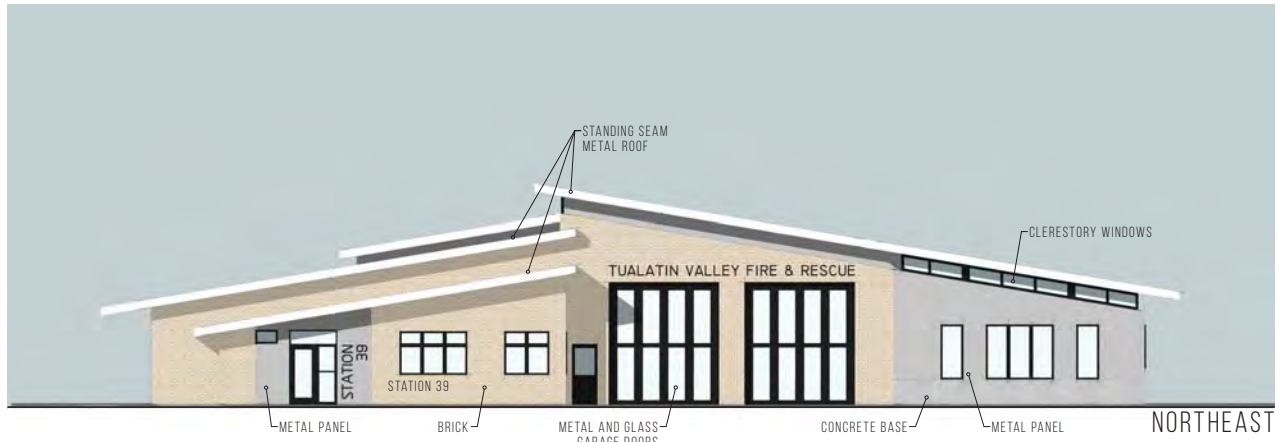
Juanita Pohl Center

8513 SW Tualatin Road

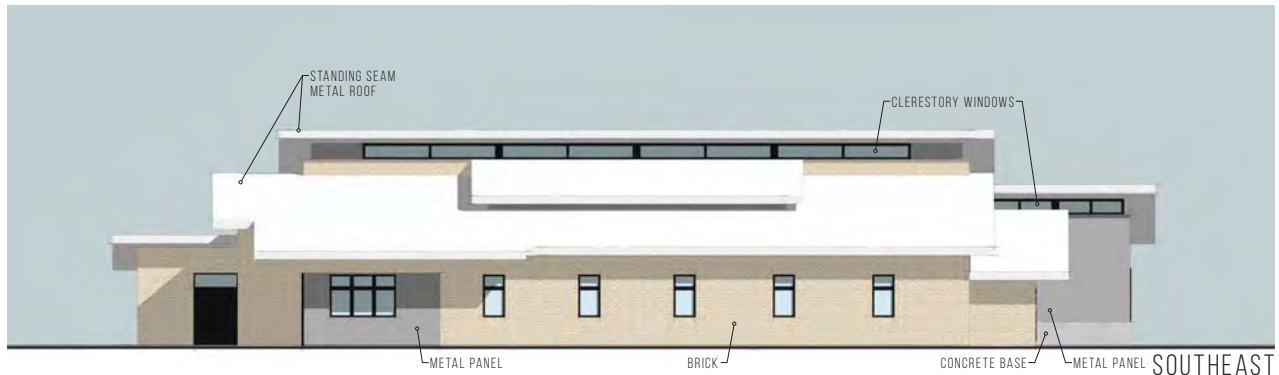
Tualatin, OR 97062

Name	Address	Email Address
Frank Angelo	921 SW Wash-It-Ste 468	fangelo@comploplanning.com
Bruce Baldwin	12965 SW HENMAN RD PDX 97235	Bruce@AKS-ENG.COM
TODD MORSEY	321 SW 4TH AVE # 400, PORTLAND	TODD@LANCASTERENGINEERING.COM
Shannon Marvin	1609 Bramble CT Newberg 97132	Shannon_Marvin@uhaul.com
Kim Merow	16219 22nd St. E Lake Tapps 98591	Kim-Merow@UHaul.com
MICHAEL BONN	17222 SW Green Heron Dr. 97140	Michaelb@amaa.com
CHARLES BENSON	18880 SW MARTINAZZI 97062	cbenson@tualatin.gov
LARRY SILVER - BURNS	18010 SW McEwan RD 97035	
"	Mail to 5400 SW GARDEN HOME RD PDX 97219	lsilver@comcast.net
Ward Havenon	TVF&R	
Sherryn Kirk	TVF&R	sherrypatt@comcast.net
Sherryn Patterson	Lake Grove Fire District #57, Lake Oswego	
ALLEN PATTERSON	"	allen@capacitycommercial.com

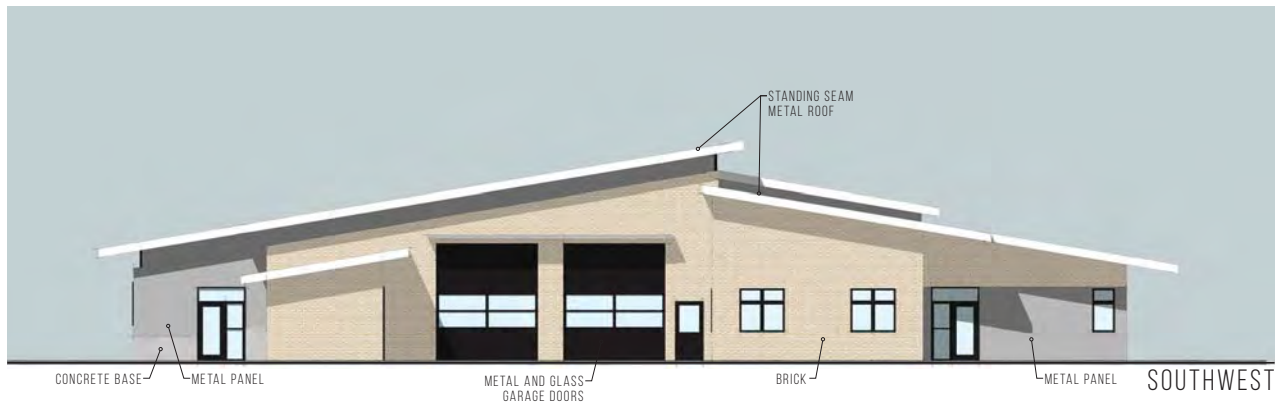




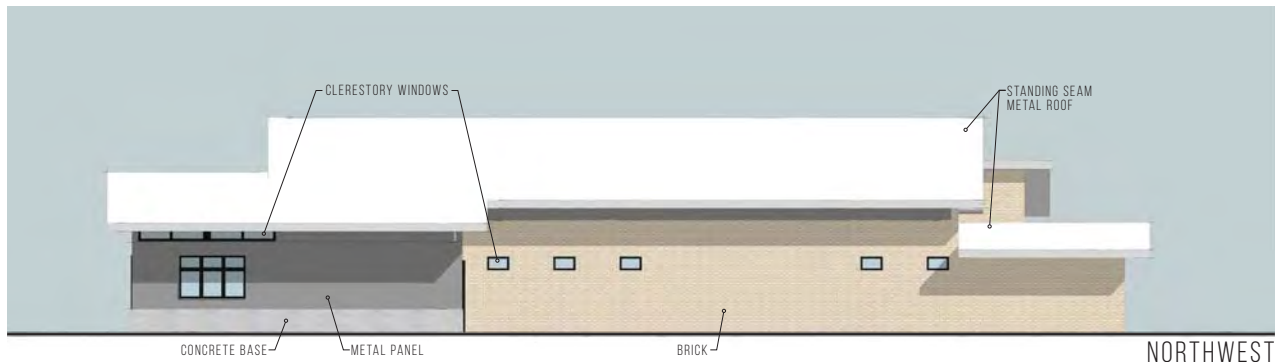
NORTHEAST



SOUTHEAST



SOUTHWEST



NORTHWEST

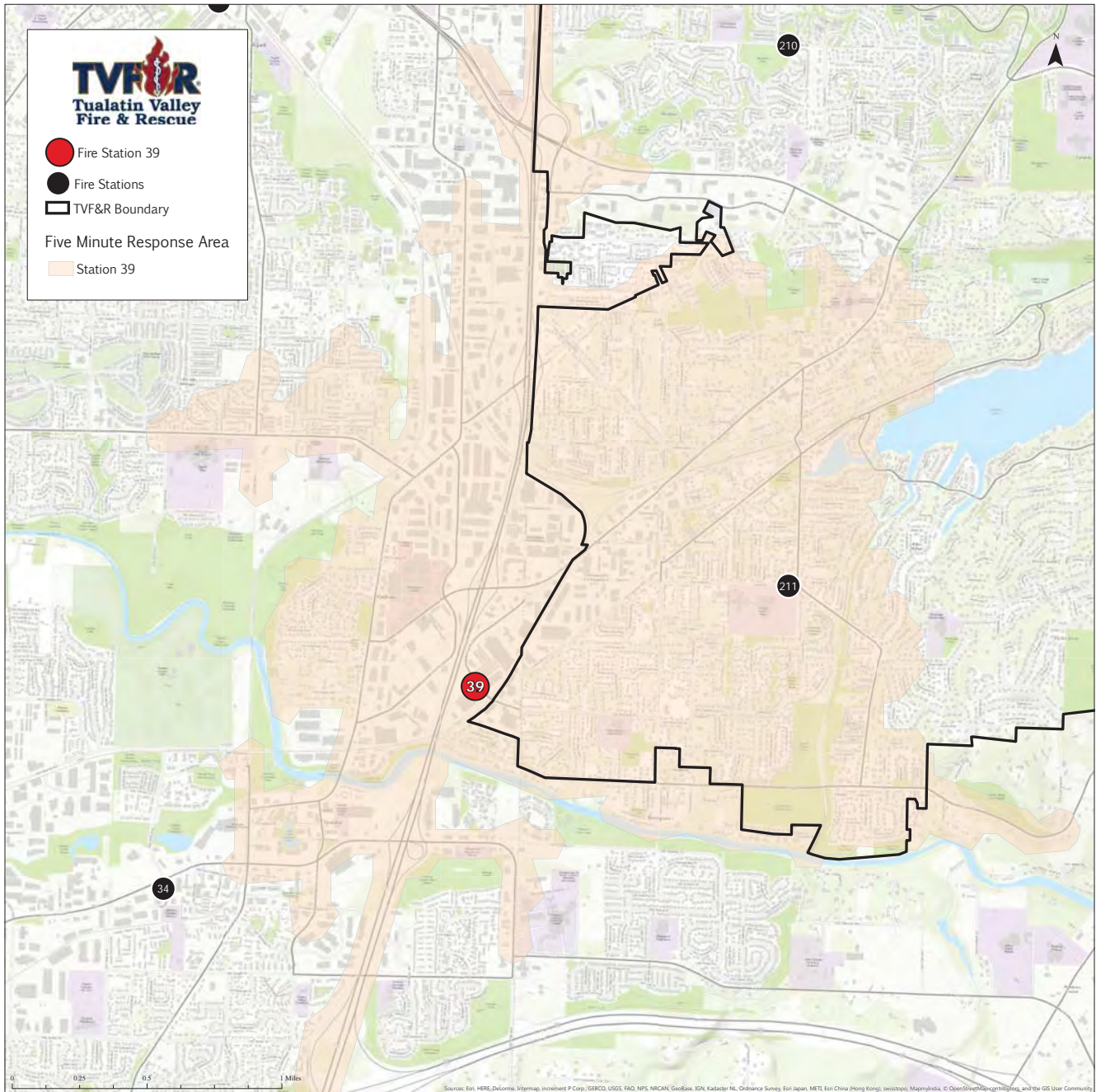


Exhibit 7: Traffic Impact Study (under separate cover)

Exhibit 8: City of Tualatin Notice of Adoption (Resolution No. 5358-18)



City of Tualatin

www.tualatinoregon.gov

NOTICE OF ADOPTION

On April 23, 2018, the City of Tualatin adopted **Resolution No. 5358-18** (File No. CUP-17-0002) granting a **Conditional Use Permit** for a fire station use (Station 39) operated by Tualatin Valley Fire & Rescue (TVF & R) for the property adjacent to 7100 SW McEwan Rd (Tax Map 2S1 13DD, Tax Lot 1601.

A copy of the resolution is attached. A copy of the resolution is also available for review at the Tualatin Community Development Department–Planning Division located at 18880 SW Martinazzi Avenue from 8:00 a.m. to 5:00 p.m., Monday through Friday.

Appeal of land use decisions is commenced by filing a Notice of Intent to Appeal with the Land Use Board of Appeals as provided in ORS 197.830 to 197.845. The notice of intent to appeal a land use decision must be filed no later than 21 days after the date of the decision that is sought to be reviewed becomes final.

Date notice mailed: May 1st, 2018

file: CUP-17-0002

cc: Frank Angelo, Angelo Planning Group, applicant
Tualatin Valley Fire and Rescue, Siobhan Kirk, property owner

RESOLUTION NO. 5358-18

A RESOLUTION GRANTING A CONDITIONAL USE PERMIT WITH CONDITIONS FOR FIRE STATION USE IN THE LIGHT MANUFACTURING (ML) PLANNING DISTRICT ON LAND ADJACENT TO 7100 SW MCEWAN ROAD (TAX MAP 2S1 13DD, TAX LOT 1601) (CUP-17-0002).

WHEREAS, Tualatin Valley Fire & Rescue (TVF&R) submitted an application with the City for a conditional use permit, for property located adjacent to 7100 SW McEwen Road, Tualatin, Oregon, 97062 (Tax Map 2S1 13DD, Tax Lot 1601);

WHEREAS, the Council held a quasi-judicial public hearing on April 9, 2018 to consider the application;

WHEREAS, notice of public hearing was given as required by the Tualatin Development Code 31.064;

WHEREAS, the Council heard and considered the testimony and evidence presented on behalf of the applicant, the City staff, and those appearing at the public hearing; and

WHEREAS, after the conclusion of the public hearing the Council voted to approve the application (with conditions).

BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF TUALATIN, OREGON, that:

Section 1. Findings. The Council adopts the findings which are attached as Exhibit A, and incorporated by reference.

Section 2. Conditions. The Conditional Use Permit (CUP-17-0002) for Tualatin Valley Fire & Rescue (TVF&R), which is attached as Exhibit B and incorporated by reference, is approved with the following conditions:

A. The approval of Conditional Use Permit 17-0002 does not approve any site redevelopment or exterior building modifications, and the applicant shall obtain approval from the City for any site or exterior modifications, pursuant to TDC 73.040(1) and TDC 73.100(1) and (2).

B. The applicant shall operate the use consistent with all application materials submitted to the City dated December 2017 (City stamp reads December 8, 2017).

C. The applicant shall comply with the noise standards in TDC 60.085.

D. The applicant shall—separately from the CUP—submit any sign permit applications pursuant to and in compliance with TDC Chapter 38.

E. The approval period shall be pursuant to TDC 32.090 Automatic Termination of Conditional Use as reproduced:

- (1) Unless otherwise provided by the Council in the resolution granting approval of the conditional use permit, a conditional use permit shall automatically become null and void two years after the effective date upon which it was granted unless one of the following events occur:
 - (a) The applicant or his successor in interest has secured a building permit within said two-year period, if a building permit is required, and has actually commenced construction of the building or structure authorized by the permit within said two-year period.
 - (b) The applicant or his successor in interest has commenced the activity or installation of the facility or structure authorized by the conditional use permit within said two-year period.
- (2) The applicant may submit a written request to the City Council for an extension of time on the conditional use permit to avoid the permit's becoming null and void. The request for extension must be submitted prior to the expiration of the times established by Subsection (1) above. The City Council may, in the resolution granting such conditional use permit, provide for an extension of time beyond 1 year.

F. The applicant shall comply with all applicable TDC policies and regulations.

Section 3. This resolution is effective upon adoption.

Adopted by the City Council this 23rd day of April, 2018.

CITY OF TUALATIN, OREGON

BY 

Mayor

APPROVED AS TO FORM:

BY 

City Attorney

ATTEST:

BY 

City Recorder

Exhibit A to
Resolution No. 5358-18

TVF&R USE FOR NEW FIRE STATION 39

CONDITIONAL USE PERMIT APPLICATION (CUP-17-0002)

ANALYSIS AND FINDINGS

The issue before the City Council is consideration of a conditional use permit for a fire station use (Station 39) operated by Tualatin Valley Fire & Rescue (TVF&R) adjacent to 7100 SW McEwan Road (Tax Map 2S1 13DD, Tax Lot 1601).

In order to grant the proposed Conditional Use Permit, the request must meet the approval criteria of Tualatin Development Code (TDC) Section 32.030. The applicant prepared a narrative that addresses the criteria, which is within the application materials (Attachment B), and staff has reviewed this and other application materials and included pertinent excerpts below.

The following materials and descriptions are based largely on the applicant's narrative; staff has made some minor edits. Staff comments, findings, and conditions of approval are in italic font.

(1) The use is listed as a conditional use in the underlying planning district.

Applicant Response: Station 39 is located in the ML zoning district. As noted in TDC Section 60.040(1)(f), a Fire Station is permitted in the ML zone as a Conditional Use.

Staff finds that Criterion 1 is met.

(2) The characteristics of the site are suitable for the proposed use, considering size, shape, location, topography, existence of improvements, and natural features.

Applicant Response:

Size: The site characteristics are compatible with other TVF&R stations throughout the District. The site size (1.16 acres) is consistent with comparable TVF&R stations and can accommodate the building program for Station 39.

Staff finds that the site size is suitable for the use.

Shape: *The applicant did not provide a response specific to the shape of the property. The site is generally rectangular. The applicant has provided a conceptual site plans to show that the proposed use could be accommodated on the property.*

Location: TVF&R has identified the location as an appropriate location to meet required service response standards and needs of the District. It's location near Interstate 5 will provide quick response to incidents on the freeway as well as quick emergency response to the surrounding community. TVF&R's Station 34 is located in the City of Tualatin but is on the westside of Interstate 5 just off Tualatin Sherwood Road (19365 SW 90th Court). Station 39's location on the eastside of Interstate 5 will significantly enhance response times for emergency services, making this location very suitable for the proposed use.

Staff finds that the location is suitable for the use. The property is located in an industrial area and surrounded by a storage facility and medical office uses, which are compatible with the proposed fire station use.

Exhibit A to
Resolution No. 5358-18

Topography: There are no topographic or natural features on the site that will impact construction of the Station 39.

Staff finds that the topography is suitable for the proposed use.

Improvements: *The applicant did not provide a response to the existing improvements on the site. The project site is a park-like green space within property that was formerly part of the U-Haul site and is surrounded on three sides by the remaining U-Haul business. The site features all utilities in the fully improved street that fronts the project site. Staff finds that the improvements on the site are appropriate for the proposed use.*

Natural Features: There are no topographic or natural features on the site that will impact construction of the Station 39.

Staff finds that—with the exception of on-site landscaping that includes trees and taller shrubs—there are no natural features on the subject site and the proposed use will not affect natural features.

As noted, the Conditional Use Permit does not authorize any construction and only analyzes the use on the site. No construction or site modifications are directly resulting from this permit. It is understood that approval of this Conditional Use Permit does not approve any site redevelopment or exterior building designs, and that after Conditional Use Permit approval is obtained, the applicant will seek approval from the City pursuant to TDC 73.040(1) and TDC 73.100 (1) and (2) for Architectural Review.

Staff finds that the following condition of approval is required to meet Criterion 2:

Condition of Approval No. 1: The approval of Conditional Use Permit 17-0002 does not approve any site redevelopment or exterior building modifications, and the applicant shall obtain approval from the City for any site or exterior designs, pursuant to TDC 73.040(1) and TDC 73.100(1) and (2).

(3) The proposed development is timely, considering the adequacy of transportation systems, public facilities, and services existing or planned for the area affected by the use.

Applicant Response:

Transportation Systems

The construction of the proposed Station 39 is funded through General Fund and a Local Option Levy approved by District voters in 2014 to upgrade and improve the safety and operations of TVF&R's fire stations. TVF&R identified the need for a station in this location to ensure quick response times in the future as development continues in Tualatin, Lake Oswego, and Tigard. Public services are immediately available to the site. As noted in the Traffic Impact Analysis submitted with this application, Station 39 traffic will not adversely impact the existing transportation system. The analysis notes that Station 39 will generate a small number of daily trips that can easily be accommodated on the transportation system.

Access to the subject site will be from SW McEwan which is generally improved and appropriate for the use, though additional improvements may be required during the Architectural Review phase. .

Off-Street Parking

The applicant did not address parking specifically. Section 73.370 of the TDC explains how many spaces are required for specific uses. A Fire Station use is not listed. In the event that a use is not listed,

Exhibit A to Resolution No. 5358-18

subsection 1.g explains that the Community Development Director will compare the use to other uses to determine the appropriate number of parking spaces needed. Again, the intent of this evaluation is to determine the appropriateness of the site for the proposed conditional use, a fire station; actual review of the spaces will be determined with the Architectural Review. The applicant has provided a conceptual site plan that shows parking that has been designed similar to the needs of other fire stations in the TVF&R system. The site plan suffices, for the purposes of a CUP, to demonstrate the site is suitable. Staff finds that the off-street parking conditions are suitable for the proposed use.

Public Facilities and Services

The applicant did not specifically address the public facilities available at the site. Through evaluation with the City engineering staff, it has been determined that the site has full utilities available in the fronting street except storm water. The conceptual site plan includes a detention basin for purposes of storm water, thus illustrating that the site is suitable for the use. Staff finds that the existing and proposed public facilities and services are adequate to service the proposed use.

Staff finds that Criterion 3 is met.

- (4) **The proposed use will not alter the character of the surrounding area in any manner, which substantially limits, impairs, or precludes the use of surrounding properties for the primary uses listed in the underlying Planning District.**

Applicant Response: The location of Station 39 will allow uses on the property immediately adjacent to Station 39 to continue operating and will not limit or preclude the use of surrounding property. As can be seen on the attached Station 39 site plan, TVF&R will take direct access to SW McEwan Road and will not impede or conflict with access to surrounding properties. The Traffic Impact Analysis submitted with this application indicates that Station 39 traffic will not adversely impact the existing transportation system. The analysis notes that Station 39 will generate a small number of daily trips that can easily be accommodated on the transportation system.

The site plan also notes how stormwater will be accommodated on-site and in a manner that will not impact adjacent properties. As well landscaping provided with the project will create a visual buffer between Station 39 and adjacent properties.

The emergency services use is not out of character with surrounding land uses in the ML zone. Medical offices are located across SW McEwan from Station 39. As can be seen from the building elevations submitted with this application Station 39 will be an appropriate design and will not be out of character with existing industrial and office buildings on surrounding properties.

The use (fire station) being proposed for Conditional Use approval will not alter the character of the surrounding area in any manner that substantially limits, impairs, or precludes the use of surrounding properties for the primary uses listed in the underlying planning district (Light Manufacturing - ML). The new station will be constructed on a legal tax lot (2S1 13 DD TL 1601) – see Exhibit 5 in the Application Appendix. As noted, existing properties in the surrounding area are a mix of industrial, office and vehicle storage. A fire station as a use is compatible with these types of uses from an operational and design perspective.

In response to staff comments, the applicant understands their concern that the physical nature of the new tax lot may raise issues about the use of the adjacent northern triangle of the U-Haul property. The use of the northern triangle for the cell tower will not be impacted, but there will be reduced parking. However, the parking issue is being addressed separately through the land acquisition and

Exhibit A to
Resolution No. 5358-18

compensation process the District has followed to secure the property and would be present whether or not a new fire station was constructed on Tax Lot 1601. The parcel could remain vacant and fenced and the concerns staff has expressed would remain. Staff concerns about the new parcel potentially impeding use of the northern parking area is not a use compatibility issue, which is the intent of the Conditional Use review and the focus of the decision criteria. The concern that's raised would exist regardless of the use proposed or if the District was proposing nothing at all on their property.

Staff notes that the proposed use would not alter the overall character of the immediate area defined by the properties abutting the site. In looking at the design of the station, as shown in the materials submitted for the CUP, it would seem that the station would eliminate several parking spaces from the existing conditions enjoyed by U-Haul. However, it is important to understand that the loss of the spaces was the result of the condemnation of the property, not the conditional use permit.

Staff finds that Criterion 4 is met.

- (5) **The proposal will satisfy those objectives and policies of the Tualatin Community Plan which apply to the proposed use.**

The Tualatin Community Plan, which is the City comprehensive plan, is integrated within the Tualatin Development Code (TDC) as Chapters 1-30. Based on discussions with City of Tualatin staff, the following two sections of the TDC are applicable to the proposed use:

A. Section 7.040 Manufacturing Planning District Objectives.

This section describes the purpose of each manufacturing planning district.

(2) Light Manufacturing Planning District (ML)

(a) Suitable for warehousing, wholesaling and light manufacturing processes that are not hazardous and that do not create undue amounts of noise, dust, odor, vibration, or smoke. Also suitable, with appropriate restrictions, are the retail sale of products not allowed for sale in General Commercial areas, subject to the Special Commercial Setback from arterial streets and Commercial Services Overlay as generally illustrated in Map 9-5 and specifically set forth in TDC 60.035, and office commercial uses where any portion of a legally created lot is within 60 feet of a CO Planning District boundary. Also suitable is the retail sale of products manufactured, assembled, packaged or wholesaled on the site provided the retail sale area, including the showroom area, is no more than 5% of the gross floor area of the building not to exceed 1,500 square feet. Also suitable for the retail sale of home improvement materials and supplies provided it is not greater than 60,000 square feet of gross floor area per building or business and subject to the Special Commercial Setback from arterial streets as generally illustrated in Map 9-5 and specifically set forth in TDC 60.035. Rail access and screened open storage allowed in these areas will conform to defined architectural, landscape and environmental design standards.

B. Chapter 60: Light Manufacturing Planning District (ML)

Section 60.010 Purpose.

Exhibit A to Resolution No. 5358-18

The purpose of this district is to provide areas of the City that are suitable for industrial uses and compatible with adjacent commercial and residential uses. The district serves to buffer heavy manufacturing uses from commercial and residential areas. The district is suitable for warehousing, wholesaling, and light manufacturing processes that are not hazardous and do not create undue amounts of noise, dust, odor, vibration, or smoke. The district is also suitable for retail sale of products manufactured, assembled, packaged or wholesaled on the site provided the retail sale area, including the showroom area, is no more than 5% of the gross floor area of the building not to exceed 1,500 square feet and, with appropriate restrictions, for retail sale of products not allowed for sale in General Commercial Planning Districts, and office commercial uses where any portion of a legally created lot is within 60 feet of a CO Planning District boundary. Railroad access and screened outdoor storage will be allowed in this district, conforming to defined architectural, landscape, and environmental design standards. In accordance with the Industrial Business Park Overlay District, TDC Chapter 69, and TDC 60.037-60.038 selected small-scale mixed uses that are supportive of and secondary to industrial uses are allowed to provide services to businesses and employees. The purpose is also to allow certain commercial service uses in the Commercial Services Overlay shown in the specific areas illustrated on Map 9-5 and selected commercial uses subject to distance restrictions from residential areas and subject to the Special Commercial Setback from arterial streets as generally illustrated in Map 9-5 and specifically set forth in TDC 60.035.

Locating TVF&R Station 39 in the ML district is appropriate. As noted in TDC Section 60.040(1)(f), a Fire Station is permitted in the ML zone as a Conditional Use. The use is not hazardous and will not create undue amounts of noise, dust, odor, vibration, or smoke. Any noise generated will be limited. Station 39 will not require sirens to sound at or near the site. Fire personnel are not required to sound sirens when leaving the station, the lights on the apparatus normally are sufficient to stop traffic. The only time the fire apparatus operators would be required to use their sirens would be when they pass through a traffic signal. Regardless, there are no noise sensitive uses near the site.

The City's comprehensive plan is designed to promote public health, safety, and welfare. Providing opportunities for emergency services to operate within the City is a critical aspect of community health, safety, and welfare. As noted earlier, locating Station 39 at this site will allow TVF&R to achieve their emergency services response times. As well, the Traffic Impact Analysis submitted with this application indicates that Station 39 traffic will not adversely impact the existing transportation system. The analysis notes that Station 39 will generate a small number of daily trips that can easily be accommodated on the transportation system.

Staff additionally finds that Section 32.030 Criteria for Conditional uses applies. The purpose for this section states:

The City Council may allow a conditional use, after a hearing conducted pursuant to TDC 32.070, provided that the applicant provides evidence substantiating that all the requirements of this Code relative to the proposed use are satisfied.

The Analysis and Findings included in this document address the five (5) identified criteria listed in Section 32.030 to aid in the City Council decision on whether or not a proposed conditional use meets applicable TDC requirements.

Exhibit A to
Resolution No. 5358-18

Staff finds that the following conditions of approval are required to meet Criterion 5:

Condition of Approval No. 2: *The applicant shall operate the use consistent with all application materials submitted to the City dated December 2017 (City stamp reads December 8, 2017).*

Condition of Approval No. 3: *The applicant shall comply with the noise standards in TDC 60.085.*

Condition of Approval No. 4: *The applicant shall—separately from the CUP—submit any sign permit applications pursuant to and in compliance with TDC Chapter 38.*

Condition of Approval No. 5: *The approval period shall be pursuant to TDC 32.090 Automatic Termination of Conditional Use as reproduced:*

- (1) *Unless otherwise provided by the Council in the resolution granting approval of the conditional use permit, a conditional use permit shall automatically become null and void two years after the effective date upon which it was granted unless one of the following events occur:*
 - (a) *The applicant or his successor in interest has secured a building permit within said two-year period, if a building permit is required, and has actually commenced construction of the building or structure authorized by the permit within said two-year period.*
 - (b) *The applicant or his successor in interest has commenced the activity or installation of the facility or structure authorized by the conditional use permit within said two-year period.*
- (2) *The applicant may submit a written request to the City Council for an extension of time on the conditional use permit to avoid the permit's becoming null and void. The request for extension must be submitted prior to the expiration of the times established by Subsection (1) above. The City Council may, in the resolution granting such conditional use permit, provide for an extension of time beyond 1 year.*

Condition of Approval No. 6: *The applicant shall comply with all applicable TDC policies and regulations.*

SUMMARY OF ANALYSIS AND FINDINGS

Based on the application materials, conditions of approval, and the analysis and findings presented above, staff finds that CUP-17-0002 meets all criteria of TDC 32.030 "Criteria for Review of Conditional Uses."



City of Tualatin

www.tualatinoregon.gov

Exhibit B to
Resolution No. 5358-18

"NECESSARY PARTIES"
MARKED BELOW

NOTICE OF APPLICATION SUBMITTAL

- ANNEXATION CONDITIONAL USE PERMIT PLAN TEXT AMENDMENT
 ARCHITECTURAL REVIEW PLAN MAP AMENDMENT OTHER:

CASE/FILE: CUP17-0002 (Community Development Dept.: Planning Division)

PROPOSAL	To approve the conditional use of a fire station—pursuant to Tualatin Development Code (TDC) 60.040(1)(f) for Tualatin Valley Fire & Rescue Station 39 on land adjacent to 7100 SW McEwan Road.
-----------------	---

PROPERTY	<input type="checkbox"/> n/a	Name of Application	TUALATIN VALLEY FIRE & RESCUE STATION 39			
		Street Address	Adjacent to 7100 SW McEwan Road			
		Tax Map and Lot No(s).	2S1 13DD 01601			
		Planning District	ML	Overlays <input type="checkbox"/>	NRPO <input type="checkbox"/>	Flood Plain <input type="checkbox"/>
		Previous Applications	AR96-33, 93-31, 74-02; VAR93-04, 94-03, 96-03; CUP13-05	Additional Applications:		CIO MANUFACTURING

DATES	Receipt of application	12/08/2017	Deemed Complete	01/08/2018	CONTACT	Name: Erin Engman	
	Notice of application submittal					01/10/2018	Title: Associate Planner
	Project Status / Development Review meeting						E-mail: EENGMAN@tualatin.gov
	Comments due for staff report					01/24/2018	Phone: 503-691-3024
	Public meeting: <input type="checkbox"/> ARB <input type="checkbox"/> TPC <input checked="" type="checkbox"/> n/a						Notes: You may view the application materials through this City web page: www.tualatinoregon.gov/projects
	City Council (CC)					<input type="checkbox"/> n/a 04/09/2018	

- | | | |
|---|---|--|
| <p>City Staff</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> City Manager <input checked="" type="checkbox"/> Building Official <input checked="" type="checkbox"/> Chief of Police <input checked="" type="checkbox"/> City Attorney <input checked="" type="checkbox"/> City Engineer <input checked="" type="checkbox"/> Community Development Director <input checked="" type="checkbox"/> Community Services Director <input checked="" type="checkbox"/> Economic Development Liaison <input checked="" type="checkbox"/> Engineering Associate* <input checked="" type="checkbox"/> Finance Director <input checked="" type="checkbox"/> GIS technician(s) <input checked="" type="checkbox"/> IS Manager <input checked="" type="checkbox"/> Operations Director* <input checked="" type="checkbox"/> Parks and Recreation Coordinator <input checked="" type="checkbox"/> Planning Manager <input checked="" type="checkbox"/> Street/Sewer Supervisor <input checked="" type="checkbox"/> Water Supervisor <p>Neighboring Cities</p> <ul style="list-style-type: none"> <input type="checkbox"/> Durham <input type="checkbox"/> King City Planning Commission <input type="checkbox"/> Lake Oswego <input type="checkbox"/> Rivergrove PC <input type="checkbox"/> Sherwood Planning Dept. | <ul style="list-style-type: none"> <input type="checkbox"/> Tigard Community Dev. Dept. <input type="checkbox"/> Wilsonville Planning Division <p>Counties</p> <ul style="list-style-type: none"> <input type="checkbox"/> Clackamas County Dept. of Transportation and Development <input checked="" type="checkbox"/> Washington County Dept. of Land Use and Transportation (ARs) <input type="checkbox"/> Washington County Long Range Planning (LRP) (Annexations) <p>Regional Government</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Metro <p>School Districts</p> <ul style="list-style-type: none"> <input type="checkbox"/> Lake Oswego School Dist. 7J <input type="checkbox"/> Sherwood SD 88J <input type="checkbox"/> Tigard-Tualatin SD 23J (TTSD) <input type="checkbox"/> West Linn-Wilsonville SD 3J <p>State Agencies</p> <ul style="list-style-type: none"> <input type="checkbox"/> Oregon Dept. of Aviation <input type="checkbox"/> Oregon Dept. of Environmental Quality (DEQ) <input type="checkbox"/> Oregon Dept. of Land Conservation and Development (DLCD) | <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Oregon Dept. of State Lands: Wetlands Program <input checked="" type="checkbox"/> Oregon Dept. of Transportation (ODOT) Region 1 <input type="checkbox"/> ODOT Maintenance Dist. 2A <input type="checkbox"/> ODOT Rail Division <input type="checkbox"/> OR Dept. of Revenue <p>Utilities</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Republic Services <input checked="" type="checkbox"/> Clean Water Services (CWS) <input checked="" type="checkbox"/> Comcast [cable]* <input checked="" type="checkbox"/> Frontier Communications [phone] <input checked="" type="checkbox"/> Northwest Natural [gas] <input checked="" type="checkbox"/> Portland General Electric (PGE) <input checked="" type="checkbox"/> TriMet <input checked="" type="checkbox"/> Tualatin Valley Fire & Rescue <input checked="" type="checkbox"/> USPS (Washington) <input type="checkbox"/> USPS (Clackamas) <input checked="" type="checkbox"/> Wash. Co. Consolidated Communications Agency (WCCCA) <p>Additional Parties</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Tualatin Citizen Involvement Organization (CIO) <p>*Paper Copies</p> |
|---|---|--|

Exhibit B to
Resolution No. 5358-18

- 1.032: Burden of Proof
- 31.071 Architectural Review Procedure
- 31.074 Architectural Review Application Review Process
- 31.077 Quasi-Judicial Evidentiary Hearing Procedures
- Metro Code 3.09.045 Annexation Review Criteria
- 32.030 Criteria for Review of Conditional Uses
- 33.020 Conditions for Granting a Variance that is not a Sign or a Wireless Communication Facility
- 33.022 Criteria for Granting a Sign Variance
- 33.024 Criteria for Granting a Minor Variance
- 33.025 Criteria for Granting a Variance
- 34.200 Tree Cutting on Private Property without Architectural Review, Subdivision or Partition Approval, or Tree Removal Permit Prohibited
- 34.210 Application for Architectural Review, Subdivision or Partition Review, or Permit
- 34.230 Criteria (tree removal)
- 35.060 Conditions for Granting Reinstatement of Nonconforming Use
- 36.160 Subdivision Plan Approval
- 36.230 Review Process (partitioning)
- 36.330 Review Process (property line adjustment)
- 37.030 Criteria for Review (IMP)
- 40.030 Conditional Uses Permitted (RL)
- 40.060 Lot Size for Conditional Uses (RL)
- 40.080 Setback Requirements for Conditional Uses (RL)
- 41.030 Conditional Uses Permitted (RML)
- 41.050 Lot Size for Conditional Uses (RML)
- 41.070 Setback Requirements for Conditional Uses (RML)
- 42.030 Conditional Uses Permitted (RMH)
- 42.050 Lot Size for Conditional Uses (RMH)
- 42.070 Setback Requirements for Conditional Uses (RMH)
- 43.030 Conditional Uses Permitted (RH)
- 43.060 Lot Size for Conditional Uses (RH)
- 43.090 Setback Requirements for Conditional Uses (RH)
- 44.030 Conditional Uses Permitted (RH-HR)
- 44.050 Lot Size for Conditional Uses (RH-HR)
- 44.070 Setback Requirements for Conditional Uses (RH-HR)
- 49.030 Conditional Uses (IN)
- 49.040 Lot Size for Permitted and Conditional Uses (IN)
- 49.060 Setback Requirements for Conditional Uses (IN)
- 50.020 Permitted Uses (CO)
- 50.030 Central Urban Renewal Plan – Additional Permitted Uses and Conditional Uses (CO)
- 50.040 Conditional Uses (CO)
- 52.030 Conditional Uses (CR)
- 53.050 Conditional Uses (CC)
- 53.055 Central Urban Renewal Area – Conditional Uses (CC)
- 54.030 Conditional Uses (CG)
- 56.030 Conditional Uses (MC)
- 56.045 Lot Size for Conditional Uses (MC)
- 57.030 Conditional Uses (MUCOD)
- 60.040 Conditional Uses (ML)
- 60.041 Restrictions on Conditional Uses (ML)
- 61.030 Conditional Uses (MG)
- 61.031 Restrictions on Conditional Uses (MG)
- 62.030 Conditional Uses (MP)
- 62.031 Restrictions on Conditional Uses (MP)
- 64.030 Conditional Uses (MBP)
- 64.050 Lot Size for Permitted and Conditional Uses (MBP)
- 64.065 Setback Requirements for Conditional Uses (MBP)
- 68.030 Criteria for Designation of a Landmark
- 68.060 Demolition Criteria
- 68.070 Relocation Criteria
- 68.100 Alteration and New Construction Criteria
- 68.110 Alteration and New Construction Approval Process
- 73.130 Standards
- 73.160 Standards
- 73.190 Standards – Single-Family and Multi-Family Uses
- 73.220 Standards
- 73.227 Standards
- 73.230 Landscaping Standards
- 73.300 Landscape Standards – Multi-Family Uses
- 73.310 Landscape Standards – Commercial, Industrial, Public and Semi-Public Uses
- 73.320 Off-Street Parking Lot Landscaping Standards
- 73.320 Off-Street Parking and Loading
- 73.470 Standards
- 73.500 Standards



MEMORANDUM

DATE May 15, 2018
TO City of Tualatin
FROM Frank Angelo & Clinton "CJ" Doxsee, APG
RE **Tualatin Valley Fire & Rescue Station 39 Completeness Items**
CC Chief Havener, TVF&R
Jamie May, TVF&R
Bruce Baldwin, AKS Engineering
Michael Bonn, Ankrom Moisan Architects

The following items have been requested by City of Tualatin staff prior to deeming Tualatin Valley Fire & Rescue's (TVF&R) Station 39 Architectural Review (AR) application complete. They include:

1. Municipal Code Section 3-5.200 – 400. Provide a finding related to the downstream stormwater analysis code requirements.

Responses to Municipal Code Section 3-5.200 to 400 have been added to the updated application narrative.

2. Municipal Code Section 4. Provide finding regarding TVF&R Emergency Fire response to the site. Absent this, a Conditional of Approval requiring coordination with TVF&R to insure fire response to the site will be included by the City.

It is acceptable to TVF&R that a condition of approval be required to comply with this section.

3. Page 1 of the narrative. There are "error references" interspersed in the narrative on page 1.

The "error references" is a technical issue with the internal reference feature in Microsoft's Word software. The application has been updated to reflect the current references.

4. Page 65 of the narrative, Response to 74.650.1-2 – Stormwater Connection Permit. We have indicated that this section does not apply. It actually does apply.

The response to this standard has been amended to read *"This section applies to this application and the applicant recognizes that CWS will be the final review authority for these elements."*

5. Sensitive Area Pre-Screen. The copy in the narrative is not signed and the appropriate box not checked.

A Sensitive Area Pre-Screen form with a dated signature is provided in Exhibit 5 of the updated application narrative.

6. DEQ – Have conversations with DEQ occurred regarding UIC?

Initial conversations have occurred with DEQ. It is acceptable to TVF&R that a condition of approval be required.

7. Is the valve automatically switched to sanitary when the hose is operational? If not, how does the valve switch over.

Vehicle wash areas are activated manually by pushing a button to diver the vehicle wash water to the sanitary sewer. There will be indicator lights and a push button on at the back of the fire station vehicle wash area. Firefighters will be able to push the button to activate a pneumatic diversion valve that diverts vehicle was to the sanitary sewer. Activation will also automatically start a one-hour time delay relay that allows any residual soap suds to gravity feed through a diversion valve before the diversion valve diverts automatically to the stormwater runoff position. There will be a yellow light indicator that will indicate if there is a problem with the sump pump and high-water levels in the vault. A photo of the device from TVF&R Station 68 is shown below.



8. Responses to Code Section 34.230 Criteria are requested.

Responses to TDC Section 34.230 have been added to the updated application narrative.

9. A service provider letter from the franchise solid waste and recycling hauler, reviewing the proposed solid waste and recyclables.

The trash enclosure is being redesigned to address earlier comments from Republic Services (see attached). Republic Services is currently reviewing the revisions and, if they address earlier concerns, a Service Provider Letter will be issued.

We believe we have addressed each of the issues raised by staff in order to deem the Station 39 Architectural Review application as complete. Please let us know if you need additional information.

Clinton "CJ" Doxsee

From: Lonergan, Frank <FLonergan@republicservices.com>
Sent: Monday, April 23, 2018 12:33 PM
To: Clinton "CJ" Doxsee
Subject: RE: TVF&R Station 39 Service Provider Letter
Attachments: Enclosure Plan- Commercial.docx

Categories: TVF&R

CJ can you change the enclosure to match something like this?

Frank Lonergan

Operations Manager
Wilsonville / Tualatin
Lake Oswego / Clackamas & Washington Counties

10295 SW Ridder Rd. Wilsonville OR 97070
e flonergan@republicservices.com
o 503-404-4176 c 503-209-5754
f 503-682-9004 w www.RepublicServices.com



We'll handle it from here.™

From: Clinton "CJ" Doxsee [mailto:cdoxsee@angeloplanning.com]
Sent: Monday, April 23, 2018 10:32 AM
To: Lonergan, Frank
Cc: Frank Angelo
Subject: TVF&R Station 39 Service Provider Letter

Frank, here's the site plan that includes trash enclosure details for your review. I've included a vicinity map and tax lot map to show the site location and provide some context.

Let me know if you have any questions, thank you!
CJ

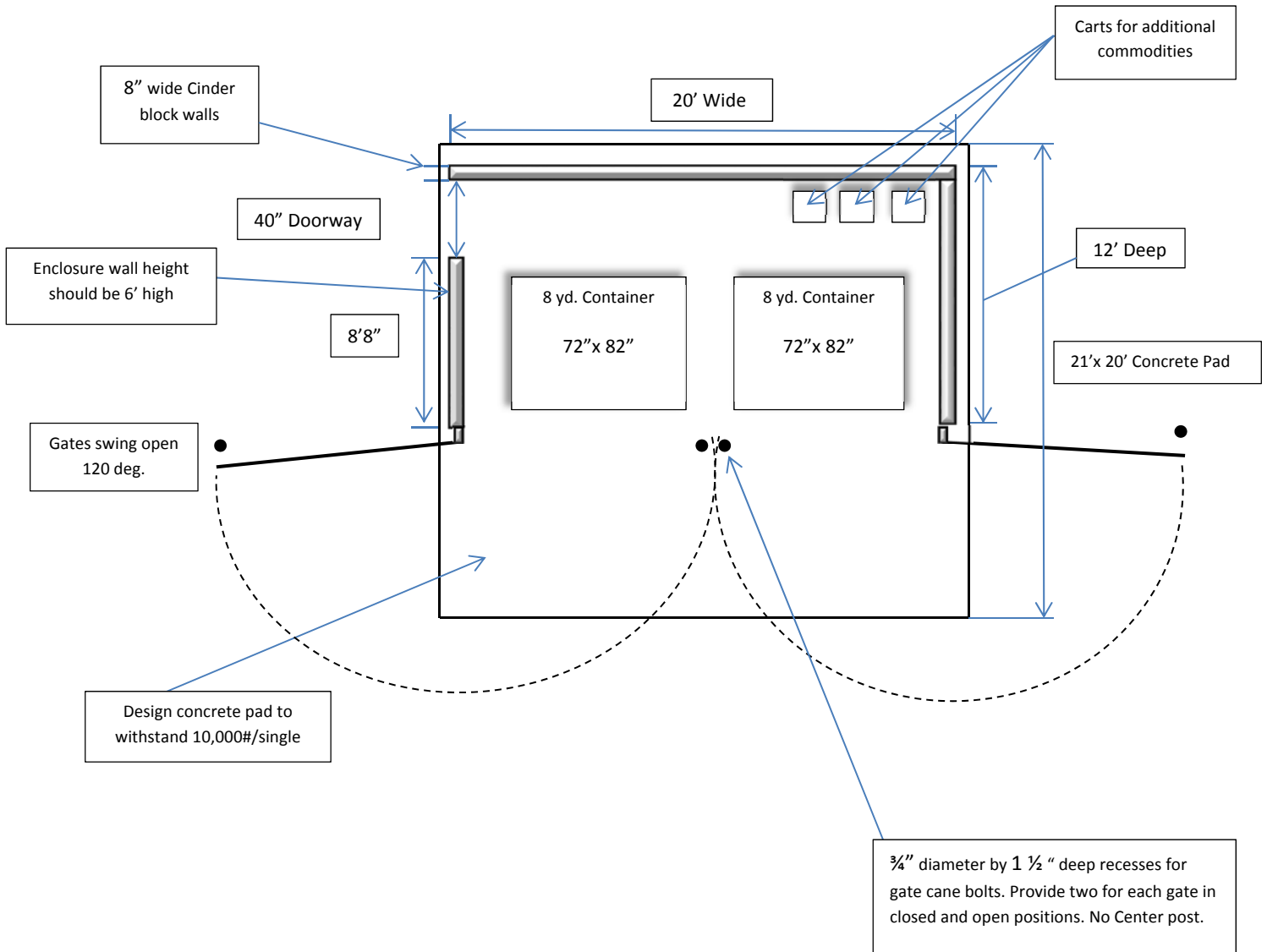


Clinton "CJ" Doxsee / Planner

503.542.3402 / cdoxsee@angeloplanning.com
921 SW Washington St. Suite 468
Portland OR 97205
<http://www.angeloplanning.com>

COMMERCIAL ENCLOSURE PLAN

Includes space available for carts



Front Load Containers



**Slant/Slope Front
Load Container**

**Square/Flat Front
Load Container**

Features*

- Models (2 yd. - 8 yd.) are Nestable
- 10 Gauge Bottoms on All Models
- HD Floor Channels on 4 - 10 yd. Models, 2" High Caster Pads on 2 & 3 yd. Models
- When Floor Channels are Capped at Both Ends, a Drain Hole is Located in the Rear Cap
- 12 Gauge Sides
- Front & Rear Top Channels are 10 Gauge
- Top Side Channels are 12 Gauge
- All Top Channel Corners are Interlocking
- All Top Edges are Rounded and Smooth
- Large Hinge Brackets for Easier Lid Replacement
- Pockets are 10 Gauge x 24" Long on 2 thru 6 yd. Models, 30" Long on 8 and 10 yd. Models
- Pockets have a 3/16" - Three Sided - One Piece Flared Fork Guide
- Pockets have a Non-Step Full 10 Gauge Gusset on Top - Tied into Fork Guide
- Rounded Bump Pads

- 1/2" Hinge Rod
- All Models meet ANSI Safety Standard - Z245.30 with Decals Installed
- All models have ANSI ID Tag
- All Containers Primed and Finish Painted a Standard Wastequip Color
- Full Welded Inside Seams
- All Models Come with a Drain and Plastic Plug
- All Side Doors will be Installed Prior to Delivery
- Many Containers Lidded Prior to Shipping
- V-Crimps on Various Models

* Features may vary slightly by region.

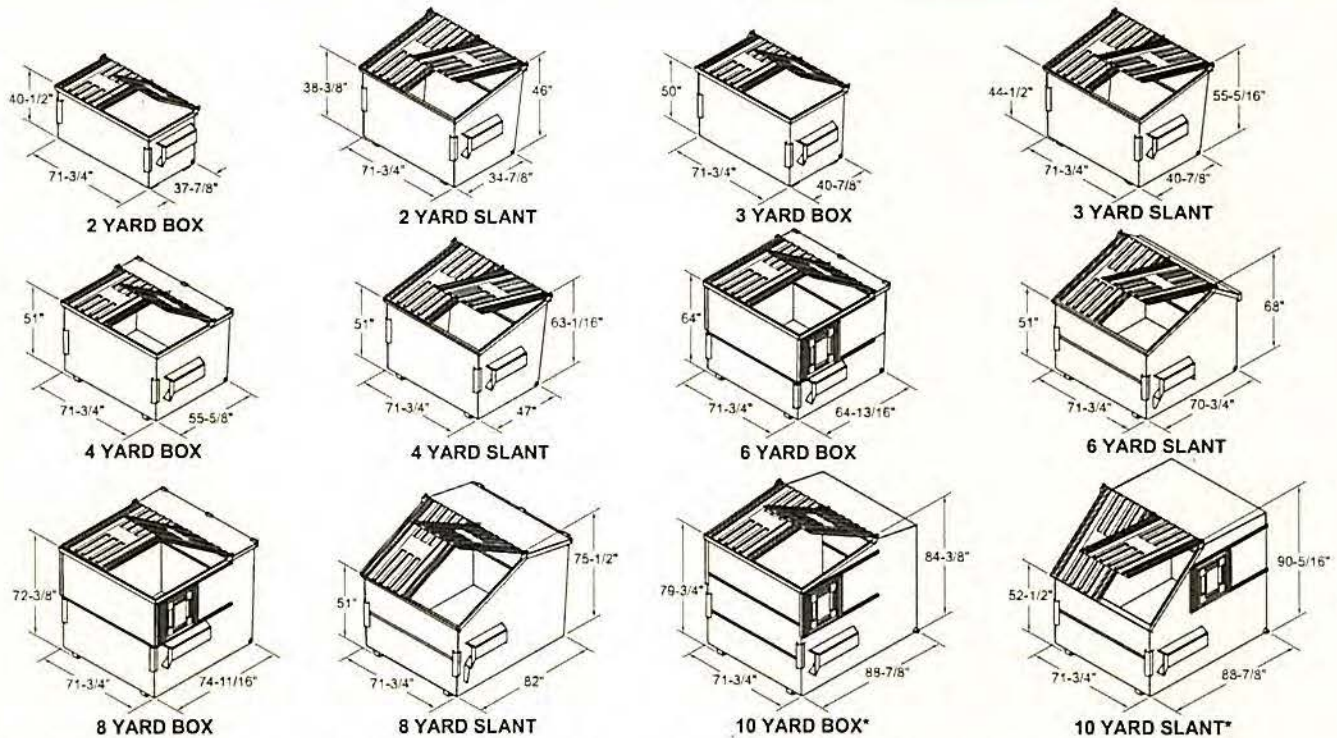
NESTABLE

**Lower Freight Cost
Easier Unloading
Less Storage Space**



WASTEQUIP

Nationally known for personal service



NOTE: 71-3/4" ID width is top dimension – floor width varies by model. * Indicates non-nested containers. Product dimensions may vary.

Model Size	2 YD BOX	3 YD BOX	4 YD BOX	6 YD BOX	8 YD BOX	10 YD BOX*	2 YD SLANT	3 YD SLANT	4 YD SLANT	6 YD SLANT	8 YD SLANT	10 YD SLANT*
Truckload Quantities 48' tr./53' tr.	53/57	34/37	25/28	14/16	13/14	6/7	49/53	31/36	28/31	14/16	13/14	6/7
Plastic Lid Standard	37" x 41" Single Wall	37" x 46" Single Wall	37" x 46" Single Wall	37" x 58" Single Wall	37" x 58" Single Wall	37" x 58" Single Wall	37" x 46" Single Wall	37" x 48" Single Wall	37" x 58" Single Wall	37" x 58" Single Wall	37" x 58" Single Wall	37" x 58" Single Wall
Side Door	N/A	N/A	N/A	30 x 30 Single Wall	30 x 30 Single Wall	30 x 30 Single Wall	N/A	N/A	N/A	N/A	N/A	Optional 30 x 30 Single Wall
Sides	12 GA.	12 GA.	12 GA.	12 GA.	12 GA.	12 GA.	12 GA.	12 GA.	12 GA.	12 GA.	12 GA.	12 GA.
Front	12 GA.	12 GA.	12 GA.	12 GA.	12 GA.	12 GA.	12 GA.	12 GA.	12 GA.	12 GA.	12 GA.	12 GA.
Rear	12 GA.	12 GA.	12 GA.	12 GA.	12 GA.	12 GA.	12 GA.	12 GA.	12 GA.	12 GA.	12 GA.	12 GA.
Bottom	10 GA.	10 GA.	10 GA.	10 GA.	10 GA.	10 GA.	10 GA.	10 GA.	10 GA.	10 GA.	10 GA.	10 GA.
Pockets	10 GA.	10 GA.	10 GA.	10 GA.	10 GA.	10 GA.	10 GA.	10 GA.	10 GA.	10 GA.	10 GA.	10 GA.
Bumpers	7 GA. Rounded	7 GA. Rounded	7 GA. Rounded	7 GA. Rounded	7 GA. Rounded	7 GA. Rounded	7 GA. Rounded	7 GA. Rounded	7 GA. Rounded	7 GA. Rounded	7 GA. Rounded	7 GA. Rounded
Bottom Channel	(4) Formed Caster Pads	(4) Formed Caster Pads	(2) Formed 3 x 4 x 10 GA. Channels	(2) Formed 3 x 4 x 10 GA. Channels	(2) Formed 3 x 4 x 10 GA. Channels	(2) Formed 3 x 4 x 10 GA. Channels	(4) Formed Caster Pads	(4) Formed Caster Pads	(2) Formed 3 x 4 x 10 GA. Channels	(2) Formed 3 x 4 x 10 GA. Channels	(2) Formed 3 x 4 x 10 GA. Channels	(2) Formed 3 x 4 x 10 GA. Channels
Back Tube	10 GA. Formed G-Channel	10 GA. Formed G-Channel	10 GA. Formed G-Channel	10 GA. Formed G-Channel	10 GA. Formed G-Channel	10 GA. Formed G-Channel	10 GA. Formed G-Channel	10 GA. Formed G-Channel	10 GA. Formed G-Channel	10 GA. Formed G-Channel	10 GA. Formed G-Channel	10 GA. Formed G-Channel
Front Tube	10 GA. Formed G-Channel	10 GA. Formed G-Channel	10 GA. Formed G-Channel	10 GA. Formed G-Channel	10 GA. Formed G-Channel	10 GA. Formed G-Channel	10 GA. Formed G-Channel	10 GA. Formed G-Channel	10 GA. Formed G-Channel	10 GA. Formed G-Channel	10 GA. Formed G-Channel	10 GA. Formed G-Channel
Side Tubes	12 GA. Formed G-Channel	12 GA. Formed G-Channel	12 GA. Formed G-Channel	12 GA. Formed G-Channel	12 GA. Formed G-Channel	12 GA. Formed G-Channel	12 GA. Formed G-Channel	12 GA. Formed G-Channel	12 GA. Formed G-Channel	12 GA. Formed G-Channel	12 GA. Formed G-Channel	12 GA. Formed G-Channel
Drain Plug	1 1/2" Dia. Plastic	1 1/2" Dia. Plastic	1 1/2" Dia. Plastic	1 1/2" Dia. Plastic	1 1/2" Dia. Plastic	1 1/2" Dia. Plastic	1 1/2" Dia. Plastic	1 1/2" Dia. Plastic	1 1/2" Dia. Plastic	1 1/2" Dia. Plastic	1 1/2" Dia. Plastic	1 1/2" Dia. Plastic
Theo. Weight	500#	625#	775#	1010#	1225#	1350#	531#	645#	765#	955#	1160#	1620#

NOTE: For XHD specifications, consult factory. Unless stated otherwise in writing, container sizes indicated on sales literature, invoices, price list, quotations, and delivery tickets are nominal sizes. Actual volume may vary from nominal sizes. *Shipping quantities based on typical 48' and 53' dropdeck trailers. Actual quantities may vary.

Clinton "CJ" Doxsee

From: Lonergan, Frank <FLonergan@republicservices.com>
Sent: Monday, April 30, 2018 10:34 AM
To: Clinton "CJ" Doxsee; Bruce Baldwin; Michael Bonn; Havener, Mark E.; Gregory.Perry@tvfr.com
Cc: Frank Angelo
Subject: RE: trash

Follow Up Flag: Follow up
Flag Status: Completed

Categories: TVF&R

Hi CJ,

There seems to be some confusion on the containers. Two (2) containers are needed; one for trash and one for recycling. We do not have one mixed use container. Both containers are about 8 feet wide. The height and depth varies depending on the size.

A side opening (no door- minimum 36 inches wide) is necessary for 2 reasons.

1. Need to place a glass cart in back and roll out the opening for deposit into a truck – roll along sidewalk – no curb
2. Easier for people to place material inside the 2 containers going thru opening along the side instead of opening larger gates in front while they have material to throw away in their arms.

Hope this helps, let me know if anyone still has questions.

Thanks,

Frank Lonergan

Operations Manager
Wilsonville / Tualatin
Lake Oswego / Clackamas & Washington Counties

10295 SW Ridder Rd. Wilsonville OR 97070
e flonergan@republicservices.com
o 503-404-4176 c 503-209-5754
f 503-682-9004 w www.RepublicServices.com



We'll handle it from here.™

From: Clinton "CJ" Doxsee [mailto:cdoxsee@angeloplanning.com]
Sent: Thursday, April 26, 2018 7:17 AM
To: Lonergan, Frank; Bruce Baldwin; Michael Bonn; Havener, Mark E.; Gregory.Perry@tvfr.com

Cc: Frank Angelo
Subject: RE: trash

Frank, I'm cc'ing some of our team members into the email thread to consolidate discussions.

Thanks for providing some clarity on the dimensions in the email below. It's looking like the station can operate with (2) 2-yard dumpsters or one combined trash-recycling dumpster. Are there specs for the combined dumpster that can be used to design the enclosure.

Will a side enclosure still be necessary if all the dumpsters will be loaded from the front.

CJ

From: Lonergan, Frank <FLonergan@republicservices.com>
Sent: Thursday, April 26, 2018 6:18 AM
To: Clinton "CJ" Doxsee <cdoxsee@angeloplanning.com>
Subject: FW: trash

Good Morning, this is the one I sent yesterday morning

Frank Lonergan
Operations Manager
Wilsonville / Tualatin
Lake Oswego / Clackamas & Washington Counties

10295 SW Ridder Rd. Wilsonville OR 97070
e flonergan@republicservices.com
o 503-404-4176 c 503-209-5754
f 503-682-9004 w www.RepublicServices.com



We'll handle it from here.™

From: Lonergan, Frank
Sent: Wednesday, April 25, 2018 6:19 AM
To: 'Clinton "CJ" Doxsee'
Subject: RE: trash

All containers are the same width, so that is why we need the 20 feet wide. They will need 2 containers. The difference in a 2 yard is about 3 feet deep to an 8 yard being about 4.5 feet deep. Most of the volume then goes in its height. They could have 90 gallon carts depending on how many on site. Recycle container is still needed which is also 8 feet wide by 4-5 feet deep. I would agree that a 2 yard is most probable for this building, however we still require the same width, but would not need 12 feet deep.

Frank Lonergan

Operations Manager

Wilsonville / Tualatin

Lake Oswego / Clackamas & Washington Counties

10295 SW Ridder Rd. Wilsonville OR 97070

e flonergan@republicservices.com

o 503-404-4176 c 503-209-5754

f 503-682-9004 w www.RepublicServices.com



We'll handle it from here.™

From: Clinton "CJ" Doxsee [<mailto:cdoxsee@angeloplanning.com>]
Sent: Tuesday, April 24, 2018 4:39 PM
To: Lonergan, Frank
Subject: Fwd: trash

Frank, are there standards for a smaller enclosure. TVF&R doesn't typically need that size for the scheduled crew. See email thread below for additional details.

Thanks
CJ

From: Michael Bonn <michaelb@ankrommoisan.com>
Sent: Tuesday, April 24, 2018 4:04 PM
Subject: FW: trash
To: Clinton "CJ" Doxsee <cdoxsee@angeloplanning.com>, Perry, Gregory E. <gregory.perry@tvfr.com>
Cc: Matthew Poncelow <matthewp@ankrommoisan.com>

CJ, you can see below that TVF&R does not need anywhere near two 8 yd. dumpsters. Do they have standards for something smaller as Greg suggests below?

Michael Bonn
SENIOR ASSOCIATE
D) 503.892.1322

Ankrom Moisan Architects, Inc.
ARCHITECTURE INTERIORS URBAN DESIGN BRANDING
38 NW Davis / Suite 300 / Portland, OR 97209
Offices In Portland / Seattle / San Francisco

ankrommoisan.com

From: Perry, Gregory E. <Gregory.Perry@tvfr.com>
Sent: Tuesday, April 24, 2018 1:44 PM

To: Michael Bonn <MichaelB@ankrommoisan.com>

Subject: RE: trash

Michael,

A standard single Company (4 Crew members) Station doesn't come anywhere close to justifying an 8 yard dumpster bin for trash or recycle.

Stations that have true "dumpster bins" have the smaller 2 yard bins.

Some of our Stations are residential type bins for trash and recycle and the Crews put the cans out by the street on trash day.

If we need to stay with dumpster bins, we would want Republic to supply their smaller 2 yard bins.

We do need two bins or cans though, one for trash one for recycle.

Greg

From: Michael Bonn <MichaelB@ankrommoisan.com>

Sent: Tuesday, April 24, 2018 10:47 AM

To: Perry, Gregory E. <Gregory.Perry@tvfr.com>

Subject: trash

Greg, you faded away and then we somehow lost connection.

Does the station need two big dumpsters, or would one be sufficient? Maybe the hauler could give us their standards for a single wide enclosure.

Michael Bonn

SENIOR ASSOCIATE

D) 503.892.1322

Ankrom Moisan Architects, Inc.

ARCHITECTURE INTERIORS URBAN DESIGN BRANDING

38 NW Davis / Suite 300 / Portland, OR 97209

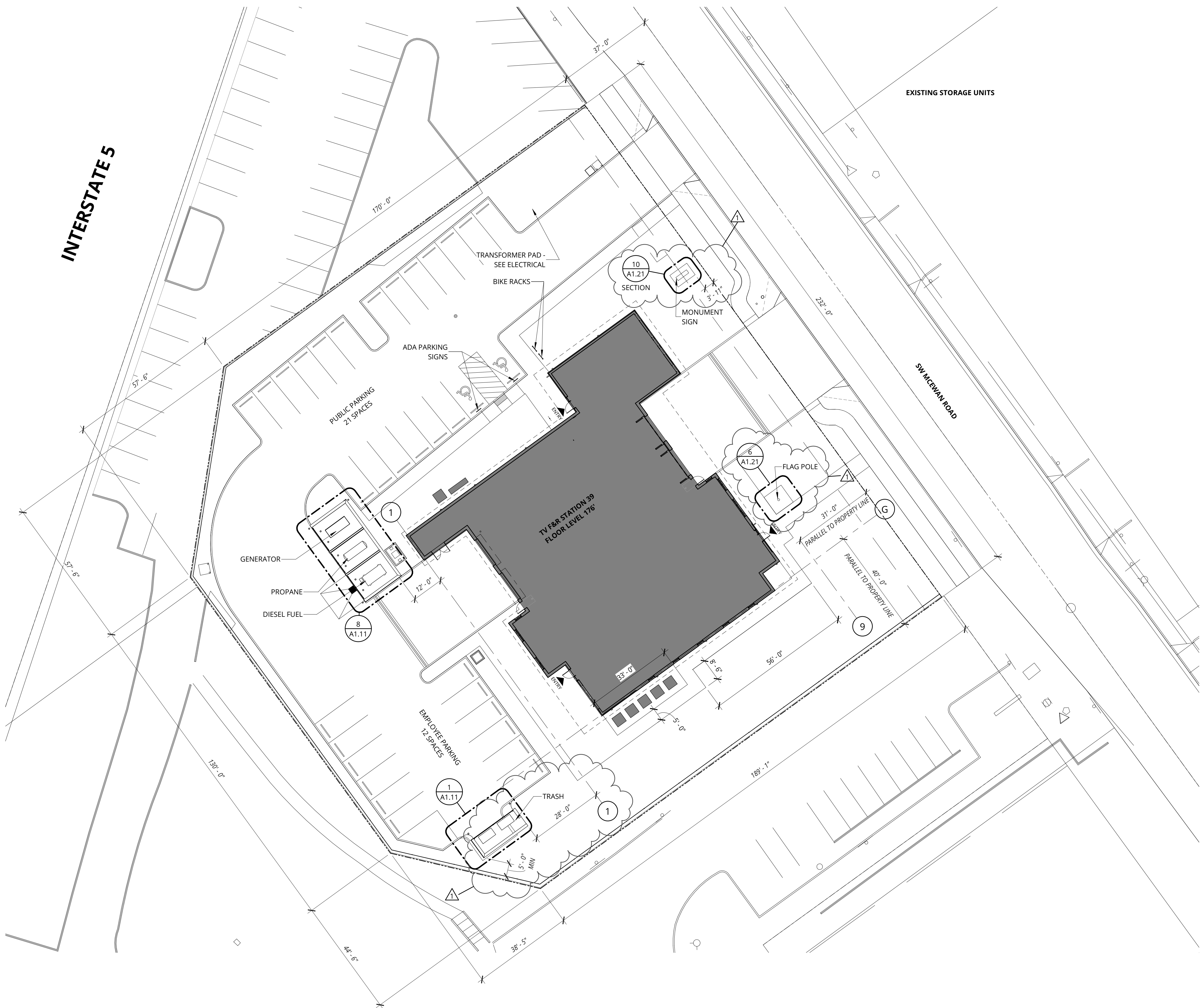
Offices In Portland / Seattle / San Francisco

ankrommoisan.com

INTERSTATE 5

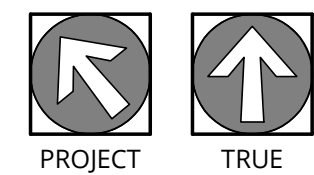
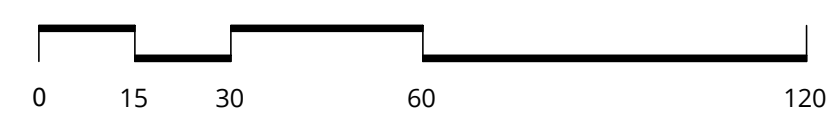
EXISTING STORAGE UNITS

SW MCEWAN ROAD



1 ARCHITECTURAL SITE PLAN

1" = 20'-0"



NOT FOR CONSTRUCTION



38 NORTHWEST DAVIS, SUITE 300
 PORTLAND, OR 97209
 T 503.245.7100

1505 5TH AVE, SUITE 300
 SEATTLE, WA 98101
 T 206.576.1600

1014 HOWARD STREET
 SAN FRANCISCO, CA 94103
 T 415.252.7063

© ANKROM MOISAN ARCHITECTS, INC.

TV F&R STATION 39 - TUALATIN

7100 SW MCEWAN
 TUALATIN, OR 97062

TUALATIN VALLEY FIRE & RESCUE

REVISION	DATE	REASON FOR ISSUE
1	Date 1	Revision 1

SITE PLAN

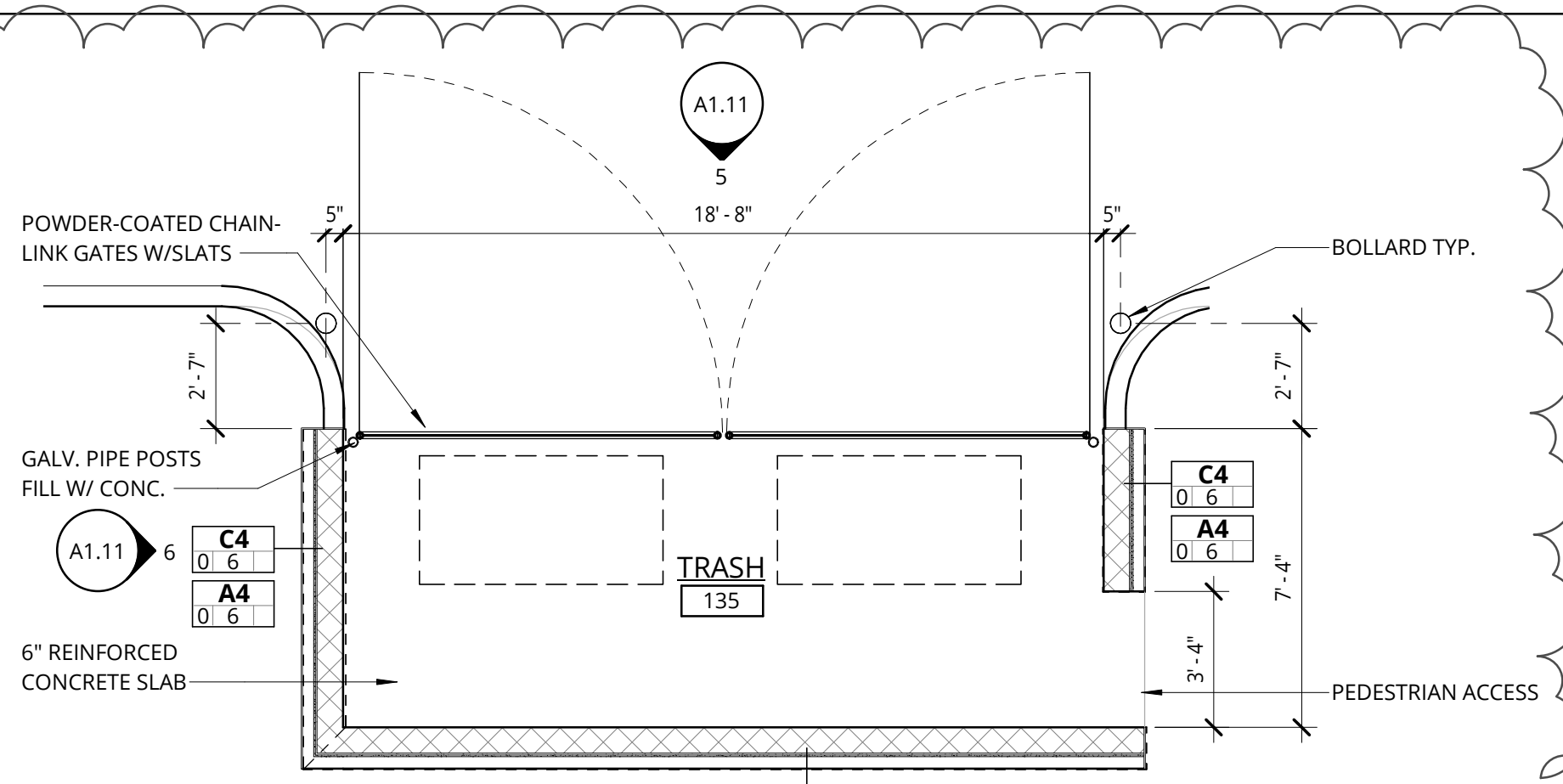
GMP SET

DATE	PROJECT NUMBER
04/24/2018	173470

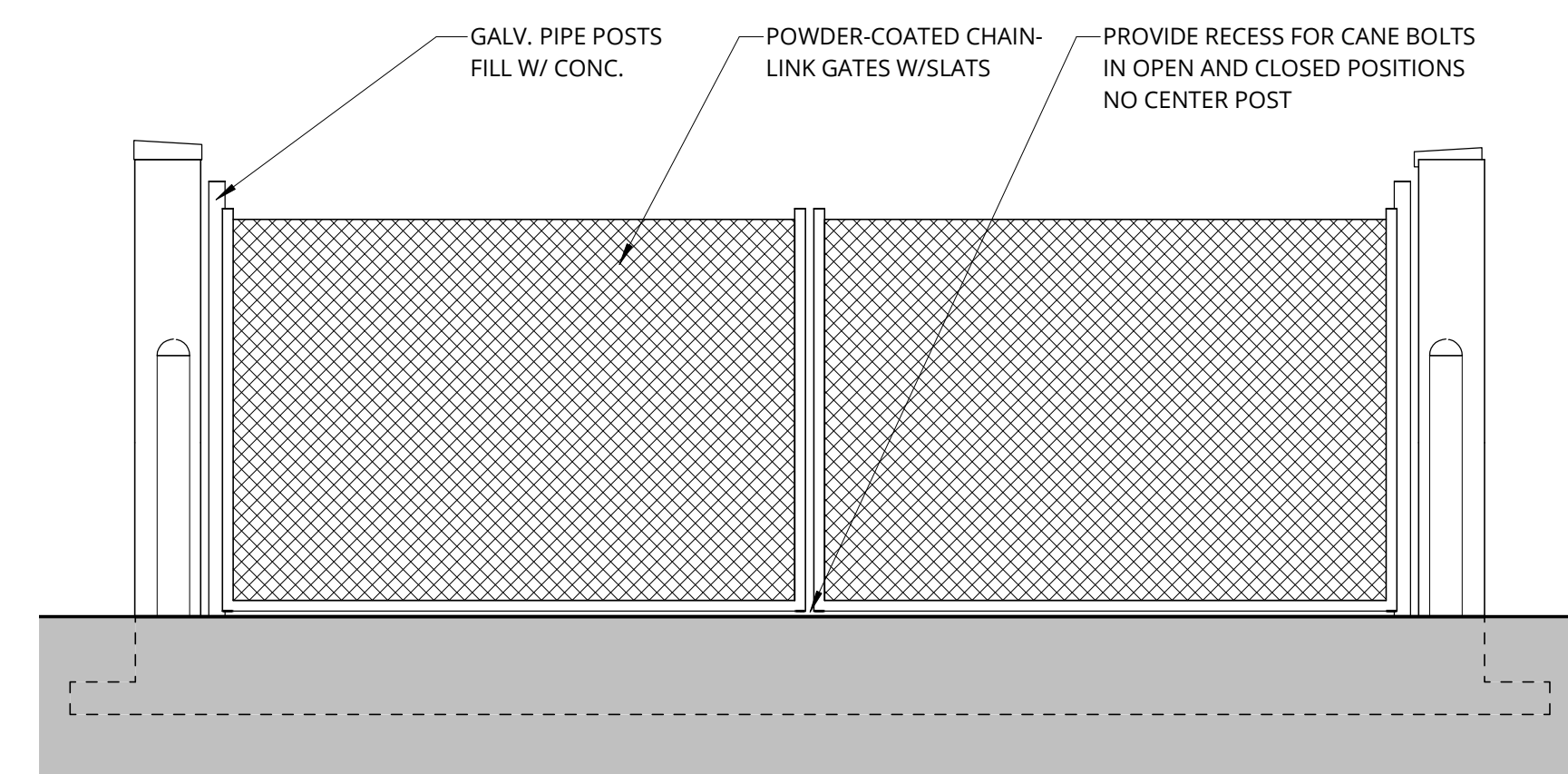
SHEET NUMBER

A1.01

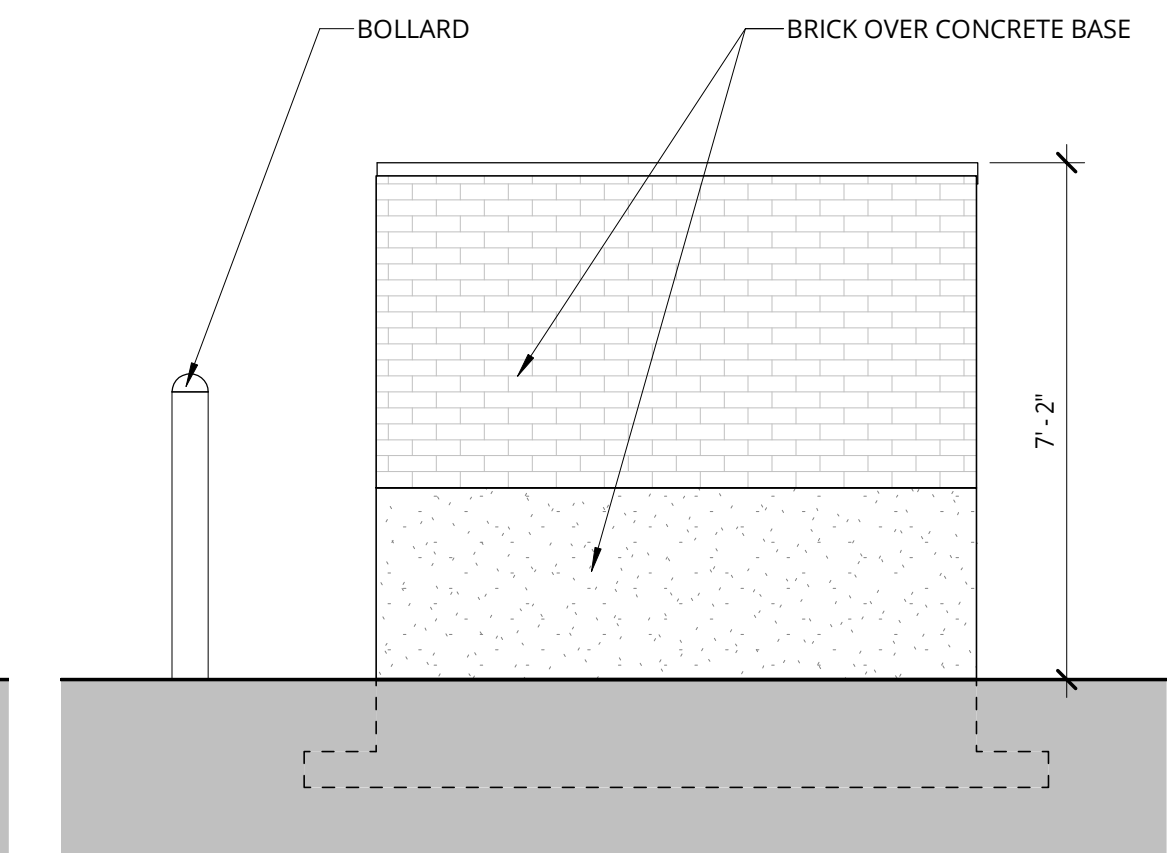
5/11/2018 11:02:20 AM



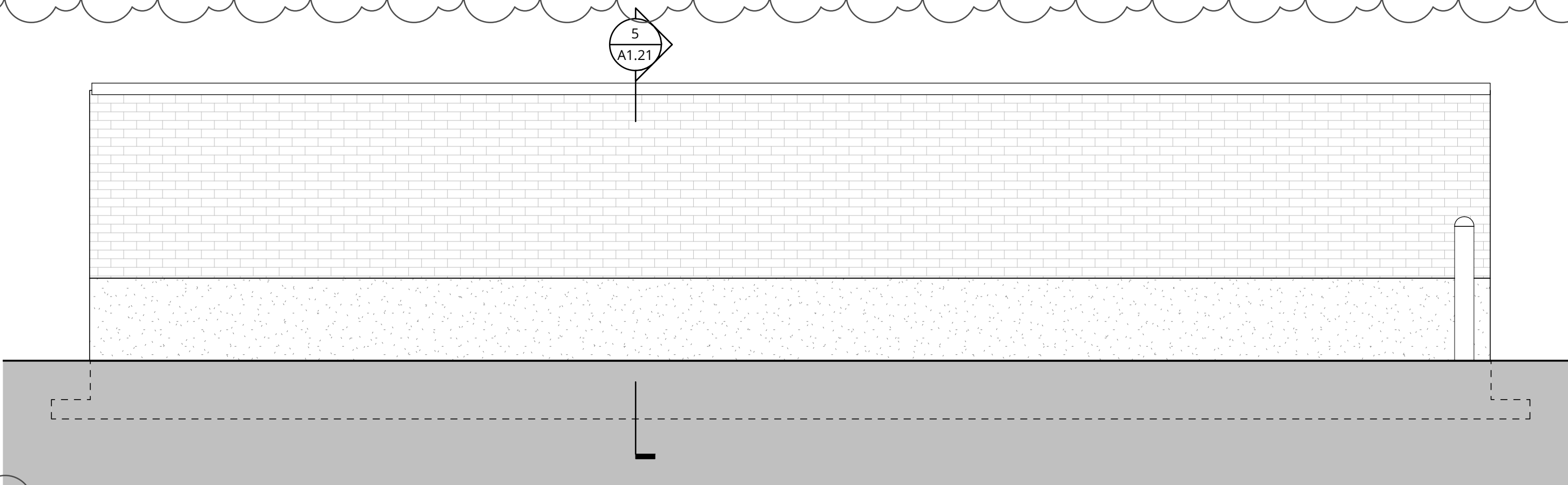
1 TRASH ENCLOSURE
1/4" = 1'-0"



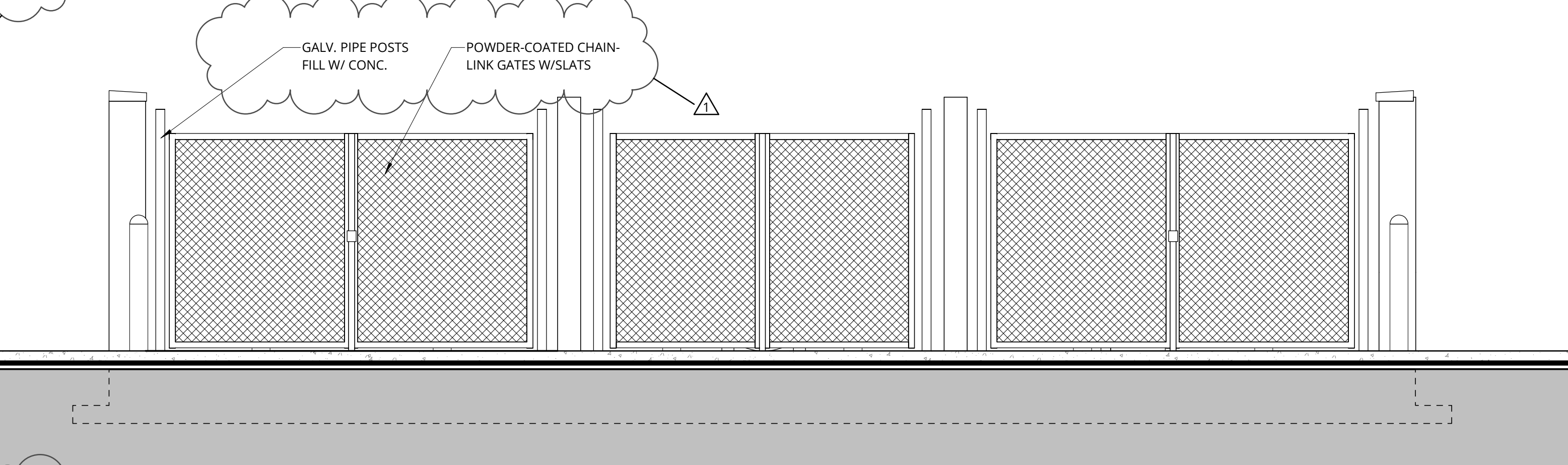
5 TRASH NORTH ELEVATION
3/8" = 1'-0"



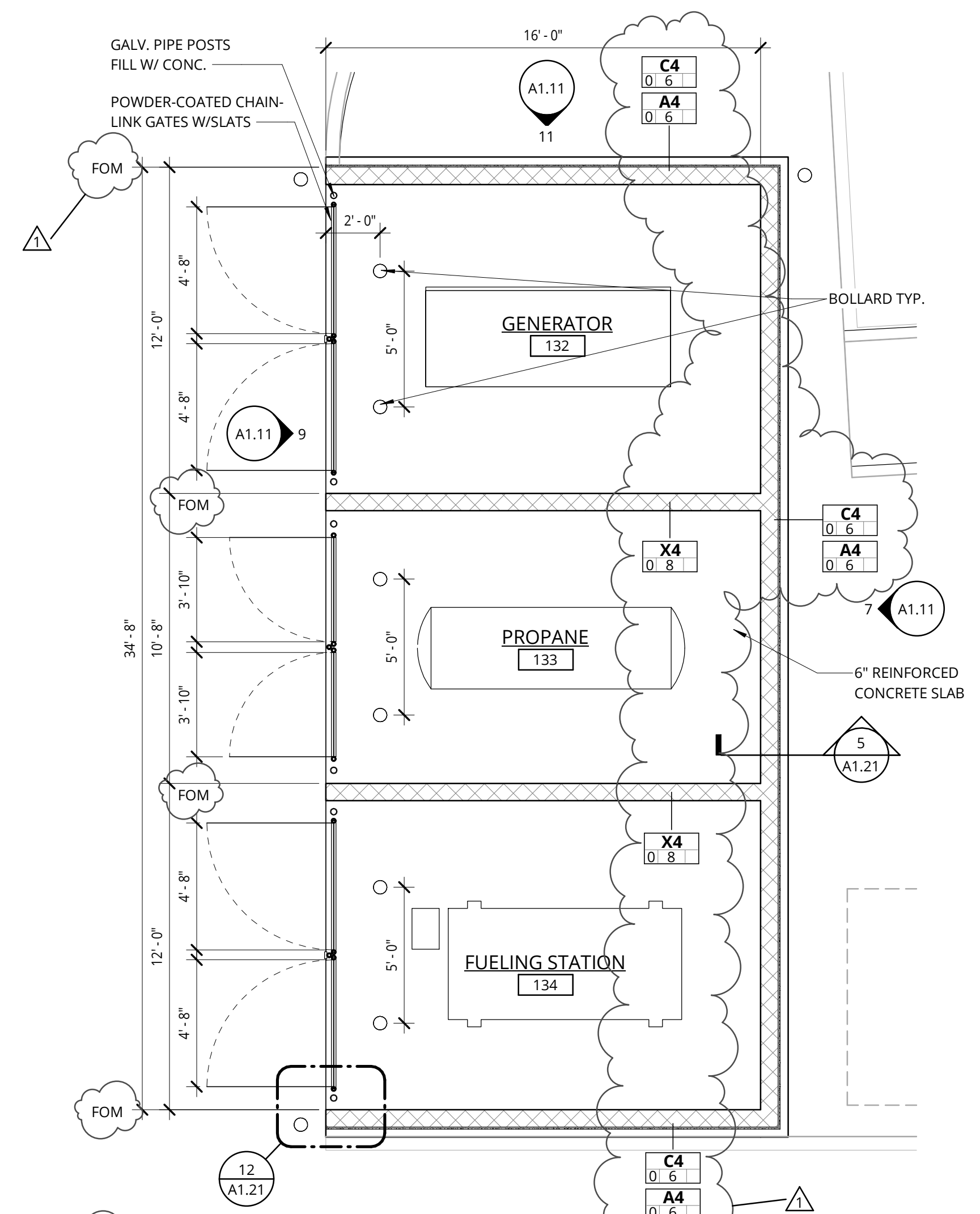
6 TRASH WEST ELEVATION
3/8" = 1'-0"



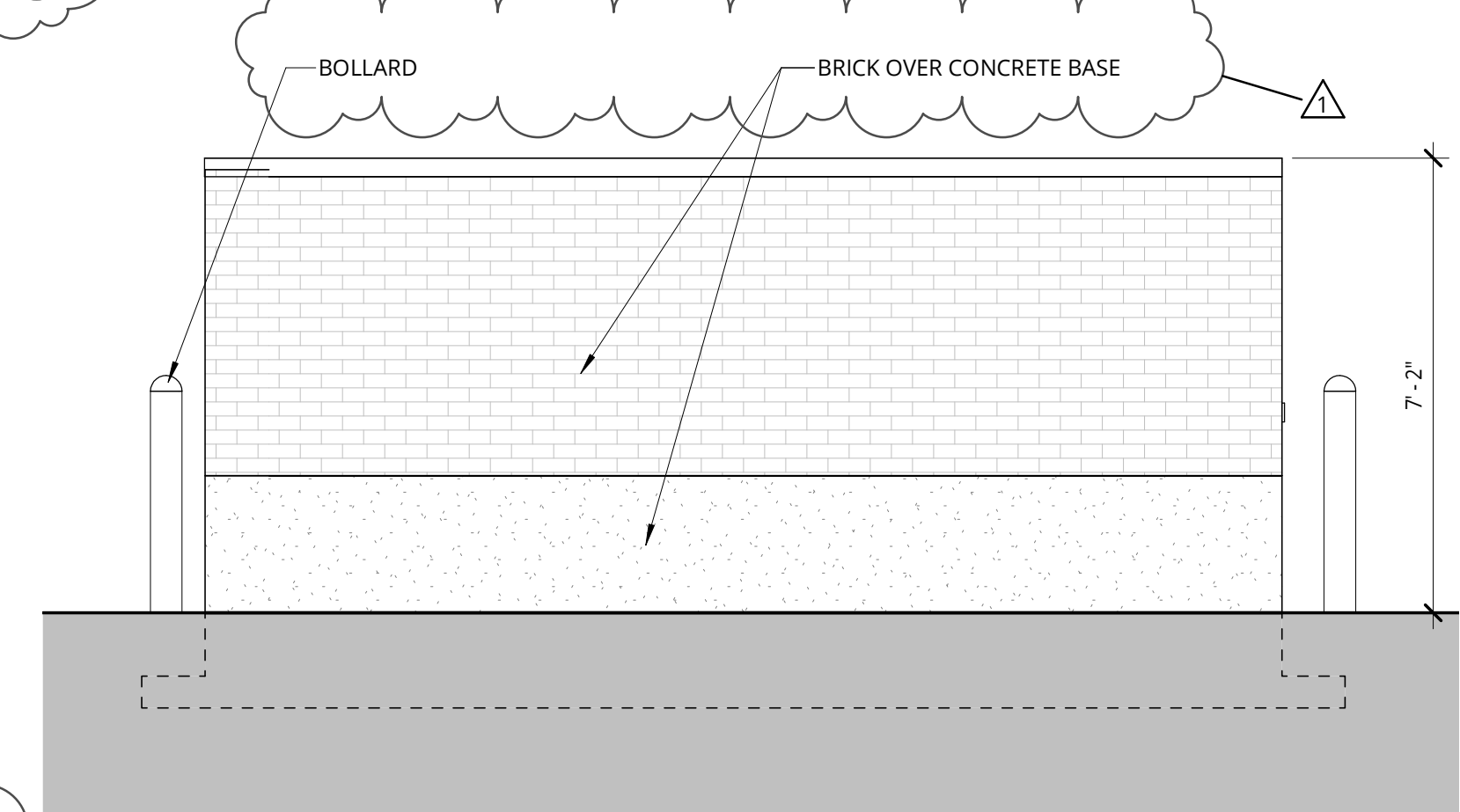
7 PROPANE / GENERATOR / FUELING EAST ELEVATION
3/8" = 1'-0"



9 PROPANE / GENERATOR / FUELING WEST ELEVATION
3/8" = 1'-0"



8 PROPANE / GENERATOR / FUELING ENCLOSURE
1/4" = 1'-0"



11 P. / G. / F. NORTH ELEVATION
3/8" = 1'-0"

NOT FOR CONSTRUCTION



38 NORTHWEST DAVIS, SUITE 300
PORTLAND, OR 97209
T 503.245.7100

1505 5TH AVE, SUITE 300
SEATTLE, WA 98101
T 206.576.1600

1014 HOWARD STREET
SAN FRANCISCO, CA 94103
T 415.252.7063

© ANKROM MOISAN ARCHITECTS, INC.

TV F&R STATION 39 - TUALATIN

7100 SW MCEWAN
TUALATIN, OR 97062

TUALATIN VALLEY FIRE & RESCUE

REVISION	DATE	REASON FOR ISSUE
1	Date 1	Revision 1

ENLARGED SITE PLANS, SECTIONS & ELEVATIONS
GMP SET

DATE 04/24/2018	PROJECT NUMBER 173470
--------------------	--------------------------

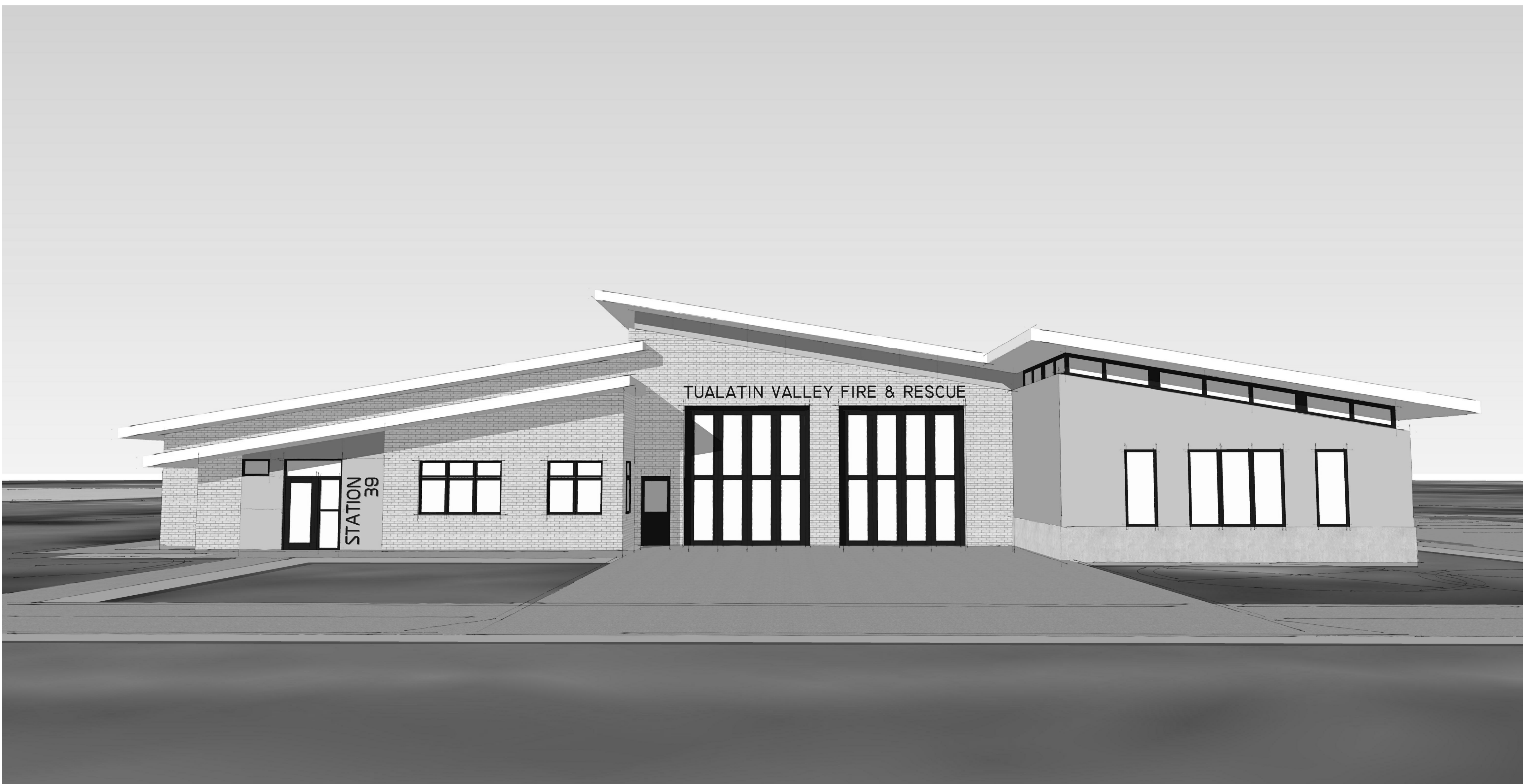
SHEET NUMBER

A1.11

C:\Reht\Projects\173470_17-11\VER 39\173470_17-11\VER 39.dwg

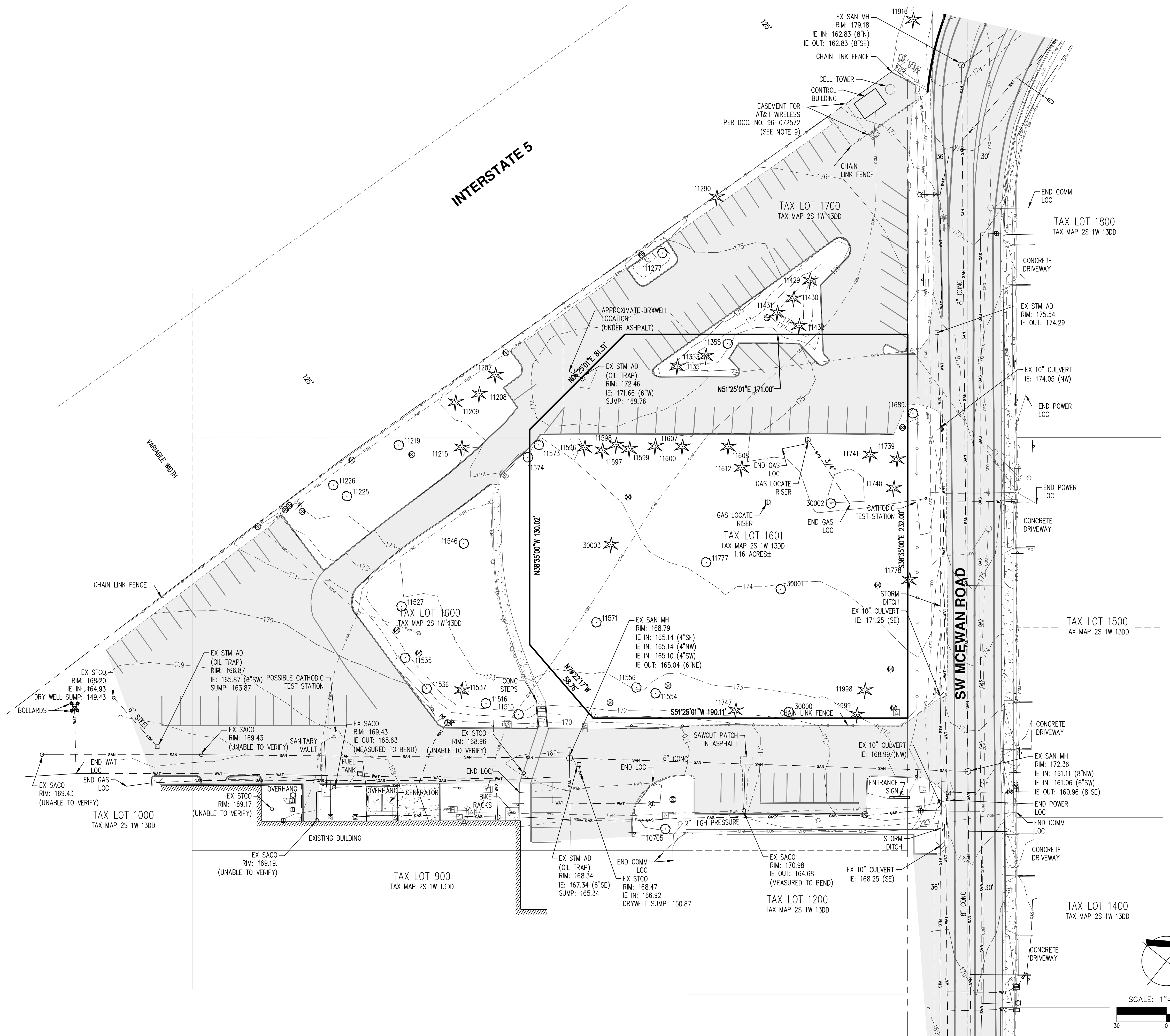
TUALATIN VALLEY FIRE & RESCUE - STATION 39

ARCHITECTURAL REVIEW SUBMITTAL



MAIN ENTRY VIEW FROM SW MCEWAN ROAD

EXISTING CONDITIONS PLAN



EXISTING		EXISTING	
DECIDUOUS TREE		STORM SEWER CLEAN OUT	
CONIFEROUS TREE		STORM SEWER CATCH BASIN	
FIRE HYDRANT		STORM SEWER AREA DRAIN	
WATER BLOWOFF		STORM SEWER MANHOLE	
WATER METER		GAS METER	
WATER VALVE		GAS VALVE	
DOUBLE CHECK VALVE		GUY WIRE ANCHOR	
AIR RELEASE VALVE		POWER POLE	
SANITARY SEWER CLEAN OUT		POWER VAULT	
SANITARY SEWER MANHOLE		POWER JUNCTION BOX	
SIGN		POWER PEDESTAL	
STREET LIGHT		COMMUNICATIONS VAULT	
MAILBOX		COMMUNICATIONS JUNCTION BOX	
		COMMUNICATIONS RISER	

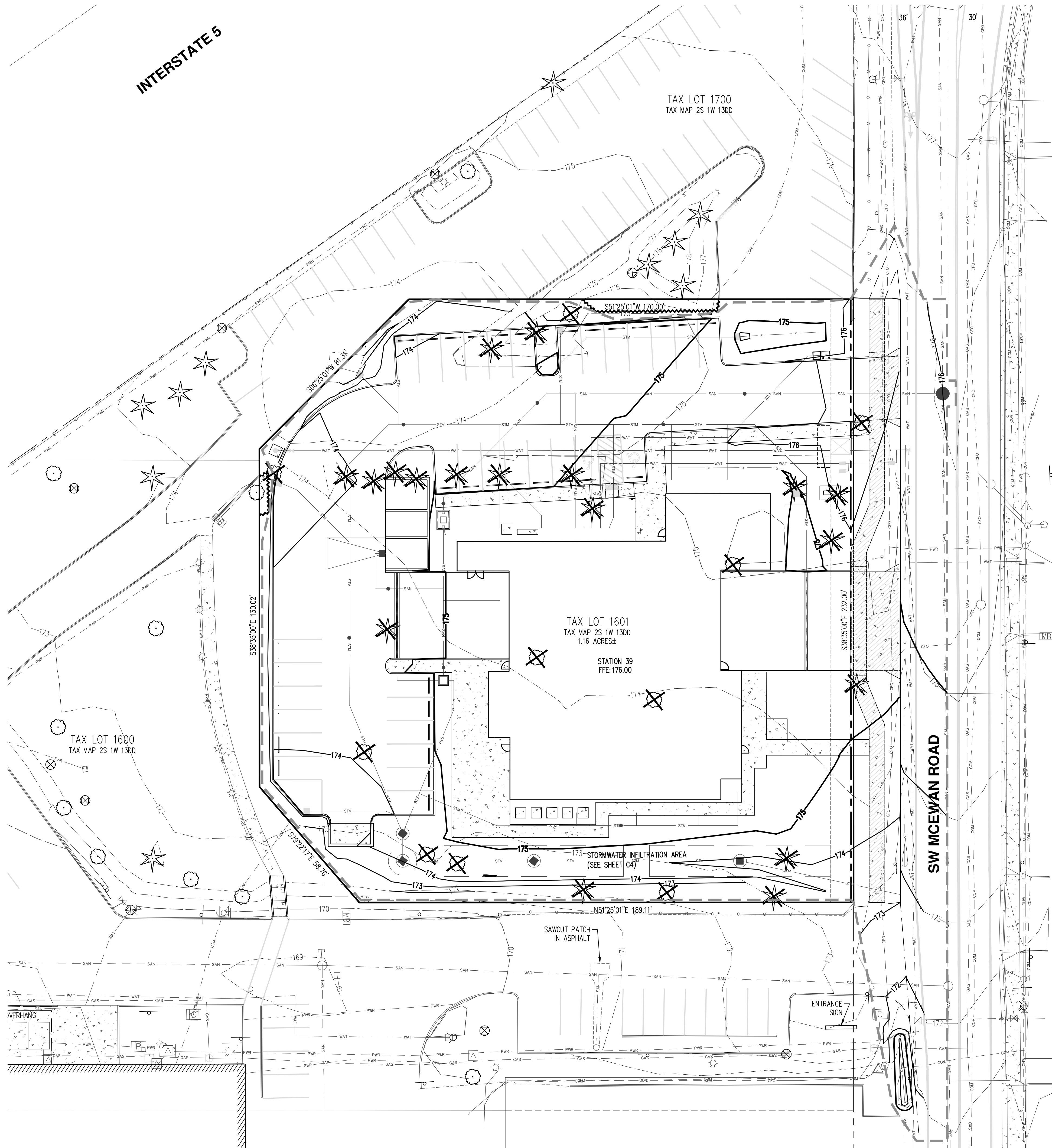
EXISTING	
RIGHT-OF-WAY LINE	
BOUNDARY LINE	
PROPERTY LINE	
CENTERLINE	
DITCH	
CURB	
EDGE OF PAVEMENT	
EASEMENT	
FENCE LINE	
GRAVEL EDGE	
POWER LINE	
OVERHEAD WIRE	
COMMUNICATIONS LINE	
FIBER OPTIC LINE	
GAS LINE	
STORM SEWER LINE	
SANITARY SEWER LINE	
WATER LINE	

- NOTES:**
- PUBLIC UTILITIES SHOWN ARE BASED ON UNDERGROUND UTILITY LOCATE MARKINGS AS PROVIDED BY OTHERS, PROVIDED PER UTILITY LOCATE TICKET NUMBERS 15296341 AND 15296364. PRIVATE LOCATES PROVIDED BY APS LOCATES. THE SURVEYOR MAKES NO GUARANTEE THAT THE UNDERGROUND LOCATES REPRESENT THE ONLY UTILITIES IN THE AREA. CONTRACTORS ARE RESPONSIBLE FOR VERIFYING ALL EXISTING CONDITIONS PRIOR TO BEGINNING CONSTRUCTION.
 - FIELD WORK WAS CONDUCTED DECEMBER 30-31, 2015 AND JANUARY 5-7, 13, 2016.
 - VERTICAL DATUM: ELEVATIONS ARE BASED ON CITY OF LAKE OSWEGO COUNTY BENCHMARK NO. 01P-1 IN THE SOUTH CURB ON MCEWAN ROAD, NEAR MIDDLE TANGENT SECTION WHICH IS PARALLEL TO 1-5, WITH A NGVD 29 ELEVATION OF 179.102 FEET.
 - THIS MAP DOES NOT CONSTITUTE A PROPERTY BOUNDARY SURVEY.
 - SURVEY IS ONLY VALID WITH SURVEYOR'S STAMP AND SIGNATURE.
 - BUILDING FOOTPRINTS ARE MEASURED TO SIDING UNLESS NOTED OTHERWISE. CONTACT SURVEYOR WITH QUESTIONS REGARDING BUILDING TIES.
 - CONTOUR INTERVAL IS 1 FOOT.
 - TREES WITH DIAMETER OF 8" AND GREATER ARE SHOWN. SEE SHEET C3 FOR DETAILED TREE INFORMATION.
 - THE AT&T EASEMENT DESCRIBED IN DOCUMENT NUMBER 96-072572 APPEARS TO CONTAIN AN ERROR IN THE DIMENSION (STATIONING) BETWEEN THE POINT OF COMMENCEMENT AND THE TRUE POINT OF BEGINNING. THE EASEMENT LOCATION WAS DETERMINED HOLDING THE CALLED EASTERLY AND SOUTHERLY HIGHWAY RIGHT-OF-WAY LINES.

AKS
 AKS ENGINEERING & FORESTRY, LLC
 12985 SW HERMAN RD STE 100
 TUALATIN, OR 97062
 P: 503.563.6151
 F: 503.563.6152
 aks-eng.com

ENGINEERING - SURVEYING - NATURAL RESOURCES
 FORESTRY - PLANNING - LANDSCAPE ARCHITECTURE
 AKS JOB NO: 4756

GRADING PLAN



INTERSTATE 5

TAX LOT 1700
TAX MAP 2S 1W 130D

TAX LOT 1800
TAX MAP 2S 1W 130D

TAX LOT 1600
TAX MAP 2S 1W 130D

TAX LOT 1601
TAX MAP 2S 1W 130D
1.16 ACRES±

STATION 39
FFE:176.00

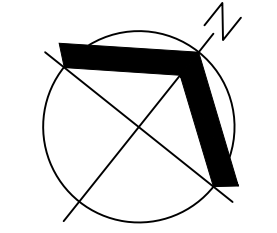
TAX LOT 1500
TAX MAP 2S 1W 130D

SW MCEWAN ROAD

LEGEND

EXISTING GROUND CONTOUR (1 FT)	
EXISTING GROUND CONTOUR (5 FT)	
FINISHED GRADE CONTOUR (1 FT)	
FINISHED GRADE CONTOUR (5 FT)	
EXISTING TREES TO BE PRESERVED	
EXISTING TREES TO BE REMOVED	
TREE PROTECTION FENCE	
GRADING LIMITS	

NOTE:
EXISTING TREES TO BE RETAINED SHALL BE FENCED AROUND THE DRIP LINE (OR AS OTHERWISE SHOWN OR APPROVED BY PROJECT ARBORIST) WITH TREE PROTECTION FENCE. SEE SHEET C3 FOR DETAILED TREE INFORMATION.

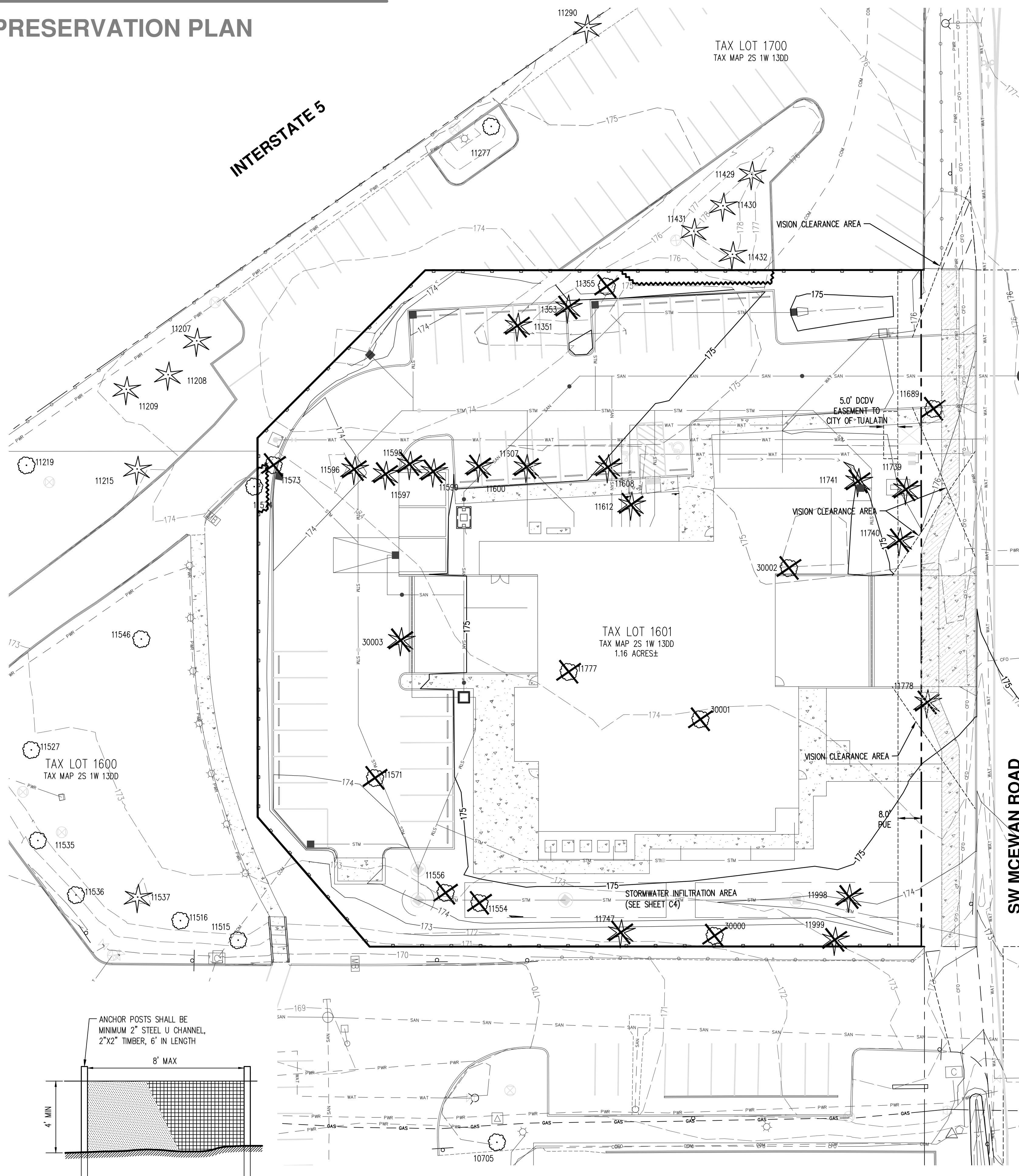


AKS

AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD STE 100
TUALATIN, OR 97062
P: 503.563.6151
F: 503.563.6152
aks-eng.com

ENGINEERING - SURVEYING - NATURAL RESOURCES
FORESTRY - PLANNING - LANDSCAPE ARCHITECTURE
AKS JOB NO: 4756

TREE PRESERVATION PLAN



LEGEND

EXISTING GROUND CONTOUR (1 FT)

EXISTING GROUND CONTOUR (5 FT)

FINISHED GRADE CONTOUR (1 FT)

FINISHED GRADE CONTOUR (5 FT)

EXISTING TREES TO BE PRESERVED

EXISTING TREES TO BE REMOVED

TREE PROTECTION FENCE

CONIFEROUS

DECIDUOUS

SCALE: 1" = 20 FEET

Detailed Tree Inventory and Assessment Report for TVFR STATION 39

AKS Job No. 4756 - Evaluation Date: 10/27/2017

Tree #	DBH (in.)	Tree Species Common Name (Scientific name)	Comments	Health Rating*	Structure Rating**	Reason for Removal
11207	28	Coniferous	OFFSITE, Not Evaluated by an Arborist	-	-	Preserve
11208	18	Coniferous	OFFSITE, Not Evaluated by an Arborist	-	-	Preserve
11209	25	Coniferous	OFFSITE, Not Evaluated by an Arborist	-	-	Preserve
11215	24	Coniferous	OFFSITE, Not Evaluated by an Arborist	-	-	Preserve
11219	22	Deciduous	OFFSITE, Not Evaluated by an Arborist	-	-	Preserve
11277	14	Deciduous	OFFSITE, Not Evaluated by an Arborist	-	-	Preserve
11351	14, 14	Hemlock (<i>Tsuga sp.</i>)	Codominant with 2' of included bark; Pruned; Some exposed roots	1	2	Improvements
11353	14	Hemlock (<i>Tsuga sp.</i>)	Previous codominant stem removed; Lean (N); Sweep; Exposed roots; Some cracks	2	2	Improvements
11355	8	Bigleaf Maple (<i>Acer macrophyllum</i>)	Codominant with included bark; Exposed roots; Lean (N); Decay; Cracks	2	3	Improvements
11429	27	Douglas-fir (<i>Pseudotsuga menziesii</i>)	OFFSITE, Pruned; Sap flow; Exposed roots; Crooked	1	2	Preserve
11430	18	Douglas-fir (<i>Pseudotsuga menziesii</i>)	OFFSITE, Pruned; Crooked; Exposed roots	1	1	Preserve
11431	27	Douglas-fir (<i>Pseudotsuga menziesii</i>)	OFFSITE, Pruned; Exposed roots	1	1	Preserve
11432	24	Douglas-fir (<i>Pseudotsuga menziesii</i>)	OFFSITE, Many surface roots; Pruned	1	2	Preserve
11515	14	Deciduous	OFFSITE, Not Evaluated by an Arborist	-	-	Preserve
11516	12	Deciduous	OFFSITE, Not Evaluated by an Arborist	-	-	Preserve
11527	24	Deciduous	OFFSITE, Not Evaluated by an Arborist	-	-	Preserve
11535	21	Deciduous	OFFSITE, Not Evaluated by an Arborist	-	-	Preserve
11536	19	Deciduous	OFFSITE, Not Evaluated by an Arborist	-	-	Preserve
11537	27	Coniferous	OFFSITE, Not Evaluated by an Arborist	-	-	Preserve
11546	37	Deciduous	OFFSITE, Not Evaluated by an Arborist	-	-	Preserve
11554	8	Cherry (<i>Prunus sp.</i>)	Crooked	1	2	Improvements
11556	10	Cherry (<i>Prunus sp.</i>)	Crooked	1	2	Improvements
11571	37	California Black Oak (<i>Quercus kelloggii</i>)	Many attachments at one point 20' from the ground; Some broken branches	1	2	Improvements
11573	12	Cherry (<i>Prunus sp.</i>)	Pruned; Decay; 1' long cavity with decay; Crooked; Bulges; Some dead branches	2	3	Improvements
11574	9	Cherry (<i>Prunus sp.</i>)	OFFSITE, Pruned; Decay; Crooked	1	2	Preserve
11596	34	Cedar (<i>Cedrus sp.</i>)	Pruned	1	1	Improvements
11597	24, 24	Cedar (<i>Cedrus sp.</i>)	Codominant with 3' of included bark; Pruned	1	2	Improvements
11598	32	Cedar (<i>Cedrus sp.</i>)	Codominant 5' above the ground with 4' of included bark between 3 stems	1	2	Improvements
11599	47	Cedar (<i>Cedrus sp.</i>)	Codominant with 5' of included bark; Pruned; Lean (SE) & Lean (N)	1	2	Improvements
11600	55	Cedar (<i>Cedrus sp.</i>)	Codominant with 3' of included bark; Pruned	1	2	Improvements
11607	9, 9, 9	Hemlock (<i>Tsuga sp.</i>)	Codominant with some included bark	1	2	Improvements
11608	9, 9	Hemlock (<i>Tsuga sp.</i>)	Codominant with some included bark; Crooked; Bulges	1	2	Improvements
11612	15, 16, 18	Hemlock (<i>Tsuga sp.</i>)	Codominant; Exposed roots; Pruned; Sweep	1	2	Improvements
11689	20	Pacific Madrone (<i>Arbutus menziesii</i>)	OFFSITE, Very sparse foliage; 95% dead; Crooked; Declining	3	2	Improvements
11739	16	Fir (<i>Abies sp.</i>)	Codominant top	1	2	Improvements
11740	19	Fir (<i>Abies sp.</i>)	Codominant top	1	2	Improvements
11741	17	Fir (<i>Abies sp.</i>)	Crooked	1	1	Improvements
11747	10, 18	Douglas-fir (<i>Pseudotsuga menziesii</i>)	Codominant; Pruned; 10" stem - Sweep	1	2	Improvements
11777	37	Maple (<i>Acer sp.</i>)	Pruned; Twisted stem; Bulges at base; Decay at base	2	2	Improvements
11778	12	Pine (<i>Pinus sp.</i>)	OFFSITE, Very crooked base	1	2	Improvements
11998	36	Atlas Cedar (<i>Cedrus atlantica</i>)	Bore holes; Many attachments at one point; Codominant with included bark; Deep cavities with decay	2	3	Improvements
11999	30	Atlas Cedar (<i>Cedrus atlantica</i>)	Bore holes; Codominant with included bark; Bulges	1	2	Improvements
30000	20	Sweet Cherry (<i>Prunus avium</i>)	Bulges; Decay; Cavities; Cracks	2	3	Improvements
30001	31	Maple (<i>Acer sp.</i>)	Pruned; Bulges at base; Crooked; Exposed roots; Twisted scaffolds	1	2	Improvements
30002	8, 8, 10, 10, 11	Cherry (<i>Prunus sp.</i>)	Cavity with decay; Codominant stems attached at one point; Cracks; Dead branches	3	3	Improvements
30003	9	Cedar (<i>Cedrus sp.</i>)		1	1	Improvements

Total # of Existing Trees Inventoried = 46

Total # of Existing Onsite Trees = 26

Total # of Existing Onsite Trees to be Preserved = 0
Total # of Existing Onsite Trees to be Removed = 26

Total # of Existing Offsite Trees = 20

Total # of Existing Offsite Trees to be Preserved = 18
Total # of Existing Offsite Trees to be Removed = 2

*Health Rating:

- 1 = Good Health - A tree that exhibits typical foliage, bark, and root characteristics, for its respective species, shows no signs of infection or infestation, and has a high level of vigor and vitality.
- 2 = Fair Health - A tree that exhibits some abnormal health characteristics and/or shows some signs of infection or infestation, but may be reversed or abated with supplemental treatment.
- 3 = Poor Health - A tree that is in significant decline, to the extent that supplemental treatment would not likely result in reversing or abating its decline.

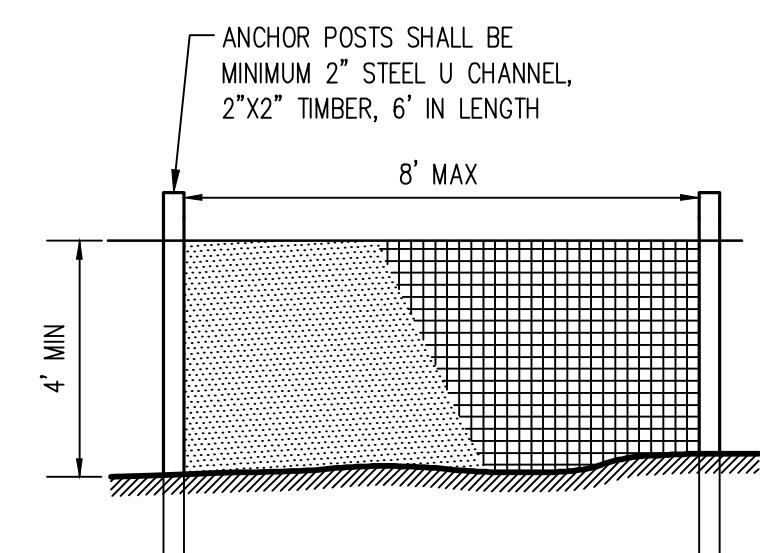
**Structure Rating:

- 1 = Good Structure - A tree that exhibits typical physical form characteristics, for its respective species, shows no signs of structural defects of the canopy, trunk, and/or root system.
- 2 = Fair Structure - A tree that exhibits some abnormal physical form characteristics and/or some signs of structural defects, which reduce the structural integrity of the tree, but are not indicative of imminent physical failure, and may be corrected using arboricultural abatement methods.
- 3 = Poor Structure - A tree that exhibits extensively abnormal physical form characteristics and/or significant structural defects that substantially reduces the structural viability of the tree, cannot feasibly be abated, and are indicative of imminent physical failure.

Arborist Disclosure Statement:

Arborists are tree specialists who use their education, knowledge, training, and experience to examine trees, recommend measures to enhance the health of trees, and attempt to reduce the risk of living near trees. The Client and Jurisdiction may choose to accept or disregard the recommendations of the arborist, or seek additional advice. Arborists cannot detect every condition that could possibly lead to the structural failure of a tree. Trees are living organisms that fail in ways we do not fully understand. Conditions are often hidden within trees and below ground. Arborists cannot guarantee that a tree will be healthy or safe under all circumstances, or for a specified period of time. Likewise, remedial treatments, like medicine, cannot be guaranteed. Trees can be managed, but they cannot be controlled. To live near trees is to accept some degree of risk. The only way to eliminate all risk associated with trees is to eliminate all trees. Neither this author nor AKS Engineering & Forestry, LLC have assumed any responsibility for liability associated with the trees on or adjacent to this site.

At the completion of construction, all trees should once again be reviewed. Land clearing and removal of adjacent trees can expose previously unseen defects and otherwise healthy trees can be damaged during construction.



- ANCHOR POSTS SHALL BE MINIMUM 2" STEEL U CHANNEL, 2"x2" TIMBER, 6' IN LENGTH
- ANCHOR POSTS MUST BE INSTALLED TO A DEPTH OF NO LESS THAN 1/3 THE TOTAL HEIGHT OF POST
- NOTES:
- CHAINLINK FENCE FOR TREE PROTECTION DEVICE OR APPROVED EQUAL.
 - AVOID DAMAGE TO CRITICAL ROOT ZONE. DO NOT DAMAGE OR SEVER LARGE ROOTS WHEN INSTALLING POSTS.
 - DEVICE SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION.

ARBORIST FIRM:
AKS ENGINEERING & FORESTRY, LLC
CONTACT: DAVID STEINKE
12965 SW HERMAN ROAD, SUITE 100
TUALATIN, OR 97062
PHONE: 503-563-6151
FAX: 503-563-6152

DAVID J. STEINKE
CERTIFIED ARBORIST
NO. 1231/16
STATE OF OREGON
EXPIRES 12/31/16

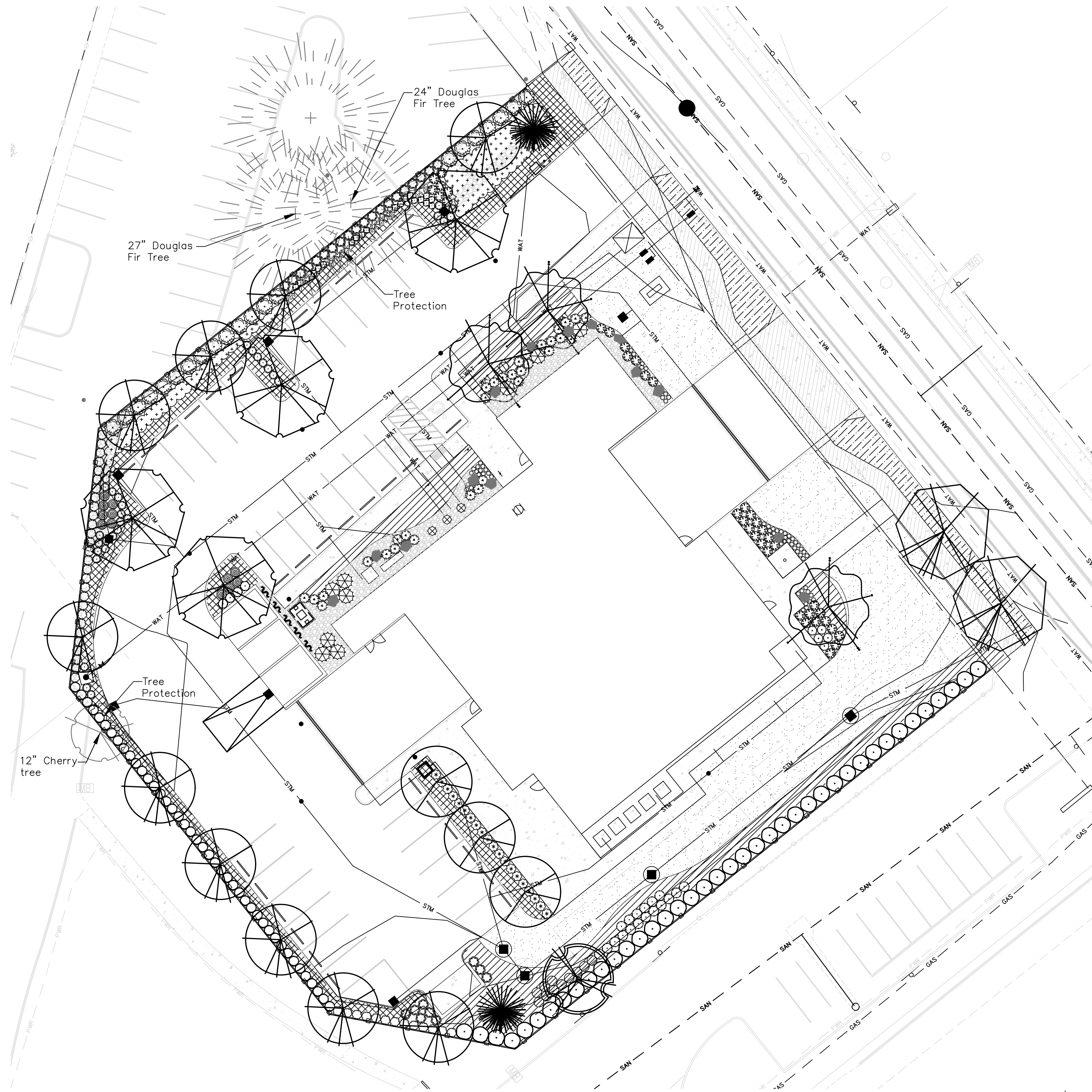
TREE PROTECTION FENCE

AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD. STE. 100
TUALATIN, OR 97062
P: 503.563.6151
F: 503.563.6152
aks-eng.com

ENGINEERING - SURVEYING - NATURAL RESOURCES
FORESTRY - PLANNING - LANDSCAPE ARCHITECTURE

AKS JOB NO. 4756

1:4/2018 5:31:20 PM



LANDSCAPE PLAN

SCALE 1" = 20'-0"

GENERAL NOTES:

1. Contractor is to verify all plant quantities.
2. Adjust plantings in the field as necessary.
3. Project is to be irrigated by an automatic, underground system, which will provide full coverage for all plant material. System is to be design/ build by Landscape Contractor. Guarantee system for a minimum one year. Show drip systems as alternate bid only.
4. All plants are to be fully foliated, well branched and true to form.
5. Height of shrubs in parking areas must not exceed 30".
6. Contractor is to notify Landscape Architect and/or Owner's Representative of any site changes or conditions that may be detrimental to plant health or cause future problems.

Total Developed Area = 54,680 SF

Total Landscaped Area = 18,004 SF or 33% of development area.

Total Parking Lot Area = 1996 SF

PLANT LIST:

SYM.	#	LATIN NAME/ COMMON NAME	SIZE	SPACING	MATURE HEIGHT OF SHRUBS
TREES					
	3	ACER GRISEUM Paper Bark Maple	1.5" cal.	As shown	
	3	CERCIS CANADENSIS Eastern Redbud	1.5" cal.	As shown	
	10	FRAXINUS OXYCARPA "RAYWOOD" Raywood Ash	2" cal.	As shown	
	2	GLEDISTIA TRIACANTHOS "SHADEMASTE" Shademaster Honeylocust	2" cal.	As shown	
	1	NYSSA SYLVATICA SOOR GUM	2" cal.	As shown	
	2	THUJA PLICATA "FASTIGIATA" Hogan Cedar	6-7'	As shown	
	4	ZELKOVA SERRATA "VILLAGE GREEN" Village Green Zelkova	2" cal.	As shown	
EXISTING NEIGHBOR TREES THAT OVERHANG SITE					
SHRUBS					
	12	ABELIA X GRANDIFLORA "KALEIDOSCOPE" Kaleidoscope Abelia	2 gal.	3' o.c.	2.5'
	21	ARBUTUS UNEDO Strawberry Tree	5 gal.	5' o.c.	10'
	58	CAREX HACHIOENSIS "EVERGOLD" Carex Evergold Sedge	1 gal.	18" o.c.	1'
	3	CUPRESSUS SEMPERVIRENS 'MONSHEL' PLANT PATENT # 12,933 Tiny Towers Italian Cypress	15 gal.	As shown	40'
	31	BERBERIS THUN. "CRIMSON PYGMY" Crimson Pygmy Barberry	1 gal.	30" o.c.	2'
	43	BERBERIS X GLADWYNENSIS 'WILLIAM PENN' William Penn Barberry	3' o.c.	2 gal.	4'
	20	BUXUS MICROPHYLLA "WINTER GREEN" Winter Green Littleleaf Boxwood	3' o.c.	2 gal.	3'
	41	ILEX CRENATA "GREEN ISLAND" Green Island Japanese Holly	2 gal.	3' o.c.	3'
	4	ILEX GLABRA "SHAMROCK" Shamrock Holly	2 gal.	3' o.c.	3.5'
	40	LIGUSTRUM JAPONICUM "TEXANUM" Texan Japanese Privet	5 gal.	5' o.c.	8'
	142	MAHONIA REPENS Creeping Mahonia	2 gal.	30" o.c.	1'
	19	MAHONIA NERVOSA Longleaf Mahonia	1 gal.	2' o.c.	4'
	32	NANDINA DOMESTICA "GULF STREAM" Gulf Stream Nandina	2 gal.	3' o.c.	3'
	37	PIERIS JAPONICA "CAVATINE" Cavatine Pieris	2 gal.	3' o.c.	2'
	3	PIERIS JAPONICA "MOUNTAIN FIRE" Mountain Fire Pieris	18"	4' o.c.	6'
	10	POLYSTICHUM MUNIUM Sword Fern	1 gal.	3' o.c.	3'
	5	RHODODENDRON "DORA AMATEIS" Dora Amateis Rhododendron	2 gal.	3' o.c.	4'
	18	ROSA "RADRAZZ" The Knock Out Rose	2 gal.	3' o.c.	3.5'
	11	SPIRAEA X BUM. "GOLDMOUND" Goldmound Spirea	2 gal.	3' o.c.	2.5'
	29	VACCINIUM OVATUM Evergreen Huckleberry	2 gal.	3' o.c.	3'
GROUNDCOVERS					
	212	ARCTOSTAPHYLOS UVA-URSI "MASS." Massachusetts Kinnikinnick	1 gal.	3' o.c.	
	156	EUONYMUS FORTUNEI "GRACILIS" Gracilis Wintercreeper Euonymus	1 gal.	3' o.c.	
	122	RUBUS CALYCNIOIDES "EMERALD CARPET" Emerald Carpet Bramble	1 gal.	3' o.c.	
VINES					
	6	TRACHELOSPERMUM JASMINOIDES Star Jasmine	1 gal.	As Shown	
FINE LAWN SEED AREA					
2"-4" DIAMETER RIVER ROCK					
FIELD ROCK MIN 18" X 16" X 12"					

NOT FOR CONSTRUCTION



38 NORTHWEST DAVIS, SUITE 300
PORTLAND, OR 97209
T 503.245.7100

1505 5TH AVE, SUITE 300
SEATTLE, WA 98101
T 206.576.1600

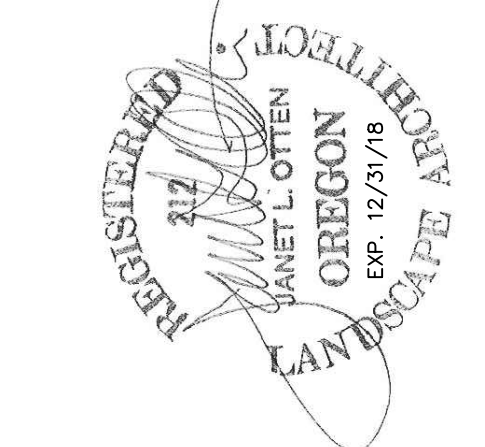
1014 HOWARD STREET
SAN FRANCISCO, CA 94103
T 415.252.7063

© ANKROM MOISAN ARCHITECTS, INC.

TV F&R STATION 39 - TUALATIN
7100 SW MCEWAN
TUALATIN, OR 97062

TUALATIN VALLEY FIRE & RESCUE

REVISION	DATE	REASON FOR ISSUE



ARCHITECTURAL REVIEW

CD PROGRESS SET

DATE 04/10/2018	PROJECT NUMBER 173470
--------------------	--------------------------

SHEET NUMBER

L1.0

OTTEN LANDSCAPE ARCHITECTS Inc. OIO

3933 SW Kelly Avenue • Suite B • Portland, Oregon 97239-4393
Phone (503) 972-0311 • www.ottenla.com

C:\Revit\Projects\173470-17-TVFR-39-TV-F&R-39-Landscape.dwg

TREE PRESERVATION NOTES:

PLACING MATERIALS NEAR TREES:

- NO PERSON MAY CONDUCT ANY ACTIVITY WITHIN THE TREE PROTECTION AREA OF ANY TREE DESIGNATED TO REMAIN, INCLUDING, BUT NOT LIMITED TO, PARKING EQUIPMENT, PLACING SOLVENTS, STORING BUILDING MATERIAL AND SOIL DEPOSITS, DUMPING CONCRETE WASHWATER.

ATTACHMENTS TO TREES:

- DURING CONSTRUCTION, NO PERSON SHALL ATTACH ANY OBJECT TO ANY TREE DESIGNATED FOR PROTECTION.

GRADING NEAR TREES:

- THE GRADE SHALL NOT BE ELEVATED OR REDUCED WITHIN THE TREE PROTECTION AREA OF TREES TO BE PRESERVED WITHOUT THE PROJECT ARBORIST'S AUTHORIZATION. THE PROJECT ARBORIST MAY ALLOW COVERAGE OF UP TO ONE HAIT OF THE AREA OF THE TREE'S OPTIMAL TREE ROOT PROTECTION ZONE WITH LIGHT SOILS (NO CLAY) TO THE MINIMUM DEPTH NECESSARY TO CARRY OUT GRADING OR LANDSCAPING PLANS, IF IT WILL NOT IMPAIR THE SURVIVAL OF THE TREE. AERATION DEVICES MAY BE REQUIRED TO ENSURE THE TREE'S SURVIVAL.
- IF THE GRADE ADJACENT TO A PRESERVED TREE IS RAISED SUCH THAT IT COULD SLOUGH OR ERODE INTO THE TREE PROTECTION AREA, IT SHALL BE PERMANENTLY STABILIZED TO PREVENT SUFFOCATION OF THE ROOTS.
- THE APPLICANT SHALL NOT INSTALL AN IMPERVIOUS SURFACE WITHIN THE TREE PROTECTION AREA WITHOUT THE AUTHORIZATION OF THE PROJECT ARBORIST. THE PROJECT ARBORIST MAY REQUIRE SPECIFIC CONSTRUCTION METHODS AND/OR USE OF AERATION DEVICES TO ENSURE THE TREE'S SURVIVAL AND TO MINIMIZE THE POTENTIAL FOR ROOT INDUCED DAMAGE TO THE IMPERVIOUS SURFACE.
- TO THE GREATEST EXTENT PRACTICAL, UTILITY TRENCHES SHALL BE LOCATED OUTSIDE OF THE TREE PROTECTION AREA. THE PROJECT ARBORIST MAY REQUIRE THAT UTILITIES BE TUNNELED UNDER THE ROOTS OF TREES TO BE RETAINED IF THE PROJECT ARBORIST DETERMINES THAT TRENCHING WOULD SIGNIFICANTLY REDUCE THE CHANCES OF THE TREE'S SURVIVAL.
- TREES AND OTHER VEGETATION TO BE RETAINED SHALL BE PROTECTED FROM EROSION AND SEDIMENTATION. CLEARING OPERATIONS SHALL BE CONDUCTED SO AS TO EXPOSE THE SMALLEST PRACTICAL AREA OF SOIL FOR THE LEAST POSSIBLE AMOUNT OF TIME. SHOULDS, GROUND COVER, AND STAMPS SHALL BE MAINTAINED TO CONTROL EROSION, WHERE FEASIBLE. WHERE NOT FEASIBLE, APPROPRIATE EROSION CONTROL PRACTICES SHALL BE IMPLEMENTED.

ADDITIONAL REQUIREMENTS:

- THE PROJECT ARBORIST MAY REQUIRE ADDITIONAL TREE PROTECTION MEASURES WHICH ARE CONSISTENT WITH ACCEPTED URBAN FORESTRY PRACTICES.

EXCAVATION WITHIN OPTIMAL TREE ROOT PROTECTION ZONES:

- EXCAVATION IN THE TOP 24 INCHES OF SOIL IN THE OPTIMAL TREE ROOT PROTECTION ZONE SHOULD BEGIN AT THE EXCAVATION LINE THAT IS CLOSEST TO THE TREE.
- THE EXCAVATION SHOULD BE DONE BY HAND/SHOVEL OR WITH AN EXCAVATOR AND A PERSON WITH A SHOVEL, PRUNING SHEARS, AND A PRUNING SAW.
- IF DONE BY HAND, ALL ROOTS 1-INCH DIAMETER OR LARGER SHOULD BE PRUNED AT THE EXCAVATION LINE.
- IF DONE WITH AN EXCAVATOR (MOST LIKELY SCENARIO), THEN THE OPERATOR SHALL START THE CUT AT THE EXCAVATION LINE AND CAREFULLY "FEEL" FOR ROOTS/RESISTANCE. WHEN THERE IS RESISTANCE, THE PERSON WITH THE SHOVEL/HAND DIGS AROUND THE ROOTS AND PRUNES THE ROOTS 1-INCH DIAMETER OR LARGER.
- THE EXCAVATOR IS TO REMAIN OFF OF THE TREE ROOTS TO BE PRESERVED AT ALL TIMES.
- ALL ROOTS SHALL BE CUT CLEANLY WITH PRUNING SHEARS OR A PRUNING SAW.
- THE PROJECT ARBORIST MUST BE ON SITE DURING ANY WORK WITHIN THE OPTIMAL TREE ROOT PROTECTION ZONE THAT IS WITHIN THE TREE PROTECTION AREA.

PRUNING/TREE REMOVAL NOTES:

- THE CONTRACTOR SHALL PROVIDE AN ADEQUATE CREW OF PERSONNEL, EQUIPMENT, AND MATERIALS TO SAFELY AND EFFICIENTLY COMPLETE THE ASSIGNED WORK. EACH SUCH CREW SHALL INCLUDE AN INDIVIDUAL WHO SHALL BE DESIGNATED AS THE CREW SUPERVISOR, BE RESPONSIBLE FOR THE CREW'S ACTIVITIES, RECEIVE INSTRUCTION FROM THE OWNER OR THE OWNER'S REPRESENTATIVE, AND DIRECT THE CREW TO ACCOMPLISH SUCH WORK.
- WHENEVER A TREE, WHICH IS NOT SCHEDULED TO BE REMOVED, MUST BE TRIMMED OR PRUNED, THE CONTRACTOR SHALL ENSURE THAT SUCH TRIMMING AND PRUNING IS CARRIED OUT UNDER THE DIRECT SUPERVISION OF A CERTIFIED ARBORIST. ALL PRUNING AND TRIMMING SHALL BE PERFORMED IN ACCORDANCE WITH THE PROVISIONS OF AND ALSO STANDARD PRACTICES FOR TREE, SHRUB AND OTHER WOODY PLANT MAINTENANCE.
- UNLESS AS OTHERWISE DIRECTED BY THE OWNER, ROOT BALLS FROM TREES BEING REMOVED SHALL BE COMPLETELY REMOVED UNLESS THE ROOT REMOVAL CROSSSES OVER ADJACENT PROPERTIES OR WOULD COMPROMISE TREES BEING PRESERVED. IN THOSE CASES, THE STUMPS SHALL BE GROUND AS NECESSARY SO AS NOT TO CAUSE DAMAGE TO THE ROOT ZONES OF ADJACENT TREES TO BE PRESERVED ON THE SUBJECT PARCEL OR ADJUTING PARCELS. STUMPS NEAR PROPERTY LINES SHALL ALSO BE GROUND AS NECESSARY SO AS NOT TO CAUSE INTERFERENCE TO ADJACENT PARCELS.
- THE CONTRACTOR SHALL PERFORM ALL WORK IN ACCORDANCE WITH THE LATEST GOVERNMENTAL SAFETY REGULATIONS. ALL WORK SHALL BE PERFORMED IN STRICT ACCORDANCE WITH AND 2133.1 "PRUNING, TRIMMING, REPAIRING, MAINTAINING AND REMOVING TREES AND CUTTING BRUSH-SAFETY REQUIREMENTS" WITH SPECIAL EMPHASIS GIVEN TO THE REQUIREMENT THAT ONLY QUALIFIED LINE-CLEARANCE TREE TRIMMERS BE ASSIGNED TO WORK WHERE A POTENTIAL ELECTRICAL HAZARD EXISTS.
- THE CONTRACTOR SHALL MAKE ALL THE NECESSARY ARRANGEMENTS WITH ANY UTILITY THAT MUST BE PROTECTED OR RELOCATED IN ORDER TO ACCOMPLISH THE WORK. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE PROTECTION OF THE OPERATING CONDITION OF ALL ACTIVE UTILITIES WITHIN THE AREA OF CONSTRUCTION AND SHALL TAKE ALL NECESSARY PRECAUTIONS TO AVOID DAMAGE TO EXISTING UTILITIES.
- ANY MATERIAL RESULTING FROM THE TRIMMING OR REMOVAL OF ANY TREES SHALL BECOME THE RESPONSIBILITY OF THE CONTRACTOR TO DISPOSE OF.
- HAZARDOUS TREE REPORTING: ANY PERSON ENGAGED IN TRIMMING OR PRUNING WHO BECOMES AWARE OF A TREE OF DOUBTFUL STRENGTH, THAT COULD BE DANGEROUS TO PERSONS AND PROPERTY, SHALL NOTIFY SUCH TREE(S) TO THE OWNER OR THE OWNER'S REPRESENTATIVE. SUCH TREES SHALL INCLUDE THOSE THAT ARE OVER MATURE, DISEASED, OR SHOWING SIGNS OF DECAY OR OTHER STRUCTURAL WEAKNESS.
- TREES DETERMINED TO BE A HAZARD SHALL BE REMOVED AS SOON AS POSSIBLE.
- DAMAGES: ANY DAMAGE CAUSED BY THE CONTRACTOR, INCLUDING, BUT NOT LIMITED TO, BROKEN SIDEWALK, CURB, RUTTED LAWN, BROKEN WATER SHUT-OFFS, WIRE DAMAGE, BUILDING DAMAGE, STREET DAMAGE, ETC., WILL BE REPAIRED OR REPLACED IN A TIMELY MANNER, TO THE OWNER'S SATISFACTION, AND ALL COSTS PAID BY THE CONTRACTOR.
- ANY BRUSH CLEARING REQUIRED WITHIN THE TREE PROTECTION AREA SHALL BE ACCOMPLISHED WITH HAND OPERATED EQUIPMENT.
- TREES TO BE REMOVED SHALL BE FELLED SO AS TO FALL AWAY FROM OPTIMAL TREE ROOT PROTECTION ZONES AND TO AVOID PULLING AND BREAKING OF ROOTS TO REMAIN. DIRECTIONAL FELLING OF TREES SHALL BE USED TO AVOID DAMAGE TO TREES DESIGNATED FOR RETENTION.
- ALL DOWNED BRUSH AND TREES SHALL BE REMOVED FROM THE TREE PROTECTION AREA EITHER BY HAND OR WITH EQUIPMENT STAGED OUTSIDE OF THE TREE PROTECTION AREA. EXTRACTION SHALL OCCUR BY LIFTING THE MATERIAL OUT, NOT BY SKIDDING IT ACROSS THE GROUND.
- IF TEMPORARY HAIL OR ACCESS ROADS MUST PASS OVER TREE PROTECTION AREA, A ROWARD OF STEEL PLATES, OR 6 INCHES OF MULCH, OR 6 INCHES OF GRAVEL SHALL BE PLACED TO PREVENT SOIL COMPACTION IF DETERMINED NECESSARY BY THE PROJECT ARBORIST. THE ROWARD MATERIAL SHALL BE REPLACED AS NECESSARY TO MAINTAIN A 6-INCH DEPTH.
- PRUNING: THE CONTRACTOR SHALL CONSULT WITH THE PROJECT ARBORIST PRIOR TO ANY PRUNING ACTIVITIES NECESSARY FOR CONSTRUCTION ACTIVITIES. ALL PRUNING ACTIVITIES SHALL BE PERFORMED IN ACCORDANCE WITH AND ALSO PRUNING STANDARDS. PRUNING SHALL BE COMPLETED PRIOR TO THE START OF CONSTRUCTION ACTIVITIES.
- CUT BRANCHES AND ROOTS WITH SHARP PRUNING INSTRUMENTS THAT DO NOT CHIP OR TEAR.
- FENCING SHALL BE INSTALLED PRIOR TO ANY CONSTRUCTION ACTIVITIES, INCLUDING, BUT NOT LIMITED TO, CLEARING, GRADING, EXCAVATION, OR DEMOLITION WORK, AND SHALL BE REMOVED ONLY AFTER THE COMPLETION OF ALL CONSTRUCTION ACTIVITIES, INCLUDING LANDSCAPING AND IRRIGATION INSTALLATION.
- TREE PROTECTION FENCING SHALL BE FLUSH WITH THE INITIAL UNDISTURBED GRADE.

OUTLINE SPECIFICATIONS PLANTING AND SEEDING:

GENERAL: All plants shall conform to all applicable standards of the latest edition of the "American Association of Nurserymen Standards", A.N.S.I. Z60.1 - 1973. Meet or exceed the regulations and laws of Federal, State, and County regulations, regarding the inspection of plant materials, certified as free from hazardous insects, disease, and noxious weeds, and certified fit for sale in Oregon.

The apparent silence of the Specifications and Plans as to any detail, or the apparent omission from them of a detailed description concerning any point, shall be regarded as meaning that only the best general practice is to prevail and that only material and workmanship of first quality are to be used. All interpretations of these Specifications shall be made upon the basis above stated.

Landscape contractor shall perform a site visit prior to bidding to view existing conditions.

PERFORMANCE QUALITY ASSURANCE: Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary horticultural practices and who are completely familiar with the specified requirements and methods needed for the proper performance of the work of this section.

NOTIFICATION: Give Landscape Architect minimum of 2 days advance notice of times for inspections. Inspections at growing site does not preclude Landscape Architect's right of rejection of deficient materials at project site. Each plant failing to meet the above mentioned "Standards" or otherwise failing to meet the specified requirements as set forth shall be rejected and removed immediately from the premises by the Contractor and at his expense, and replaced with satisfactory plants or trees conforming to the specified requirements.

SUBSTITUTIONS: Only as approved by the Landscape Architect or the Owner's Representative.

GUARANTEE AND REPLACEMENT: All plant material shall be guaranteed from final acceptance for two full growing season. During this period the Contractor shall replace any plant material that is not in good condition and producing new growth (except that material damaged by severe weather conditions, due to Owner's negligence, normally unforeseen peculiarities of the planting site, or lost due to vandalism). Guarantee to replace, at no cost to Owner, unacceptable plant materials with plants of same variety, age, size and quality as plant originally specified. Conditions of guarantee on replacement plant shall be same as for original plant.

Landscape Contractor shall keep on site for Owner's Representative's inspection, all receipts for soil amendment and topsoil deliveries.

PROTECTION Protect existing roads, sidewalks, and curbs, landscaping, and other features remaining as final work. Verify location of underground utilities prior to doing work. Repair and make good any damage to service lines, existing features, etc. caused by landscaping installation.

PLANT QUALITY ASSURANCE: Deliver direct from nursery. Maintain and protect roots of plant material from drying or other possible injury. Store plants in shade and protect them from weather immediately upon delivery, if not to be planted within four hours.

Nursery stock shall be healthy, well branched and rooted, formed true to variety and species, full foliated, free of disease, injury, defects, insects, weeds, and weed roots. Trees shall have straight trunks, symmetrical tips, and have an intact single leader. Any trees with double leaders will be rejected upon inspection. All Plants: True to name, with one of each bundle or lot tagged with the common and botanical name and size of the plants in accordance with standards of practice of the American Association of Nurserymen, and shall conform to the Standardized Plant Names, 1942 Edition.

Container grown stock: Small container-grown plants, furnished in removable containers, shall be well rooted to ensure healthy growth. **Grow container plants in containers a minimum of one year** prior to delivery, with roots filling container but not root bound. Bare root stock: Roots well-branched and fibrous. Balled and burlapped (B&B): Ball shall be of natural size to ensure healthy growth. Ball shall be firm and the burlap sound. No loose or made ball will be acceptable.

TOPSOIL AND FINAL GRADES: Landscape Contractor is to verify with the General Contractor if the on site topsoil is or is not conducive to proper plant growth. Supply alternate bid for imported topsoil.

Landscape Contractor is to supply and place 12" of topsoil in planting beds and 6" in lawn areas. If topsoil stockpiled on site is not conducive to proper plant growth, the Landscape Contractor shall import the required amount. Landscape Contractor is to submit samples of the imported soil and/or soil amendments to the Landscape Architect. The topsoil shall be a sandy loam, free of all weeds and debris inimical to lawn or plant growth.

Landscaping shall include finished grades and even distribution of topsoil to meet planting requirements. Grades and slopes shall be as indicated. Planting bed grades shall be approximately 3" below adjacent walks, paving, finished grade lines, etc., to allow for bark application. Finish grading shall remove all depressions or low areas to provide positive drainage throughout the area.

PLANTING SPECIFICATIONS:

HERBICIDES: Prior to soil preparation, all areas showing any undesirable weed or grass growth shall be treated with Round-up in strict accordance with the manufacturer's instructions.

SOIL PREPARATION: Work all areas by rototilling to a minimum depth of 8". Remove all stones (over 1 1/2" size), sticks, mortar, large clumps of vegetation, roots, debris, or extraneous matter turned up in working. Soil shall be of a homogeneous fine texture. Level, smooth and lightly compact area to plus or minus .10 of required grades.

In groundcover areas add 2" of compost (or as approved) and till in to the top 6" of soil.

PLANTING HOLE: Lay out all plant locations and excavate all soils from planting holes to 2 1/2 times the root ball or root system width. Loosen soil inside bottom of plant hole. Dispose of any "subsoil" or debris from excavation. Check drainage of planting hole with water, and adjust any area showing drainage problems.

SOIL MIX: Prepare soil mix in each planting hole by mixing:
2 part native topsoil (no subsoil)
1 part compost (as approved)

Thoroughly mix in planting hole and add fertilizers at the following rates:

- Small shrubs - 1/8 lb./ plant
- Shrubs - 1/3 to 1/2 lb./ plant
- Trees - 1/3 to 1 lb./ plant

FERTILIZER: For trees and shrubs use Commercial Fertilizer "A" (Inorganic 5-4-3) with micro-nutrients and 50% slow releasing nitrogen. For initial application in fine seed lawn areas use Commercial Fertilizer "B" (8-16-8) with micro-nutrients and 50% slow-releasing nitrogen. For lawn maintenance use Commercial Fertilizer "C" (22-16-8) with micro-nutrients and 50% slow-releasing nitrogen. **DO NOT** apply fertilizer to Water Quality Swale.

PLANTING TREES AND SHRUBS: Plant upright and face to give best appearance or relationship to adjacent plants and structures. Place 6" minimum, lightly compacted layer of prepared planting soil under root system. Loosen and remove twine binding and burlap from top 1/2 of root balls. Cut off cleanly all broken or frayed roots, and spread roots out. Stagger Plants in rows. Backfill planting hole with soil mix while working each layer to eliminate voids.

When approximately 2/3 full, water thoroughly, then allow water to soak away. Place remaining backfill and dish surface around plant to hold water. Final grade should keep root ball slightly above surrounding grade, not to exceed 1". Water again until no more water is absorbed. Initial watering by irrigation system is not allowed.

STAKING OF TREES: Stake or guy all trees. Stakes shall be 2" X 2" (nom.) quality tree stakes with point. They shall be of Douglas Fir, clear and sturdy. Stake to be minimum 2/3 the height of the tree, not to exceed 8'-0". Drive stake firmly 1'-6" below the planting hole. Tree ties for deciduous trees shall be "Chainlock" (or better). For Evergreen trees use "Gro-Strait" Tree Ties (or a reinforced rubber hose and guy wires) with guy wires of a minimum 2 strand twisted 12 ga. wire. Staking and guying shall be loose enough to allow movement of tree while holding tree upright.

MULCHING OF PLANTINGS: Mulch planting areas with dark, aged, medium grind fir or hemlock bark (aged at least 6 months) to a depth of 2" in ground cover areas and 2 1/2" in shrub beds. Apply evenly, not higher than grade of plant as it came from the nursery, and rake to a smooth finish. Water thoroughly, then hose down planting area with fine spray to wash leaves of plants.

FINE LAWN AREAS: In fine lawn area apply Commercial Fertilizer Mix "B" at 4.5 lbs. Per 1,000 sq.ft. and rake into soil surface. Establish an even, fine textured seedbed meeting grades, surfaces and texture. Sow seed with a mechanical spreader at the uniform rates as noted below. Rake seed lightly to provide cover.

SEED: Blue oat grass seed conforming to applicable State laws. No noxious weed seeds. Submit Guaranteed analysis.
Fine Lawn Seed Mix: To contain 50% Top Hat Perennial Ryegrass, 30% Derby Supreme Ryegrass, 20% Longfellow Chewings Fescue (Hobbs and Hopkins Pro-Time 303 Lawn Mix or as approved) Sow Seed at 5 lbs. / 1000 sq. ft.

MAINTENANCE OF SEEDED AREAS:
Fine Lawn Areas: The lawn areas shall be maintained by watering, mowing, reseeding, and weeding for a minimum of 60 days after seeding. After 30 days, or after the second mowing, apply Commercial Fertilizer Mix "C" at 5 lbs. per 1,000 sq. ft. Mow and keep at 1 1/2" to 2" in height. Remove clippings and dispose of off site.

GENERAL MAINTENANCE: Protect and maintain work described in these specifications against all defects of materials and workmanship, through final acceptance. Replace plants not in normal healthy condition at the end of this period. Water, weed, cultivate, mulch, reset plants to proper grade or upright position, remove dead wood and do necessary standard maintenance operations. Irrigate when necessary to avoid drying out of plant materials, and to promote healthy growth.

CLEAN-UP: At completion of each division of work all extra material, supplies, equipment, etc., shall be removed from the site. All walks, paving, or other surfaces shall be swept clean, mulch areas shall have debris removed and any soil cleared from surface. All areas of the project shall be kept clean, orderly and complete.

NOT FOR CONSTRUCTION



38 NORTHWEST DAVIS, SUITE 300
PORTLAND, OR 97209
T 503.245.7100

1505 5TH AVE, SUITE 300
SEATTLE, WA 98101
T 206.576.1600

1014 HOWARD STREET
SAN FRANCISCO, CA 94103
T 415.252.7063

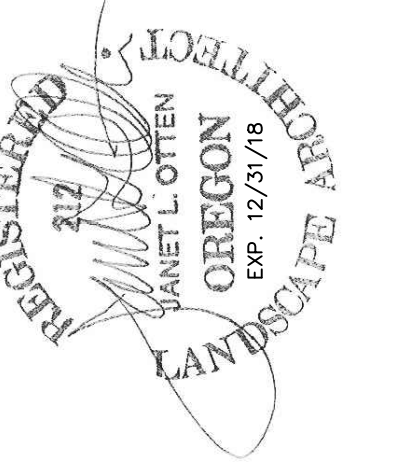
© ANKROM MOISAN ARCHITECTS, INC.

TV F&R STATION 39 - TUALATIN

7100 SW MCEWAN
TUALATIN, OR 97062

TUALATIN VALLEY FIRE & RESCUE

REVISION	DATE	REASON FOR ISSUE



DETAILS AND SPECS.

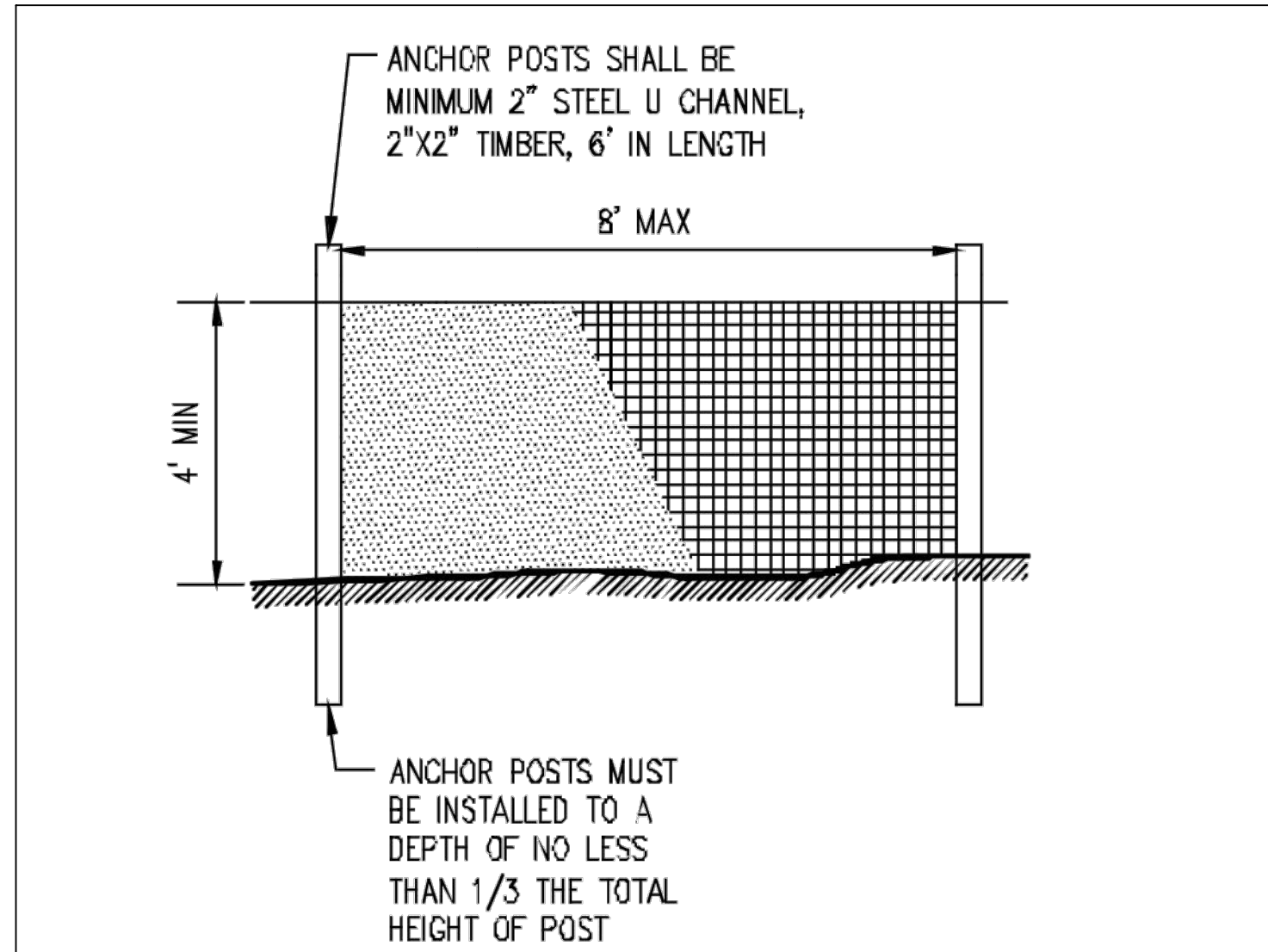
ARCHITECTURAL REVIEW

DATE 04/10/2018	PROJECT NUMBER 173470
--------------------	--------------------------

SHEET NUMBER

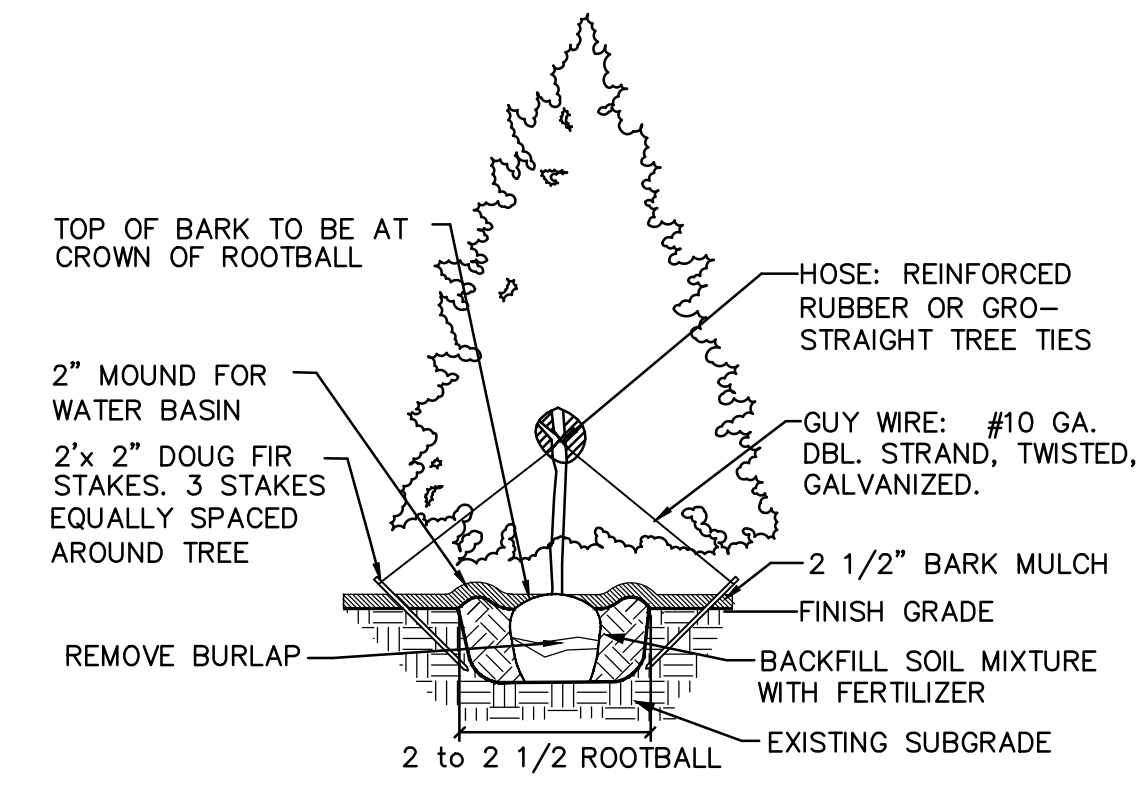
L2.0

OTTEN LANDSCAPE ARCHITECTS, INC. 3933 SW Kelly Avenue • Suite B • Portland, Oregon Phone (503) 972-0311 • www.ottelma.com 97239-4393

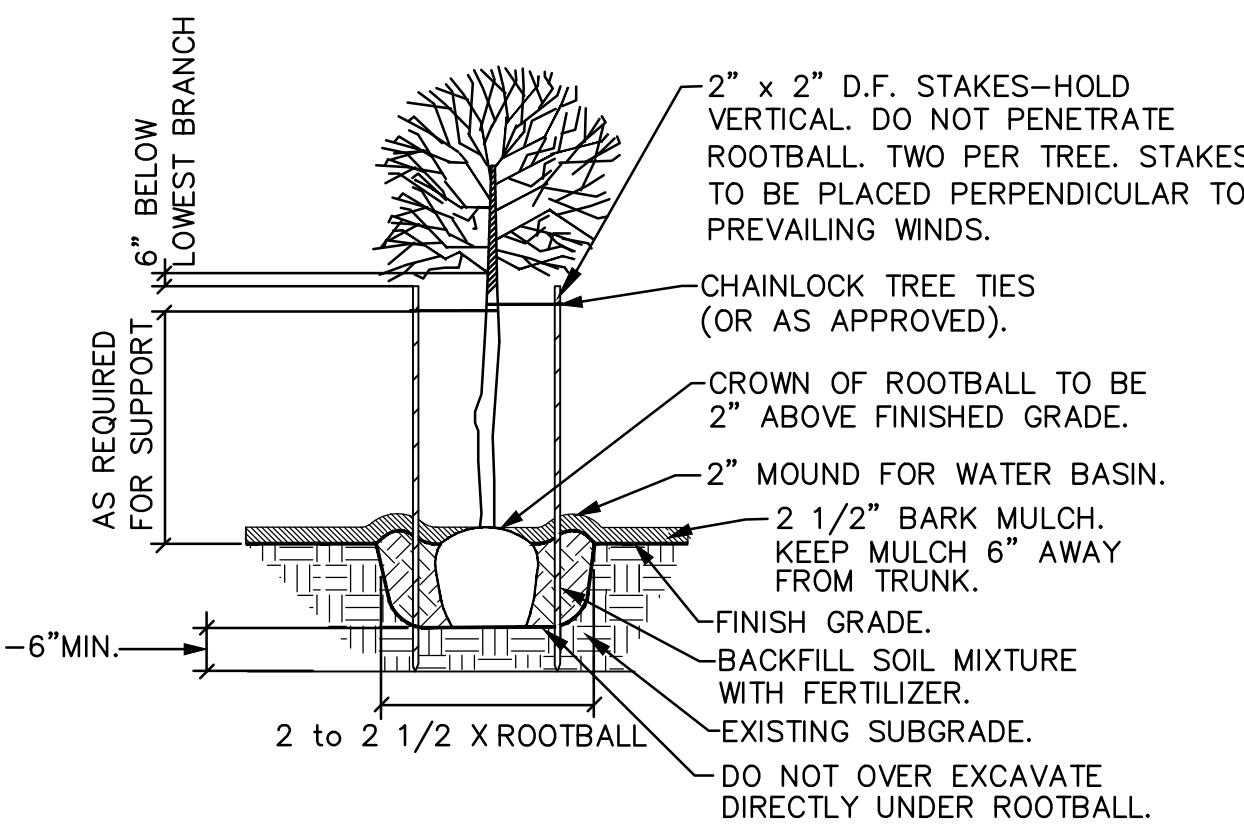


- NOTES:
- CHAINLINK FENCE FOR TREE PROTECTION DEVICE OR APPROVED EQUAL.
 - AVOID DAMAGE TO CRITICAL ROOT ZONE. DO NOT DAMAGE OR SEVER LARGE ROOTS WHEN INSTALLING POSTS.
 - DEVICE SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION.

TREE PROTECTION / CONSTRUCTION FENCE

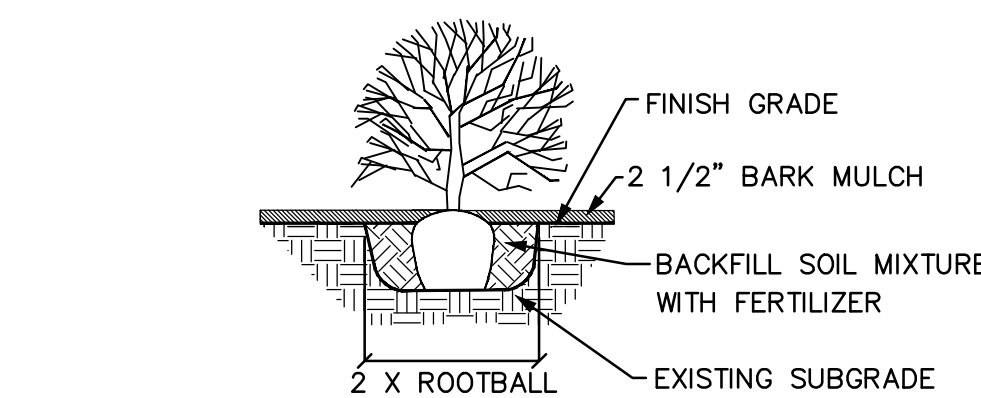


EVERGREEN TREE STAKING DETAIL NOT TO SCALE



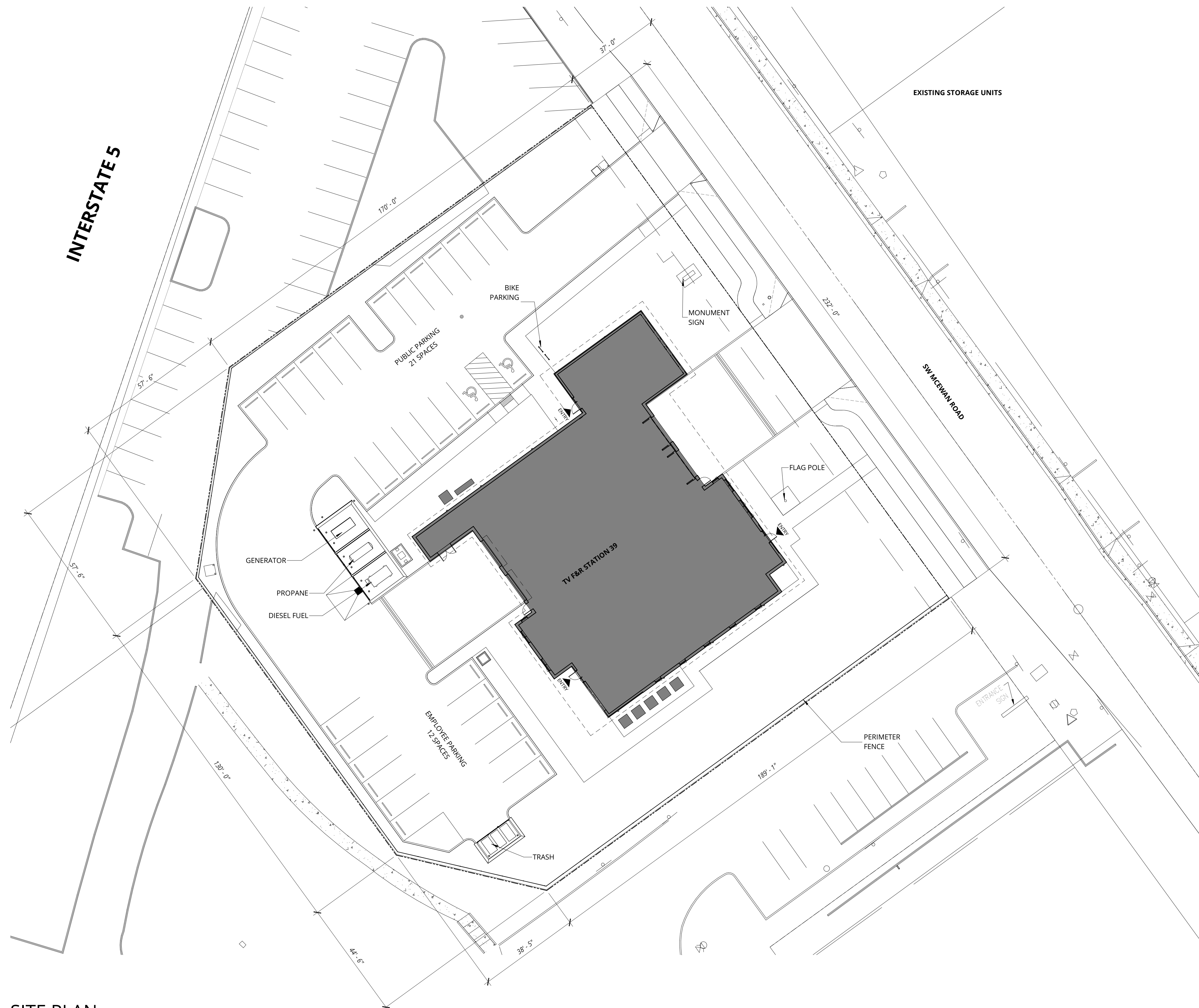
NOTE: ANY PROPOSED CHANGES TO OUR SPECIFICATION OR DETAIL SHOULD BE APPROVED BY THE LANDSCAPE ARCHITECT. LIKEWISE, IN ACCORDANCE WITH BEST PRACTICES OF LOCAL LANDSCAPE INSTALLATION, SHOULD THE LANDSCAPE CONTRACTOR FIND A PREFERRED ALTERNATE METHOD, THE LANDSCAPE ARCHITECT MAY BE SO ADVISED.

GENERAL DECIDUOUS TREE PLANTING DETAIL NOT TO SCALE

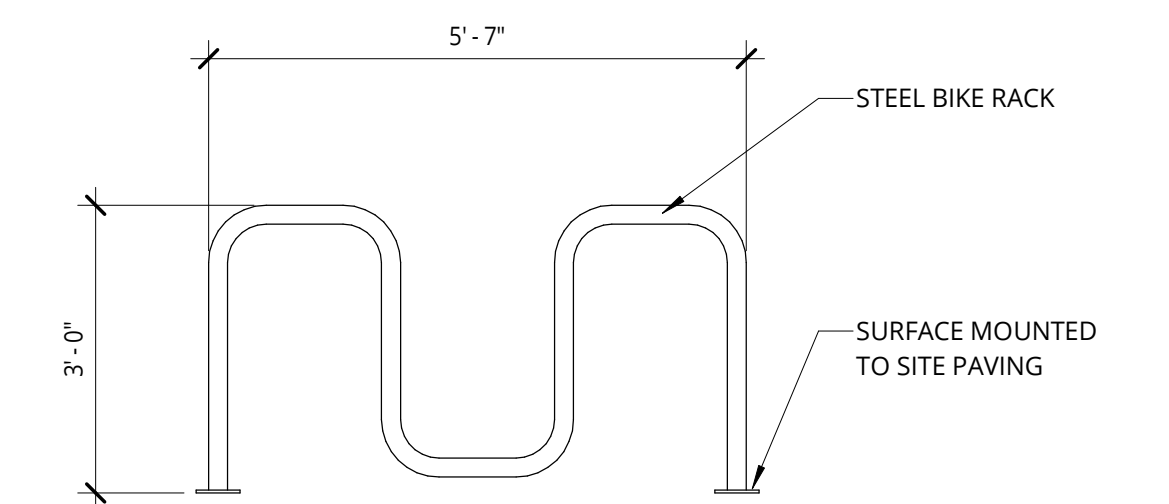


SHRUB PLANTING DETAIL NOT TO SCALE

SITE PLAN

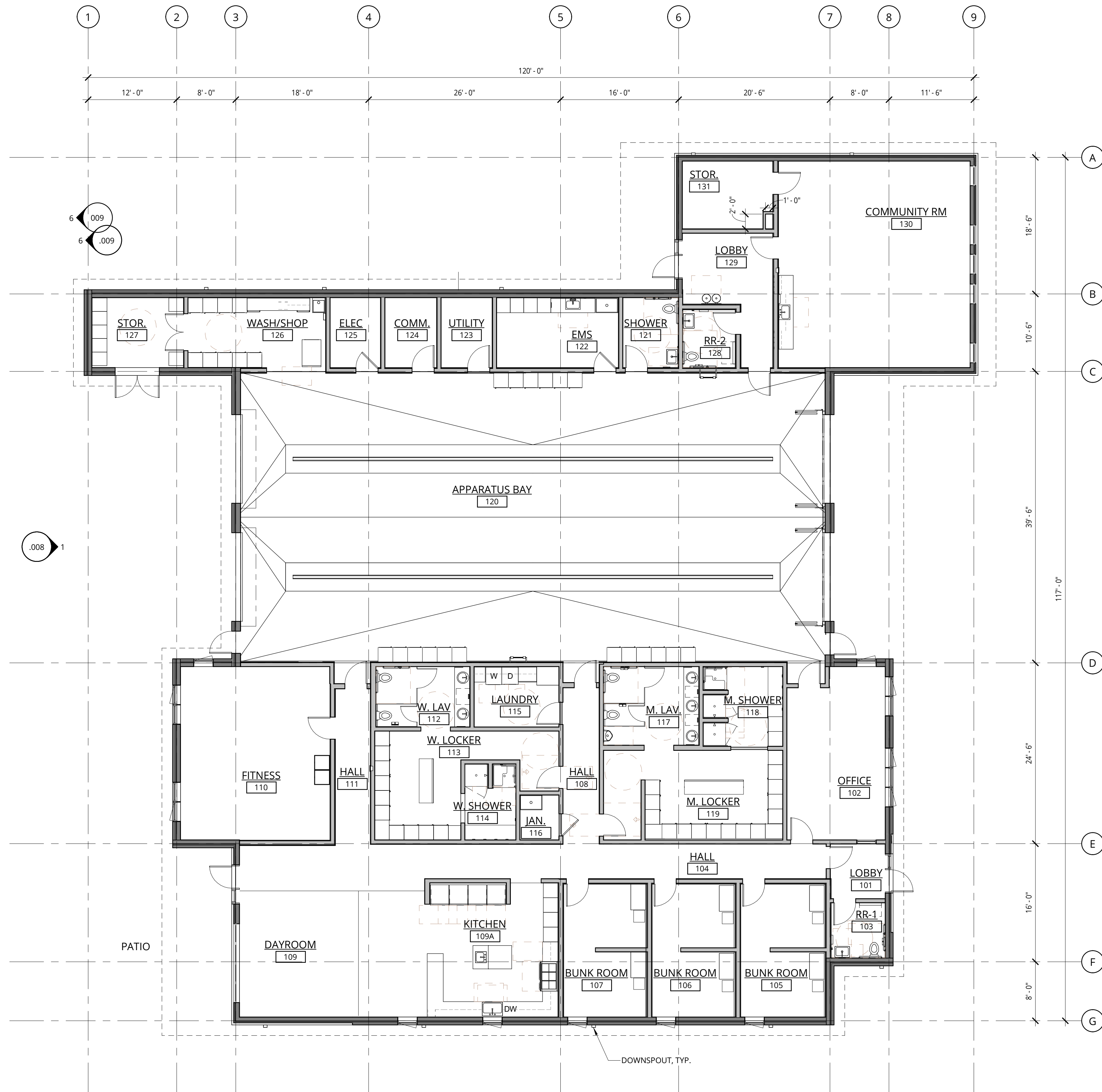


1 SITE PLAN
1" = 20'-0"

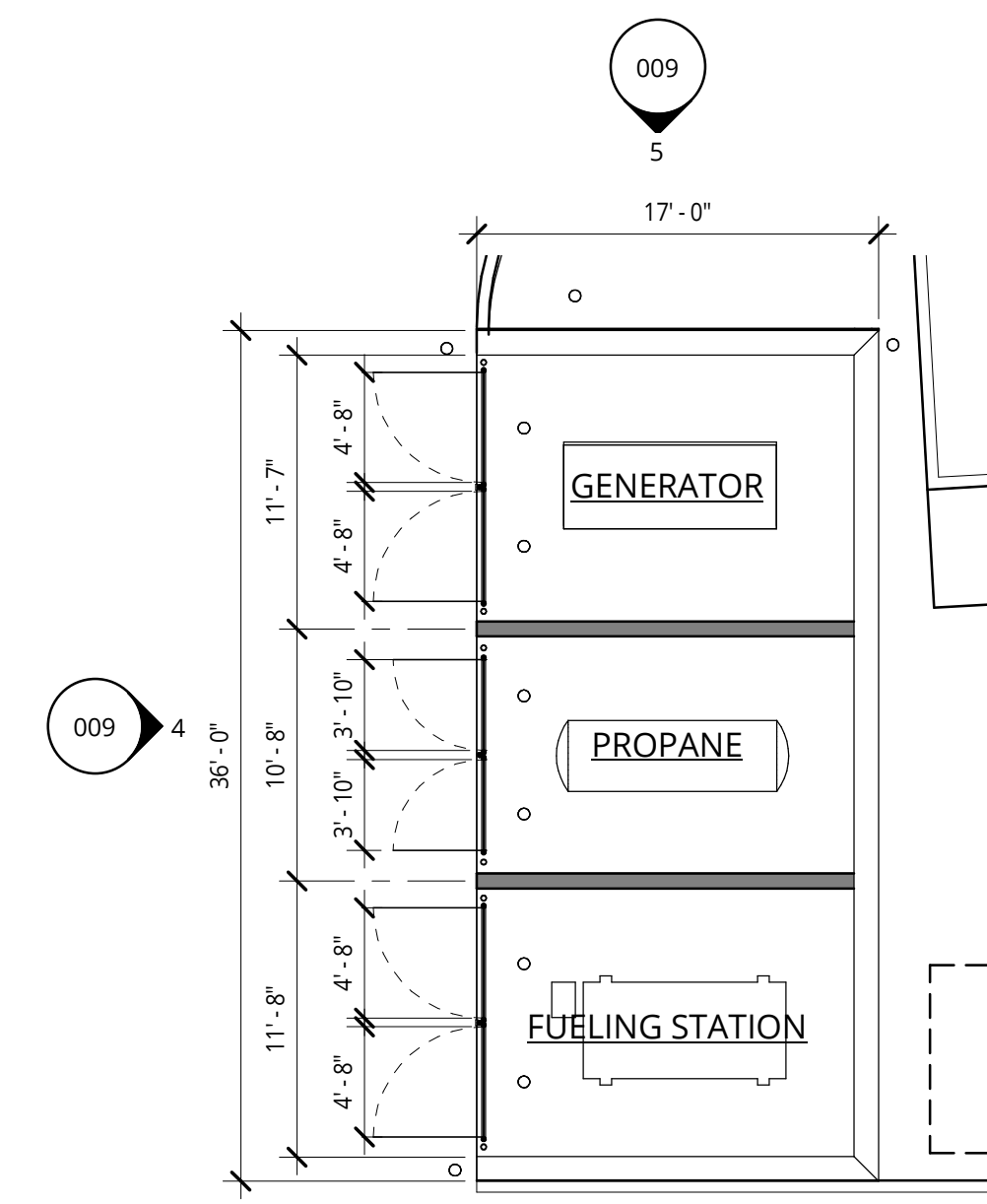


2 BIKE RACK
1/2" = 1'-0"

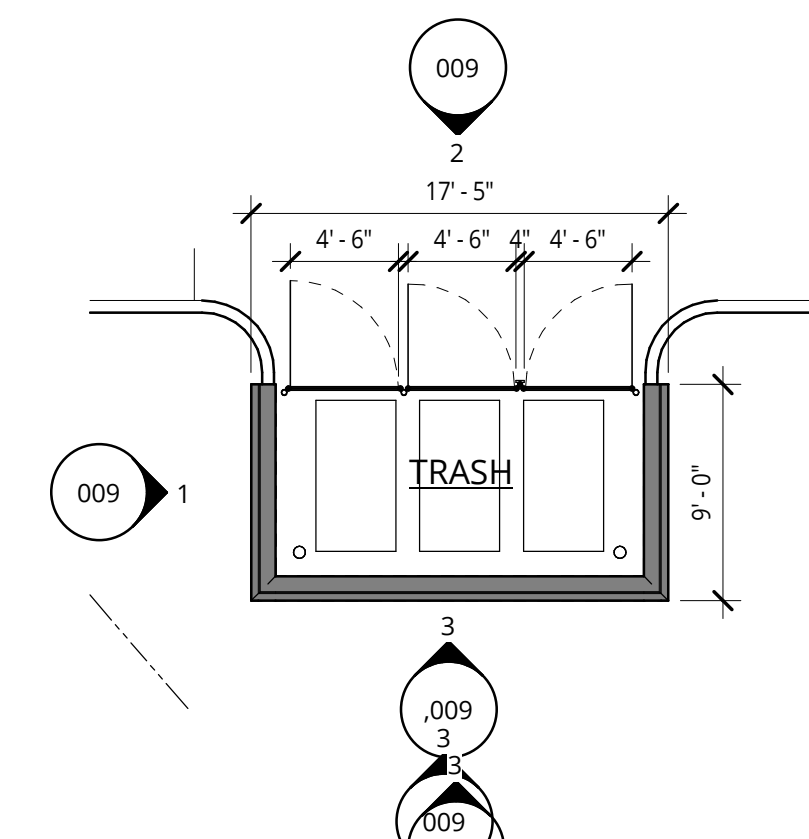
FLOOR PLAN



1 FLOOR PLAN
1/8" = 1'-0"

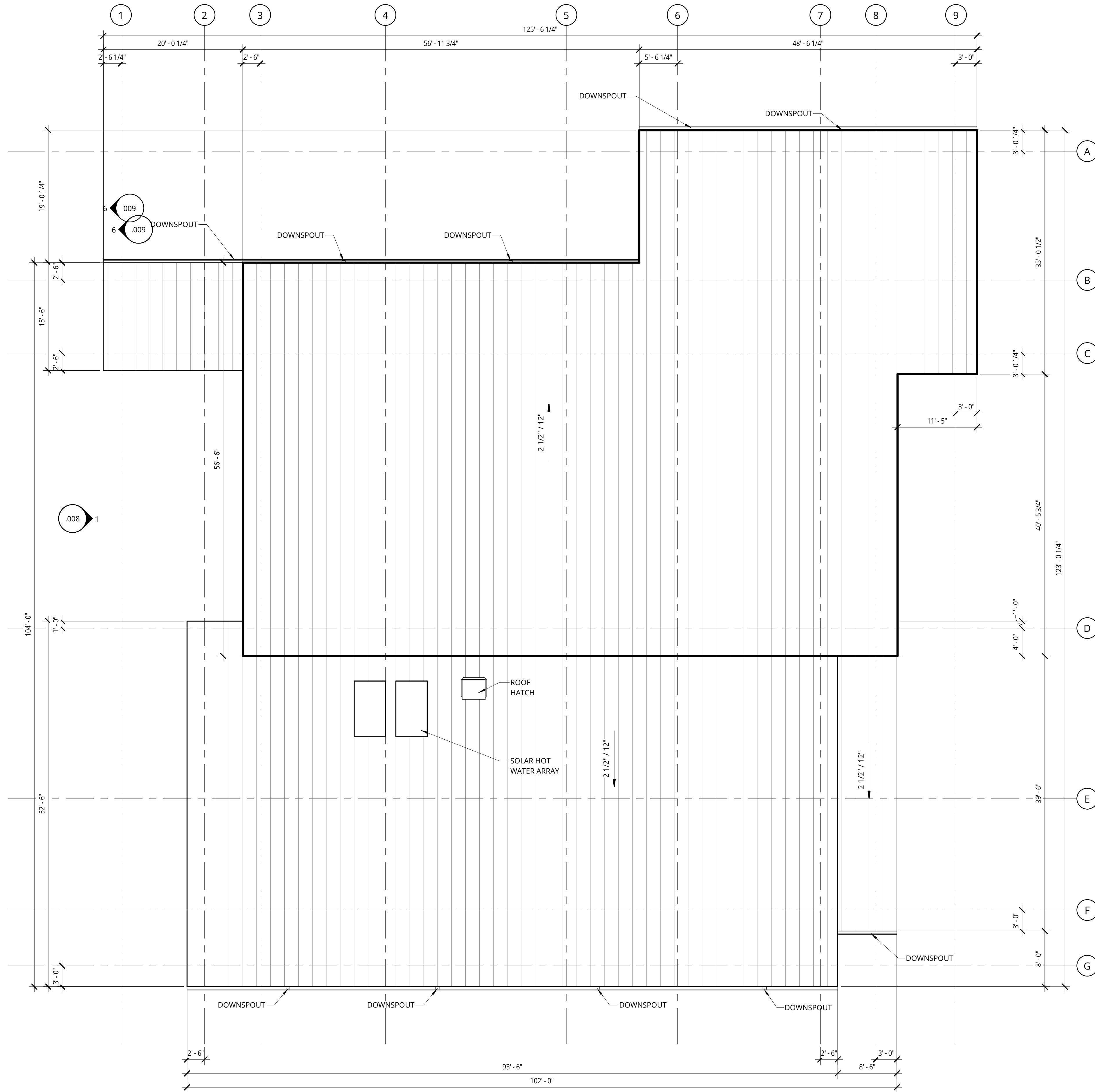


3 PROPANE / GENERATOR / FUELING ENCLOSURE
1/8" = 1'-0"



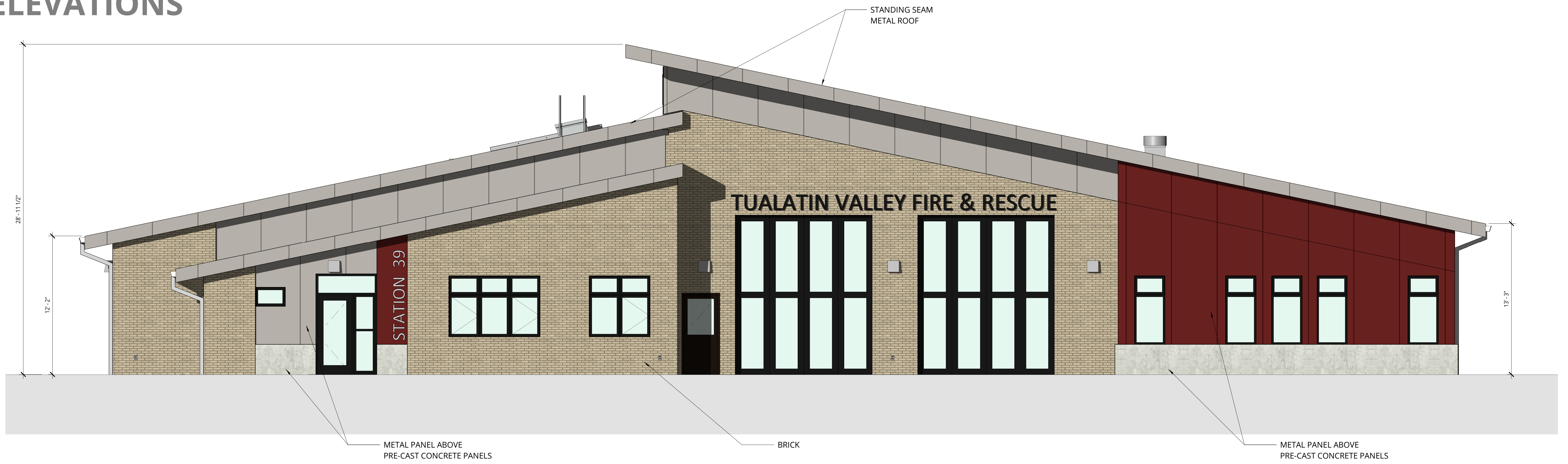
2 TRASH ENCLOSURE
1/8" = 1'-0"

ROOF PLAN



1 ROOF PLAN
1/8" = 1'-0"

ELEVATIONS

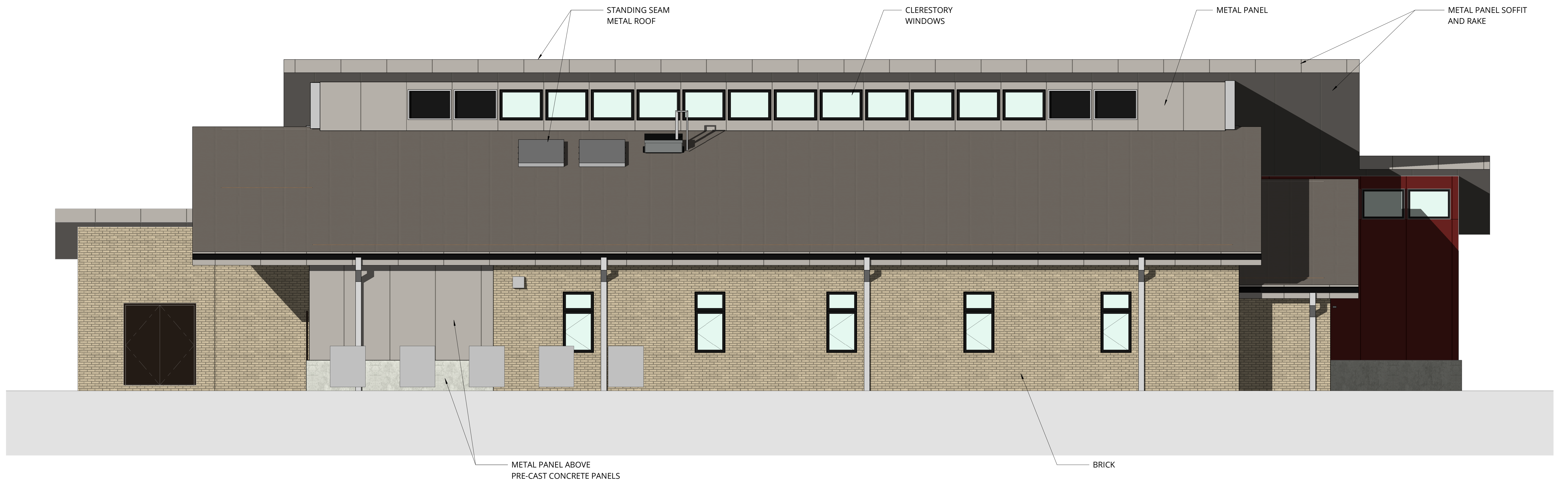


2 NORTH EAST ELEVATION
1/4" = 1'-0"



1 NORTH WEST ELEVATION
1/4" = 1'-0"

ELEVATIONS

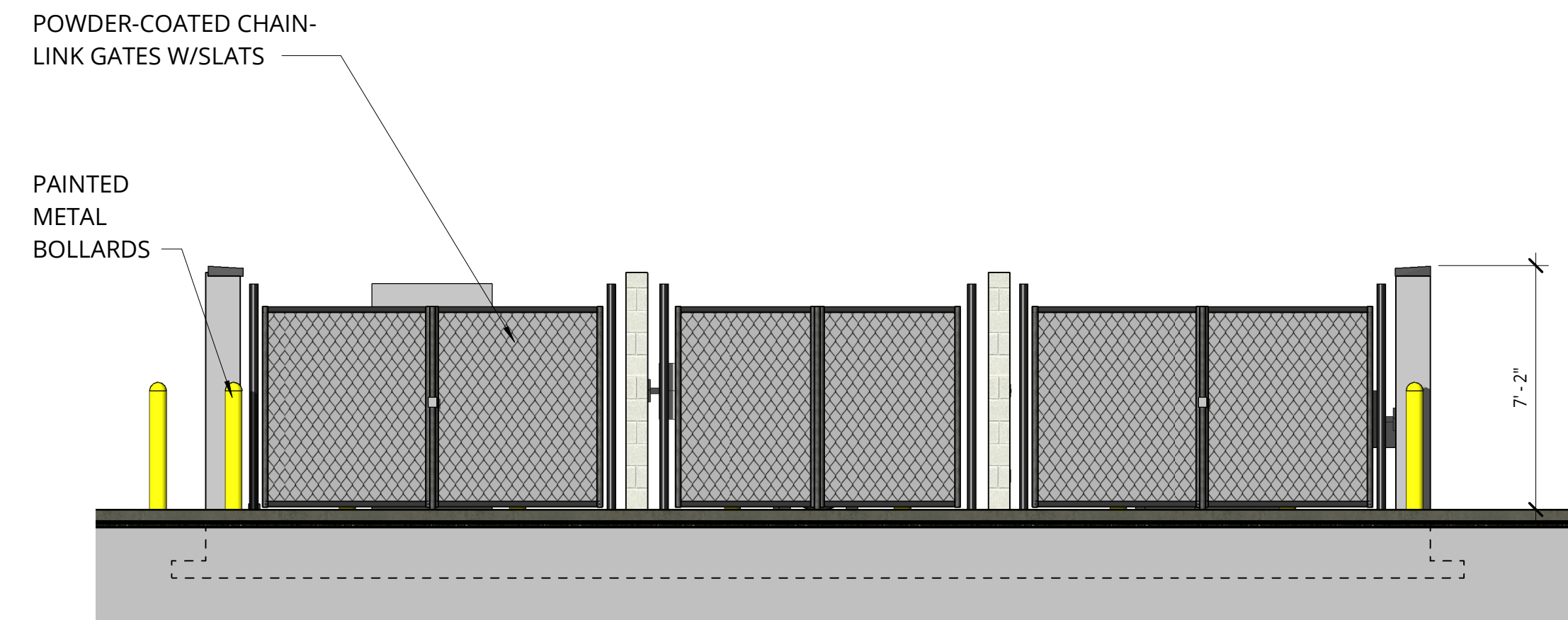


2 SOUTH EAST ELEVATION
1/4" = 1'-0"

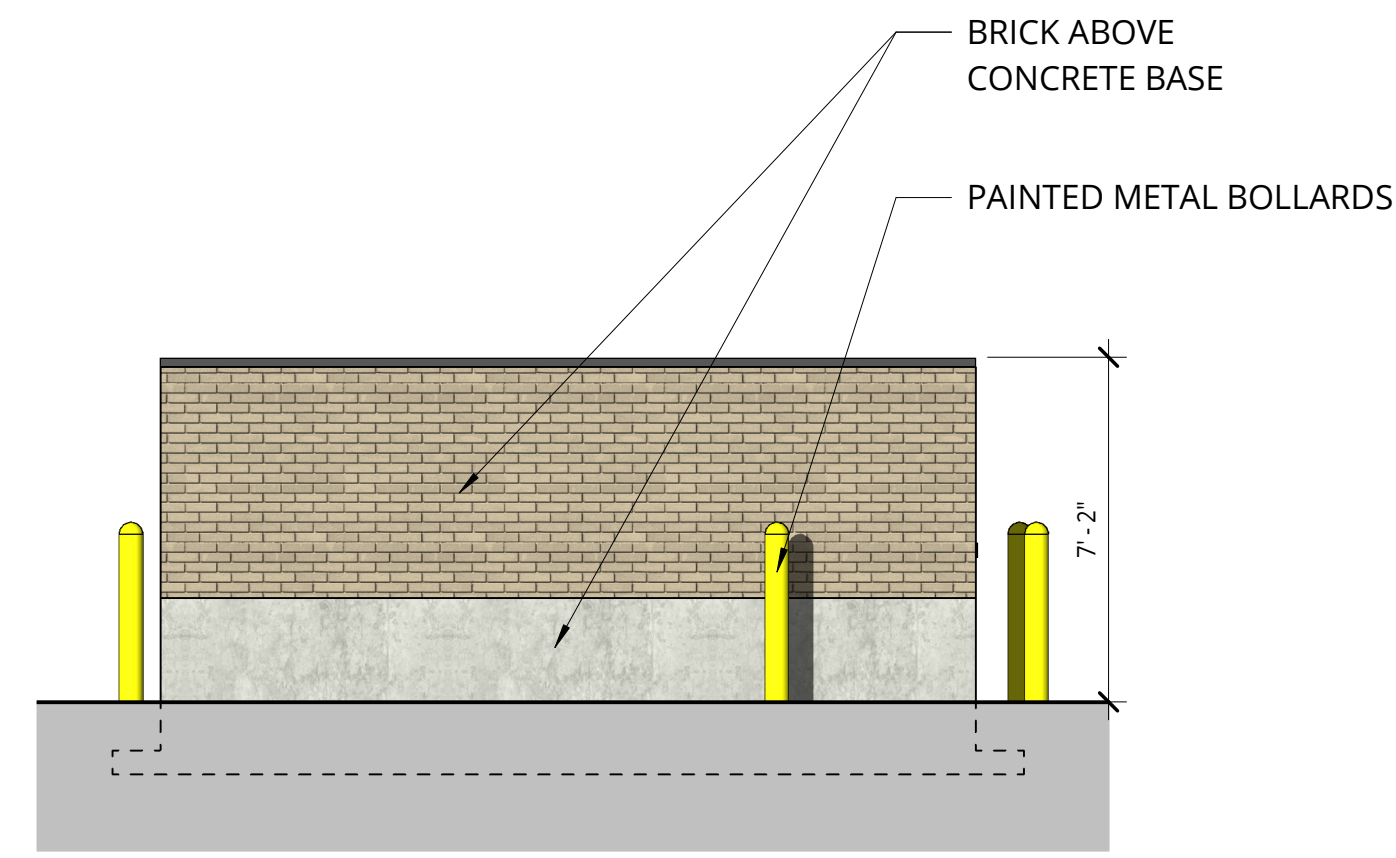


1 SOUTH WEST ELEVATION
1/4" = 1'-0"

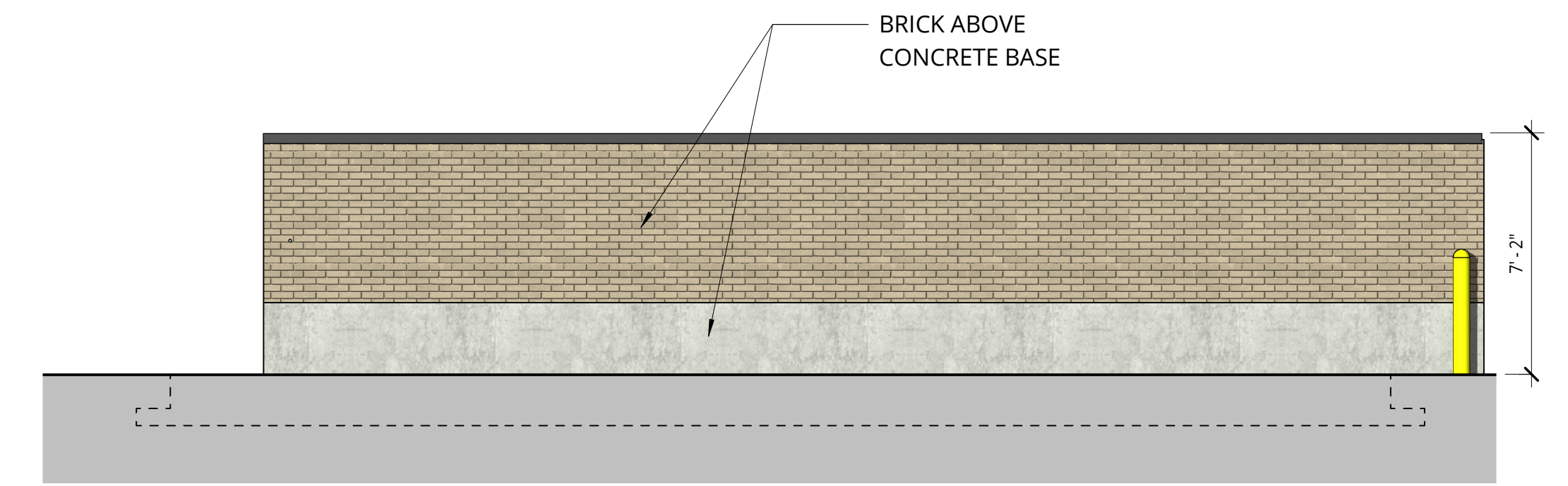
ELEVATIONS



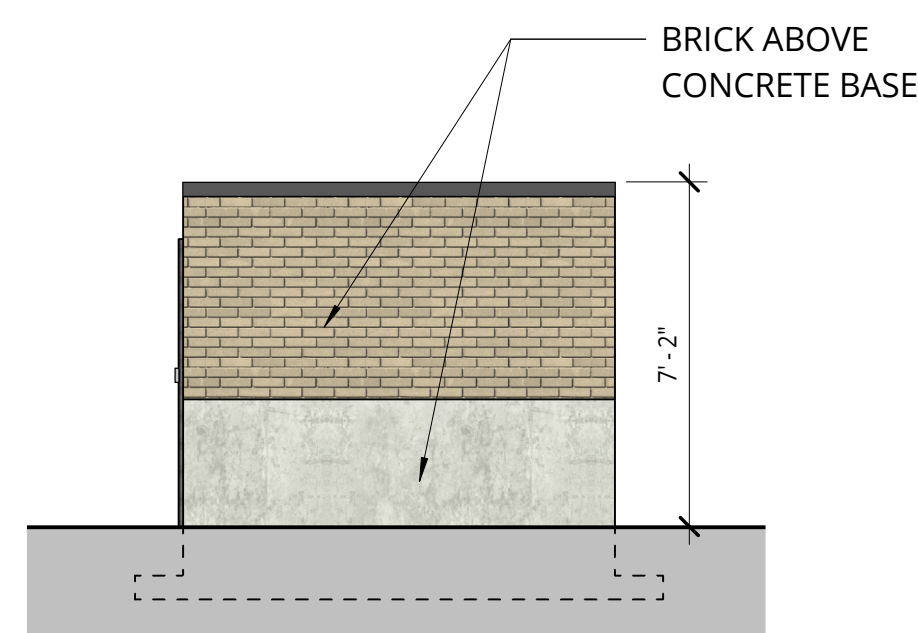
4 PROPANE / GENERATOR / FUELING WEST ELEVATION
1/4" = 1'-0"



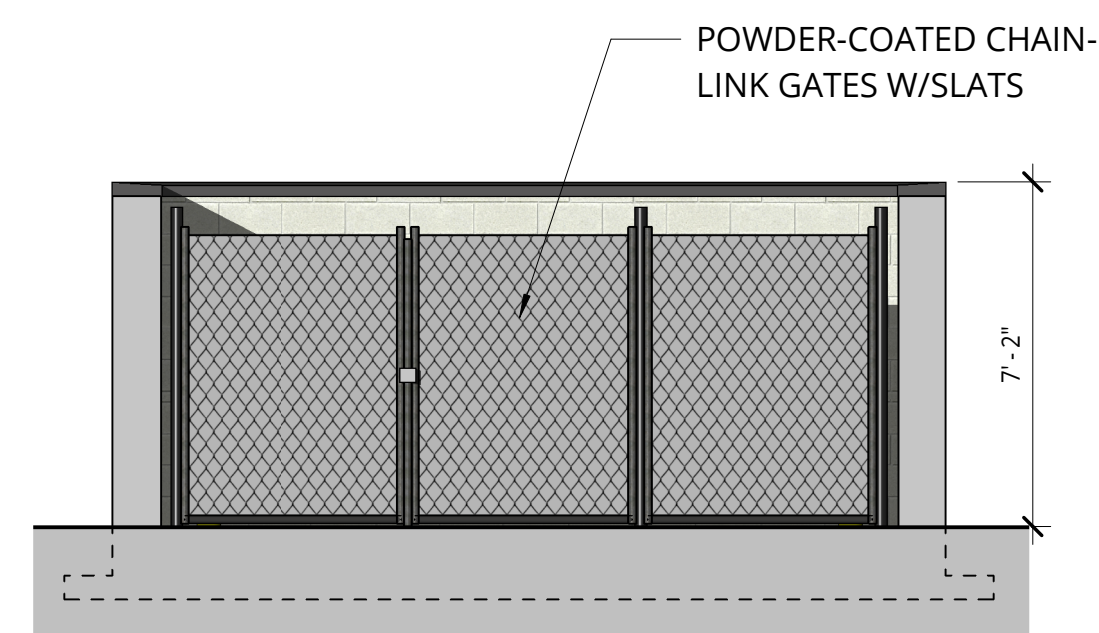
5 P. / G. / F. NORTH ELEVATION
1/4" = 1'-0"



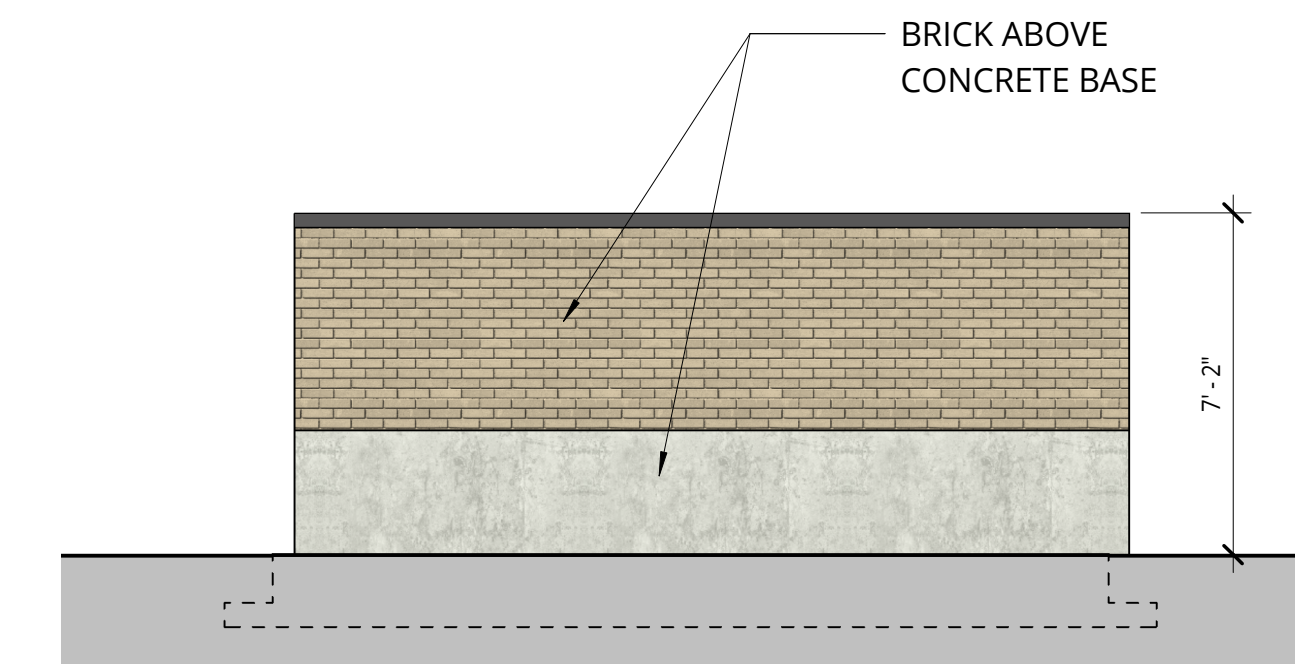
6 P. / G. / F. EAST ELEVATION
1/4" = 1'-0"



1 TRASH WEST ELEVATION
1/4" = 1'-0"



2 TRASH NORTH ELEVATION
1/4" = 1'-0"



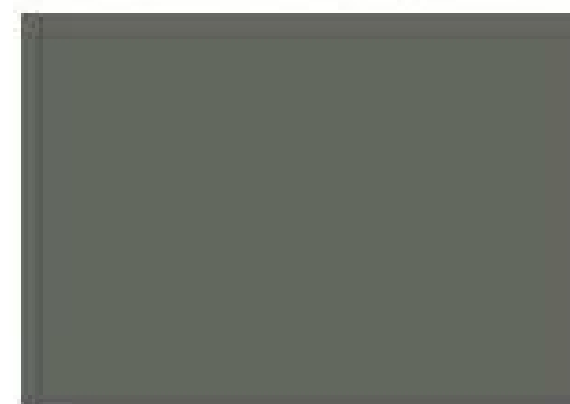
3 TRASH SOUTH ELEVATION
1/4" = 1'-0"

EXTERIOR MATERIALS

ROOF



STANDING SEAM METAL ROOF - AEP SPAN - ZINC GRAY

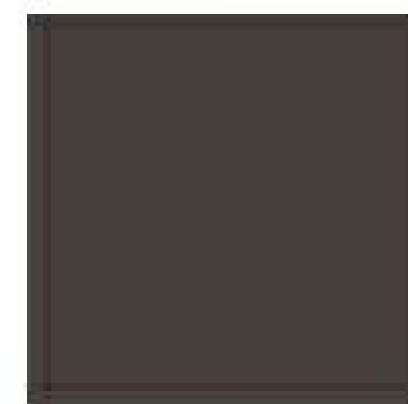


Cool Zinc Gray

WINDOWS



WINDOWS - ANDERSEN A SERIES - DARK BRONZE



Dark Bronze

DOORS



FOLDING DOOR - FOUR FOLD SERIES 300 - CUSTOM BROWN



RAL 8019

WALLS



TEXTURED METAL WALL PANEL - AEP SPAN - PARCHMENT



Cool Parchment



TEXTURED METAL WALL PANEL - AEP SPAN - RED



Cool Red



BRICK - MUTUAL MATERIALS - IMPERIAL GRAY



PRECAST CONCRETE

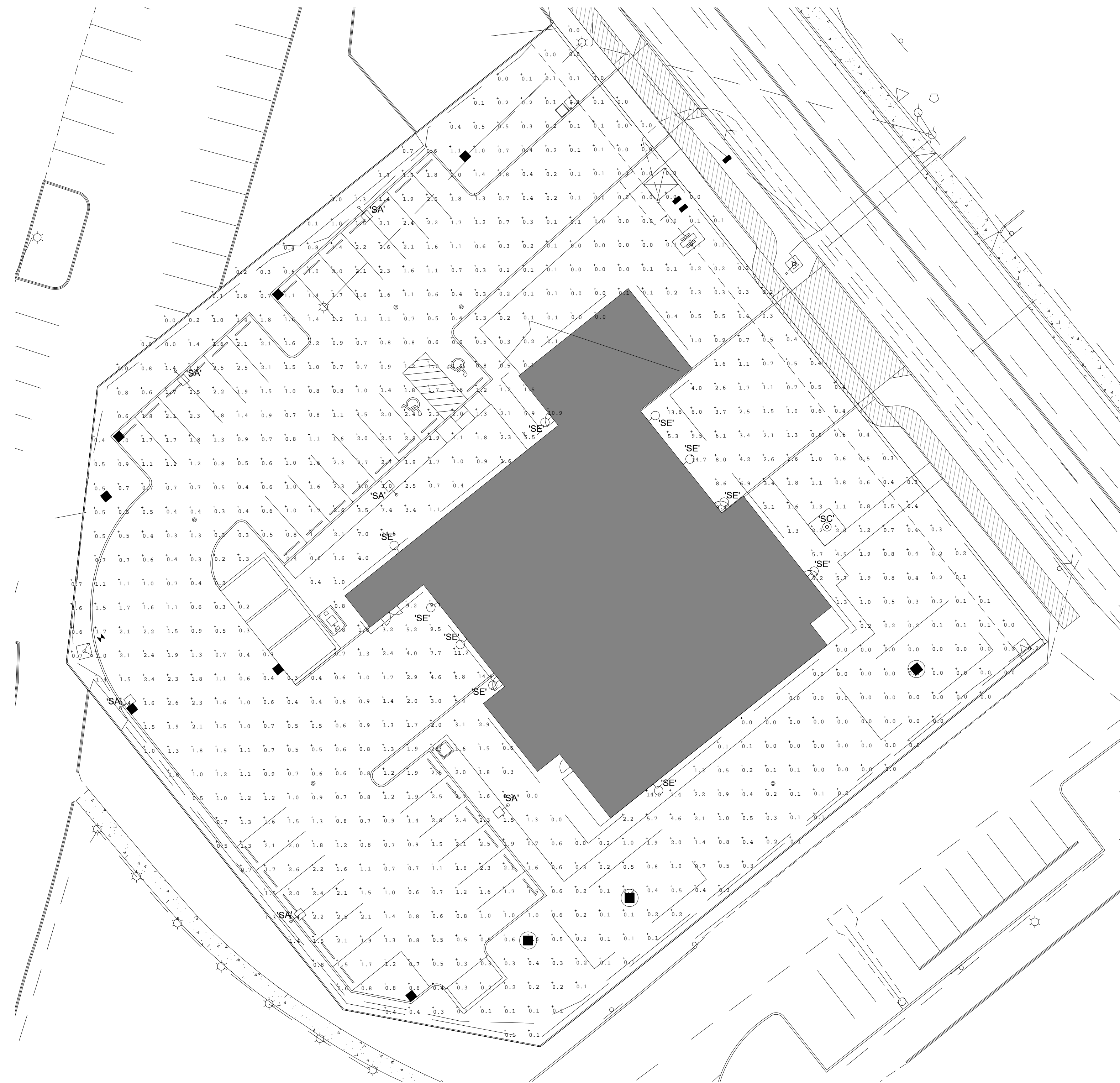


OVERHEAD DOOR - WAYNE DALTON TS200 - BROWN

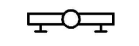





Brown embossed
stucco finish

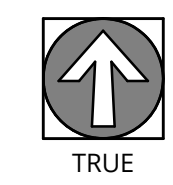
SITE LIGHTING



SITE LIGHTING SYMBOL LIST

- Lighting**
-  WALL MOUNTED 6" WIDE LUMINAIRE
 -  WALL MOUNTED LUMINAIRE
 -  AREA LUMINAIRE ARM MOUNTED WITH POLE AND CONCRETE BASE. NUMBER OF HEADS AND CONFIGURATION INDICATED ON PLANS.
 -  AREA LUMINAIRE POLE TOP MOUNTED WITH POLE AND CONCRETE BASE.

1 SITE LIGHTING - PHOTOMETRIC LAYOUT
NOT TO SCALE



LUMINAIRE SCHEDULE

TYPE	DESCRIPTION	HOUSING	SHIELDING	MOUNTING	FINISH	UL/IP RATING	BALLAST	LAMP(S)	INPUT WATTS	MFG/CATALOG #	NOTES
SA	LED AREA LUMINAIRE WITH BACKLIGHT CONTROL OPTIC	SINGLE-PIECE DIE-CAST ALUMINUM.	ACRYLIC LENSE	POLE MOUNTED	DARK BRONZE	WET	700MA INTEGRAL ELECTRONIC DRIVER	20-LED ARRAY, 4198 LUMENS, 4000K	45	LITHONIA DSX0 SERIES OR APPROVED.	PROVIDE WITH 18" HIGH STRAIGHT STEEL SQUARE POLE. POLE TO WITHSTAND 100 MILE PER HOUR WINDS WITH GUST FACTOR OF 1.3
SB	DAMP LISTED LINEAR DIRECT/INDIRECT LED	NOMINAL 4-INCH BY 3.5-INCH BY 4-FOOT EXTRUDED ALUMINUM	FROSTED ACRYLIC LENS	WALL MOUNTED TO BEAM	ALUMINUM	DAMP	INTEGRAL ELECTRONIC DRIVER	640 UPLIGHT LUMENS, 400 DOWNLIGHT LUMENS PER FOOT, 4000K LED	36	AXIS LIGHTING WET BEAM 4 SERIES, PMC ES46-LED SERIES, OR APPROVED.	
SC	LED FLAGPOLE POST LUMINAIRE	NOMINAL 25-FOOT TALL FLAG POLE WITH INTEGRAL POST-TOP LED.			AS SELECTED BY ARCHITECT	WET	INTEGRAL ELECTRONIC DRIVER	LED	54	MAGNIFLOOD BAYVILLE FLAGLIGHTER.	REFER TO ARCHITECTURAL SPECIFICATION FOR ADDITIONAL INFORMATION.
SD	LED SIGN LIGHTER	NOMINAL 3-FOOT LONG ALUMINUM AND STAINLESS STEEL HOUSING WITH 24-INCH CANTILEVER ARMS.	ACRYLIC LENS	CANTILEVER MOUNT TO MONUMENT SIGN	AS SELECTED BY ARCHITECT	WET	INTEGRAL ELECTRONIC DRIVER	2198 LUMENS, 4000K LED	32	ELLIPTIPAR S171 SERIES OR APPROVED.	
SE	LED WALLPACK	NOMINAL 8.75-INCH TALL BY 6.5-INCH WIDE BY 3.9-INCH DEEP DIE-CAST ALUMINUM	TEMPERED GLASS	WALL MOUNTED	BRONZE	WET	INTEGRAL ELECTRONIC DRIVER	2500 LUMENS, 4000K LED	26	RAB LIGHTING SLIM26N SERIES, LURALINE LTV2FP SERIES, OR APPROVED.	



LIGHTING CUTS

FIXTURE 'SA'

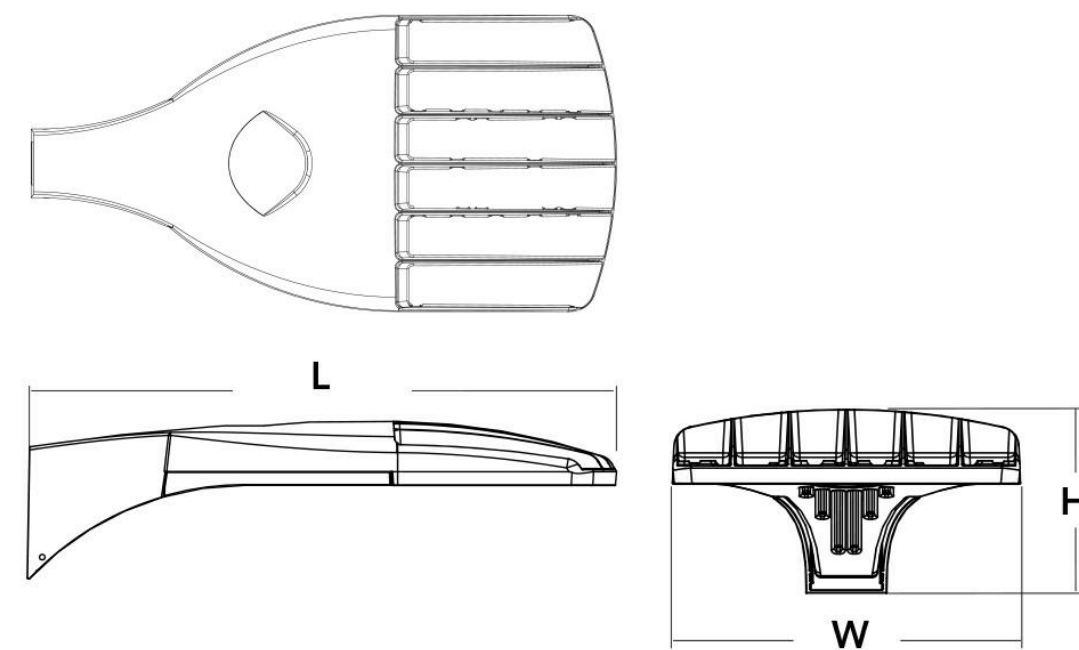


**D-Series
Size 0**
LED Area Luminaire

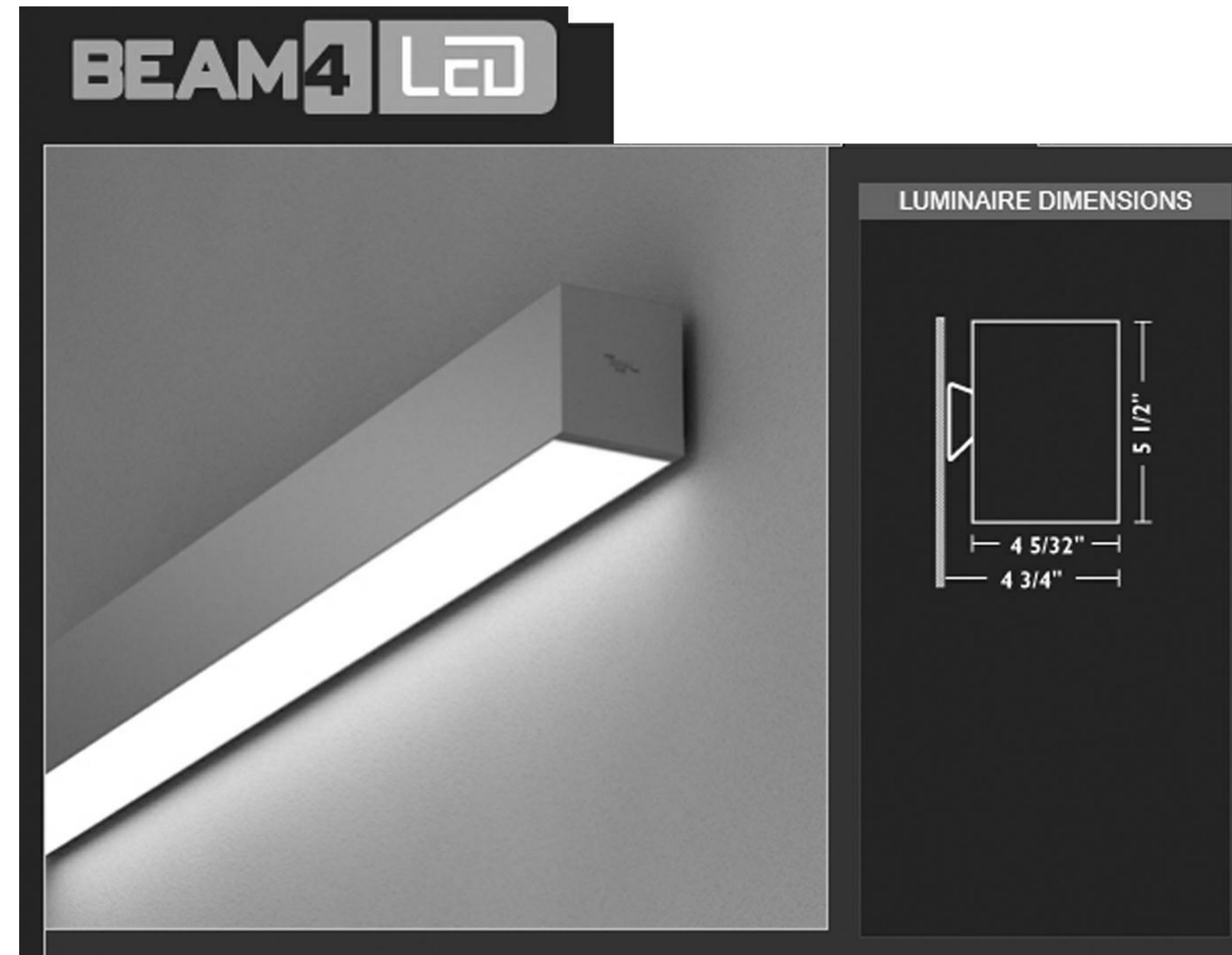


Specifications

EPA: 0.95 ft² (0.09 m²)
 Length: 26" (66.0 cm)
 Width: 13" (33.0 cm)
 Height: 7" (17.8 cm)
 Weight (max): 16 lbs (7.25 kg)



FIXTURE 'SB'



LUMINAIRE DIMENSIONS



FIXTURE 'SD'

Lighting the Vertical Small outdoor, integral driver Solid State (LED) **Style S171**

Surface Hanger (Lighting Downward) 1:8 Scale

Cantilever Hanger with Splice Box

Internal Components 1:4 Scale

FIXTURE 'SE'
SLIM26N

12, 18 and 26 Watt SLIM wallpacks are ultra efficient and deliver impressive light distribution with a compact low-profile design that's super easy to install as a downlight or uplight.

Color: Bronze Weight: 4.5 lbs

FIXTURE 'SC'

25' or 30'

11 3/8" Square

HANDHOLE COVER IN CAST ALUMINUM FRAME

16"

1" X 3/8" J BOLTS

Ø10 1/2" BOLT CIRCLE

21"

24 1/2" (Luminaire Alone)

34" (Luminaire & Adapter)

S.O. cord from luminaire drops down through flagpole

Ø7"



MEMORANDUM

TVF&R Station 39 Pre-Application Conference Request

DATE September 11, 2017
TO City of Tualatin
FROM Frank Angelo, APG
CC Siobhan Kirk, TVF&R
Jennifer Jenkins, Ankrom Mosian Architects
Michael Bonn, Ankrom Moisan Architects
Bruce Baldwin, AKS
Todd Mobley, Lancaster Engineering
Jamin Kimmel, APG

Tualatin Valley Fire & Rescue is proposing to develop a new fire station (Station 39) on SW McEwan Road south of SW Boones Ferry Road. The new station will be approximately 9,500 square feet and will include a 600-square foot community room. The building will house the station's firefighters and have an interior two-space parking bay for fire trucks and necessary emergency apparatus. There are 36 parking spaces proposed on-site to serve the fire station and community room. Station 39 will include 24-hour staffing starting with 4 persons per shift and ultimately growing to 6 person shifts. The building will look similar to TVF&R Station 55 which is currently under construction in the City of West Linn.

Questions for the Pre-Application Conference

1. Describe the Conditional Use and Architectural review standards, review procedures and schedule.
2. Discuss Neighborhood Meeting requirements.
3. Identify Transportation Assessments that will be required (if any).
4. Describe CWS review requirements.

Attachments: Pre-Application Conference Form
Station 39 Preliminary Site Plan
Station 39 Preliminary Building Elevations
Pre-Application Fee (provided separately)



City of Tualatin

COMMUNITY DEVELOPMENT PLANNING DIVISION

Pre-Application Meeting Request

The purpose of the Scoping and Pre-Application meetings is to offer early assistance in the land use and permitting process. This includes thoughtful feedback on preliminary design direction and visioning, outlining expectations, and to assist the applicant in attaining a complete application at first submittal.

PROJECT DESCRIPTION

Project name/title: TVF&R Station 39

What is the primary purpose of this pre-application meeting (What would you like to accomplish)? (Attach additional sheets if needed.)

- Review Station 39 site plan

- Discuss site issues

- Determine review processes & standards

PROPERTY INFORMATION

Property address/location(s): Adjacent to
7100 SW McEwan, Tualatin, OR 97062

Tax map and tax lot no.(s): 2S 113DD TL 1600/1700

Zoning: ML

PROPERTY OWNER/HOLDER INFORMATION

Name(s): Tualatin Valley Fire & Rescue
c/o Siobhan Kirk

Address: 11945 SW 70th Ave Phone: 503.649.8577

City/state: Tigard, OR Zip: 97223

APPLICANT INFORMATION

Name: Angelo Planning Group

Address: 921 SW Washington St Phone: 503.649.8577

City/state: Portland, OR Zip: 97205

Contact person: Frank Angelo

Phone: 503.227.3664 Email: fangelo@angeloplanning.com

Pre-application Conference Information

All of the information identified on this form is required and must be submitted to the Planning Division with this application. Conferences are scheduled subject to availability and a minimum of two weeks after receiving this application and all materials. Pre-application conferences are one (1) hour long and are typically held on Mondays between the hours of 3-4 p.m. or Wednesdays between 2-4 p.m.

If more than four (4) people are expected to attend the pre-application conference in your group, please inform the City in advance so that alternate room arrangements can be made to accommodate the group.

REQUIRED SUBMITTAL ELEMENTS

(Note: Requests will not be accepted without the required submittal elements)

- A complete application form and accompanying fee.
- 1 hard copy and an electronic set of the following:**
 - Preliminary site and building plans, drawn to scale, showing existing and proposed features. (Plans do not need to be professionally prepared; just accurate and reliable.)
 - A detailed narrative description of the proposal that clearly identifies the location, existing and proposed uses, and any proposed construction.
 - A list of all questions or issues the applicant would like the City to address.

FOR STAFF USE ONLY

Case No.: _____

Related Case No.(s): _____

Application fee: _____

Application accepted: _____

By: _____ Date: _____

Date of pre-app: _____

Time of pre-app: _____

Planner assigned to pre-app: _____

What type of development are you proposing? (Check all that apply)

Industrial Commercial Residential Institutional Mixed-use

Please provide a brief description of your project: (Attach additional sheets if needed.) Please include description of existing uses and structures in addition to what is proposed.

Construct a new TVF&R fire station (Station 39). Will include a community room.

Are you familiar with the development process in Washington or Clackamas County or Tualatin?

Yes No

If yes, please identify an example project:

TVF&R Station 34 in Tualatin

Are you familiar with the sections of the Tualatin Development Code (TDC) that pertain to your proposed development?

Yes No

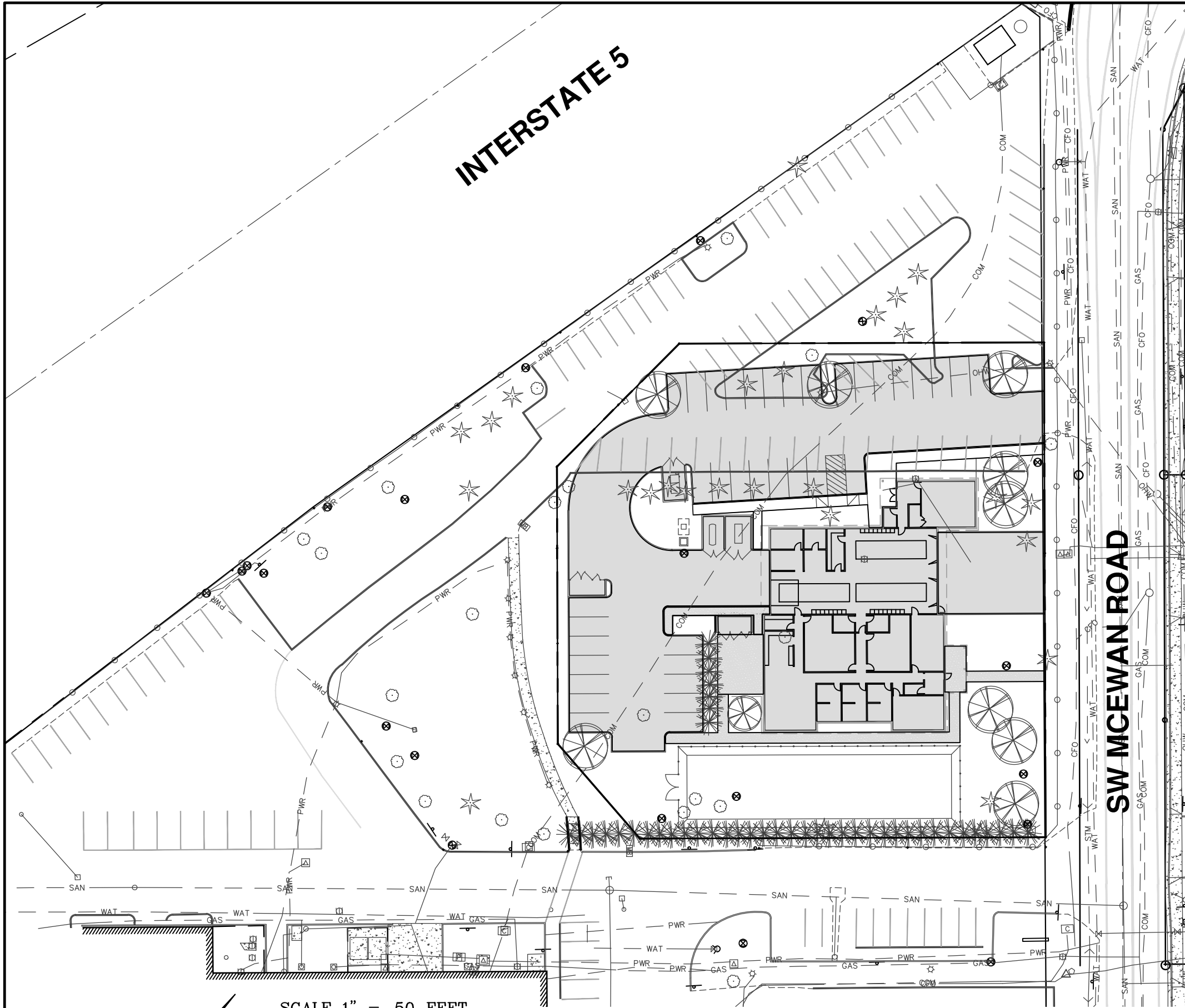
Is the property under enforcement action? If yes, please attached a notice of the violation.

Please provide the names of City, TVF&R, CWS, and County staff with whom you have already discussed this proposal:

Scoping meeting held with City staff on March 6, 2016

INTERSTATE 5

SW MCEWAN ROAD



SCALE 1" = 50 FEET



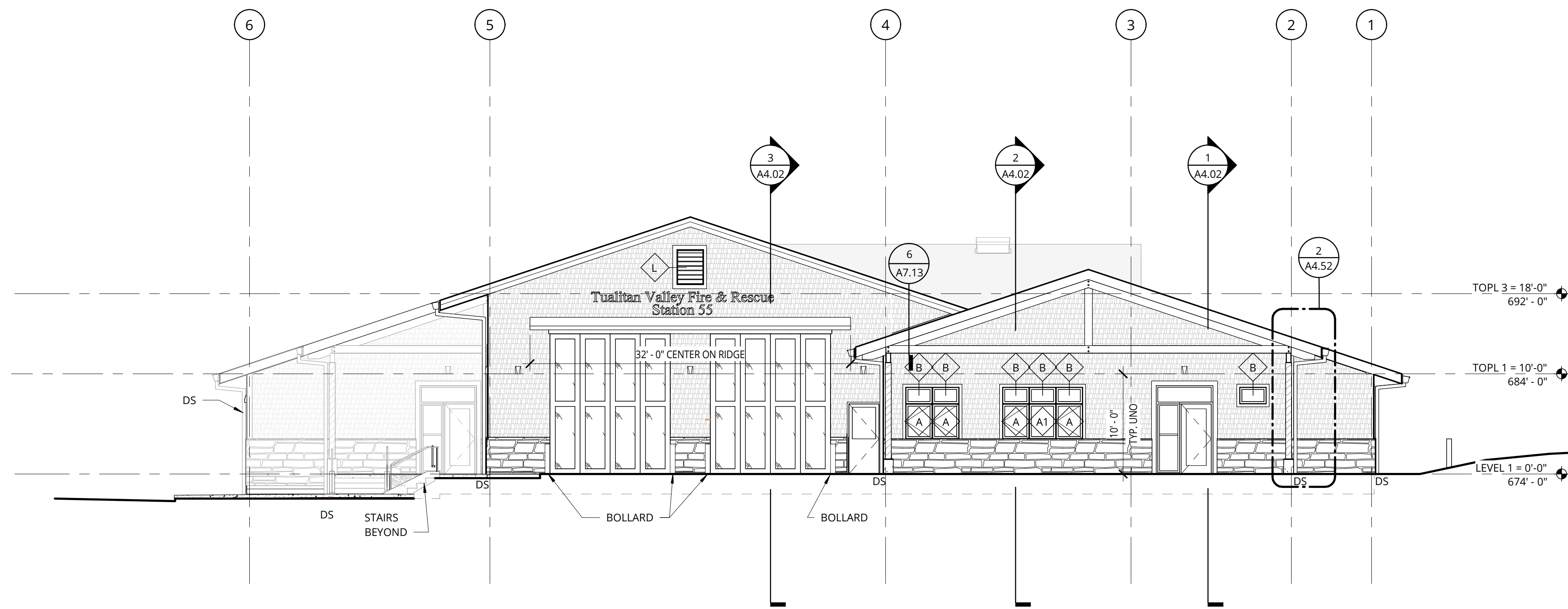
NOTE: SCALE BAR ACCURATE WHEN PLOTTED ON 11"x17" SHEET

DATE: 09/07/2017

SITE FIT PLAN		EXHIBIT
TVFR STATION 39		A
AKS ENGINEERING & FORESTRY, LLC 12965 SW HERMAN RD, STE 100 TUALATIN, OR 97062 P: 503.563.6151 F: 503.563.6152 aks-eng.com		DRWN: LTP CHKD: BRB AKS JOB: 4756









6/19/2017 4:29:03 PM



1 NORTH ELEVATION
1/8" = 1'-0"

GENERAL NOTES - EXTERIOR ELEVATIONS
 EXTERIOR ELEVATIONS
 1. REFER TO SHEET A0.01 FOR 'PROJECT NOTES' APPLICABLE TO ALL PORTIONS OF THE WORK
 2. ELEVATIONS NOTED ARE RELATIVE TO SEA LEVEL (OR PROJECT DATUM)
 3. SEE SHEET A12.21 FOR WINDOW SCHEDULE
 4. SEE DOOR SCHEDULE SHEET A12.01 FOR DOOR LOCATIONS AND TYPES.
 5. SEE ENLARGED ELEVATIONS AND WALL SECTIONS FOR ADDITIONAL EXTERIOR ENVELOPE DETAILS.

- MATERIALS - LEGEND**
-  FIBER CEMENT SHINGLE SIDING
 -  SIMULATED STONE
 -  EXPOSED TIMBER FRAMING
 -  ASPHALT ROOF SHINGLES
 -  EXTERIOR LIGHTING
 -  DS

Ankrom Moisan
 38 NW DAVIS ST, SUITE 300
 PORTLAND, OR 97209
 T 503.245.7100
 1505 5TH AVE, SUITE 300
 SEATTLE, WA 98101
 T 206.576.1600
 © ANKROM MOISAN ARCHITECTS, INC.



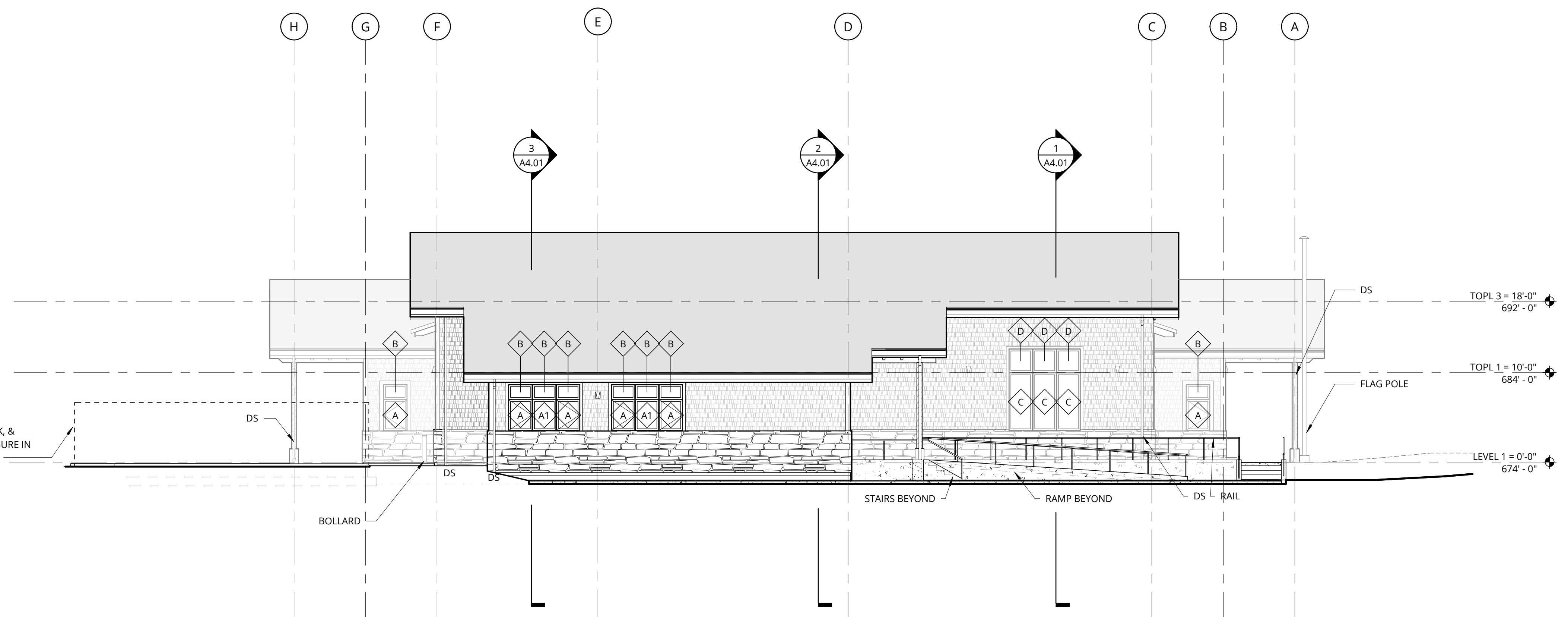
TVF&R Station 55 - Rosemont
 20790 Hidden Springs Rd
 West Linn, OR 97068
 Tualatin Valley Fire & Rescue

REVISION	DATE	REASON FOR ISSUE

N & E EXTERIOR ELEVATIONS

CONSTRUCTION SET

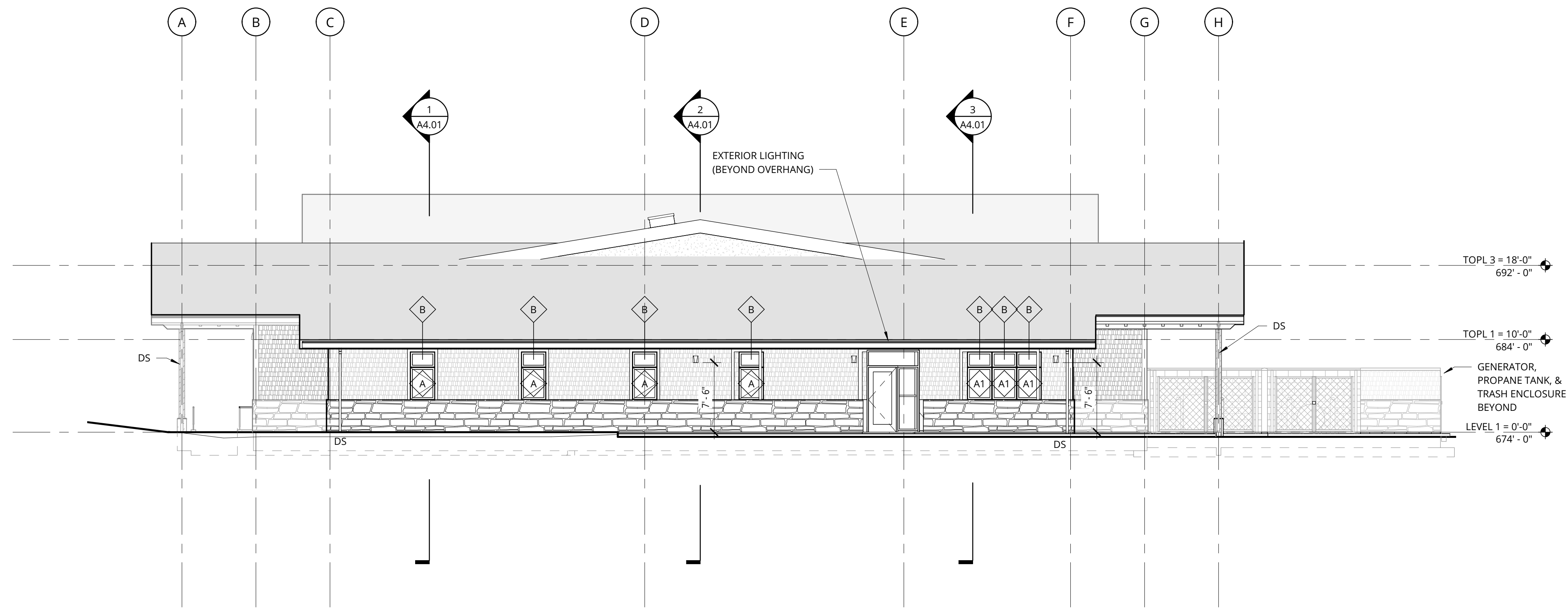
DATE 06/16/17	REVISION
PROJECT NUMBER 160420	SHEET NUMBER A3.11
SCALE As indicated	



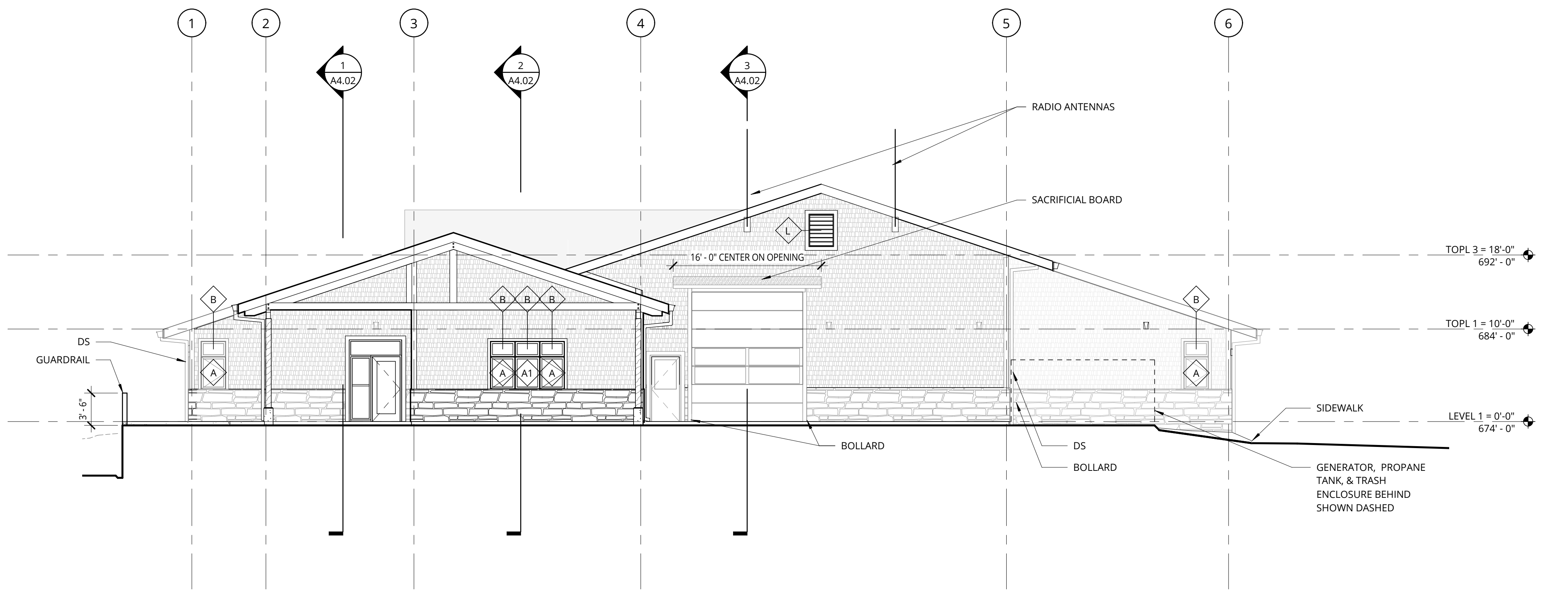
2 EAST ELEVATION
1/8" = 1'-0"

C:\Revit\Projects\160420_17-TVFR\160420_17-TVFR 55.dwg.rvt

6/19/2017 4:29:04 PM



2 WEST ELEVATION
1/8" = 1'-0"




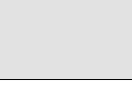




1 SOUTH ELEVATION
1/8" = 1'-0"

GENERAL NOTES - EXTERIOR ELEVATIONS

- EXTERIOR ELEVATIONS
1. REFER TO SHEET A0.01 FOR 'PROJECT NOTES' APPLICABLE TO ALL PORTIONS OF THE WORK. ELEVATIONS NOTED ARE RELATIVE TO SEA LEVEL (OR PROJECT DATUM).
 2. SEE SHEET A12.21 FOR WINDOW SCHEDULE.
 3. SEE DOOR SCHEDULE SHEET A12.01 FOR DOOR LOCATIONS AND TYPES.
 4. SEE ENLARGED ELEVATIONS AND WALL SECTIONS FOR ADDITIONAL EXTERIOR ENVELOPE DETAILS.

MATERIALS - LEGEND

-  FIBER CEMENT SHINGLE SIDING
-  SIMULATED STONE
-  EXPOSED TIMBER FRAMING
-  ASPHALT ROOF SHINGLES
-  EXTERIOR LIGHTING
-  DOWNSPOUT



38 NW DAVIS ST, SUITE 300
PORTLAND, OR 97209
T 503.245.7100

1505 5TH AVE, SUITE 300
SEATTLE, WA 98101
T 206.576.1600
© ANKROM MOISAN ARCHITECTS, INC.



TVF&R Station 55 - Rosemont

20790 Hidden Springs Rd
West Linn, OR 97068

Tualatin Valley Fire & Rescue

REVISION	DATE	REASON FOR ISSUE

S & W EXTERIOR ELEVATIONS

CONSTRUCTION SET

DATE 06/16/17	REVISION
PROJECT NUMBER 160420	SHEET NUMBER A3.12
SCALE As indicated	

C:\Revit\Projects\160420_17-TVFR\160420_17-TVFR_55.dwg.rvt

*Tualatin Valley Fire & Rescue Station 39
Tualatin, Oregon*

**Preliminary Stormwater
Report**

Date: April 16, 2018

Client: Tualatin Valley Fire & Rescue
11945 SW 70th Avenue
Tigard, OR, 97223

Engineering Contact: Alex Hurley, PE, PLS
503-563-6151 | Alex@aks-eng.com

Engineering Firm: AKS Engineering & Forestry, LLC
12965 SW Herman Road, Suite 100
Tualatin, OR 97062

AKS Job Number: 4756

Table of Contents

1.0	Purpose of Report	1
2.0	Project Location/Description	1
3.0	Regulatory Design Criteria	1
3.1	STORMWATER QUANTITY	1
3.2	STORMWATER QUALITY.....	2
4.0	Design Methodology	2
5.0	Design Parameters	2
5.1	DESIGN STORMS.....	2
5.2	PRE-DEVELOPED SITE CONDITIONS	2
5.2.1	Site Topography	2
5.2.2	Land Use.....	2
5.3	SOIL TYPE.....	2
5.4	POST-DEVELOPED SITE CONDITIONS	3
5.4.1	Site Topography	3
5.4.2	Land Use.....	3
5.4.3	Post-Developed Input Parameters.....	3
5.4.4	Description of Off-Site Contributing Basins	3
6.0	Stormwater Analyses	3
6.1	PROPOSED STORMWATER CONDUIT SIZING AND INLET SPACING	3
6.2	PROPOSED STORMWATER QUALITY CONTROL FACILITY.....	3
6.3	PROPOSED STORMWATER QUANTITY CONTROL FACILITY.....	3
6.4	DOWNSTREAM ANALYSIS	4

Tables

Table 5-1:	Rainfall Intensities.....	2
Table 5-2:	Hydrologic Soil Group Ratings	3

Figures

- FIGURE 1:** VICINITY MAP
- FIGURE 2:** EXISTING BASIN DELINEATION
- FIGURE 3:** POST-DEVELOPED BASIN DELINEATION
- FIGURE 4:** PRE-DEVELOPMENT DOWNSTREAM BASIN DELINEATION
- FIGURE 5:** POST-DEVELOPMENT DOWNSTREAM BASIN DELINEATION

Appendices

- APPENDIX A:** EXISTING AND POST-DEVELOPED SITE 25-YEAR AND 100-YEAR STORM EVENT ANALYSIS
 - APPENDIX B:** DOWNSTREAM 25-YEAR STORM EVENT ANALYSIS
 - APPENDIX C:** USDA-NRCS SOIL RESOURCE REPORT
 - APPENDIX D:** GEOTECHNICAL INFILTRATION TESTING MEMORANDUM
 - APPENDIX E:** NRCS URBAN HYDROLOGY FOR SMALL WATERSHEDS TR55 RUNOFF CURVE NUMBERS
 - APPENDIX F:** OPERATION AND MAINTENANCE FOR PRIVATE PROPERTY OWNERS
-

Preliminary Stormwater Report

TUALATIN VALLEY FIRE & RESCUE STATION 39

TUALATIN, OREGON

1.0 Purpose of Report

The purpose of this report is to analyze the effects the proposed development will have on the existing stormwater conveyance system; document the criteria, methodology, and informational sources used to design the proposed stormwater system; and present the results of the preliminary hydraulic analysis.

2.0 Project Location/Description

The proposed fire station will be located between SW McEwan Road and Interstate 5 in Tualatin Oregon, encompassing +/- 1.16 acres (Tax Lot 1601, Tax Map 2S 2W 13DD).

The proposed project will consist of a new fire station and associated site improvements. The site improvements will include the construction of a parking lot, underground utilities, and stormwater facilities.

3.0 Regulatory Design Criteria

3.1 STORMWATER QUANTITY

Per City of Tualatin Municipal Code 3-5-220 Criteria for Requiring On-Site Detention to be Constructed, the City shall determine whether the onsite facility shall be constructed. On-site facilities shall be constructed when any of the following conditions exist:

1. *There is an identified downstream deficiency, as defined by TMC 3-5-210, and detention rather than conveyance system enlargement is determined to be more effective solution.*
2. *There is an identified regional detention site within the boundary of the development.*
3. *There is a site within the boundary of the development which would qualify as a regional detention site under criteria or capital plan adopted by the Unified Sewerage Agency.*
4. *The site is located in the Hedges Creek Subbasin as identified in the Tualatin Drainage Plan and surface water runoff from the site flows directly or indirectly into the Wetland Protected Area (WPA) as defined in TDC 71.020. Properties located within the Wetland Protection District as described in TDC 71.010, or within the portion of the subbasin east of SW Tualatin Road are expected from the on-site detention facility requirement.*

The City of Tualatin has determined that infiltration of all on-site stormwater to the 100-year design storm will be required for this site.

Per correspondence with City staff, it is understood that detention of the SW McEwan Road frontage improvements is not required if no downstream stream deficiencies are identified through a downstream analysis.

3.2 STORMWATER QUALITY

Per City of Tualatin Municipal Code 3-5-380:

Onsite facilities shall be constructed as required by OAR 340-41-455, unless otherwise approved by the City on a case by case basis due to the size of the development, topography, or other factors causing the City to determine that the construction of onsite permanent stormwater treatment systems is impracticable or undesirable. Determinations by the City may be based upon, but not limited to, consideration of the following factors:

Site topography, geological stability, hazards to public safety, accessibility for maintenance, environmental impacts to sensitive areas, size of the site and development, existence of a more efficient and effective regional site with the basin capable of serving the site, and consistency with subbasin master plan.

Site topography does not allow stormwater runoff from SW McEwan Road to be treated via the on-site system. Per correspondence with City staff, it is understood that a fee-in-lieu of treatment of this area is acceptable.

4.0 Design Methodology

The Santa Barbara Urban Hydrograph (SBUH) Method was used to analyze stormwater runoff from the site. This method utilizes the SCS Type 1A 24-hour design storm. HydroCAD 10.0 computer software aided in the analysis. Representative CN numbers were obtained from the *Technical Release 55* and are included in Appendix C.

5.0 Design Parameters

5.1 DESIGN STORMS

Per City of Tualatin requirements, the stormwater analysis utilized the 24-hour storm for the evaluation and design of the existing and proposed stormwater facilities. The following 24-hour rainfall intensity was utilized as the design storm for the recurrence interval:

Recurrence Interval (Years)	Total Precipitation Depth (Inches)
25	3.90
100	4.50

5.2 PRE-DEVELOPED SITE CONDITIONS

5.2.1 Site Topography

Existing on-site grades generally vary from $\pm 1\%$ to $\pm 3\%$, with the site draining towards the southwest. The site has a high point of ± 176 feet in the north property corner and a low point of ± 171 feet near the southern property line.

5.2.2 Land Use

The existing site consists of a commercial/industrial property with a paved parking lot and open space.

5.3 SOIL TYPE

The soil beneath the project site and associated drainage basins is classified as Briedwell Silt Loam, according to the USDA Soil Survey for Washington County. The following table outlines the Hydrologic Soil Group rating for the soil type:

Table 5-2: Hydrologic Soil Group Ratings		
NRCS Map Unit Identification	NRCS Soil Classification	Hydrologic Soil Group Rating
4B	Briedwell Silt Loam	B

Further information on this soil type is included in the NRCS Soil Resource Report located in Appendix C of this report.

5.4 POST-DEVELOPED SITE CONDITIONS

5.4.1 Site Topography

The on-site slopes will be modified with minor cuts and fills to accommodate the construction of the fire station and associated improvements.

5.4.2 Land Use

The post-developed site land use will consist of a fire station, with associated site improvements, sidewalks, and underground utilities.

5.4.3 Post-Developed Input Parameters

See HydroCAD Analysis in the attached appendices.

5.4.4 Description of Off-Site Contributing Basins

The parking lot areas and associated landscaping to the north/northwest direct stormwater runoff towards the subject site. Drainage ditches and inlets have been designed to collect and convey this water to the onsite infiltration facilities, and the facilities have been sized to infiltrate this additional runoff.

6.0 Stormwater Analyses

6.1 PROPOSED STORMWATER CONDUIT SIZING AND INLET SPACING

The proposed catch basins will be spaced to properly convey stormwater runoff. The proposed storm system pipes will be sized using Manning’s equation to convey the peak flows from the 100-year storm event.

6.2 PROPOSED STORMWATER QUALITY CONTROL FACILITY

Stormwater quality management for this project’s on-site runoff will be met by utilizing a water quality manhole and underground infiltration systems per Oregon Department of Environmental Quality’s Rule Authorized Injection Systems requirements.

Paying a fee-in-lieu of providing stormwater quality treatment is proposed for the new impervious area (approximately 2,704 square feet) along the SW McEwan Road frontage.

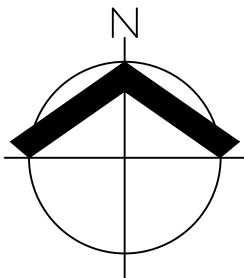
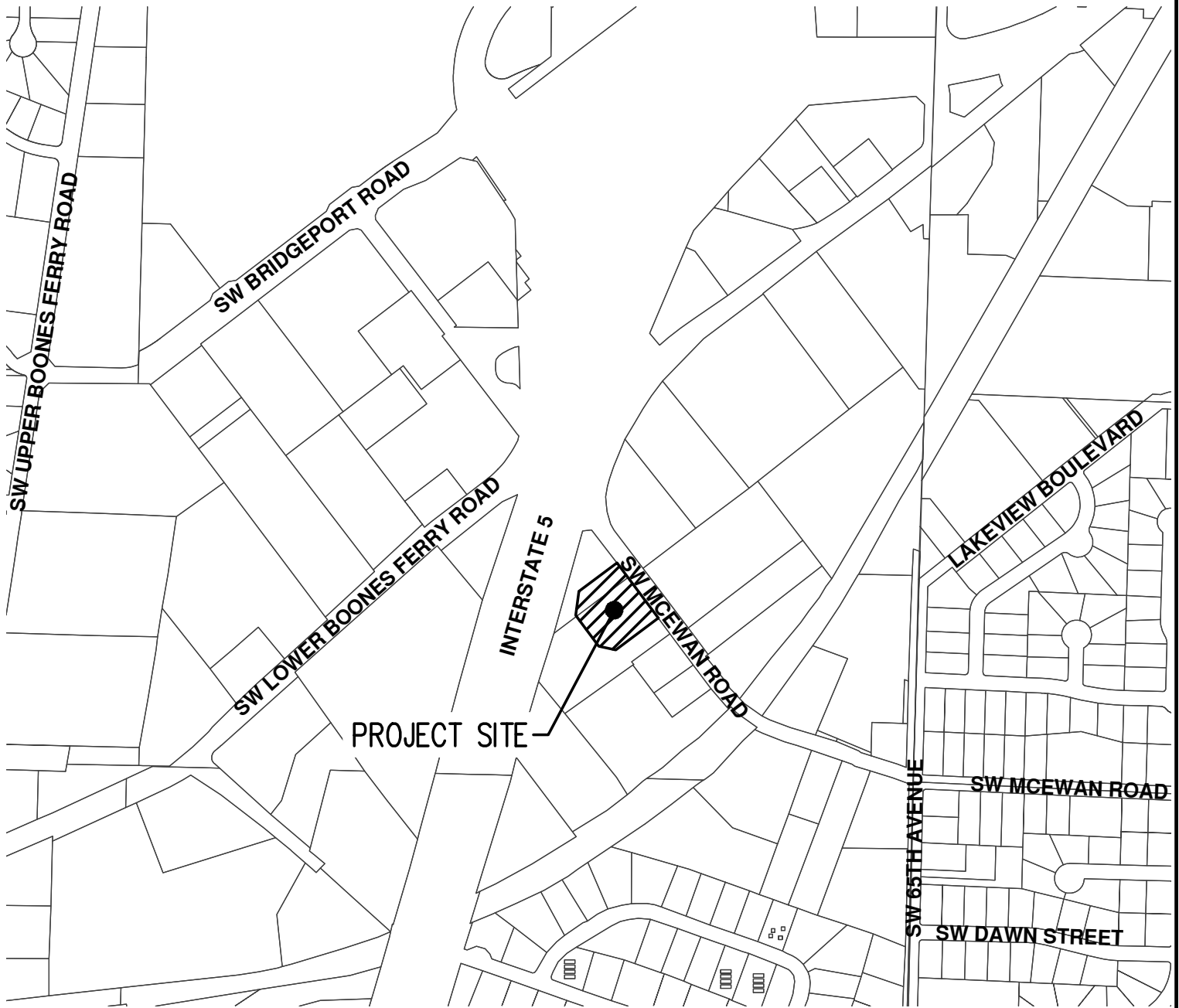
6.3 PROPOSED STORMWATER QUANTITY CONTROL FACILITY

Stormwater quantity management for this project’s on-site runoff for the 100-year storm event will be met by utilizing underground infiltration systems per Oregon Department of Environmental Quality’s Rule Authorized Injection Systems requirements.

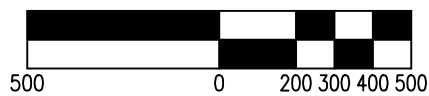
6.4 DOWNSTREAM ANALYSIS

Since the SW McEwan Road frontage improvements will not be routed to the on-site detention facility, a downstream analysis has been performed per the City of Tualatin Municipal Code 3-5-210 Review of Downstream System. Stormwater runoff from SW McEwan Road is conveyed southeast via the existing curb and gutter and an existing roadside ditch. From that point, stormwater flow enters a 10-inch culvert that discharges into an ODOT Railroad right-of-way. At the point where runoff from the SW McEwan Road basin discharges into the ODOT Railroad right-of-way, the project's increased runoff for the 25-year storm event accounts for approximately 5% of the total SW McEwan Road runoff to the ODOT Railroad right-of-way. No downstream deficiencies were identified.

A visual inspection was performed of the downstream system from the project stormwater outfall into the existing roadside ditch to a point ¼ mile downstream. The visual investigation did not identify any observable downstream impacts to existing structures.

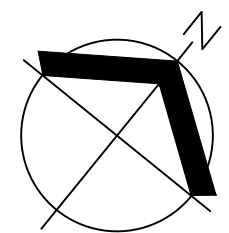
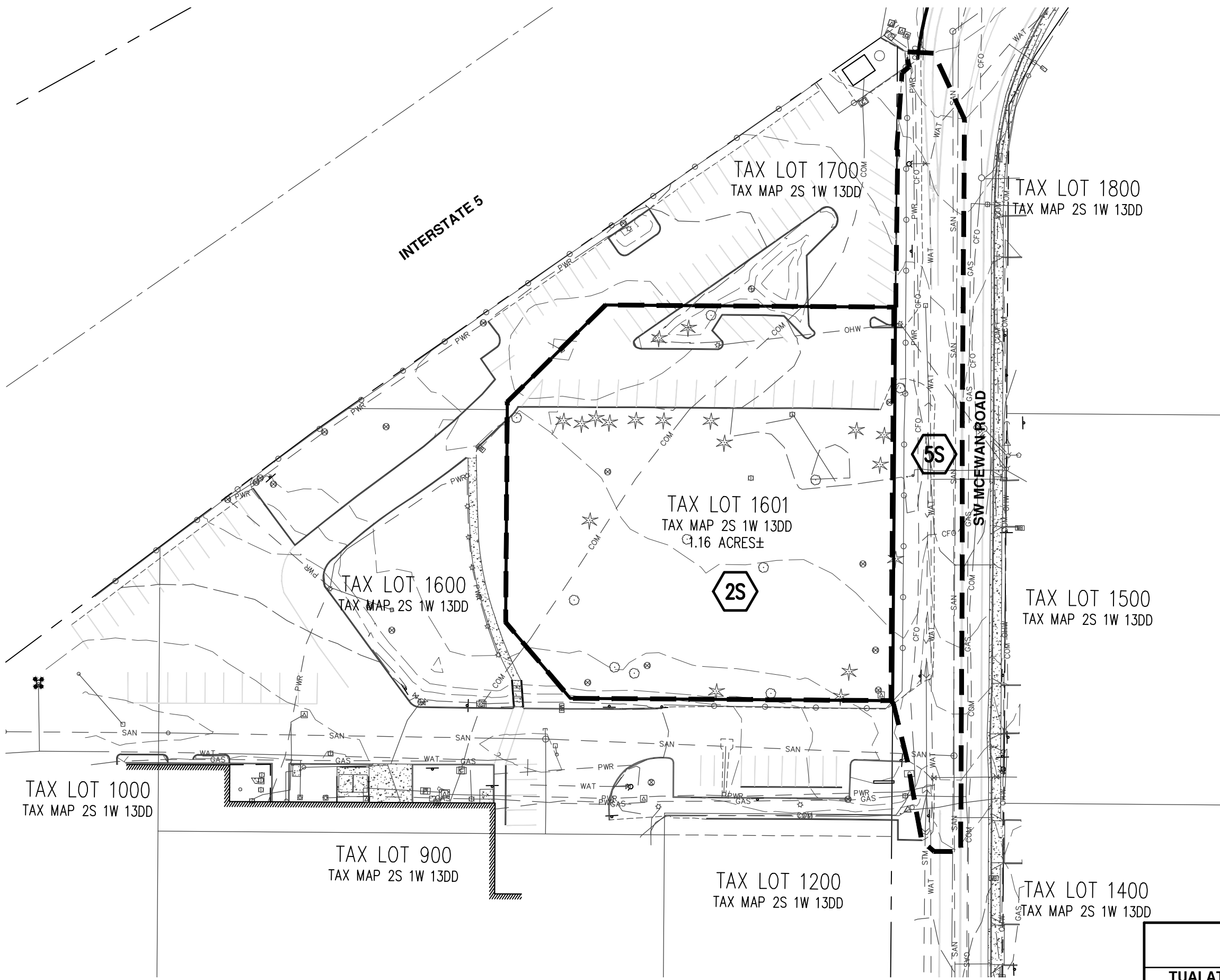


SCALE: 1" = 500 FEET



DATE: 4/16/2018

VICINITY MAP		FIGURE 1
AKS ENGINEERING & FORESTRY, LLC 12965 SW HERMAN RD, STE 100 TUALATIN, OR 97062 P: 503.563.6151 F: 503.563.6152 aks-eng.com		DRWN: AZV CHKD: BRB AKS JOB: 4756
AKS		



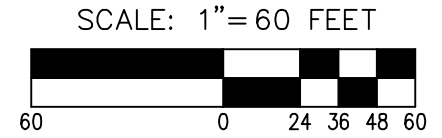
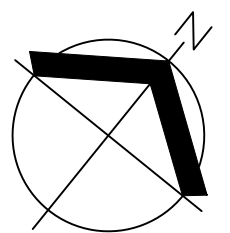
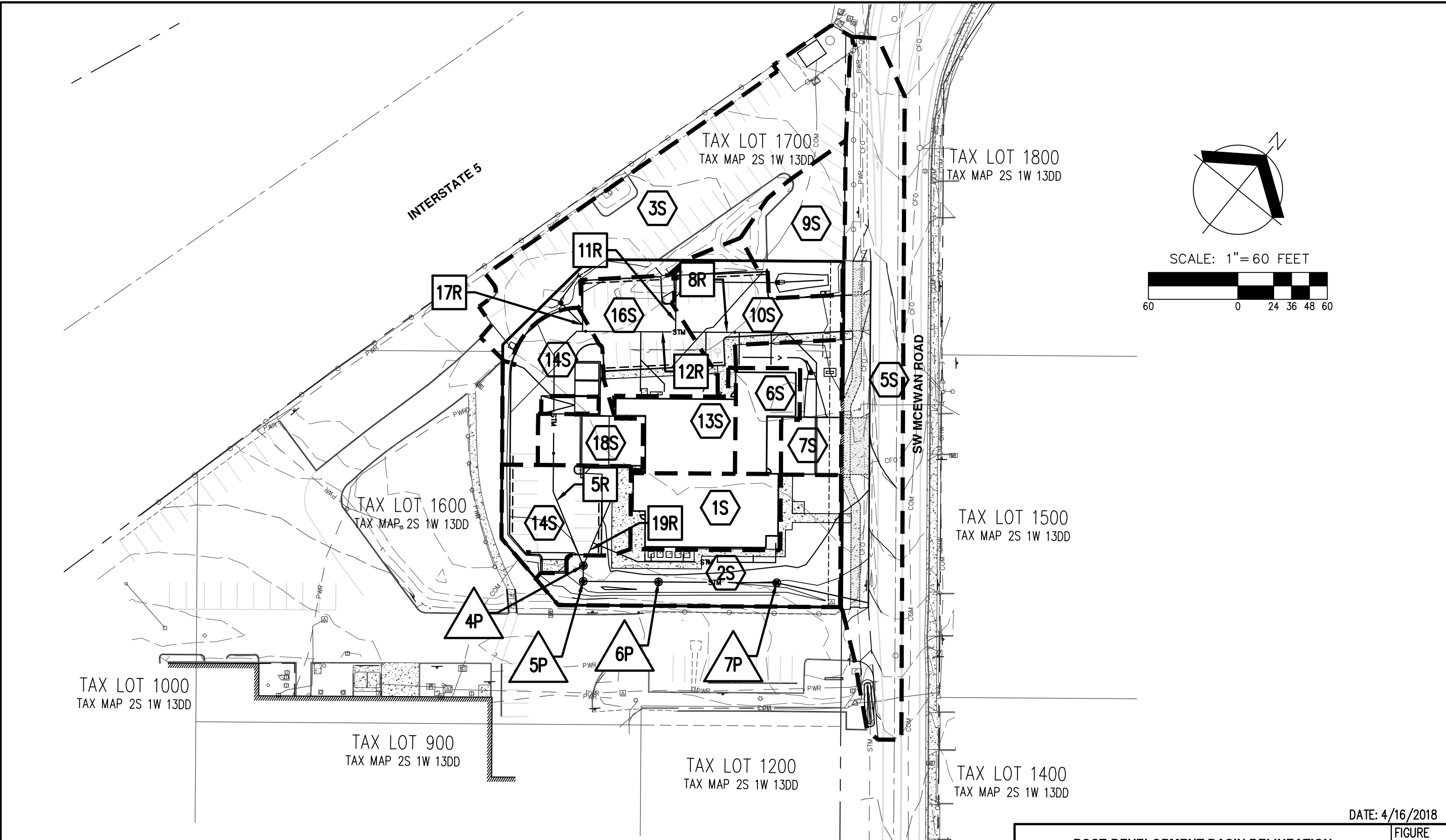
SCALE: 1" = 60 FEET



DATE: 4/16/2018

EXISTING BASIN DELINEATION	FIGURE
TUALATIN VALLEY FIRE & RESCUE STATION 39	2
AKS ENGINEERING & FORESTRY, LLC 12965 SW HERMAN RD, STE 100 TUALATIN, OR 97062 P: 503.563.6151 F: 503.563.6152 aks-eng.com	DRWN: AZV CHKD: BRB AKS JOB: 4756

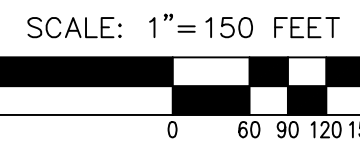
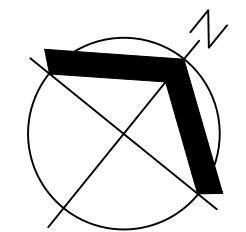
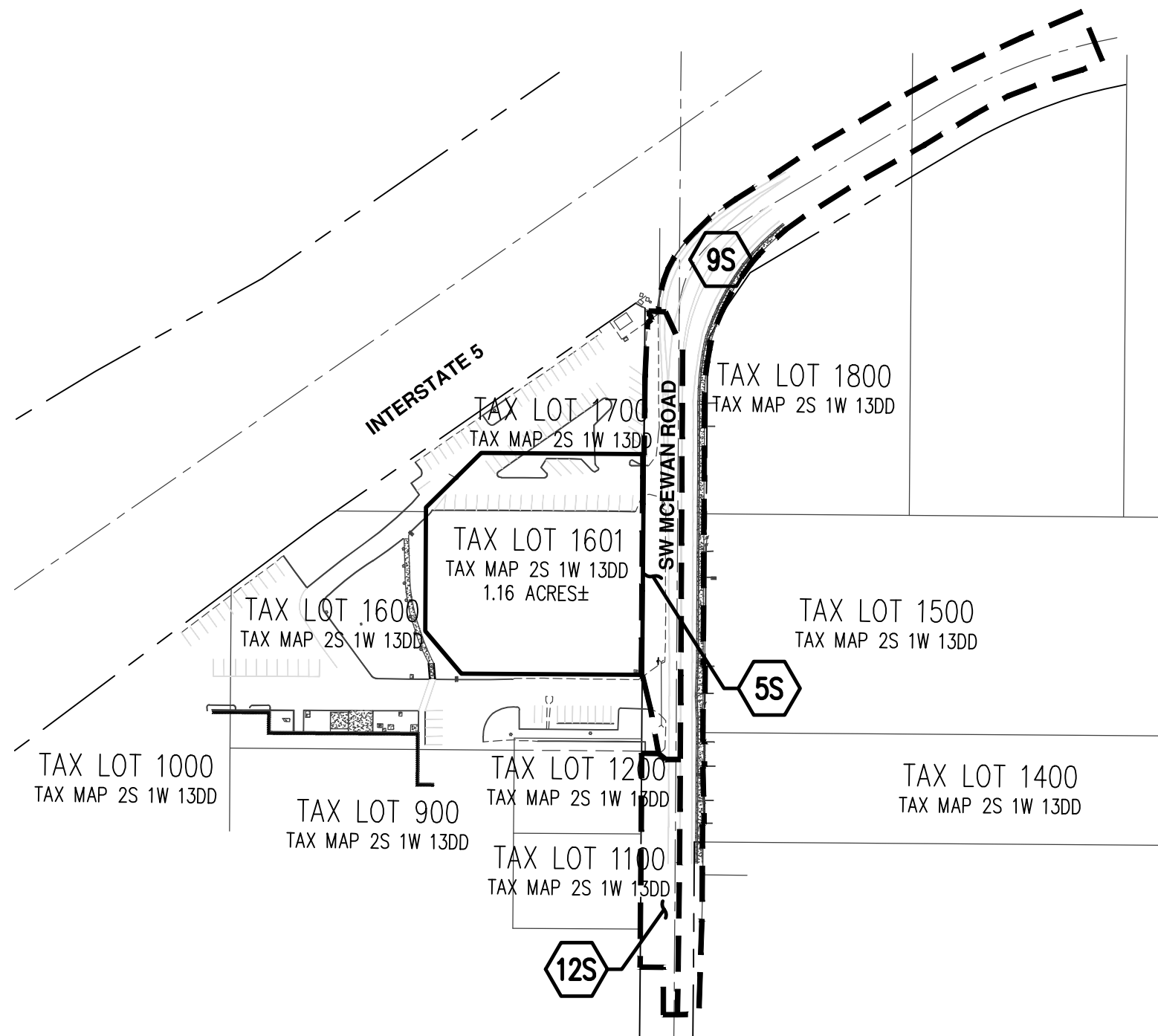




DATE: 4/16/2018

POST-DEVELOPMENT BASIN DELINEATION	FIGURE
TUALATIN VALLEY FIRE & RESCUE STATION 39	3
AKS ENGINEERING & FORESTRY, LLC 12965 SW HERMAN RD, STE 100 TUALATIN, OR 97062 P: 503.563.6151 F: 503.563.6152 aks-eng.com	DRWN: AZV CHKD: BRB AKS JOB: 4756

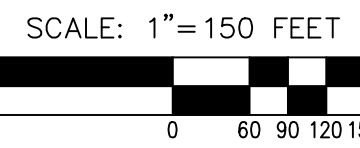
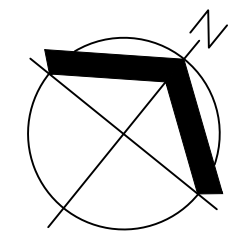
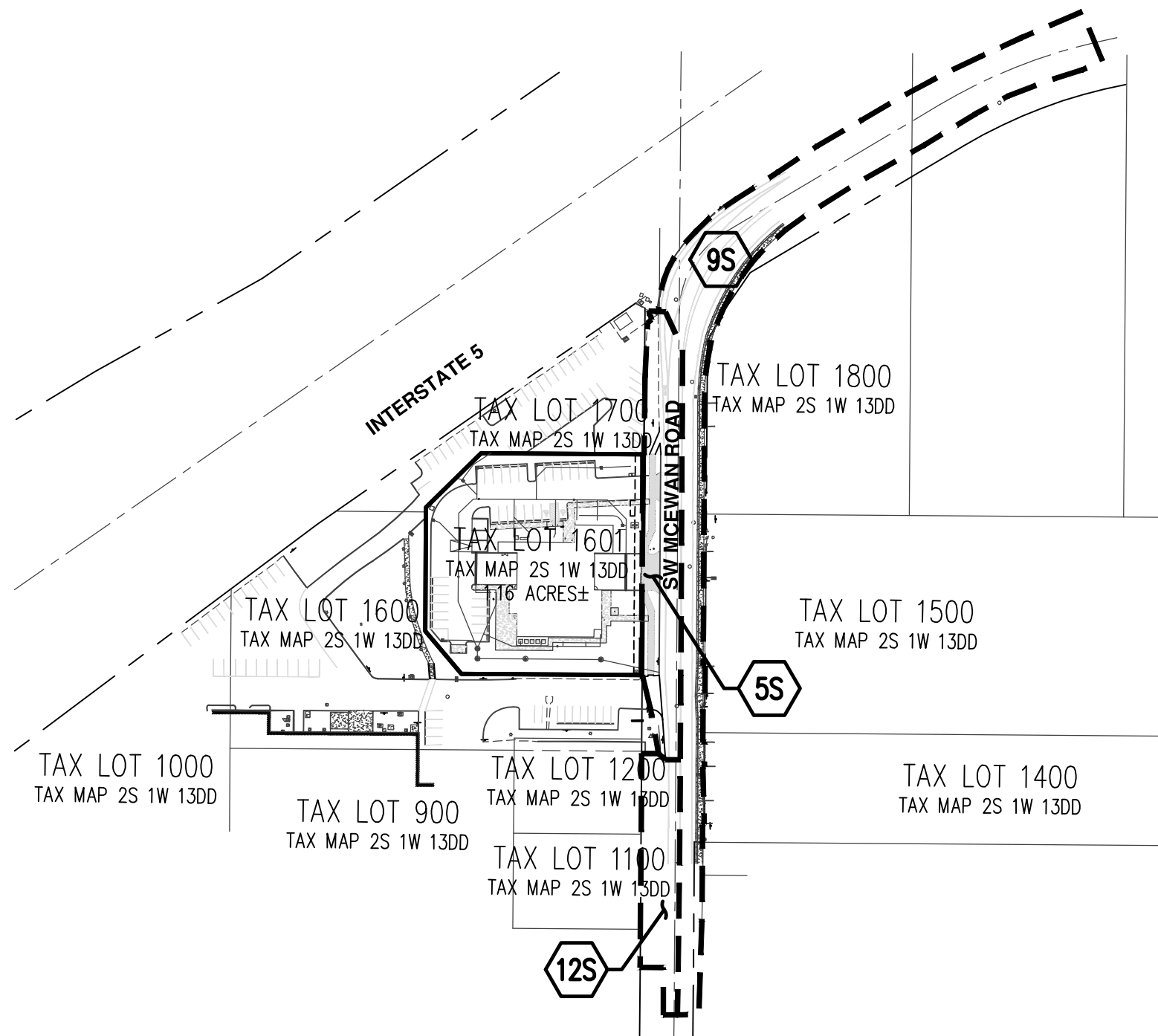




DATE: 4/16/2018

PRE-DEVELOPMENT DOWNSTREAM BASIN DELINEATION	FIGURE
TUALATIN VALLEY FIRE & RESCUE STATION 39	4
AKS ENGINEERING & FORESTRY, LLC 12965 SW HERMAN RD, STE 100 TUALATIN, OR 97062 P: 503.563.6151 F: 503.563.6152 aks-eng.com	DRWN: AZV CHKD: BRB AKS JOB: 4756





DATE: 4/16/2018

POST-DEVELOPMENT DOWNSTREAM BASIN DELINEATION	FIGURE
TUALATIN VALLEY FIRE & RESCUE STATION 39	5
AKS ENGINEERING & FORESTRY, LLC 12965 SW HERMAN RD, STE 100 TUALATIN, OR 97062 P: 503.563.6151 F: 503.563.6152 aks-eng.com	DRWN: AZV CHKD: BRB AKS JOB: 4756



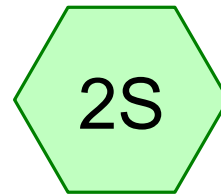
APPENDIX A

EXISTING AND POST-DEVELOPED SITE 25-YEAR AND 100-YEAR STORM EVENT ANALYSIS

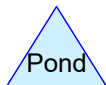
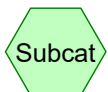
EXISTING SITE



PRE-DEVELOPED
ROW



PRE-DEVELOPED
SITE



4756 TVFR 39 PreDev

Type IA 24-hr 25 Year Rainfall=3.88"

Prepared by AKS Engineering & Forestry, LLC

Printed 4/16/2018

HydroCAD® 10.00-18 s/n 01338 © 2016 HydroCAD Software Solutions LLC

Page 2

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points

Runoff by SBUH method, Split Pervious/Imperv.

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 2S: PRE-DEVELOPED SITE Runoff Area=50,271 sf 21.31% Impervious Runoff Depth>1.71"
Tc=5.0 min CN=69/98 Runoff=0.42 cfs 0.164 af

Subcatchment 5S: PRE-DEVELOPED ROW Runoff Area=17,749 sf 59.78% Impervious Runoff Depth>2.65"
Tc=5.0 min CN=69/98 Runoff=0.25 cfs 0.090 af

Total Runoff Area = 1.562 ac Runoff Volume = 0.254 af Average Runoff Depth = 1.95"
68.65% Pervious = 1.072 ac 31.35% Impervious = 0.489 ac

Summary for Subcatchment 2S: PRE-DEVELOPED SITE

Runoff = 0.42 cfs @ 7.98 hrs, Volume= 0.164 af, Depth> 1.71"

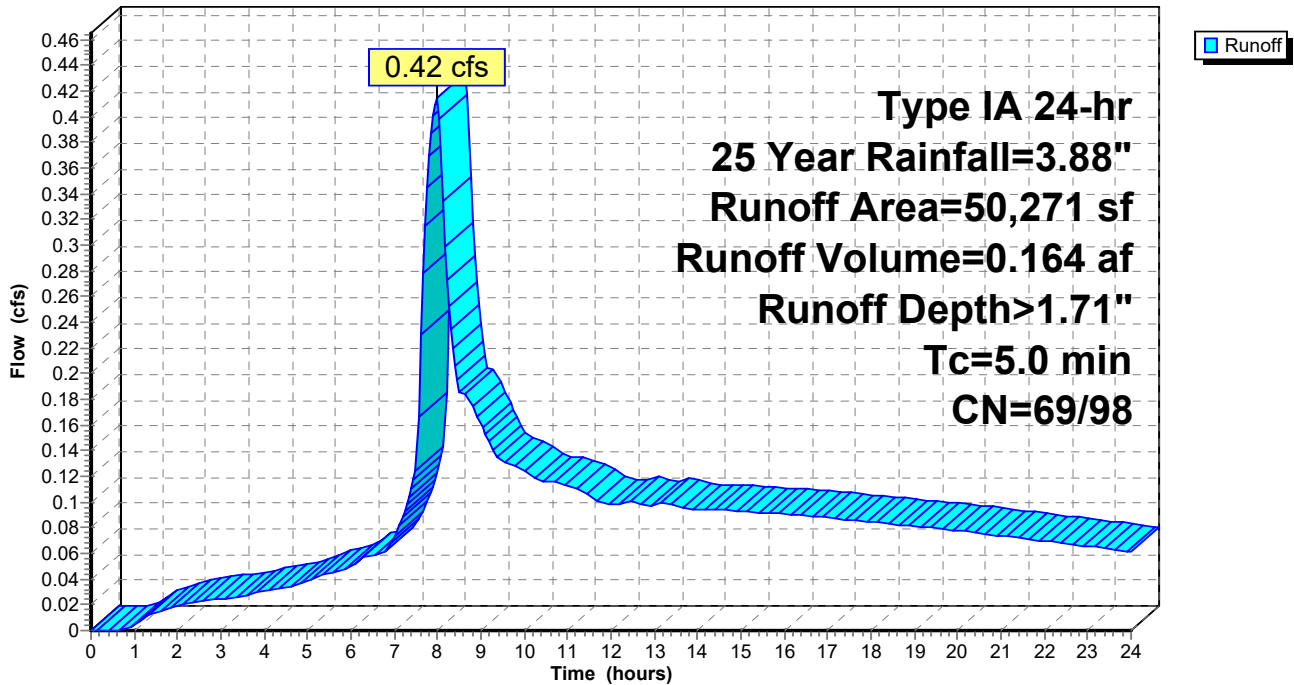
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 25 Year Rainfall=3.88"

	Area (sf)	CN	Description
*	10,711	98	Paved parking & sidewalk
	39,560	69	50-75% Grass cover, Fair, HSG B
	50,271	75	Weighted Average
	39,560		78.69% Pervious Area
	10,711		21.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 2S: PRE-DEVELOPED SITE

Hydrograph



Summary for Subcatchment 5S: PRE-DEVELOPED ROW

Runoff = 0.25 cfs @ 7.93 hrs, Volume= 0.090 af, Depth> 2.65"

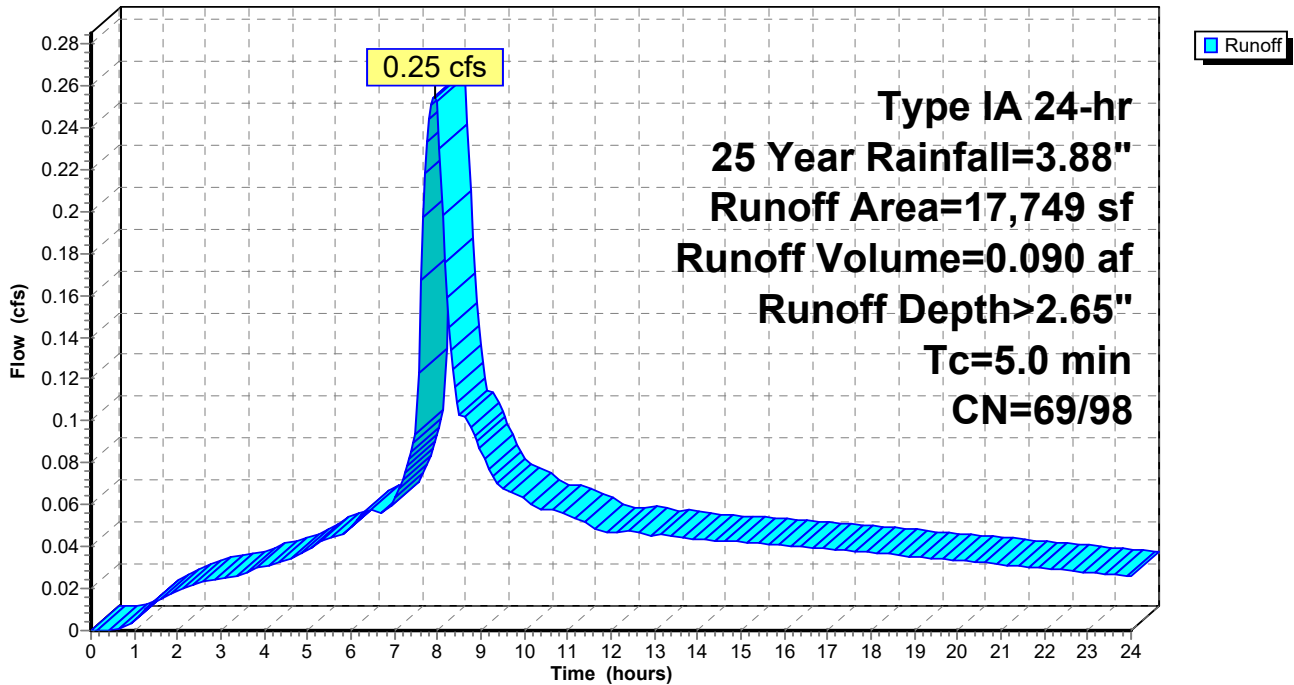
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 25 Year Rainfall=3.88"

	Area (sf)	CN	Description
*	10,611	98	Street paving
	7,138	69	50-75% Grass cover, Fair, HSG B
	17,749	86	Weighted Average
	7,138		40.22% Pervious Area
	10,611		59.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 5S: PRE-DEVELOPED ROW

Hydrograph



4756 TVFR 39 PreDev

Type IA 24-hr 100 Year Rainfall=4.95"

Prepared by AKS Engineering & Forestry, LLC

Printed 4/16/2018

HydroCAD® 10.00-18 s/n 01338 © 2016 HydroCAD Software Solutions LLC

Page 5

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points

Runoff by SBUH method, Split Pervious/Imperv.

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 2S: PRE-DEVELOPED SITE Runoff Area=50,271 sf 21.31% Impervious Runoff Depth>2.51"
Tc=5.0 min CN=69/98 Runoff=0.65 cfs 0.241 af

Subcatchment 5S: PRE-DEVELOPED ROW Runoff Area=17,749 sf 59.78% Impervious Runoff Depth>3.58"
Tc=5.0 min CN=69/98 Runoff=0.35 cfs 0.122 af

Total Runoff Area = 1.562 ac Runoff Volume = 0.363 af Average Runoff Depth = 2.79"
68.65% Pervious = 1.072 ac 31.35% Impervious = 0.489 ac

Summary for Subcatchment 2S: PRE-DEVELOPED SITE

Runoff = 0.65 cfs @ 7.98 hrs, Volume= 0.241 af, Depth> 2.51"

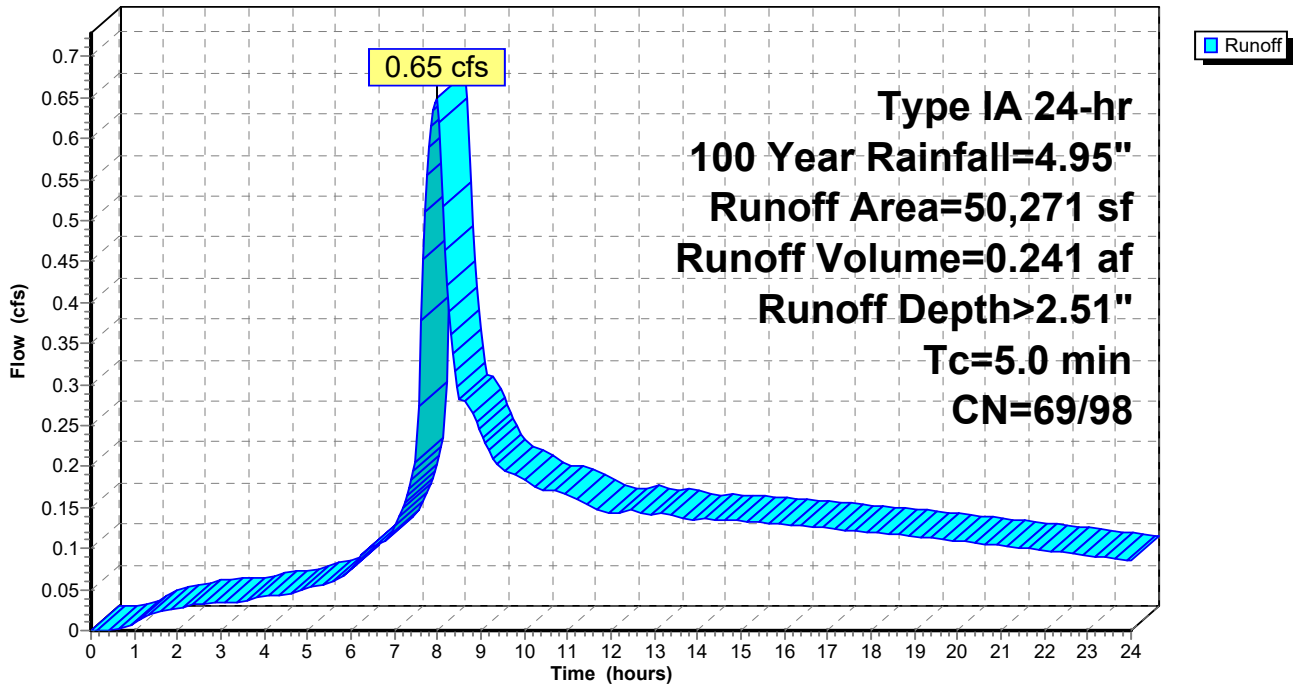
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 100 Year Rainfall=4.95"

	Area (sf)	CN	Description
*	10,711	98	Paved parking & sidewalk
	39,560	69	50-75% Grass cover, Fair, HSG B
	50,271	75	Weighted Average
	39,560		78.69% Pervious Area
	10,711		21.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 2S: PRE-DEVELOPED SITE

Hydrograph



Summary for Subcatchment 5S: PRE-DEVELOPED ROW

Runoff = 0.35 cfs @ 7.92 hrs, Volume= 0.122 af, Depth> 3.58"

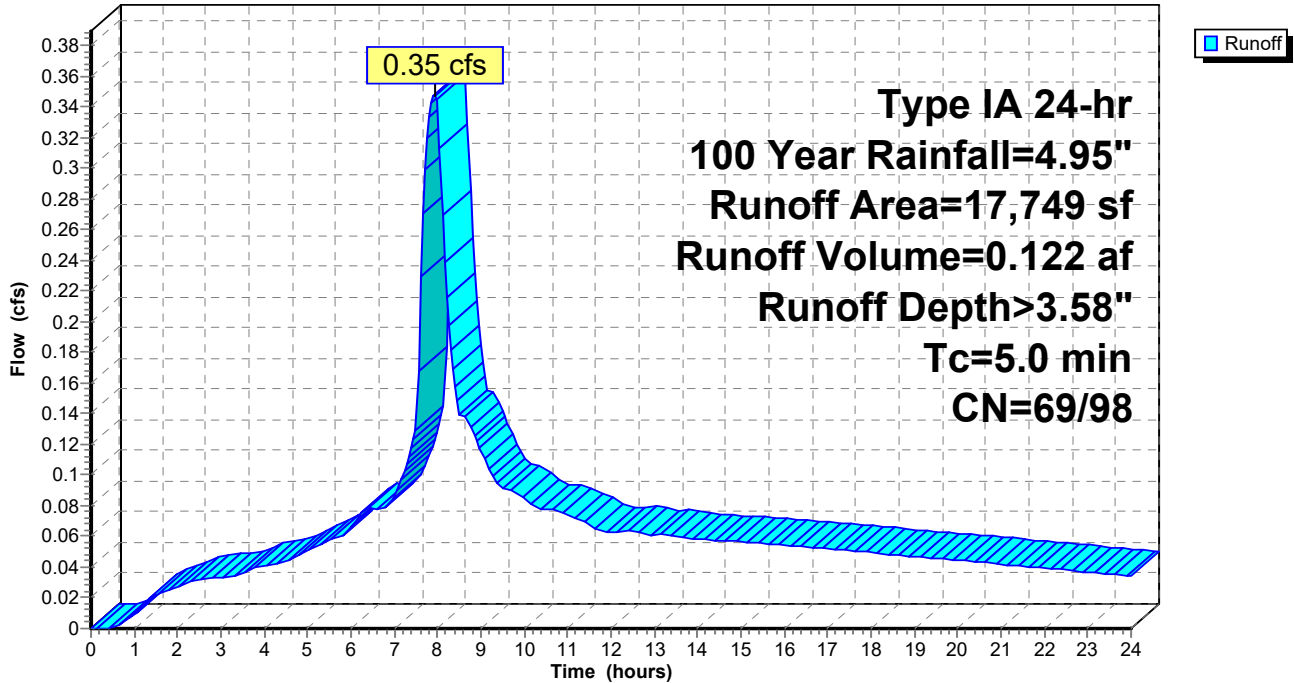
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 100 Year Rainfall=4.95"

	Area (sf)	CN	Description
*	10,611	98	Street paving
	7,138	69	50-75% Grass cover, Fair, HSG B
	17,749	86	Weighted Average
	7,138		40.22% Pervious Area
	10,611		59.78% Impervious Area

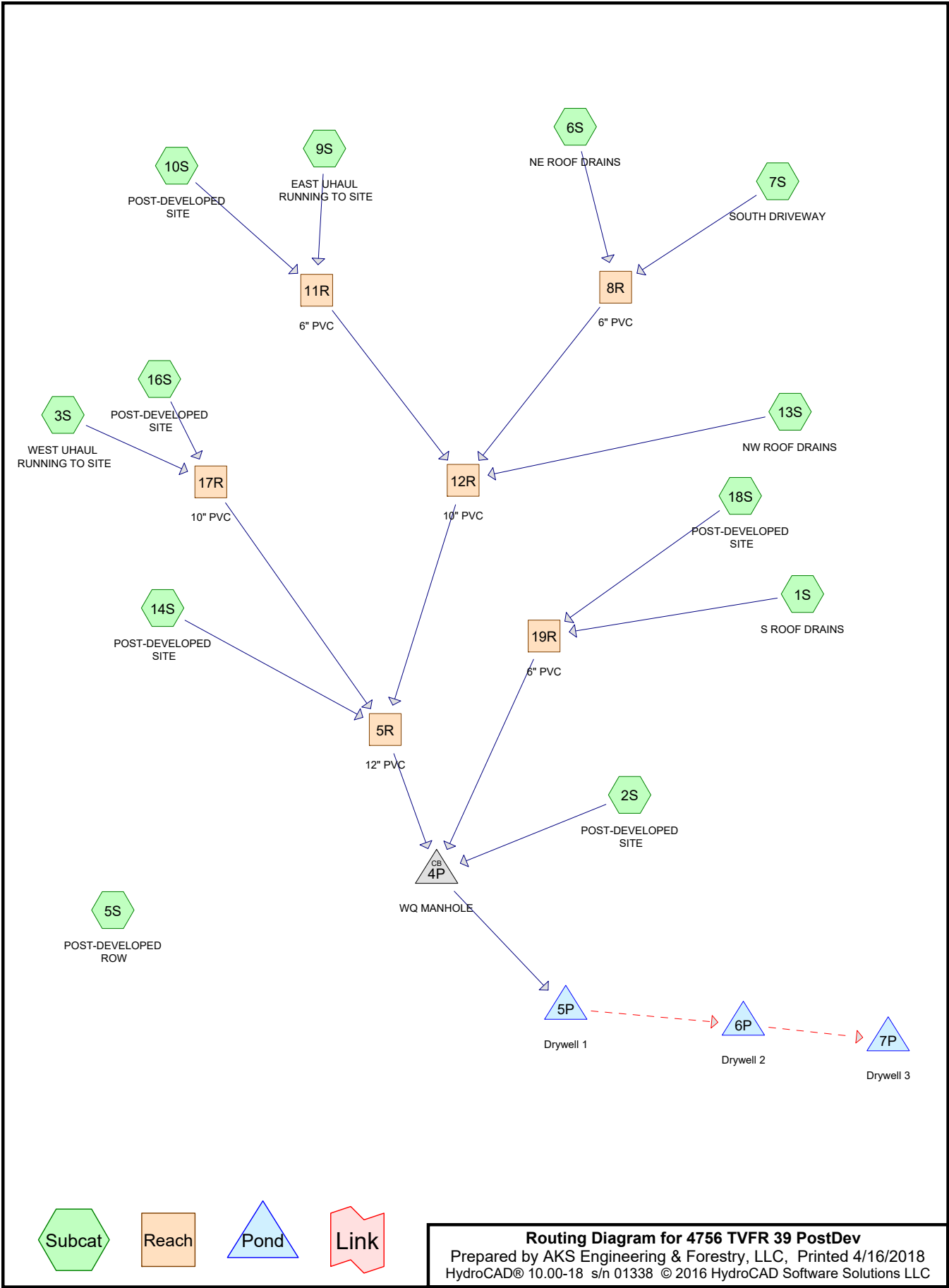
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 5S: PRE-DEVELOPED ROW

Hydrograph



POST-DEVELOPED SITE



4756 TVFR 39 PostDev

Type IA 24-hr 25 Year Rainfall=3.90"

Prepared by AKS Engineering & Forestry, LLC

Printed 4/16/2018

HydroCAD® 10.00-18 s/n 01338 © 2016 HydroCAD Software Solutions LLC

Page 2

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points

Runoff by SBUH method, Split Pervious/Imperv.

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: S ROOF DRAINS	Runoff Area=5,142 sf 100.00% Impervious Runoff Depth>3.66" Tc=5.0 min CN=0/98 Runoff=0.11 cfs 0.036 af
Subcatchment 2S: POST-DEVELOPED SITE	Runoff Area=9,005 sf 15.62% Impervious Runoff Depth>1.58" Tc=5.0 min CN=69/98 Runoff=0.07 cfs 0.027 af
Subcatchment 3S: WEST UHAUL	Runoff Area=18,036 sf 83.11% Impervious Runoff Depth>3.24" Tc=5.0 min CN=69/98 Runoff=0.33 cfs 0.112 af
Subcatchment 5S: POST-DEVELOPED	Runoff Area=17,749 sf 75.02% Impervious Runoff Depth>3.04" Tc=5.0 min CN=69/98 Runoff=0.30 cfs 0.103 af
Subcatchment 6S: NE ROOF DRAINS	Runoff Area=4,565 sf 100.00% Impervious Runoff Depth>3.66" Tc=5.0 min CN=0/98 Runoff=0.10 cfs 0.032 af
Subcatchment 7S: SOUTH DRIVEWAY	Runoff Area=3,703 sf 41.86% Impervious Runoff Depth>2.23" Tc=5.0 min CN=69/98 Runoff=0.04 cfs 0.016 af
Subcatchment 9S: EAST UHAUL RUNNING	Runoff Area=4,934 sf 62.99% Impervious Runoff Depth>2.75" Tc=5.0 min CN=69/98 Runoff=0.07 cfs 0.026 af
Subcatchment 10S: POST-DEVELOPED	Runoff Area=5,557 sf 85.75% Impervious Runoff Depth>3.31" Tc=5.0 min CN=69/98 Runoff=0.10 cfs 0.035 af
Subcatchment 13S: NW ROOF DRAINS	Runoff Area=1,662 sf 100.00% Impervious Runoff Depth>3.66" Tc=5.0 min CN=0/98 Runoff=0.03 cfs 0.012 af
Subcatchment 14S: POST-DEVELOPED	Runoff Area=10,138 sf 83.51% Impervious Runoff Depth>3.25" Tc=5.0 min CN=69/98 Runoff=0.19 cfs 0.063 af
Subcatchment 16S: POST-DEVELOPED	Runoff Area=5,422 sf 78.09% Impervious Runoff Depth>3.12" Tc=5.0 min CN=69/98 Runoff=0.09 cfs 0.032 af
Subcatchment 18S: POST-DEVELOPED	Runoff Area=2,383 sf 100.00% Impervious Runoff Depth>3.66" Tc=5.0 min CN=0/98 Runoff=0.05 cfs 0.017 af
Reach 5R: 12" PVC	Avg. Flow Depth=0.43' Max Vel=2.99 fps Inflow=0.96 cfs 0.328 af 12.0" Round Pipe n=0.013 L=173.4' S=0.0050 '/' Capacity=2.52 cfs Outflow=0.96 cfs 0.328 af
Reach 8R: 6" PVC	Avg. Flow Depth=0.20' Max Vel=1.84 fps Inflow=0.14 cfs 0.048 af 6.0" Round Pipe n=0.013 L=140.0' S=0.0050 '/' Capacity=0.40 cfs Outflow=0.14 cfs 0.048 af
Reach 11R: 6" PVC	Avg. Flow Depth=0.19' Max Vel=2.53 fps Inflow=0.18 cfs 0.061 af 6.0" Round Pipe n=0.013 L=35.1' S=0.0100 '/' Capacity=0.56 cfs Outflow=0.18 cfs 0.061 af
Reach 12R: 10" PVC	Avg. Flow Depth=0.27' Max Vel=2.29 fps Inflow=0.35 cfs 0.120 af 10.0" Round Pipe n=0.013 L=60.4' S=0.0050 '/' Capacity=1.54 cfs Outflow=0.35 cfs 0.120 af

4756 TVFR 39 PostDev

Type IA 24-hr 25 Year Rainfall=3.90"

Prepared by AKS Engineering & Forestry, LLC

Printed 4/16/2018

HydroCAD® 10.00-18 s/n 01338 © 2016 HydroCAD Software Solutions LLC

Page 3

Reach 17R: 10" PVC Avg. Flow Depth=0.25' Max Vel=3.12 fps Inflow=0.42 cfs 0.144 af
10.0" Round Pipe n=0.013 L=31.6' S=0.0101 '/ Capacity=2.20 cfs Outflow=0.42 cfs 0.144 af

Reach 19R: 6" PVC Avg. Flow Depth=0.22' Max Vel=1.91 fps Inflow=0.16 cfs 0.053 af
6.0" Round Pipe n=0.013 L=140.0' S=0.0050 '/ Capacity=0.40 cfs Outflow=0.16 cfs 0.053 af

Pond 4P: WQ MANHOLE Peak Elev=168.59' Inflow=1.18 cfs 0.407 af
12.0" Round Culvert n=0.013 L=10.6' S=0.0104 '/ Outflow=1.18 cfs 0.407 af

Pond 5P: Drywell 1 Peak Elev=167.70' Storage=446 cf Inflow=1.18 cfs 0.407 af
Discarded=0.01 cfs 0.021 af Secondary=1.17 cfs 0.376 af Outflow=1.18 cfs 0.398 af

Pond 6P: Drywell 2 Peak Elev=166.73' Storage=4,163 cf Inflow=1.17 cfs 0.376 af
Discarded=0.10 cfs 0.169 af Secondary=0.46 cfs 0.114 af Outflow=0.56 cfs 0.283 af

Pond 7P: Drywell 3 Peak Elev=155.36' Storage=0.032 af Inflow=0.46 cfs 0.114 af
Outflow=0.10 cfs 0.114 af

Total Runoff Area = 2.027 ac Runoff Volume = 0.511 af Average Runoff Depth = 3.03"
25.72% Pervious = 0.521 ac 74.28% Impervious = 1.506 ac

Summary for Subcatchment 1S: S ROOF DRAINS

Runoff = 0.11 cfs @ 7.90 hrs, Volume= 0.036 af, Depth> 3.66"

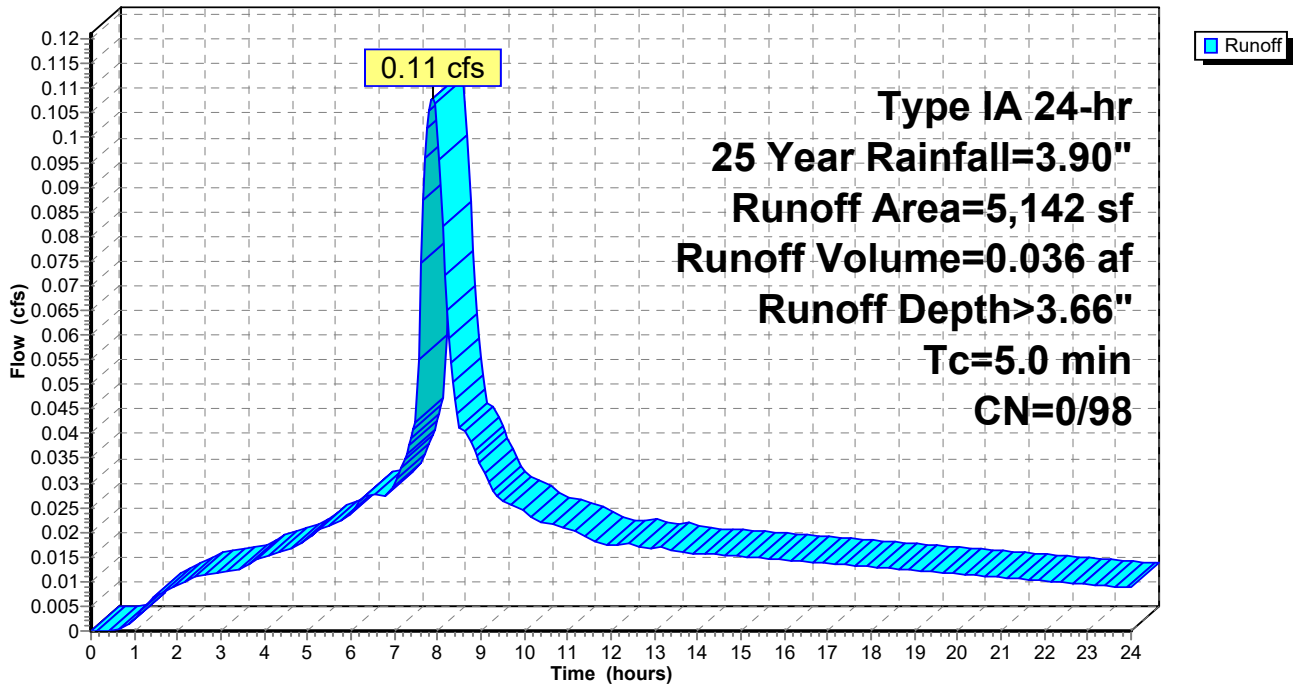
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 25 Year Rainfall=3.90"

Area (sf)	CN	Description
5,142	98	Paved parking & roofs
5,142		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 1S: S ROOF DRAINS

Hydrograph



Summary for Subcatchment 2S: POST-DEVELOPED SITE

Runoff = 0.07 cfs @ 7.98 hrs, Volume= 0.027 af, Depth> 1.58"

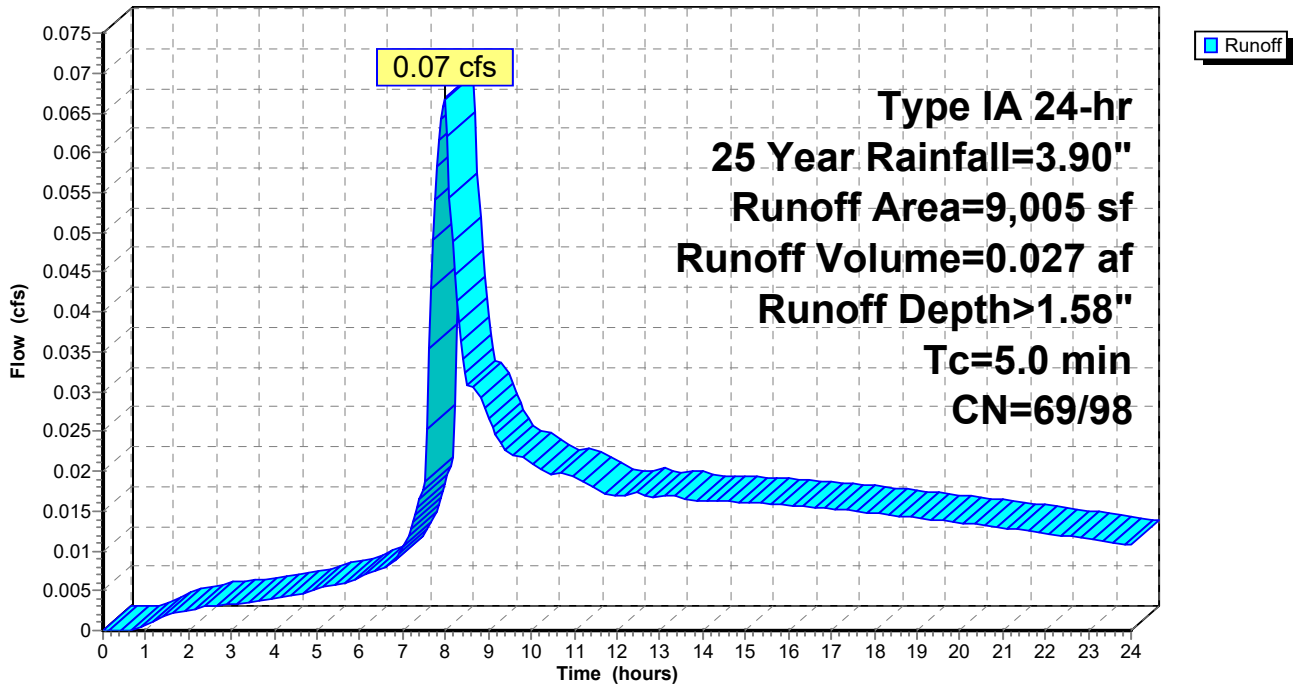
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 25 Year Rainfall=3.90"

	Area (sf)	CN	Description
*	1,407	98	Paved parking & sidewalk
	7,598	69	50-75% Grass cover, Fair, HSG B
	9,005	74	Weighted Average
	7,598		84.38% Pervious Area
	1,407		15.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 2S: POST-DEVELOPED SITE

Hydrograph



Summary for Subcatchment 3S: WEST UHAUL RUNNING TO SITE

Runoff = 0.33 cfs @ 7.91 hrs, Volume= 0.112 af, Depth> 3.24"

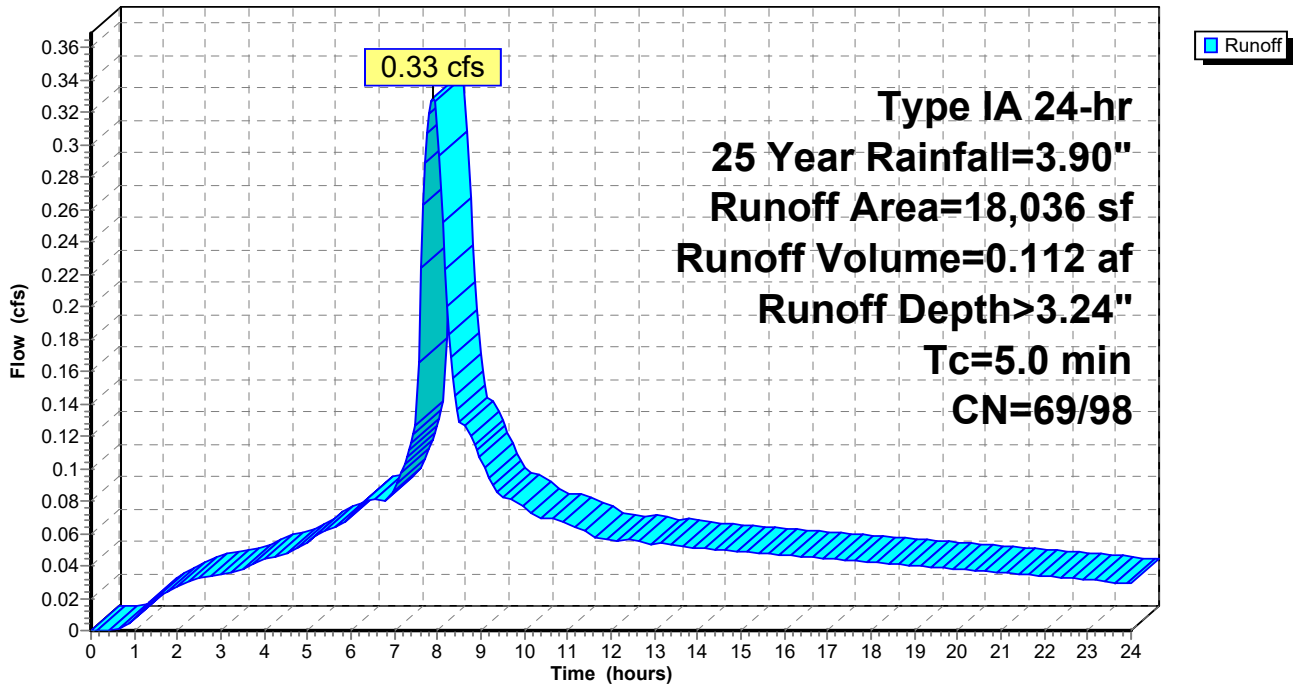
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 25 Year Rainfall=3.90"

Area (sf)	CN	Description
* 14,989	98	Paved parking & sidewalk
3,047	69	50-75% Grass cover, Fair, HSG B
18,036	93	Weighted Average
3,047		16.89% Pervious Area
14,989		83.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 3S: WEST UHAUL RUNNING TO SITE

Hydrograph



Summary for Subcatchment 5S: POST-DEVELOPED ROW

Runoff = 0.30 cfs @ 7.91 hrs, Volume= 0.103 af, Depth> 3.04"

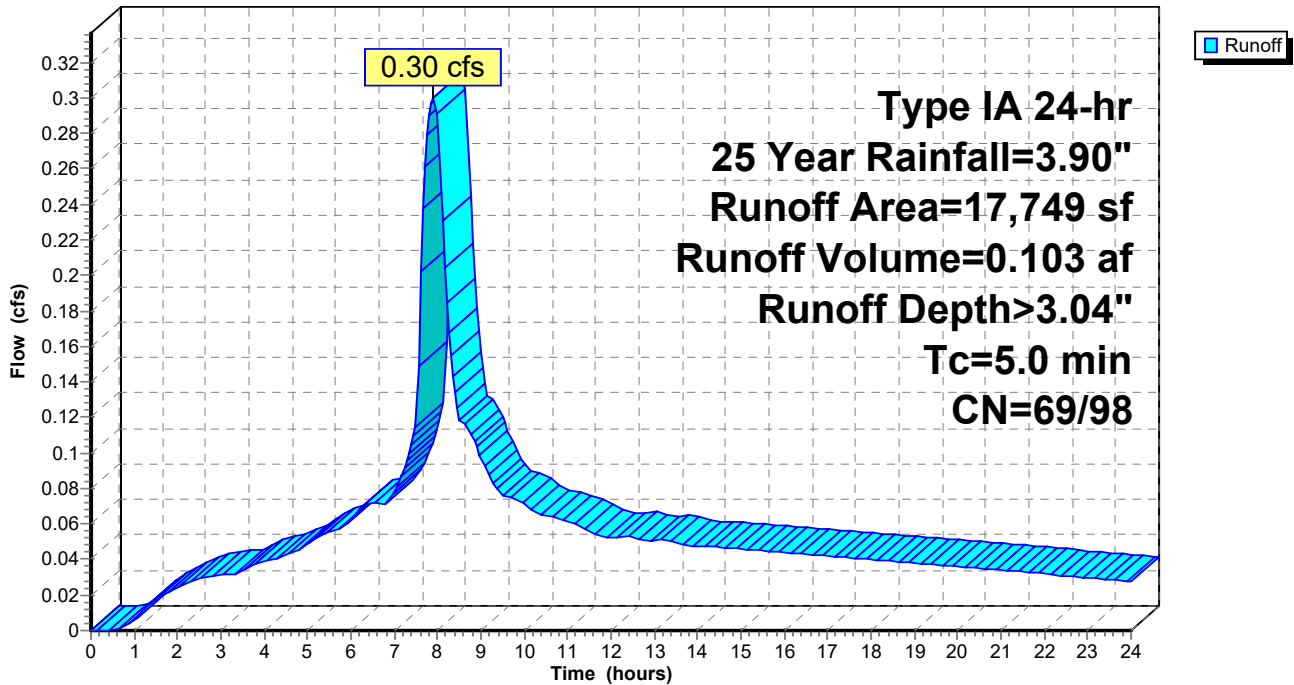
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 25 Year Rainfall=3.90"

	Area (sf)	CN	Description
*	13,315	98	Street Paving & sidewalk
	4,434	69	50-75% Grass cover, Fair, HSG B
	17,749	91	Weighted Average
	4,434		24.98% Pervious Area
	13,315		75.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 5S: POST-DEVELOPED ROW

Hydrograph



Summary for Subcatchment 6S: NE ROOF DRAINS

Runoff = 0.10 cfs @ 7.90 hrs, Volume= 0.032 af, Depth> 3.66"

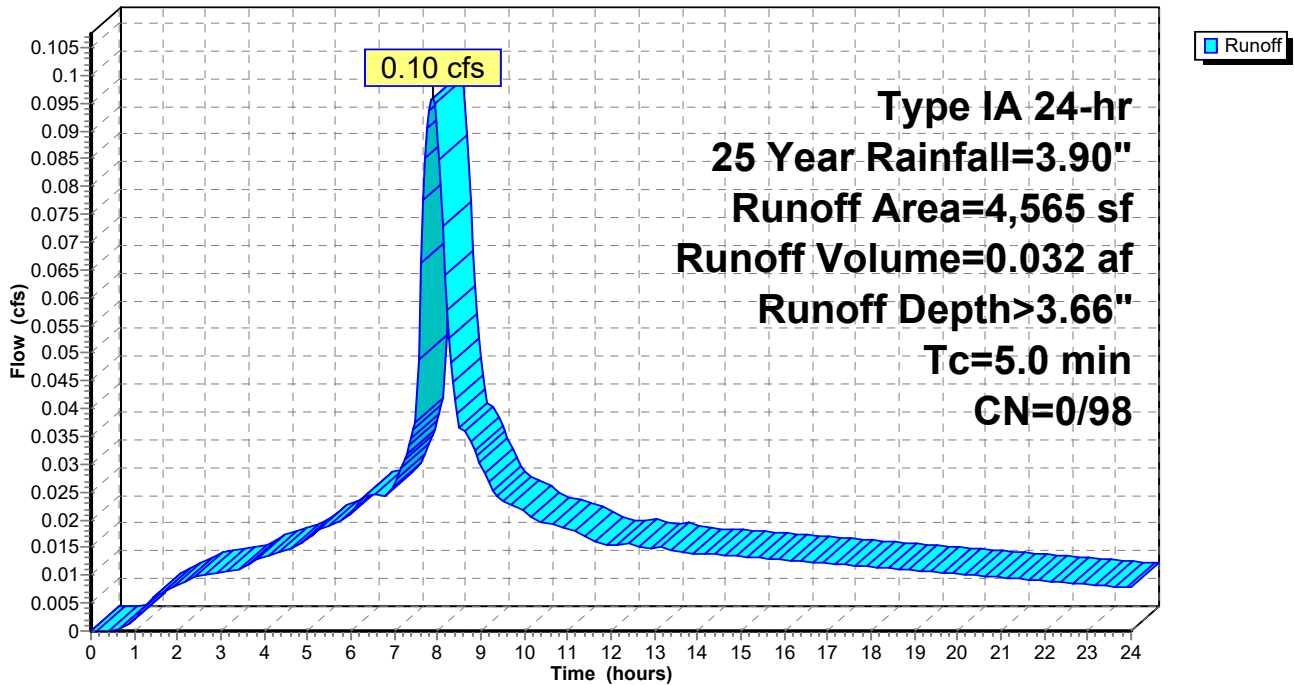
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 25 Year Rainfall=3.90"

Area (sf)	CN	Description
* 4,565	98	Roofs
4,565		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 6S: NE ROOF DRAINS

Hydrograph



Summary for Subcatchment 7S: SOUTH DRIVEWAY

Runoff = 0.04 cfs @ 7.95 hrs, Volume= 0.016 af, Depth> 2.23"

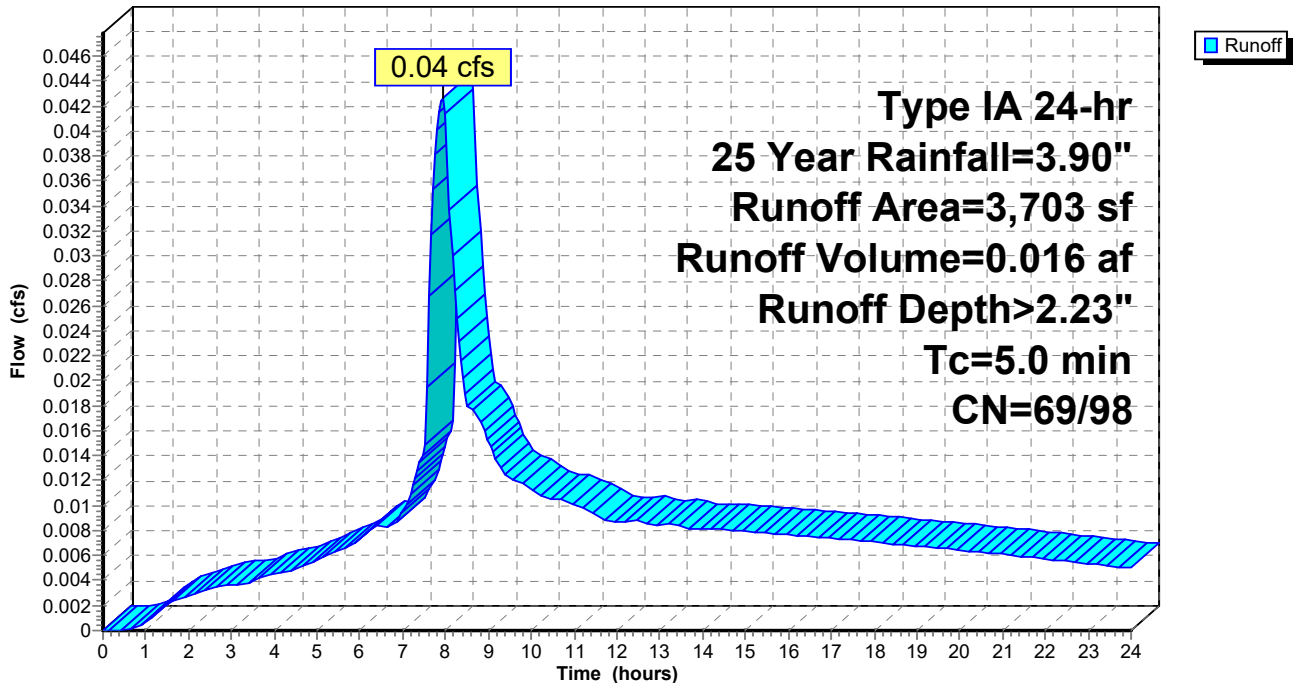
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 25 Year Rainfall=3.90"

Area (sf)	CN	Description
* 1,550	98	Paved parking & sidewalk
2,153	69	50-75% Grass cover, Fair, HSG B
3,703	81	Weighted Average
2,153		58.14% Pervious Area
1,550		41.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 7S: SOUTH DRIVEWAY

Hydrograph



Summary for Subcatchment 9S: EAST UHAUL RUNNING TO SITE

Runoff = 0.07 cfs @ 7.92 hrs, Volume= 0.026 af, Depth> 2.75"

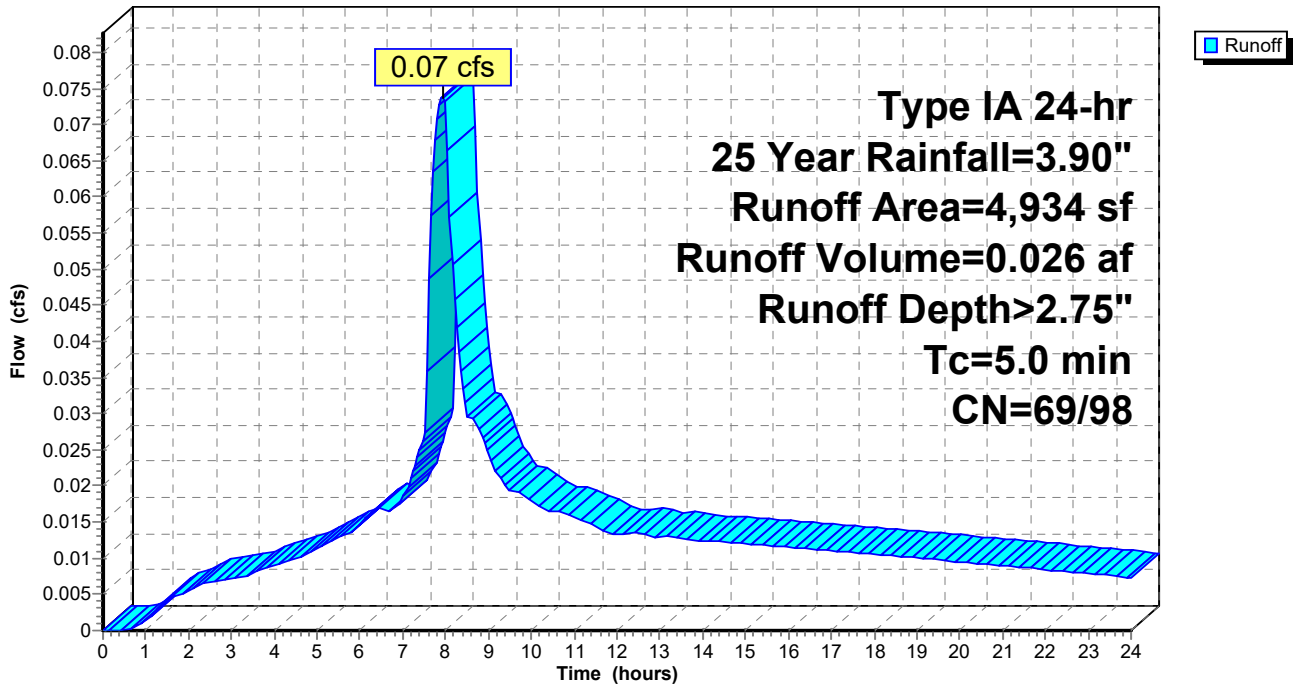
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 25 Year Rainfall=3.90"

Area (sf)	CN	Description
3,108	98	Paved parking & sidewalk
1,826	69	50-75% Grass cover, Fair, HSG B
4,934	87	Weighted Average
1,826		37.01% Pervious Area
3,108		62.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 9S: EAST UHAUL RUNNING TO SITE

Hydrograph



Summary for Subcatchment 10S: POST-DEVELOPED SITE

Runoff = 0.10 cfs @ 7.91 hrs, Volume= 0.035 af, Depth> 3.31"

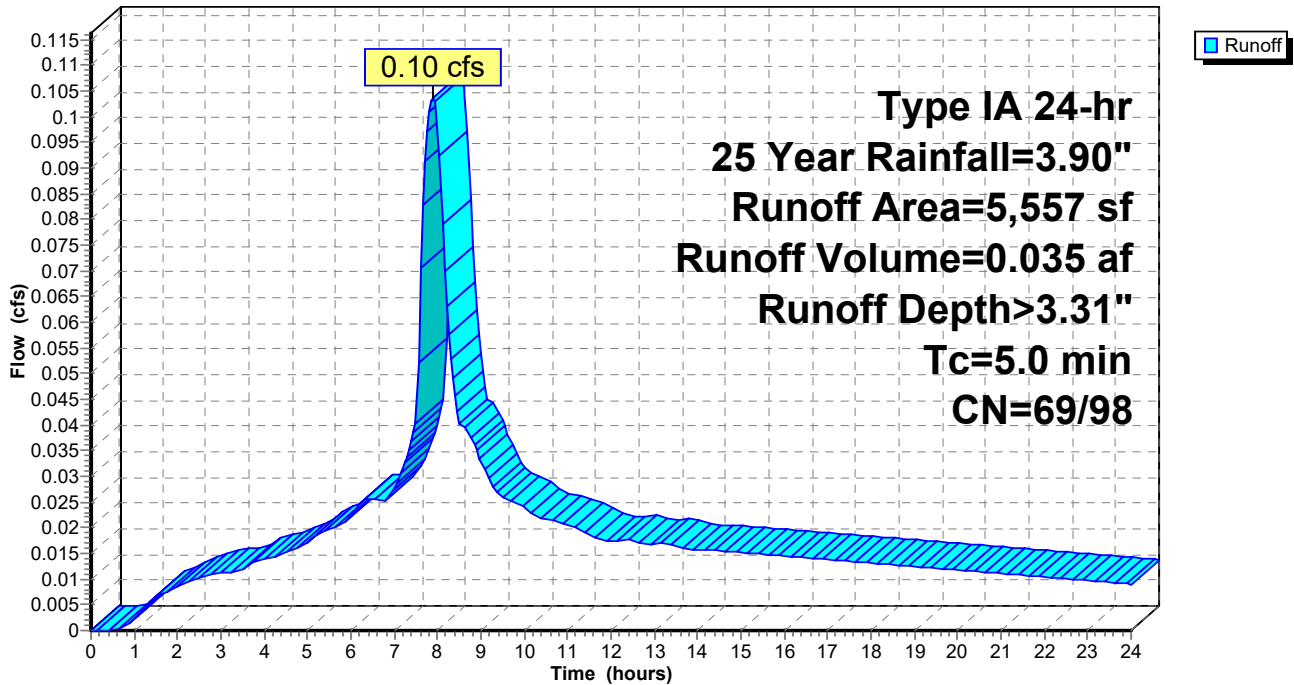
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 25 Year Rainfall=3.90"

Area (sf)	CN	Description
* 4,765	98	Paved parking & sidewalk
792	69	50-75% Grass cover, Fair, HSG B
5,557	94	Weighted Average
792		14.25% Pervious Area
4,765		85.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 10S: POST-DEVELOPED SITE

Hydrograph



Summary for Subcatchment 13S: NW ROOF DRAINS

Runoff = 0.03 cfs @ 7.90 hrs, Volume= 0.012 af, Depth> 3.66"

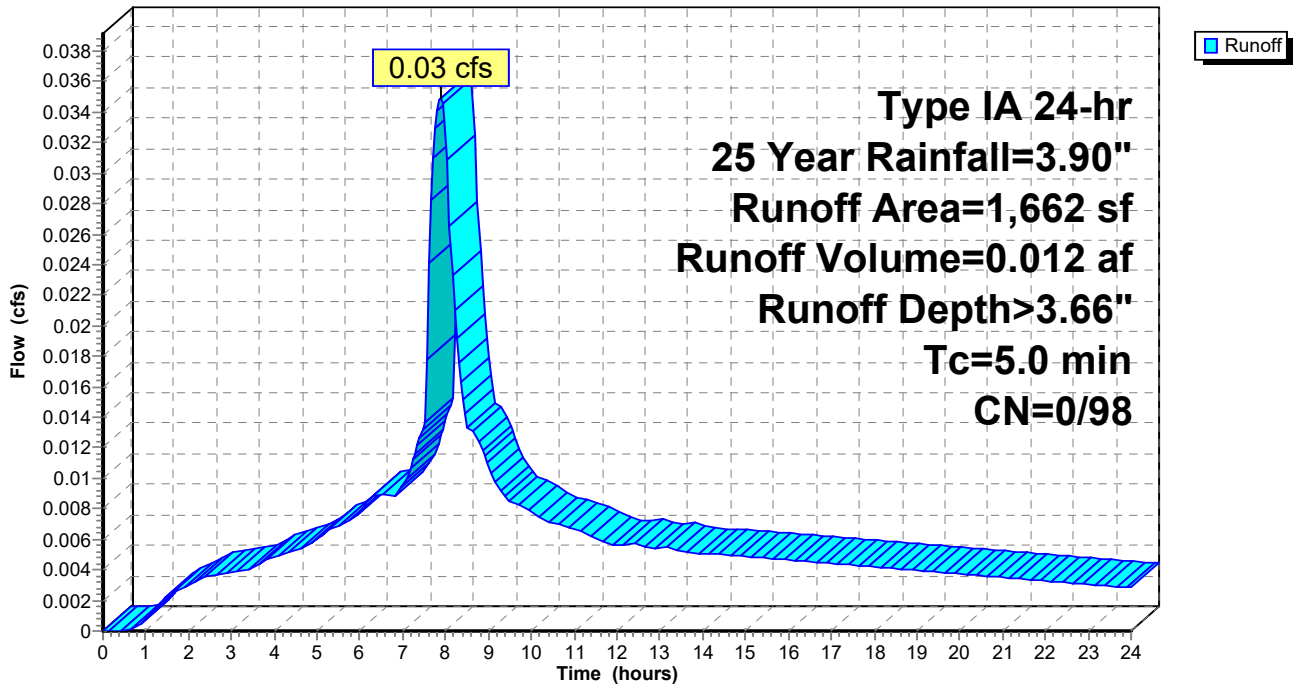
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 25 Year Rainfall=3.90"

Area (sf)	CN	Description
1,662	98	Paved parking & roofs
1,662		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 13S: NW ROOF DRAINS

Hydrograph



Summary for Subcatchment 14S: POST-DEVELOPED SITE

Runoff = 0.19 cfs @ 7.91 hrs, Volume= 0.063 af, Depth> 3.25"

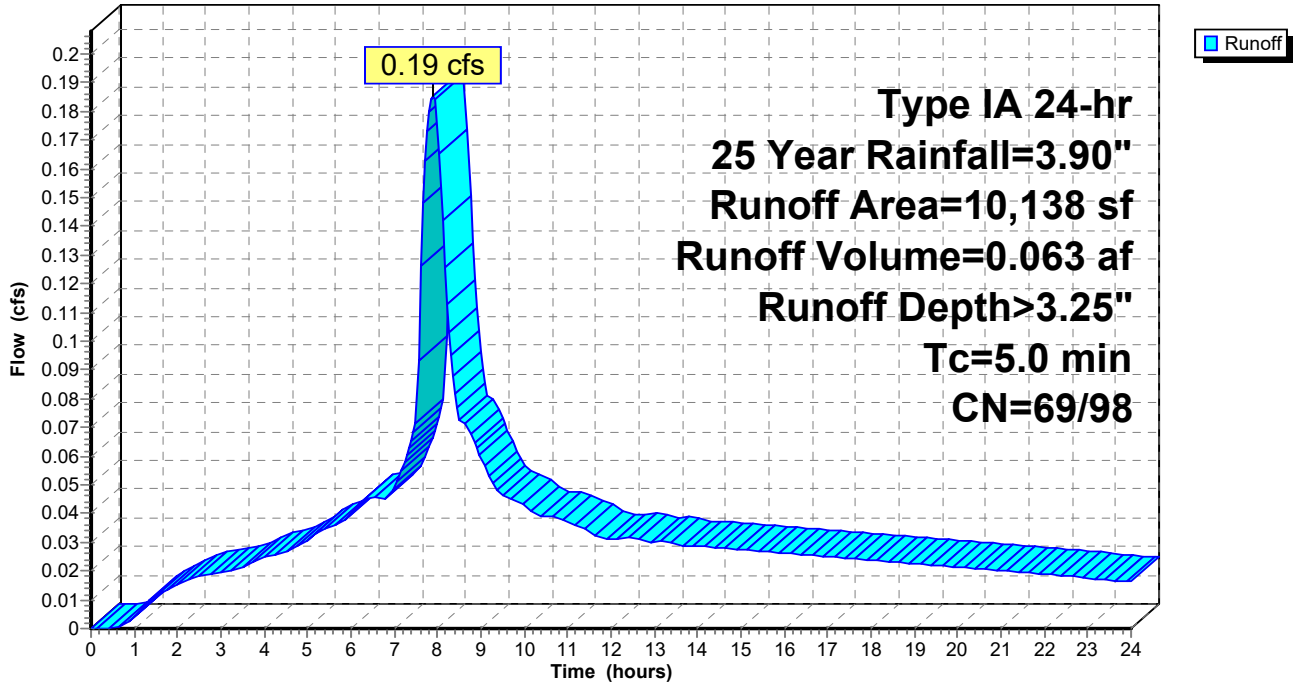
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 25 Year Rainfall=3.90"

Area (sf)	CN	Description
* 8,466	98	Paved parking & sidewalk
1,672	69	50-75% Grass cover, Fair, HSG B
10,138	93	Weighted Average
1,672		16.49% Pervious Area
8,466		83.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 14S: POST-DEVELOPED SITE

Hydrograph



Summary for Subcatchment 16S: POST-DEVELOPED SITE

Runoff = 0.09 cfs @ 7.91 hrs, Volume= 0.032 af, Depth> 3.12"

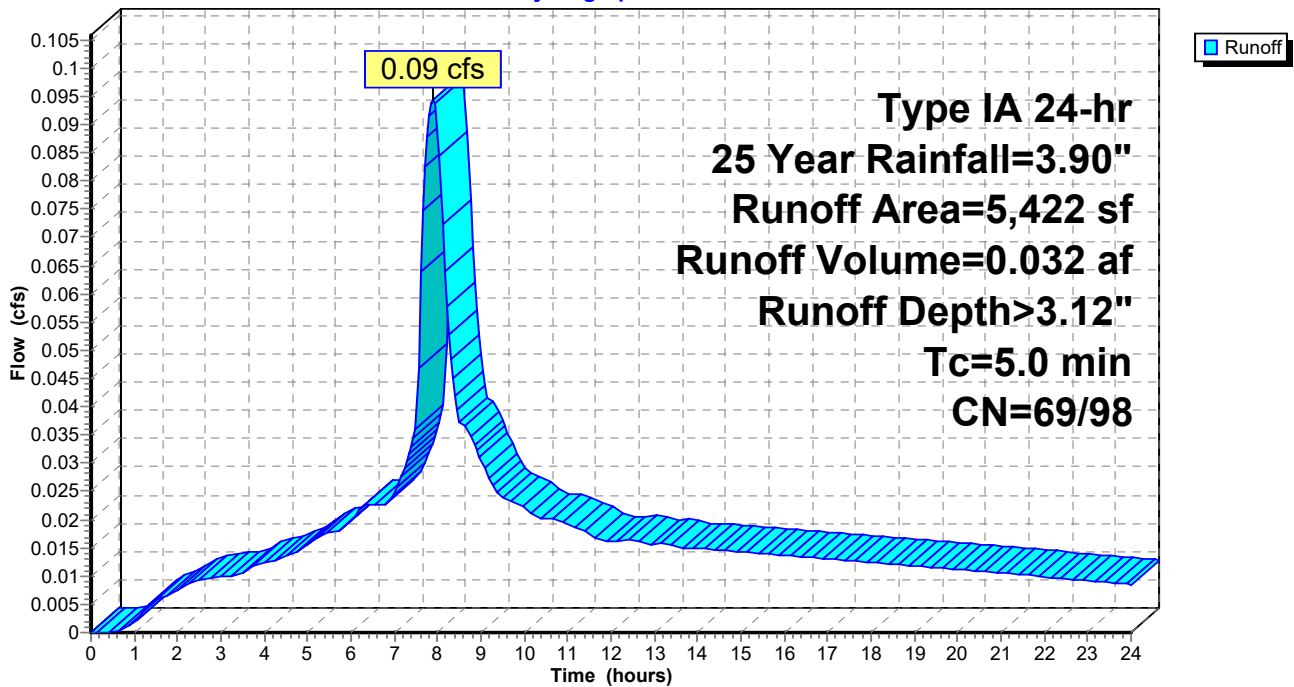
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 25 Year Rainfall=3.90"

	Area (sf)	CN	Description
*	4,234	98	Paved parking & sidewalk
	1,188	69	50-75% Grass cover, Fair, HSG B
	5,422	92	Weighted Average
	1,188		21.91% Pervious Area
	4,234		78.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 16S: POST-DEVELOPED SITE

Hydrograph



Summary for Subcatchment 18S: POST-DEVELOPED SITE

Runoff = 0.05 cfs @ 7.90 hrs, Volume= 0.017 af, Depth> 3.66"

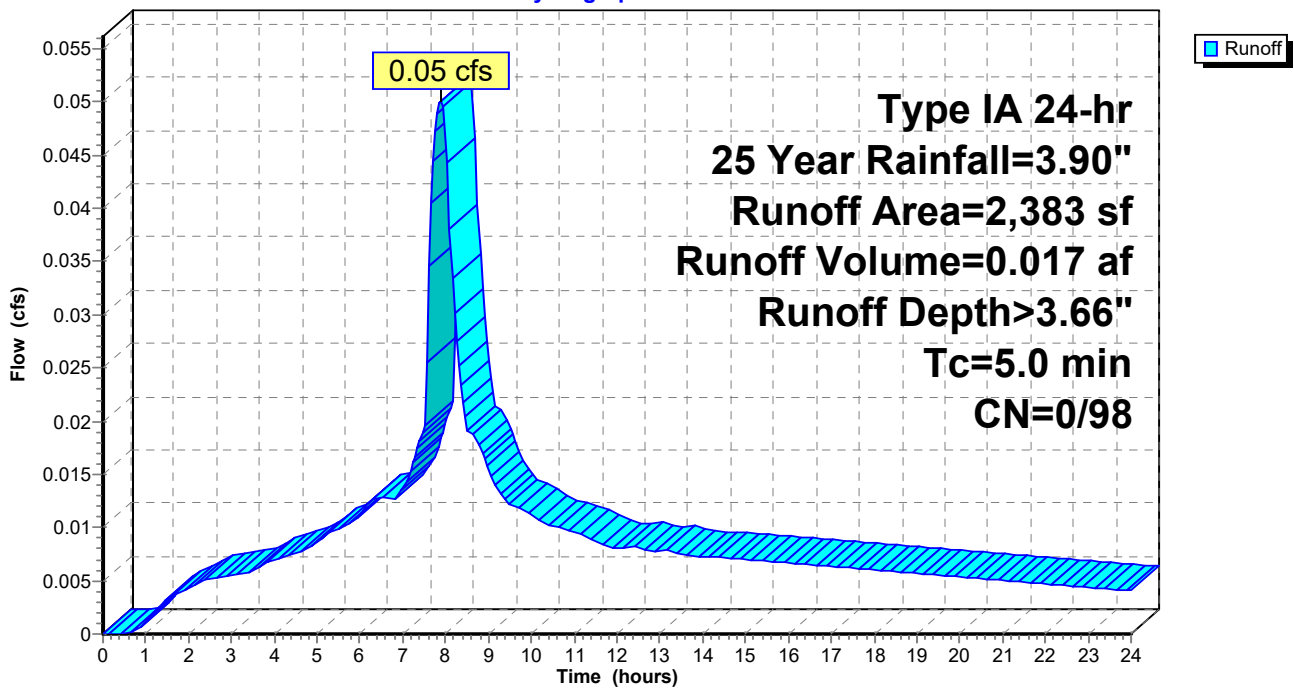
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 25 Year Rainfall=3.90"

Area (sf)	CN	Description
* 2,383	98	Paved parking & sidewalk
2,383		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 18S: POST-DEVELOPED SITE

Hydrograph



4756 TVFR 39 PostDev

Prepared by AKS Engineering & Forestry, LLC

HydroCAD® 10.00-18 s/n 01338 © 2016 HydroCAD Software Solutions LLC

Type IA 24-hr 25 Year Rainfall=3.90"

Printed 4/16/2018

Page 16

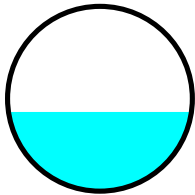
Summary for Reach 5R: 12" PVC

Inflow Area = 1.240 ac, 80.23% Impervious, Inflow Depth > 3.17" for 25 Year event
Inflow = 0.96 cfs @ 7.91 hrs, Volume= 0.328 af
Outflow = 0.96 cfs @ 7.93 hrs, Volume= 0.328 af, Atten= 0%, Lag= 0.6 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.99 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 1.75 fps, Avg. Travel Time= 1.7 min

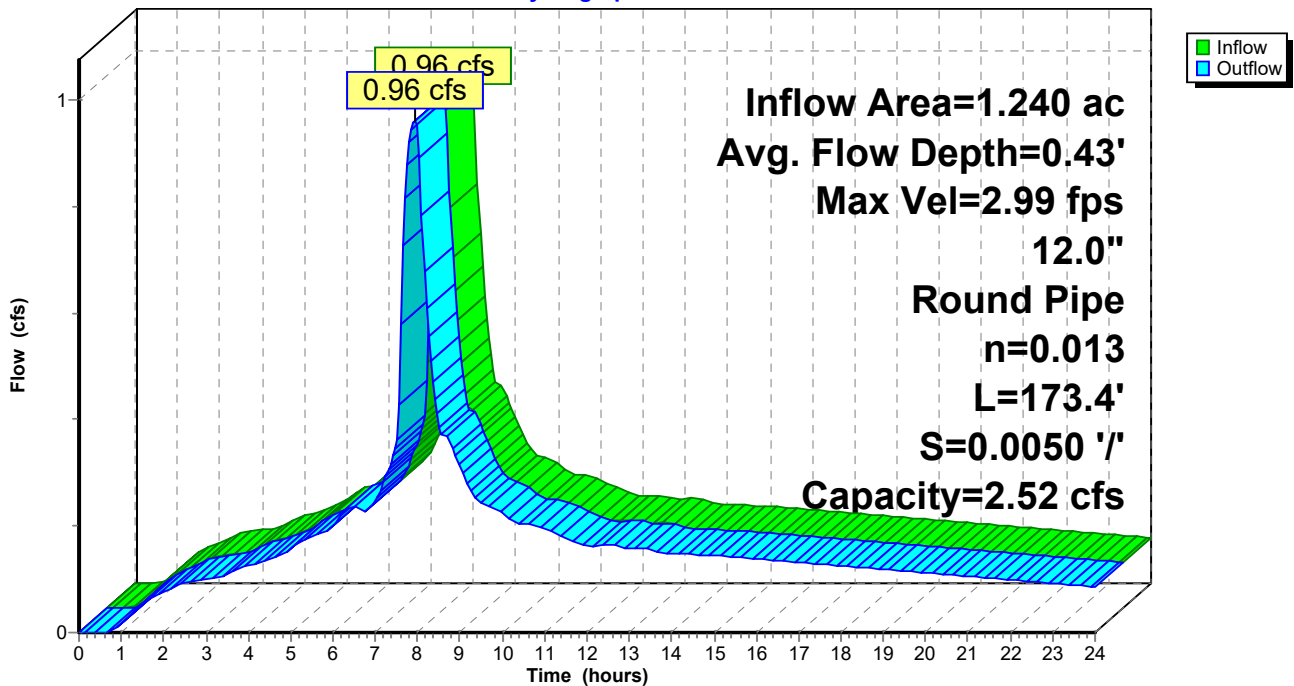
Peak Storage= 56 cf @ 7.93 hrs
Average Depth at Peak Storage= 0.43'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 2.52 cfs

12.0" Round Pipe
n= 0.013
Length= 173.4' Slope= 0.0050 '/'
Inlet Invert= 169.00', Outlet Invert= 168.13'



Reach 5R: 12" PVC

Hydrograph



4756 TVFR 39 PostDev

Prepared by AKS Engineering & Forestry, LLC

HydroCAD® 10.00-18 s/n 01338 © 2016 HydroCAD Software Solutions LLC

Type IA 24-hr 25 Year Rainfall=3.90"

Printed 4/16/2018

Page 17

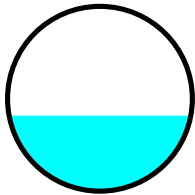
Summary for Reach 8R: 6" PVC

Inflow Area = 0.190 ac, 73.96% Impervious, Inflow Depth > 3.02" for 25 Year event
Inflow = 0.14 cfs @ 7.91 hrs, Volume= 0.048 af
Outflow = 0.14 cfs @ 7.93 hrs, Volume= 0.048 af, Atten= 0%, Lag= 0.9 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.84 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 1.08 fps, Avg. Travel Time= 2.2 min

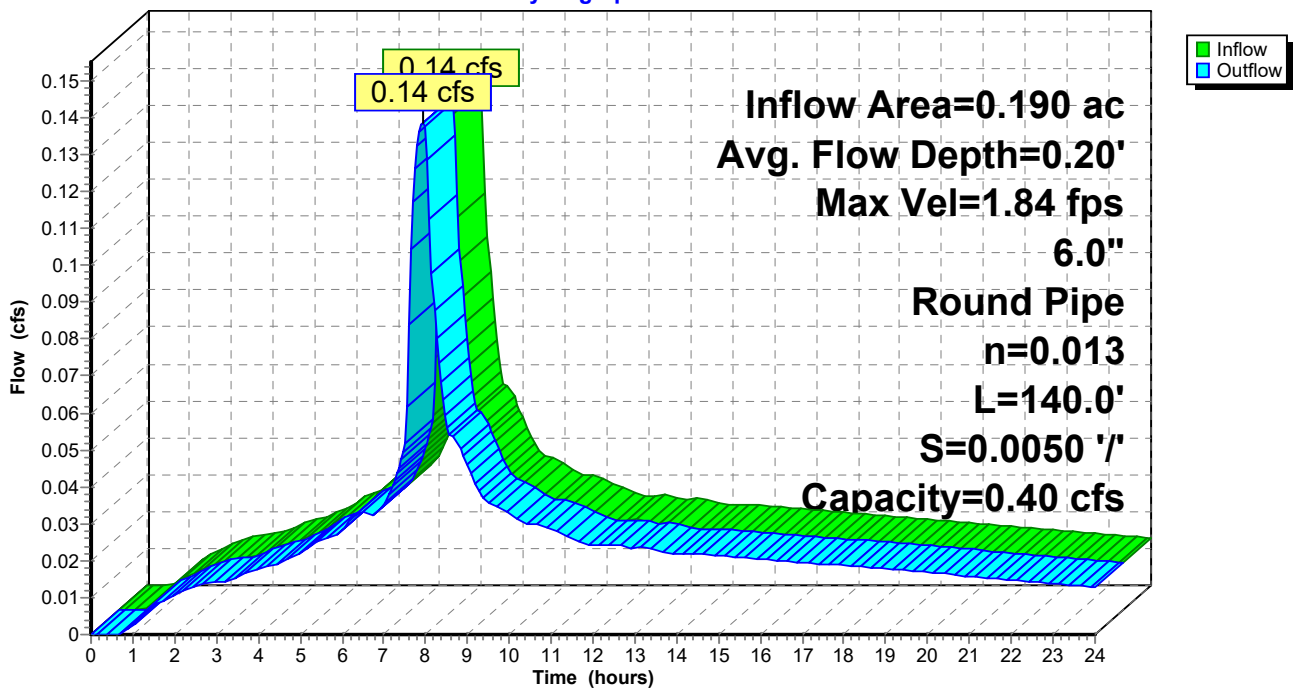
Peak Storage= 11 cf @ 7.93 hrs
Average Depth at Peak Storage= 0.20'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.40 cfs

6.0" Round Pipe
n= 0.013
Length= 140.0' Slope= 0.0050 '/'
Inlet Invert= 170.64', Outlet Invert= 169.94'



Reach 8R: 6" PVC

Hydrograph



4756 TVFR 39 PostDev

Prepared by AKS Engineering & Forestry, LLC

HydroCAD® 10.00-18 s/n 01338 © 2016 HydroCAD Software Solutions LLC

Type IA 24-hr 25 Year Rainfall=3.90"

Printed 4/16/2018

Page 18

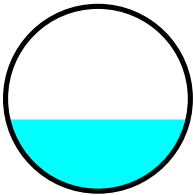
Summary for Reach 11R: 6" PVC

Inflow Area = 0.241 ac, 75.05% Impervious, Inflow Depth > 3.05" for 25 Year event
Inflow = 0.18 cfs @ 7.91 hrs, Volume= 0.061 af
Outflow = 0.18 cfs @ 7.92 hrs, Volume= 0.061 af, Atten= 0%, Lag= 0.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.53 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.48 fps, Avg. Travel Time= 0.4 min

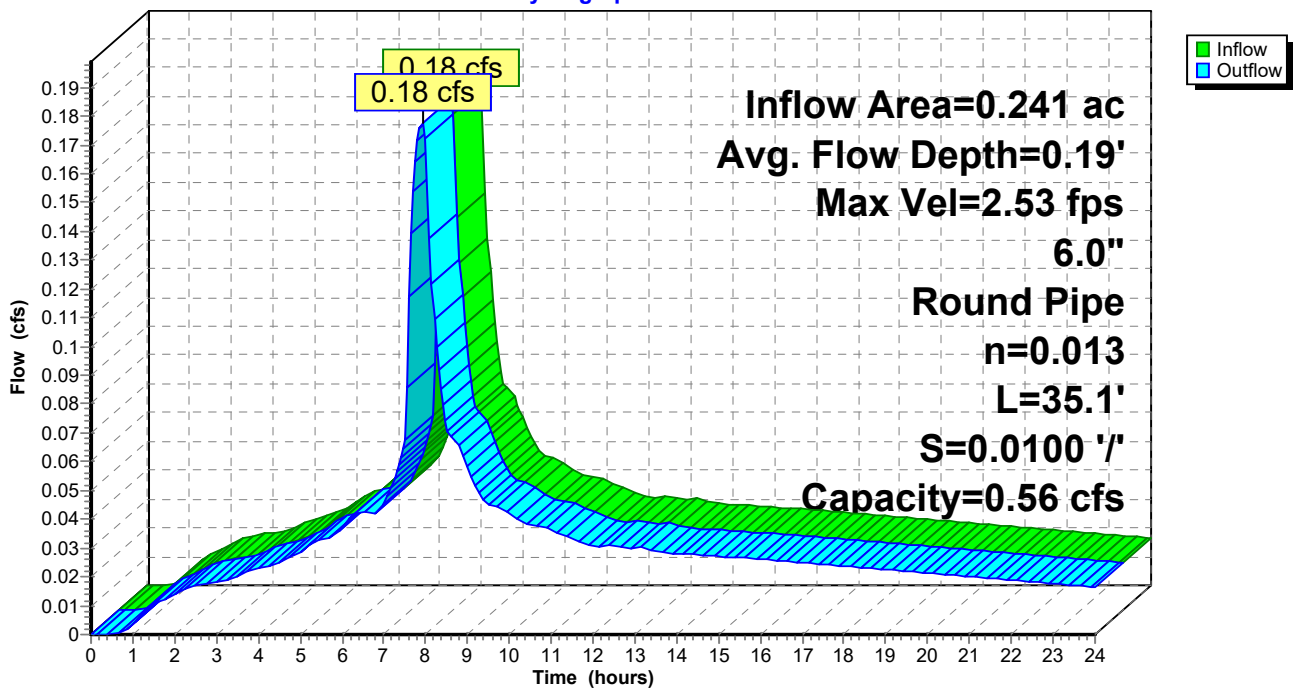
Peak Storage= 2 cf @ 7.92 hrs
Average Depth at Peak Storage= 0.19'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.56 cfs

6.0" Round Pipe
n= 0.013
Length= 35.1' Slope= 0.0100 '/'
Inlet Invert= 170.03', Outlet Invert= 169.68'



Reach 11R: 6" PVC

Hydrograph



4756 TVFR 39 PostDev

Prepared by AKS Engineering & Forestry, LLC

HydroCAD® 10.00-18 s/n 01338 © 2016 HydroCAD Software Solutions LLC

Type IA 24-hr 25 Year Rainfall=3.90"

Printed 4/16/2018

Page 19

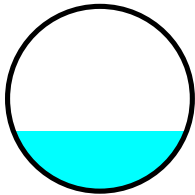
Summary for Reach 12R: 10" PVC

Inflow Area = 0.469 ac, 76.64% Impervious, Inflow Depth > 3.08" for 25 Year event
Inflow = 0.35 cfs @ 7.92 hrs, Volume= 0.120 af
Outflow = 0.35 cfs @ 7.92 hrs, Volume= 0.120 af, Atten= 0%, Lag= 0.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.29 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.33 fps, Avg. Travel Time= 0.8 min

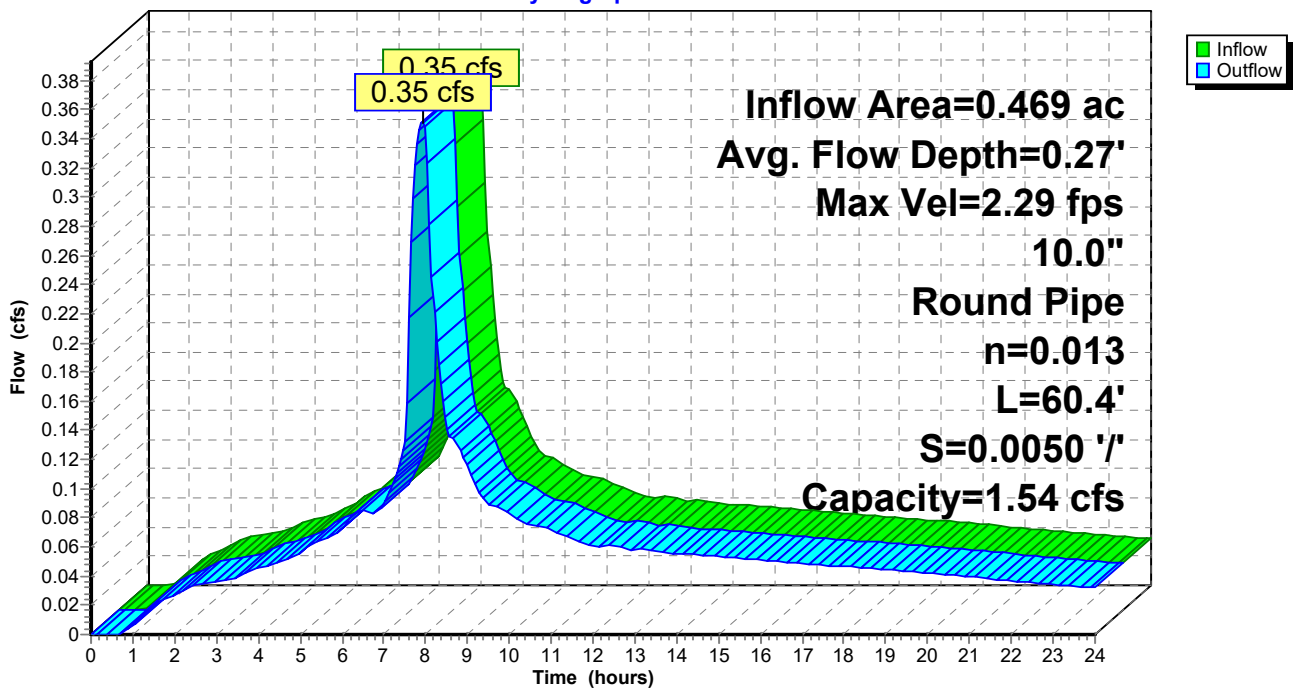
Peak Storage= 9 cf @ 7.92 hrs
Average Depth at Peak Storage= 0.27'
Bank-Full Depth= 0.83' Flow Area= 0.5 sf, Capacity= 1.54 cfs

10.0" Round Pipe
n= 0.013
Length= 60.4' Slope= 0.0050 '/'
Inlet Invert= 169.47', Outlet Invert= 169.17'



Reach 12R: 10" PVC

Hydrograph



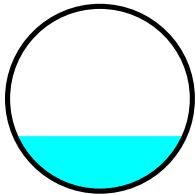
Summary for Reach 17R: 10" PVC

Inflow Area = 0.539 ac, 81.95% Impervious, Inflow Depth > 3.21" for 25 Year event
 Inflow = 0.42 cfs @ 7.91 hrs, Volume= 0.144 af
 Outflow = 0.42 cfs @ 7.91 hrs, Volume= 0.144 af, Atten= 0%, Lag= 0.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Max. Velocity= 3.12 fps, Min. Travel Time= 0.2 min
 Avg. Velocity = 1.80 fps, Avg. Travel Time= 0.3 min

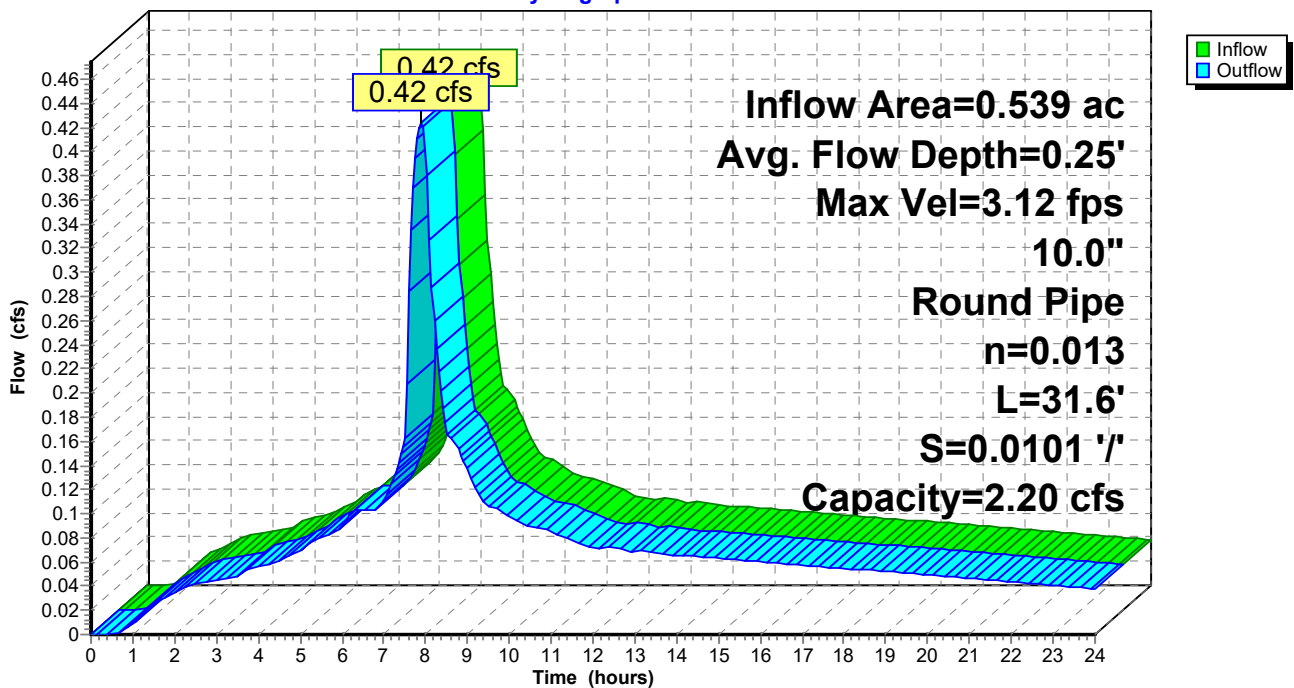
Peak Storage= 4 cf @ 7.91 hrs
 Average Depth at Peak Storage= 0.25'
 Bank-Full Depth= 0.83' Flow Area= 0.5 sf, Capacity= 2.20 cfs

10.0" Round Pipe
 n= 0.013
 Length= 31.6' Slope= 0.0101 '/
 Inlet Invert= 169.37', Outlet Invert= 169.05'



Reach 17R: 10" PVC

Hydrograph



4756 TVFR 39 PostDev

Prepared by AKS Engineering & Forestry, LLC

HydroCAD® 10.00-18 s/n 01338 © 2016 HydroCAD Software Solutions LLC

Type IA 24-hr 25 Year Rainfall=3.90"

Printed 4/16/2018

Page 21

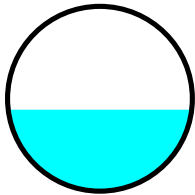
Summary for Reach 19R: 6" PVC

Inflow Area = 0.173 ac, 100.00% Impervious, Inflow Depth > 3.66" for 25 Year event
Inflow = 0.16 cfs @ 7.90 hrs, Volume= 0.053 af
Outflow = 0.16 cfs @ 7.91 hrs, Volume= 0.053 af, Atten= 0%, Lag= 0.9 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.91 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 1.11 fps, Avg. Travel Time= 2.1 min

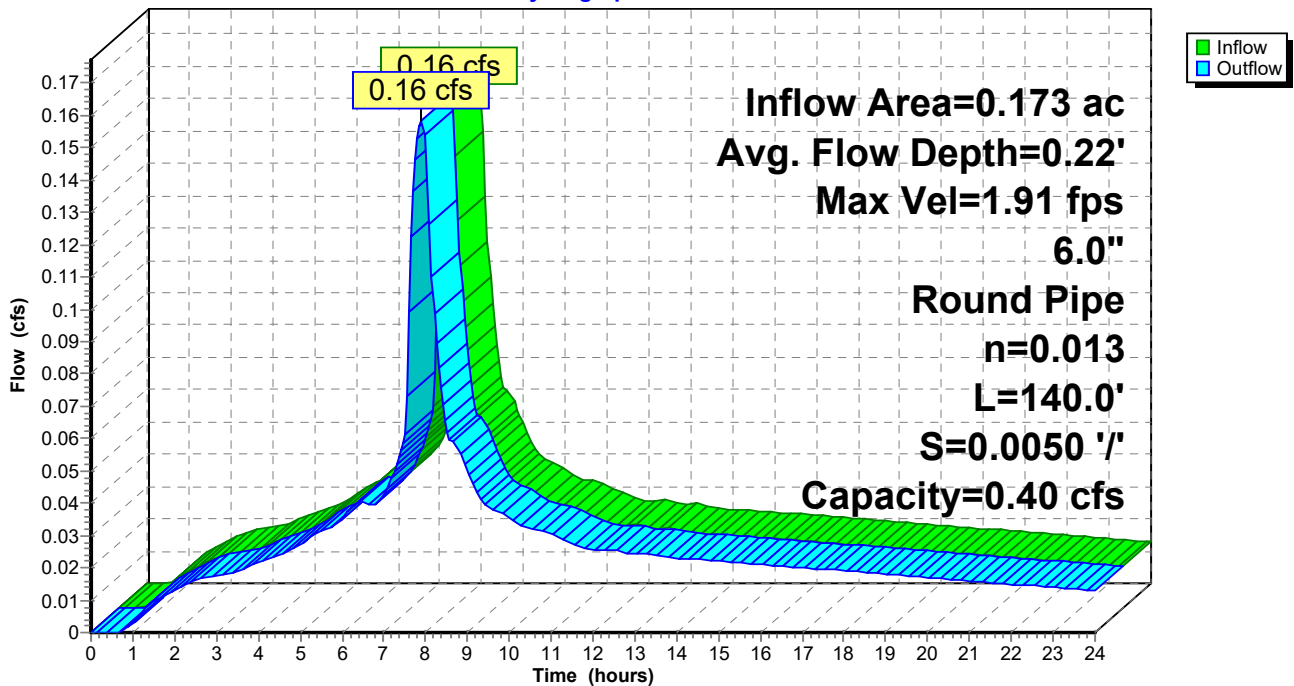
Peak Storage= 12 cf @ 7.91 hrs
Average Depth at Peak Storage= 0.22'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.40 cfs

6.0" Round Pipe
n= 0.013
Length= 140.0' Slope= 0.0050 '/'
Inlet Invert= 170.64', Outlet Invert= 169.94'



Reach 19R: 6" PVC

Hydrograph



Summary for Pond 4P: WQ MANHOLE

Inflow Area = 1.620 ac, 74.09% Impervious, Inflow Depth > 3.02" for 25 Year event
 Inflow = 1.18 cfs @ 7.93 hrs, Volume= 0.407 af
 Outflow = 1.18 cfs @ 7.93 hrs, Volume= 0.407 af, Atten= 0%, Lag= 0.0 min
 Primary = 1.18 cfs @ 7.93 hrs, Volume= 0.407 af

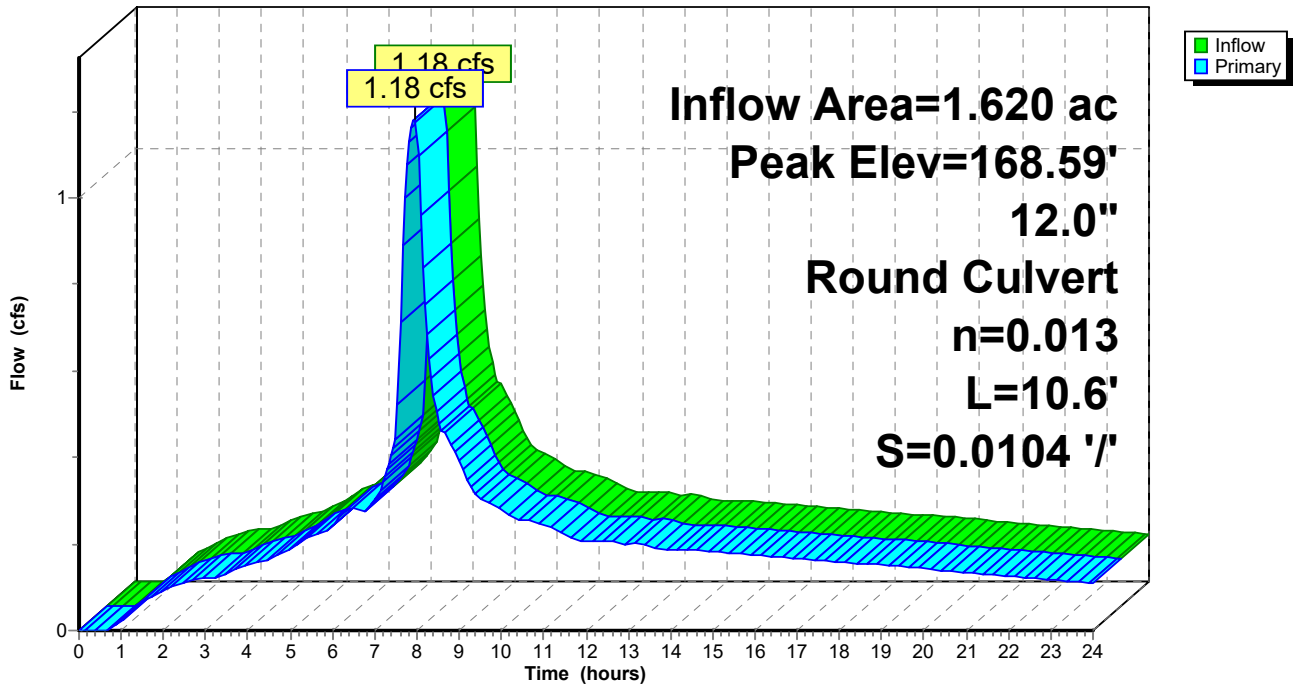
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 168.59' @ 7.93 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	167.90'	12.0" Round Culvert L= 10.6' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 167.90' / 167.79' S= 0.0104 '/ Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.18 cfs @ 7.93 hrs HW=168.59' TW=167.70' (Dynamic Tailwater)
 ←1=Culvert (Barrel Controls 1.18 cfs @ 2.86 fps)

Pond 4P: WQ MANHOLE

Hydrograph



Summary for Pond 5P: Drywell 1

Inflow Area = 1.620 ac, 74.09% Impervious, Inflow Depth > 3.02" for 25 Year event
 Inflow = 1.18 cfs @ 7.93 hrs, Volume= 0.407 af
 Outflow = 1.18 cfs @ 7.93 hrs, Volume= 0.398 af, Atten= 0%, Lag= 0.2 min
 Discarded = 0.01 cfs @ 1.10 hrs, Volume= 0.021 af
 Secondary = 1.17 cfs @ 7.93 hrs, Volume= 0.376 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 167.70' @ 7.93 hrs Surf.Area= 95 sf Storage= 446 cf

Plug-Flow detention time= 32.1 min calculated for 0.398 af (98% of inflow)
 Center-of-Mass det. time= 14.1 min (697.0 - 682.9)

Volume	Invert	Avail.Storage	Storage Description
#1	155.03'	364 cf	11.00'D x 15.66'H Vertical Cone/Cylinder 1,488 cf Overall - 275 cf Embedded = 1,213 cf x 30.0% Voids
#2	155.69'	188 cf	4.00'D x 15.00'H Vertical Cone/Cylinder Inside #1 275 cf Overall - 5.0" Wall Thickness = 188 cf
		552 cf	Total Available Storage

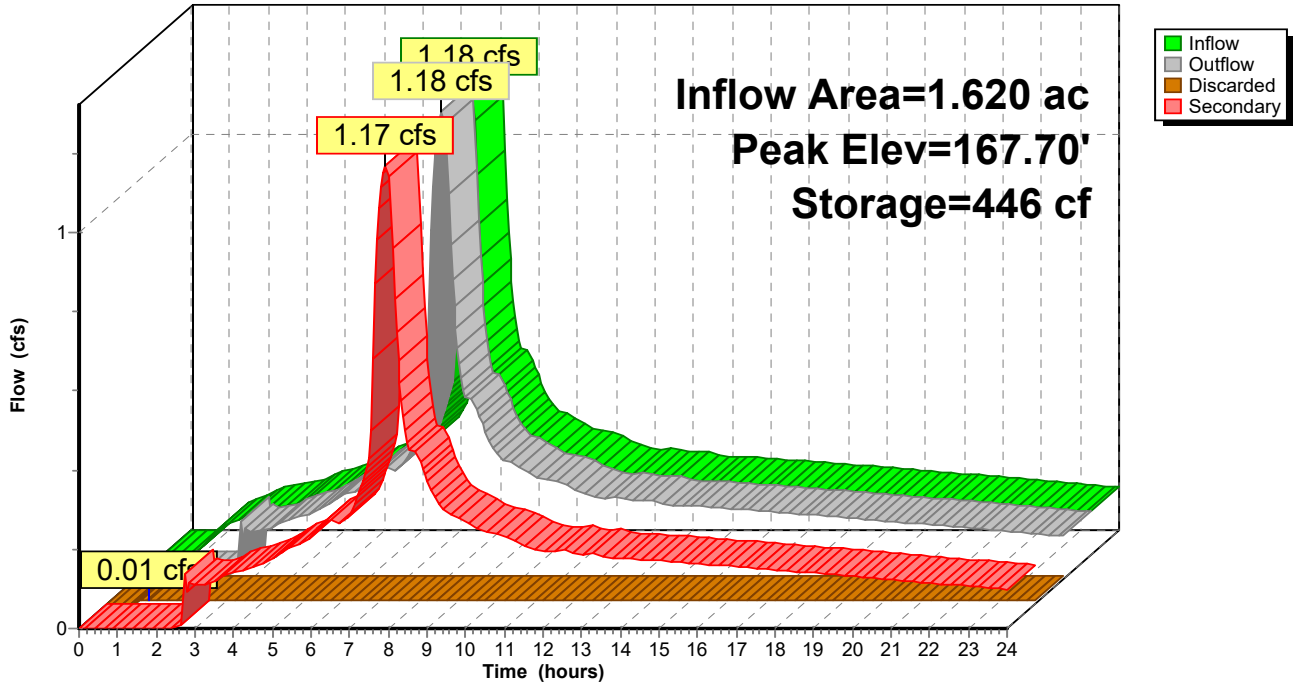
Device	Routing	Invert	Outlet Devices
#1	Discarded	155.03'	5.000 in/hr Exfiltration over Horizontal area
#2	Secondary	167.05'	12.0" Round Culvert L= 50.5' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 167.05' / 166.55' S= 0.0099 ' S= 0.0099 ' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Discarded OutFlow Max=0.01 cfs @ 1.10 hrs HW=155.25' (Free Discharge)
 ↳1=Exfiltration (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=1.17 cfs @ 7.93 hrs HW=167.70' TW=162.42' (Dynamic Tailwater)
 ↳2=Culvert (Inlet Controls 1.17 cfs @ 2.17 fps)

Pond 5P: Drywell 1

Hydrograph



Summary for Pond 6P: Drywell 2

Inflow = 1.17 cfs @ 7.93 hrs, Volume= 0.376 af
 Outflow = 0.56 cfs @ 8.38 hrs, Volume= 0.283 af, Atten= 53%, Lag= 27.0 min
 Discarded = 0.10 cfs @ 3.55 hrs, Volume= 0.169 af
 Secondary = 0.46 cfs @ 8.38 hrs, Volume= 0.114 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 166.73' @ 8.38 hrs Surf.Area= 828 sf Storage= 4,163 cf

Plug-Flow detention time= 246.7 min calculated for 0.283 af (75% of inflow)
 Center-of-Mass det. time= 91.0 min (785.3 - 694.3)

Volume	Invert	Avail.Storage	Storage Description
#1	150.42'	5,022 cf	12.00'W x 69.00'L x 20.66'H Prismaoid 17,106 cf Overall - 367 cf Embedded = 16,740 cf x 30.0% Voids
#2	151.08'	251 cf	4.00'D x 20.00'H Vertical Cone/Cylinder Inside #1 367 cf Overall - 5.0" Wall Thickness = 251 cf
		5,273 cf	Total Available Storage

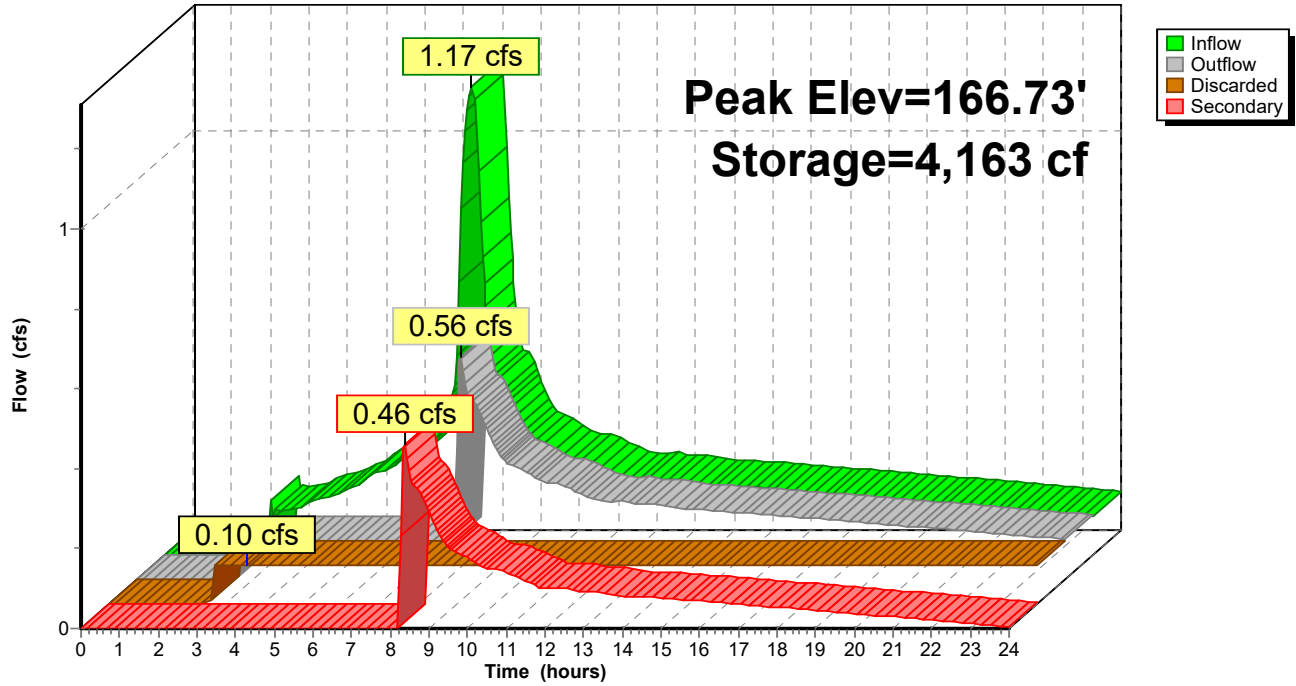
Device	Routing	Invert	Outlet Devices
#1	Discarded	150.42'	5.000 in/hr Exfiltration over Horizontal area
#2	Secondary	166.35'	12.0" Round Culvert L= 79.3' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 166.35' / 165.51' S= 0.0106 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Discarded OutFlow Max=0.10 cfs @ 3.55 hrs HW=150.63' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.10 cfs)

Secondary OutFlow Max=0.46 cfs @ 8.38 hrs HW=166.73' TW=150.30' (Dynamic Tailwater)
 ↑2=Culvert (Inlet Controls 0.46 cfs @ 1.66 fps)

Pond 6P: Drywell 2

Hydrograph



Summary for Pond 7P: Drywell 3

Inflow = 0.46 cfs @ 8.38 hrs, Volume= 0.114 af
 Outflow = 0.10 cfs @ 8.35 hrs, Volume= 0.114 af, Atten= 79%, Lag= 0.0 min
 Discarded = 0.10 cfs @ 8.35 hrs, Volume= 0.114 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 155.36' @ 12.75 hrs Surf.Area= 0.019 ac Storage= 0.032 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 165.5 min (926.1 - 760.6)

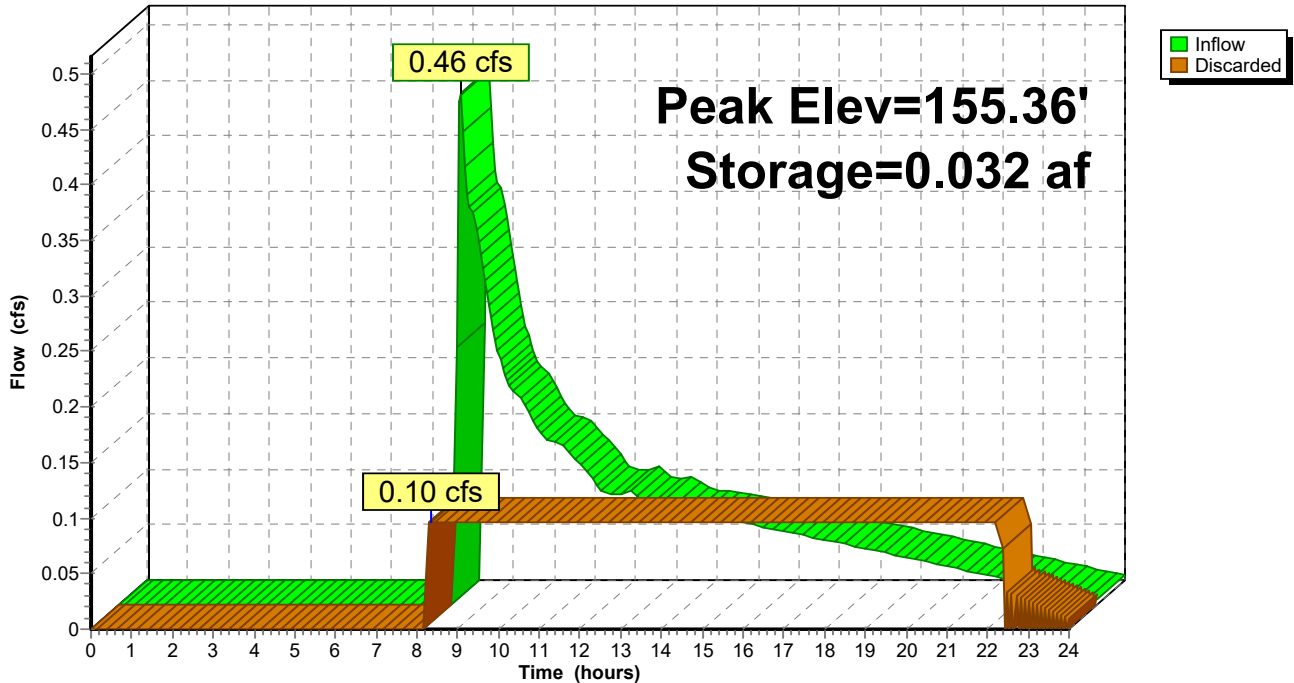
Volume	Invert	Avail.Storage	Storage Description
#1	149.90'	0.116 af	12.00'W x 69.50'L x 20.66'H Prismaoid 0.396 af Overall - 0.008 af Embedded = 0.387 af x 30.0% Voids
#2	150.56'	0.006 af	4.00'D x 20.00'H Vertical Cone/Cylinder Inside #1 0.008 af Overall - 5.0" Wall Thickness = 0.006 af
		0.122 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	149.90'	5.000 in/hr Exfiltration over Horizontal area

Discarded OutFlow Max=0.10 cfs @ 8.35 hrs HW=150.12' (Free Discharge)
 ↳1=Exfiltration (Exfiltration Controls 0.10 cfs)

Pond 7P: Drywell 3

Hydrograph



4756 TVFR 39 PostDev

Type IA 24-hr 100 Year Rainfall=4.50"

Prepared by AKS Engineering & Forestry, LLC

Printed 4/16/2018

HydroCAD® 10.00-18 s/n 01338 © 2016 HydroCAD Software Solutions LLC

Page 28

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points

Runoff by SBUH method, Split Pervious/Imperv.

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: S ROOF DRAINS	Runoff Area=5,142 sf 100.00% Impervious Runoff Depth>4.26" Tc=5.0 min CN=0/98 Runoff=0.13 cfs 0.042 af
Subcatchment 2S: POST-DEVELOPED SITE	Runoff Area=9,005 sf 15.62% Impervious Runoff Depth>2.01" Tc=5.0 min CN=69/98 Runoff=0.09 cfs 0.035 af
Subcatchment 3S: WEST UHAUL	Runoff Area=18,036 sf 83.11% Impervious Runoff Depth>3.81" Tc=5.0 min CN=69/98 Runoff=0.39 cfs 0.131 af
Subcatchment 5S: POST-DEVELOPED	Runoff Area=17,749 sf 75.02% Impervious Runoff Depth>3.59" Tc=5.0 min CN=69/98 Runoff=0.35 cfs 0.122 af
Subcatchment 6S: NE ROOF DRAINS	Runoff Area=4,565 sf 100.00% Impervious Runoff Depth>4.26" Tc=5.0 min CN=0/98 Runoff=0.11 cfs 0.037 af
Subcatchment 7S: SOUTH DRIVEWAY	Runoff Area=3,703 sf 41.86% Impervious Runoff Depth>2.71" Tc=5.0 min CN=69/98 Runoff=0.05 cfs 0.019 af
Subcatchment 9S: EAST UHAUL RUNNING	Runoff Area=4,934 sf 62.99% Impervious Runoff Depth>3.27" Tc=5.0 min CN=69/98 Runoff=0.09 cfs 0.031 af
Subcatchment 10S: POST-DEVELOPED	Runoff Area=5,557 sf 85.75% Impervious Runoff Depth>3.88" Tc=5.0 min CN=69/98 Runoff=0.12 cfs 0.041 af
Subcatchment 13S: NW ROOF DRAINS	Runoff Area=1,662 sf 100.00% Impervious Runoff Depth>4.26" Tc=5.0 min CN=0/98 Runoff=0.04 cfs 0.014 af
Subcatchment 14S: POST-DEVELOPED	Runoff Area=10,138 sf 83.51% Impervious Runoff Depth>3.82" Tc=5.0 min CN=69/98 Runoff=0.22 cfs 0.074 af
Subcatchment 16S: POST-DEVELOPED	Runoff Area=5,422 sf 78.09% Impervious Runoff Depth>3.67" Tc=5.0 min CN=69/98 Runoff=0.11 cfs 0.038 af
Subcatchment 18S: POST-DEVELOPED	Runoff Area=2,383 sf 100.00% Impervious Runoff Depth>4.26" Tc=5.0 min CN=0/98 Runoff=0.06 cfs 0.019 af
Reach 5R: 12" PVC	Avg. Flow Depth=0.47' Max Vel=3.12 fps Inflow=1.13 cfs 0.385 af 12.0" Round Pipe n=0.013 L=173.4' S=0.0050 '/' Capacity=2.52 cfs Outflow=1.13 cfs 0.385 af
Reach 8R: 6" PVC	Avg. Flow Depth=0.22' Max Vel=1.92 fps Inflow=0.16 cfs 0.056 af 6.0" Round Pipe n=0.013 L=140.0' S=0.0050 '/' Capacity=0.40 cfs Outflow=0.16 cfs 0.056 af
Reach 11R: 6" PVC	Avg. Flow Depth=0.21' Max Vel=2.65 fps Inflow=0.21 cfs 0.072 af 6.0" Round Pipe n=0.013 L=35.1' S=0.0100 '/' Capacity=0.56 cfs Outflow=0.21 cfs 0.072 af
Reach 12R: 10" PVC	Avg. Flow Depth=0.29' Max Vel=2.40 fps Inflow=0.41 cfs 0.142 af 10.0" Round Pipe n=0.013 L=60.4' S=0.0050 '/' Capacity=1.54 cfs Outflow=0.41 cfs 0.142 af

4756 TVFR 39 PostDev

Type IA 24-hr 100 Year Rainfall=4.50"

Prepared by AKS Engineering & Forestry, LLC

Printed 4/16/2018

HydroCAD® 10.00-18 s/n 01338 © 2016 HydroCAD Software Solutions LLC

Page 29

Reach 17R: 10" PVC Avg. Flow Depth=0.27' Max Vel=3.27 fps Inflow=0.50 cfs 0.169 af
10.0" Round Pipe n=0.013 L=31.6' S=0.0101 '/ Capacity=2.20 cfs Outflow=0.50 cfs 0.169 af

Reach 19R: 6" PVC Avg. Flow Depth=0.24' Max Vel=1.98 fps Inflow=0.18 cfs 0.061 af
6.0" Round Pipe n=0.013 L=140.0' S=0.0050 '/ Capacity=0.40 cfs Outflow=0.18 cfs 0.061 af

Pond 4P: WQ MANHOLE Peak Elev=168.67' Inflow=1.40 cfs 0.481 af
12.0" Round Culvert n=0.013 L=10.6' S=0.0104 '/ Outflow=1.40 cfs 0.481 af

Pond 5P: Drywell 1 Peak Elev=167.77' Storage=449 cf Inflow=1.40 cfs 0.481 af
Discarded=0.01 cfs 0.021 af Secondary=1.39 cfs 0.450 af Outflow=1.40 cfs 0.471 af

Pond 6P: Drywell 2 Peak Elev=167.02' Storage=4,237 cf Inflow=1.39 cfs 0.450 af
Discarded=0.10 cfs 0.171 af Secondary=1.24 cfs 0.185 af Outflow=1.34 cfs 0.356 af

Pond 7P: Drywell 3 Peak Elev=163.49' Storage=0.080 af Inflow=1.24 cfs 0.185 af
Outflow=0.10 cfs 0.128 af

Total Runoff Area = 2.027 ac Runoff Volume = 0.604 af Average Runoff Depth = 3.57"
25.72% Pervious = 0.521 ac 74.28% Impervious = 1.506 ac

Summary for Subcatchment 1S: S ROOF DRAINS

Runoff = 0.13 cfs @ 7.90 hrs, Volume= 0.042 af, Depth> 4.26"

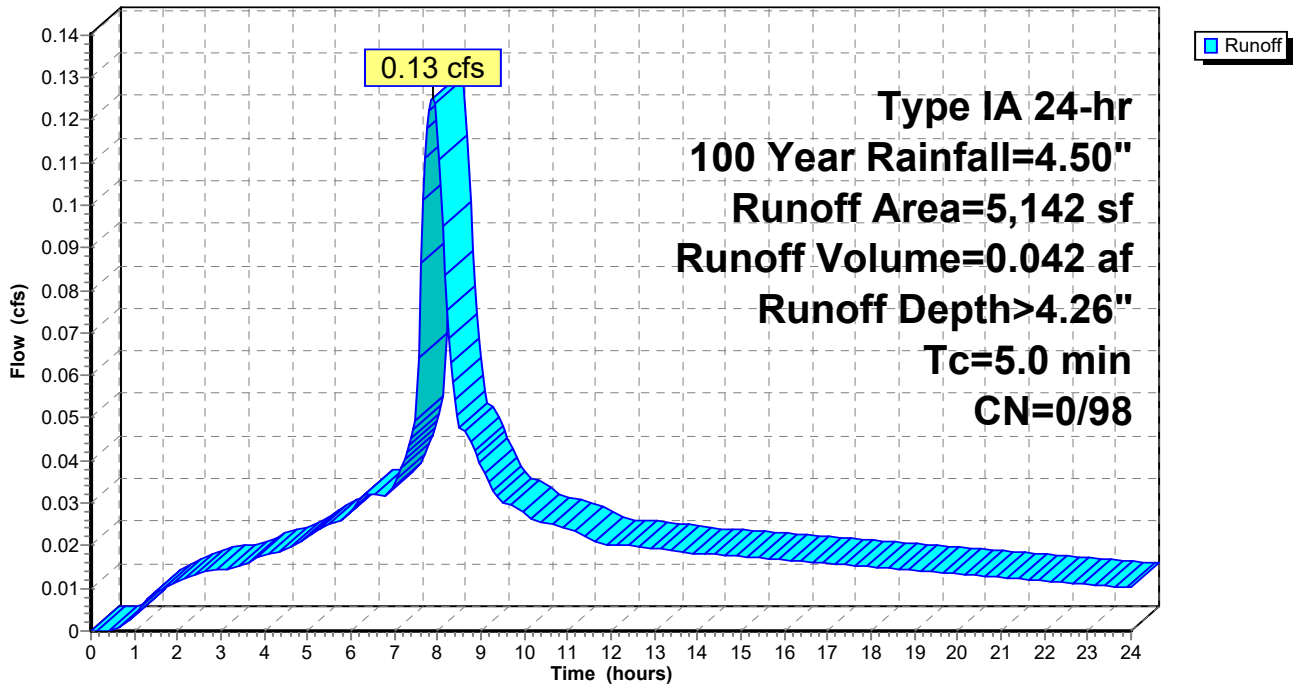
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 100 Year Rainfall=4.50"

Area (sf)	CN	Description
5,142	98	Paved parking & roofs
5,142		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 1S: S ROOF DRAINS

Hydrograph



Summary for Subcatchment 2S: POST-DEVELOPED SITE

Runoff = 0.09 cfs @ 7.98 hrs, Volume= 0.035 af, Depth> 2.01"

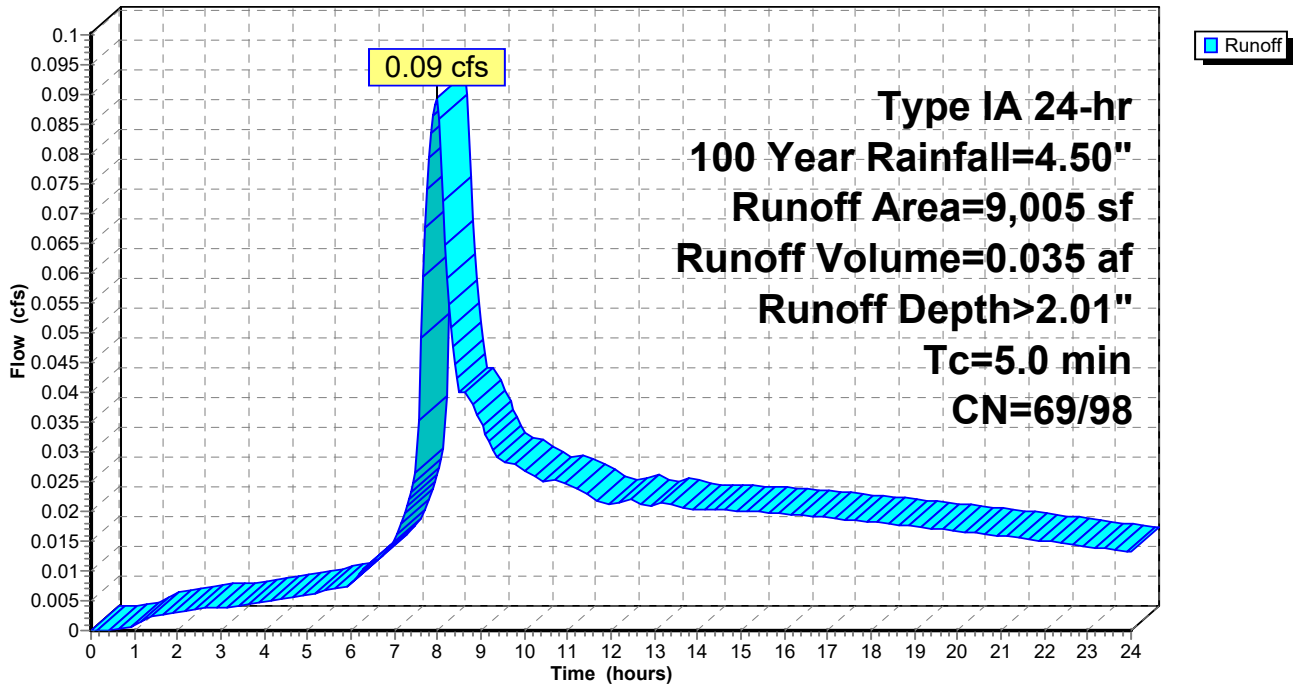
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 100 Year Rainfall=4.50"

	Area (sf)	CN	Description
*	1,407	98	Paved parking & sidewalk
	7,598	69	50-75% Grass cover, Fair, HSG B
	9,005	74	Weighted Average
	7,598		84.38% Pervious Area
	1,407		15.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 2S: POST-DEVELOPED SITE

Hydrograph



Summary for Subcatchment 3S: WEST UHAUL RUNNING TO SITE

Runoff = 0.39 cfs @ 7.91 hrs, Volume= 0.131 af, Depth> 3.81"

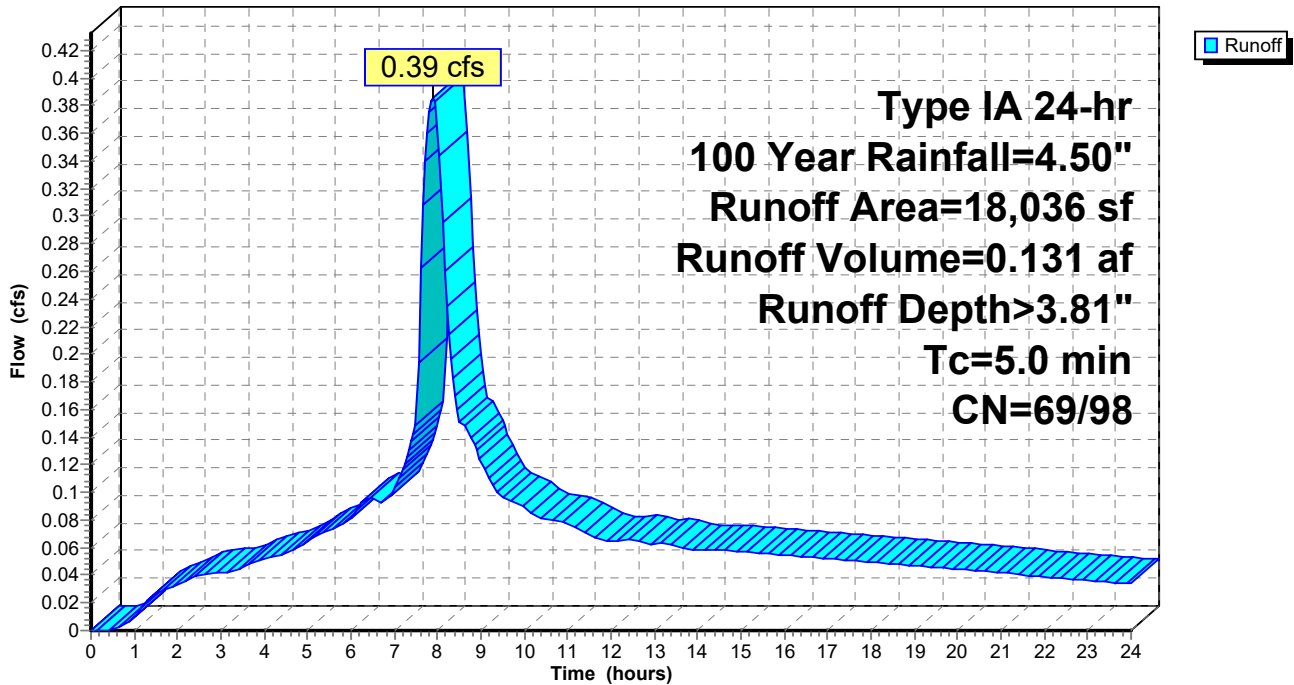
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 100 Year Rainfall=4.50"

Area (sf)	CN	Description
* 14,989	98	Paved parking & sidewalk
3,047	69	50-75% Grass cover, Fair, HSG B
18,036	93	Weighted Average
3,047		16.89% Pervious Area
14,989		83.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 3S: WEST UHAUL RUNNING TO SITE

Hydrograph



Summary for Subcatchment 5S: POST-DEVELOPED ROW

Runoff = 0.35 cfs @ 7.91 hrs, Volume= 0.122 af, Depth> 3.59"

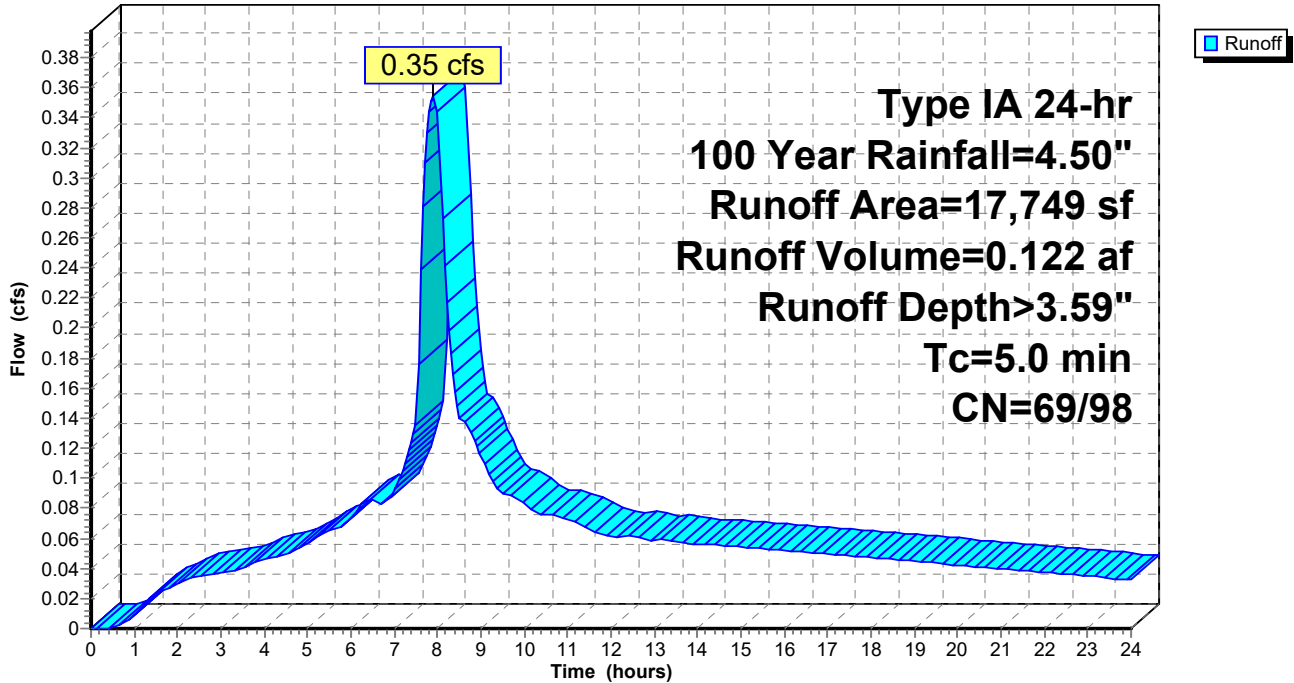
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 100 Year Rainfall=4.50"

	Area (sf)	CN	Description
*	13,315	98	Street Paving & sidewalk
	4,434	69	50-75% Grass cover, Fair, HSG B
	17,749	91	Weighted Average
	4,434		24.98% Pervious Area
	13,315		75.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 5S: POST-DEVELOPED ROW

Hydrograph



Summary for Subcatchment 6S: NE ROOF DRAINS

Runoff = 0.11 cfs @ 7.90 hrs, Volume= 0.037 af, Depth> 4.26"

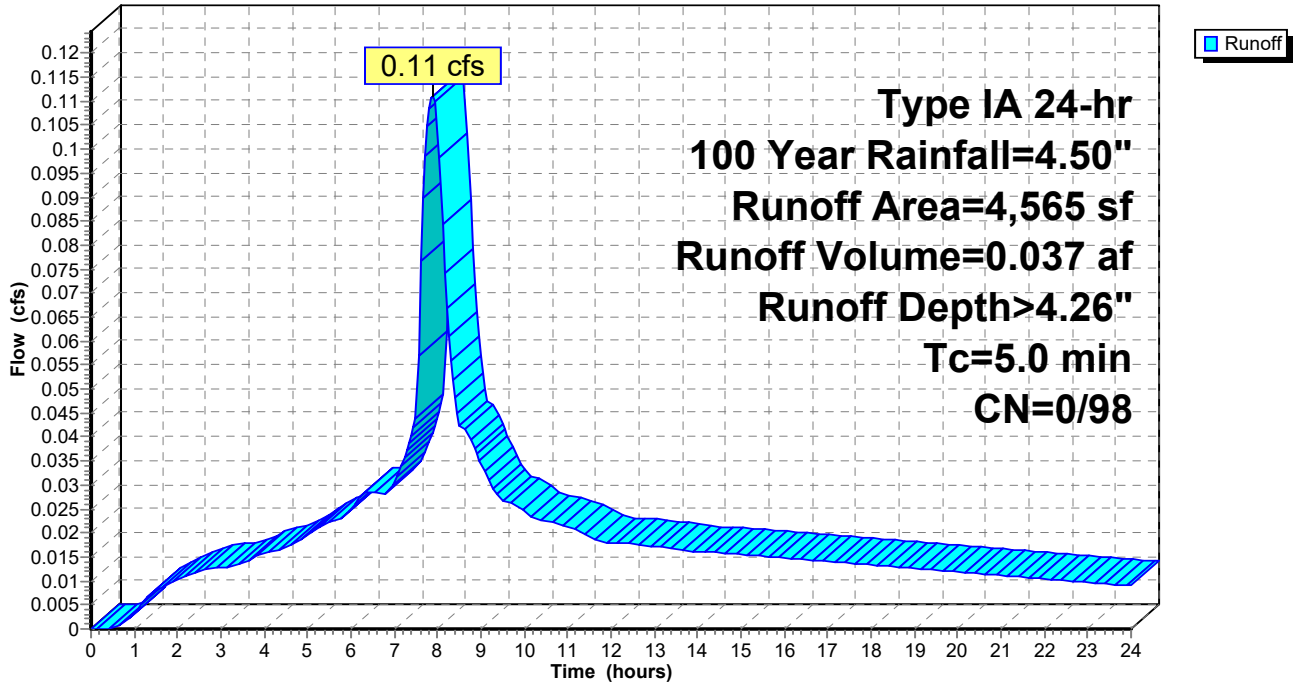
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 100 Year Rainfall=4.50"

Area (sf)	CN	Description
* 4,565	98	Roofs
4,565		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 6S: NE ROOF DRAINS

Hydrograph



Summary for Subcatchment 7S: SOUTH DRIVEWAY

Runoff = 0.05 cfs @ 7.95 hrs, Volume= 0.019 af, Depth> 2.71"

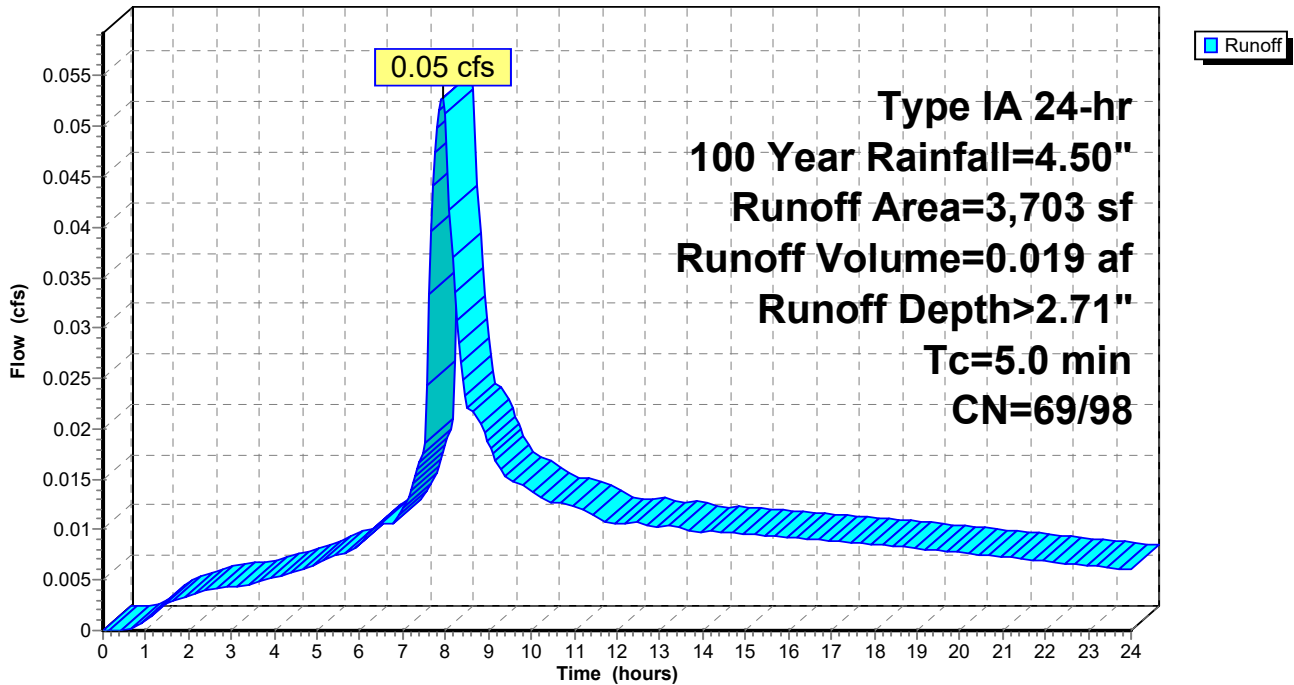
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 100 Year Rainfall=4.50"

Area (sf)	CN	Description
1,550	98	Paved parking & sidewalk
2,153	69	50-75% Grass cover, Fair, HSG B
3,703	81	Weighted Average
2,153		58.14% Pervious Area
1,550		41.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 7S: SOUTH DRIVEWAY

Hydrograph



Summary for Subcatchment 9S: EAST UHAUL RUNNING TO SITE

Runoff = 0.09 cfs @ 7.92 hrs, Volume= 0.031 af, Depth> 3.27"

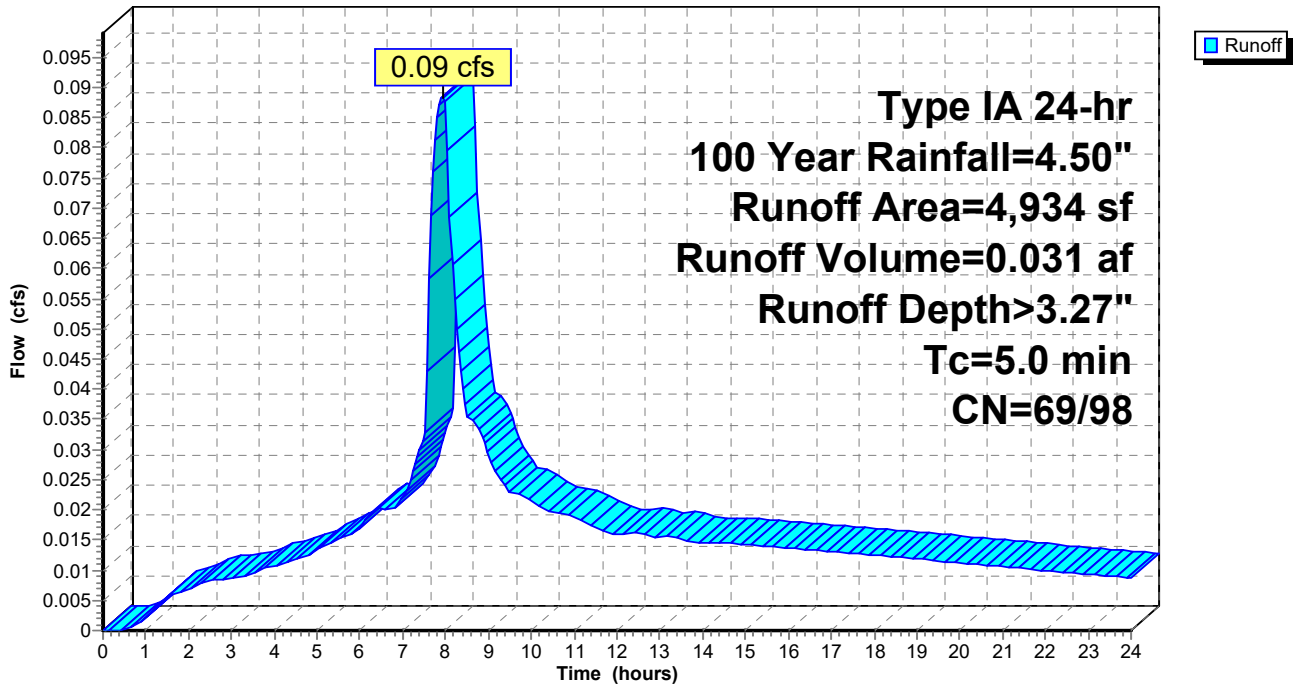
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 100 Year Rainfall=4.50"

Area (sf)	CN	Description
3,108	98	Paved parking & sidewalk
1,826	69	50-75% Grass cover, Fair, HSG B
4,934	87	Weighted Average
1,826		37.01% Pervious Area
3,108		62.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 9S: EAST UHAUL RUNNING TO SITE

Hydrograph



Summary for Subcatchment 10S: POST-DEVELOPED SITE

Runoff = 0.12 cfs @ 7.90 hrs, Volume= 0.041 af, Depth> 3.88"

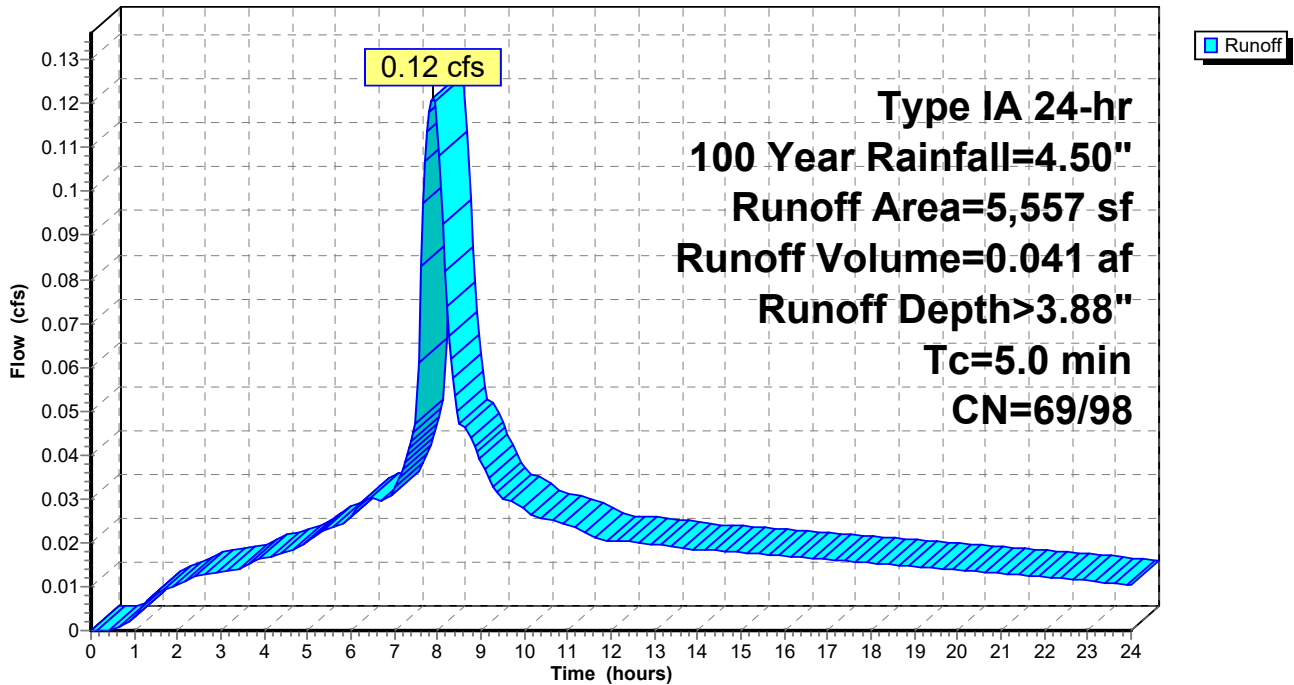
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 100 Year Rainfall=4.50"

Area (sf)	CN	Description
4,765	98	Paved parking & sidewalk
792	69	50-75% Grass cover, Fair, HSG B
5,557	94	Weighted Average
792		14.25% Pervious Area
4,765		85.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 10S: POST-DEVELOPED SITE

Hydrograph



Summary for Subcatchment 13S: NW ROOF DRAINS

Runoff = 0.04 cfs @ 7.90 hrs, Volume= 0.014 af, Depth> 4.26"

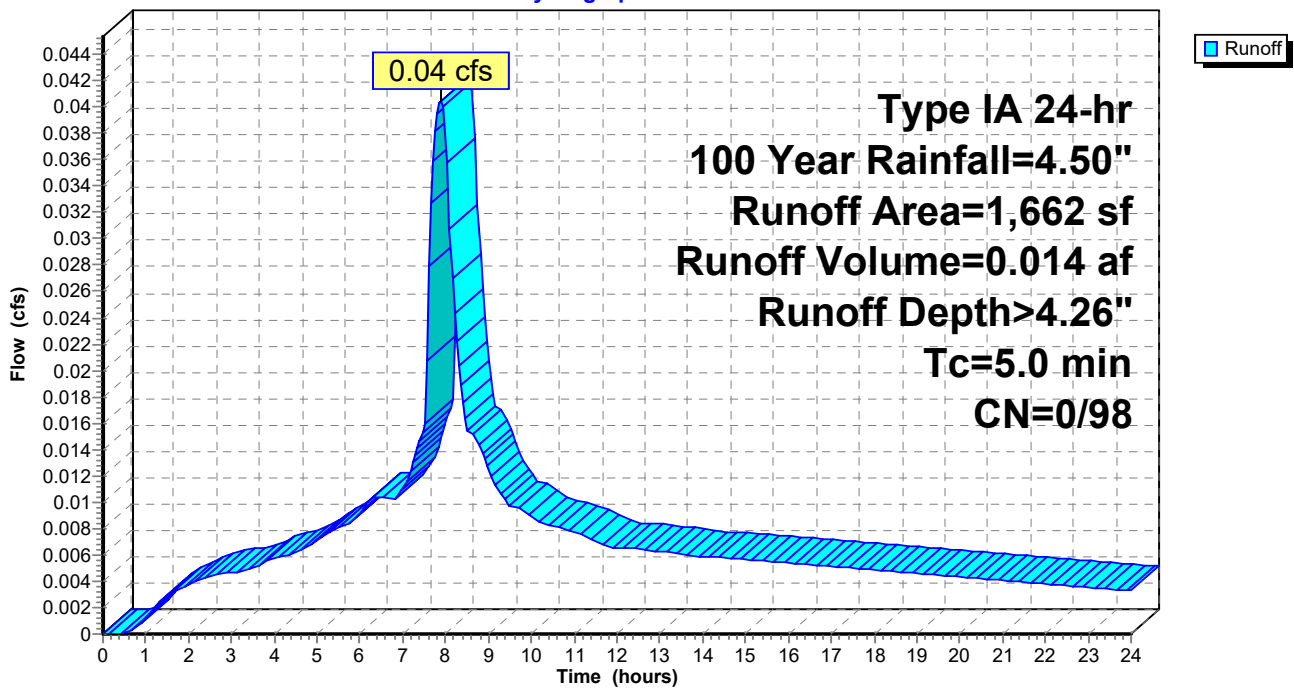
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 100 Year Rainfall=4.50"

Area (sf)	CN	Description
1,662	98	Paved parking & roofs
1,662		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 13S: NW ROOF DRAINS

Hydrograph



Summary for Subcatchment 14S: POST-DEVELOPED SITE

Runoff = 0.22 cfs @ 7.91 hrs, Volume= 0.074 af, Depth> 3.82"

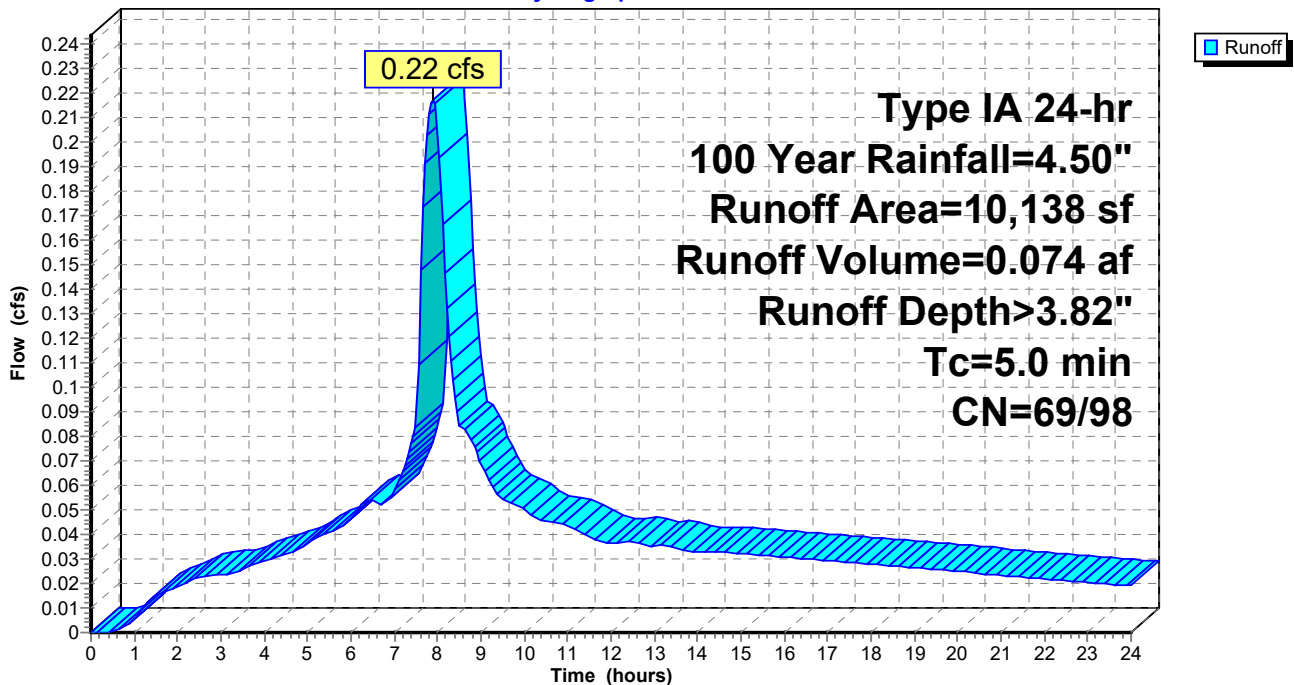
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 100 Year Rainfall=4.50"

Area (sf)	CN	Description
* 8,466	98	Paved parking & sidewalk
1,672	69	50-75% Grass cover, Fair, HSG B
10,138	93	Weighted Average
1,672		16.49% Pervious Area
8,466		83.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 14S: POST-DEVELOPED SITE

Hydrograph



Summary for Subcatchment 16S: POST-DEVELOPED SITE

Runoff = 0.11 cfs @ 7.91 hrs, Volume= 0.038 af, Depth> 3.67"

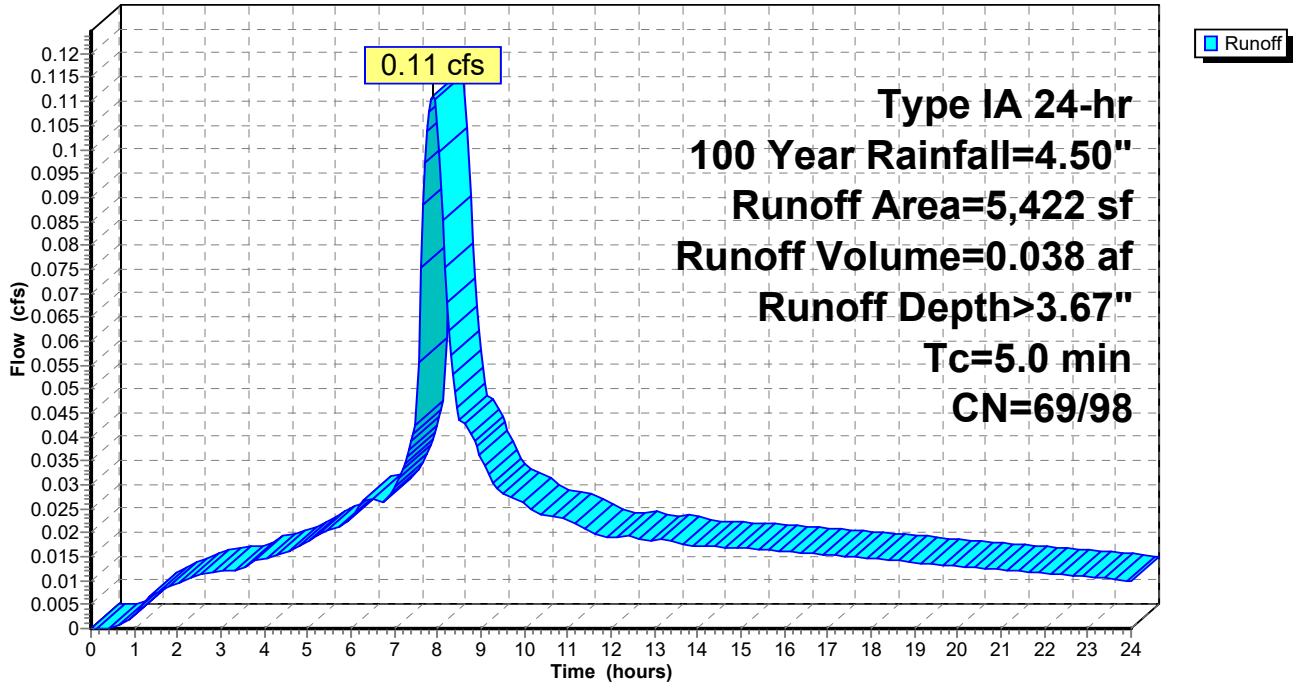
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 100 Year Rainfall=4.50"

	Area (sf)	CN	Description
*	4,234	98	Paved parking & sidewalk
	1,188	69	50-75% Grass cover, Fair, HSG B
	5,422	92	Weighted Average
	1,188		21.91% Pervious Area
	4,234		78.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 16S: POST-DEVELOPED SITE

Hydrograph



Summary for Subcatchment 18S: POST-DEVELOPED SITE

Runoff = 0.06 cfs @ 7.90 hrs, Volume= 0.019 af, Depth> 4.26"

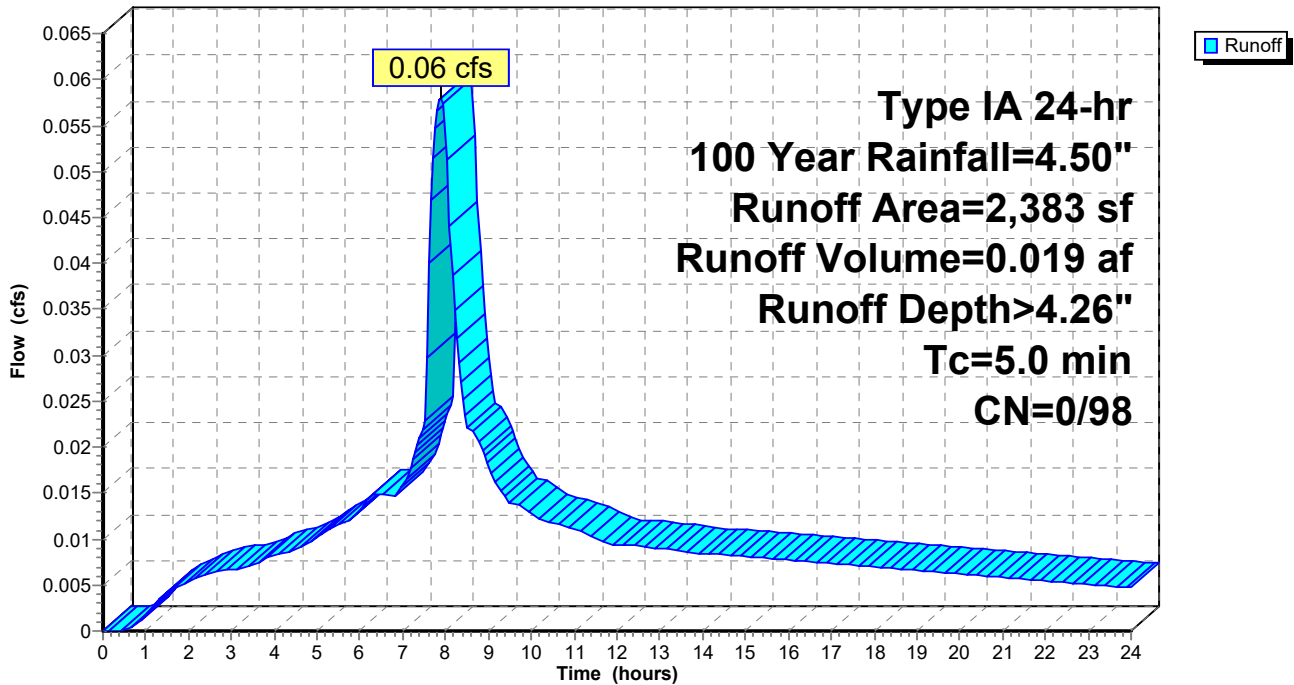
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 100 Year Rainfall=4.50"

Area (sf)	CN	Description
* 2,383	98	Paved parking & sidewalk
2,383		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 18S: POST-DEVELOPED SITE

Hydrograph



4756 TVFR 39 PostDev

Prepared by AKS Engineering & Forestry, LLC

HydroCAD® 10.00-18 s/n 01338 © 2016 HydroCAD Software Solutions LLC

Type IA 24-hr 100 Year Rainfall=4.50"

Printed 4/16/2018

Page 42

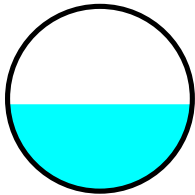
Summary for Reach 5R: 12" PVC

Inflow Area = 1.240 ac, 80.23% Impervious, Inflow Depth > 3.73" for 100 Year event
Inflow = 1.13 cfs @ 7.91 hrs, Volume= 0.385 af
Outflow = 1.13 cfs @ 7.92 hrs, Volume= 0.385 af, Atten= 0%, Lag= 0.6 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.12 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 1.83 fps, Avg. Travel Time= 1.6 min

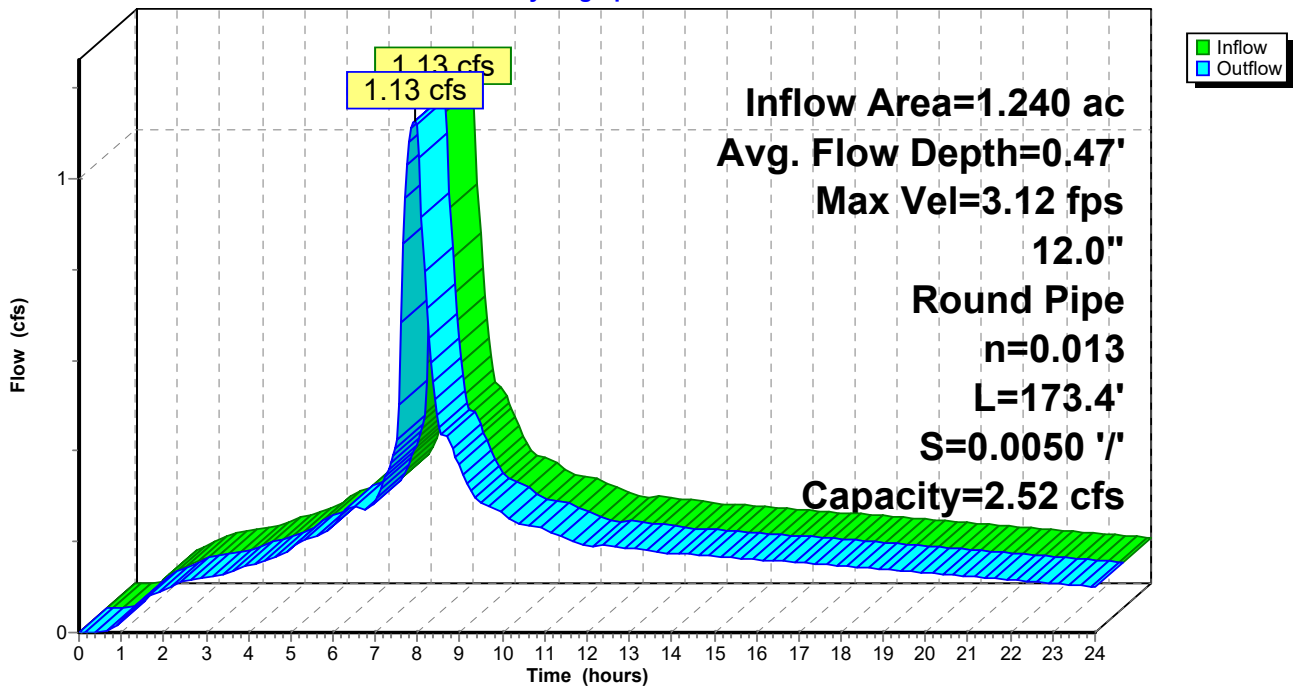
Peak Storage= 63 cf @ 7.92 hrs
Average Depth at Peak Storage= 0.47'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 2.52 cfs

12.0" Round Pipe
n= 0.013
Length= 173.4' Slope= 0.0050 '/'
Inlet Invert= 169.00', Outlet Invert= 168.13'



Reach 5R: 12" PVC

Hydrograph



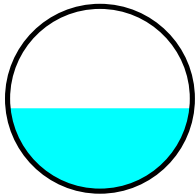
Summary for Reach 8R: 6" PVC

Inflow Area = 0.190 ac, 73.96% Impervious, Inflow Depth > 3.56" for 100 Year event
 Inflow = 0.16 cfs @ 7.91 hrs, Volume= 0.056 af
 Outflow = 0.16 cfs @ 7.93 hrs, Volume= 0.056 af, Atten= 0%, Lag= 0.9 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Max. Velocity= 1.92 fps, Min. Travel Time= 1.2 min
 Avg. Velocity = 1.13 fps, Avg. Travel Time= 2.1 min

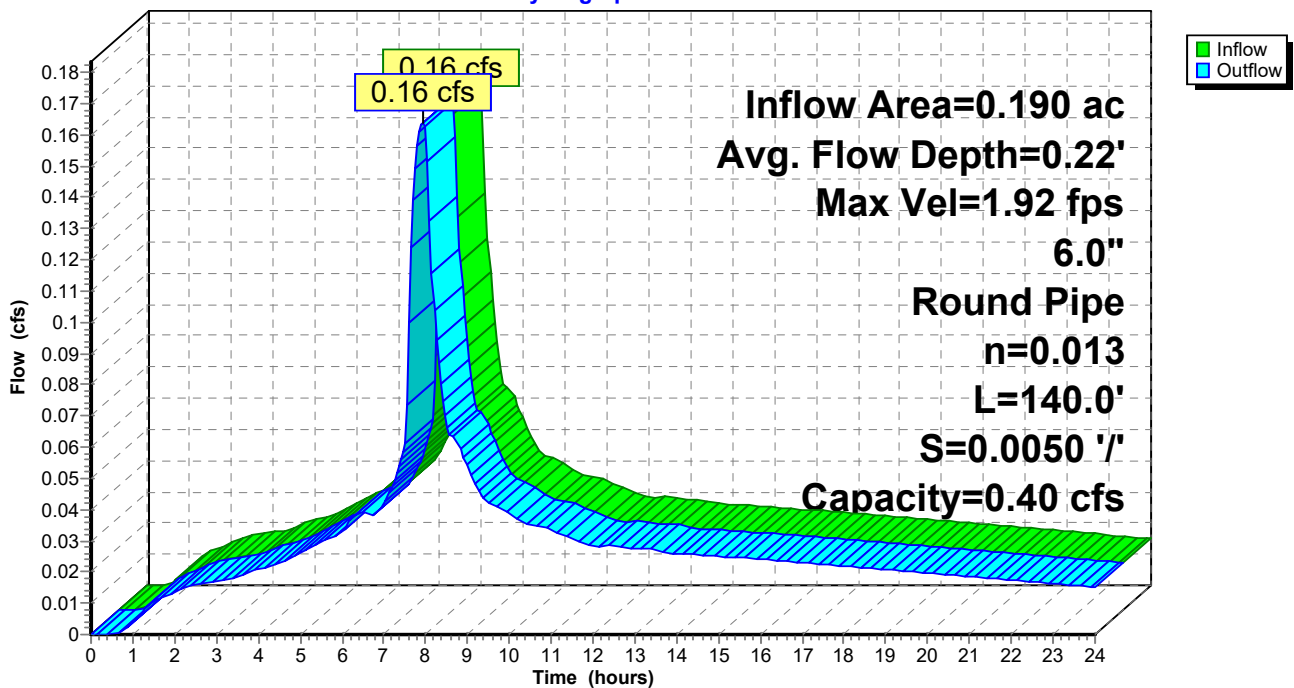
Peak Storage= 12 cf @ 7.93 hrs
 Average Depth at Peak Storage= 0.22'
 Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.40 cfs

6.0" Round Pipe
 n= 0.013
 Length= 140.0' Slope= 0.0050 '/'
 Inlet Invert= 170.64', Outlet Invert= 169.94'



Reach 8R: 6" PVC

Hydrograph



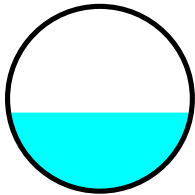
Summary for Reach 11R: 6" PVC

Inflow Area = 0.241 ac, 75.05% Impervious, Inflow Depth > 3.59" for 100 Year event
 Inflow = 0.21 cfs @ 7.91 hrs, Volume= 0.072 af
 Outflow = 0.21 cfs @ 7.92 hrs, Volume= 0.072 af, Atten= 0%, Lag= 0.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Max. Velocity= 2.65 fps, Min. Travel Time= 0.2 min
 Avg. Velocity = 1.55 fps, Avg. Travel Time= 0.4 min

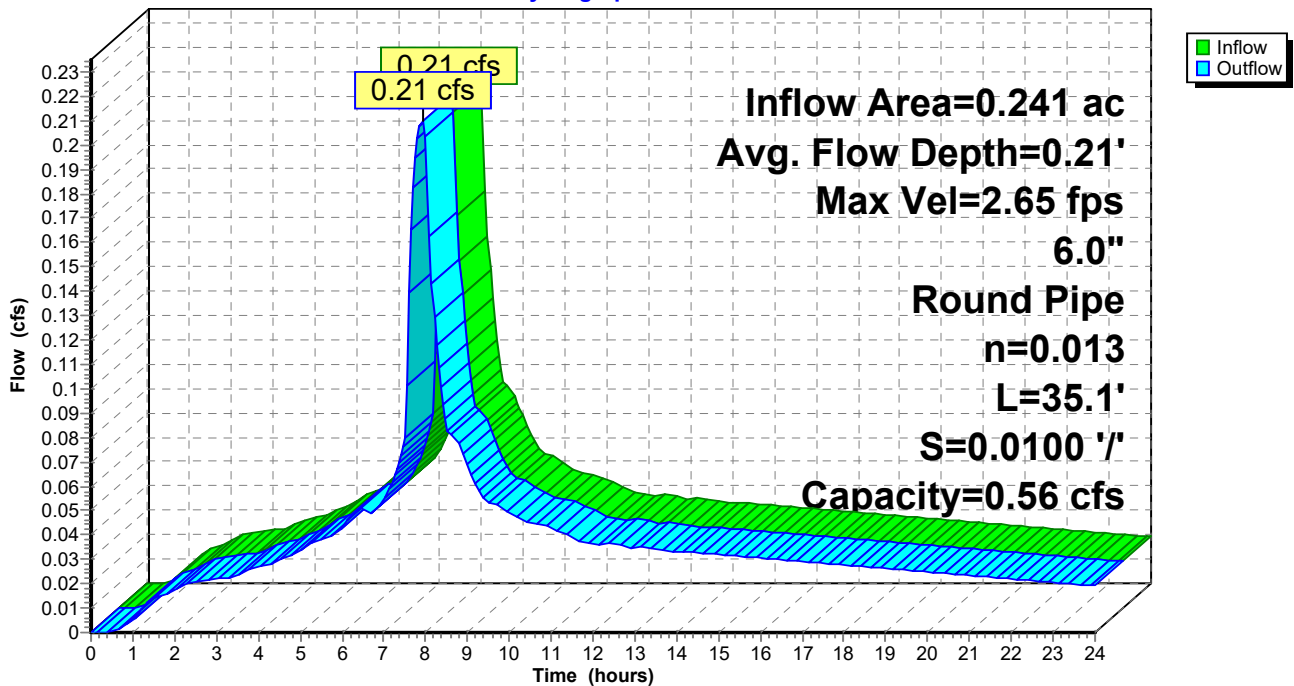
Peak Storage= 3 cf @ 7.92 hrs
 Average Depth at Peak Storage= 0.21'
 Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.56 cfs

6.0" Round Pipe
 n= 0.013
 Length= 35.1' Slope= 0.0100 '/
 Inlet Invert= 170.03', Outlet Invert= 169.68'



Reach 11R: 6" PVC

Hydrograph



4756 TVFR 39 PostDev

Prepared by AKS Engineering & Forestry, LLC

HydroCAD® 10.00-18 s/n 01338 © 2016 HydroCAD Software Solutions LLC

Type IA 24-hr 100 Year Rainfall=4.50"

Printed 4/16/2018

Page 45

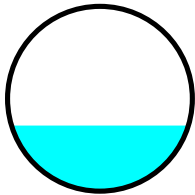
Summary for Reach 12R: 10" PVC

Inflow Area = 0.469 ac, 76.64% Impervious, Inflow Depth > 3.63" for 100 Year event
Inflow = 0.41 cfs @ 7.92 hrs, Volume= 0.142 af
Outflow = 0.41 cfs @ 7.92 hrs, Volume= 0.142 af, Atten= 0%, Lag= 0.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.40 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.39 fps, Avg. Travel Time= 0.7 min

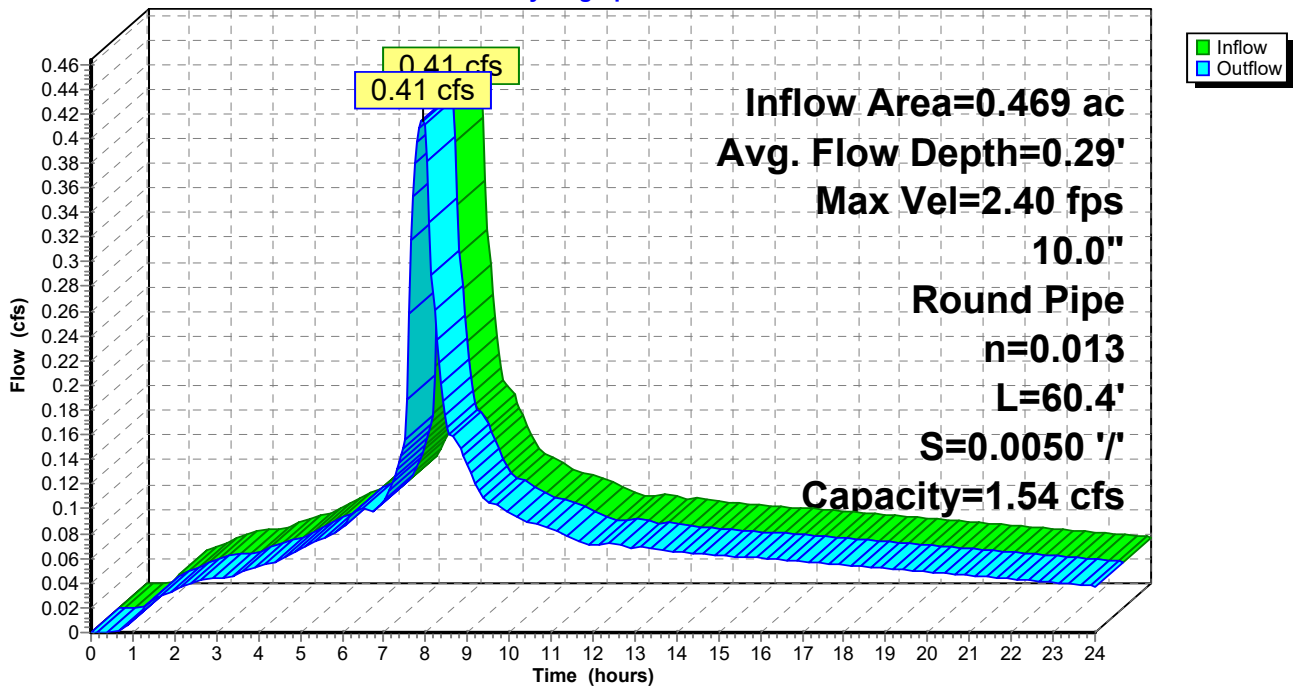
Peak Storage= 10 cf @ 7.92 hrs
Average Depth at Peak Storage= 0.29'
Bank-Full Depth= 0.83' Flow Area= 0.5 sf, Capacity= 1.54 cfs

10.0" Round Pipe
n= 0.013
Length= 60.4' Slope= 0.0050 '/'
Inlet Invert= 169.47', Outlet Invert= 169.17'



Reach 12R: 10" PVC

Hydrograph



4756 TVFR 39 PostDev

Prepared by AKS Engineering & Forestry, LLC

HydroCAD® 10.00-18 s/n 01338 © 2016 HydroCAD Software Solutions LLC

Type IA 24-hr 100 Year Rainfall=4.50"

Printed 4/16/2018

Page 46

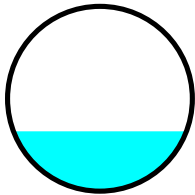
Summary for Reach 17R: 10" PVC

Inflow Area = 0.539 ac, 81.95% Impervious, Inflow Depth > 3.78" for 100 Year event
Inflow = 0.50 cfs @ 7.91 hrs, Volume= 0.169 af
Outflow = 0.50 cfs @ 7.91 hrs, Volume= 0.169 af, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.27 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.88 fps, Avg. Travel Time= 0.3 min

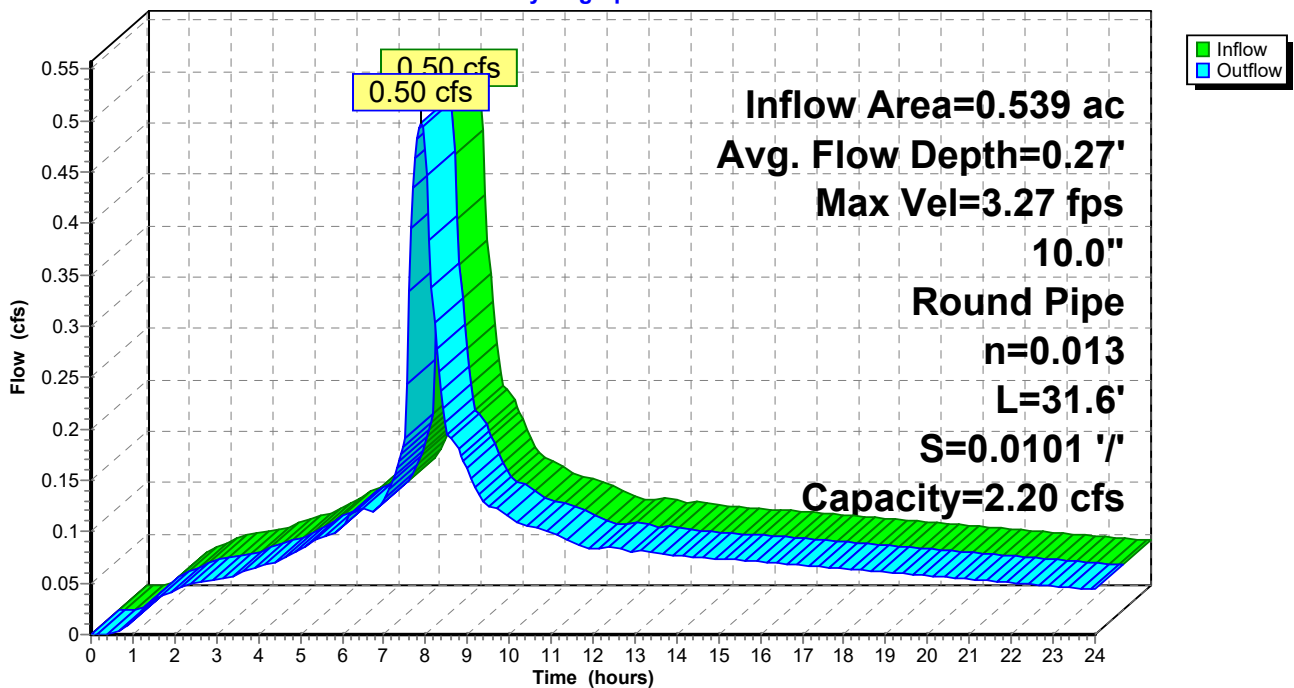
Peak Storage= 5 cf @ 7.91 hrs
Average Depth at Peak Storage= 0.27'
Bank-Full Depth= 0.83' Flow Area= 0.5 sf, Capacity= 2.20 cfs

10.0" Round Pipe
n= 0.013
Length= 31.6' Slope= 0.0101 '/'
Inlet Invert= 169.37', Outlet Invert= 169.05'



Reach 17R: 10" PVC

Hydrograph



4756 TVFR 39 PostDev

Prepared by AKS Engineering & Forestry, LLC

HydroCAD® 10.00-18 s/n 01338 © 2016 HydroCAD Software Solutions LLC

Type IA 24-hr 100 Year Rainfall=4.50"

Printed 4/16/2018

Page 47

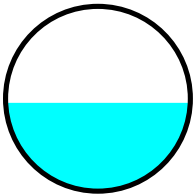
Summary for Reach 19R: 6" PVC

Inflow Area = 0.173 ac, 100.00% Impervious, Inflow Depth > 4.26" for 100 Year event
Inflow = 0.18 cfs @ 7.90 hrs, Volume= 0.061 af
Outflow = 0.18 cfs @ 7.91 hrs, Volume= 0.061 af, Atten= 0%, Lag= 0.9 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.98 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 1.16 fps, Avg. Travel Time= 2.0 min

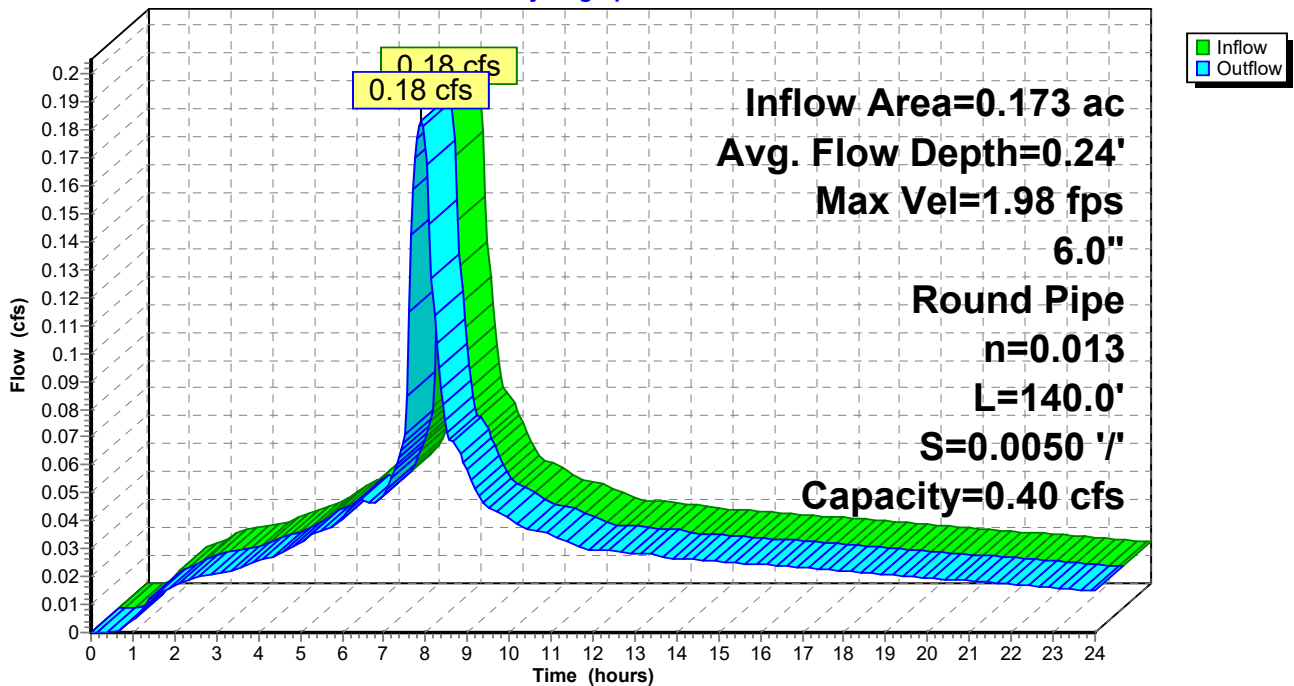
Peak Storage= 13 cf @ 7.91 hrs
Average Depth at Peak Storage= 0.24'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.40 cfs

6.0" Round Pipe
n= 0.013
Length= 140.0' Slope= 0.0050 '/'
Inlet Invert= 170.64', Outlet Invert= 169.94'



Reach 19R: 6" PVC

Hydrograph



Summary for Pond 4P: WQ MANHOLE

Inflow Area = 1.620 ac, 74.09% Impervious, Inflow Depth > 3.56" for 100 Year event
 Inflow = 1.40 cfs @ 7.93 hrs, Volume= 0.481 af
 Outflow = 1.40 cfs @ 7.93 hrs, Volume= 0.481 af, Atten= 0%, Lag= 0.0 min
 Primary = 1.40 cfs @ 7.93 hrs, Volume= 0.481 af

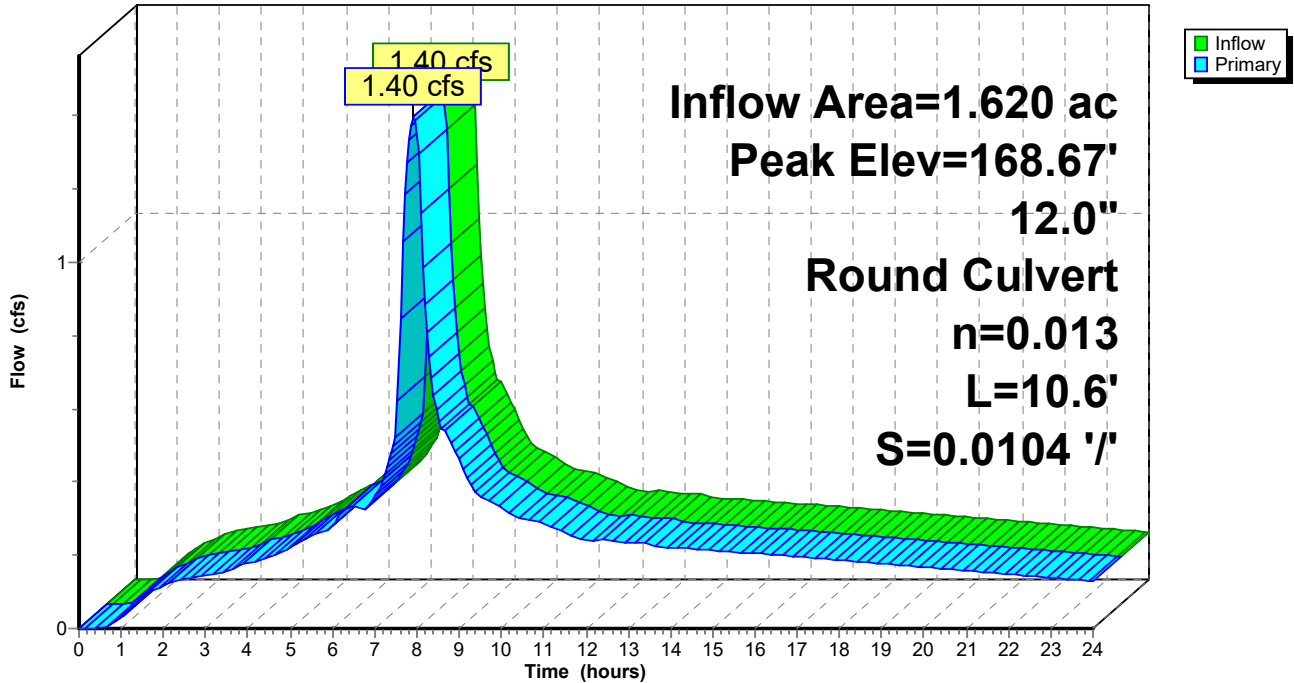
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 168.67' @ 7.93 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	167.90'	12.0" Round Culvert L= 10.6' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 167.90' / 167.79' S= 0.0104 '/ Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.40 cfs @ 7.93 hrs HW=168.67' TW=167.77' (Dynamic Tailwater)
 ←1=Culvert (Barrel Controls 1.40 cfs @ 2.98 fps)

Pond 4P: WQ MANHOLE

Hydrograph



Summary for Pond 5P: Drywell 1

Inflow Area = 1.620 ac, 74.09% Impervious, Inflow Depth > 3.56" for 100 Year event
 Inflow = 1.40 cfs @ 7.93 hrs, Volume= 0.481 af
 Outflow = 1.40 cfs @ 7.93 hrs, Volume= 0.471 af, Atten= 0%, Lag= 0.2 min
 Discarded = 0.01 cfs @ 0.95 hrs, Volume= 0.021 af
 Secondary = 1.39 cfs @ 7.93 hrs, Volume= 0.450 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 167.77' @ 7.93 hrs Surf.Area= 95 sf Storage= 449 cf

Plug-Flow detention time= 27.5 min calculated for 0.471 af (98% of inflow)
 Center-of-Mass det. time= 12.1 min (692.6 - 680.4)

Volume	Invert	Avail.Storage	Storage Description
#1	155.03'	364 cf	11.00'D x 15.66'H Vertical Cone/Cylinder 1,488 cf Overall - 275 cf Embedded = 1,213 cf x 30.0% Voids
#2	155.69'	188 cf	4.00'D x 15.00'H Vertical Cone/Cylinder Inside #1 275 cf Overall - 5.0" Wall Thickness = 188 cf
		552 cf	Total Available Storage

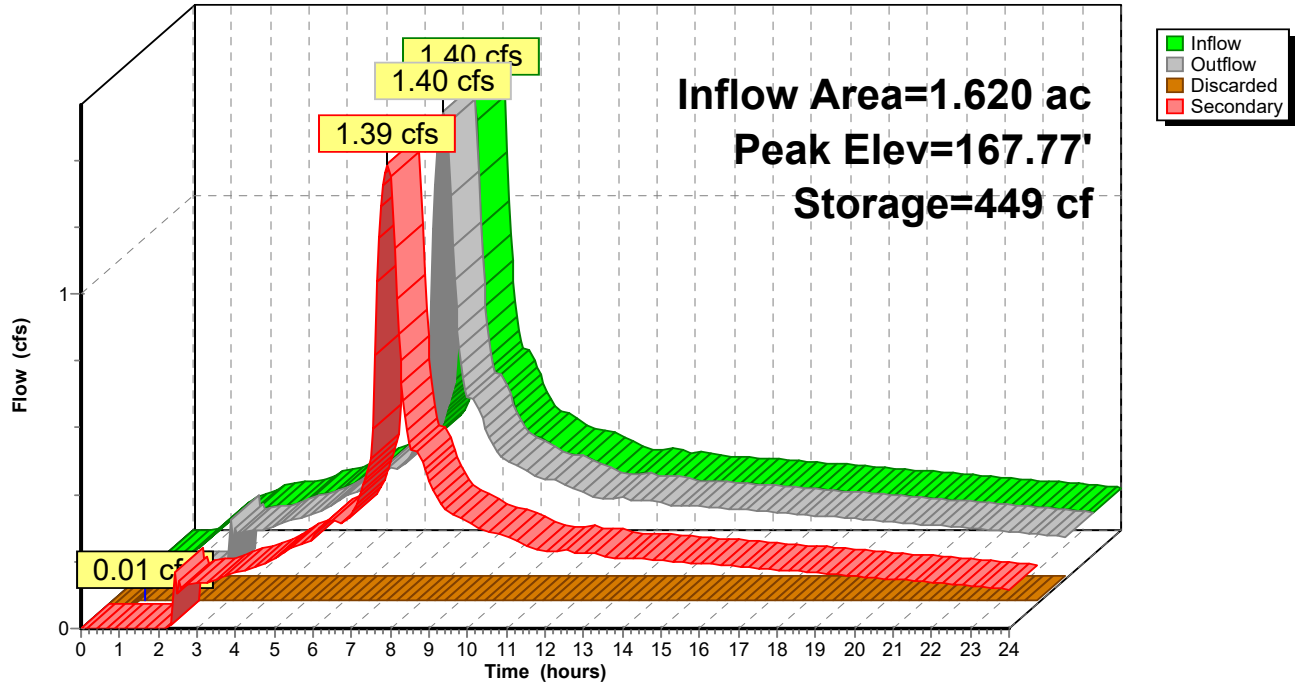
Device	Routing	Invert	Outlet Devices
#1	Discarded	155.03'	5.000 in/hr Exfiltration over Horizontal area
#2	Secondary	167.05'	12.0" Round Culvert L= 50.5' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 167.05' / 166.55' S= 0.0099 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Discarded OutFlow Max=0.01 cfs @ 0.95 hrs HW=155.20' (Free Discharge)
 ↑**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Secondary OutFlow Max=1.39 cfs @ 7.93 hrs HW=167.77' TW=166.14' (Dynamic Tailwater)
 ↑**2=Culvert** (Inlet Controls 1.39 cfs @ 2.28 fps)

Pond 5P: Drywell 1

Hydrograph



Summary for Pond 6P: Drywell 2

Inflow = 1.39 cfs @ 7.93 hrs, Volume= 0.450 af
 Outflow = 1.34 cfs @ 8.05 hrs, Volume= 0.356 af, Atten= 4%, Lag= 7.3 min
 Discarded = 0.10 cfs @ 2.85 hrs, Volume= 0.171 af
 Secondary = 1.24 cfs @ 8.05 hrs, Volume= 0.185 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 167.02' @ 8.05 hrs Surf.Area= 828 sf Storage= 4,237 cf

Plug-Flow detention time= 213.1 min calculated for 0.356 af (79% of inflow)
 Center-of-Mass det. time= 78.8 min (769.1 - 690.3)

Volume	Invert	Avail.Storage	Storage Description
#1	150.42'	5,022 cf	12.00'W x 69.00'L x 20.66'H PrismaToid 17,106 cf Overall - 367 cf Embedded = 16,740 cf x 30.0% Voids
#2	151.08'	251 cf	4.00'D x 20.00'H Vertical Cone/Cylinder Inside #1 367 cf Overall - 5.0" Wall Thickness = 251 cf
		5,273 cf	Total Available Storage

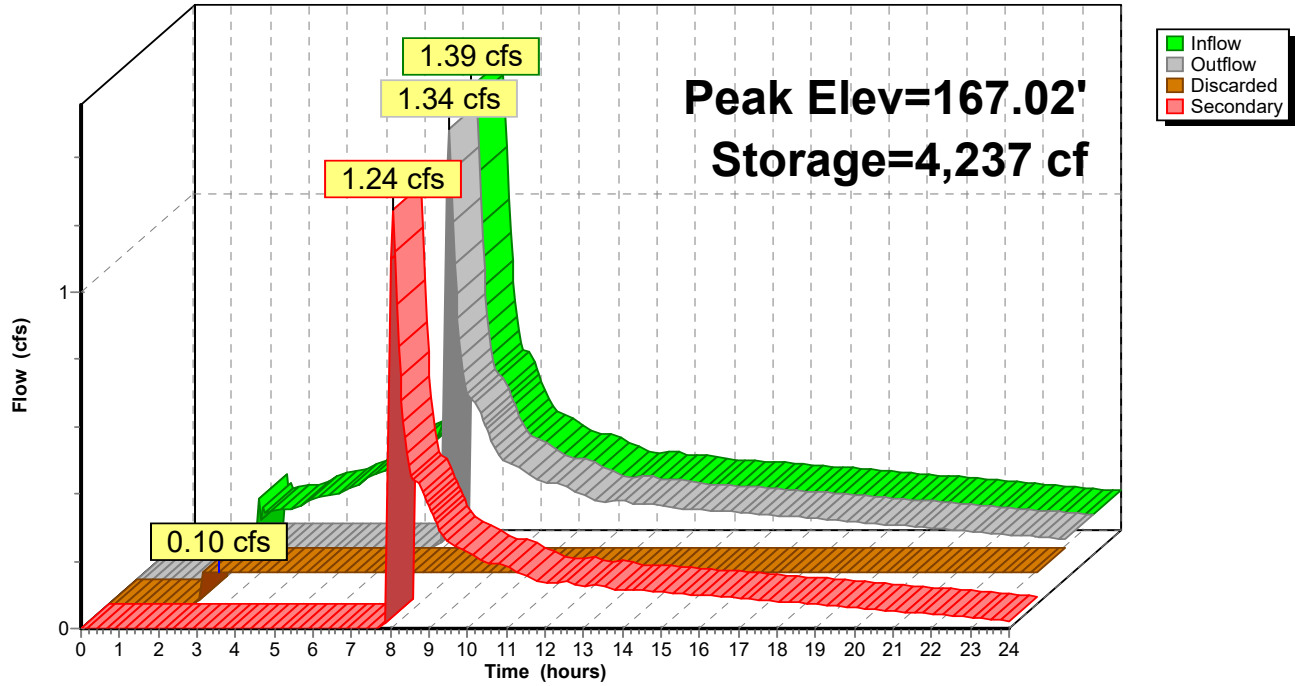
Device	Routing	Invert	Outlet Devices
#1	Discarded	150.42'	5.000 in/hr Exfiltration over Horizontal area
#2	Secondary	166.35'	12.0" Round Culvert L= 79.3' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 166.35' / 165.51' S= 0.0106 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Discarded OutFlow Max=0.10 cfs @ 2.85 hrs HW=150.64' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.10 cfs)

Secondary OutFlow Max=1.24 cfs @ 8.05 hrs HW=167.02' TW=151.05' (Dynamic Tailwater)
 ↑2=Culvert (Inlet Controls 1.24 cfs @ 2.20 fps)

Pond 6P: Drywell 2

Hydrograph



Summary for Pond 7P: Drywell 3

Inflow = 1.24 cfs @ 8.05 hrs, Volume= 0.185 af
 Outflow = 0.10 cfs @ 8.00 hrs, Volume= 0.128 af, Atten= 92%, Lag= 0.0 min
 Discarded = 0.10 cfs @ 8.00 hrs, Volume= 0.128 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 163.49' @ 16.28 hrs Surf.Area= 0.019 ac Storage= 0.080 af

Plug-Flow detention time= 359.4 min calculated for 0.128 af (69% of inflow)
 Center-of-Mass det. time= 212.2 min (959.1 - 747.0)

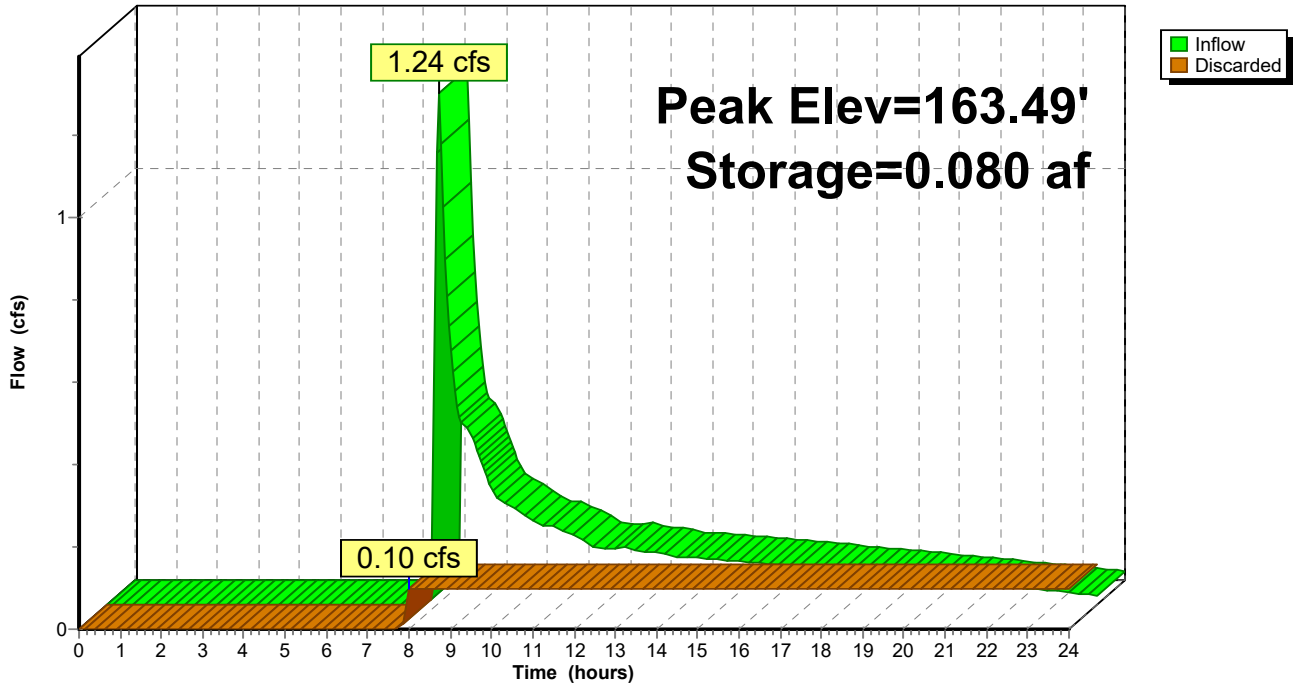
Volume	Invert	Avail.Storage	Storage Description
#1	149.90'	0.116 af	12.00'W x 69.50'L x 20.66'H Prismatic 0.396 af Overall - 0.008 af Embedded = 0.387 af x 30.0% Voids
#2	150.56'	0.006 af	4.00'D x 20.00'H Vertical Cone/Cylinder Inside #1 0.008 af Overall - 5.0" Wall Thickness = 0.006 af
		0.122 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	149.90'	5.000 in/hr Exfiltration over Horizontal area

Discarded OutFlow Max=0.10 cfs @ 8.00 hrs HW=150.26' (Free Discharge)
 ↳1=Exfiltration (Exfiltration Controls 0.10 cfs)

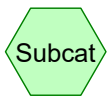
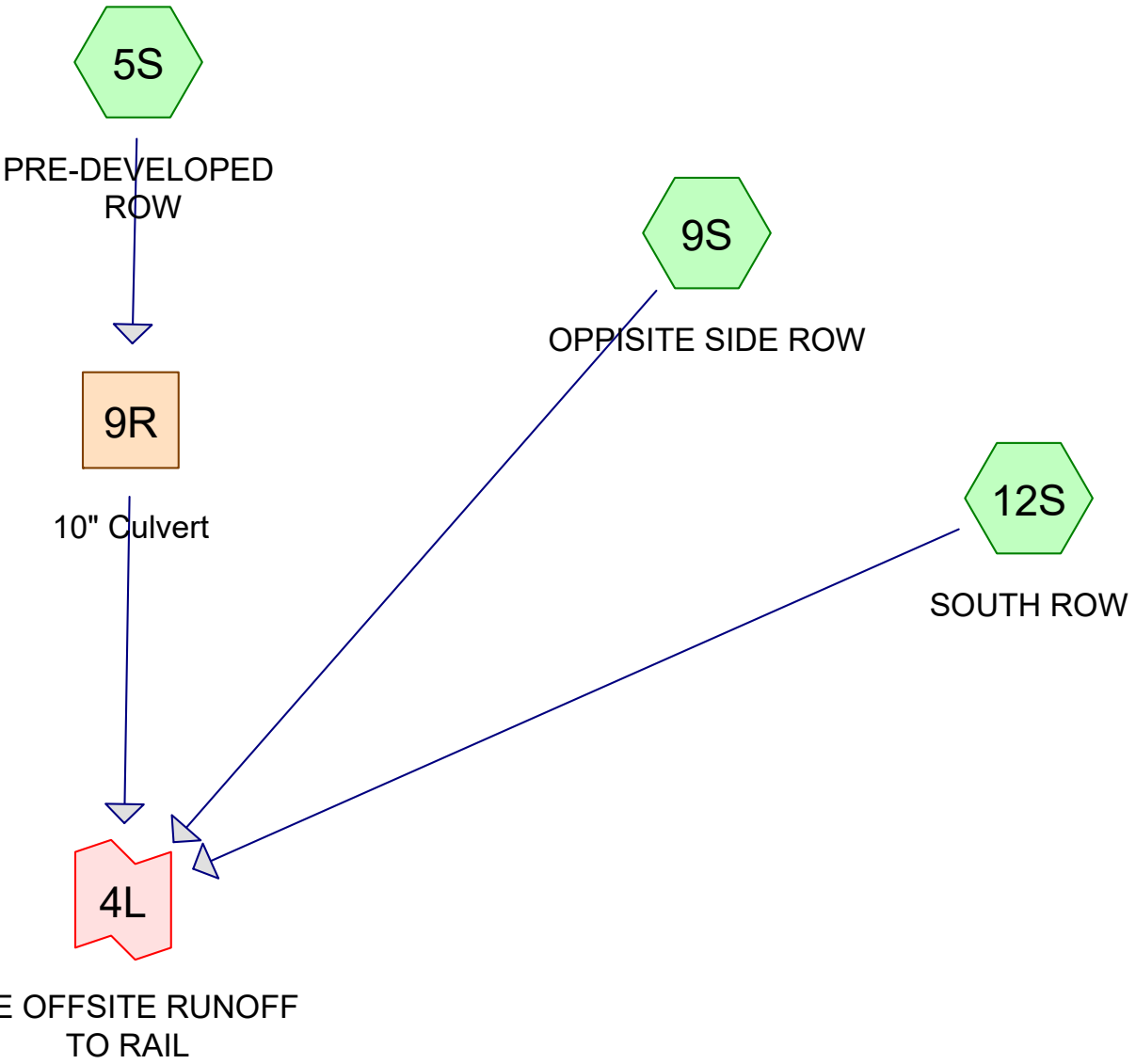
Pond 7P: Drywell 3

Hydrograph



APPENDIX B

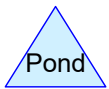
DOWNSTREAM 25-YEAR STORM EVENT ANALYSIS



Subcat



Reach



Pond



Link

Routing Diagram for 4756 TVFR 39 PRE-Downstream
 Prepared by AKS Engineering & Forestry, LLC, Printed 4/16/2018
 HydroCAD® 10.00-18 s/n 01338 © 2016 HydroCAD Software Solutions LLC

4756 TVFR 39 PRE-Downstream

Type IA 24-hr 25 Year Rainfall=3.90"

Prepared by AKS Engineering & Forestry, LLC

Printed 4/16/2018

HydroCAD® 10.00-18 s/n 01338 © 2016 HydroCAD Software Solutions LLC

Page 2

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points

Runoff by SBUH method, Split Pervious/Imperv.

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 5S: PRE-DEVELOPED ROW Runoff Area=17,749 sf 59.78% Impervious Runoff Depth>2.67"
Tc=5.0 min CN=69/98 Runoff=0.26 cfs 0.091 af

Subcatchment 9S: OPPOSITE SIDE ROW Runoff Area=48,420 sf 100.00% Impervious Runoff Depth>3.66"
Tc=5.0 min CN=0/98 Runoff=1.02 cfs 0.339 af

Subcatchment 12S: SOUTH ROW Runoff Area=9,730 sf 98.97% Impervious Runoff Depth>3.63"
Tc=5.0 min CN=69/98 Runoff=0.20 cfs 0.068 af

Reach 9R: 10" Culvert Avg. Flow Depth=0.19' Max Vel=2.65 fps Inflow=0.26 cfs 0.091 af
10.0" Round Pipe n=0.013 L=230.0' S=0.0096 '/' Capacity=2.15 cfs Outflow=0.26 cfs 0.091 af

Link 4L: PRE OFFSITE RUNOFF TO RAIL Inflow=1.48 cfs 0.497 af
Primary=1.48 cfs 0.497 af

Total Runoff Area = 1.742 ac Runoff Volume = 0.497 af Average Runoff Depth = 3.42"
9.54% Pervious = 0.166 ac 90.46% Impervious = 1.576 ac

4756 TVFR 39 PRE-Downstream

Type IA 24-hr 25 Year Rainfall=3.90"

Prepared by AKS Engineering & Forestry, LLC

Printed 4/16/2018

HydroCAD® 10.00-18 s/n 01338 © 2016 HydroCAD Software Solutions LLC

Page 3

Summary for Subcatchment 5S: PRE-DEVELOPED ROW

Runoff = 0.26 cfs @ 7.93 hrs, Volume= 0.091 af, Depth> 2.67"

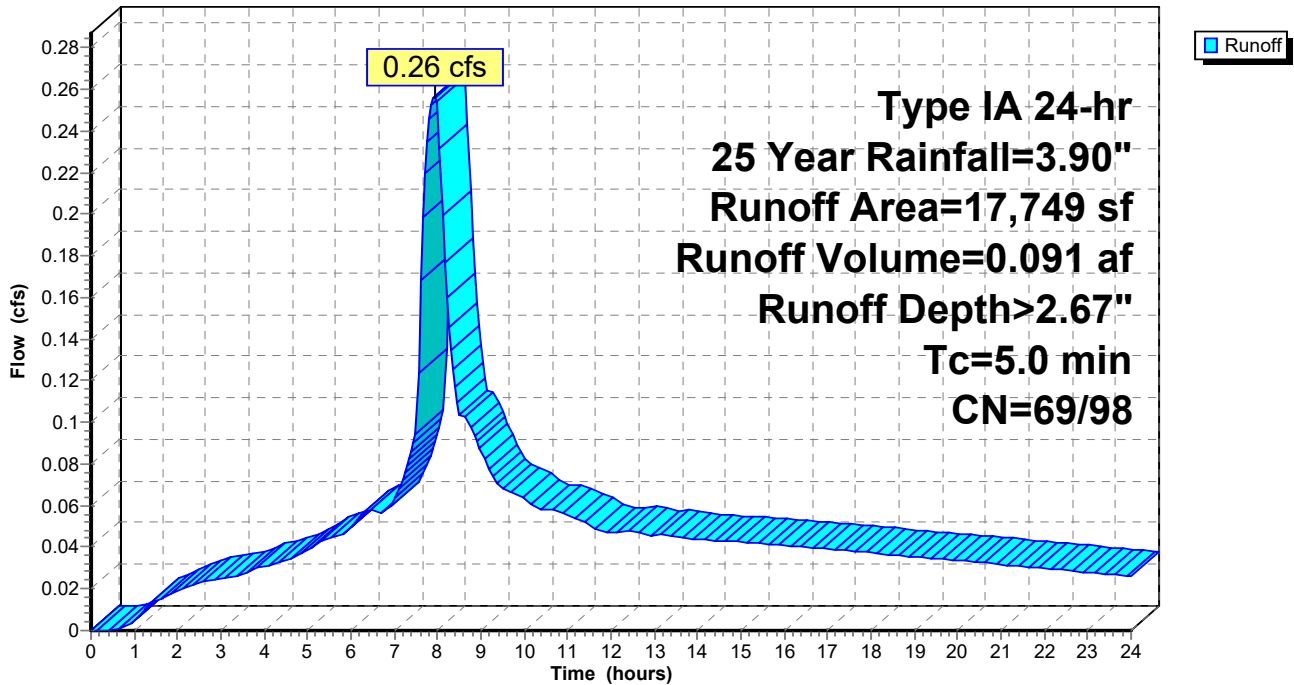
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 Year Rainfall=3.90"

	Area (sf)	CN	Description
*	10,611	98	Paved parking & sidewalk
	7,138	69	50-75% Grass cover, Fair, HSG B
	17,749	86	Weighted Average
	7,138		40.22% Pervious Area
	10,611		59.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 5S: PRE-DEVELOPED ROW

Hydrograph



4756 TVFR 39 PRE-Downstream

Type IA 24-hr 25 Year Rainfall=3.90"

Prepared by AKS Engineering & Forestry, LLC

Printed 4/16/2018

HydroCAD® 10.00-18 s/n 01338 © 2016 HydroCAD Software Solutions LLC

Page 4

Summary for Subcatchment 9S: OPPISITE SIDE ROW

Runoff = 1.02 cfs @ 7.90 hrs, Volume= 0.339 af, Depth> 3.66"

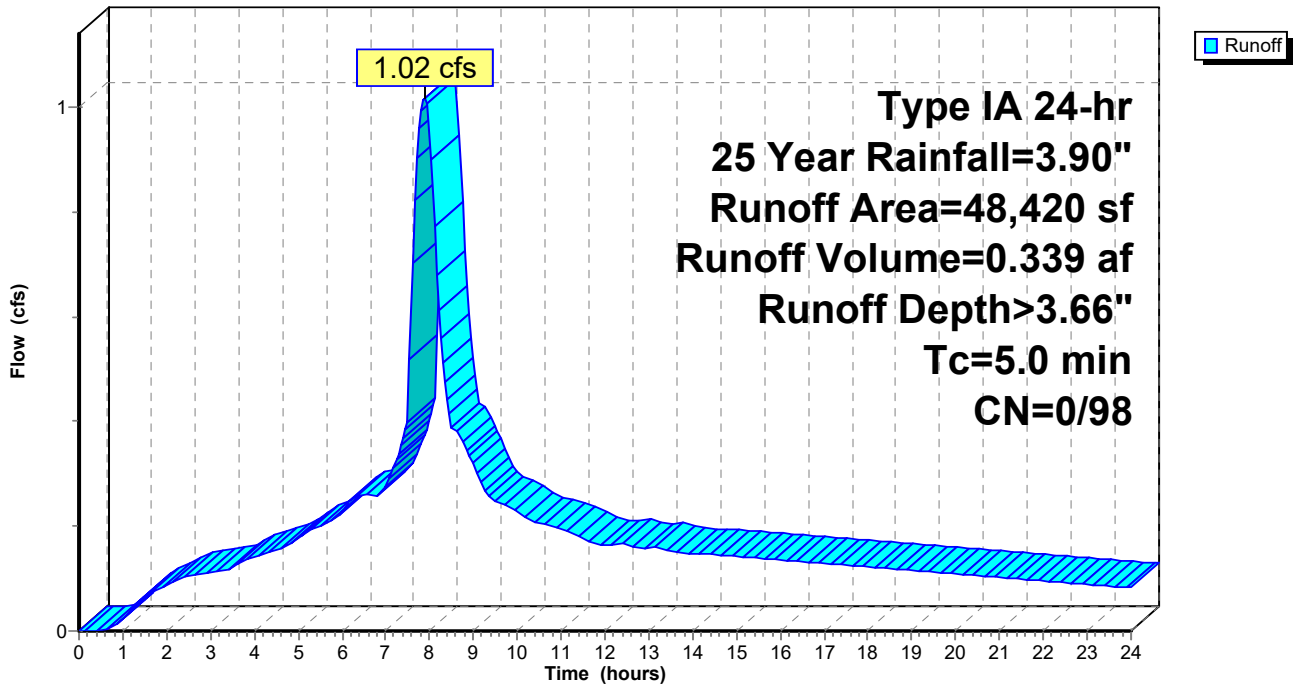
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 25 Year Rainfall=3.90"

Area (sf)	CN	Description
* 48,420	98	Street paving & sidewalk
48,420		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 9S: OPPISITE SIDE ROW

Hydrograph



4756 TVFR 39 PRE-Downstream

Type IA 24-hr 25 Year Rainfall=3.90"

Prepared by AKS Engineering & Forestry, LLC

Printed 4/16/2018

HydroCAD® 10.00-18 s/n 01338 © 2016 HydroCAD Software Solutions LLC

Page 5

Summary for Subcatchment 12S: SOUTH ROW

Runoff = 0.20 cfs @ 7.90 hrs, Volume= 0.068 af, Depth> 3.63"

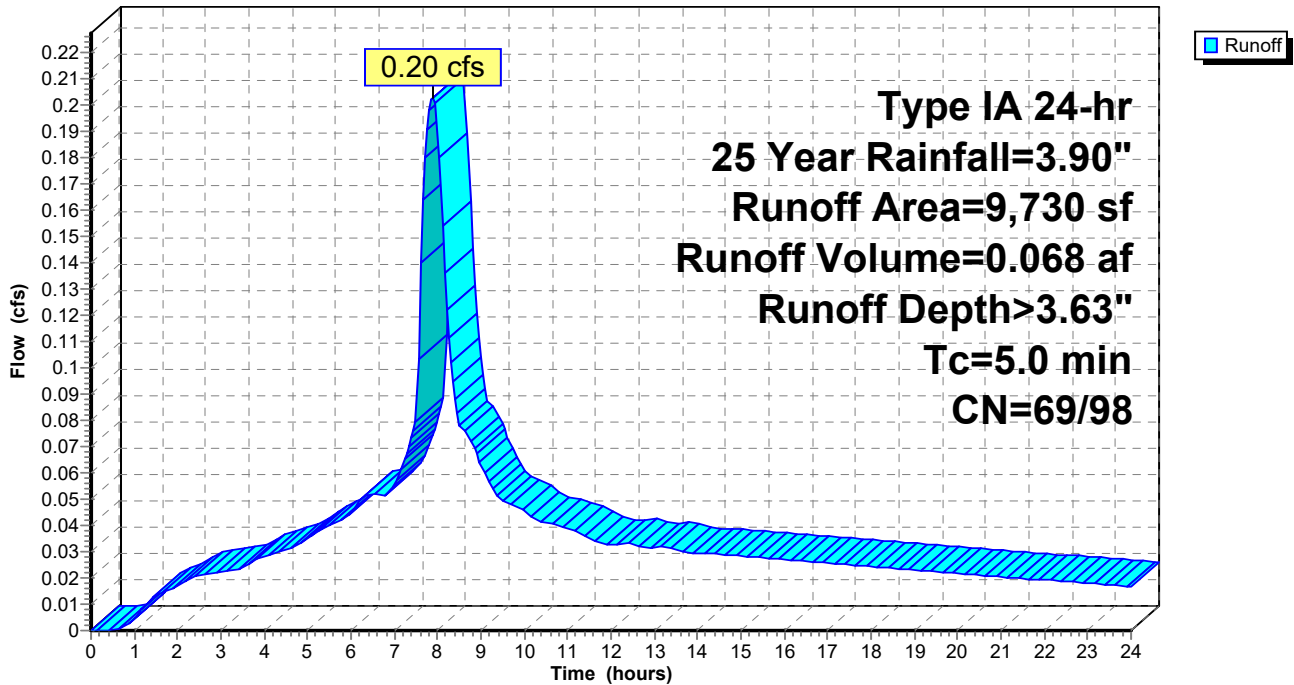
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 Year Rainfall=3.90"

Area (sf)	CN	Description
* 9,630	98	Paved parking & sidewalk
100	69	50-75% Grass cover, Fair, HSG B
9,730	98	Weighted Average
100		1.03% Pervious Area
9,630		98.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 12S: SOUTH ROW

Hydrograph



4756 TVFR 39 PRE-Downstream

Prepared by AKS Engineering & Forestry, LLC

HydroCAD® 10.00-18 s/n 01338 © 2016 HydroCAD Software Solutions LLC

Type IA 24-hr 25 Year Rainfall=3.90"

Printed 4/16/2018

Page 6

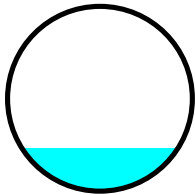
Summary for Reach 9R: 10" Culvert

Inflow Area = 0.407 ac, 59.78% Impervious, Inflow Depth > 2.67" for 25 Year event
Inflow = 0.26 cfs @ 7.93 hrs, Volume= 0.091 af
Outflow = 0.26 cfs @ 7.94 hrs, Volume= 0.091 af, Atten= 0%, Lag= 1.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.65 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 1.54 fps, Avg. Travel Time= 2.5 min

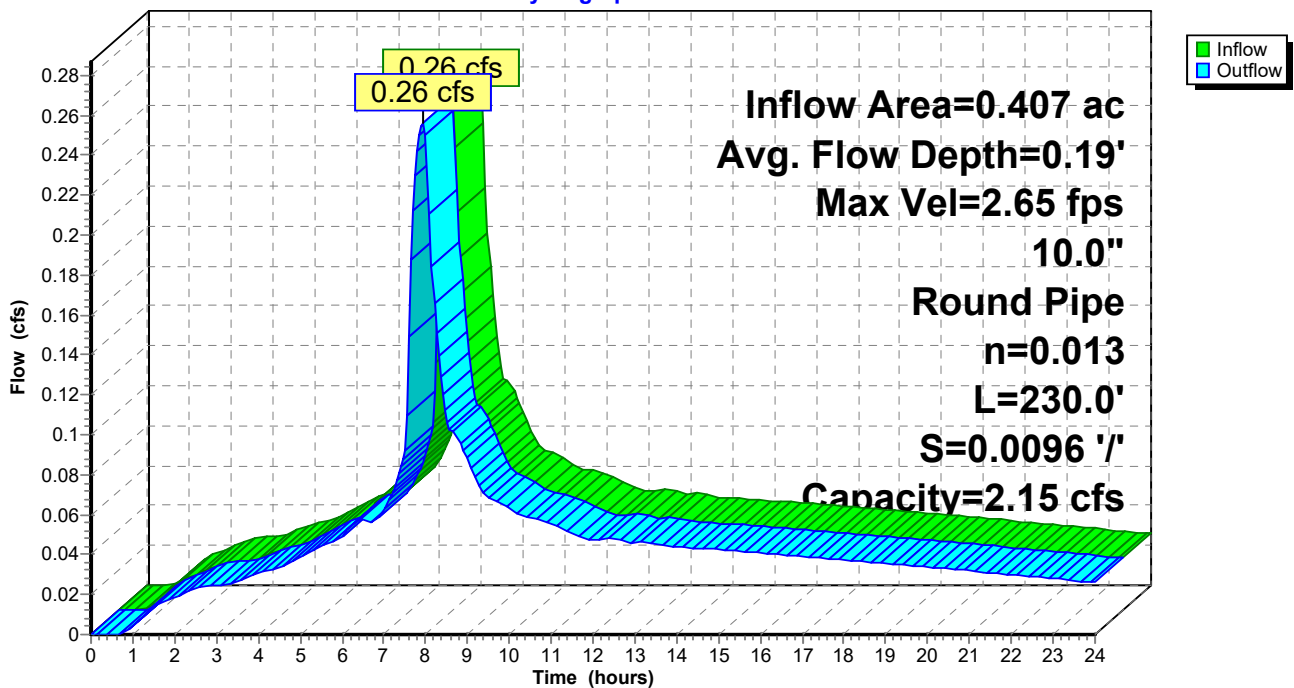
Peak Storage= 22 cf @ 7.94 hrs
Average Depth at Peak Storage= 0.19'
Bank-Full Depth= 0.83' Flow Area= 0.5 sf, Capacity= 2.15 cfs

10.0" Round Pipe
n= 0.013
Length= 230.0' Slope= 0.0096 '/'
Inlet Invert= 168.25', Outlet Invert= 166.04'



Reach 9R: 10" Culvert

Hydrograph

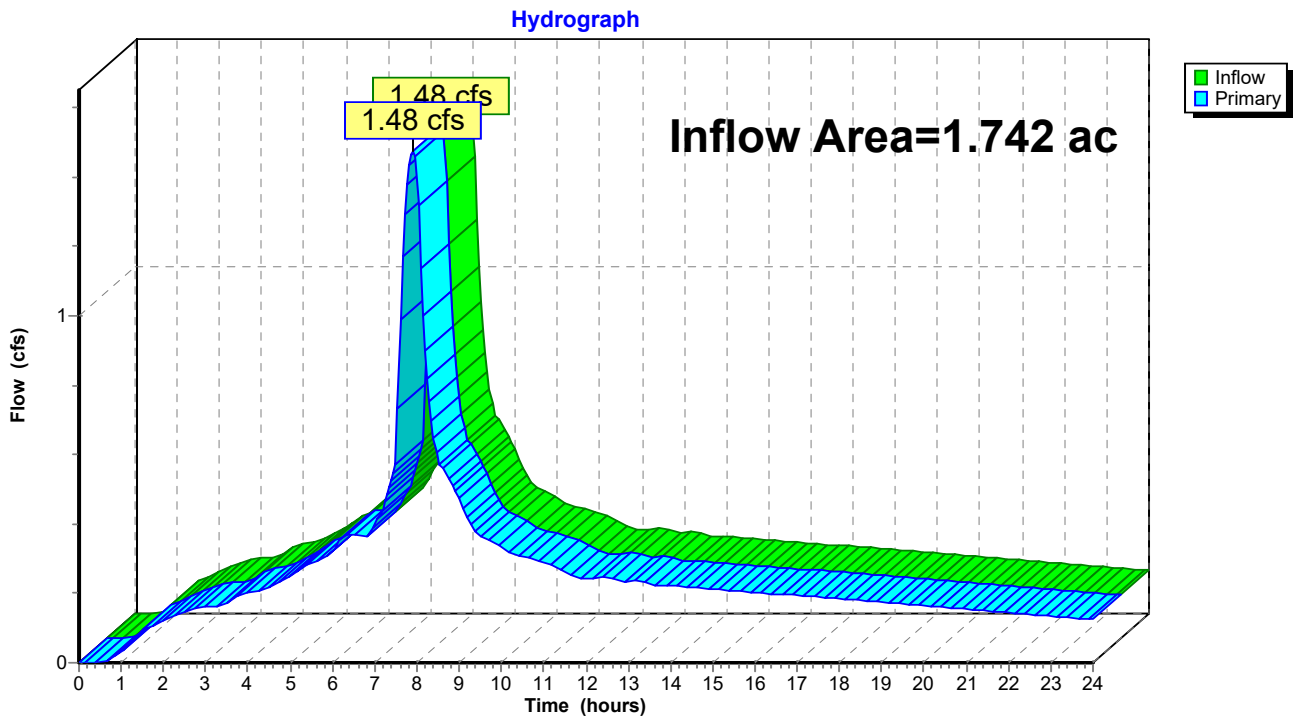


Summary for Link 4L: PRE OFFSITE RUNOFF TO RAIL

Inflow Area = 1.742 ac, 90.46% Impervious, Inflow Depth > 3.42" for 25 Year event
Inflow = 1.48 cfs @ 7.90 hrs, Volume= 0.497 af
Primary = 1.48 cfs @ 7.90 hrs, Volume= 0.497 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 4L: PRE OFFSITE RUNOFF TO RAIL





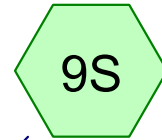
POST-DEVELOPED
ROW



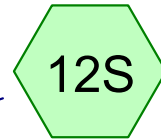
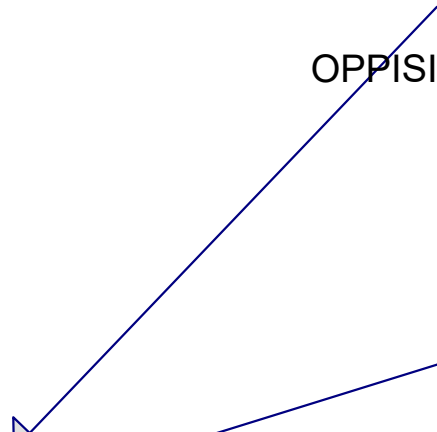
10" Culvert



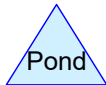
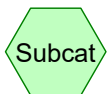
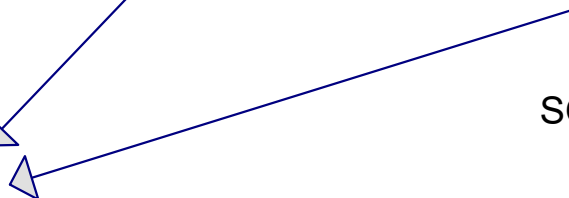
POST OFFSITE
RUNOFF TO RAIL



OPPOSITE SIDE ROW



SOUTH ROW



Routing Diagram for 4756 TVFR 39 POST-Downstream
Prepared by AKS Engineering & Forestry, LLC, Printed 4/16/2018
HydroCAD® 10.00-18 s/n 01338 © 2016 HydroCAD Software Solutions LLC

4756 TVFR 39 POST-Downstream

Type IA 24-hr 25 Year Rainfall=3.90"

Prepared by AKS Engineering & Forestry, LLC

Printed 4/16/2018

HydroCAD® 10.00-18 s/n 01338 © 2016 HydroCAD Software Solutions LLC

Page 2

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points

Runoff by SBUH method, Split Pervious/Imperv.

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 5S: POST-DEVELOPED Runoff Area=17,749 sf 75.02% Impervious Runoff Depth>3.04"
Tc=5.0 min CN=69/98 Runoff=0.30 cfs 0.103 af

Subcatchment 9S: OPPOSITE SIDE ROW Runoff Area=48,420 sf 100.00% Impervious Runoff Depth>3.66"
Tc=5.0 min CN=0/98 Runoff=1.02 cfs 0.339 af

Subcatchment 12S: SOUTH ROW Runoff Area=9,730 sf 98.97% Impervious Runoff Depth>3.63"
Tc=5.0 min CN=69/98 Runoff=0.20 cfs 0.068 af

Reach 9R: 10" Culvert Avg. Flow Depth=0.21' Max Vel=2.77 fps Inflow=0.30 cfs 0.103 af
10.0" Round Pipe n=0.013 L=230.0' S=0.0096 '/' Capacity=2.15 cfs Outflow=0.30 cfs 0.103 af

Link 4L: POST OFFSITE RUNOFF TO RAIL Inflow=1.52 cfs 0.510 af
Primary=1.52 cfs 0.510 af

Total Runoff Area = 1.742 ac Runoff Volume = 0.510 af Average Runoff Depth = 3.51"
5.97% Pervious = 0.104 ac 94.03% Impervious = 1.638 ac

4756 TVFR 39 POST-Downstream

Type IA 24-hr 25 Year Rainfall=3.90"

Prepared by AKS Engineering & Forestry, LLC

Printed 4/16/2018

HydroCAD® 10.00-18 s/n 01338 © 2016 HydroCAD Software Solutions LLC

Page 3

Summary for Subcatchment 5S: POST-DEVELOPED ROW

Runoff = 0.30 cfs @ 7.91 hrs, Volume= 0.103 af, Depth> 3.04"

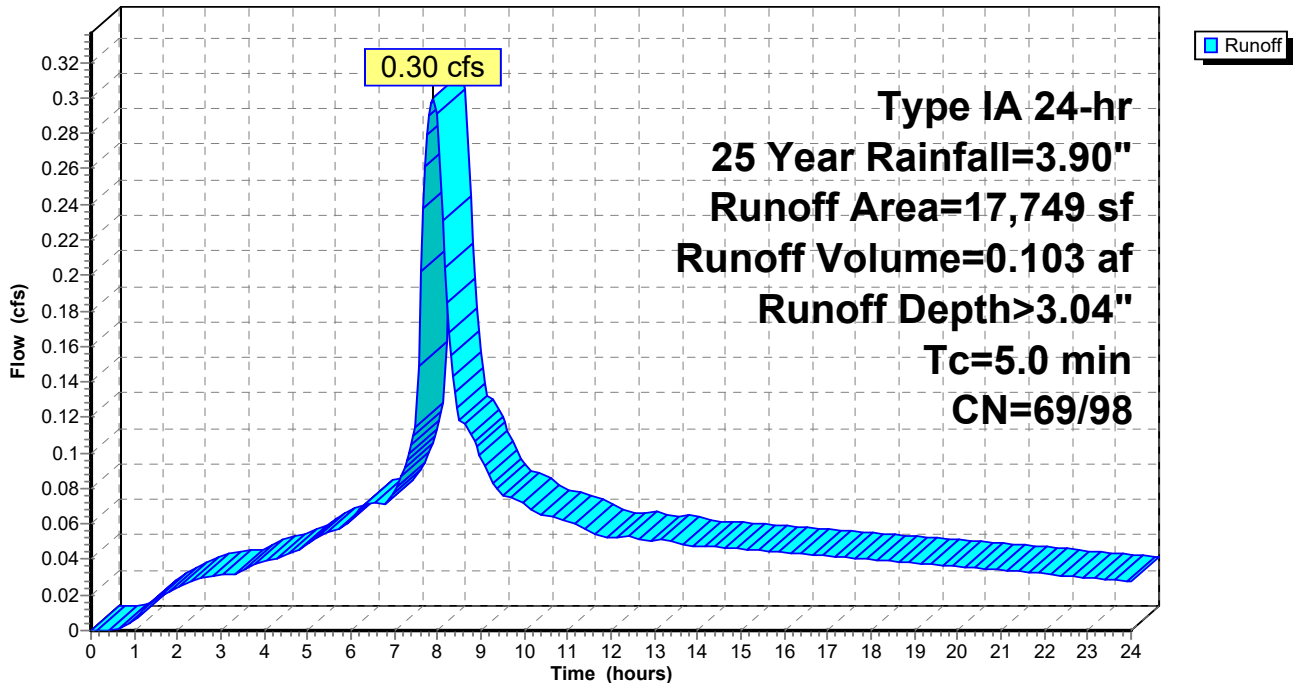
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 Year Rainfall=3.90"

	Area (sf)	CN	Description
*	13,315	98	Paved parking & sidewalk
	4,434	69	50-75% Grass cover, Fair, HSG B
	17,749	91	Weighted Average
	4,434		24.98% Pervious Area
	13,315		75.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 5S: POST-DEVELOPED ROW

Hydrograph



4756 TVFR 39 POST-Downstream

Type IA 24-hr 25 Year Rainfall=3.90"

Prepared by AKS Engineering & Forestry, LLC

Printed 4/16/2018

HydroCAD® 10.00-18 s/n 01338 © 2016 HydroCAD Software Solutions LLC

Page 4

Summary for Subcatchment 9S: OPPISITE SIDE ROW

Runoff = 1.02 cfs @ 7.90 hrs, Volume= 0.339 af, Depth> 3.66"

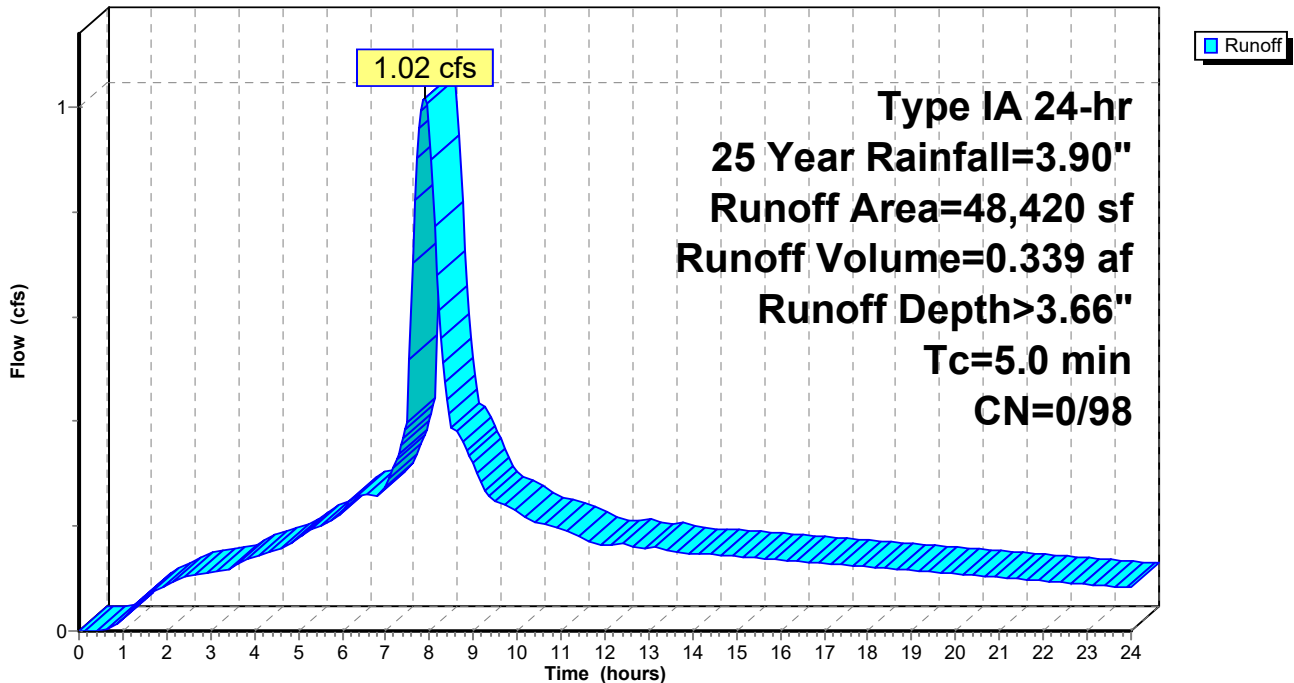
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 Year Rainfall=3.90"

Area (sf)	CN	Description
* 48,420	98	Street paving & sidewalk
48,420		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 9S: OPPISITE SIDE ROW

Hydrograph



4756 TVFR 39 POST-Downstream

Type IA 24-hr 25 Year Rainfall=3.90"

Prepared by AKS Engineering & Forestry, LLC

Printed 4/16/2018

HydroCAD® 10.00-18 s/n 01338 © 2016 HydroCAD Software Solutions LLC

Page 5

Summary for Subcatchment 12S: SOUTH ROW

Runoff = 0.20 cfs @ 7.90 hrs, Volume= 0.068 af, Depth> 3.63"

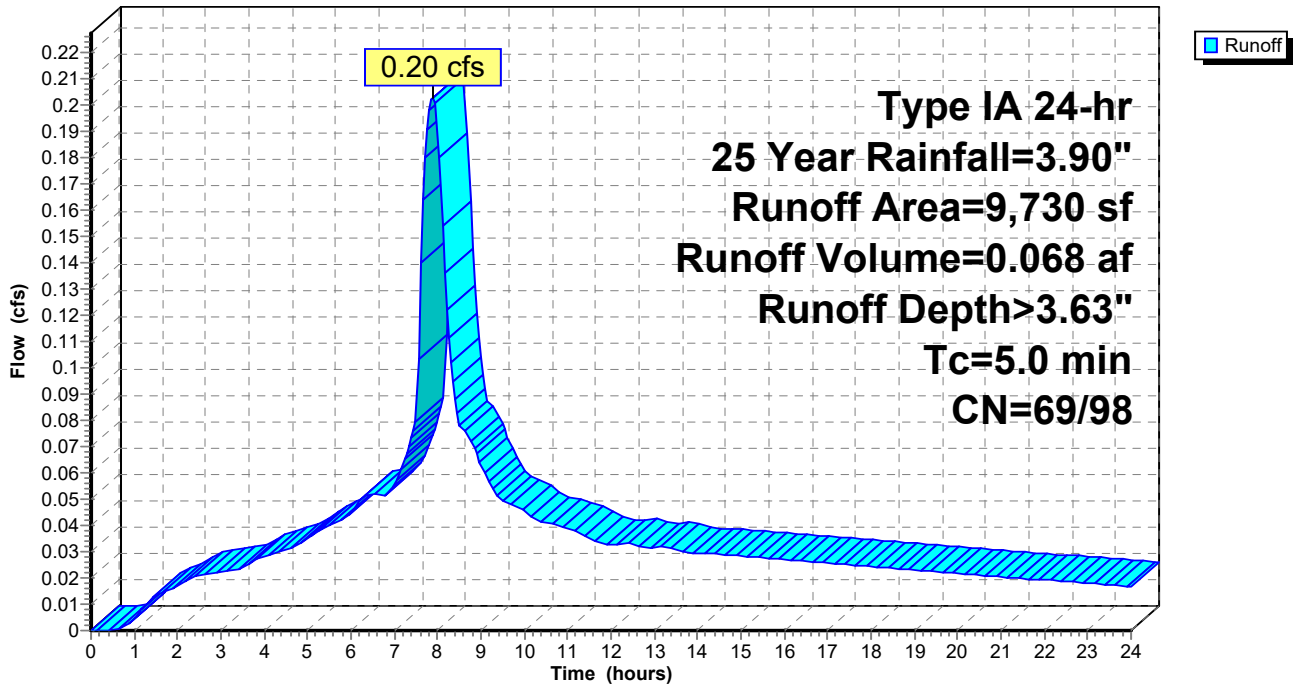
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 Year Rainfall=3.90"

	Area (sf)	CN	Description
*	9,630	98	Street Paving & sidewalk
	100	69	50-75% Grass cover, Fair, HSG B
	9,730	98	Weighted Average
	100		1.03% Pervious Area
	9,630		98.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 12S: SOUTH ROW

Hydrograph



4756 TVFR 39 POST-Downstream

Type IA 24-hr 25 Year Rainfall=3.90"

Prepared by AKS Engineering & Forestry, LLC

Printed 4/16/2018

HydroCAD® 10.00-18 s/n 01338 © 2016 HydroCAD Software Solutions LLC

Page 6

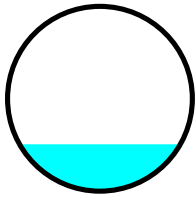
Summary for Reach 9R: 10" Culvert

Inflow Area = 0.407 ac, 75.02% Impervious, Inflow Depth > 3.04" for 25 Year event
 Inflow = 0.30 cfs @ 7.91 hrs, Volume= 0.103 af
 Outflow = 0.30 cfs @ 7.93 hrs, Volume= 0.103 af, Atten= 0%, Lag= 1.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Max. Velocity= 2.77 fps, Min. Travel Time= 1.4 min
 Avg. Velocity = 1.60 fps, Avg. Travel Time= 2.4 min

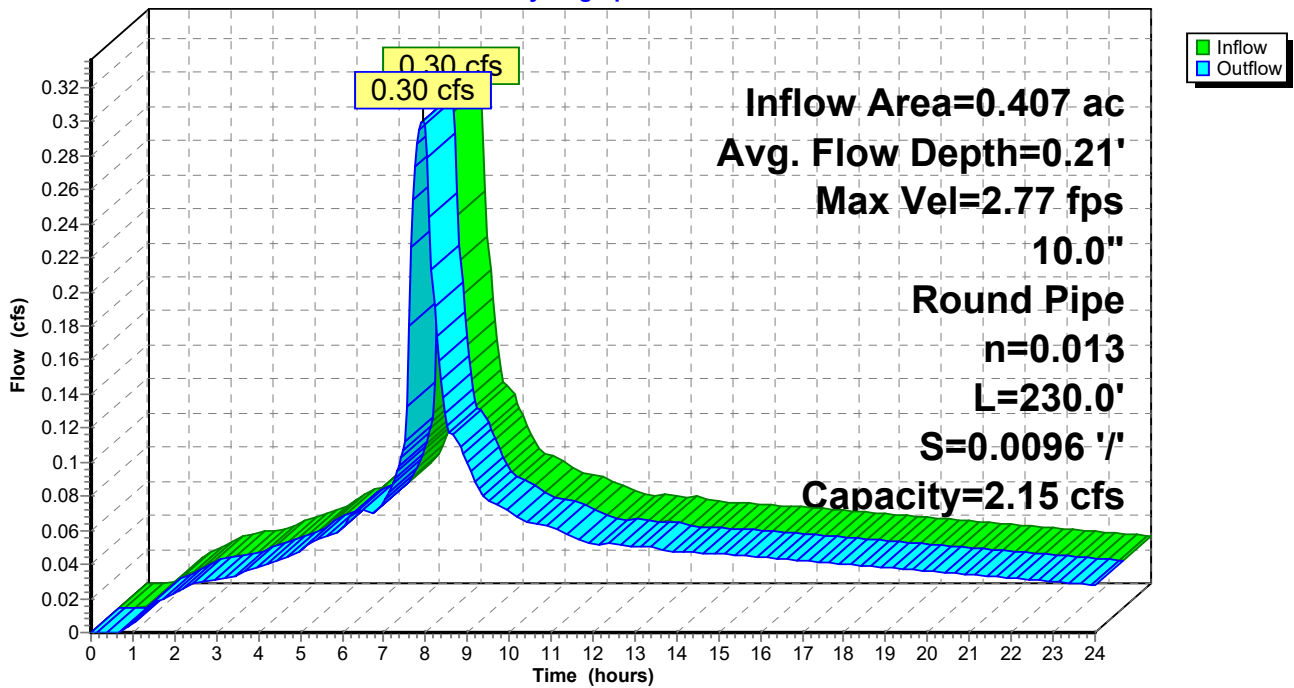
Peak Storage= 25 cf @ 7.93 hrs
 Average Depth at Peak Storage= 0.21'
 Bank-Full Depth= 0.83' Flow Area= 0.5 sf, Capacity= 2.15 cfs

10.0" Round Pipe
 n= 0.013
 Length= 230.0' Slope= 0.0096 '/
 Inlet Invert= 168.25', Outlet Invert= 166.04'



Reach 9R: 10" Culvert

Hydrograph

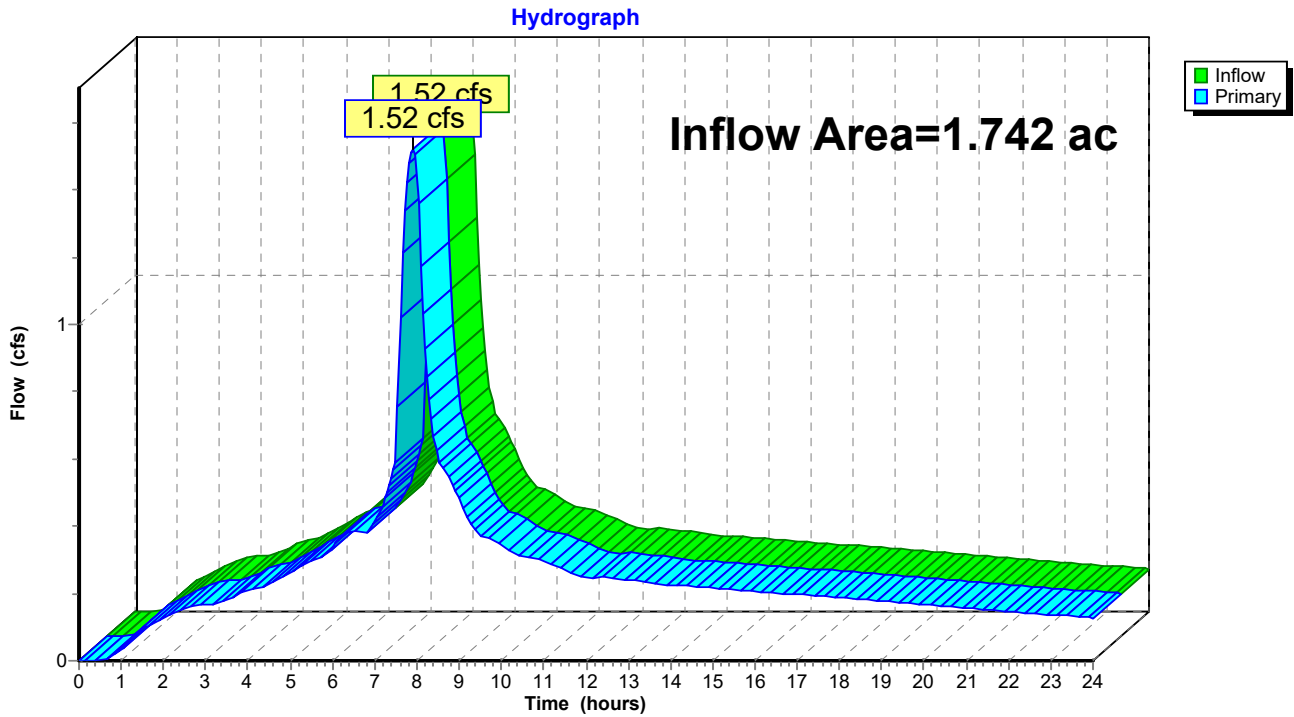


Summary for Link 4L: POST OFFSITE RUNOFF TO RAIL

Inflow Area = 1.742 ac, 94.03% Impervious, Inflow Depth > 3.51" for 25 Year event
Inflow = 1.52 cfs @ 7.90 hrs, Volume= 0.510 af
Primary = 1.52 cfs @ 7.90 hrs, Volume= 0.510 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 4L: POST OFFSITE RUNOFF TO RAIL



APPENDIX C
USDA-NCRS SOIL RESOURCE REPORT

Custom Soil Resource Report for Washington County, Oregon



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

Preface	2
How Soil Surveys Are Made	5
Soil Map	8
Soil Map.....	9
Legend.....	10
Map Unit Legend.....	11
Map Unit Descriptions.....	11
Washington County, Oregon.....	13
4B—Briedwell silt loam, 0 to 7 percent slopes.....	13
References	14

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

Custom Soil Resource Report

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

Custom Soil Resource Report

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

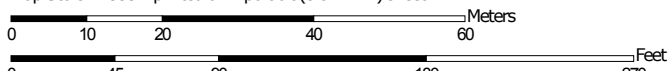
Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report Soil Map




Map Scale: 1:999 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)




















Soils







 Soil Map Unit Polygons

 Soil Map Unit Lines


 Soil Map Unit Points

Special Point Features






-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot

-  Spoil Area
-  Stony Spot
-  Very Stony Spot
-  Wet Spot
-  Other
-  Special Line Features


Water Features

 Streams and Canals

Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Washington County, Oregon
 Survey Area Data: Version 14, Sep 16, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 3, 2014—Aug 23, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
4B	Briedwell silt loam, 0 to 7 percent slopes	2.8	100.0%
Totals for Area of Interest		2.8	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Custom Soil Resource Report

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Washington County, Oregon

4B—Briedwell silt loam, 0 to 7 percent slopes

Map Unit Setting

National map unit symbol: 220g
Elevation: 200 to 320 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Briedwell and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Briedwell

Setting

Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty over gravelly alluvium

Typical profile

H1 - 0 to 12 inches: silt loam
H2 - 12 to 26 inches: clay loam
H3 - 26 to 60 inches: extremely cobbly clay loam

Properties and qualities

Slope: 0 to 7 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 6.2 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Other vegetative classification: Well drained < 15% Slopes (G002XY002OR)
Hydric soil rating: No

References

- American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.
- American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.
- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.
- Federal Register. July 13, 1994. Changes in hydric soils of the United States.
- Federal Register. September 18, 2002. Hydric soils of the United States.
- Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.
- National Research Council. 1995. Wetlands: Characteristics and boundaries.
- Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262
- Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577
- Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580
- Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.
- United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.
- United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374
- United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. <http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084>

Custom Soil Resource Report

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

APPENDIX D
GEOTECHNICAL INFILTRATION TESTING
MEMORANDUM



9750 SW Nimbus Avenue
 Beaverton, OR 97008-7172
 p | 503-641-3478 f | 503-644-8034

MEMORANDUM

To: Siobhan Kirk / Tualatin Valley Fire & Rescue

Date: January 5, 2018

GRI Project No.: 5803-A

From: Michael Reed, PE, GE; Jason Bock, PE

**Re: Infiltration Testing
 TVFR Fire Station No. 39
 SW McEwan Road and SW 65th Avenue
 Tualatin, Oregon**

GRI completed a geotechnical investigation for the TVFR Fire Station No. 39, which is summarized in our January 26, 2016, draft geotechnical report titled "Geotechnical Investigation and Site-Specific Seismic Hazard Evaluation, TVFR Fire Station No. 39, SW McEwan Road and SW 65th Avenue, Tualatin, Oregon." The project civil engineer, AKS Engineering & Forestry, LLC, subsequently requested we provide additional consultation to assist with design of a stormwater infiltration system for the project.

SUBSURFACE CONDITIONS

On December 11, 2017, additional deeper infiltration testing was performed at depths of approximately 10 and 17 ft through a new infiltration boring, I-1, indicated on the attached site plan, Figure 1. Infiltration testing was previously performed in boring B-3 as part of our 2016 investigation, the results of which are not included in this memo. Drilling of the infiltration boring was performed by Western States Soil Conservation, Inc., of Hubbard, Oregon. The new boring was drilled specifically for infiltration testing. A member of GRI's geotechnical engineering staff maintained a detailed log of the materials and conditions disclosed during the course of the work. Disturbed samples of the soil were obtained at approximately 5-ft intervals and at the test depths using a California-modified split-spoon sampler, field classified, placed in air-tight containers, and returned to our laboratory for further examination. A log of the exploration is shown on Figure 2. The terms and symbols used to describe the materials encountered in the boring are defined in Table 1 and the attached legend. Laboratory testing was limited to percent passing the No. 200 sieve (washed analysis). Soil descriptions and laboratory test results are tabulated below.

Location	Depth of Sample, ft	% Passing No. 200 Sieve	Soil Type
I-1	10	10	GRAVEL, some silt and sand, trace clay, contains cobbles
I-1	17	12	GRAVEL, some silt and sand, trace clay, contains cobbles

Groundwater was not encountered in the infiltration boring at the time of drilling. Based on our review of nearby water well logs, we anticipate the regional groundwater surface is located at a depth of about 50 ft within the underlying medium-grained sand and gravel deposits.

INFILTRATION TESTING

Field infiltration tests were conducted in boring I-1 at depths of 10 and 17 ft in general conformance with the Clean Water Services' 2017 Design and Construction Standards. Infiltration testing was completed using the Encased Falling-Head method. The test consisted of advancing a 7¼-in.-diameter hollow-stem auger to the depth of interest and firmly seating the auger into the soil by pushing an additional 6 to 7 in. below the bottom of the boring. Water was placed in the auger to a height of approximately 18 to 24 in. above the test depth and allowed to saturate the soil. After soaking, the water level in the pipe was increased to a height of approximately 36 to 60 in. above the test depth, and the drop in water level was recorded at 10-minute intervals for a period of 1 hour. Three infiltration tests were conducted at each test depth. Following completion of the infiltration testing, the auger was extracted and the infiltration boring was backfilled with bentonite chips.

The test results were analyzed, and average, un-factored, field infiltration rates of 1 and 10 in./hour were observed at the test depths of 10 and 17 ft, respectively. We recommend a minimum factor of safety of 2.0 for infiltration design based on encased falling-head infiltration tests.

LIMITATIONS

This memorandum has been prepared to aid in the design of a stormwater infiltration feature for this project. The test results provided in this memorandum are based on the data obtained from the infiltration boring completed in addition to our original geotechnical report. In the performance of subsurface investigations, specific information is obtained at specific locations at specific times. However, it is acknowledged that variations in soil conditions may exist between exploration locations. This memorandum does not reflect any variations that may occur between these locations.

Submitted for GRI,



Michael W. Reed, PE, GE
Principal

Renews 12/2018

A handwritten signature in black ink, appearing to read "Jason D. Bock".

Jason D. Bock, PE
Project Engineer

This document has been submitted electronically.

Table 1: GUIDELINES FOR CLASSIFICATION OF SOIL

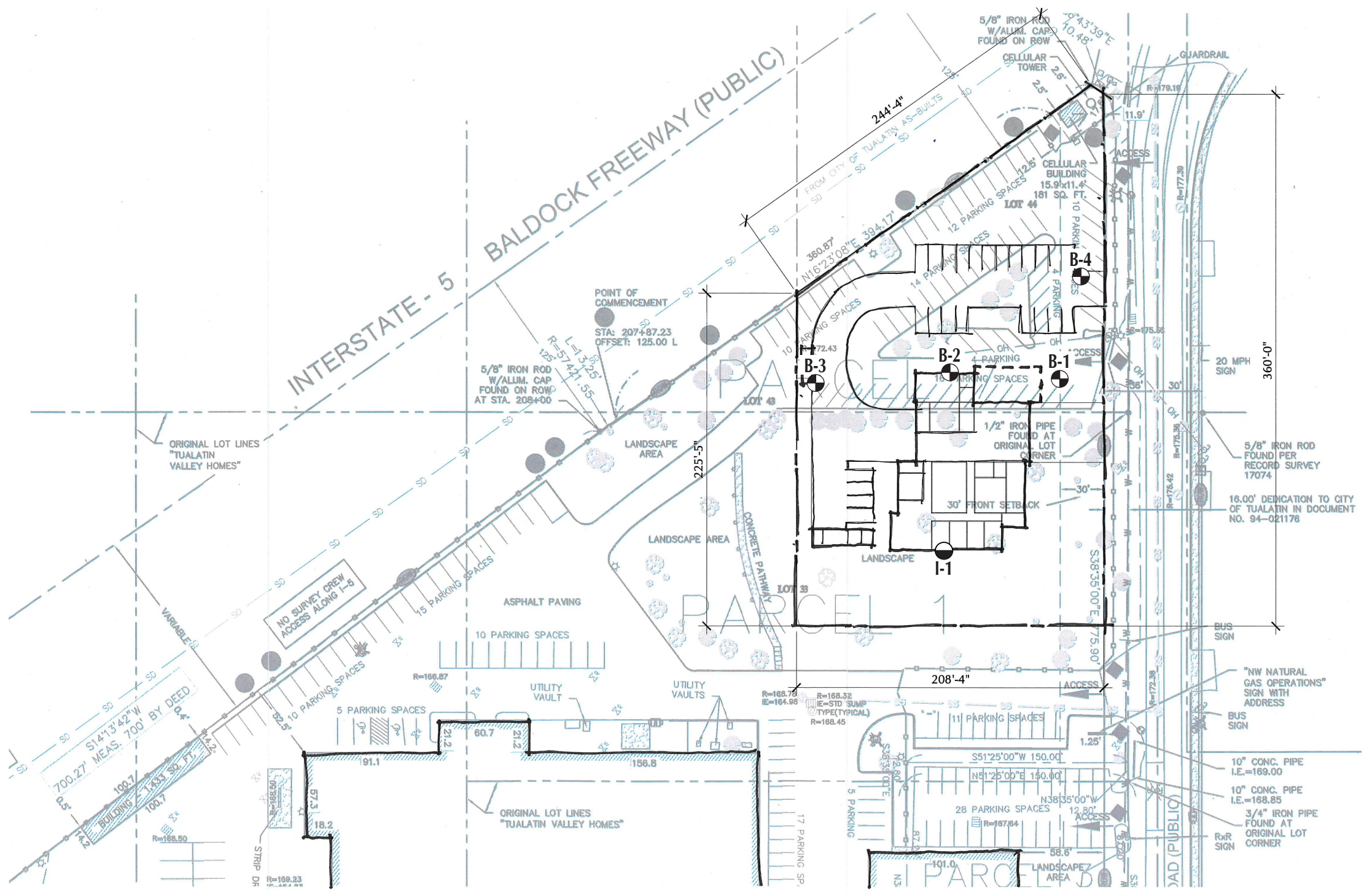
Description of Relative Density for Granular Soil

Relative Density	Standard Penetration Resistance (N-values), blows per ft
Very Loose	0 - 4
Loose	4 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	over 50

Description of Consistency for Fine-Grained (Cohesive) Soils

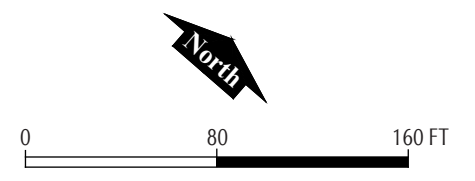
Consistency	Standard Penetration Resistance (N-values), blows per ft	Torvane or Undrained Shear Strength, tsf
Very Soft	0 - 2	less than 0.125
Soft	2 - 4	0.125 - 0.25
Medium Stiff	4 - 8	0.25 - 0.50
Stiff	8 - 15	0.50 - 1.0
Very Stiff	15 - 30	1.0 - 2.0
Hard	over 30	over 2.0

Grain-Size Classification	Modifier for Subclassification		
<i>Boulders:</i> > 12 in.		Primary Constituent SAND or GRAVEL	Primary Constituent SILT or CLAY
<i>Cobbles:</i> 3 - 12 in.	Adjective	Percentage of Other Material (by weight)	
<i>Gravel:</i> 1/4 - 3/4 in. (fine) 3/4 - 3 in. (coarse)	trace: some: sandy, gravelly:	5 - 15 (sand, gravel) 15 - 30 (sand, gravel) 30 - 50 (sand, gravel)	5 - 15 (sand, gravel) 15 - 30 (sand, gravel) 30 - 50 (sand, gravel)
<i>Sand:</i> No. 200 - No. 40 sieve (fine) No. 40 - No. 10 sieve (medium) No. 10 - No. 4 sieve (coarse)	trace: some: silty, clayey:	< 5 (silt, clay) 5 - 12 (silt, clay) 12 - 50 (silt, clay)	<i>Relationship of clay and silt determined by plasticity index test</i>
<i>Silt/Clay:</i> pass No. 200 sieve			



- INFILTRATION BORING COMPLETED BY GRI (DECEMBER 11, 2017)
- BORING COMPLETED BY GRI (JANUARY 12, 2016)

SITE PLAN FROM FILE BY ANKROM MOISAN, DATED OCTOBER 22, 2015



GRI TUALATIN VALLEY FIRE & RESCUE STATION 39

SITE PLAN

BORING AND TEST PIT LOG LEGEND

SOIL SYMBOLS

Symbol	Typical Description
	LANDSCAPE MATERIALS
	FILL
	GRAVEL; clean to some silt, clay, and sand
	Sandy GRAVEL; clean to some silt and clay
	Silty GRAVEL; up to some clay and sand
	Clayey GRAVEL; up to some silt and sand
	SAND; clean to some silt, clay, and gravel
	Gravelly SAND; clean to some silt and clay
	Silty SAND; up to some clay and gravel
	Clayey SAND; up to some silt and gravel
	SILT; up to some clay, sand, and gravel
	Gravelly SILT; up to some clay and sand
	Sandy SILT; up to some clay and gravel
	Clayey SILT; up to some sand and gravel
	CLAY; up to some silt, sand, and gravel
	Gravelly CLAY; up to some silt and sand
	Sandy CLAY; up to some silt and gravel
	Silty CLAY; up to some sand and gravel
	BOULDER

BEDROCK SYMBOLS

Symbol	Typical Description
	BASALT
	MUDSTONE
	SILTSTONE
	SANDSTONE

SURFACE MATERIAL SYMBOLS

Symbol	Typical Description
	Asphalt concrete PAVEMENT
	Portland cement concrete PAVEMENT
	Crushed rock BASE COURSE

SAMPLER SYMBOLS

Symbol	Sampler Description
	2.0-in. O.D. split-spoon sampler and Standard Penetration Test with recovery (ASTM D1586)
	Shelby tube sampler with recovery (ASTM D1587)
	3.0-in. O.D. split-spoon sampler with recovery (ASTM D3550)
	Grab Sample
	Rock core sample interval
	Sonic core sample interval
	Geoprobe sample interval

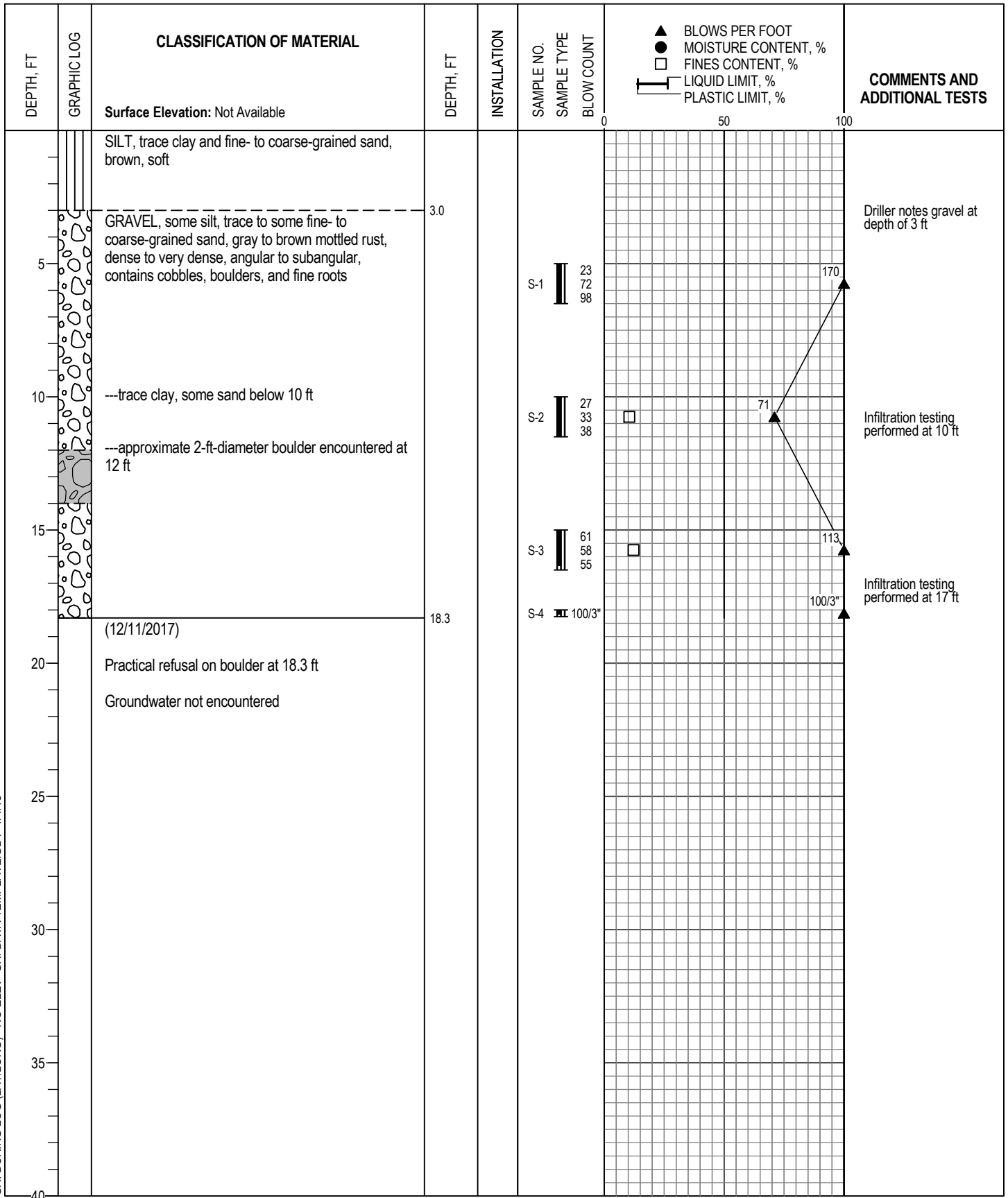
INSTALLATION SYMBOLS

Symbol	Symbol Description
	Flush-mount monument set in concrete
	Concrete, well casing shown where applicable
	Bentonite seal, well casing shown where applicable
	Filter pack, machine-slotted well casing shown where applicable
	Grout, vibrating-wire transducer cable shown where applicable
	Vibrating-wire pressure transducer
	1-in.-diameter solid PVC
	1-in.-diameter hand-slotted PVC
	Grout, inclinometer casing shown where applicable

FIELD MEASUREMENTS

Symbol	Typical Description
	Groundwater level during drilling and date measured
	Groundwater level after drilling and date measured
	Rock core recovery (%)
	Rock quality designation (RQD, %)

GRI BORING LOG (LAT/LONG) - NO ELEV GRI DATA TEMPLATE.GDT 1/4/18



Logged By: N. Utevsy		Drilled by: Western States Soil Conservation, Inc.	
Date Started: 12/11/17		Coordinates: Not Available	
Drilling Method: Hollow-Stem Auger		Hammer Type: Auto Hammer	
Equipment: CME 55 HT Track-Mounted Drill Rig		Weight: 140 lb	
Hole Diameter: 8 in.		Drop: 30 in.	
Note: See Legend for Explanation of Symbols		Energy Ratio:	

- ◆ TORVANE SHEAR STRENGTH, TSF
- UNDRAINED SHEAR STRENGTH, TSF



BORING I-1

APPENDIX E
NRCS URBAN HYDROLOGY FOR SMALL WATERSHEDS
TR55 RUNOFF CURVE NUMBERS

Table 2-2a Runoff curve numbers for urban areas ^{1/}

Cover description	Average percent impervious area ^{2/}	Curve numbers for hydrologic soil group			
		A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.) ^{3/} :					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) ^{4/}		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Developing urban areas					
Newly graded areas					
(pervious areas only, no vegetation) ^{5/}		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

¹ Average runoff condition, and $I_a = 0.2S$.

² The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.

³ CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

⁴ Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.

⁵ Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

APPENDIX F
**OPERATION AND MAINTENANCE FOR PRIVATE
PROPERTY OWNERS**

Trenches and Drywells Facility Name: _____

Facility Location: _____

Maintenance Item	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	Storm
GENERAL													
When accumulated trash and debris impede facility performance, clear piping to facility, clean gutters, rain drains, and silt traps.													
For any visible accumulation of oil, gas, paint, or other contaminant (includes concrete debris or slurry), remove/dispose in accordance with state and federal regulation. If possible, identify and control source.													
When ponding water occurs, Clear piping through facility. Replace rock/sand reservoirs as necessary. Tilling of subgrade below reservoir may be necessary (for trenches) prior to backfill. May require decommissioning and replacement.													
If splash pad is missing or damaged, repair or replace.													
If leaves are clogging the roof downspout, remove and of leaves. Repair/ seal cracks in cracked drain pipes or manholes. Replace when repair is insufficient.													

Trenches and Drywells Facility Name: _____

Facility Location: _____

Maintenance Item	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	Storm
STORAGE SUMP													
For accumulated material within 18 inches of the bottom of the outlet pipe or greater than designed sediment depth for sump, remove/ dispose in accordance with state and federal regulations.													
Repair or replace maintenance holes that cannot be opened by one person, locking bolts that are missing or damaged, or locking threads that are less than 1/2 inch of thread.													
If maintenance holes are buried, expose and restore to surface grade. Maintain ingress/egress.													
If maintenance hole cover is missing, replace cover.													
VEGETATION MANAGEMENT													
Prevent large root systems from damaging subsurface structural components.													
INTEGRATED PEST MANAGEMENT													
Do not apply herbicides or pesticides to the facility.													
Survey for presence of detrimental insects and pests													

Sensitive Area Pre-Screening Site Assessment

1. Jurisdiction: Tualatin

2. Property Information (example 1S234AB01400)

Tax lot ID(s): 2S 113DD TL 1601

3. Owner Information

Name: Siobhan Kirk

Company: Tualatin Valley Fire & Rescue

Address: 11945 SW 70th Avenue

City, State, Zip: Tigard, OR 97223

Phone/Fax: 503-649-8577

E-Mail: _____

OR Site Address: Adjacent to 7100 SW McEwan

City, State, Zip: Tualatin, OR 97062

Nearest Cross Street: SW McEwan & Lower Boones Ferry Rd.

4. Development Activity (check all that apply)

- Addition to Single Family Residence (rooms, deck, garage)
- Lot Line Adjustment Minor Land Partition
- Residential Condominium Commercial Condominium
- Residential Subdivision Commercial Subdivision
- Single Lot Commercial Multi Lot Commercial
- Other New fire station

5. Applicant Information

Name: Frank Angelo

Company: Angelo Planning Group

Address: 921 SW Washington Ave. Suite 468

City, State, Zip: Portland, OR 97205

Phone/Fax: 503-649-8577

E-Mail: fangelo@angeloplanning.com

6. Will the project involve any off-site work? Yes No Unknown

Location and description of off-site work _____

7. Additional comments or information that may be needed to understand your project Site plan and tax map are attached.

This application does NOT replace Grading and Erosion Control Permits, Connection Permits, Building Permits, Site Development Permits, DEQ 1200-C Permit or other permits as issued by the Department of Environmental Quality, Department of State Lands and/or Department of the Army COE. All required permits and approvals must be obtained and completed under applicable local, state, and federal law.

By signing this form, the Owner or Owner's authorized agent or representative, acknowledges and agrees that employees of Clean Water Services have authority to enter the project site at all reasonable times for the purpose of inspecting project site conditions and gathering information related to the project site. I certify that I am familiar with the information contained in this document, and to the best of my knowledge and belief, this information is true, complete, and accurate.

Print/Type Name Frank Angelo

Print/Type Title Principal

Signature _____

Date Oct. 18, 2017

FOR DISTRICT USE ONLY

Sensitive areas potentially exist on site or within 200' of the site. **THE APPLICANT MUST PERFORM A SITE ASSESSMENT PRIOR TO ISSUANCE OF A SERVICE PROVIDER LETTER.** If Sensitive Areas exist on the site or within 200 feet on adjacent properties, a Natural Resources Assessment Report may also be required.

Based on review of the submitted materials and best available information Sensitive areas do not appear to exist on site or within 200' of the site. This Sensitive Area Pre-Screening Site Assessment does NOT eliminate the need to evaluate and protect water quality sensitive areas if they are subsequently discovered. This document will serve as your Service Provider letter as required by Resolution and Order 17-05, Section 3.02.1. All required permits and approvals must be obtained and completed under applicable local, State, and federal law.

Based on review of the submitted materials and best available information the above referenced project will not significantly impact the existing or potentially sensitive area(s) found near the site. This Sensitive Area Pre-Screening Site Assessment does NOT eliminate the need to evaluate and protect additional water quality sensitive areas if they are subsequently discovered. This document will serve as your Service Provider letter as required by Resolution and Order 17-05, Section 3.02.1. All required permits and approvals must be obtained and completed under applicable local, state and federal law.

This Service Provider Letter is not valid unless _____ CWS approved site plan(s) are attached.

The proposed activity does not meet the definition of development or the lot was platted after 9/9/95 ORS 92.040(2). NO SITE ASSESSMENT OR SERVICE PROVIDER LETTER IS REQUIRED.

Reviewed by Chuck Marshall

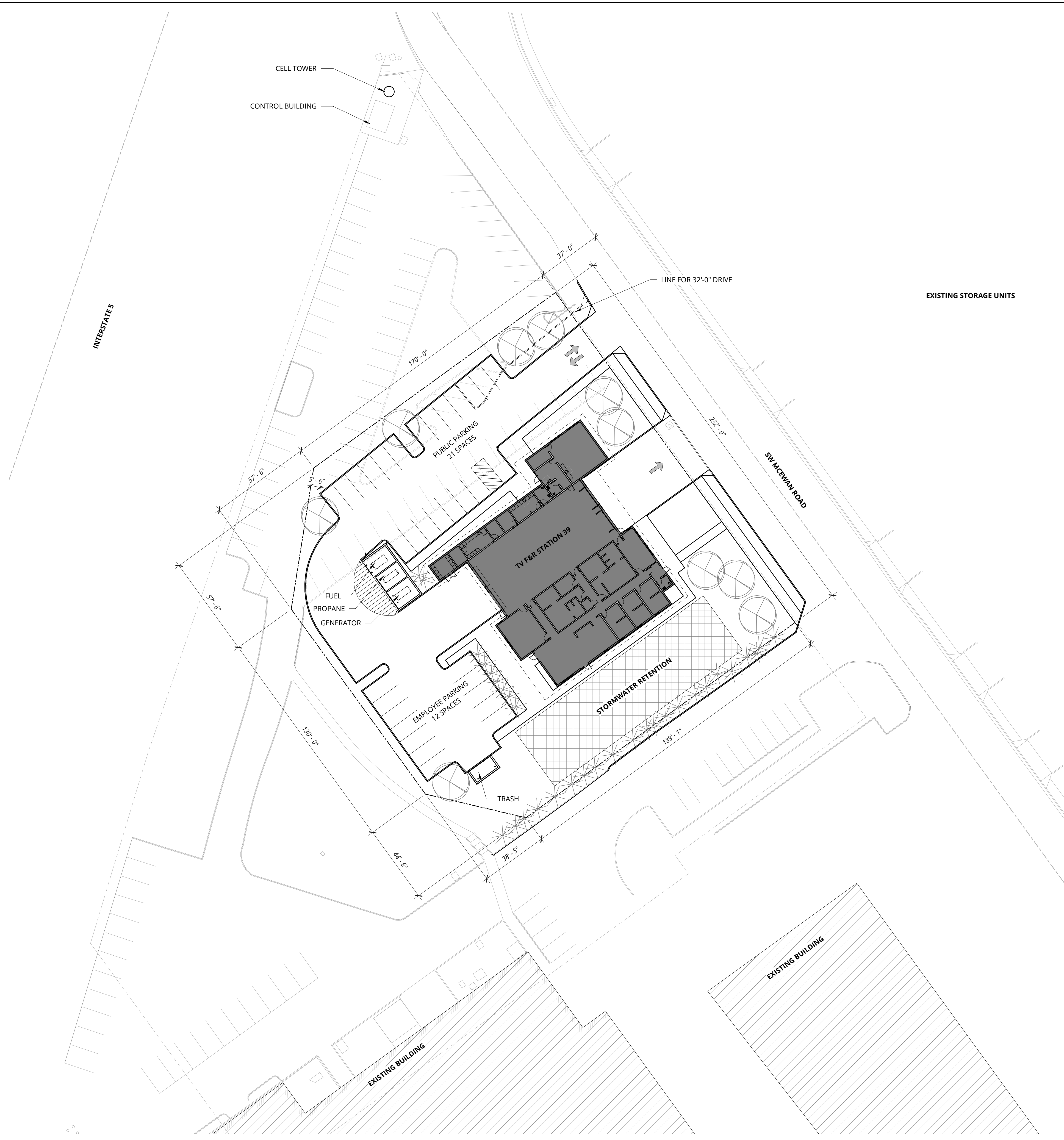
Date 10/31/17

Once complete, email to: SPLReview@cleanwaterservices.org • Fax: (503) 681-4439

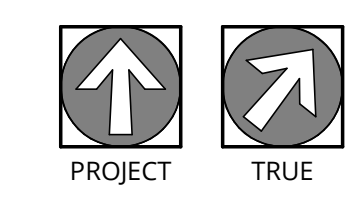
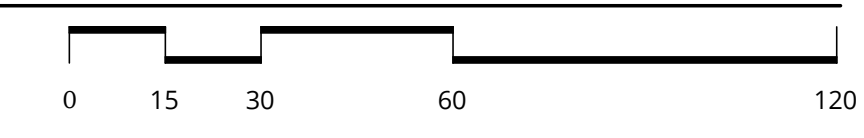
OR mail to: SPL Review, Clean Water Services, 2550 SW Hillsboro Highway, Hillsboro, Oregon 97123

10/16/2017 1:46:45 PM

C:\Revt\Projects\173470_17-TVFR 39\173470_17-TVFR 39.mxd



1 ARCHITECTURAL SITE PLAN
1" = 30'-0"



NOT FOR CONSTRUCTION



38 NORTHWEST DAVIS, SUITE 300
PORTLAND, OR 97209
T 503.245.7100

1505 5TH AVE, SUITE 300
SEATTLE, WA 98101
T 206.576.1600

1014 HOWARD STREET
SAN FRANCISCO, CA 94103
T 415.252.7063
© ANKROM MOISAN ARCHITECTS, INC.

TV F&R STATION 39 - TUALATIN
7100 SW MCEWAN
TUALATIN, OR 97062

TUALATIN VALLEY FIRE & RESCUE

REVISION	DATE	REASON FOR ISSUE

SITE PLAN

SCHEMATIC DESIGN

DATE 10/16/2017 PROJECT NUMBER 173470

SHEET NUMBER **A1.01**

SE 1/4 SE 1/4 SECTION 13 T2S R1W W.M.

WASHINGTON COUNTY OREGON

SCALE 1"=100'

2S | 13DD

KENNY STREET

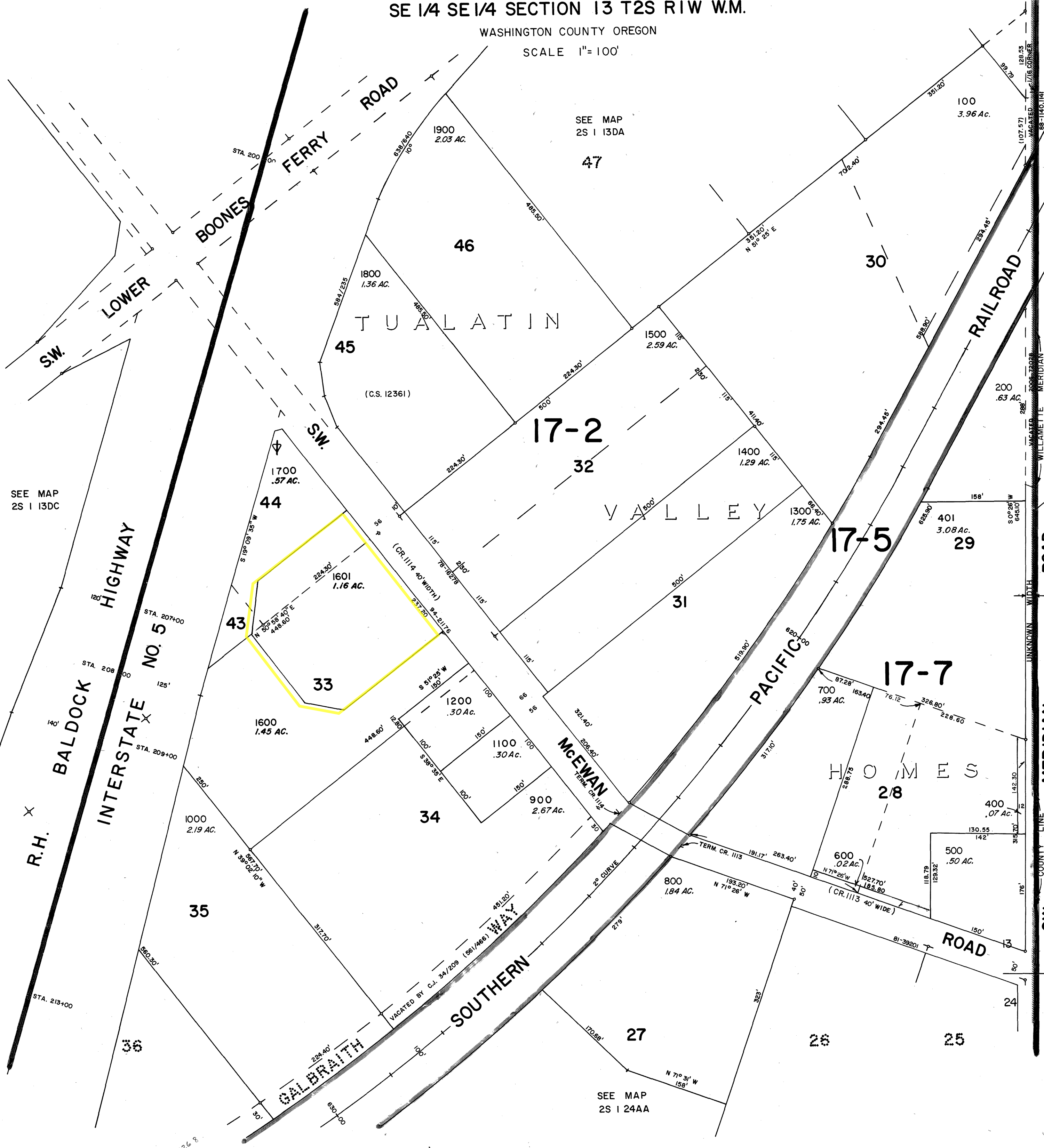
CANCELLED TAX LOTS
300,1700-C1

COUNTY

CLACKAMAS

LAKE OSWEGO
TUALATIN
2S | 13DD

FOR ASSESSMENT
PURPOSES ONLY
DO NOT RELY ON
FOR ANY OTHER USE



SEE MAP
2S | 13DA

SEE MAP
2S | 13DC

SEE MAP
2S | 24AA

5-5-83

[Handwritten signature]

SE 1/4 SE 1/4 SECTION 13 T2S R1W W.M.

2S 1 13DD

WASHINGTON COUNTY OREGON

SCALE 1"=100'

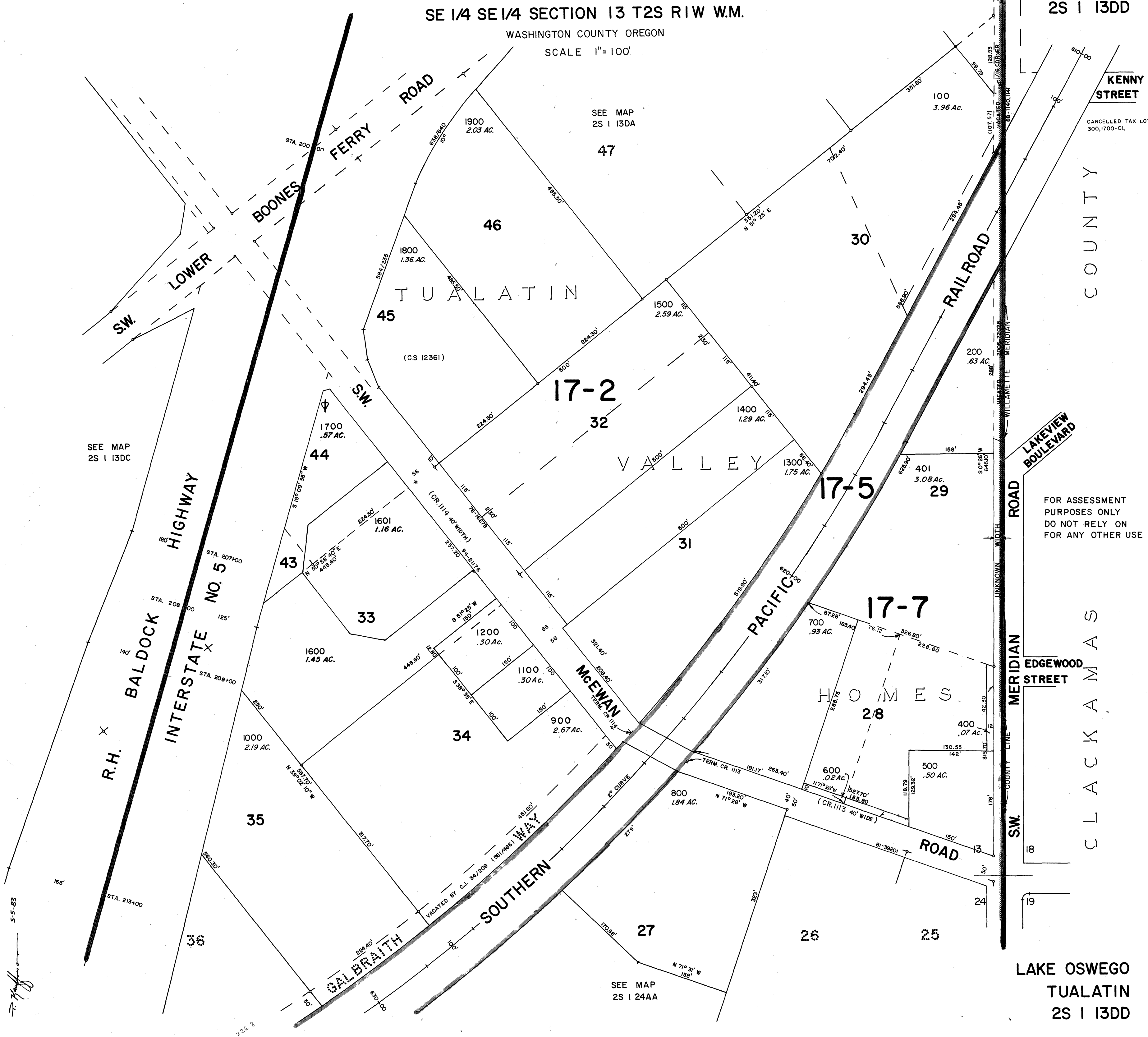
KENNY STREET

CANCELLED TAX LOTS 300,1700-CI

COUNTY

CLACKAMAS

LAKE OSWEGO TUALATIN 2S 1 13DD



SEE MAP 2S 1 13DC

SEE MAP 2S 1 13DA

SEE MAP 2S 1 24AA

FOR ASSESSMENT PURPOSES ONLY DO NOT RELY ON FOR ANY OTHER USE

5-5-83

[Handwritten signature]

**NEIGHBORHOOD/DEVELOPER MEETING
AFFIDAVIT OF MAILING**

STATE OF OREGON)
) SS
COUNTY OF WASHINGTON)

I, Clinton Dorse, being first duly sworn, depose and say:

That on the 24 day of October, 2017, I served upon the persons shown on Exhibit "A," attached hereto and by this reference incorporated herein, a copy of the Notice of Neighborhood/Developer meeting marked Exhibit "B," attached hereto and by this reference incorporated herein, by mailing to them a true and correct copy of the original hereof. I further certify that the addresses shown on said Exhibit "A" are their regular addresses as determined from the books and records of the Washington County and/or Clackamas County Departments of Assessment and Taxation Tax Rolls, and that said envelopes were placed in the United States Mail with postage fully prepared thereon.



Signature

SUBSCRIBED AND SWORN to before me this 29th day of November, 2017.





Notary Public for Oregon
My commission expires:

RE: TVF+R Station 39



Dear Resident/Property Owner,

Tualatin Valley Fire & Rescue (TVF&R) is proposing to develop a new fire station (Station 39) on SW McEwan Road south of SW Boones Ferry Road. The new station will be approximately 7,500 square feet and include a 600-square foot community room. The building will house the station's firefighters and have an interior two-space parking bay for fire trucks and necessary emergency apparatus. Station 39 will include 24-hour staffing starting with 4 persons per shift and ultimately growing to 6-person shifts.

The 1.16-acre site is within the City of Tualatin's Light Manufacturing Planning District (ML). New fire stations are permitted in the ML Planning District through a Conditional Use Permit and Architectural Review. The Conditional Use will require submittal of an application to the City for review and approval by the City Council. A pre-application conference was held for the project on September 20, 2017. Following Conditional Use review an Architectural Review application will be submitted for construction of the new station. This application will be reviewed by staff.

As specific engineering and site plans are being prepared and before submitting the application for the necessary reviews and approvals, we would like to discuss the proposal with the surrounding property owners and residents. In accordance with City requirements, we are conducting a Neighborhood Meeting on the following date and at the following location:

Tuesday, November 7th, 2017

6:00 – 7:00 pm

Juanita Pohl Center

8513 SW Tualatin Road

Tualatin, Oregon 97062

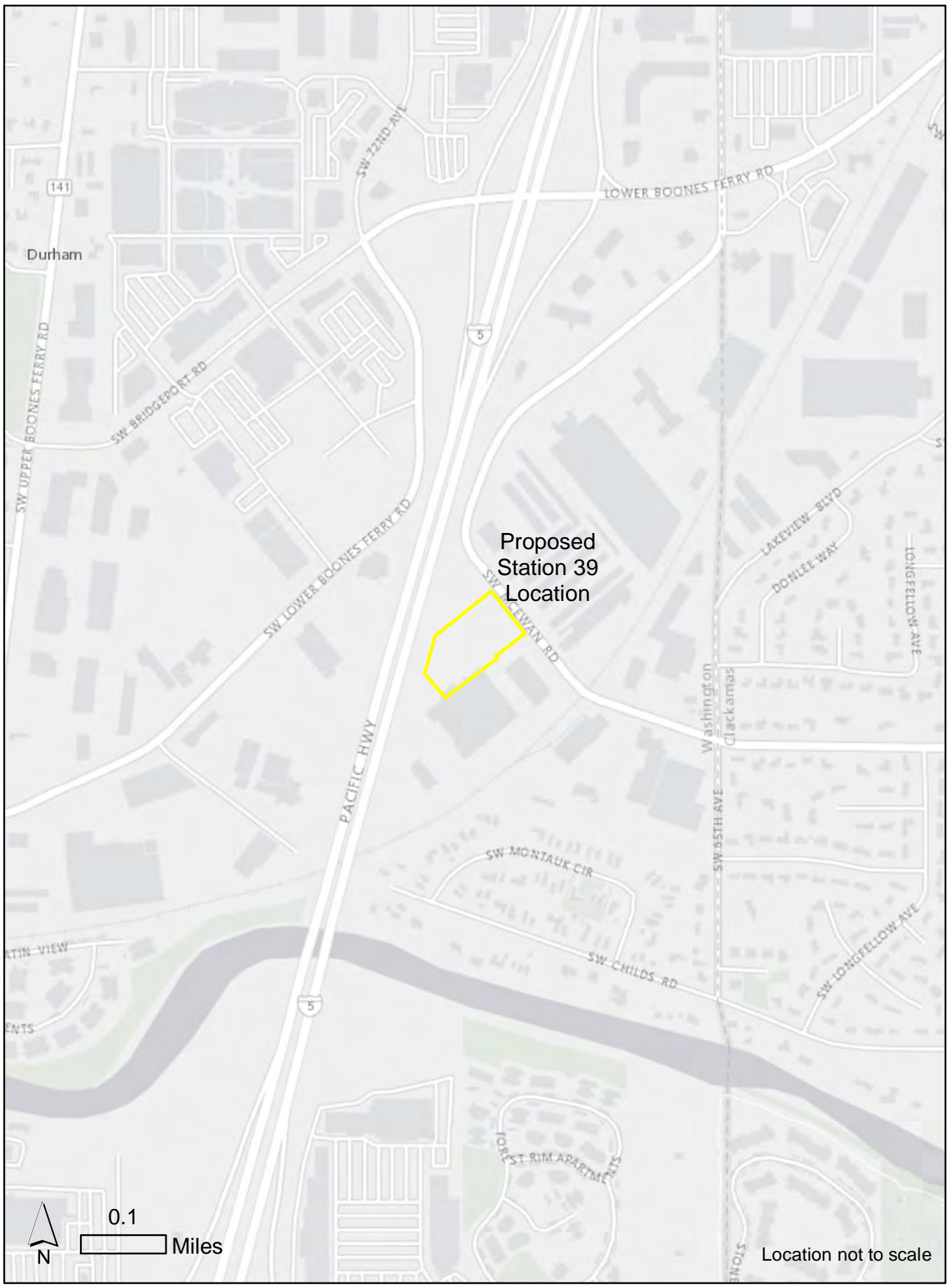
We look forward to discussing the proposal with you. Please feel free to contact the project's development application representative, at 503-227-3664 or fangelo@angeloplanning.com if you have any questions.

Sincerely,

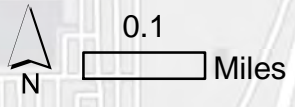
A handwritten signature in black ink, appearing to read 'Frank Angelo'.

Frank Angelo, Principal

Attachment: Vicinity/Location Map



Proposed
Station 39
Location



Location not to scale

NEIGHBORHOOD / DEVELOPER MEETING CERTIFICATION OF SIGN POSTING

<p style="text-align: center;">NOTICE</p> <p style="text-align: center;">NEIGHBORHOOD / DEVELOPER MEETING</p> <p style="text-align: center;">__/__/2010 __:__.m.</p> <p style="text-align: center;">SW _____</p> <p style="text-align: center;">503-____-____</p>	18"
---	-----

24"

In addition to the requirements of TDC 31.064(2) quoted earlier in the packet, the 18" x 24" sign that the applicant provides must display the meeting date, time, and address and a contact phone number. The block around the word "NOTICE" must remain **orange** composed of the **RGB color values Red 254, Green 127, and Blue 0**. Additionally, the potential applicant must provide a flier (or flyer) box on or near the sign and fill the box with brochures reiterating the meeting info and summarizing info about the potential project, including mention of anticipated land use application(s). Staff has a Microsoft PowerPoint 2007 template of this sign design available through the Planning Division homepage at < www.tualatinoregon.gov/planning/land-use-application-sign-templates >.

As the applicant for the
TVF+R Station 39 project, I

hereby certify that on this day, October 24, 2017 sign(s) was/were posted on the subject property in accordance with the requirements of the Tualatin Development Code and the Community Development Department - Planning Division.

Applicant's Name: Clinton Daxsee, Angela Planning Group
(PLEASE PRINT)

Applicant's Signature: [Signature]

Date: 11/29/17

NOTICE

NEIGHBORHOOD / DEVELOPER MEETING

11/7/2017 6:00 p.m.

8513 SW Tualatin Road

503-227-3664.

TVF&R Station 39 Neighborhood/Developer Meeting Notice Sign posted on site.





MEMORANDUM

TVF&R Station 39 Neighborhood Meeting Notes

DATE November 9, 2017
TO Project Team
FROM Frank Angelo, APG
CC

The Station 39 Neighborhood Meeting for the land use application was held on Tuesday, November 7, 2017 at the Juanita Pohl Center, 8513 SW Tualatin Road, Tualatin, Oregon 97062. The meeting Agenda, Sign-in Sheet and Illustrations presented at the meeting are attached to this meeting summary.

Project team attendance:

- TVF&R: Assistant Chief Havener, Siobhan Kirk
- APG: Frank Angelo
- Ankrom Moisan Architects: Michael Bonn
- AKS: Bruce Baldwin
- Lancaster Engineering: Todd Mobley

City of Tualatin Staff in attendance:

- Charles Benson, Planner

Frank Angelo introduced the Neighborhood Meeting and turned it over to Assistant Chief Havener to introduce the project and discuss the site selection, project funding and station operations.

Frank Angelo reviewed the land use application process and schedule for application submittal, noting the following.

- Tonight's meeting is a part of the city's land use application process. We are preparing a Conditional Use first, then an Architectural Review 2 land use application to demonstrate how the project complies with the City's CU Review Criteria.
- The Conditional Use application will address the use of the property and be presented at a City Council public hearing.

- The second application will follow Conditional Use approval and will be the Architectural Review application.
- The AR application will demonstrate how the project meets the City's design requirements and standards.
- The AR application will be reviewed and approved by staff. The application does not require review/approval by the Planning Commission.
- We expect to file the Conditional Use application in November.
- You received direct notice of tonight's meeting because you are within 1000' of the project site. Following submittal of the CU application you will receive notice of the Planning Commission hearing date/time.

Michael Bonn, Ankrom Moisan Architects, reviewed the site plan and building design elements.

- Michael provided an overview of site design considerations and key features.
- Stepped through the site plan, access to the site, on-site circulation, stormwater treatment, and landscaping.
- Station 39 will be similar in design to Station 55 currently under construction in West Linn.
- Staffing will be 4 full-time staff (24-hour shifts) with room to expand to 6 full-time staff.
- Michael noted the 600 sf Community Room and its availability to the residents for meetings.

Questions from the audience:

1. Discuss the landscaping that will be provided.
2. Question regarding the location of the driveway to SW McEwen and its proximity to the existing cell tower.
3. Where is the station in relation to the Legacy Medical office?
4. Has the design considered flooding and debris flows from Scoggins Dam?
5. Where is this site in relation to the Lake Oswego Fire District boundary?
6. Is there an agreement (Mutual Aid Agreement) between TVF&R and LOFD?
7. Is the building being constructed to address emergency preparedness? Design will include seismic enhancements.
8. Will TVF&R assist with HazMat calls?

The meeting adjourned at 7:00pm.

Attachments: Meeting Agenda; Sign-In Sheet; Project Illustrations



**Tualatin Valley Fire & Rescue Station 39
Neighborhood / Developer Meeting
Tuesday, November 7th, 2017
6:00 – 7:00 pm
Juanita Pohl Center
8513 SW Tualatin Road
Tualatin, Oregon 97062**

Agenda

1. Welcome / Meeting Overview – Frank Angelo, Angelo Planning Group
2. Introduction from TVF&R – Assistant Chief Mark Havener
3. Land Use Application – Frank Angelo
4. Site Plan– Michael Bonn, Ankrom Moisan Architects
5. Audience Questions / Comments – All

TVF&R Station 39 Neighborhood Meeting



November 7, 2017

6:00 pm – 7:00 pm

Juanita Pohl Center

8513 SW Tualatin Road

Tualatin, OR 97062

Name	Address	Email Address
Frank Angelo		
Bruce Bradman		
TODD MORSEY		
Shannon Martin		
Kim Merow		
MICHAEL BONN		
CHARLES BENSON		
LARRY SILVER - BURD		
"		
Ward Havenon		
Siobhan Kirk		
Sherry Patterson		
ALLEN PATTERSON		

INTERSTATE 5

LINE FOR 32'-0" DRIVE
PROPERTY LINE

170'-0"

37'-0"

232'-0"

SW MCEWAN ROAD

PUBLIC PARKING
21 SPACES

**TVF&R
STATION 39**

PROPANE
GENERATOR
FUEL

EMPLOYEE PARKING
12 SPACES

STORMWATER RETENTION

TRASH

189'-1"

57'-6"

57'-6"

5'-6"

130'-0"

44'-6"

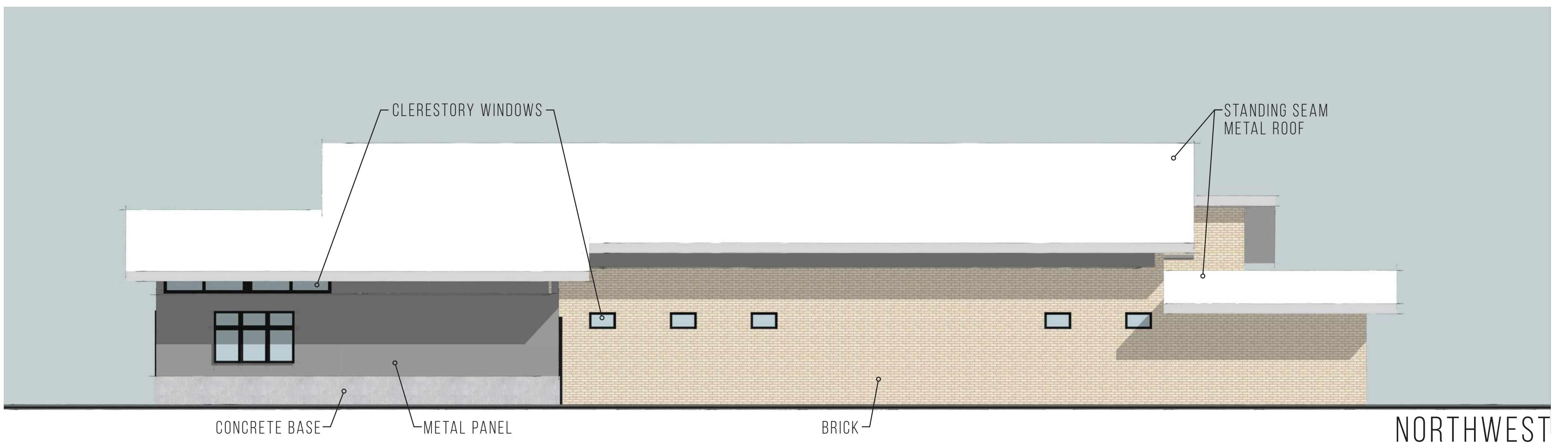
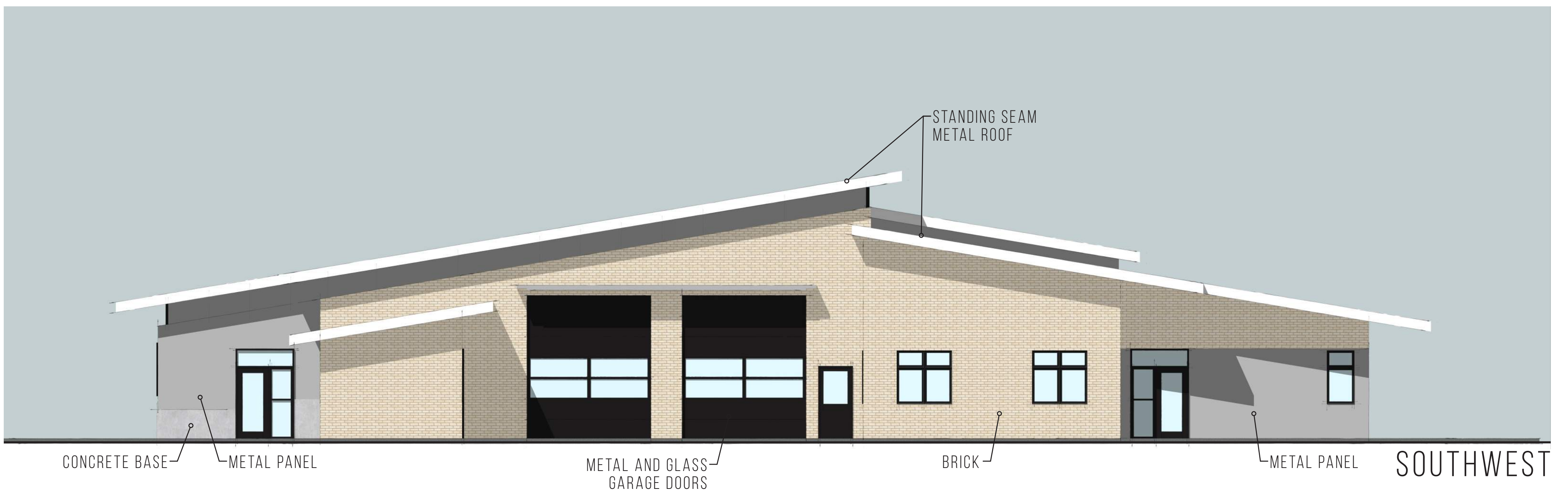
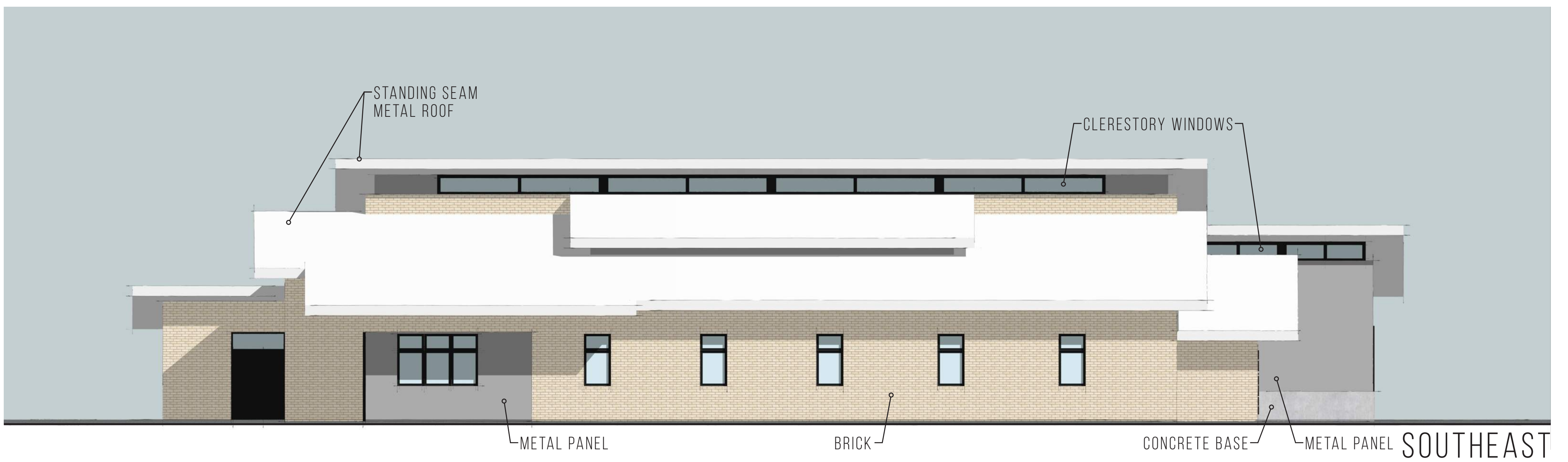
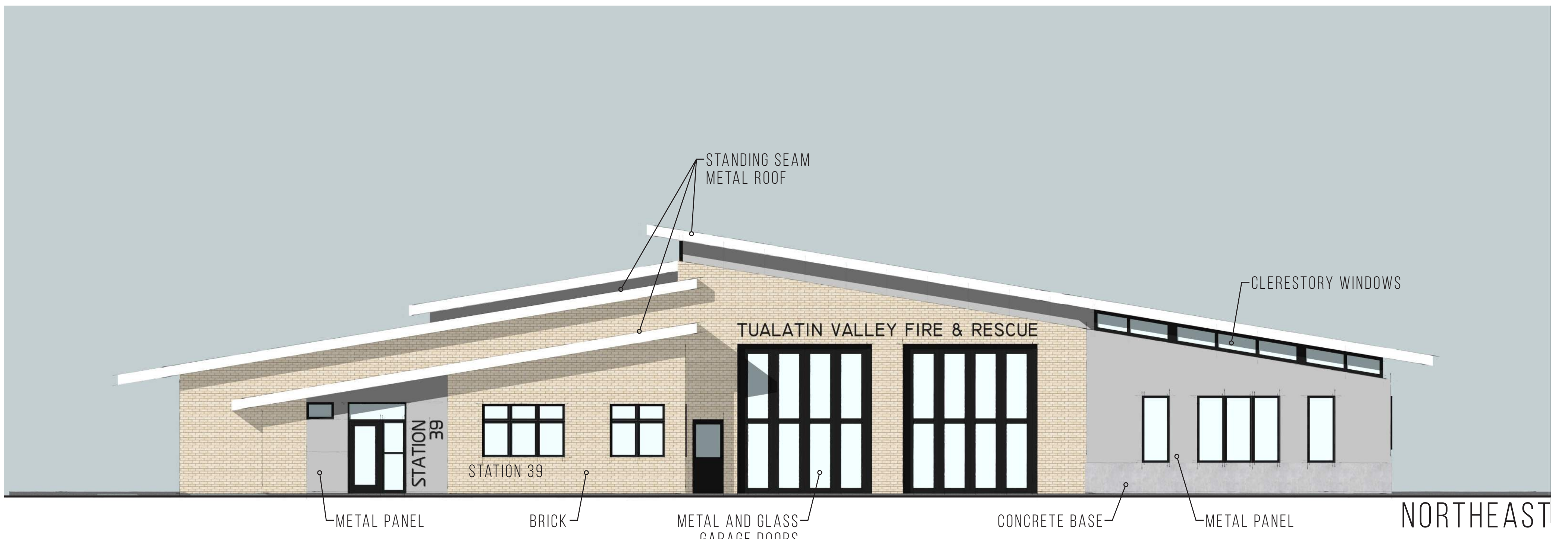
38'-5"

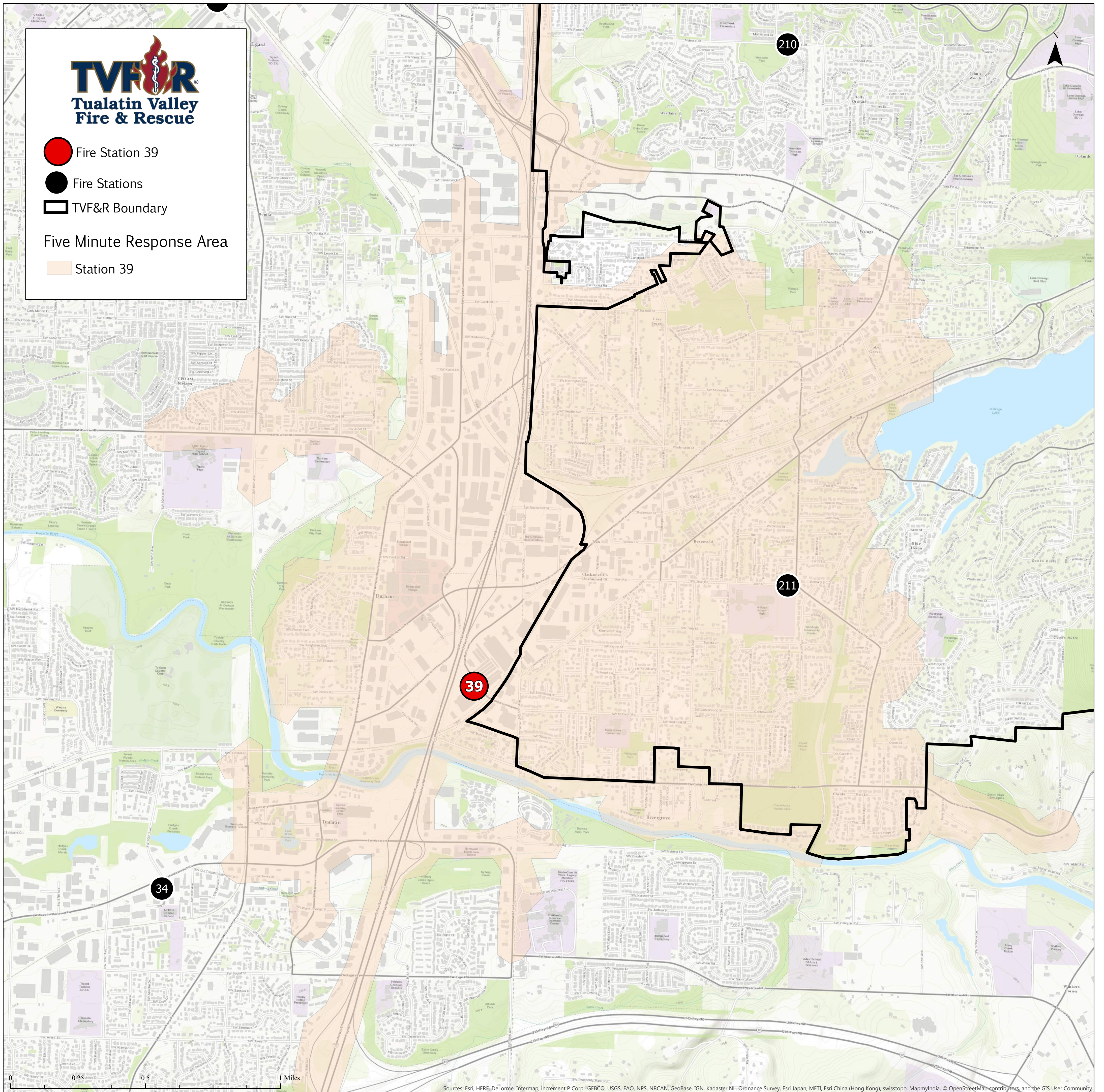


FIRE STATION 39

TUALATIN / 11.07.2017







Tualatin Valley Fire & Rescue Station #39 Rivergrove

Transportation Impact Study
Tualatin, Oregon

Date:

December 7, 2017

Prepared for:

Tualatin Valley Fire & Rescue

Prepared by:

Daniel Stumpf, EI

Todd Mobley, PE



RENEWS: 12/31/18



**LANCASTER
ENGINEERING**

1e

Table of Contents

Executive Summary	1
Project Description and Location	2
Introduction	2
Project and Location Description	2
Vicinity Streets	2
Study Intersections	3
Transit	3
Traffic Counts	4
Site Trips	7
Trip Generation	7
Trip Distribution	8
Future Traffic Volumes	10
Background Volumes	10
Background Volumes plus Site Trips	10
Safety Analysis	13
Crash Data Analysis	13
Sight Distance Analysis	13
Warrant Analysis	15
Driveway Width	15
Operational Analysis	18
Capacity Analysis	18
Conclusions	20
Appendix	21

Table of Figures

Figure 1 – Vicinity Map 5
Figure 2 – Existing Conditions 6
Figure 3 – Site Trip Assignment 9
Figure 4 – Year 2019 Background Conditions 11
Figure 5 – Year 2019 Background Conditions plus Site Trips 12
Figure 6 – Turning Movement Analysis (Northbound Entering Vehicle) 16
Figure 7 – Turning Movement Analysis (Southbound Entering Vehicle) 17

Table of Tables

Table 1 – Vicinity Roadway Descriptions 3
Table 1 – Trip Generation Summary 7
Table 2 – Capacity Analysis Summary 19

Executive Summary

1. The Tualatin Valley Fire & Rescue Station #39 – Rivergrove, has been proposed for development on a property located near 7100 SW McEwan Road in Tualatin, Oregon.
2. The trip generation calculations show that the proposed development is projected to generate twelve site trips during the morning peak hour and four site trips during the evening peak hour.
3. No significant trends or crash patterns were identified at any of the study intersections. Accordingly, no specific safety mitigation is recommended.
4. Adequate sight distance is available at both site accesses to ensure safe operation of each proposed intersection along SW McEwan Road. No sight distance mitigation is necessary or recommended.
5. Left-turn lane warrants are not projected to be met at either site access intersection under any of the analysis scenarios through the 2019 build-out year. No new turn lanes are necessary or recommended.
6. Due to insufficient main and side-street traffic volumes, traffic signal warrants are not projected to be met at the intersection of SW 65th Avenue at SW McEwan Road under any of the analysis scenarios.
7. Based on a turning-movement analysis, a driveway width of 24 feet is sufficient to accommodate entering emergency response vehicles at the north site access intersection.
8. All study intersections are currently operating acceptably per their respective jurisdictional standards and are projected to continue operating acceptably upon build-out of the proposed development through year 2019. No operational mitigation is necessary or recommended at these intersections.



Project Description and Location

Introduction

The Tualatin Valley Fire & Rescue (TVF&R) Station #39 – Rivergrove, has been proposed for development on a property located near 7100 SW McEwan Road in Tualatin, Oregon. This report addresses the impacts of the proposed development on the nearby street system. The study includes safety and capacity/level-of-service analyses at the following intersections:

- SW 65th Avenue at SW Lower Boones Ferry Road;
- Proposed north site access at SW McEwan Road;
- Proposed south site access at SW McEwan Road; and
- SW 65th Avenue at SW McEwan Road.

The purpose of this study is to determine whether the transportation system within the vicinity of the site is capable of safely and efficiently supporting the existing and proposed uses and to determine any mitigation that may be necessary to do so. Detailed information on traffic counts, trip generation calculations, safety analyses, and level of service calculations is included in the appendix to this report.

Project and Location Description

The project site is located southwest of SW McEwan Road and east of Interstate 5 (I-5) in Tualatin, Oregon. The subject site is surrounded by a mix of land-uses, with a medical clinic to the north, a U-Haul facility to the south, and self-storage facilities to the east. Two notable developments within a half-mile walking/biking distance of the site include the Meridian Square Shopping Mall to the north and River Grove Elementary School to the east.

Access to the site will be provided via two driveways along SW McEwan Road: a two-way access to the north and an emergency response vehicle egress access to the south.

Vicinity Streets

The proposed development is expected to predominantly impact three nearby vicinity roadways: SW Lower Boones Ferry Road, SW McEwan Road, and SW 65th Avenue. Table 1 provides a description of each of the vicinity roadways.

Table 1 – Vicinity Roadway Descriptions

Roadway	Jurisdiction	Functional Classification	Cross-Section	Speed	On-street Parking	Bicycle Lanes	Curbs	Sidewalks
SW Lower Boones Ferry Road	Clackamas County	Arterial	5 to 8 Lanes	35 mph Posted	Not Permitted	Both Sides	Both Sides	Both Sides
SW McEwan Road	City of Tualatin	Major Collector/Local Street	2 to 3 Lanes	25/30 mph Posted	Partially Permitted	Partial Both Sides	Partial Both Sides	Partial Both Sides
SW 65th Avenue	City of Tualatin	Neighborhood Collector/Major Collector	2 to 4 Lanes	25/30 mph Posted	Permitted	None	Partial Both Sides	Partial Both Sides

Study Intersections

The intersection of SW 65th Avenue at SW Lower Boones Ferry Road is a four-legged intersection that is controlled by a traffic signal. The northbound approach has one left-turn lane and one shared lane for all turning-movements. The southbound approach has one shared left-turn/through lane and one right-turn lane served with permitted/overlap phasing. The northbound and southbound approaches operate under split phasing. The eastbound approach has one left-turn lane served with protected phasing, two through lanes, one right-turn lane served with permitted/overlap phasing, and a bicycle lane situated in between the outermost through and right-turn lanes. The westbound approach has one left-turn lane served with protected phasing, two through lanes, one shared through/right-turn lane, and a bicycle lane to the right of the outermost standard travel lane. Crosswalks are marked across all four intersection legs.

The intersection of SW 65th Avenue at SW McEwan Road is a four-legged intersection that is all-way stop-controlled. All four intersection approaches each have one shared lane for all turning-movements. Crosswalks are unmarked across all four intersection legs.

A vicinity map displaying the project site, vicinity streets, and the study intersections with their associated lane configurations is shown in Figure 1 on page 5.

Transit

The project site is located near two transit lines that have stops within a half-mile walking/biking distance north of the site, just east of the intersection of SW 65th Avenue at SW Lower Boones Ferry Road. Complete sidewalks and adequate crossing measures at intersections are available between the project site and each of the transit stop locations allowing for safe and comfortable travel for transit users.

TriMet bus line #36 – *South Shore*, provides service between Tualatin Park & Ride and Portland City Center, with notable stops near Lake Oswego Transit Center, Lake Oswego Library, and Johns Landing. Weekday service is scheduled from approximately 7:00 AM to 7:15 PM and has headways of approximately 30 to 100 minutes.

TriMet bus line #37 – *Lake Grove*, provides service between Tualatin Park & Ride and Lake Oswego Transit Center, with notable stops near Lake Oswego High School and Lake Oswego Library. Weekday service is scheduled from approximately 7:00 AM to 5:30 PM and has headways of approximately 50 to 100 minutes.

Traffic Counts

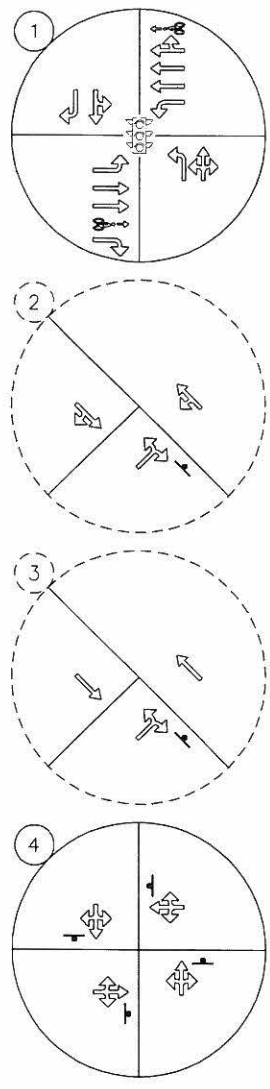
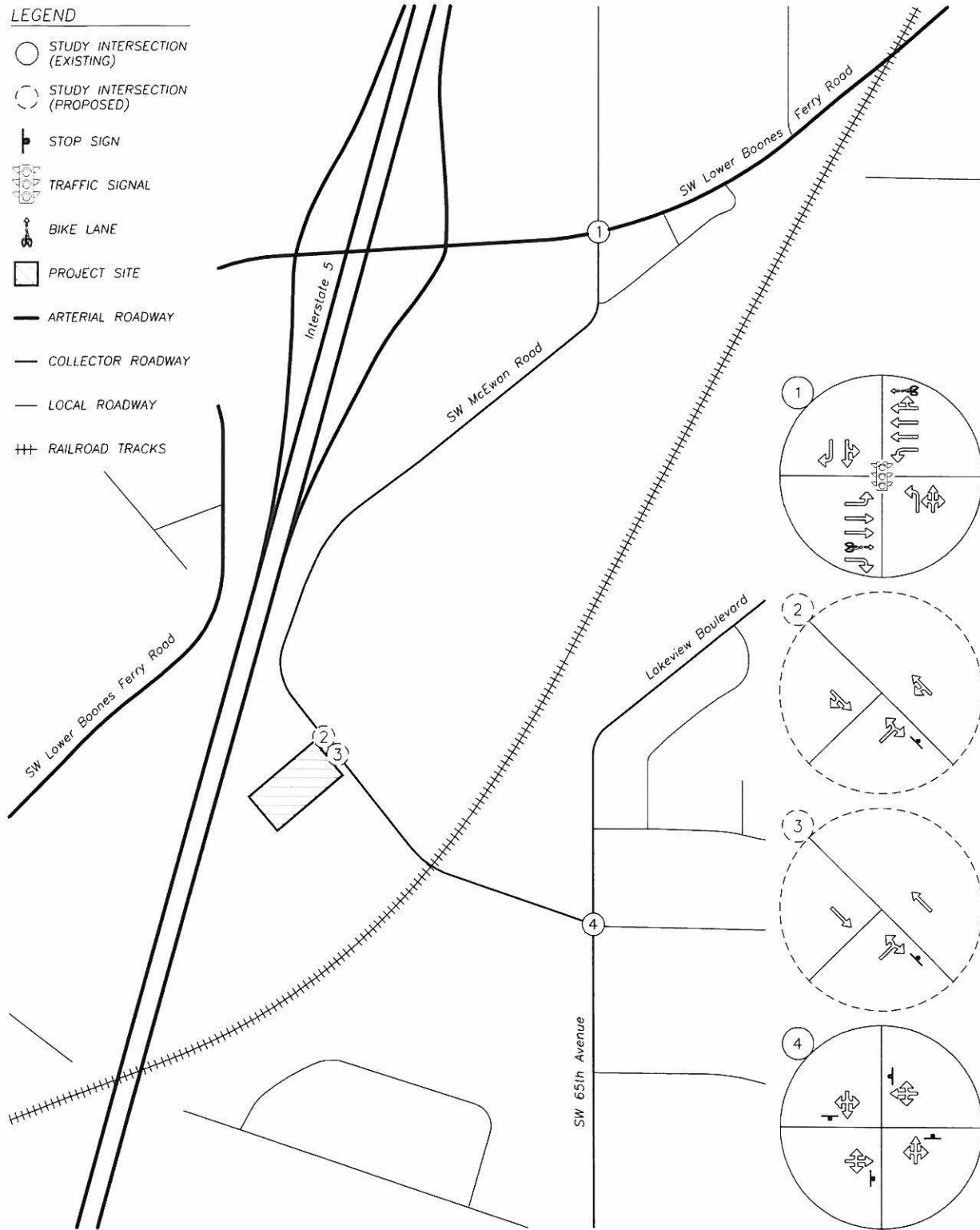
Traffic counts were conducted at the intersection of SW 65th Avenue at SW Lower Boones Ferry Road on Wednesday, November 15th, 2017 and at the intersection of SW 65th Avenue at SW McEwan Road on Tuesday, November 28th, 2017, from 7:00 AM to 9:00 AM and from 4:00 PM to 6:00 PM. Data was used from each intersection's respective morning and evening peak hours.

To determine through volumes along SW McEwan Road at the site access locations, traffic volumes were balanced with the intersections of SW 65th Avenue at SW Lower Boones Ferry Road and at SW 65th Avenue at SW McEwan Road. The highest directional volumes to/from each intersection were utilized, which subsequently provides a conservative assessment of operation at the site access intersections.

Figure 2 on page 6 shows the existing morning and evening peak hour traffic volumes at the study intersections.

LEGEND

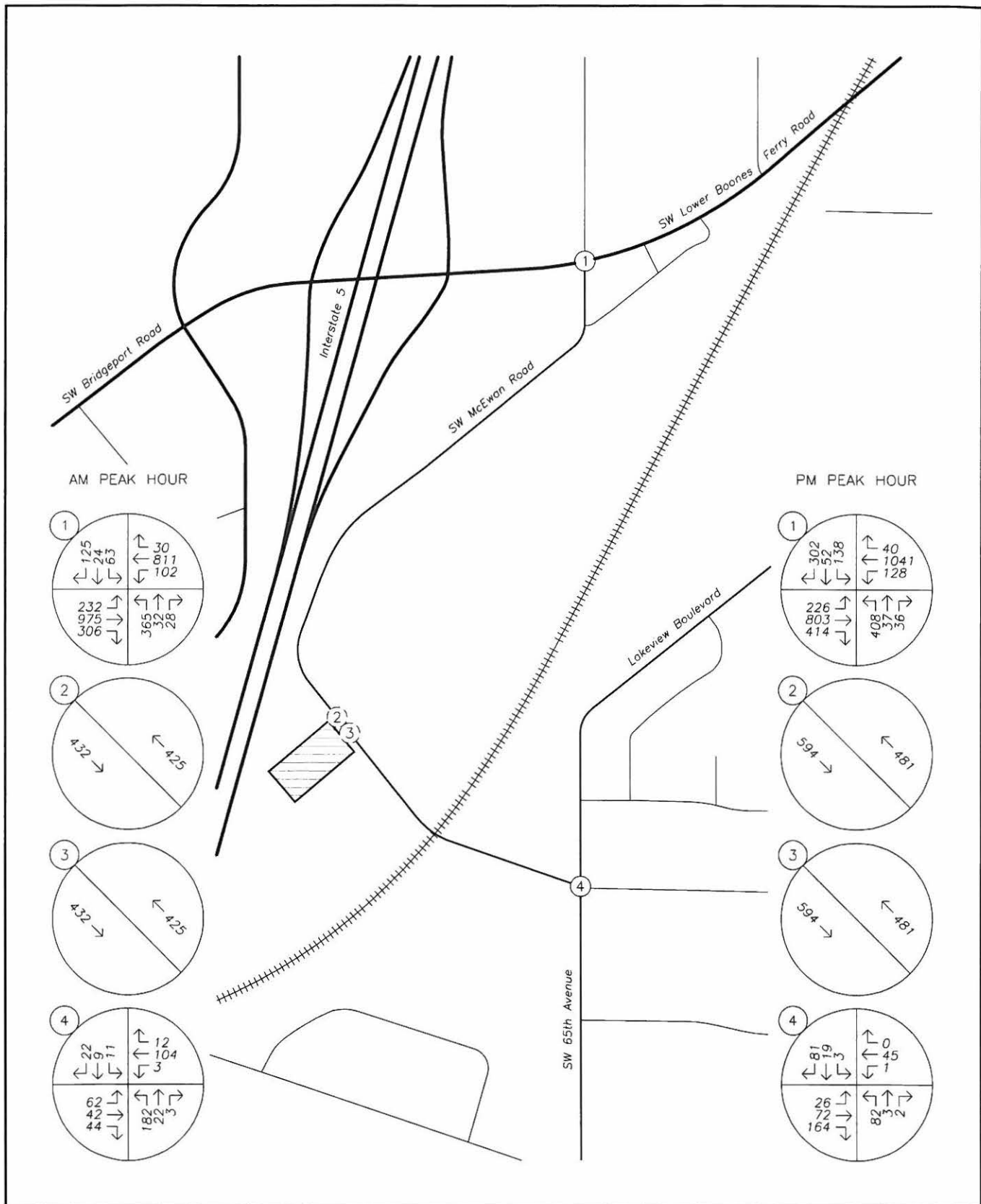
- STUDY INTERSECTION (EXISTING)
- STUDY INTERSECTION (PROPOSED)
- ⊥ STOP SIGN
- ⊞ TRAFFIC SIGNAL
- 🚲 BIKE LANE
- ▭ PROJECT SITE
- ARTERIAL ROADWAY
- COLLECTOR ROADWAY
- LOCAL ROADWAY
- ⊕⊕ RAILROAD TRACKS



VICINITY MAP



FIGURE 1
PAGE 5



TRAFFIC VOLUMES
Existing Conditions
AM & PM Peak Hours



2e

Site Trips

Trip Generation

No comparable land-use category exists in the *TRIP GENERATION MANUAL*¹ for fire stations; therefore, the size and operation of the facility was examined in order to best estimate the trip generation of the station. The trip generation calculations shown below are supported by trip data collected at other similar TVF&R stations. The proposed Station #39 is designed for a crew size of six full-time employees. Shifts for full-time employees are 24 hours in duration and shift changes will occur at 7:00 AM. The majority of site trips during the morning peak hour are typically generated from employees. Additional trips corresponding to visitors, deliveries, and emergency response services are also accounted for.

It is estimated that the proposed station will generate a total of twelve morning peak hour site trips, with six employees entering and exiting the site. During the evening peak hour, the site is expected to generate a nominal number individual employee trips to the site; however, two trips entering and exiting the site were included to account for visitors, deliveries, and other miscellaneous traffic. Usage of the TVF&R's Community Room will typically occur after the evening peak hour; therefore, trips generated by the Community Room will increase site's total daily trip generation while not increasing morning or evening peak hour trip generation.

The trip generation estimates of the proposed TVF&R facility are summarized in Table 2 below.

Table 2 – Trip Generation Summary

	Size	Morning Peak Hour			Evening Peak Hour			Weekday Total
		Enter	Exit	Total	Enter	Exit	Total	
Proposed TVF&R #39								
Employee Shift Change	6 Employees	6	6	12	0	0	0	12
Community Room	15 People	0	0	0	0	0	0	20
Emergency Calls	4 Events	0	0	0	0	0	0	8
Non-Emergency Calls	2 Events	0	0	0	0	0	0	4
Visitors, Deliveries, etc	5 People	0	0	0	2	2	4	10
Total		6	6	12	2	2	4	54

¹ Institute of Transportation Engineers (ITE). *TRIP GENERATION MANUAL*, 9th Edition, 2012.

Trip Distribution

TVF&R Station #39 – Rivergrove will predominately serve residents in the surrounding areas of Tualatin, Lake Oswego, and unincorporated Washington and Clackamas Counties. Areas within the site vicinity, particularly the neighborhoods to the east and northeast of the site, generate a significant number of emergency response calls. Non-emergency trips, such as employee commuting, visitors, deliveries, etc, are more likely to travel to/from SW Lower Boones Ferry Road and I-5.

The directional distribution of peak hour site trips to/from the proposed development was estimated based on locations of likely trip destinations, locations of major transportation facilities within the site vicinity, and existing travel patterns at study intersections.

The following trip distribution was estimated and used for analysis:

- Approximately 60 percent of site trips will travel to/from the west along SW Lower Boones Ferry Road;
- Approximately 15 percent of site trips will travel to/from the east along SW Lower Boones Ferry Road;
- Approximately 10 percent of site trips will travel to/from the east along SW McEwan Road;
- Approximately 10 percent of site trips will travel to/from the south along SW 65th Avenue; and
- Approximately 5 percent of site trips will travel to/from the north along SW 65th Avenue.

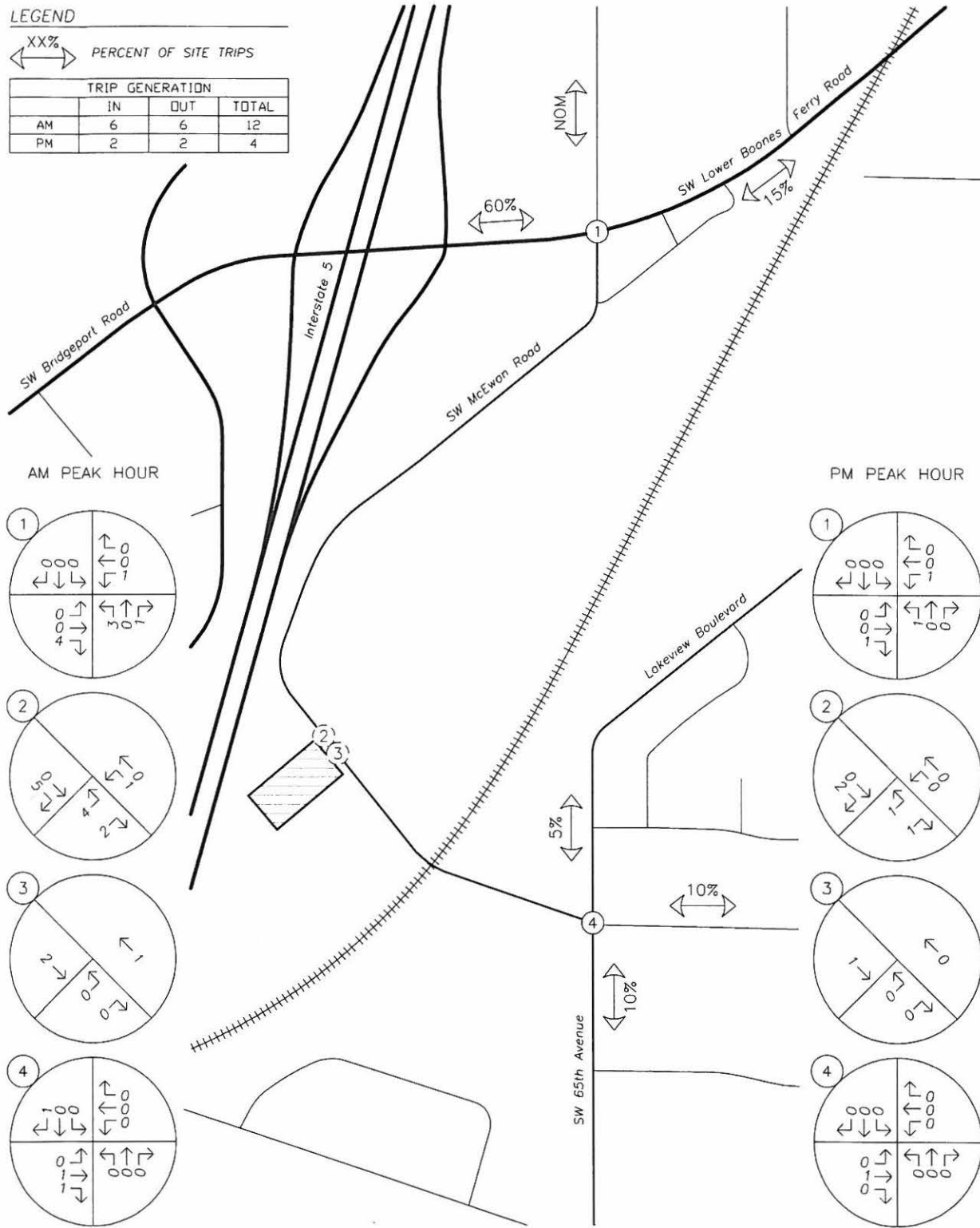
The proposed development will be served by two accesses along SW McEwan Road. The north site access will serve inbound emergency response vehicles and as a two-way access for passenger vehicles while the south site access will serve outbound emergency response vehicles only. Based on the projected trips generated, approximately 20 percent of site trips will result from emergency/non-emergency calls to the station; accordingly, the south access may serve approximately 20 percent of exiting trips throughout a typical day. However, since calls to the station are expected to be uncommon, will occur irregularly, and cannot be anticipated, no response calls were projected during either peak hour. Therefore, all site trips generated during the morning and evening peak hours will utilize the northern access.

The trip assignment for the site trips generated by the proposed development during the morning and evening peak hours are shown in Figure 3 on page 9.

LEGEND

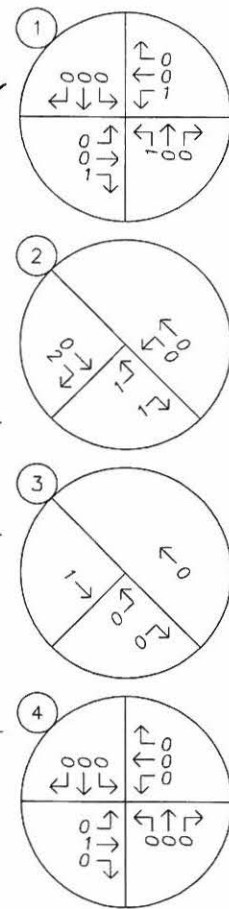
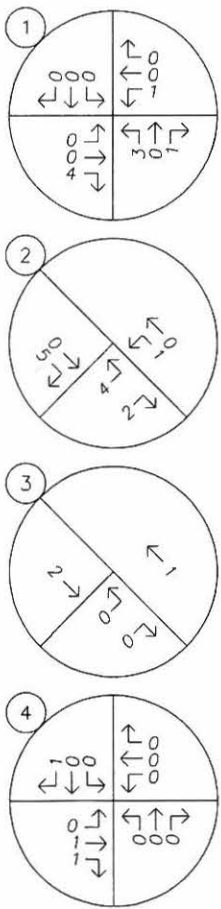
XX% PERCENT OF SITE TRIPS

TRIP GENERATION			
	IN	OUT	TOTAL
AM	6	6	12
PM	2	2	4



AM PEAK HOUR

PM PEAK HOUR



SITE TRIP DISTRIBUTION & ASSIGNMENT
Proposed Development Plan - Site Trips
AM & PM Peak Hours



FIGURE 3

PAGE 9

Future Traffic Volumes

Background Volumes

To provide analysis of the impact of the proposed development on the nearby transportation facilities, an estimate of future traffic volumes is required. In order to calculate the future traffic volumes at the study intersections, a compounded growth rate of two percent per year for an assumed build-out condition of two years was applied to the measured existing traffic volumes to approximate year 2019 background conditions.

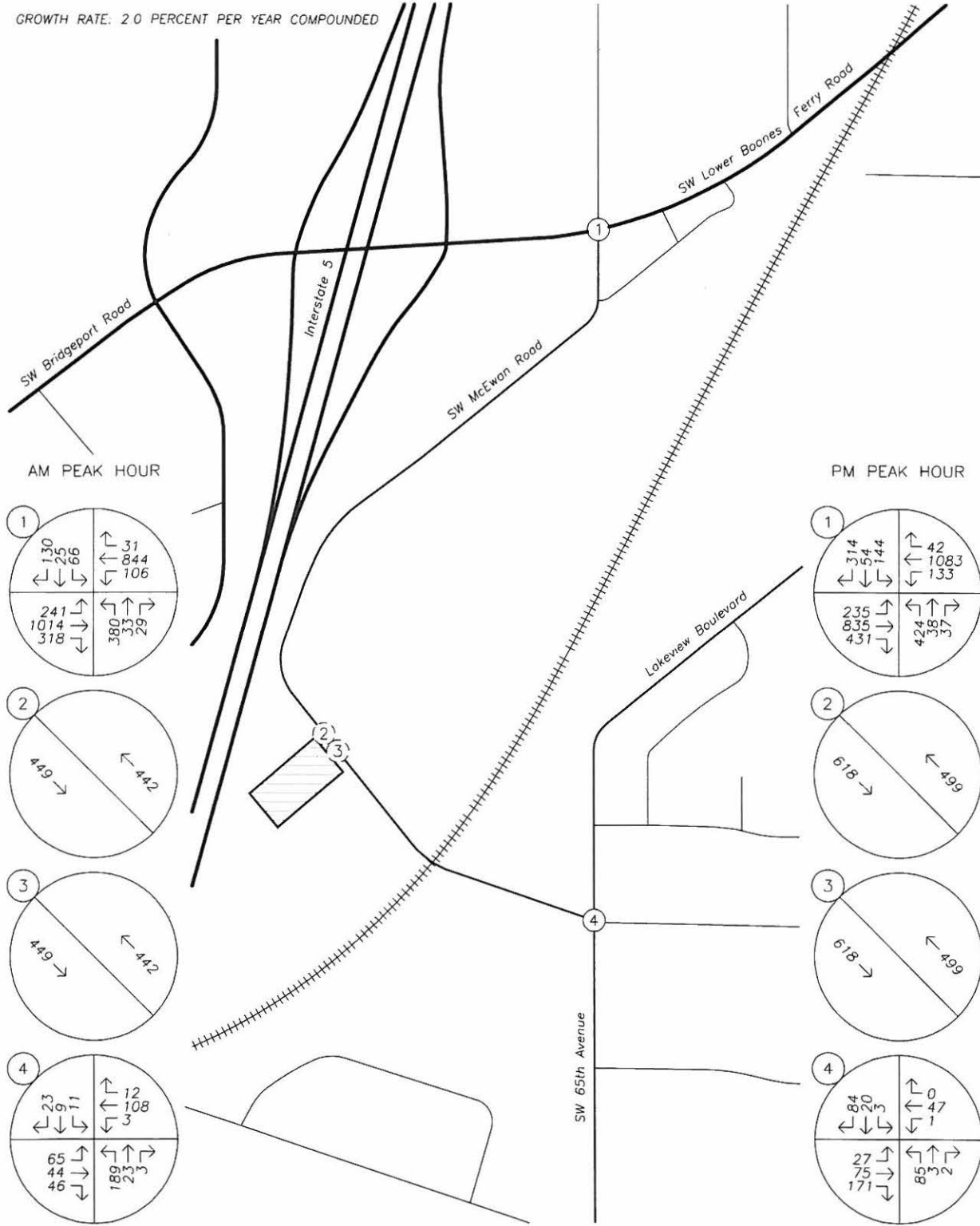
Figure 4 on page 11 shows the projected year 2019 background traffic volumes at the study intersections during the morning and evening peak hours.

Background Volumes plus Site Trips

Peak hour trips calculated to be generated by the proposed development, as described earlier within the *Site Trips* section, were added to the projected year 2019 background traffic volumes to obtain the expected 2019 background volumes plus site trips.

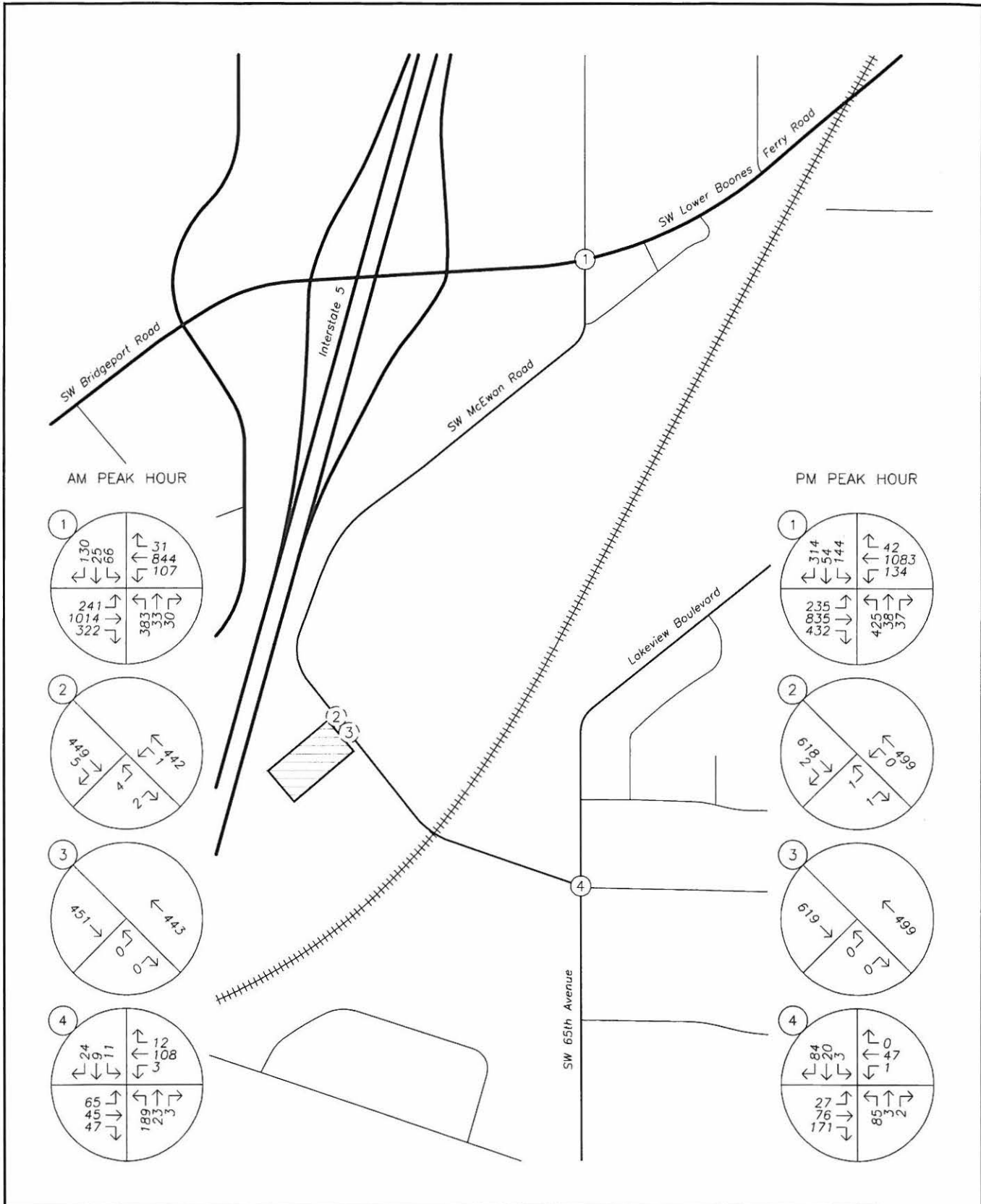
Figure 5 on page 12 shows the projected year 2019 peak hour background traffic volumes plus proposed development site trips at the study intersections during the morning and evening peak hours.

GROWTH RATE: 2.0 PERCENT PER YEAR COMPOUNDED



TRAFFIC VOLUMES
 Year 2019 Background Conditions
 AM & PM Peak Hours





TRAFFIC VOLUMES
 Year 2019 Background Conditions plus Site Trips
 AM & PM Peak Hours



Safety Analysis

Crash Data Analysis

Using data obtained from the Oregon Department of Transportation's (ODOT) Crash Analysis and Reporting Unit, a review of the most recent available five years of crash history (from January 2011 to December 2015) at the study intersections was performed. The crash data was evaluated based on the number of crashes, the type of collisions, the severity of the collisions, and the resulting crash rate for the intersection. 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 period represents 10 percent of average daily traffic (ADT) at the intersection. Crash rates in excess of one to two crashes per million entering vehicles (CMEV) may be indicative of design deficiencies and therefore require a need for further investigation and possible mitigation.

The intersection of SW 65th Avenue at SW Lower Boones Ferry Road had ten reported crashes during the analysis period. The crashes consisted of seven rear-end collisions, one angle-type collision, one fixed-object collision, and one turning-movement collision. Of the reported crashes, five were classified as "Property Damage Only" (*PDO*), four were classified as "Possible Injury – Complaint of Pain" (*Injury C*), and one was classified as "Non-Incapacitating Injury" (*Injury B*). The crash rate at the intersection was calculated to be 0.15 CMEV.

The intersection of SW 65th Avenue at SW McEwan Road had one reported crash during the analysis period. The crash was a turning-movement collision that was classified as *PDO*. The crash rate at the intersection was calculated to be 0.11 CMEV.

Based on the most recent five years of available crash data, no significant trends or crash patterns were identified at any of the study intersections. Accordingly, no specific safety mitigation is recommended.

Sight Distance Analysis

Sight distance was examined for the site access intersections located along SW McEwan Road. Intersection sight distance was measured and evaluated in accordance with the standards established in *A Policy on Geometric Design of Highways and Streets*². According to AASHTO, the driver's eye is assumed to be 15 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.

² American Association of State Highway and Transportation Officials (AASHTO), *A Policy on Geometric Design of Highways and Streets*, 6th Edition, 2011.

North Site Access

The northernmost site access will serve two-way traffic, where vehicles exiting the site will consist of predominately passenger cars. Therefore, the minimum recommended intersection sight distance was calculated assuming a time gap of 7.5 seconds for a minor-street approaching passenger car. Based on a posted speed of 30 mph, the minimum recommended intersection sight distance for a passenger car turning onto a three-lane roadway was calculated to be 335 feet.

Intersection sight distance at the north site access was measured to be 450 feet to the north, limited by a building located north of the site along the eastern side of SW McEwan Road. Sight distance to the south was measured to be in excess of 550 feet. Based on the measurements conducted at the north site access, adequate sight distance is available to ensure safe operation at the proposed intersection while maintaining unimpeded flow of traffic along SW McEwan Road.

South Site Access

The southernmost site access will serve as a one-way egress access for emergency response vehicles only. Typically, it is expected that when an emergency vehicle exits the site, lights and possibly sirens will be active. In these instances, interrupting the flow of traffic on the major-street is the intent of the emergency vehicle and accordingly maintaining adequate intersection sight distance would generally not be applicable at this access. However, in the event that a non-emergency occurs but requires an emergency response vehicle, adequate intersection sight distance would be necessary at the access.

Since the access will serve vehicles larger than a passenger car, the minimum recommended intersection sight distance was calculated assuming a time gap of 9.5 for a minor-street approaching single-unit truck. Based on a posted speed of 30 mph, the minimum recommended intersection sight distance for a single-unit truck was calculated to be 420 feet.

The south egress access will serve emergency response vehicles, which will likely have drivers seated at a higher position than in regular passenger vehicles. Therefore, in addition to utilizing the standard 3.5-foot high driver's eye height on the minor-street approach, a 7.6-foot truck eye height was also used to measure intersection sight distance at the access.

Intersection sight distance at the south site access was measured to be 492 feet to the north, limited by a building located north of the site along the eastern side of SW McEwan Road. Sight distance to the south was measured to be in excess of 550 feet. Based on the measurements conducted at the south site access, adequate sight distance is available to ensure safe operation at the proposed intersection while maintaining unimpeded flow of traffic along SW McEwan Road.

Based on the analysis, adequate sight distance is available at both site accesses to ensure safe operation of each proposed intersection along SW McEwan Road. No sight distance mitigation is necessary or recommended.

2e

Warrant Analysis

Left-turn and traffic signal warrants were examined for the study intersections where such treatments would be applicable.

A left-turn refuge lane is primarily a safety consideration for the major-street, removing left-turning vehicles from the through traffic stream. The left-turn lane warrants used were developed from the National Cooperative Highway Research Project's (NCHRP) Report 457. Turn lane warrants were evaluated based on the number of advancing and opposing vehicles as well as the number of turning vehicles, the travel speed, and the number of through lanes.

Left-turn lane warrants are not projected to be met at the north site access intersection under any of the analysis scenarios through the 2019 build-out year. Since the south site access will be egress only, left-turn lanes are not applicable at the proposed intersection. Accordingly, no new turn lanes are necessary or recommended.

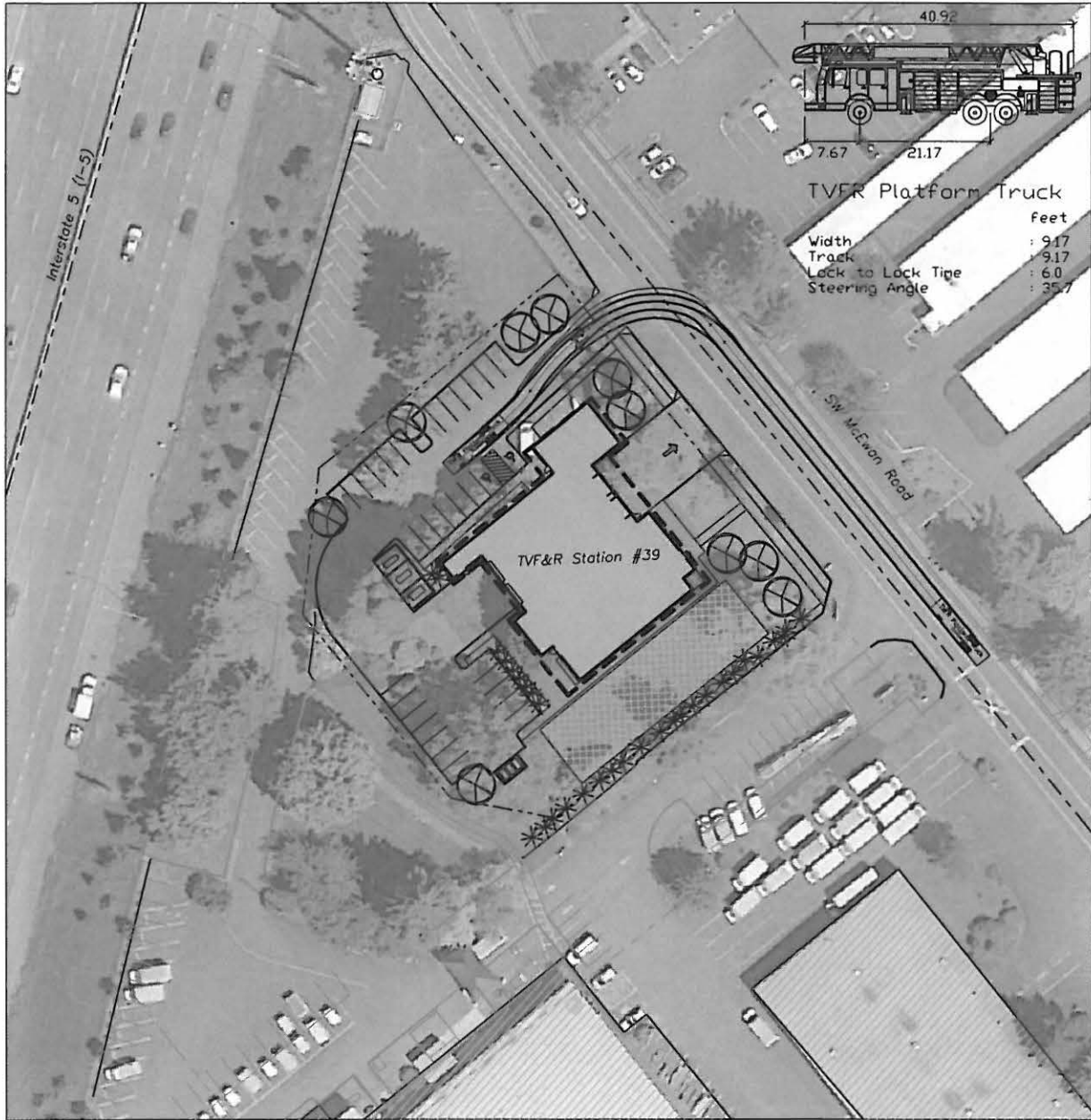
Traffic signal warrants were examined for the unsignalized study intersections to determine whether the installation of any new traffic signal will be warranted at the intersections upon completion of the proposed development. Due to insufficient main and side-street traffic volumes, traffic signal warrants are not projected to be met at the intersection of SW 65th Avenue at SW McEwan Road under any of the analysis scenarios.

Driveway Width

To demonstrate an access width of 24 feet is sufficient to serve emergency response vehicles entering the site at the north access, a turning-movement analysis was conducted using AutoTurn software. A custom design vehicle, modeled after a standard TVF&R emergency response vehicle, was created and used. Analysis scenarios examined include the following:

- A northbound left-turning vehicle entering the north access; and
- A southbound right-turning vehicle entering the north access.

Based on the turning-movement analysis, a driveway width of 24 feet is sufficient to accommodate entering emergency response vehicles at the north site access intersection. Diagrams showing the turning-movements for each analysis scenario are shown in Figure 6 on page 16 and Figure 7 on page 17 for northbound and southbound entering vehicles, respectively.

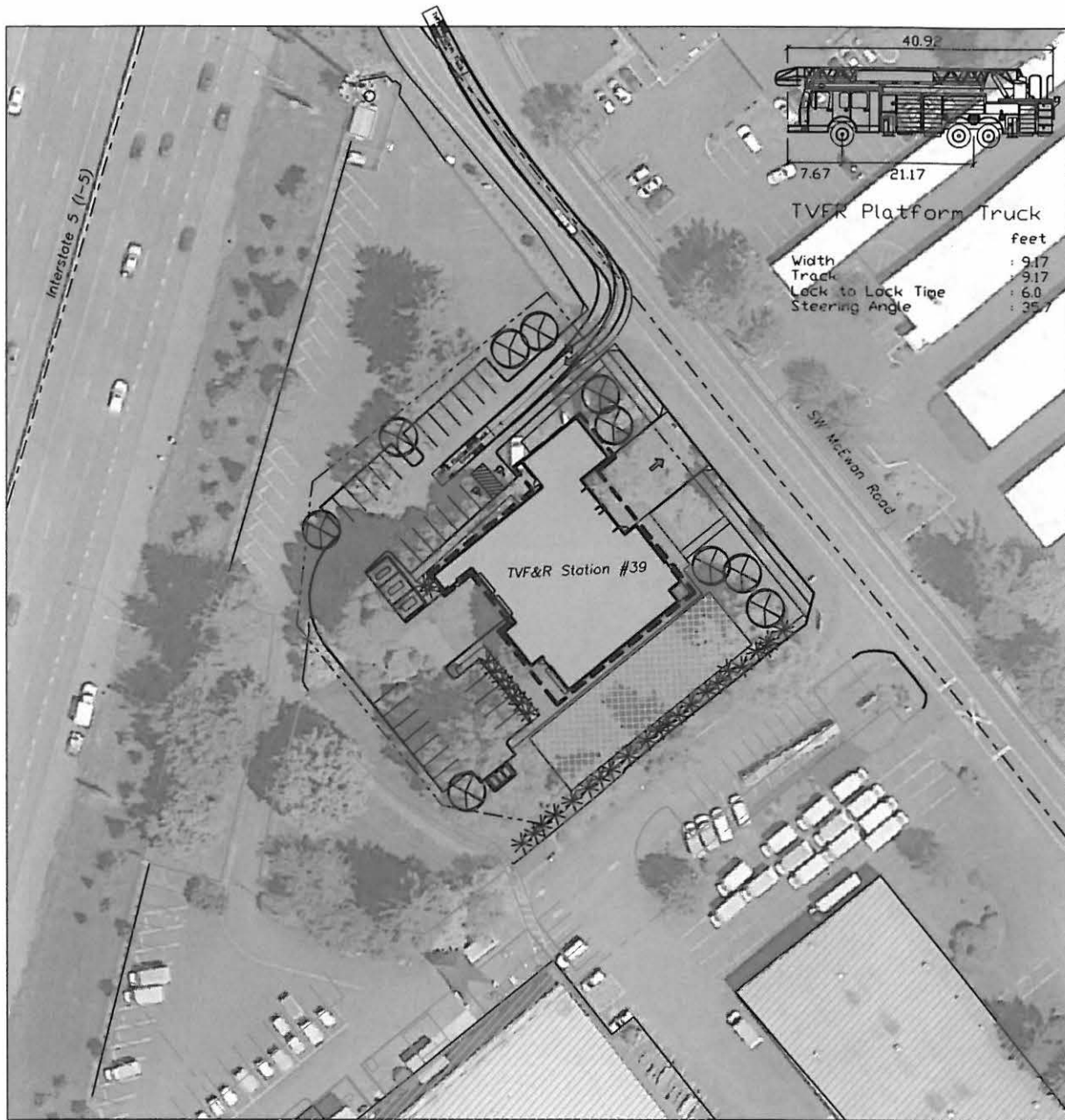


TURNING MOVEMENT ANALYSIS
 North Access – Northbound Entering Vehicle
 Custom TVF&R Design Vehicle



FIGURE
6

PAGE
16



TURNING MOVEMENT ANALYSIS
 North Access – Southbound Entering Vehicle
 Custom TVF&R Design Vehicle



FIGURE
7

PAGE
17



Operational Analysis

Capacity Analysis

A capacity and delay analysis was conducted for each of the study intersections per the signalized and unsignalized intersection analysis methodologies in the *HIGHWAY CAPACITY MANUAL*³ (HCM). 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 study area includes intersections located within multiple jurisdictions, including the City of Tualatin, and Clackamas County. The following is a description of each jurisdictional standard

- The City of Tualatin standards require intersections operate at LOS E or better.
- Per Table 5-2a and Map 4-8 of Clackamas County's Comprehensive Plan, Clackamas County standards require intersections operate with a v/c ratio of 0.99 or less.

For both LOS and delay related to the analysis of unsignalized intersections, the reported results apply to the worst movement.

The intersection of SW 65th Avenue at SW Lower Boones Ferry Road operates at LOS C with v/c ratios of 0.81 or less during the morning peak hour and at LOS D with v/c ratios of 0.81 or less during the evening peak hour or all analysis scenarios.

Upon build-out of the proposed development, the north site access intersection at SW McEwan Road is projected to operate at LOS C with v/c ratios of 0.02 or less during the morning and evening peak hours.

Upon build-out of the proposed development, the south site access intersection at SW McEwan Road is projected to operate at LOS B with a v/c ratio of 0.01 during the morning peak hour and at LOS C with a v/c ratio of 0.01 during the evening peak hour.

The intersection of SW 65th Avenue at SW McEwan Road currently operates at LOS A during the morning and evening peak hours. Under year 2019 background conditions, the intersection is projected to operate at LOS B during the morning peak hour and at LOS A during the evening peak hour.

The v/c, delay, and LOS results of the capacity analysis are shown in Table 3 for the morning and evening peak hours. The reported results are generally based on the analysis methodologies provided in the 2010 HCM; however, for intersections where the 2010 methodology is unable to determine intersection capacity/delay, such as SW 65th Avenue at SW Lower Boones Ferry Road due to the northbound shared lane

³ Transportation Research Board, *HIGHWAY CAPACITY MANUAL 2000* and *HIGHWAY CAPACITY MANUAL 2010*.

2e

configuration, operation was evaluated using the HCM 2000 methodologies. Detailed calculations as well as tables showing the relationship between delay and LOS are included in the appendix to this report.

Table 3 – Capacity Analysis Summary

	Morning Peak Hour			Evening Peak Hour		
	LOS	Delay (s)	v/c	LOS	Delay (s)	v/c
SW 65th Ave at SW Lower Boones Ferry Rd						
2017 Existing Conditions	C	31	0.78	D	35	0.78
2019 Background Conditions	C	33	0.81	D	42	0.81
2019 Background plus Site Conditions	C	33	0.81	D	42	0.81
North Site Access at SW McEwan Rd						
2019 Background plus Site Conditions	C	16	0.02	C	18	0.01
South Site Access at SW McEwan Rd						
2019 Background plus Site Conditions	B	15	0.01	C	18	0.01
SW 65th Ave at SW McEwan Rd						
2017 Existing Conditions	A	10	-	A	9	-
2019 Background Conditions	B	10	-	A	9	-
2019 Background plus Site Conditions	B	10	-	A	9	-

Based on the results of the operational analysis, all study intersections are currently operating acceptably per their respective jurisdictional standards and are projected to continue operating acceptably upon build-out of the proposed development through year 2019. No operational mitigation is necessary or recommended at these intersections.

Conclusions

No significant trends or crash patterns were identified at any of the study intersections. Accordingly, no specific safety mitigation is recommended.

Adequate sight distance is available at both site accesses to ensure safe operation of each proposed intersection along SW McEwan Road. No sight distance mitigation is necessary or recommended.

Left-turn lane warrants are not projected to be met at either site access intersection under any of the analysis scenarios through the 2019 build-out year. No new turn lanes are necessary or recommended.

Due to insufficient main and side-street traffic volumes, traffic signal warrants are not projected to be met at the intersection of SW 65th Avenue at SW McEwan Road under any of the analysis scenarios.

Based on a turning-movement analysis, a driveway width of 24 feet is sufficient to accommodate entering emergency response vehicles at the north site access intersection.

All study intersections are currently operating acceptably per their respective jurisdictional standards and are projected to continue operating acceptably upon build-out of the proposed development through year 2019. No operational mitigation is necessary or recommended at these intersections.

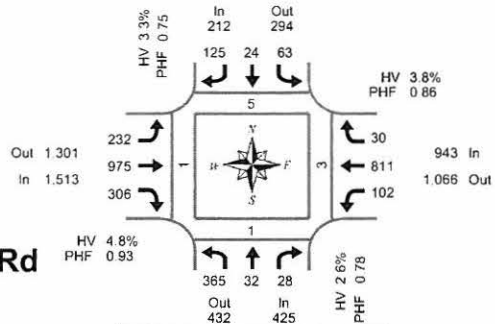
1e

Appendix

Total Vehicle Summary



Clay Carney
(503) 833-2740



Peak Hour Summary
7:55 AM to 8:55 AM

SW 65th Ave & SW Lower Boones Ferry Rd

Wednesday, November 15, 2017
7:00 AM to 9:00 AM

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

Interval Start Time	Northbound SW 65th Ave				Southbound SW 65th Ave				Eastbound SW Lower Boones Ferry Rd				Westbound SW Lower Boones Ferry Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	13	4	2	0	1	1	4	0	16	81	15	0	7	51	1	0	196	0	0	0	0
7:05 AM	23	3	1	0	1	1	10	0	11	55	23	0	2	57	2	0	189	0	0	0	1
7:10 AM	34	4	1	0	0	3	17	0	23	47	16	0	5	54	0	0	204	2	0	0	0
7:15 AM	28	6	4	0	1	1	15	0	6	76	14	0	5	66	0	0	222	0	0	0	0
7:20 AM	32	7	2	0	3	3	4	0	17	58	24	0	7	33	1	0	191	0	0	0	0
7:25 AM	21	0	1	0	4	2	6	0	15	74	13	0	1	56	0	0	193	0	0	0	0
7:30 AM	22	4	2	0	4	0	10	0	12	73	25	0	8	49	0	0	209	0	0	0	0
7:35 AM	33	2	2	0	6	1	6	0	10	64	20	0	3	55	0	0	202	0	0	0	0
7:40 AM	14	3	0	0	3	0	5	0	10	75	13	1	2	34	4	0	163	0	1	0	1
7:45 AM	12	4	4	0	3	0	8	0	10	87	23	1	8	38	0	0	197	1	0	0	0
7:50 AM	33	2	2	0	7	4	12	0	13	74	21	1	5	59	0	0	232	0	0	0	0
7:55 AM	23	3	3	0	4	3	7	0	15	107	27	0	7	57	1	0	257	0	0	0	0
8:00 AM	28	1	1	0	3	1	8	0	28	83	24	0	12	57	2	0	246	0	0	0	0
8:05 AM	40	7	3	0	2	0	9	0	21	86	14	0	4	59	2	0	247	0	0	0	0
8:10 AM	24	3	1	0	4	1	8	0	14	77	25	1	8	64	0	0	229	1	0	0	0
8:15 AM	15	0	3	0	4	4	10	0	30	78	25	0	9	79	4	0	261	0	0	0	0
8:20 AM	37	5	5	0	5	3	10	0	21	75	34	0	11	58	3	0	267	0	0	0	0
8:25 AM	29	3	2	0	3	3	8	0	15	93	33	0	7	88	4	0	288	1	0	0	0
8:30 AM	50	1	5	0	6	2	15	0	24	80	30	0	9	61	4	1	287	1	0	0	0
8:35 AM	41	4	2	0	11	3	9	0	16	52	21	0	8	50	2	0	219	1	0	2	0
8:40 AM	28	0	1	0	6	1	13	0	17	92	22	0	8	82	2	0	272	0	0	0	0
8:45 AM	18	1	1	0	8	1	19	0	20	86	15	0	6	85	5	0	265	0	1	1	0
8:50 AM	32	4	1	0	7	2	9	0	13	66	36	0	13	71	1	0	255	1	0	0	1
8:55 AM	37	2	8	0	8	2	9	1	21	61	40	0	13	48	3	0	252	0	2	0	0
Total Survey	667	73	57	0	104	42	231	1	396	1,800	553	4	168	1,411	41	1	5,543	8	4	3	3

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

Interval Start Time	Northbound SW 65th Ave				Southbound SW 65th Ave				Eastbound SW Lower Boones Ferry Rd				Westbound SW Lower Boones Ferry Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	70	11	4	0	2	5	31	0	50	183	54	0	14	162	3	0	589	2	0	0	1
7:15 AM	81	13	7	0	8	6	25	0	38	208	51	0	13	155	1	0	606	0	0	0	0
7:30 AM	69	9	4	0	13	1	21	0	32	212	58	1	13	138	4	0	574	0	1	0	1
7:45 AM	68	9	9	0	14	7	27	0	38	268	71	2	20	154	1	0	686	1	0	0	0
8:00 AM	92	11	5	0	9	2	25	0	61	246	63	1	24	180	4	0	722	1	0	0	0
8:15 AM	81	8	10	0	12	10	28	0	66	246	92	0	27	225	11	0	816	1	0	0	0
8:30 AM	119	5	6	0	23	6	37	0	57	224	73	0	25	193	8	1	778	2	0	2	0
8:45 AM	87	7	10	0	23	5	37	1	54	213	91	0	32	204	9	0	772	1	3	1	1
Total Survey	667	73	57	0	104	42	231	1	396	1,800	553	4	168	1,411	41	1	5,543	8	4	3	3

Peak Hour Summary
7:55 AM to 8:55 AM

By Approach	Northbound SW 65th Ave				Southbound SW 65th Ave				Eastbound SW Lower Boones Ferry Rd				Westbound SW Lower Boones Ferry Rd				Total	Pedestrians Crosswalk				
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West	
Volume	425	432	857	0	212	294	506	0	1,513	1,301	2,814	1	943	1,066	2,009	1	3,093	5	1	3	1	
%HV			2.6%				3.3%				4.8%					3.8%		4.1%				
PHF			0.78				0.75				0.93					0.86		0.92				

By Movement	Northbound SW 65th Ave				Southbound SW 65th Ave				Eastbound SW Lower Boones Ferry Rd				Westbound SW Lower Boones Ferry Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	365	32	28	425	63	24	125	212	232	975	306	1,513	102	811	30	943	3,093
%HV	1.9%	3.1%	10.7%	2.6%	1.6%	0.0%	4.8%	3.3%	2.6%	5.9%	2.6%	4.8%	2.9%	4.1%	0.0%	3.8%	4.1%
PHF	0.76	0.73	0.58	0.78	0.63	0.60	0.76	0.75	0.88	0.88	0.79	0.93	0.91	0.85	0.68	0.86	0.92

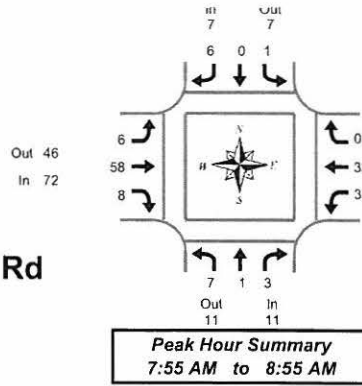
Rolling Hour Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 65th Ave				Southbound SW 65th Ave				Eastbound SW Lower Boones Ferry Rd				Westbound SW Lower Boones Ferry Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	288	42	24	0	37	19	104	0	158	871	234	3	60	609	9	0	2,455	3	1	0	2
7:15 AM	310	42	25	0	44	16	98	0	169	934	243	4	70	627	10	0	2,588	2	1	0	1
7:30 AM	310	37	28	0	48	20	101	0	197	972	284	4	84	697	20	0	2,798	3	1	0	1
7:45 AM	360	33	32	0	58	25	117	0	222	984	299	3	96	752	24	1	3,002	5	0	2	0
8:00 AM	379	31	33	0	67	23	127	1	238	929	319	1	108	802	32	1	3,088	5	3	3	1

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



SW 65th Ave & SW Lower Boones Ferry Rd

Wednesday, November 15, 2017

7:00 AM to 9:00 AM

Peak Hour Summary
7:55 AM to 8:55 AM

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

Interval Start Time	Northbound SW 65th Ave				Southbound SW 65th Ave				Eastbound SW Lower Boones Ferry Rd				Westbound SW Lower Boones Ferry Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	0	1	0	1	0	0	0	0	0	2	0	2	0	2	0	2	5
7:05 AM	0	0	0	0	1	0	0	1	0	2	0	2	0	2	0	3	6
7:10 AM	2	1	0	3	0	0	0	0	0	3	1	4	0	2	0	2	9
7:15 AM	3	0	0	3	0	0	1	1	0	2	0	2	0	3	0	3	9
7:20 AM	1	0	0	1	0	0	0	0	1	3	1	5	0	2	0	2	8
7:25 AM	0	0	0	0	1	0	0	1	0	2	1	3	0	3	0	3	7
7:30 AM	1	0	0	1	0	0	0	0	1	2	0	3	2	3	0	5	9
7:35 AM	1	0	1	2	0	0	1	1	0	4	0	4	0	1	0	1	8
7:40 AM	1	0	0	1	1	0	1	2	0	4	0	4	0	2	0	2	9
7:45 AM	0	0	0	0	0	0	1	1	0	4	0	4	1	1	0	2	7
7:50 AM	2	0	0	2	0	0	0	0	0	1	0	1	1	0	0	1	4
7:55 AM	1	0	0	1	0	0	0	0	0	3	0	3	1	3	0	4	8
8:00 AM	1	0	0	1	0	0	0	0	0	4	1	5	0	2	0	2	8
8:05 AM	2	1	0	3	0	0	1	1	1	4	0	5	0	4	0	4	13
8:10 AM	0	0	0	0	0	0	0	0	0	4	1	5	0	3	0	3	8
8:15 AM	0	0	0	0	0	0	0	0	0	5	1	6	0	3	0	3	9
8:20 AM	1	0	1	2	0	0	0	0	1	3	1	5	0	3	0	3	10
8:25 AM	0	0	0	0	0	0	2	2	1	7	1	9	1	5	0	6	17
8:30 AM	0	0	1	1	0	0	0	0	1	5	0	6	0	0	0	0	7
8:35 AM	0	0	1	1	1	0	0	1	0	8	0	8	0	1	0	1	11
8:40 AM	0	0	0	0	0	0	1	1	2	5	1	8	0	4	0	4	13
8:45 AM	1	0	0	1	0	0	2	2	0	5	0	5	1	2	0	3	11
8:50 AM	1	0	0	1	0	0	0	0	0	5	2	7	0	3	0	3	11
8:55 AM	2	0	0	2	0	0	2	2	0	2	3	5	0	2	0	2	11
Total Survey	20	3	4	27	4	0	12	16	8	89	14	111	7	57	0	64	218

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

Interval Start Time	Northbound SW 65th Ave				Southbound SW 65th Ave				Eastbound SW Lower Boones Ferry Rd				Westbound SW Lower Boones Ferry Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	2	2	0	4	1	0	0	1	0	7	1	8	0	7	0	7	20
7:15 AM	4	0	0	4	1	0	1	2	1	7	2	10	0	8	0	8	24
7:30 AM	3	0	1	4	1	0	2	3	1	10	0	11	2	6	0	8	26
7:45 AM	3	0	0	3	0	0	1	1	0	8	0	8	3	4	0	7	19
8:00 AM	3	1	0	4	0	0	1	1	1	12	2	15	0	9	0	9	29
8:15 AM	1	0	1	2	0	0	2	2	2	15	3	20	1	11	0	12	36
8:30 AM	0	0	2	2	1	0	1	2	3	18	1	22	0	5	0	5	31
8:45 AM	4	0	0	4	0	0	4	4	0	12	5	17	1	7	0	8	33
Total Survey	20	3	4	27	4	0	12	16	8	89	14	111	7	57	0	64	218

Heavy Vehicle Peak Hour Summary 7:55 AM to 8:55 AM

By Approach	Northbound SW 65th Ave			Southbound SW 65th Ave			Eastbound SW Lower Boones Ferry Rd			Westbound SW Lower Boones Ferry Rd			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	11	11	22	7	7	14	72	46	118	36	62	98	126
PHF	0.55			0.44			0.78			0.75			0.88

By Movement	Northbound SW 65th Ave				Southbound SW 65th Ave				Eastbound SW Lower Boones Ferry Rd				Westbound SW Lower Boones Ferry Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	7	1	3	11	1	0	6	7	6	58	8	72	3	33	0	36	126
PHF	0.44	0.25	0.38	0.55	0.25	0.00	0.50	0.44	0.50	0.73	0.67	0.78	0.75	0.75	0.00	0.75	0.88

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

Interval Start Time	Northbound SW 65th Ave				Southbound SW 65th Ave				Eastbound SW Lower Boones Ferry Rd				Westbound SW Lower Boones Ferry Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	12	2	1	15	3	0	4	7	2	32	3	37	5	25	0	30	89
7:15 AM	13	1	1	15	2	0	5	7	3	37	4	44	5	27	0	32	98
7:30 AM	10	1	2	13	1	0	6	7	4	45	5	54	6	30	0	36	110
7:45 AM	7	1	3	11	1	0	5	6	6	53	6	65	4	29	0	33	115
8:00 AM	8	1	3	12	1	0	8	9	6	57	11	74	2	32	0	34	129

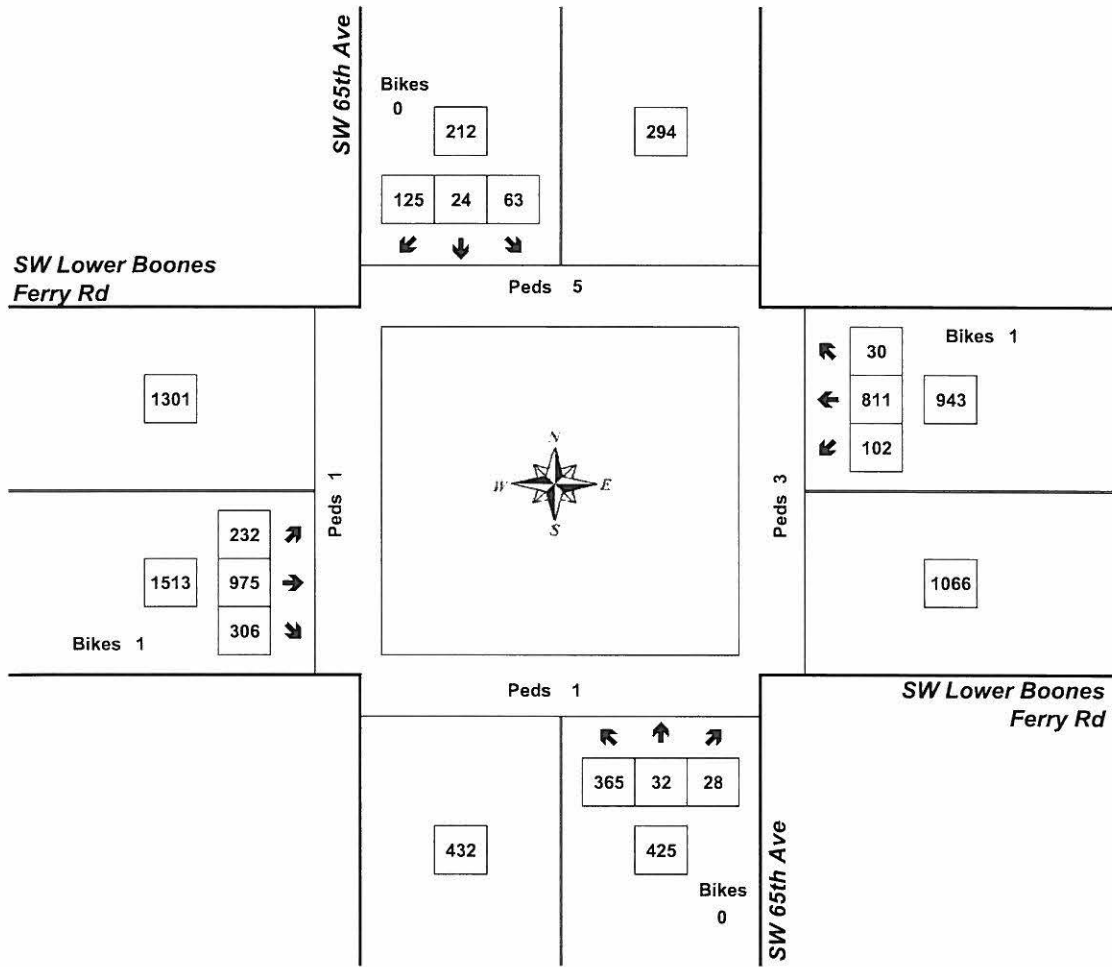
Peak Hour Summary



Clay Carney
(503) 833-2740

SW 65th Ave & SW Lower Boones Ferry Rd

7:55 AM to 8:55 AM
Wednesday, November 15, 2017



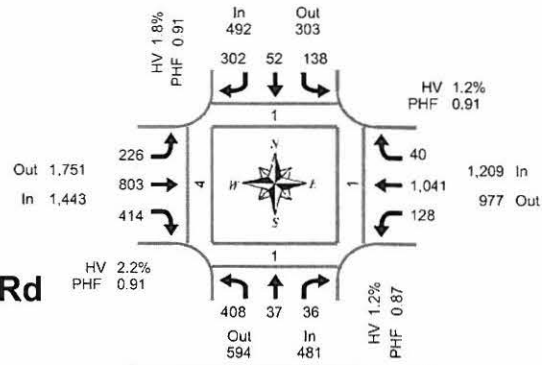
Approach	PHF	HV%	Volume
EB	0.93	4.8%	1,513
WB	0.86	3.8%	943
NB	0.78	2.6%	425
SB	0.75	3.3%	212
Intersection	0.92	4.1%	3,093

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

Total Vehicle Summary



Clay Carney
(503) 833-2740



SW 65th Ave & SW Lower Boones Ferry Rd

Wednesday, November 15, 2017

4:00 PM to 6:00 PM

Peak Hour Summary
4:20 PM to 5:20 PM

15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 65th Ave				Southbound SW 65th Ave				Eastbound SW Lower Boones Ferry Rd				Westbound SW Lower Boones Ferry Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	72	5	9	0	39	13	103	0	62	206	82	0	22	269	9	0	891	0	1	0	0
4:15 PM	84	9	8	0	47	15	83	0	66	183	97	0	37	249	14	0	892	1	1	0	0
4:30 PM	118	10	9	0	36	11	88	0	40	176	98	0	28	251	9	0	874	0	1	0	1
4:45 PM	92	6	7	0	31	15	75	0	59	232	98	0	33	290	9	0	947	0	0	0	1
5:00 PM	117	11	11	0	27	13	80	0	68	181	99	0	29	236	10	0	882	0	0	1	2
5:15 PM	105	13	6	0	37	17	68	0	50	226	135	0	23	204	11	0	895	0	1	0	1
5:30 PM	114	18	7	0	30	21	60	0	49	178	100	1	13	209	3	0	802	0	1	2	0
5:45 PM	71	12	11	0	22	21	43	0	60	206	99	0	27	256	13	0	841	0	1	0	0
Total Survey	773	84	68	0	269	126	600	0	454	1,588	808	1	212	1,964	78	0	7,024	1	6	3	5

Peak Hour Summary

4:20 PM to 5:20 PM

By Approach	Northbound SW 65th Ave				Southbound SW 65th Ave				Eastbound SW Lower Boones Ferry Rd				Westbound SW Lower Boones Ferry Rd				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	481	594	1,075	0	492	303	795	0	1,443	1,751	3,194	0	1,209	977	2,186	0	3,625	1	1	1	4
%HV	1.2%				1.8%				2.2%				1.2%				1.7%				
PHF	0.87				0.91				0.91				0.91				0.96				

By Movement	Northbound SW 65th Ave				Southbound SW 65th Ave				Eastbound SW Lower Boones Ferry Rd				Westbound SW Lower Boones Ferry Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	408	37	36	481	138	52	302	492	226	803	414	1,443	128	1,041	40	1,209	3,625
%HV	1.0%	2.7%	2.8%	1.2%	1.4%	0.0%	2.3%	1.8%	7.5%	1.2%	1.2%	2.2%	0.8%	1.2%	0.0%	1.2%	1.7%
PHF	0.86	0.77	0.75	0.87	0.78	0.87	0.86	0.91	0.83	0.87	0.90	0.91	0.76	0.88	0.59	0.91	0.96

Rolling Hour Summary

4:00 PM to 6:00 PM

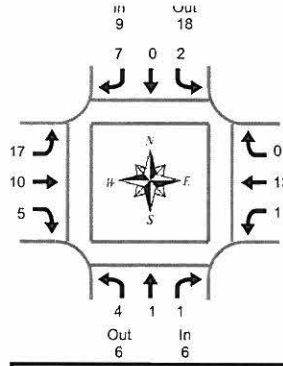
Interval Start Time	Northbound SW 65th Ave				Southbound SW 65th Ave				Eastbound SW Lower Boones Ferry Rd				Westbound SW Lower Boones Ferry Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	366	30	33	0	153	54	349	0	227	797	375	0	120	1,059	41	0	3,604	1	3	0	2
4:15 PM	411	36	35	0	141	54	326	0	233	772	392	0	127	1,026	42	0	3,595	1	2	1	4
4:30 PM	432	40	33	0	131	56	311	0	217	815	430	0	113	981	39	0	3,598	0	2	1	5
4:45 PM	428	48	31	0	125	66	283	0	226	817	432	1	98	939	33	0	3,526	0	2	3	4
5:00 PM	407	54	35	0	116	72	251	0	227	791	433	1	92	905	37	0	3,420	0	3	3	3

Heavy Vehicle Summary



Clay Carney
(503) 833-2740

Out 24
In 32



Peak Hour Summary
4:20 PM to 5:20 PM

SW 65th Ave & SW Lower Boones Ferry Rd

Wednesday, November 15, 2017
4:00 PM to 6:00 PM

Heavy Vehicle 15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 65th Ave				Southbound SW 65th Ave				Eastbound SW Lower Boones Ferry Rd				Westbound SW Lower Boones Ferry Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	0	0	0	0	0	2	2	13	7	3	23	0	5	0	5	30
4:15 PM	3	0	1	4	2	0	1	3	5	1	3	9	1	2	0	3	19
4:30 PM	1	0	0	1	0	0	3	3	6	2	0	8	0	1	0	1	13
4:45 PM	1	0	0	1	0	0	2	2	1	4	0	5	0	5	0	5	13
5:00 PM	0	1	0	1	0	0	1	1	4	3	2	9	0	4	0	4	15
5:15 PM	3	0	0	3	1	0	0	1	2	1	1	4	0	2	0	2	10
5:30 PM	1	0	0	1	0	0	2	2	3	5	2	10	0	5	0	5	18
5:45 PM	1	0	0	1	0	1	0	1	0	4	0	4	0	5	0	5	11
Total Survey	10	1	1	12	3	1	11	15	34	27	11	72	1	29	0	30	129

Heavy Vehicle Peak Hour Summary

4:20 PM to 5:20 PM

By Approach	Northbound SW 65th Ave			Southbound SW 65th Ave			Eastbound SW Lower Boones Ferry Rd			Westbound SW Lower Boones Ferry Rd			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	6	6	12	9	18	27	32	24	56	14	13	27	61
PHF	0.50			0.56			0.73			0.58			0.73

By Movement	Northbound SW 65th Ave				Southbound SW 65th Ave				Eastbound SW Lower Boones Ferry Rd				Westbound SW Lower Boones Ferry Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	4	1	1	6	2	0	7	9	17	10	5	32	1	13	0	14	61
PHF	0.50	0.25	0.25	0.50	0.25	0.00	0.58	0.56	0.53	0.42	0.63	0.73	0.25	0.54	0.00	0.58	0.73

Heavy Vehicle Rolling Hour Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 65th Ave				Southbound SW 65th Ave				Eastbound SW Lower Boones Ferry Rd				Westbound SW Lower Boones Ferry Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	5	0	1	6	2	0	8	10	25	14	6	45	1	13	0	14	75
4:15 PM	5	1	1	7	2	0	7	9	16	10	5	31	1	12	0	13	60
4:30 PM	5	1	0	6	1	0	6	7	13	10	3	26	0	12	0	12	51
4:45 PM	5	1	0	6	1	0	5	6	10	13	5	28	0	16	0	16	56
5:00 PM	5	1	0	6	1	1	3	5	9	13	5	27	0	16	0	16	54

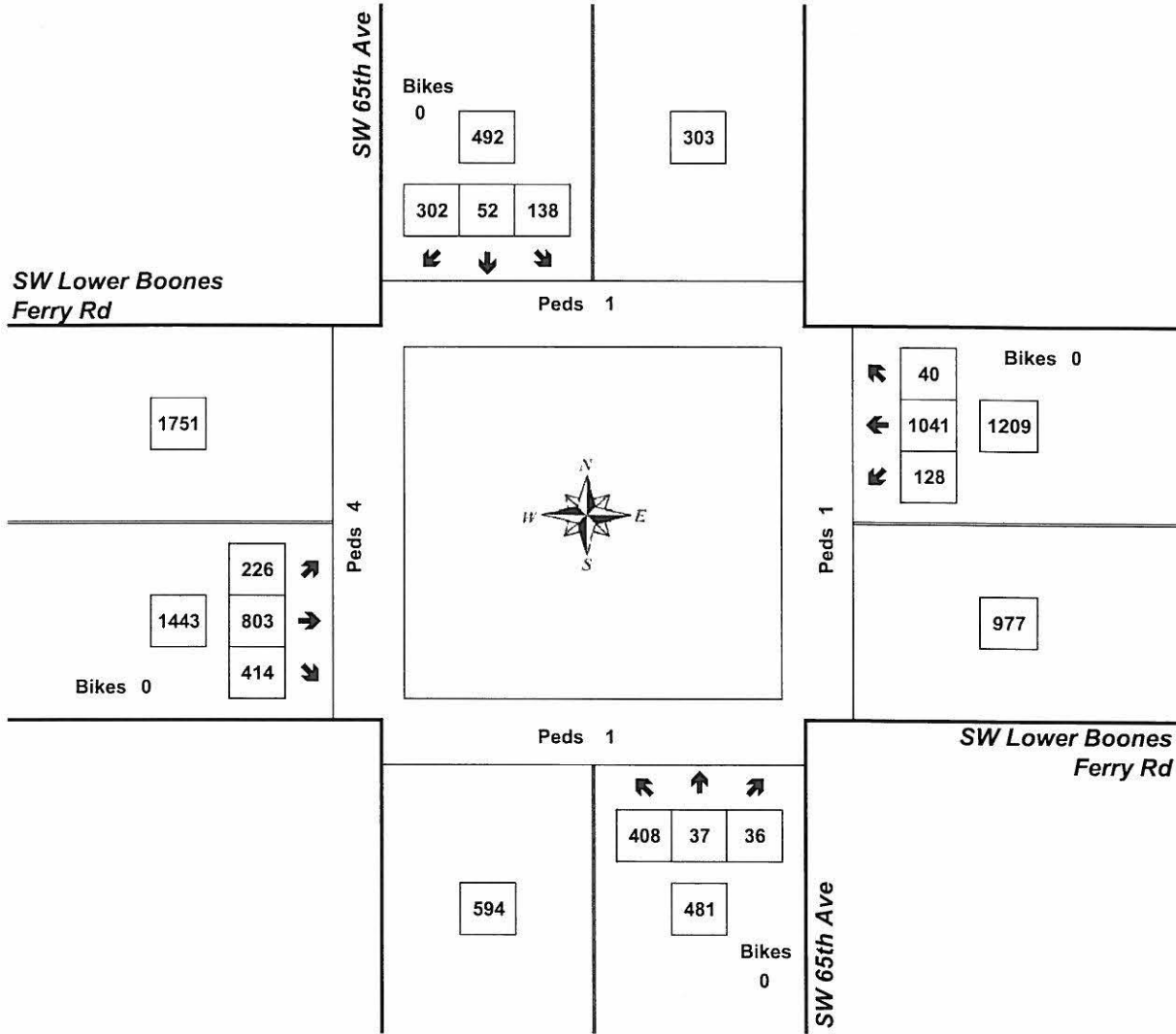
Peak Hour Summary



Clay Carney
(503) 833-2740

SW 65th Ave & SW Lower Boones Ferry Rd

4:20 PM to 5:20 PM
Wednesday, November 15, 2017



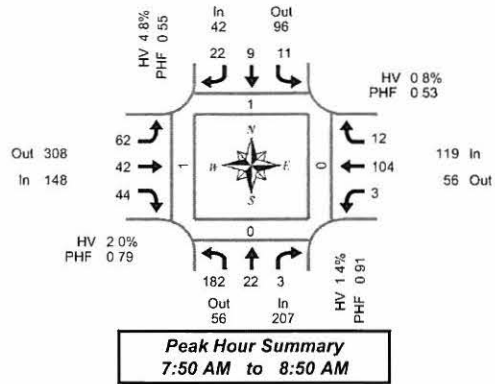
Approach	PHF	HV%	Volume
EB	0.91	2.2%	1,443
WB	0.91	1.2%	1,209
NB	0.87	1.2%	481
SB	0.91	1.8%	492
Intersection	0.96	1.7%	3,625

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

Total Vehicle Summary



Clay Carney
(503) 833-2740



SW 65th Ave & SW Mcewan Rd

Tuesday, November 28, 2017
7:00 AM to 9:00 AM

Peak Hour Summary
7:50 AM to 8:50 AM

5-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 65th Ave				Southbound SW 65th Ave				Eastbound SW Mcewan Rd				Westbound SW Mcewan Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	12	0	0	0	0	0	0	0	4	0	1	0	0	3	0	0	20	0	0	0	0
7:05 AM	12	2	0	0	0	0	2	0	1	2	0	0	0	1	0	0	20	0	0	0	0
7:10 AM	13	0	0	0	0	0	1	0	5	3	3	0	0	7	0	0	32	0	0	0	0
7:15 AM	15	1	0	0	0	0	3	0	2	2	0	0	0	5	0	0	28	0	0	0	0
7:20 AM	11	0	0	0	0	0	4	0	2	4	0	1	0	3	0	0	24	0	0	0	0
7:25 AM	19	1	0	0	0	0	4	0	2	2	1	0	0	9	0	0	36	0	0	0	0
7:30 AM	16	1	0	0	0	0	2	0	2	0	3	0	0	2	1	0	27	0	0	0	0
7:35 AM	14	1	0	0	2	0	1	0	4	4	1	0	0	3	0	0	30	0	0	0	0
7:40 AM	11	0	0	0	0	2	4	0	6	2	6	0	0	6	0	0	37	0	0	0	0
7:45 AM	18	0	0	0	0	0	0	0	4	2	0	0	0	7	0	0	31	0	0	1	0
7:50 AM	22	4	0	0	0	0	5	0	4	5	2	0	0	5	0	0	47	0	0	0	0
7:55 AM	15	0	0	0	0	0	1	0	9	2	6	0	0	8	0	0	41	0	0	0	0
8:00 AM	14	2	0	0	0	0	2	0	10	0	4	0	0	9	0	0	41	0	0	0	0
8:05 AM	19	1	0	0	0	0	2	0	6	3	3	0	0	5	0	0	39	0	0	0	1
8:10 AM	17	0	1	0	3	0	2	0	4	5	4	0	0	7	0	0	43	0	0	0	0
8:15 AM	14	3	0	0	3	1	2	0	3	8	5	0	2	4	4	0	49	0	0	0	0
8:20 AM	9	3	1	0	5	1	2	0	8	7	3	0	0	18	0	0	57	0	0	0	0
8:25 AM	20	2	1	0	0	1	1	0	2	2	3	0	1	23	3	0	59	1	0	0	0
8:30 AM	10	2	0	0	0	2	2	0	2	6	2	0	0	10	1	0	37	0	0	0	0
8:35 AM	8	2	0	0	0	0	3	0	3	2	3	0	0	6	1	0	28	0	0	0	0
8:40 AM	21	0	0	0	0	3	0	0	6	0	3	0	0	8	1	0	42	0	0	0	0
8:45 AM	13	3	0	0	0	1	0	0	5	2	6	0	0	1	2	0	33	0	0	0	0
8:50 AM	9	4	0	0	0	0	2	0	1	2	4	0	0	1	0	0	23	0	0	0	0
8:55 AM	10	1	0	0	0	0	3	0	3	1	4	0	0	9	2	0	33	0	0	0	0
Total Survey	342	33	3	0	13	11	48	0	98	66	67	1	3	160	15	0	859	1	0	1	1

15-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 65th Ave				Southbound SW 65th Ave				Eastbound SW Mcewan Rd				Westbound SW Mcewan Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	37	2	0	0	0	0	3	0	10	5	4	0	0	11	0	0	72	0	0	0	0
7:15 AM	45	2	0	0	0	0	11	0	6	8	1	1	0	17	0	0	90	0	0	0	0
7:30 AM	41	2	0	0	2	2	7	0	12	6	10	0	0	11	1	0	94	0	0	0	0
7:45 AM	55	4	0	0	0	0	6	0	17	9	8	0	0	20	0	0	119	0	0	1	0
8:00 AM	50	3	1	0	3	0	6	0	20	8	11	0	0	21	0	0	123	0	0	0	1
8:15 AM	43	8	2	0	8	3	5	0	13	17	11	0	3	45	7	0	165	1	0	0	0
8:30 AM	39	4	0	0	0	5	5	0	11	8	8	0	0	24	3	0	107	0	0	0	0
8:45 AM	32	8	0	0	0	1	5	0	9	5	14	0	0	11	4	0	89	0	0	0	0
Total Survey	342	33	3	0	13	11	48	0	98	66	67	1	3	160	15	0	859	1	0	1	1

Peak Hour Summary

7:50 AM to 8:50 AM

By Approach	Northbound SW 65th Ave				Southbound SW 65th Ave				Eastbound SW Mcewan Rd				Westbound SW Mcewan Rd				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	207	56	263	0	42	96	138	0	148	308	456	0	119	56	175	0	516	1	0	0	1
%HV		1.4%				4.8%				2.0%				0.8%			1.7%				
PHF		0.91				0.55				0.79				0.53			0.78				

By Movement	Northbound SW 65th Ave				Southbound SW 65th Ave				Eastbound SW Mcewan Rd				Westbound SW Mcewan Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	182	22	3	207	11	9	22	42	62	42	44	148	3	104	12	119	516
%HV	1.1%	4.5%	0.0%	1.4%	9.1%	11.1%	0.0%	4.8%	0.0%	2.4%	4.5%	2.0%	0.0%	0.0%	8.3%	0.8%	1.7%
PHF	0.89	0.69	0.38	0.91	0.25	0.45	0.69	0.55	0.62	0.53	0.85	0.79	0.25	0.51	0.43	0.53	0.78

Rolling Hour Summary

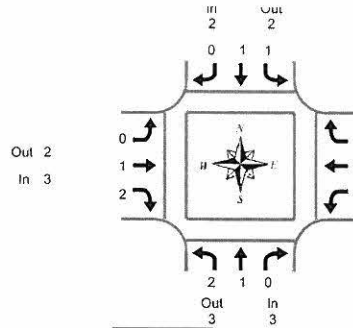
7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 65th Ave				Southbound SW 65th Ave				Eastbound SW Mcewan Rd				Westbound SW Mcewan Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	178	10	0	0	2	2	27	0	45	28	23	1	0	59	1	0	375	0	0	1	0
7:15 AM	191	11	1	0	5	2	30	0	55	31	30	1	0	69	1	0	426	0	0	1	1
7:30 AM	189	17	3	0	13	5	24	0	62	40	40	0	3	97	8	0	501	1	0	1	1
7:45 AM	187	19	3	0	11	8	22	0	61	42	38	0	3	110	10	0	514	1	0	1	1
8:00 AM	164	23	3	0	11	9	21	0	53	38	44	0	3	101	14	0	484	1	0	0	1

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



SW 65th Ave & SW Mcewan Rd

Tuesday, November 28, 2017

7:00 AM to 9:00 AM

Peak Hour Summary
7:50 AM to 8:50 AM

Heavy Vehicle 5-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 65th Ave				Southbound SW 65th Ave				Eastbound SW Mcewan Rd				Westbound SW Mcewan Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1
7:05 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:10 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:20 AM	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1
7:25 AM	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:35 AM	0	0	0	0	1	0	0	1	0	1	1	2	0	0	0	0	3
7:40 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:50 AM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
7:55 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
8:05 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:10 AM	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:20 AM	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1
8:25 AM	0	1	0	1	0	0	0	0	0	1	1	1	0	0	0	0	2
8:30 AM	0	0	0	0	0	1	0	1	0	0	1	1	0	0	0	0	2
8:35 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
8:40 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:50 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:55 AM	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1
Total Survey	2	1	0	3	2	1	2	5	0	2	5	7	0	0	1	1	16

Heavy Vehicle 15-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 65th Ave				Southbound SW 65th Ave				Eastbound SW Mcewan Rd				Westbound SW Mcewan Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1
7:15 AM	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	2
7:30 AM	0	0	0	0	1	0	0	1	0	1	1	2	0	0	0	0	3
7:45 AM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
8:00 AM	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
8:15 AM	0	1	0	1	1	0	0	1	0	0	1	1	0	0	0	0	3
8:30 AM	0	0	0	0	0	1	0	1	0	0	1	1	0	0	1	1	3
8:45 AM	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1
Total Survey	2	1	0	3	2	1	2	5	0	2	5	7	0	0	1	1	16

Heavy Vehicle Peak Hour Summary

7:50 AM to 8:50 AM

By Approach	Northbound SW 65th Ave			Southbound SW 65th Ave			Eastbound SW Mcewan Rd			Westbound SW Mcewan Rd			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	3	3	6	2	2	4	3	2	5	1	2	3	9
PHF	0.38			0.25			0.38			0.25			0.45

By Movement	Northbound SW 65th Ave				Southbound SW 65th Ave				Eastbound SW Mcewan Rd				Westbound SW Mcewan Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	2	1	0	3	1	1	0	2	0	1	2	3	0	0	1	1	9
PHF	0.25	0.25	0.00	0.38	0.25	0.25	0.00	0.25	0.00	0.25	0.25	0.38	0.00	0.00	0.25	0.25	0.45

Heavy Vehicle Rolling Hour Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 65th Ave				Southbound SW 65th Ave				Eastbound SW Mcewan Rd				Westbound SW Mcewan Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	0	0	0	0	1	0	2	3	0	2	2	4	0	0	0	0	7
7:15 AM	2	0	0	2	1	0	2	3	0	2	1	3	0	0	0	0	8
7:30 AM	2	1	0	3	2	0	0	2	0	2	2	4	0	0	0	0	9
7:45 AM	2	1	0	3	1	1	0	2	0	1	2	3	0	0	1	1	9
8:00 AM	2	1	0	3	1	1	0	2	0	0	3	3	0	0	1	1	9

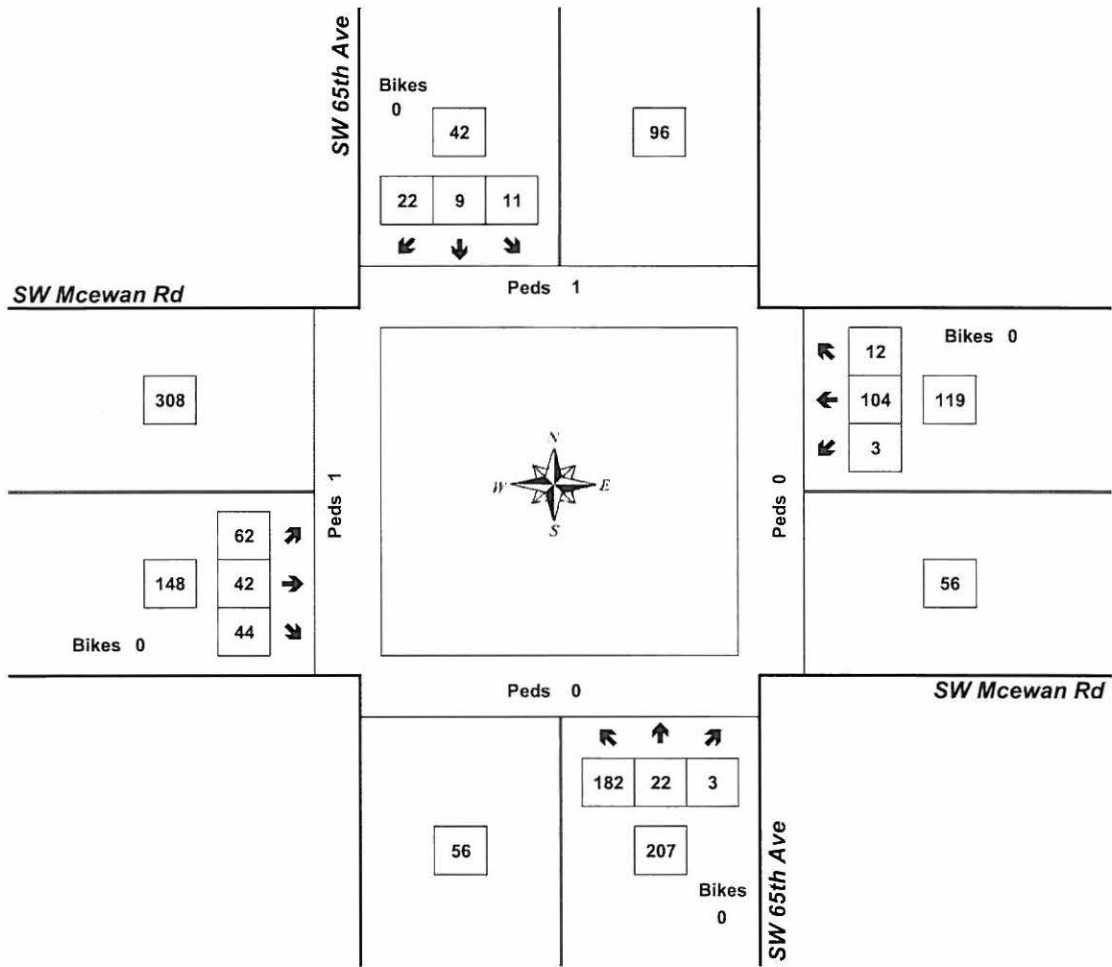
Peak Hour Summary



Clay Carney
(503) 833-2740

SW 65th Ave & SW Mcewan Rd

7:50 AM to 8:50 AM
Tuesday, November 28, 2017



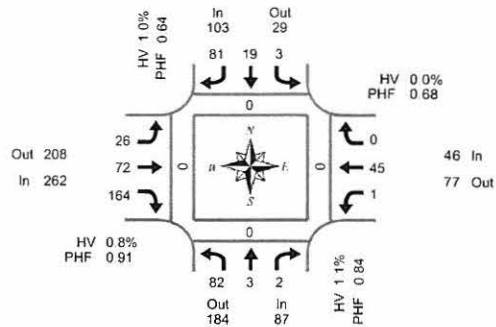
Approach	PHF	HV%	Volume
EB	0.79	2.0%	148
WB	0.53	0.8%	119
NB	0.91	1.4%	207
SB	0.55	4.8%	42
Intersection	0.78	1.7%	516

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

Total Vehicle Summary



Clay Carney
(503) 833-2740



Peak Hour Summary
5:00 PM to 6:00 PM

SW 65th Ave & SW Mcewan Rd

Tuesday, November 28, 2017

4:00 PM to 6:00 PM

5-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 65th Ave				Southbound SW 65th Ave				Eastbound SW Mcewan Rd				Westbound SW Mcewan Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	4	0	0	0	1	0	4	0	0	6	10	0	0	4	1	0	30	0	0	0	1
4:05 PM	10	0	0	0	0	1	7	0	4	4	18	0	0	2	0	0	46	0	0	0	0
4:10 PM	5	1	0	0	0	3	6	0	2	5	12	0	0	3	0	0	37	0	0	0	0
4:15 PM	6	1	0	0	0	2	2	0	4	0	15	0	0	8	0	0	38	0	0	0	0
4:20 PM	10	0	0	0	1	1	2	0	3	5	16	0	0	4	0	0	42	0	0	0	0
4:25 PM	6	0	0	0	0	1	4	0	3	8	10	0	0	2	1	0	35	0	0	0	0
4:30 PM	3	0	0	0	0	2	6	0	1	4	13	0	0	4	0	0	33	0	0	0	0
4:35 PM	8	0	0	0	0	2	8	0	1	4	15	0	0	7	0	0	45	0	0	0	0
4:40 PM	9	0	0	0	0	2	1	0	3	4	11	0	0	4	0	0	34	0	0	0	0
4:45 PM	10	1	1	0	0	2	3	0	5	4	18	0	0	2	0	0	46	0	0	0	0
4:50 PM	4	1	0	0	0	0	4	0	0	10	9	0	0	0	1	0	29	1	0	0	0
4:55 PM	2	1	0	0	0	2	6	0	1	5	14	0	0	4	0	0	35	0	0	0	0
5:00 PM	2	0	0	0	1	1	9	0	2	5	20	0	0	7	0	0	47	0	0	0	0
5:05 PM	7	0	0	0	0	5	13	0	1	8	9	0	1	3	0	0	47	0	0	0	0
5:10 PM	9	0	0	0	0	0	11	0	1	6	13	0	0	0	0	0	40	0	0	0	0
5:15 PM	3	2	1	0	0	3	8	0	1	4	17	0	0	5	0	0	44	0	0	0	0
5:20 PM	10	0	0	0	0	2	6	0	4	3	16	0	0	1	0	0	42	0	0	0	0
5:25 PM	4	0	0	0	1	2	4	0	3	5	9	0	0	6	0	0	34	0	0	0	0
5:30 PM	9	0	0	0	0	1	3	0	3	8	16	0	0	0	0	0	40	0	0	0	0
5:35 PM	7	1	0	0	0	2	5	0	1	2	12	0	0	9	0	0	39	0	0	0	0
5:40 PM	5	0	1	0	1	0	5	0	1	9	11	0	0	5	0	0	38	0	0	0	0
5:45 PM	7	0	0	0	0	0	7	0	3	11	12	0	0	3	0	0	43	0	0	0	0
5:50 PM	13	0	0	0	0	1	5	0	3	5	11	0	0	2	0	0	40	0	0	0	0
5:55 PM	6	0	0	0	0	2	5	0	3	6	18	0	0	4	0	0	44	0	0	0	0
Total Survey	159	8	3	0	5	37	134	0	53	131	325	0	1	89	3	0	948	1	0	0	1

15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 65th Ave				Southbound SW 65th Ave				Eastbound SW Mcewan Rd				Westbound SW Mcewan Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	19	1	0	0	1	4	17	0	6	15	40	0	0	9	1	0	113	0	0	0	1
4:15 PM	22	1	0	0	1	4	8	0	10	13	41	0	0	14	1	0	115	0	0	0	0
4:30 PM	20	0	0	0	0	6	15	0	5	12	39	0	0	15	0	0	112	0	0	0	0
4:45 PM	16	3	1	0	0	4	13	0	6	19	41	0	0	6	1	0	110	1	0	0	0
5:00 PM	18	0	0	0	1	6	33	0	4	19	42	0	1	10	0	0	134	0	0	0	0
5:15 PM	17	2	1	0	1	7	18	0	8	12	42	0	0	12	0	0	120	0	0	0	0
5:30 PM	21	1	1	0	1	3	13	0	5	19	39	0	0	14	0	0	117	0	0	0	0
5:45 PM	26	0	0	0	0	3	17	0	9	22	41	0	0	9	0	0	127	0	0	0	0
Total Survey	159	8	3	0	5	37	134	0	53	131	325	0	1	89	3	0	948	1	0	0	1

Peak Hour Summary

5:00 PM to 6:00 PM

By Approach	Northbound SW 65th Ave				Southbound SW 65th Ave				Eastbound SW Mcewan Rd				Westbound SW Mcewan Rd				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	87	184	271	0	103	29	132	0	262	208	470	0	46	77	123	0	498	0	0	0	0
%HV		1.1%				1.0%				0.8%				0.0%	0.0%		0.8%				
PHF		0.84				0.64				0.91				0.68			0.93				

By Movement	Northbound SW 65th Ave				Southbound SW 65th Ave				Eastbound SW Mcewan Rd				Westbound SW Mcewan Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	82	3	2	87	3	19	81	103	26	72	164	262	1	45	0	46	498
%HV	0.0%	0.0%	50.0%	1.1%	0.0%	0.0%	1.2%	1.0%	3.8%	0.0%	0.6%	0.8%	0.0%	0.0%	0.0%	0.0%	0.8%
PHF	0.79	0.38	0.50	0.84	0.75	0.59	0.61	0.64	0.65	0.72	0.89	0.91	0.25	0.66	0.00	0.68	0.93

Rolling Hour Summary

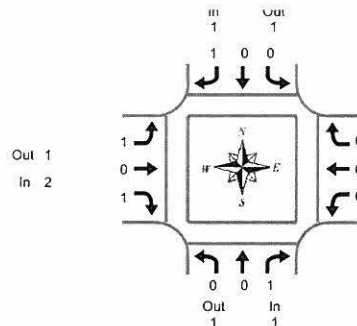
4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 65th Ave				Southbound SW 65th Ave				Eastbound SW Mcewan Rd				Westbound SW Mcewan Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	77	5	1	0	2	18	53	0	27	59	161	0	0	44	3	0	450	1	0	0	1
4:15 PM	76	4	1	0	2	20	69	0	25	63	163	0	1	45	2	0	471	1	0	0	0
4:30 PM	71	5	2	0	2	23	79	0	23	62	164	0	1	43	1	0	476	1	0	0	0
4:45 PM	72	6	3	0	3	20	77	0	23	69	164	0	1	42	1	0	481	1	0	0	0
5:00 PM	82	3	2	0	3	19	81	0	26	72	164	0	1	45	0	0	498	0	0	0	0

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



SW 65th Ave & SW Mcewan Rd

Tuesday, November 28, 2017

4:00 PM to 6:00 PM

Peak Hour Summary
5:00 PM to 6:00 PM

Heavy Vehicle 5-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 65th Ave				Southbound SW 65th Ave				Eastbound SW Mcewan Rd				Westbound SW Mcewan Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
4:05 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:10 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
4:20 PM	0	0	0	0	0	0	0	0	1	0	1	2	0	0	0	0	2
4:25 PM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	1	2
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:35 PM	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	2
4:40 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
4:50 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:55 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1
5:05 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:10 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:20 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:25 PM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:35 PM	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1
5:40 PM	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:50 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:55 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	1	0	1	2	0	1	3	4	3	0	2	5	0	1	1	2	13

Heavy Vehicle 15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 65th Ave				Southbound SW 65th Ave				Eastbound SW Mcewan Rd				Westbound SW Mcewan Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
4:15 PM	0	0	0	0	0	1	0	1	2	0	1	3	0	0	1	1	5
4:30 PM	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	2
4:45 PM	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
5:00 PM	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1
5:15 PM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1
5:30 PM	0	0	1	1	0	0	0	0	0	0	1	1	0	0	0	0	2
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	1	0	1	2	0	1	3	4	3	0	2	5	0	1	1	2	13

Heavy Vehicle Peak Hour Summary

5:00 PM to 6:00 PM

By Approach	Northbound SW 65th Ave			Southbound SW 65th Ave			Eastbound SW Mcewan Rd			Westbound SW Mcewan Rd			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	1	1	2	1	1	2	2	1	3	0	1	1	4
PHF	0.25			0.25			0.25			0.00			0.50

By Movement	Northbound SW 65th Ave				Southbound SW 65th Ave				Eastbound SW Mcewan Rd				Westbound SW Mcewan Rd				Total				
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total					
Volume	0	0	1	1	0	0	1	1	1	0	1	2	0	0	0	0	0	0	0	0	4
PHF	0.00	0.00	0.25	0.25	0.00	0.00	0.25	0.25	0.25	0.00	0.25	0.25	0.00	0.00	0.00	0.00	0.00	0.50			

Heavy Vehicle Rolling Hour Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 65th Ave				Southbound SW 65th Ave				Eastbound SW Mcewan Rd				Westbound SW Mcewan Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	1	0	0	1	0	1	2	3	2	0	1	3	0	1	1	2	9
4:15 PM	1	0	0	1	0	1	3	4	2	0	1	3	0	0	1	1	9
4:30 PM	1	0	0	1	0	0	3	3	1	0	0	1	0	0	0	0	5
4:45 PM	1	0	1	2	0	0	1	1	1	0	1	2	0	0	0	0	5
5:00 PM	0	0	1	1	0	0	1	1	1	0	1	2	0	0	0	0	4

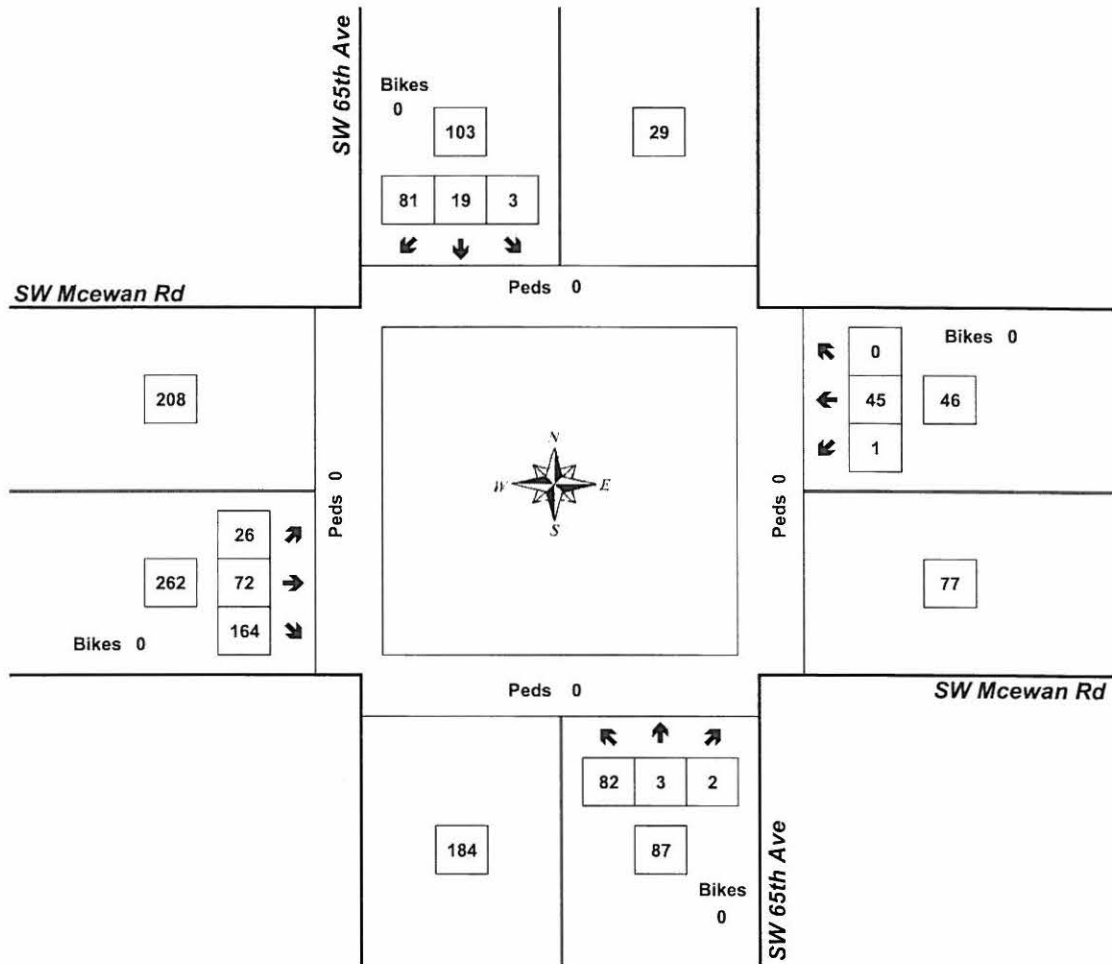
Peak Hour Summary



Clay Carney
(503) 833-2740

SW 65th Ave & SW Mcewan Rd

5:00 PM to 6:00 PM
Tuesday, November 28, 2017



Approach	PHF	HV%	Volume
EB	0.91	0.8%	262
WB	0.68	0.0%	46
NB	0.84	1.1%	87
SB	0.64	1.0%	103
Intersection	0.93	0.8%	498

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

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CRASH SUMMARIES BY YEAR BY COLLISION TYPE
65TH AVE at BOONES FERRY RD, City of Tualatin, Clackamas County, 01/01/2011 to 12/31/2015

COLLISION TYPE	FATAL CRASHES	NON- FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER- SECTION	INTER- SECTION RELATED	OFF- ROAD
YEAR: 2012														
ANGLE	0	1	0	1	0	4	0	0	1	0	1	1	0	0
REAR-END	0	2	1	3	0	3	0	1	2	2	1	3	0	0
YEAR 2012 TOTAL	0	3	1	4	0	7	0	1	3	2	2	4	0	0
YEAR: 2011														
REAR-END	0	1	1	2	0	1	0	0	1	1	1	2	0	0
YEAR 2011 TOTAL	0	1	1	2	0	1	0	0	1	1	1	2	0	0
FINAL TOTAL	0	4	2	6	0	8	0	1	4	3	3	6	0	0

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirements, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

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

CITY OF TUALATIN, CLACKAMAS COUNTY

65TH AVE at BOONES FERRY RD, City of Tualatin, Clackamas County, 01/01/2011 to 12/31/2015

TOTAL CRASH RECORDS: 6

CASE NO	DATE	CLASS	CITY STREET	RD CLAS	INT-TYPE			WTR	CSASH	SPCL USE		MOVE	PRC	SVR	EX	PES	LSC	SBRCP	ACT	EVENT	CAUSE	
					LEIS	TRAF	ORDEL			SRF	CLL											TRIP
INVERT	TIME	DISC	STREET	DIR	LANE	CONFL	LEVAY	DRY	STOP	VEH	VEH	FRM	DR	TYE	SVR	EX	PES	LSC	SBRCP	ACT	EVENT	CAUSE
20216	11/15/2012	14	BOONES FERRY RD SW 65TH AVE	INTER	CROSS	N	N	RAIN	S-1STOP	01	NONE	0	STRECHT									
				NE		TRF SIGNAL	N	WET	FRAR		PRVTE	NE-SW									000	00
				06	0		N	LAZ	INJ		PSNGR CAR			01	DRVE	NONE	16	F	OR-Y	026	000	00
											02	NONE	0	STOP								
											PRVTE	NE-SW									011	00
											PSNGR CAR			01	DRVE	TRIC	42	M	OR-Y	080	000	00
41248	10/14/2012	14	BOONES FERRY RD SW 65TH AVE	INTER	CROSS	N	N	CLR	S-1STOP	01	NONE	0	STRECHT									
				NE		TRF SIGNAL	N	DRY	REAR		PRVTE	NE-SW									000	00
				06	0		N	DAY	PCD		UNKNOWN			01	DRVE	NONE	00	M	OR-Y	026	000	00
											02	NONE	0	STOP								
											PRVTE	NE-SW									011	00
											PSNGR CAR			01	DRVE	NONE	32	P	OR-Y	080	000	00
54430	11/19/2012	14	BOONES FERRY RD SW 65TH AVE	INTER	CROSS	N	N	RAIN	S-1STOP	01	NONE	0	STRECHT									
				NE		TRF SIGNAL	N	WET	FRAR		PRVTE	NE-SW									000	00
				06	1		N	DLIT	INJ		PSNGR CAR			01	DRVE	NONE	17	M	OR-Y	145	000	13
											02	NONE	0	STOP								
											PRVTE	NE-SW									011	00
											PSNGR CAR			01	DRVE	TRIC	11	P	OR-Y	080	000	00
54631	12/12/2011	16	BOONES FERRY RD SW 65TH AVE	INTER	CROSS	N	N	DRY	S-1STOP	01	NONE	0	STRECHT									
				S		TRF SIGNAL	N	DRY	FRAR		PRVTE	S-N									000	00
				06	0		N	DLIT	PCD		PSNGR CAR			01	DRVE	NONE	55	F	OR-Y	026	000	00
											02	NONE	0	STOP								
											PRVTE	S-N									011	00
											PSNGR CAR			01	DRVE	NONE	40	M	OR-Y	080	000	00
44749	11/11/2011	16	BOONES FERRY RD SW 65TH AVE	INTER	CROSS	N	N	RAIN	S-1STOP	01	NONE	0	STRECHT									
				S		TRF SIGNAL	N	WET	REAR		PRVTE	S-N									000	00
				06	0		N	DAY	INJ		PSNGR CAR			01	DRVE	NONE	24	F	OR-Y	026	088	00
											02	NONE	0	STOP								
											PRVTE	S-N									011	00
											PSNGR CAR			01	DRVE	TRIC	52	F	OR-Y	080	080	00
56214	11/23/2013	14	BOONES FERRY RD SW 65TH AVE	INTER	CROSS	N	N	RAIN	ANGL-OTH	01	NONE	0	STRECHT									
				CH		TRF SIGNAL	N	WET	ANGL		PRVTE	E-W									000	00
				02	1		N	DLIT	INJ		PSNGR CAR			01	DRVE	NONE	65	M	OTH-Y	026	000	04
											01	NONE	0	STRECHT								
											PRVTE	E-W									011	00
											PSNGR CAR			01	DRVE	TRIC	59	F	OR-Y	080	000	00

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in CRS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirement, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

ODS380
01/14/2017

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

Page: 2

CITY OF TUALATIN, CLACKAMAS COUNTY

65TH AVE at BOONES FERRY RD, City of Tualatin, Clackamas County, 01/01/2011 to 12/31/2015

TOTAL CRASH RECORDS: 6

SR	RD	INT-TYPE	SPCL USE	MOV	A	S	ACT	CAUSE															
FILE	DATE	CLASS	CITY STREET	RD CHAR	DIR	LANES	CONTR	DRVRY	AL HIT	SVETY	VE TYPE	TO	PR TYER	SVRTY	E	X	RES	LSV	FR20R	ACT	SVNT	CAUSE	
											02 NONE	0	STREHT										
											DRVTE		S -N										
											PSNGR	CAR		01	DRVK	NDR	20	F	OR-V			000	000
																						00	
											02 NONE	0	STREHT										
											DRVTE		S -N										
											PSNGR	CAR		02	PSNG	NDR	21	F				000	000
																						00	
											02 NONE	0	STREHT										
											DRVTE		S -N										
											PSNGR	CAR		03	PSNG	NDR	33	M				000	000
																						00	

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirement effective 01/01/2004 may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CRASH SUMMARIES BY YEAR BY COLLISION TYPE
65TH AVE at LOWER BOONES FERRY, City of Tualatin, Washington County, 01/01/2011 to 12/31/2015

COLLISION TYPE	FATAL CRASHES	NON- FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER- SECTION	INTER- SECTION RELATED	OFF- ROAD
YEAR: 2014														
FIXED / OTHER OBJECT	0	0	1	1	0	0	0	0	1	0	1	1	0	1
YEAR 2014 TOTAL	0	0	1	1	0	0	0	0	1	0	1	1	0	1
YEAR: 2012														
REAR-END	0	0	1	1	0	0	0	1	0	1	0	1	0	0
YEAR 2012 TOTAL	0	0	1	1	0	0	0	1	0	1	0	1	0	0
YEAR: 2011														
REAR-END	0	1	0	1	0	1	0	1	0	1	0	1	0	0
TURNING MOVEMENTS	0	0	1	1	0	0	0	0	1	0	1	1	0	0
YEAR 2011 TOTAL	0	1	1	2	0	1	0	1	1	1	1	2	0	0
FINAL TOTAL	0	1	3	4	0	1	0	2	2	2	2	4	0	1

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirements, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

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

CITY OF TUALATIN, WASHINGTON COUNTY

65TH AVE at LOWER BOONES FERRY, City of Tualatin, Washington County, 01/01/2011 to 12/31/2015

Total Crash Records: 4

FILE	DATE	CLASS	CITY STREET	RD CHAR	INT-TYPE	INT-RTG	ORTRD	WTRF	CRASH	SPEC USE	MOVE	PREC	SVTY	SEX	AGE	PRD	SPROR	ACT EVENT	CAUSE	
INVEST	TIME	FROM	SECOND STREET	DIR	(LANES)	(CON)	DEVMY	DIRT	SVETY	V# TYPE	TO	RE TYPE	SVTY	B	X	POS	LEN	SPROR	ACT EVENT	CAUSE
NONP	04/20/2011	03	SW LOWER BOONES FERRY INTER	W	CROSS	N	N	CLR	S-1STOP	01	NONP	0	STDRHT							
	11A	0	SW 65TH AVE	W				DRY	FRAR	01	UNKN	0	W -4					026	000	00
				06	0			DRY	FRAR	01	PSNGR CAR		01	DRVP	NONP	00	M	DR-Y		00
										02	NONE	0	STOP							
										01	PSNGR CAR		01	DRVP	NONP	39	F	DR-Y		00
																		000	000	00
06844	07/15/2014	04	SW LOWER BOONES FERRY INTER	E	CROSS	N	Y	RAIN	F-X DRG	01	NONP	0	STDRHT							
CITY	SA	05	SW 65TH AVE	E				WET	FLX	01	PRVTE	0	W -1							
	1P	0		05	0			BLT	FLX	01	PSNGR CAR		01	DRVP	NONP	22	M	DR-Y		000
																		047,000	000	00
																			000	000
05371	05/18/2011	04	SW LOWER BOONES FERRY INTER	W	CROSS	N	N	CLR	S-1STOP	01	UNKN	0	STDRHT							
CITY	1P	06	SW 65TH AVE	W				DRY	FLAR	01	UNKN	0	W -4							
				06	0			DRY	FLAR	01	PSNGR CAR		01	DRVP	NONP	00	DR	DR-Y		000
										02	NONE	0	STOP							
										01	PSNGR CAR		01	DRVP	NONP	11	F	DR-Y		000
																		000	000	00
										03	NONE	0	STOP							
										01	PSNGR CAR		01	DRVP	NONP	56	F	DR-Y		000
																		000	000	00
05508	11/11/2011	04	SW LOWER BOONES FERRY INTER	W	CROSS	N	N	RAIN	S-1 L-TURN	01	NONP	0	STDRHT							
NONP	5P	07	SW 65TH AVE	W				WET	FLAR	01	PRVTE	0	W -4							
	7P	0		07	0			DRY	FLAR	01	PSNGR CAR		01	DRVP	NONP	27	F	DR-Y		000
										02	UNKN	0	TURN-L							
										01	PSNGR CAR		01	DRVP	NONP	00	M	DR-Y		000
																		004,028	000	00
																			000	00

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirement, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CRASH SUMMARIES BY YEAR BY COLLISION TYPE
65TH AVE at MCEWAN RD, City of Tualatin, Clackamas County, 01/01/2011 to 12/31/2015

COLLISION TYPE	FATAL CRASHES	NON- FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER- SECTION	INTER- SECTION RELATED	OFF- ROAD
FINAL TOTAL														

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirements, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CRASH SUMMARIES BY YEAR BY COLLISION TYPE
65TH AVE at MCEWAN RD, City of Tualatin, Washington County, 01/01/2011 to 12/31/2015

COLLISION TYPE	FATAL CRASHES	NON- FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER- SECTION	INTER- SECTION RELATED	OFF- ROAD
YEAR: 2013														
TURNING MOVEMENTS	0	0	1	1	0	0	0	1	0	0	1	1	0	0
YEAR 2013 TOTAL	0	0	1	1	0	0	0	1	0	0	1	1	0	0
FINAL TOTAL	0	0	1	1	0	0	0	1	0	0	1	1	0	0

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirements, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
 TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
 CRASH SUMMARIES BY YEAR BY COLLISION TYPE
 65TH AVE at MCEWAN RD, City of Tualatin, Washington County, 01/01/2011 to 12/31/2015

COLLISION TYPE	FATAL CRASHES	NON- FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER- SECTION	INTER- SECTION RELATED	OFF- ROAD
YEAR: 2013														
TURNING MOVEMENTS	0	0	1	1	0	0	0	1	0	0	1	1	0	0
YEAR 2013 TOTAL	0	0	1	1	0	0	0	1	0	0	1	1	0	0
FINAL TOTAL	0	0	1	1	0	0	0	1	0	0	1	1	0	0

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirements, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

Left-Turn Lane Warrant Analysis

Le

Project: TVF&R Station 39
 Intersection: North Site Access at SW McEwan Road
 Date: 11/28/2017
 Scenario: 2019 Background plus Site Conditions - AM Peak Hour

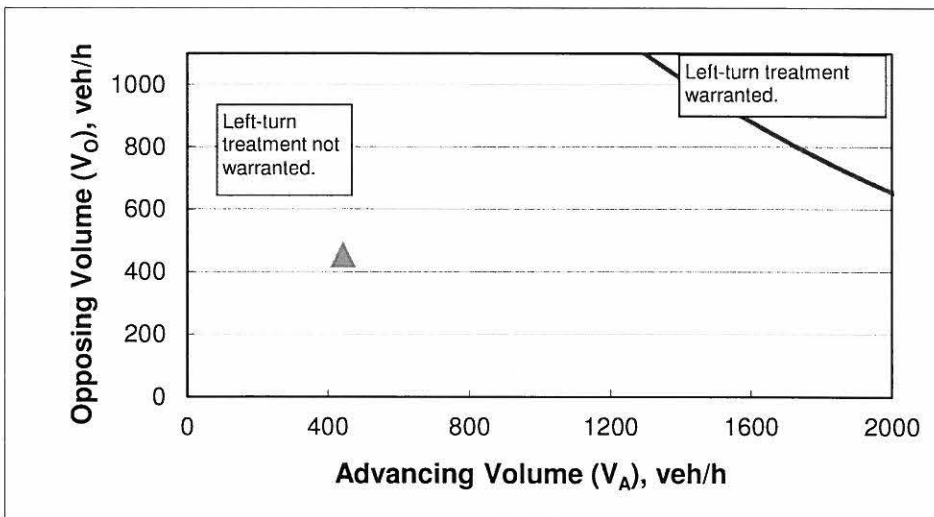
2-lane roadway (English)

INPUT

Variable	Value
85 th percentile speed, mph:	30
Percent of left-turns in advancing volume (V_A), %:	0%
Advancing volume (V_A), veh/h:	443
Opposing volume (V_O), veh/h:	454

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	2456
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Left-Turn Lane Warrant Analysis

Le

Project: TVF&R Station 39
 Intersection: North Site Access at SW McEwan Road
 Date: 11/28/2017
 Scenario: 2019 Background plus Site Conditions - PM Peak Hour

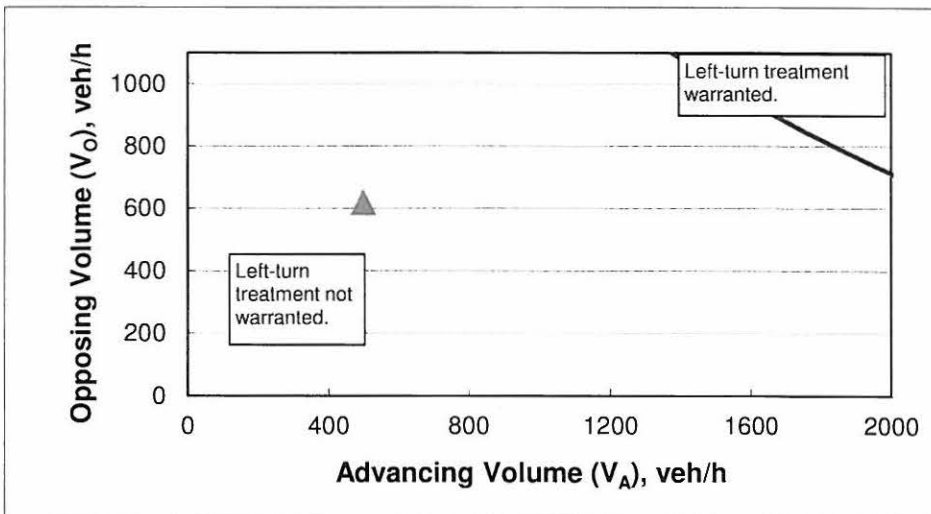
2-lane roadway (English)

INPUT

Variable	Value
85 th percentile speed, mph:	30
Percent of left-turns in advancing volume (V_A), %:	0%
Advancing volume (V_A), veh/h:	499
Opposing volume (V_O), veh/h:	620

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	2199
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Traffic Signal Warrant Analysis

Project: TVF&R Station 39
 Date: 11/30/2017
 Scenario: Year 2019 Background plus Site Conditions

Major Street:	SW McEwan Road	Minor Street:	SW 65th Avenue
Number of Lanes:	1	Number of Lanes:	1
PM Peak Hour Volumes:	322	PM Peak Hour Volumes:	90

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
WARRANT 1, CONDITION A					
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
WARRANT 1, CONDITION 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?
<i>Warrant 1</i>			
<i>Condition A: Minimum Vehicular Volume</i>			
Major Street	3,220	8,850	
Minor Street*	900	2,650	No
<i>Condition B: Interruption of Continuous Traffic</i>			
Major Street	3,220	13,300	
Minor Street*	900	1,350	No
<i>Combination Warrant</i>			
Major Street	3,220	10,640	
Minor Street*	900	2,120	No

* Minor street right-turning traffic volumes reduced by 25%

1e

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.

Le

*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

HCM Signalized Intersection Capacity Analysis
 1: SW 65th Avenue & SW Lower Boones Ferry Road

11/30/2017

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	232	975	306	102	811	30	365	32	28	63	24	125
Future Volume (vph)	232	975	306	102	811	30	365	32	28	63	24	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5			4.5	4.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91		0.95	0.95			1.00	1.00
Frbp, ped/bikes	1.00	1.00	0.99	1.00	1.00		1.00	1.00			1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.98			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.97			0.97	1.00
Satd. Flow (prot)	1719	3438	1515	1736	4955		1665	1655			1777	1559
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.97			0.64	1.00
Satd. Flow (perm)	1719	3438	1515	1736	4955		1665	1655			1178	1559
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	252	1060	333	111	882	33	397	35	30	68	26	136
RTOR Reduction (vph)	0	0	151	0	4	0	0	6	0	0	0	48
Lane Group Flow (vph)	252	1060	182	111	911	0	230	226	0	0	94	88
Confl. Peds. (#/hr)	5		1	1		5	1		3	3		1
Confl. Bikes (#/hr)			1			1						
Heavy Vehicles (%)	5%	5%	5%	4%	4%	4%	3%	3%	3%	3%	3%	3%
Turn Type	Prot	NA	pm+ov	Prot	NA		Split	NA		Perm	NA	pm+ov
Protected Phases	7	4	2	3	8		2	2			6	7
Permitted Phases			4							6		6
Actuated Green, G (s)	15.7	28.4	44.2	6.9	19.6		15.8	15.8			11.6	27.3
Effective Green, g (s)	15.7	28.4	44.2	6.9	19.6		15.8	15.8			11.6	27.3
Actuated g/C Ratio	0.19	0.35	0.55	0.09	0.24		0.20	0.20			0.14	0.34
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5			4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	334	1209	914	148	1203		325	324			169	614
v/s Ratio Prot	c0.15	c0.31	0.04	0.06	0.18		c0.14	0.14				0.03
v/s Ratio Perm			0.08								c0.08	0.03
v/c Ratio	0.75	0.88	0.20	0.75	0.76		0.71	0.70			0.56	0.14
Uniform Delay, d1	30.7	24.5	9.3	36.1	28.3		30.3	30.2			32.2	18.6
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	9.3	7.4	0.1	19.0	2.8		6.9	6.4			3.9	0.1
Delay (s)	40.0	31.9	9.4	55.1	31.1		37.2	36.7			36.1	18.7
Level of Service	D	C	A	E	C		D	D			D	B
Approach Delay (s)		28.6			33.7			36.9			25.8	
Approach LOS		C			C			D			C	

Intersection Summary

HCM 2000 Control Delay	31.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	80.7	Sum of lost time (s)	18.0
Intersection Capacity Utilization	62.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Intersection

Intersection Delay, s/veh 10
 Intersection LOS A

























Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	62	42	44	3	104	12	182	22	3	11	9	22
Future Vol, veh/h	62	42	44	3	104	12	182	22	3	11	9	22
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Heavy Vehicles, %	2	2	2	1	1	1	1	1	1	5	5	5
Mvmt Flow	79	54	56	4	133	15	233	28	4	14	12	28
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.6	9.3	10.9	8.4
HCM LOS	A	A	B	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	88%	42%	3%	26%
Vol Thru, %	11%	28%	87%	21%
Vol Right, %	1%	30%	10%	52%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	207	148	119	42
LT Vol	182	62	3	11
Through Vol	22	42	104	9
RT Vol	3	44	12	22
Lane Flow Rate	265	190	153	54
Geometry Grp	1	1	1	1
Degree of Util (X)	0.367	0.255	0.208	0.073
Departure Headway (Hd)	4.973	4.839	4.907	4.907
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	719	738	726	722
Service Time	3.036	2.901	2.973	2.99
HCM Lane V/C Ratio	0.369	0.257	0.211	0.075
HCM Control Delay	10.9	9.6	9.3	8.4
HCM Lane LOS	B	A	A	A
HCM 95th-tile Q	1.7	1	0.8	0.2

HCM Signalized Intersection Capacity Analysis
 1: SW 65th Avenue & SW Lower Boones Ferry Road

11/30/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	226	803	414	128	1041	40	408	37	36	138	52	302
Future Volume (vph)	226	803	414	128	1041	40	408	37	36	138	52	302
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5			4.5	4.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91		0.95	0.95			1.00	1.00
Frbp, ped/bikes	1.00	1.00	0.99	1.00	1.00		1.00	1.00			1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.98			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.97			0.96	1.00
Satd. Flow (prot)	1770	3539	1562	1787	5103		1698	1685			1797	1570
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.97			0.96	1.00
Satd. Flow (perm)	1770	3539	1562	1787	5103		1698	1685			1797	1570
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	235	836	431	133	1084	42	425	39	38	144	54	315
RTOR Reduction (vph)	0	0	216	0	5	0	0	7	0	0	0	47
Lane Group Flow (vph)	235	836	215	133	1121	0	251	244	0	0	198	268
Confl. Peds. (#/hr)	1		1	1		1	4		1	1		4
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	2%	2%	2%
Turn Type	Prot	NA	pm+ov	Prot	NA		Split	NA		Split	NA	pm+ov
Protected Phases	7	4	2	3	8		2	2		6	6	7
Permitted Phases			4									6
Actuated Green, G (s)	15.0	24.6	41.0	9.3	18.9		16.4	16.4			13.9	28.9
Effective Green, g (s)	15.0	24.6	41.0	9.3	18.9		16.4	16.4			13.9	28.9
Actuated g/C Ratio	0.18	0.30	0.50	0.11	0.23		0.20	0.20			0.17	0.35
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5			4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	322	1059	864	202	1173		338	336			303	637
v/s Ratio Prot	c0.13	0.24	0.05	0.07	c0.22		c0.15	0.14			c0.11	0.08
v/s Ratio Perm			0.09									0.09
v/c Ratio	0.73	0.79	0.25	0.66	0.96		0.74	0.73			0.65	0.42
Uniform Delay, d1	31.7	26.4	11.8	34.9	31.2		30.9	30.8			31.9	20.3
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	8.0	4.0	0.2	7.5	16.7		8.5	7.6			5.0	0.4
Delay (s)	39.7	30.4	11.9	42.5	47.9		39.4	38.4			36.9	20.7
Level of Service	D	C	B	D	D		D	D			D	C
Approach Delay (s)		26.6			47.3			38.9			27.0	
Approach LOS		C			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	35.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	82.2	Sum of lost time (s)	18.0
Intersection Capacity Utilization	64.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection

Intersection Delay, s/veh 8.7
 Intersection LOS A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	26	72	164	1	45	1	82	3	2	3	19	81
Future Vol, veh/h	26	72	164	1	45	1	82	3	2	3	19	81
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	1	1	1	0	0	0	1	1	1	1	1	1
Mvmt Flow	28	77	176	1	48	1	88	3	2	3	20	87
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.1	8	8.7	8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	94%	10%	2%	3%
Vol Thru, %	3%	27%	96%	18%
Vol Right, %	2%	63%	2%	79%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	87	262	47	103
LT Vol	82	26	1	3
Through Vol	3	72	45	19
RT Vol	2	164	1	81
Lane Flow Rate	94	282	51	111
Geometry Grp	1	1	1	1
Degree of Util (X)	0.128	0.321	0.066	0.132
Departure Headway (Hd)	4.937	4.099	4.666	4.289
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	725	879	767	835
Service Time	2.972	2.121	2.698	2.322
HCM Lane V/C Ratio	0.13	0.321	0.066	0.133
HCM Control Delay	8.7	9.1	8	8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.4	1.4	0.2	0.5

HCM Signalized Intersection Capacity Analysis
 1: SW 65th Avenue & SW Lower Boones Ferry Road

11/30/2017

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	241	1014	318	106	844	31	380	33	29	66	25	130
Future Volume (vph)	241	1014	318	106	844	31	380	33	29	66	25	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5			4.5	4.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91		0.95	0.95			1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00		1.00	1.00			1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.98			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.97			0.96	1.00
Satd. Flow (prot)	1719	3438	1515	1736	4955		1665	1654			1776	1559
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.97			0.63	1.00
Satd. Flow (perm)	1719	3438	1515	1736	4955		1665	1654			1166	1559
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	262	1102	346	115	917	34	413	36	32	72	27	141
RTOR Reduction (vph)	0	0	154	0	4	0	0	6	0	0	0	48
Lane Group Flow (vph)	262	1102	192	115	947	0	240	235	0	0	99	93
Confl. Peds. (#/hr)	5		1	1		5	1		3	3		1
Confl. Bikes (#/hr)			1			1						
Heavy Vehicles (%)	5%	5%	5%	4%	4%	4%	3%	3%	3%	3%	3%	3%
Turn Type	Prot	NA	pm+ov	Prot	NA		Split	NA		Perm	NA	pm+ov
Protected Phases	7	4	2	3	8		2	2			6	7
Permitted Phases			4							6		6
Actuated Green, G (s)	16.1	29.5	45.6	6.7	20.1		16.1	16.1			12.0	28.1
Effective Green, g (s)	16.1	29.5	45.6	6.7	20.1		16.1	16.1			12.0	28.1
Actuated g/C Ratio	0.20	0.36	0.55	0.08	0.24		0.20	0.20			0.15	0.34
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5			4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	336	1232	922	141	1210		325	323			170	617
v/s Ratio Prot	c0.15	c0.32	0.04	0.07	0.19		c0.14	0.14				0.03
v/s Ratio Perm			0.09								c0.08	0.03
v/c Ratio	0.78	0.89	0.21	0.82	0.78		0.74	0.73			0.58	0.15
Uniform Delay, d1	31.4	24.9	9.2	37.2	29.1		31.1	31.0			32.8	18.8
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	10.9	8.6	0.1	29.1	3.4		8.5	7.9			5.0	0.1
Delay (s)	42.3	33.6	9.4	66.3	32.4		39.6	38.9			37.8	18.9
Level of Service	D	C	A	E	C		D	D			D	B
Approach Delay (s)		30.0			36.1			39.3			26.7	
Approach LOS		C			D			D			C	

Intersection Summary

HCM 2000 Control Delay	32.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	82.3	Sum of lost time (s)	18.0
Intersection Capacity Utilization	64.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection

Intersection Delay, s/veh 10.2
 Intersection LOS B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕			↕			↕		
Traffic Vol, veh/h	65	44	46	3	108	12	189	23	3	11	9	23
Future Vol, veh/h	65	44	46	3	108	12	189	23	3	11	9	23
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Heavy Vehicles, %	2	2	2	1	1	1	1	1	1	5	5	5
Mvmt Flow	83	56	59	4	138	15	242	29	4	14	12	29
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.8	9.4	11.2	8.5
HCM LOS	A	A	B	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	88%	42%	2%	26%
Vol Thru, %	11%	28%	88%	21%
Vol Right, %	1%	30%	10%	53%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	215	155	123	43
LT Vol	189	65	3	11
Through Vol	23	44	108	9
RT Vol	3	46	12	23
Lane Flow Rate	276	199	158	55
Geometry Grp	1	1	1	1
Degree of Util (X)	0.384	0.269	0.217	0.076
Departure Headway (Hd)	5.014	4.882	4.957	4.958
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	711	729	718	714
Service Time	3.082	2.951	3.03	3.048
HCM Lane V/C Ratio	0.388	0.273	0.22	0.077
HCM Control Delay	11.2	9.8	9.4	8.5
HCM Lane LOS	B	A	A	A
HCM 95th-tile Q	1.8	1.1	0.8	0.2

HCM Signalized Intersection Capacity Analysis

1: SW 65th Avenue & SW Lower Boones Ferry Road

11/30/2017

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	235	835	431	133	1083	42	424	38	37	144	54	314
Future Volume (vph)	235	835	431	133	1083	42	424	38	37	144	54	314
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5			4.5	4.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91		0.95	0.95			1.00	1.00
Frbp, ped/bikes	1.00	1.00	0.99	1.00	1.00		1.00	1.00			1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.98			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.97			0.96	1.00
Satd. Flow (prot)	1770	3539	1562	1787	5102		1698	1685			1797	1570
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.97			0.96	1.00
Satd. Flow (perm)	1770	3539	1562	1787	5102		1698	1685			1797	1570
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	245	870	449	139	1128	44	442	40	39	150	56	327
RTOR Reduction (vph)	0	0	219	0	5	0	0	7	0	0	0	47
Lane Group Flow (vph)	245	870	230	139	1167	0	261	253	0	0	206	280
Confl. Peds. (#/hr)	1		1	1		1	4		1	1		4
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	2%	2%	2%
Turn Type	Prot	NA	pm+ov	Prot	NA		Split	NA		Split	NA	pm+ov
Protected Phases	7	4	2	3	8		2	2		6	6	7
Permitted Phases			4									6
Actuated Green, G (s)	15.4	25.7	42.5	8.1	18.4		16.8	16.8			14.2	29.6
Effective Green, g (s)	15.4	25.7	42.5	8.1	18.4		16.8	16.8			14.2	29.6
Actuated g/C Ratio	0.19	0.31	0.51	0.10	0.22		0.20	0.20			0.17	0.36
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5			4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	329	1098	886	174	1133		344	341			308	646
v/s Ratio Prot	c0.14	0.25	0.05	0.08	c0.23		c0.15	0.15			c0.11	0.08
v/s Ratio Perm			0.09									0.10
v/c Ratio	0.74	0.79	0.26	0.80	1.03		0.76	0.74			0.67	0.43
Uniform Delay, d1	31.8	26.1	11.3	36.6	32.2		31.1	31.0			32.1	20.2
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	8.8	4.0	0.2	22.0	34.8		9.2	8.4			5.4	0.5
Delay (s)	40.7	30.1	11.5	58.6	67.0		40.3	39.4			37.5	20.7
Level of Service	D	C	B	E	E		D	D			D	C
Approach Delay (s)		26.4			66.1			39.9			27.2	
Approach LOS		C			E			D			C	

Intersection Summary

HCM 2000 Control Delay	41.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	82.8	Sum of lost time (s)	18.0
Intersection Capacity Utilization	66.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection

Intersection Delay, s/veh 8.8
 Intersection LOS A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	27	75	171	1	47	1	85	3	2	3	20	84
Future Vol, veh/h	27	75	171	1	47	1	85	3	2	3	20	84
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	1	1	1	0	0	0	1	1	1	1	1	1
Mvmt Flow	29	81	184	1	51	1	91	3	2	3	22	90
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.2	8.1	8.8	8.1
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	94%	10%	2%	3%
Vol Thru, %	3%	27%	96%	19%
Vol Right, %	2%	63%	2%	79%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	90	273	49	107
LT Vol	85	27	1	3
Through Vol	3	75	47	20
RT Vol	2	171	1	84
Lane Flow Rate	97	294	53	115
Geometry Grp	1	1	1	1
Degree of Util (X)	0.134	0.336	0.069	0.138
Departure Headway (Hd)	4.977	4.123	4.703	4.328
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	719	872	761	826
Service Time	3.014	2.146	2.738	2.364
HCM Lane V/C Ratio	0.135	0.337	0.07	0.139
HCM Control Delay	8.8	9.2	8.1	8.1
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.5	1.5	0.2	0.5

HCM Signalized Intersection Capacity Analysis
 1: SW 65th Avenue & SW Lower Boones Ferry Road

11/30/2017

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	241	1014	322	107	844	31	383	33	30	66	25	130
Future Volume (vph)	241	1014	322	107	844	31	383	33	30	66	25	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5			4.5	4.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91		0.95	0.95			1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00		1.00	1.00			1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.98			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.97			0.96	1.00
Satd. Flow (prot)	1719	3438	1515	1736	4955		1665	1654			1776	1559
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.97			0.63	1.00
Satd. Flow (perm)	1719	3438	1515	1736	4955		1665	1654			1168	1559
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	262	1102	350	116	917	34	416	36	33	72	27	141
RTOR Reduction (vph)	0	0	156	0	4	0	0	6	0	0	0	48
Lane Group Flow (vph)	262	1102	194	116	947	0	245	234	0	0	99	93
Confl. Peds. (#/hr)	5		1	1		5	1		3	3		1
Confl. Bikes (#/hr)			1			1						
Heavy Vehicles (%)	5%	5%	5%	4%	4%	4%	3%	3%	3%	3%	3%	3%
Turn Type	Prot	NA	pm+ov	Prot	NA		Split	NA		Perm	NA	pm+ov
Protected Phases	7	4	2	3	8		2	2			6	7
Permitted Phases			4							6		6
Actuated Green, G (s)	16.1	29.5	45.7	6.7	20.1		16.2	16.2			12.0	28.1
Effective Green, g (s)	16.1	29.5	45.7	6.7	20.1		16.2	16.2			12.0	28.1
Actuated g/C Ratio	0.20	0.36	0.55	0.08	0.24		0.20	0.20			0.15	0.34
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5			4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	335	1230	922	141	1208		327	325			170	616
v/s Ratio Prot	c0.15	c0.32	0.04	0.07	0.19		c0.15	0.14				0.03
v/s Ratio Perm			0.09								c0.08	0.03
v/c Ratio	0.78	0.90	0.21	0.82	0.78		0.75	0.72			0.58	0.15
Uniform Delay, d1	31.5	25.0	9.3	37.3	29.1		31.2	31.0			32.9	18.9
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	11.3	8.7	0.1	30.5	3.4		9.1	7.4			5.0	0.1
Delay (s)	42.8	33.7	9.4	67.8	32.5		40.3	38.4			37.9	19.0
Level of Service	D	C	A	E	C		D	D			D	B
Approach Delay (s)		30.1			36.4			39.3			26.8	
Approach LOS		C			D			D			C	

Intersection Summary

HCM 2000 Control Delay	33.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	82.4	Sum of lost time (s)	18.0
Intersection Capacity Utilization	64.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Intersection						
Int Delay, s/veh	0.1					
Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations	↕			↕	↕	
Traffic Vol, veh/h	449	5	1	442	4	2
Future Vol, veh/h	449	5	1	442	4	2
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	488	5	1	480	4	2

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	493	0	974
Stage 1	-	-	-	-	491
Stage 2	-	-	-	-	483
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1071	-	279
Stage 1	-	-	-	-	615
Stage 2	-	-	-	-	620
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1071	-	279
Mov Cap-2 Maneuver	-	-	-	-	279
Stage 1	-	-	-	-	615
Stage 2	-	-	-	-	619

Approach	SE	NW	NE
HCM Control Delay, s	0	0	15.9
HCM LOS			C

Minor Lane/Major Mvmt	NELn1	NWL	NWT	SET	SER
Capacity (veh/h)	337	1071	-	-	-
HCM Lane V/C Ratio	0.019	0.001	-	-	-
HCM Control Delay (s)	15.9	8.4	0	-	-
HCM Lane LOS	C	A	A	-	-
HCM 95th %tile Q(veh)	0.1	0	-	-	-

Intersection

Int Delay, s/veh 0

Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations	↑			↑	↘	
Traffic Vol, veh/h	451	0	0	443	1	1
Future Vol, veh/h	451	0	0	443	1	1
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	490	0	0	482	1	1

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	0	-	-	972 490
Stage 1	-	-	-	490 -
Stage 2	-	-	-	482 -
Critical Hdwy	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	5.42 -
Follow-up Hdwy	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	-	0 0	-	280 578
Stage 1	-	0 0	-	616 -
Stage 2	-	0 0	-	621 -
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	280 578
Mov Cap-2 Maneuver	-	-	-	280 -
Stage 1	-	-	-	616 -
Stage 2	-	-	-	621 -

Approach	SE	NW	NE
HCM Control Delay, s	0	0	14.6
HCM LOS			B

Minor Lane/Major Mvmt	NELn1	NWT	SET
Capacity (veh/h)	377	-	-
HCM Lane V/C Ratio	0.006	-	-
HCM Control Delay (s)	14.6	-	-
HCM Lane LOS	B	-	-
HCM 95th %tile Q(veh)	0	-	-

Intersection

Intersection Delay, s/veh 10.2
Intersection LOS B

























Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	65	45	47	3	108	12	189	23	3	11	9	24
Future Vol, veh/h	65	45	47	3	108	12	189	23	3	11	9	24
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Heavy Vehicles, %	2	2	2	1	1	1	1	1	1	5	5	5
Mvmt Flow	83	58	60	4	138	15	242	29	4	14	12	31
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.8	9.4	11.2	8.5
HCM LOS	A	A	B	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	88%	41%	2%	25%
Vol Thru, %	11%	29%	88%	20%
Vol Right, %	1%	30%	10%	55%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	215	157	123	44
LT Vol	189	65	3	11
Through Vol	23	45	108	9
RT Vol	3	47	12	24
Lane Flow Rate	276	201	158	56
Geometry Grp	1	1	1	1
Degree of Util (X)	0.384	0.273	0.217	0.078
Departure Headway (Hd)	5.021	4.881	4.962	4.956
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	711	731	718	714
Service Time	3.092	2.952	3.038	3.048
HCM Lane V/C Ratio	0.388	0.275	0.22	0.078
HCM Control Delay	11.2	9.8	9.4	8.5
HCM Lane LOS	B	A	A	A
HCM 95th-tile Q	1.8	1.1	0.8	0.3

HCM Signalized Intersection Capacity Analysis
 1: SW 65th Avenue & SW Lower Boones Ferry Road

11/30/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	235	835	432	134	1083	42	425	38	37	144	54	314
Future Volume (vph)	235	835	432	134	1083	42	425	38	37	144	54	314
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5			4.5	4.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91		0.95	0.95			1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00		1.00	1.00			1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.98			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.97			0.96	1.00
Satd. Flow (prot)	1770	3539	1562	1787	5102		1698	1685			1797	1570
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.97			0.96	1.00
Satd. Flow (perm)	1770	3539	1562	1787	5102		1698	1685			1797	1570
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	245	870	450	140	1128	44	443	40	39	150	56	327
RTOR Reduction (vph)	0	0	220	0	5	0	0	7	0	0	0	47
Lane Group Flow (vph)	245	870	230	140	1167	0	261	254	0	0	206	280
Confl. Peds. (#/hr)	1		1	1		1	4		1	1		4
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	2%	2%	2%
Turn Type	Prot	NA	pm+ov	Prot	NA		Split	NA		Split	NA	pm+ov
Protected Phases	7	4	2	3	8		2	2		6	6	7
Permitted Phases			4									6
Actuated Green, G (s)	15.4	25.6	42.4	8.2	18.4		16.8	16.8			14.2	29.6
Effective Green, g (s)	15.4	25.6	42.4	8.2	18.4		16.8	16.8			14.2	29.6
Actuated g/C Ratio	0.19	0.31	0.51	0.10	0.22		0.20	0.20			0.17	0.36
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5			4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	329	1094	884	176	1133		344	341			308	646
v/s Ratio Prot	c0.14	0.25	0.05	0.08	c0.23		c0.15	0.15			c0.11	0.08
v/s Ratio Perm			0.09									0.10
v/c Ratio	0.74	0.80	0.26	0.80	1.03		0.76	0.74			0.67	0.43
Uniform Delay, d1	31.8	26.2	11.4	36.5	32.2		31.1	31.0			32.1	20.2
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	8.8	4.1	0.2	21.5	34.8		9.2	8.5			5.4	0.5
Delay (s)	40.7	30.3	11.5	58.0	67.0		40.3	39.5			37.5	20.7
Level of Service	D	C	B	E	E		D	D			D	C
Approach Delay (s)		26.5			66.0			39.9			27.2	
Approach LOS		C			E			D			C	

Intersection Summary

HCM 2000 Control Delay	41.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	82.8	Sum of lost time (s)	18.0
Intersection Capacity Utilization	66.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection

Int Delay, s/veh 0

Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations	↗			↖	↘	↙
Traffic Vol, veh/h	618	2	1	499	1	1
Future Vol, veh/h	618	2	1	499	1	1
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	672	2	1	542	1	1

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	674
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.12
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.218
Pot Cap-1 Maneuver	-	-	917
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	917
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	SE	NW	NE
HCM Control Delay, s	0	0	18.1
HCM LOS			C

Minor Lane/Major Mvmt	NELn1	NWL	NWT	SET	SER
Capacity (veh/h)	277	917	-	-	-
HCM Lane V/C Ratio	0.008	0.001	-	-	-
HCM Control Delay (s)	18.1	8.9	0	-	-
HCM Lane LOS	C	A	A	-	-
HCM 95th %tile Q(veh)	0	0	-	-	-

Intersection						
Int Delay, s/veh	0					
Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations	↑			↑	↘	
Traffic Vol, veh/h	619	0	0	499	1	1
Future Vol, veh/h	619	0	0	499	1	1
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	673	0	0	542	1	1

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	0	-	-	1215 673
Stage 1	-	-	-	673 -
Stage 2	-	-	-	542 -
Critical Hdwy	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	5.42 -
Follow-up Hdwy	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	-	0 0	-	200 455
Stage 1	-	0 0	-	507 -
Stage 2	-	0 0	-	583 -
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	200 455
Mov Cap-2 Maneuver	-	-	-	200 -
Stage 1	-	-	-	507 -
Stage 2	-	-	-	583 -

Approach	SE	NW	NE
HCM Control Delay, s	0	0	18.1
HCM LOS			C

Minor Lane/Major Mvmt	NELn1	NWT	SET
Capacity (veh/h)	278	-	-
HCM Lane V/C Ratio	0.008	-	-
HCM Control Delay (s)	18.1	-	-
HCM Lane LOS	C	-	-
HCM 95th %tile Q(veh)	0	-	-

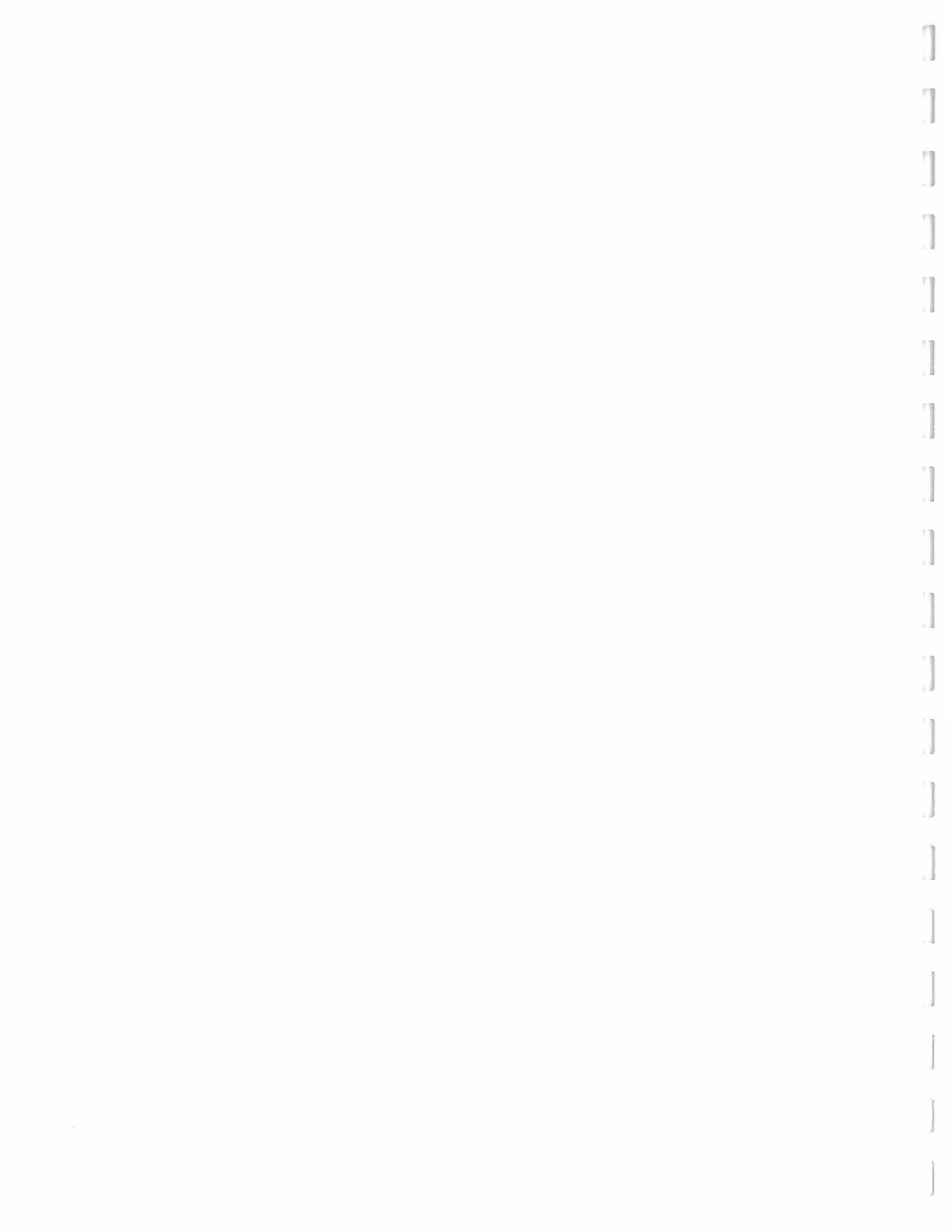
Intersection

Intersection Delay, s/veh	8.9
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	27	76	171	1	47	1	85	3	2	3	20	84
Future Vol, veh/h	27	76	171	1	47	1	85	3	2	3	20	84
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	1	1	1	0	0	0	1	1	1	1	1	1
Mvmt Flow	29	82	184	1	51	1	91	3	2	3	22	90
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.3	8.1	8.8	8.1
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	94%	10%	2%	3%
Vol Thru, %	3%	28%	96%	19%
Vol Right, %	2%	62%	2%	79%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	90	274	49	107
LT Vol	85	27	1	3
Through Vol	3	76	47	20
RT Vol	2	171	1	84
Lane Flow Rate	97	295	53	115
Geometry Grp	1	1	1	1
Degree of Util (X)	0.134	0.338	0.069	0.138
Departure Headway (Hd)	4.981	4.124	4.704	4.332
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	719	872	760	826
Service Time	3.018	2.148	2.74	2.368
HCM Lane V/C Ratio	0.135	0.338	0.07	0.139
HCM Control Delay	8.8	9.3	8.1	8.1
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.5	1.5	0.2	0.5



AR18-0001

To lessen the bulk of the notice of application and to address privacy concerns, this sheet substitutes for the photocopy of the mailing labels. A copy is available upon request.



City of Tualatin

www.tualatinoregon.gov

E-mailed and sent via First Class Mail **May 18, 2018**

Chief Mark Havener
Tualatin Valley Fire & Rescue
11945 SW 70th Av.
Tigard, OR 97223
Mark.Havener@tvfr.com

Site: Adjacent to 7100 SW McEwan Rd, Tualatin, OR

Dear Mr. Havener:

Staff has reviewed the materials submitted for the Architectural Review (AR) application for the proposed for the new Fire Station No. 39 (Tax Lot: 2S113DDTL1601), including revised materials submitted on May 15, 2018. This application was first submitted on April 20, 2018, and **has been deemed complete on May 18, 2018** based on the information that you submitted. You are receiving this letter in compliance with Oregon Revised Statutes (ORS) 227.178(2). Staff will coordinate a draft staff report meeting with you in approximately three (3) weeks from this date.

If you have any questions regarding your application, you may contact me via phone at 503.691.3026 or email at mstraite@tualatin.gov.

Sincerely,

A handwritten signature in black ink, appearing to read "Matt Straite".

Matt Straite,
Contract Planner

cc: Aquilla Hurd-Ravich, Community Development Director
Lynette Sanford, Office Coordinator

File: AR18-0001