EXHIBIT B

City of Cottage Grove

File No.: ________

Date Submitted by Applicant: ________

Date Deemed Complete: ________

400 Main Street Cottage Grove, OR 97424

TYPE III PERMIT APPLICATION

To: City of Cottage Grove Planning Commission

A. Applicant

1. Name: Pine Springs, LLC Phone No.: 503-929-3331
2. Mailing Address: 3025 West 7th Place, Eugene OR 97402
3. Email Address: colin@timberviewconst.com
4. Status: [✓ Owner] Agent

Note: If agent you must have owner's consent and signature.

B. Owner *(if not applicant)*

4. Owner's Name: ________ Phone No.: ________
5. Owner's Mailing Address: ________

C. Location of Property

6. Address/Location: 725 Row River Road, Cottage Grove OR 97424
7. Map & Tax Lot Number: 20-03-27-20 tax lots 3701, 3702 (portion only)
8. Present Use: Vacant
9. Proposed Use: New Apartments with on-site parking and common open space

D. Request for Consideration

10. Type of Land Use Application applying for: Master Planned Development

Options: Conditional Use, Greenway Conditional Use, Cottage Industry, Historic Alteration, Land Use District Map changes (no plan amendment required), Master Planned Developments, Site Design Reviews, Subdivisions, Variance (Class C)

11. Is this application filed in association with other land use permit applications?

[✓ Yes] No

12. Reasons for Application: The site is zoned Commercial Tourist and requires an approved Master Planned Development for apartments.

E. Required Information

☐ Narrative Statement: This application must be filed with one copy of a narrative statement that explains how the application satisfies each and all of the relevant criteria and standards in sufficient detail for review and decision-making.

Note: Additional information may be required under the specific application requirements for each approval, e.g., Chapters 4.2 (Land Use Review), 4.3 (Land Divisions), 4.4 (Conditional Use), 4.5 (Master Planned Developments), 4.6 (Modifications), 4.8 (Code Interpretations), 4.9 (Miscellaneous Permits) and 5.1 (Variances).

☐ Plans: Three (3) sets of plans, including one (1) set of plans in a reproducible form that is no larger than 11"x17" in size. Content of plans will vary with application type. Refer to submittal requirements for specific application type.

☐ Neighborhood Meeting verification (for Master Planned Developments, Conditional Uses and Subdivisions). Must include copy of meeting notice and minutes and/or recording of meeting.

☐ Non-refundable application fee.

G. Signature

I hereby request a Type III Permit on the above described real property, which is either owned by or under contract of sale to the applicant, and is located within the City of Cottage Grove, Oregon.

I hereby acknowledge that this application is not considered filed and complete until all of the required information has been submitted as determined by the Community Development Director and all required fees have been paid in full. Once the original application is submitted, Staff has 30 days to determine whether an application is complete. Within 30 days a letter will be mailed to you either deeming the application complete or requesting additional information. If additional information is requested you have 150 days to either: submit the missing information, submit some of the information and written notice that no other information will be provided, or submit a written notice that none of the missing information will be provided. *Once your application is deemed complete* you will be assigned a public hearing date before the Planning Commission and Staff will have 120 days to complete the processing of your application. (ORS 227.178)

	Owner:	Agent:
Signature:		
Name:	Brent Lanz for Pine Springs, LLC	
Date:		

Office Use Only

Date Application Received: ____________ Initials: ____________

Date Application Complete: ____________ Initials: ____________

Applicant Notified of Completeness: ______

Fee Paid: ________Receipt No.__________ Initials: ____________

PINE SPRINGS MASTER PLAN

Submitted to:
CITY OF COTTAGE GROVE
400 E. Main Street
Cottage Grove, OR 97424

Prepared For:
PINE SPRINGS, LLC
3025 West 7th Place
Eugene, OR 97402

Submittal Date:
February 22, 2023

BISHOW
CONSULTING

P.O. Box 50721
Eugene, OR 97405
www.bishowconsulting.com

APPLICATION CONTENTS

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Exhibit B - Vicinity Map
Exhibit C - Zoning Map
Exhibit D – Aerial Photo
Exhibit E – Neighborhood Meeting Documentation
Exhibit F – Pine Springs at Village Green TIA
Exhibit G – Geotechnical Engineering Investigation
Exhibit H – Stormwater Report
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DRAWINGS (Full Size)

Dougherty Landscape Architects

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Sheet LA-2	Preliminary Landscape Master Plan
Sheet LA-3	Tree Preservation Map
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A & O Engineering

Sheet C-1.0	Paving and Grading Plan
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FORMS AND FEES

Type III Land Use Application Form
Application Fee

PART I. – SUMMARY

Project Name: **Pine Springs Apartments**

Develop a 121-unit apartment complex with an on-site manager and leasing office, common open space amenities, and parking. The 2-story apartment buildings will offer 2-bedroom, 2-bath units with outdoor patios and balconies.

Application: Pine Springs Master Plan

Location: Row River Road, Cottage Grove OR 97424

Assessor Map: 20-03-27-20 (Lot 3 of Village Green Subdivision)

Size: 7.9 Acres (new Lot 3)

Zoning: CT Commercial Tourist

Plan Designation: Tourist Commercial

Existing Uses: Vacant, part of the former Village Green Hotel

Proposed Use: New apartments with amenities such as off-street parking, on-site pedestrian circulation and open space.

Pre-Application Mtg: January 4, 2023

Neighborhood Mtg: February 1, 2023

Project Design Team:

Owner/Applicant
Pine Springs, LLC
Colin Kelley
3025 West 7th Place
Eugene, OR 97402
colin@timberviewconst.com

Landscape Architect
David Dougherty, ASLA
Dougherty Landscape Architects
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Eugene, OR 97401
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Civil Engineer
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Land Use Planner
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Architect
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Rodd@rharchitectural.com

Surveyor
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Roseburg, OR 97470
knapp@ieengineering.com

Geotechnical Engineer
Ron Derrick
Branch Engineering
301 5th Street
Springfield, OR 97477
RonD@branchengineering.com

2022 Conditions & Key Problems:

In 2022, the Green Village Hotel was not operating in a sustainable manner due to:

- Substantial decline in the hotel and tourist industry
- Increased hotel competition in the region
- Insufficient modern amenities
- Several buildings are in substandard or blighted conditions.
- The 6.5-acre garden, seasonal pool and hot tub require extensive maintenance substantially impacting operational costs.

View of one-story building renovated for hotel guest rooms and currently proposed to be retained on proposed Lot 1 of the Village Green Subdivision.

View of building in substandard condition when applicant purchased the site. The substandard buildings on proposed Lot 3 were demolished in 2022.

Planning Objectives:

The key planning objective is to develop an apartment complex providing needed housing for the community. The apartment complex will provide additional support population for nearby commercial uses and stimulate economic development. The residential use of the property will also compliment the hotel, the small scale commercial uses on the vacant commercial lots, and the RV Park.

Development Schedule:

The Pine Springs Master Plan is not a phased project.

Following City approval of the Conceptual Master Plan, the developer intends to seek City approval of the Final Master Plan and Site Plan Review applications. Once the planning entitlement phase is complete, the developer plans to promptly move forward with construction.

The construction will comply with applicable standards including clear fire access routes being maintained at all times.

Applicant's Intentions:

Following approval of the Village Green Subdivision Final Plat, the applicant intends to sell lots 1, 2, 4 and 5. The sale of these lots will allow new property owners to re-open the hotel, continue to operate the RV Park, and develop the two vacant lots fronting Row River Road.

The applicant intends to construct and maintain ownership of the Pine Springs Apartments.

PART II. – APPLICATION SUBMITTAL REQUIREMENTS

14.45.140 Master Planned Development – Overlay Zone & Concept Plan Submission

A. General Submission Requirements. The applicant shall submit an application containing all of the general information required for a Type III procedure, as governed by Section 14.41.400. In addition, the applicant shall submit the following:

1. A statement of planning objectives to be achieved by the planned development through the particular approach proposed by the applicant. This statement should include a description of the character of the proposed development and the rationale behind the assumptions and choices made by the applicant.

See Part I, page 7 for statement of planning objectives.

2. A development schedule indicating the approximate dates when construction of the planned development and its various phases are expected to be initiated and completed.

See Part I, page 7 for development schedule.

3. A statement of the applicant's intentions with regard to the future selling or leasing of all or portions of the planned development.

See Part I, page 7 for statement of applicant's intentions.

4. Narrative report or letter documenting compliance with the applicable approval criteria contained in Section 14.45.150.

This written narrative provides evidence demonstrating compliance with applicable approval criteria in Section 14.45.150. See Part III.

5. Special studies prepared by qualified professionals as required by the Community Development Director or Planning Commission to determine potential traffic, geologic, water quality, wetland, sensitive habitat, archeological, natural vegetation and other impacts, and required mitigation.

This application includes technical reports prepared by qualified professionals including a geotechnical report, traffic study, stormwater calculations, and tree inventory. See Exhibit F – Pine Springs at Village Green TIA, Exhibit G – Geotechnical Engineering

Investigation, Exhibit H – Stormwater Report, Sheet LA-3 Tree Preservation Map and Sheet LA-4 Tree Preservation Data.

B. Additional Information. In addition to the general information described in Subsection "A" above, the concept plan, data, and narrative shall include the following exhibits and information:

1. Existing Conditions map, as defined in Section 14.42.500 - Site Design Review Application Submission Requirements;

See Village Green Subdivision Sheet 2 Existing Conditions. For additional survey drawings, please refer to the Village Green subdivision application.

2. Conceptual site plan (e.g., general land use, building envelopes, circulation, open space, utility connections, and other information necessary to convey the concept plan);

See Sheet LA-1 Site Plan, Sheet LA-2 Preliminary Landscape Master Plan, and Sheet C-2.0 Utility Plan.

3. Grading concept (for hillside or sloping properties, or where extensive grading is anticipated);

See Sheet C-1.0 Paving and Grading Plan.

4. Landscape concept (e.g., shows retention of existing vegetation and general planting areas);

See Sheet LA-2 Preliminary Landscape Master Plan, Sheet LA-3 Tree Preservation Map, and Sheet LA-4 Tree Preservation Data.

5. Architectural concept (e.g., information sufficient to describe architectural styles, building heights, and general materials);

In general, the two-story apartment buildings each contain eight dwellings. All units have two bedrooms and two baths. The ground floor units have a rear patio and the upper floor units have balconies. A one-story leasing office also contains a dwelling unit for an on-site manager. For more information, please see architectural drawings prepared by Rodd Hansen Architect, LLC.

6. Sign concept plan (e.g., locations, general size, style and materials of signs);

One freestanding monument sign for the Pine Springs Apartments will be located at the main entry drive east of the leasing office. The general location of the sign is shown on Sheet LA-1 Site Plan.

7. Copy of all existing covenants and restrictions, and general description of proposed restrictions or covenants (e.g., for common areas, access, parking, etc.);

The application includes a title report for the entire Village Green site that contains existing covenants and restrictions. See Exhibit I – Title Report. Proposed shared access easements are being reviewed with the Village Green Subdivision. Common areas are shown on Sheet LA-2 Preliminary Landscape Master Plan.

8. A copy of an approved State Access Permit, if taking new access onto a State Highway. (Ord. 2959 §5(Exh. A (part)), 2007. Formerly 4.5.140)

No new access is proposed onto a State Highway. The Pine Springs Master Plan does include proposed improvements to the existing main driveway entrance at the intersection of Row River Road and Jim Wright Way. See Sheet C-1.0 Paving and Grading Plan.

PART III. – MASTER PLANNED DEVELOPMENT APPROVAL CRITERIA

This section provides the applicable approval criteria for reviewing the proposed application followed by findings demonstrating compliance. Cottage Grove Code provisions are shown in ***bold italics*** followed by findings demonstrating compliance.

14.45.110 Master Planned Development – Applicability

The master planned development designation is an overlay zone that may be applied over any of the City's land use districts. An applicant may elect to develop a project as a master planned development in compliance with the requirements of this Chapter. . .

The Village Green site is 16.26 acres and has historically been used for a mixture of commercial and residential uses. The Pine Springs Apartments Master Planned Development consists of the portion of the Village Green site to be redeveloped for apartments. The site is zoned Commercial Tourist and multi-family use is permitted with an approved Master Plan.

14.45.150 Master Planned Development – Overlay Zone & Concept Plan Approval Criteria

A. Comprehensive Plan. All relevant provisions of the Comprehensive Plan are met;

The Cottage Grove Comprehensive Plan (Comprehensive Plan) designates the subject property as Tourist Commercial. Cottage Grove has five commercial zones to implement the various Commercial Plan designations. The Commercial Tourist (C-T) zoning applies to commercial areas adjacent to the I-5 interchange. The subject property is zoned C-T consistent with the Comprehensive Plan designation. This application does not include a request to amend the Comprehensive Plan or the zoning map.

The Comprehensive Plan goals are broad statements describing the community's aspirations for Cottage Grove and include[1]:

> ***To assure wise and efficient use of our urbanizable lands.***
>
> ***To take advantage of our location within commuting distance of the Eugene-Springfield area by providing for residential development and commercial services for those desiring metropolitan employment but a small town living environment.***

---

[1] Comprehensive Plan, pages 7 and 8.

> ***To continue to provide for tourist-oriented development.***
>
> ***To provide for the housing needs of present and future residents by encouraging the availability of housing units priced within the financial capabilities of area residents and allow for flexibility of housing location, type and density.***

The Comprehensive Plan contains the following general policies:

> ***The GENERAL RESIDENTIAL plan land use category will provide for the majority of future residential needs. For MEDIUM DENSITY RESIDENTIAL needs both the plan amendments to MEDIUM DENSITY RESIDENTIAL or the Planned Unit Development process for large parcels will be relied upon to assure that sufficient land, in addition to that shown on the Land Use Diagram, is made available for multiple family residential uses.***[2]
>
> ***Preserve tourist-commercial areas for highway-oriented tourist developments with Commercial Tourist (C-T) zoning.***[3]

The goals and policies listed above demonstrate the community's desire for new medium density residential development and a strong local economy. The Comprehensive Plan and the C-T zone allow medium density residential development based on an approved master plan. The allowance of medium density housing helps assure sufficient land is available to meet projected population growth. The Comprehensive Plan also recognizes that, "*Tourist commercial (leisure and hospitality) uses typically require direct access to I-5 but also locate in the Downtown Historic District.*"[4]

As shown on Sheet LA-1 Conceptual Site Plan submitted with the Village Green subdivision application, the development site will provide a mix of uses including tourist commercial and medium density residential. The Village Green Conceptual Site Plan provides a framework for redevelopment to improve the financial stability of the hotel, allow for a few new commercial uses and provide new apartments. The proposed land uses are consistent with the Comprehensive Plan.

The Cottage Grove Hillsides Map adopted as part of the Comprehensive Plan does not identify the subject property as in a hillside area.

The Cottage Grove Historical Sites Map adopted as part of the Comprehensive Plan does not identify any historic resources on the subject property.

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[2] Comprehensive Plan Housing Recommendation 12, page 11.

[3] Comprehensive Plan Commercial Policy 5, page 20.

[4] Comprehensive Plan, page 14.

B. Land Division Chapter. All of the requirements for land divisions, as applicable shall be met (Chapter 14.43);

Currently, the Village Green development site consists of two parcels created by a partition. Shown on Assessor Map 20-03-27-20, Tax Lot 3700 consists of about 9.65 acres and was developed with the main hotel building, a maintenance building, caretaker residence, 9 single-story hotel buildings with guest rooms, and the RV Park. Tax Lot 3701 consists of a 6.5-acre garden with a pool and hot tub, walking trails, and the site for the relocated train depot.

The Village Green Subdivision Preliminary Plat application will create a legal lot specifically for the Pine Springs Apartments (lot 3). Please refer to the subdivision application for findings demonstrating compliance with the Land Division Chapter.

C. Chapter 2 and Chapter 3 Standards. All of the land use, development, and design standards contained in Chapters 2 and 3 are met, except as may be modified in Section 14.45.130;

Based on the findings below, all of the applicable land use, development, and design standards in Chapters 2 and 3 are met.

The property is zoned C-T Commercial Tourist. As shown on Sheet LA-1 Conceptual Site Plan, a portion of the area on the Row River Corridor will continue to be available for Tourist Oriented Retail Sales and Services.

Per Table 14.23.110, Tourist Commercial Retail Sales and Service uses are permitted outright in the C-T zone. Examples of these uses include a hotel, coffee shop and financial services. Drive-Up Uses are also permitted subject to a Conditional Use and special standards. Per Table 14.23.110, multiple family residential use is permitted through an approved Master Plan.

Table 1 below lists standards from Table 14.23.120 Commercial Development Standards, Section 14.23.150 Building Orientation and Commercial Block Layout, and 14.23.170 Commercial Districts – Architectural Design Standards.

TABLE 1– Chapter 2 Standards, Proposed Master Plan, and Compliance

Subject	***Standards for C-T Zone***	***Proposed***	***Complies***
Minimum Lot Area	*None*	*NA*	*NA*
Minimum Lot. Width – Nonresidential Uses	*50 ft*	*Lot Widths in Excess of 50 ft*	*YES*

Maximum Building Height	*40 ft (slopes less than 15%)*	*Leasing Office @15 feet* *Apt Bldgs @ 25 feet*	*YES*
Fences, Retaining / Garden Walls	*Maximum 7 ft*	*No new fencing proposed at this time*	*YES*
Maximum Bldg Coverage	*50%*	*About 20%*	*YES*
Minimum Landscape Area (% of Site Area)	*15% - 1.19 Acres May include plant and non-plant areas per Section 14.32.300(D)*	*Common Open Space is at least 15% - 1.19 Acres* *Additional Open Space Area 2.57 acres*	*YES* *YES*
Minimum Setbacks	*0 ft*	*All Apt Bldgs Setback Minimum of 20 feet from Highway and Row River Road.*	*YES*
Build-To Line	*60 ft, may be increased per Section 14.23.170*	*Buildings are within 60 ft of Row River except where setback increased due to stormwater pond or separated by other lots.*	*YES*
Building Orientation *Section 14.23.150.C*	*At least one primary entrance facing the street* *Parking placed to avoid adverse impacts to pedestrians*	*Primary entrances for the apartments are oriented internally towards open space and direct connections to sidewalks.* *Parking is conveniently located and designed to avoid conflicts with pedestrians*	*YES*

	Motor vehicle areas between the primary entrance and the street limited to one 24 ft driveway with parking bays.	*No motor vehicle areas are located between the apartment buildings and Row River Road.*	
	If development contains multiple buildings with insufficient street frontage, primary entrance may be oriented to common green space.	*Apartment entrances are conveniently located and face landscape beds or common green space.*	
Pedestrian Orientation *Section 14.23.170.B*	*Building design support a safe and attractive pedestrian environment.*	*Buildings are oriented in a manner that creates a safe and attractive pedestrian environment.*	*YES*
	Corner building entrances within 20 feet of street corner	*There are no buildings located on the corner of two public streets.*	
	40% of Bldg Front Façade at Build-to Line or Closer Ground floor windows / displays on at least 40% of street-facing elevations	*The apartments contain ample windows on the ground floor suitable for residential use.*	
	Primary building entrances designed with weather protection	*The primary building entrances provide weather protection for residents.*	
Building Compatibility *Section 14.23.170.C*	*New buildings and major remodels designed consistent with architectural context for area.*	*There is no dominant architectural scheme in the vicinity of the site. The two-story apartment buildings will be compatible for the setting.*	*YES*

Human Scale *Section 14.23.170.D*	*All Buildings are designed to be a human-scale.*	*The two-story apartment buildings and one-story leasing office will be human-scale.*	*YES*

14.31.200 Vehicle Access and Circulation

The subject property is located on the east side of I-5 and adjacent to the interchange at Row River Corridor. The site currently has two driveways onto Row River Corridor. The Master Plan proposes to retain both driveways. The north driveway will be improved to add a center left turn lane for vehicles exiting the site onto Row River Corridor. The intersection design will also be widened to align better with Jim Wright Way.

No new motor vehicle accesses are being requested.

In compliance with Section 14.31.200.L, driveway connections to public street will conform with city design standards. In compliance with Section 14.31.200.M, fire access lanes at least 20' wide are provided as shown on the Village Green Subdivision Sheet C-2.0 Easement Plan. In compliance with Section 14.31.200.O, no visual obstructions will be placed in required vision clearance areas.

14.31.300 Pedestrian Access and Circulation

Pedestrian circulation is provided throughout the development including sidewalk connections between primary building entrances and the adjacent street. The sidewalks also connect to on-site parking areas, the leasing office, open space, and common areas.

All sidewalks will be a minimum of 5 feet wide, raised 6 inches and protected from motor vehicle areas by a curb. All sidewalks will comply with ADA requirements with accessible ramps provided where the sidewalks intersect a driveway or street.

See Sheet LA-1 Site Plan and Sheet LA-2 Preliminary Landscape Master Plan.

14.32.200 Landscape Conservation

The site does not contain any identified Statewide Goal 5 Natural Resources. The site does not contain any known streams, wetlands or other protected natural resource areas. The site is not subject to the provisions in Chapter 14.37 – Sensitive Lands.

14.32.300 Landscaping

The site is zoned C-T Commercial Tourist. According to 14.32.300.C.4, the minimum percent of required landscaping in the C-T district is 15% of the site. This is consistent with the requirements for open space for Master Planned Developments at 14.45.150.E Open Space.

The Pine Springs Master Plan contains 7.92 acres. The minimum required open space is 7.92 X 15% or 1.19 acres. Per the provisions related to Master Plans, the proposed open space shall be dedicated to the city or leased to a legal entity. To meet this standard, the Master Plan will lease Common Open Space Areas A, B, C, and D as shown on Sheet LA-1 Site Plan. The Common Open Space areas have a total of 1.20 acres exceeding the minimum required. All Common Open Space areas will be attractively landscaped as shown on Sheet LA-2 Preliminary Landscape Master Plan.

In addition to Common Open Space areas, additional landscaping is proposed in all yards and parking areas. The landscape areas are dispersed throughout the development and designed to comply with city Landscape Design Standards. See Sheet LA-2 Preliminary Landscape Master Plan.

14.32.400 Street Trees

The applicant intends to comply with street tree requirements. To the extent practicable, new street trees on Row River will be spaced on average 30 feet on center and will be located outside utility easements. The proposed trees are shown on Sheet LA-2 Preliminary Landscape Master Plan.

14.32.500 Fences and Walls

No new fencing is proposed at this time. If fencing is proposed at a future date, the applicant agrees to install fencing within the maximum allowed height of seven (7) feet.

14.33.300 Automobile Parking Standards

Per ***Table 14.33.300.A - Minimum Required Parking by Use*** the quantity required and provided is below:

Multifamily 1.5 spaces/unit per 2-bedroom unit
121 units = 182 required parking spaces
Proposed Standard Spaces: 227
Proposed ADA Spaces: 8
Total Proposed = 235 parking spaces – 1.9 spaces per unit

The applicant intends to comply with city parking stall standards and requirements for accessible parking.

14.33.400 Bicycle Parking Standxards

Per Table 14.33.400, minimum required bicycle parking and the number of spaces being provided is listed below:

Multifamily ***1 per 4 units (long-term)*** / 30 required / 61 provided
1 per 20 units (short-term) / 6 required / 6 provided

The location, design, and lighting for bicycle parking will be done in compliance with city standards. Each ground floor apartment unit and the on-site manager's dwelling contain a storage closet accessed from the outdoor patio that provides one long-term bike parking space. The six short-term spaces will be located at the leasing office at the south end of the site and near Building 10 at the north end of the site. See Sheet LA-1 Site Plan for the location of short-term bike parking. See Sheet A3.1 8-plex and Sheet A3.1 Leasing Unit for the ground floor storage closets.

14.34.100 Transportation Standards

The Village Green Subdivision creates 5 new lots. Lots 1, 4, and 5 will have frontage along a public street. Due to access restrictions on Row River Corridor, all lots will share use of a main driveway entrance at the intersection with Jim Wright Way. All lots will also have access to a shared access easement to the second existing driveway on Row River Corridor.

As shown on the Village Green Subdivision Sheet C-2.0 Easement Plan, private shared access easements will provide for motor vehicle, pedestrian, and emergency access circulation within the development site.

Historic development patterns restrict the ability and prevent the need to extend public streets within the development site. The location of I-5 along the west side of the property, Walmart along the south side and Row River Road along the north and east result in the inability to provide public street connections and create a traditional block pattern. Due to this situation, the Master Plan provides shared access easements and provides adequate circulation between various uses.

14.34.200 Public Use Areas

The Master Plan does not propose the dedication of any public use areas. Common Open Space areas will be leased to a separate legal entity.

14.34.300 Sanitary Sewer and Water Service Improvements

As shown on Sheet C-2.0 Utility Plan, sanitary sewers and water mains will be installed to serve the development in accordance with the City's Sanitary Sewer Master Plan, Water System Master Plan, and application construction specifications. The current sanitary sewer line crossing through the site to the hotel parcel (Lot 1 in the Village

Green Subdivision) will be vacated and removed and a new line installed outside of Lot 3.

14.34.400 Storm Drainage Improvements

As shown on Sheet C-2.0 Utility Plan, adequate provisions will be provided for storm water and flood water runoff according to the City's Storm Drainage Master Plan and Chapter 14.35, Surface Water Management. The project includes three stormwater detention and water quality treatment areas. The stormwater management plan is based on the geotechnical site investigation and the calculation of the development impacts. See Exhibit H – Stormwater Report, Sheet LA-1 Site Plan, Sheet LA-2 Preliminary Landscape Master Plan, and Sheet C-3.2 Storm Facility Details.

14.34.500 Utilities

All new utility lines will be placed underground, except for surface mounted transformers, surface mounted connection boxes and meter cabinets. See Sheet C-2.0 Utility Plan.

14.34.600 Easements

The Village Green Subdivision Sheet C-2.0 Easement Plan shows the general location and type of easements to be granted prior to approval of the Final Plat.

D. Chapter 4 Standards. Master plans that involve the creation of new parcels shall meet the standards established in Section 14.43 Land Divisions. Conditional uses within master plans shall comply with the criteria found in Chapter 14.44.400A.

The Village Green Subdivision application will create a new legal lot for the Pines Springs Apartments. The subdivision will be reviewed by the city for compliance with standards in Section 14.43 Land Divisions. The boundary of the Pines Springs Master Plan is the same as the proposed boundary of Lot 3 of the Village Green Subdivision. The Pine Springs Master Plan will not create any new parcels therefore this approval criterion is not applicable.

E. Open Space. Master plans shall contain a minimum of 15 percent open space. Public open space shall be integral to the master plan. Plans shall emphasize public gathering places such as plazas, neighborhood parks, trails, and other publicly accessible spaces that integrate land use and transportation and contribute toward a sense of place. Where public or common private open space is designated, the following standards apply:

1. The open space area shall be shown on the final plan and recorded with the final plat or separate instrument; and

2. The open space shall be conveyed in accordance with one of the following methods:

- **_a. By dedication to the City as publicly owned and maintained open space. Open space proposed for dedication to the City must be acceptable to the City with regard to the size, shape, location, improvement, environmental condition (i.e., the applicant may be required to provide a level one environmental assessment), and budgetary and maintenance abilities;_**

- **_b. By leasing or conveying title (including beneficial ownership) to a corporation, home association or other legal entity, with the City retaining the development rights to the property. The terms of such lease or other instrument of conveyance must include provisions (e.g., maintenance, property tax payment, etc.) suitable to the City._**

The Master Plan identifies long-term open space areas for the use and enjoyment of apartment residents and guests. These privately owned open space areas will be leased to a separate legal entity and maintained by the property owner. Upon approval of the Detailed Development Plan, the final drawings will restrict the future use of the areas designated as Common Open Space.

The Common Open Space areas will be attractively landscaped and provide passive recreational amenities. At the request of city staff, the Common Open Space areas will not include any of the larger stormwater ponds intended to exclusively serve stormwater management from the apartments.

See Sheet LA-1 Site Plan and Sheet LA-2 Preliminary Landscape Master Plan.

View of hotel courtyard with existing, privately-owned, plaza and fountain on the proposed Lot 1 of the Village Green Subdivision.

View of hotel courtyard with existing privately-owned, open green space and gazebo on the proposed Lot 1 of the Village Green Subdivision.

3. The open space shall meet the following minimum design standards:

a. Master plans shall contain open space that equal or exceeding 15 percent of the site area. The site area is defined as the lot or parcel on which the development to be located, after subtracting any required dedication of street right-of-way and other land for public purposes (e.g., public park or school grounds, etc.);

The Master Plan contains a total of about 1.20 acres of Common Open Space or about 15% of the Pine Springs site. There is about 2.62 acres of additional open space bringing the total amount of open space to about 3.82 acres or about 48% of the site area.

b. In meeting the common open space standard, the master plan shall contain one or more of the following: outdoor recreation area, protection of sensitive lands (e.g., trees preserved), play fields, outdoor playgrounds, outdoor dining areas, walking fitness courses, pedestrian amenities, or similar open space amenities for residents and/or employees. Sensitive lands such as prominent ridgelines, floodways or wetlands shall be considered of highest importance and shall be designated for protection as open space;

The Master Plan contains a variety of pedestrian amenities in the areas designated as Common Open Space. In addition, the Common Open Space areas contribute to the preservation of significant trees and shrubs. See Sheet LA-2 Preliminary Landscape Master Plan.

c. Historic buildings or landmarks that are open to the public may count toward meeting the open space requirements when approved by the planning commission;

The Pine Springs Master Plan site does not contain any Statewide Goal 5 historic or cultural resources nor any locally designated historic buildings or landmarks.

The Village Green site does provide a home for the relocated Village Green Depot building at the southwest corner of the property. At this time, there are no plans to relocate the depot. The Village Green Depot will be included in Lot 2 of the Village Green Subdivision and may be adapted for the use by the RV Park residents.

According to Kate Vaughn with the Historical Society, *"The depot building at the Village Green was constructed to be the ticket office and gift shop for the Oregon, pacific and Eastern's Blue Goose excursion train. The train ran from 1971 until 1988. The journey started at the depot and ran up the Row River Valley to Culp Creek."*

View of Depot Building at the Village Green on proposed Lot 2 of the Village Green Subdivision.

d. To receive credit under Section 14.45.150.D, a common open space area shall have an average width that is not less than 20 feet and an average length that is not less than 20 feet. (Ord. 2959 §5(Exhibit A (part)), 2007. Formerly 4.5.150)

All areas shown on the Master Plan as Common Open Space have an average width and average depth greater than 20 feet.

PART VIII. – CONCLUSION

The Pine Springs Master Plan application provides evidence demonstrating compliance with the applicable approval criteria.

If there are questions, please contact Teresa Bishow at 541-514-1029 or via e-mail at teresa@bishowconsulting.com.

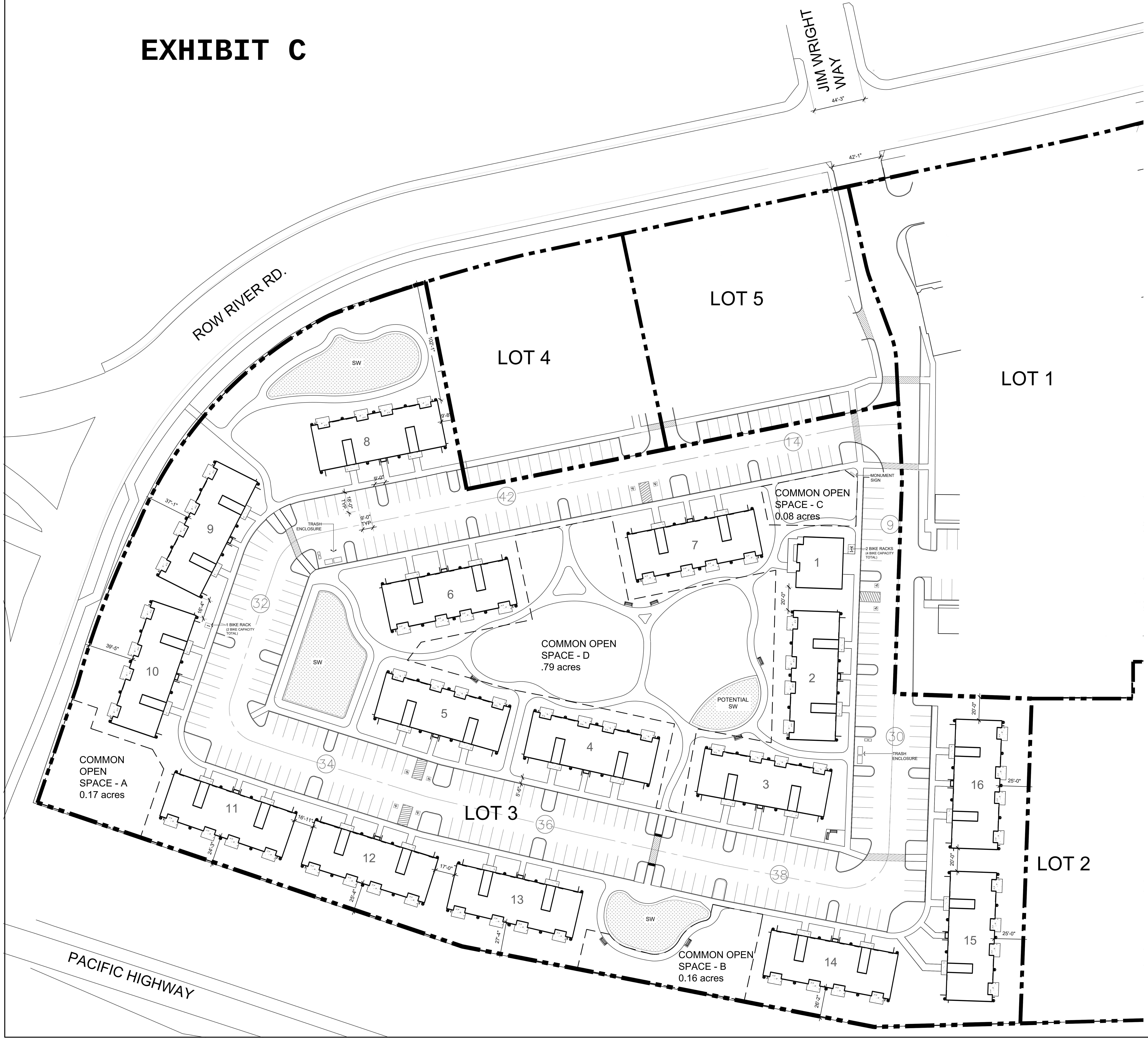
Sincerely,

Teresa Bishow

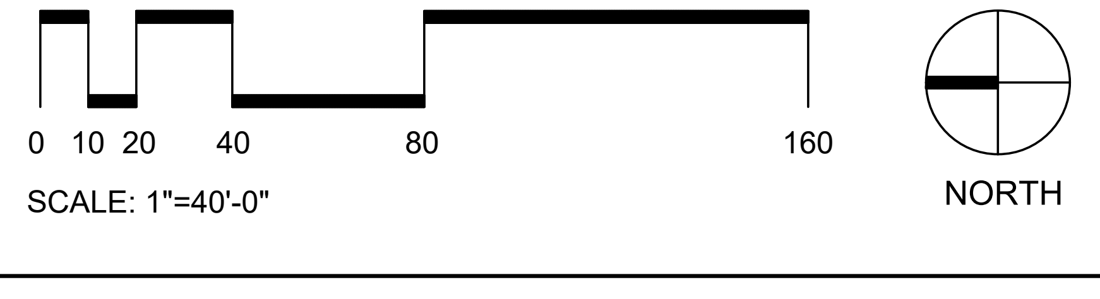
Teresa Bishow, AICP

END OF WRITTEN STATEMENT

EXHIBIT C



SITE PLAN



SCALE: 1"=40'-0"

SITE DATA

ZONING: CT COMMERCIAL TOURIST

PINE SPRINGS AT VILLAGE GREEN
UNITS: 121
AREA: 7.92 ACRES
DENSITY: 15.3 UNITS PER ACRE

VEHICLE PARKING
REQUIRED: 1.5 SPACES/2-BDRM UNIT
1.5 X 121 = 181.5
PROPOSED: STANDARD: 227 SPACES
ADA: 8 SPACES
TOTAL: 235 = 1.9 PER UNIT

PARKING AREA LANDSCAPING
TOTAL PARKING AREA SURFACE (TPAS) = 79,805 SF
REQUIRED: 10%
10% X 79,805 SF = 7,981 SF
PROPOSED: 8,066 SF

CANOPY TREES
REQUIRED: 1 PER 3000 SF OF TPAS
79,805/3000 = 27 TREES
PROPOSED: 44 TREES

BICYCLE PARKING
REQUIRED: 1 PER 4 UNITS (LONG TERM) = 30
1 PER 20 UNITS (SHORT TERM) = 6

PROPOSED: LONG TERM = 61
(GROUND FLOOR UNITS STORAGE RM)
SHORT TERM = 6

COMMON OPEN SPACE
REQUIRED: 15%
15% X 7.92 ACRES = 1.19 ACRES
PROPOSED: 1.20 ACRES

OTHER OPEN SPACE
PROPOSED: 2.62 ACRES

LOT BUILDING COVERAGE
MAXIMUM: 50%
50% X 350,076 = 175,038 SF
PROPOSED: 66,358 SF (20%)

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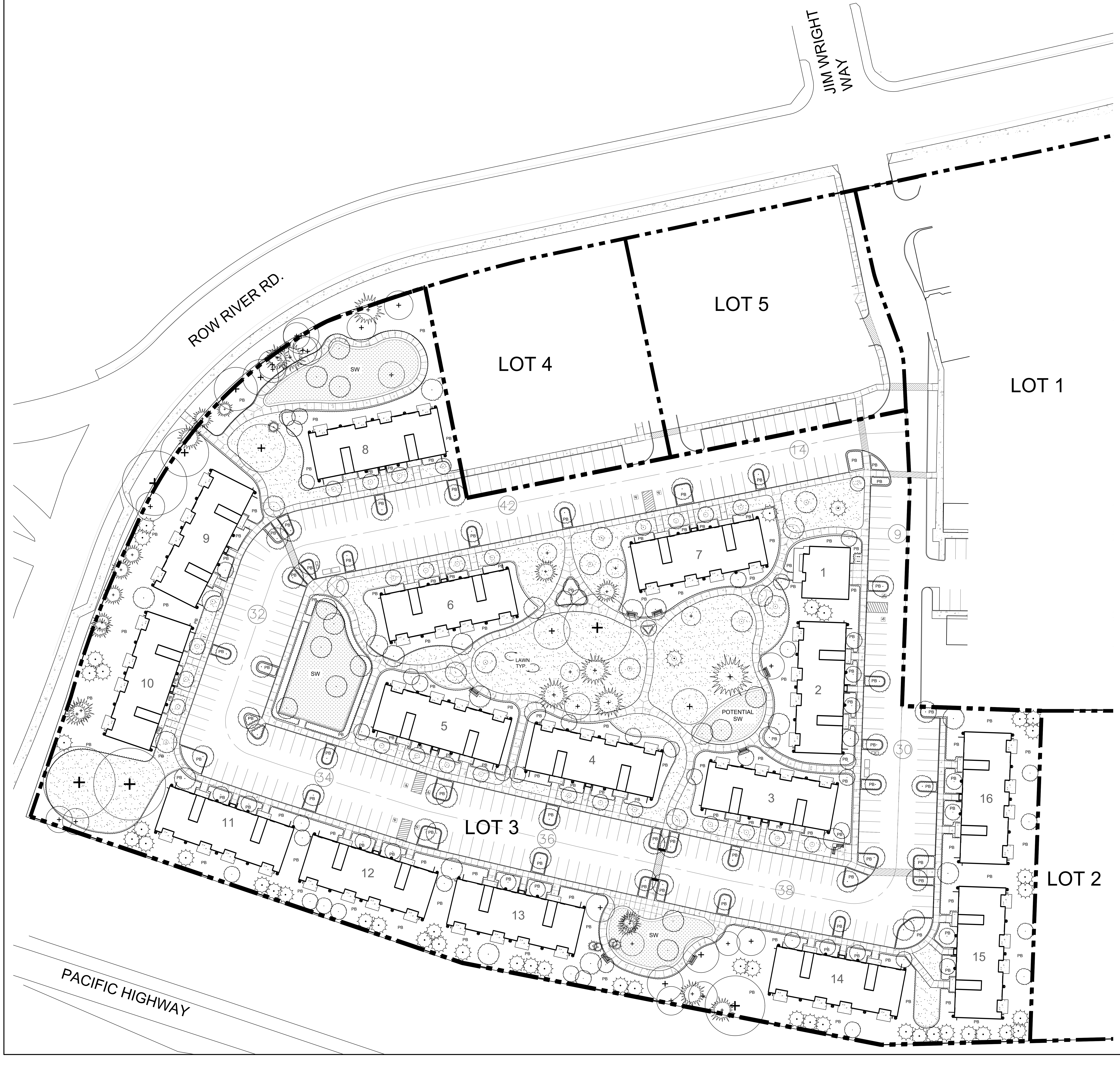
REGISTERED LANDSCAPE ARCHITECT
David J. Dougherty
OREGON
PRELIMINARY NOT FOR CONSTRUCTION

PINE SPRINGS MASTER PLAN
ROW RIVER ROAD, COTTAGE GROVE, OR 97424

Date: 02.20.23
Drawn By: JM / EH
Checked By: DVD
Submission:
PINE SPRINGS MASTER PLAN
Revisions

LA-1



LEGEND

- EXISTING DECIDUOUS TREE TO REMAIN
- EXISTING CONIFEROUS TREE TO REMAIN
- PROPOSED DECIDUOUS TREE
- PROPOSED CONIFEROUS TREE
- LAWN OR MEADOW
- PB — PLANT BED
- SW — STORMWATER FACILITY
- BENCH: 5 - 6' LENGTH
- SHORT TERM BIKE STORAGE RACKS
- PROPOSED CONCRETE SIDEWALK
- EXISTING CONCRETE SIDEWALK

PRELIMINARY NEW PLANT SCHEDULE

TREES	QUANTITY	BOTANICAL NAME	COMMON NAME	SIZE	REMARKS
ACC		Acer circinatum	Vine Maple	6` ht.	Multi-stem, B&B
ACG		Acer griseum	Paperbark Maple	1.5" cal.	Single stem, B&B, full (B)
ACRR		Acer rubrum `Red Sunset`	Red Sunset Maple	2" cal.	Matching, limbed up to approx. 6 ft.
CEC		Cercis canadensis	Eastern Redbud	1.5" cal.	Single stem, B&B, matching, full
CECF		Cercis canadensis `Forest Pansy`	Forest Pansy Redbud	6` ht.	Multi stem, B&B, matching, full
CHO		Chamaecyparis obtusa	Hinoki False Cypress	8` ht.	Matching, full
LAIG		Lagerstroemia indica `Glendora White`	Glendora White Crape Myrtle	6` ht.	(3) stem min, B&B, matching, full
LAIS		Lagerstroemia indica `Seminole`	Seminole Crape Myrtle	6` ht.	(3) stem min., B&B, matching, full
PIPO		Pinus ponderosa	Ponderosa Pine	6' ht.	Matching, full, B&B
THPH		Thuja plicata `Hogan`	Hogan Cedar	8` ht.	Matching, full, B&B
TITO		Tilia tomentosa	Green Mountain Silver Linden	2" cal.	Matching, limbed up to approx. 6 ft.
ZSVG		Zelkova serrata `Village Green`	Sawleaf Zelkova	3" cal.	Matching, limbed up to approx. 6 ft.

SHRUBS	QUANTITY	BOTANICAL NAME	COMMON NAME	SIZE	REMARKS
AUC		Arbutus unedo `Compacta`	Dwarf Strawberry Tree	5 gal	Matching, full
AZMD		Azalea x `Mother`s Day`	Mother's Day Azalea	3 gal	Matching, full
CASY		Camellia sasanqua `Yuletide`	Yuletide Camellia	5 gal	Matching, full
CIPS		Cistus pulverulentus `Sunset`	Sunset Rockrose	3 gal	Matching, full
COBA		Cornus alba `Bailhalo`	Ivory Halo Dogwood	5 gal	Matching, full
COSK		Cornus sericea `Kelseyi`	Dwarf Redtwig Dogwood	3 gal	Matching, full
DO		Daphne odora	Winter Daphne	3 gal	Matching, full
EUAC		Euonymus alatus `Compactus`	Compact Burning Bush	5 gal	Matching, full
FOG		Fothergilla gardenii	Dwarf Fothergilla	3 gal	Matching, full
HSCM		Hibiscus syriacus `Collie Mullens`	Rose Of Sharon	5 gal	Matching, full
ICC		Ilex crenata `Compacta`	Japanese Holly	3 gal	Matching, full
MC		Myrica californica	Pacific Wax Myrtle	5 gal	Matching, full
PLO		Prunus laurocerasus `Otto Luyken`	Otto Luyken English Laurel	3 gal	Matching, full
RHA		Rhododendron x `Anah Krusche`	Anah Krusche Rhododendron	5 gal	Matching, full
RHP		Rhododendron x `PJM`	PJM Rhododendron	5 gal	Matching, full
RHU		Rhododendron x `Unique`	Unique Rhododendron	5 gal	Matching, full
RIS		Ribes sanguineum	Red Flowering Currant	5 gal	Matching, full
SPD		Spiraea douglasii	Western Spirea	5 gal	Matching, full
SPBA		Spiraea x bumalda `Anthony Waterer`	Anthony Waterer Spiraea	3 gal	Matching, full
SPGF		Spiraea x bumalda `Goldflame`	Goldflame Spirea	3 gal	Matching, full
VID		Viburnum davidii	David Viburnum	3 gal	Matching, full
VIP		Viburnum plicatum tomentosum	Doublefile Viburnum	5 gal	Matching, full
VIT		Viburnum tinus `Spring Bouquet`	Spring Bouquet Laurestinus	5 gal	Matching, full

GROUND COVERS	QUANTITY	BOTANICAL NAME	COMMON NAME	SIZE	REMARKS
BC		Bergenia crassifolia	Siberian-tea	1 gal	Matching, full,15" o.c.
CA		Calamagrostis x acutiflora `Karl Foerster`	Feather Reed Grass	1 gal	Matching, full, 30" o.c.
FG		Festuca glauca	Blue Fescue	1 gal	Matching, full, 15" o.c.
GS		Gaultheria shallon	Salal	1 gal	Matching, full, 36" o.c.
IRTE		Iris tenax	Oregon Iris	1 gal	Matching, full, 15" o.c.
LAM		Lavandula angustifolia `Munstead`	Munstead English Lavender	1 gal	Matching, full, 24" o.c.
NAK		Narcissus x `King Alfred`	King Alfred Daffodil	bulb	Plant in clumps of 5-6 (each bulb 2" apart)
PEAH		Pennisetum alopecuroides `Hameln`	Hameln Dwarf Fountain Grass	1 gal	Matching, full, 24" o.c
POM		Polystichum munitum	Western Sword Fern	1 gal	Matching, full, 24" o.c.
PLMV		Prunus laurocerasus `Mount Vernon`	Mount Vernon Laurel	2 gal	Matching, full. 36" o.c.
RFG		Rudbeckia fulgida `Goldstrum`	Coneflower	1 gal	Matching, full, 18" o.c.
SAJ		Sedum x `Autumn Joy`	Autumn Joy Sedum	1 gal	Matching, full, 18" o.c.

PRELIMINARY
LANDSCAPE MASTER PLAN

0 10 20 40 80 160

SCALE: 1"=40'-0"

NORTH

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David J. Dougherty

PRELIMINARY NOT FOR CONSTRUCTION

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ROW RIVER ROAD, COTTAGE GROVE, OR 97424

Date: 02.20.23
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Revisions

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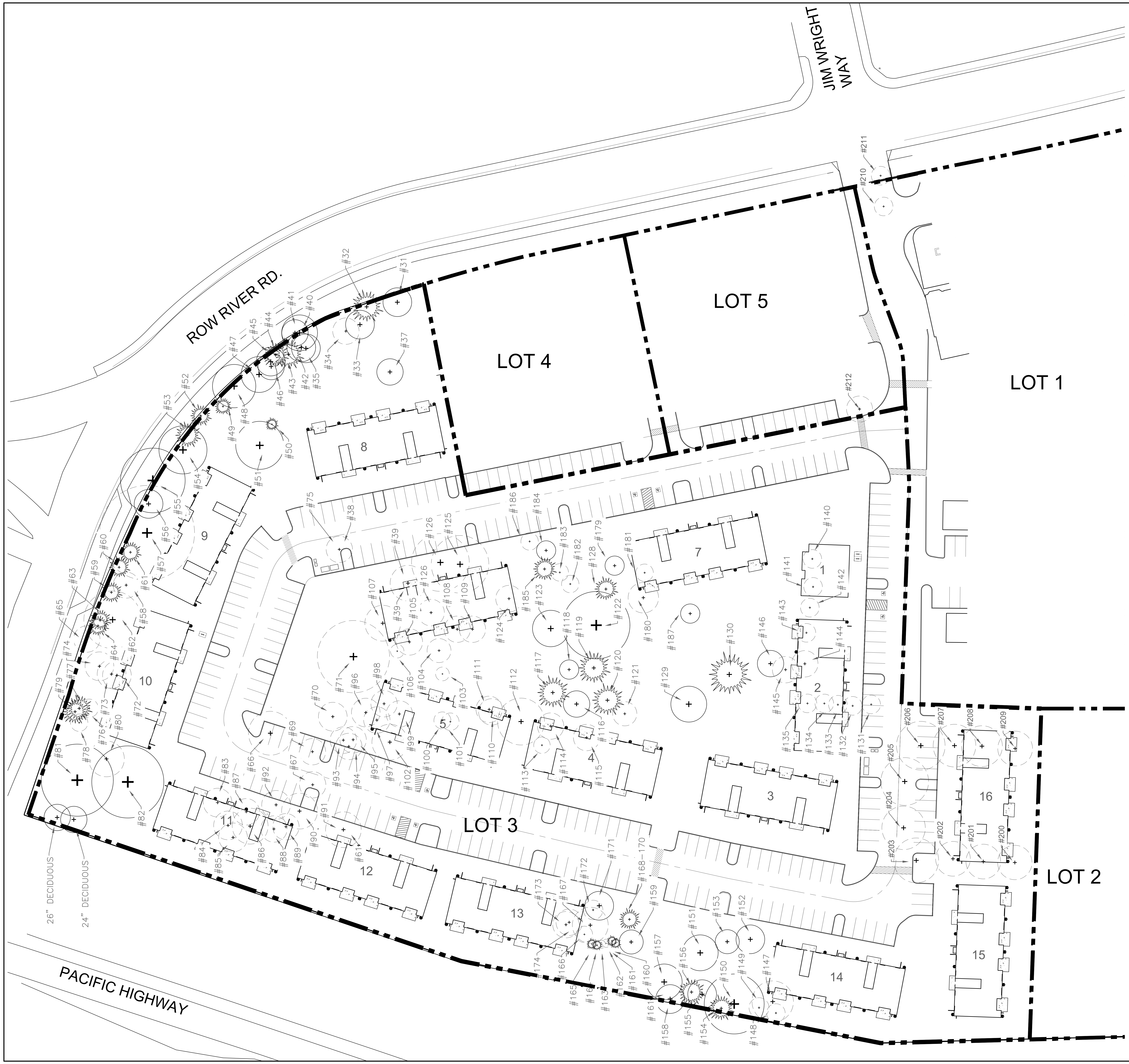
△
△
△

LA-2



LEGEND

- TREE TO BE REMOVED
  SYMBOLS SIZED FOR APPROXIMATE CANOPY RADIUS
- DECIDUOUS TREES TO BE PRESERVED*
  SYMBOLS SIZED FOR APPROXIMATE CANOPY RADIUS
- CONIFEROUS TREES TO BE PRESERVED*
  SYMBOLS SIZED FOR APPROXIMATE CANOPY RADIUS
- #206 TREE TAG CALLOUT

* DEPENDING ON FINAL CONSTRUCTION IMPACTS

NOTE: THE MASTER PLAN DOES NOT CONTAIN PROPOSED CHANGES TO LANDSCAPING ON LOTS 1, 2, 4, OR 5 EXCEPT AS NECESSARY TO PROVIDE ACCESS OR NEW UTILITY EXTENSIONS.

TREE PRESERVATION MAP

SCALE: 1"=40'-0"

DOUGHERTY LANDSCAPE ARCHITECTS

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PINE SPRINGS MASTER PLAN

725 ROW RIVER ROAD, COTTAGE GROVE, OR 97424

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Revisions

LA-3

TREE INVENTORY TABLES

TREE SPECIES LEGEND

Tree Codes	
C	Cherry
A	Ash
AA	Tree of Heaven
ABV	Arbovitae
ACP	Japanese Maple
AR	Red Maple

B	Birch
BM	Big Leaf Maple
CA	Crab apple
CAG	Blue Atlas Cedar
CC	Choke Cherry
CD	Cedar

CJ	Katsura Tree
CP	Catalpa
CRW	Coast Redwood
F	Fig
G	Ginkgo
HL	Holy

HRC	Hogan Red Cedar
HT	Hawthorn
JP	Juniper
JPG	Japanese Pagoda Tree
L	Laurel
M	Maple
-MS	Multi-stem

PI	Pine
PIPO	Ponderosa Pine
PL	Plum
PH	Photinia
PSM	Doug Fir
QG	Oregon White Oak
QR	Red Oak

S	Spruce
SYC	Sycamore
T	Tulip Tree
WRC	Western Red Cedar
WS	Weeping Spruce
Z	Zelkova

TREE STATUS LEGEND

P: To be preserved depending on final construction impacts

R: To be removed depending on final construction impacts

NA: Tree located outside of Pine Spring Master Plan project area

Tag #	Species	Size	Con/Dec	Condition	Status
1	PSM	10"	CONIFEROUS	Good	NA
2	CAG	14"	CONIFEROUS	Good	NA
3	CAG	15"	CONIFEROUS	Good	NA
4	PIPO	22"	CONIFEROUS	Good	NA
5	CAG	13"	CONIFEROUS	Good	NA
6	CAG	8"	CONIFEROUS	Good	P
7	QR	24"	DECIDUOUS	Good	NA
8	QR	18"	DECIDUOUS	Good	NA
9	QR	22"	DECIDUOUS	Good	NA
10	QR	26"	DECIDUOUS	Good	NA
11	QR	26"	DECIDUOUS	Good	NA
12	QR	32"	DECIDUOUS	Good	NA
13	QR	34"	DECIDUOUS	Good	NA
14	QR	34"	DECIDUOUS	Good	NA
15	C	10"	DECIDUOUS	Good	NA
16	B	6"	DECIDUOUS	Poor/Dying	NA
17	C	14"	DECIDUOUS	Good	NA
18	S	7"	CONIFEROUS	Good	NA
19	WS	24"	DECIDUOUS	Good	NA
20	CD	15"	CONIFEROUS	Good	NA
21	CD	26"	CONIFEROUS	Good	NA
22	CD	13"	CONIFEROUS	Good	NA
23	QR	38"	DECIDUOUS	Good	NA
24	PSM	13"	CONIFEROUS	Good	NA
25	ACP	5"	DECIDUOUS	Good	NA
26	PSM	10"	CONIFEROUS	Good	NA
27	QR	36"	DECIDUOUS	Good	NA
28	A	6"	DECIDUOUS	Good	NA
29	PIPO	18"	CONIFEROUS	Poor	NA
30	A	24"	DECIDUOUS	Good	NA
31	QG	13"	DECIDUOUS	Good	P
32	PIPO	15"	CONIFEROUS	Good	P
33	QG	8"	DECIDUOUS	Good	P
34	S	6"	CONIFEROUS	Poor	R
35	CC	12"	DECIDUOUS	Good	P
36	A	10"	DECIDUOUS	Good	NA
37	A	27"	DECIDUOUS	Good	P
38	PSM	17"	CONIFEROUS	Good	R
39	AA	24"	DECIDUOUS	Good	R
40	CC	10"	DECIDUOUS	Good	P
41	CC	17"	DECIDUOUS	Good	P
42	CC	7"	DECIDUOUS	Good	P
43	S	8"	CONIFEROUS	Poor	P
44	CD	11"	CONIFEROUS	Good	P
45	C	7"	DECIDUOUS	Good	P
46	HT	7"	DECIDUOUS	Good	P
47	C	16"	DECIDUOUS	Good	P
48	A	24"	DECIDUOUS	Good	P
49	CD	9"	CONIFEROUS	Good	P
50	JP	5"	CONIFEROUS	Good	P
51	T	40"	DECIDUOUS	Good	P
52	PI	20"	CONIFEROUS	Fair	P
53	PSM	12"	CONIFEROUS	Good	P
54	BM	42"	DECIDUOUS	Good	P
55	QG	40"	DECIDUOUS	Good	P
56	C	14"	DECIDUOUS	Good	P
57	QG	40"	DECIDUOUS	Good	R
58	JP	11"	CONIFEROUS	Good	R
59	WRC	12"	CONIFEROUS	Good	P
60	JP	12"	CONIFEROUS	Good	P
61	WRC	12"	CONIFEROUS	Good	P
62	BM	36"	DECIDUOUS	Good	R
63	L-MS	24"	CONIFEROUS	Good	P
64	L-MS	36"	CONIFEROUS	Good	P
65	A	6"	DECIDUOUS	Poor	R
66	CAG	30"	CONIFEROUS	Fair	R
67	A	26"	DECIDUOUS	Good	R
68	A	17"	DECIDUOUS	Good	P
69	CRW	12"	CONIFEROUS	Good	R
70	L	12"	CONIFEROUS	Good	R
71	SYC	42"	DECIDUOUS	Good	R
72	C	30"	DECIDUOUS	Good	R
73	C	30"	DECIDUOUS	Good	R
74	A	9"	DECIDUOUS	Good	R
75	PSM	17"	CONIFEROUS	Good	R
76	L	6"	CONIFEROUS	Good	R
77	L	6"	CONIFEROUS	Good	P
78	L	5"	CONIFEROUS	Good	R
79	L	10"	CONIFEROUS	Good	P
80	BM	12"	DECIDUOUS	Good	R
81	QG	32"	DECIDUOUS	Good	P
82	QG	28"	DECIDUOUS	Good	P
83	ACP	6"	DECIDUOUS	Good	R
84	ACP	8"	DECIDUOUS	Good	R
85	ACP	8"	DECIDUOUS	Good	R
86	T	13"	DECIDUOUS	Poor	R
87	C	18"	DECIDUOUS	Poor	R
88	A	7"	DECIDUOUS	Good	R
89	ACP	4"	DECIDUOUS	Good	R
90	C	12"	DECIDUOUS	Good	R
91	C	18"	DECIDUOUS	Good	R
92	A	12"	DECIDUOUS	Good	R
93	A	24"	DECIDUOUS	Good	R
94	A	12"	DECIDUOUS	Good	R
95	A	29"	DECIDUOUS	Good	R
96	C	12"	DECIDUOUS	Good	R
97	C	12"	DECIDUOUS	Good	R
98	C	15"	DECIDUOUS	Good	R
99	ACP	8"	DECIDUOUS	Good	R
100	PSM	16"	CONIFEROUS	Good	R
101	PSM	17"	CONIFEROUS	Good	R
102	ACP	28"	DECIDUOUS	Good	R
103	CD	10 "	CONIFEROUS	Fair	R
104	HT	10"	DECIDUOUS	Good	R
105	RW	20"	CONIFEROUS	Good	R
106	CD	6"	CONIFEROUS	Good	R
107	C	7"	DECIDUOUS	Good	R
108	HT	9"	DECIDUOUS	Good	R
109	HT	12"	DECIDUOUS	Good	R
110	A	7"	DECIDUOUS	Good	R
111	A	7"	DECIDUOUS	Good	R
112	A	40"	DECIDUOUS	Good	R
113	PSM	6"	CONIFEROUS	Good	R
114	HT	20"	DECIDUOUS	Good	R
115	M	24"	DECIDUOUS	Good	R
116	C	30"	DECIDUOUS	Good	P
117	CD	10"	CONIFEROUS	Good	P
118	C	12"	DECIDUOUS	Good	P
119	CD	15"	CONIFEROUS	Good	P
120	CD	14"	CONIFEROUS	Good	P
121	CD	10"	DECIDUOUS	Poor	R
122	QG	54"	DECIDUOUS	Good	P
123	Z	10"	DECIDUOUS	Excellent	P
124	AA	24"	DECIDUOUS	Poor	R
125	SYC	12"	DECIDUOUS	Good	R
126	Z	10"	DECIDUOUS	Good	R
127	Z	20"	DECIDUOUS	Good	R
128	PI	12"	CONIFEROUS	Good	P
129	JPG	17"	DECIDUOUS	Good	P
130	PSM	24"	CONIFEROUS	Good	P
131	PSM	24"	CONIFEROUS	Good	R
132	PSM	20"	CONIFEROUS	Good	R
133	PSM	17"	CONIFEROUS	Good	R
134	PSM	24"	CONIFEROUS	Good	R
135	PSM	24"	CONIFEROUS	Good	R
136	AR	5"	DECIDUOUS	Good	NA
137	AR	5"	DECIDUOUS	Good	NA
138	AR	5"	DECIDUOUS	Good	NA
139	G	4"	DECIDUOUS	Good	NA
140	CD	24"	CONIFEROUS	Good	R
141	CD	20"	CONIFEROUS	Good	TRB
142	CD	24"	CONIFEROUS	Good	R
143	CD	6"	CONIFEROUS	Poor	R
144	QG	5"	DECIDUOUS	Poor	R
145	CD	5"	CONIFEROUS	Good	R
146	QG	7"	DECIDUOUS	Good	P
147	PSM	12"	CONIFEROUS	Good	R
148	PI	18"	CONIFEROUS	Dead	R
149	CD	7"	CONIFEROUS	Good	R
150	SYC	17"	DECIDUOUS	Good	P
151	B	17"	DECIDUOUS	Good	P
152	F	9"	DECIDUOUS	Good	P
153	CA	6"	DECIDUOUS	Good	P
154	HRC	22"	CONIFEROUS	Good	P
155	B	18"	DECIDUOUS	Good	P
156	PSM	24"	CONIFEROUS	Good	P
157	QG	12"	DECIDUOUS	Good	P
158	PL	15"	DECIDUOUS	Good	P
159	C	12"	DECIDUOUS	Good	P
160	ABV	24"	CONIFEROUS	Good	P
161	ABV	14"	CONIFEROUS	Good	P
162	ABV	12"	CONIFEROUS	Good	R
163	ABV	12"	CONIFEROUS	Good	R
164	ABV	12"	CONIFEROUS	Good	P
165	ABV	12"	CONIFEROUS	Good	P
166	CRW	16"	CONIFEROUS	Good	R
167	CP	7"	DECIDUOUS	Good	R
168	L	10"	CONIFEROUS	Good	P
169	L	10"	CONIFEROUS	Good	P
170	L	20"	CONIFEROUS	Good	P
171	HT	24"	DECIDUOUS	Good	P
172	HL	4"	DECIDUOUS	Good	R
173	L	30"	CONIFEROUS	Good	R
174	L	10"	CONIFEROUS	Good	R
175	PSM	30"	CONIFEROUS	_	NA
176	PSM	30"	CONIFEROUS	Good	NA
177	PSM	22"	CONIFEROUS	Good	NA
178	PSM	21"	CONIFEROUS	Good	NA
179	PI	12"	DECIDUOUS	Poor	P
180	PH	16"	DECIDUOUS	Poor	R
181	PH	8"	DECIDUOUS	Poor	R
182	CD-MS	14"	CONIFEROUS	Fair	R
183	CD	12"	CONIFEROUS	Fair	R
184	QG	10"	DECIDUOUS	Poor	P
185	S	12"	CONIFEROUS	Poor	P
186	Z	12"	DECIDUOUS	_	R
187	CD	10"	DECIDUOUS	Fair	P
200	M	10"	DECIDUOUS	Good	R
201	M	11"	DECIDUOUS	Good	R
202	M	12"	DECIDUOUS	Good	R
203	M	12"	DECIDUOUS	Good	R
204	M	12"	DECIDUOUS	Good	R
205	M	14"	DECIDUOUS	Good	R
206	M	16"	DECIDUOUS	Good	R
207	M	18"	DECIDUOUS	Good	R
208	M	15"	DECIDUOUS	Good	R
209	M	15"	DECIDUOUS	Good	R
210	JP	15"	CONIFEROUS	Good	R
211	JP	15"	CONIFEROUS	Good	R
212	A	30"	DECIDUOUS	Good	R

TREE PRESERVATION DATA

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LANDSCAPE
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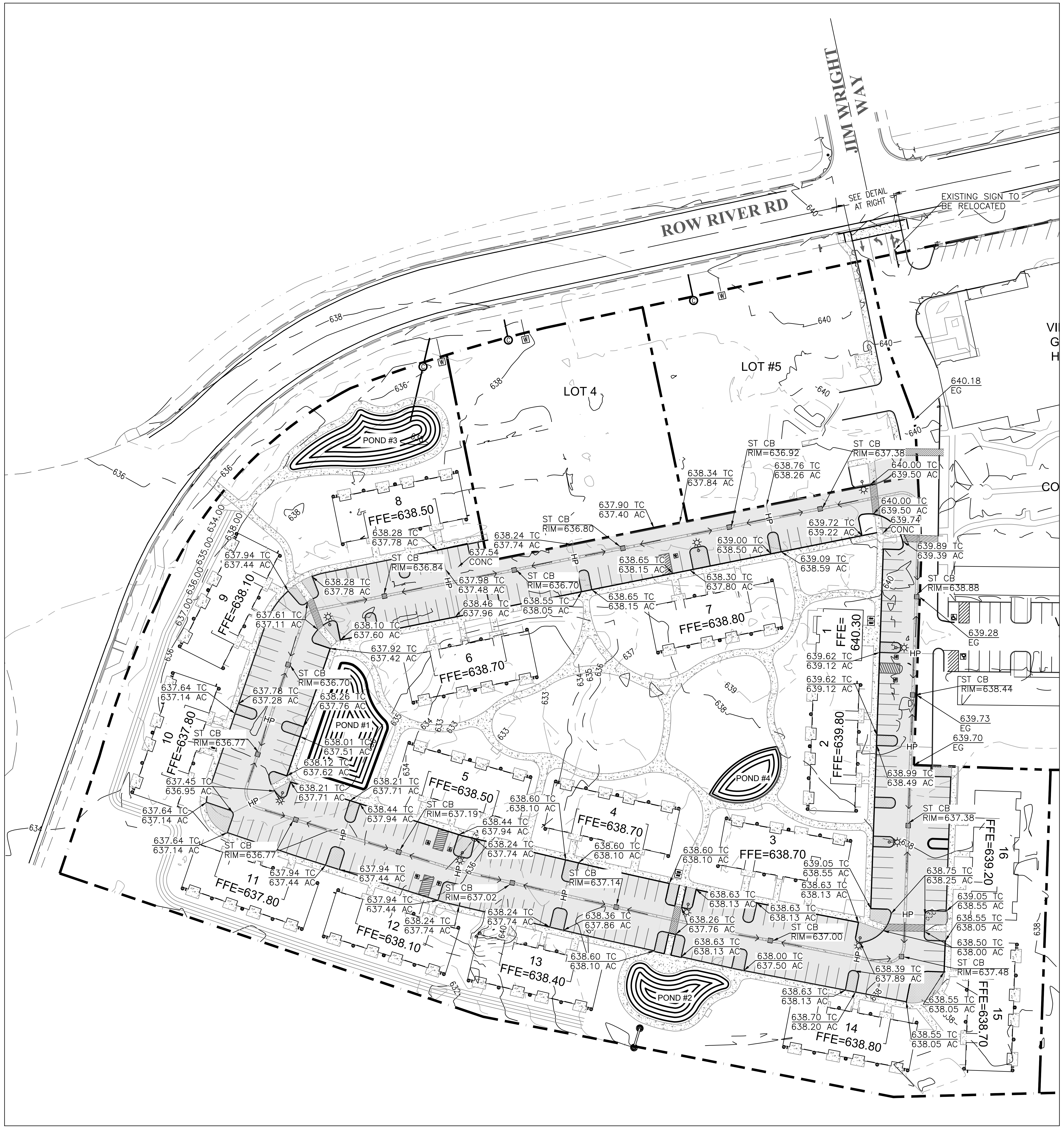
Revisions

LA-4



GENERAL NOTES:

1. **THESE PLANS ARE INTENDED FOR DEVELOPMENT REVIEW PURPOSES, AND ARE NOT INTENDED TO BE USED FOR CONSTRUCTION IN THE FIELD.**
2. VERTICAL ELEVATIONS AND CONTOURS BASED UPON DATA RETRIEVED BY I.E. ENGINEERING INC. AUGUST 2021.
3. AREAS NOT SHOWN AS IMPERVIOUS SURFACE TO BE LANDSCAPED. SEE LANDSCAPE ARCHITECT PLANS FOR DETAILS.
4. EXISTING GRADES ARE SHOWN AS CONTOURS ON GRADING PLAN. PROPOSED GRADES ARE CALLED OUT AS SPOT GRADES.

GRADING NOTES:

1. ADA PARKING SPACES AND ADJACENT ACCESSIBLE AISLES SHALL BE SLOPED LESS THAN 2% IN ALL DIRECTIONS.
2. ALL ADA FACILITIES TO MEET CURRENT ADOPTED REGULATION STANDARDS.
3. ADA SPACES TO BE CONSTRUCTED PER DETAILS ON SHEET C–3.0.
3. LANDSCAPE AREAS TO SLOPE AWAY FROM APARTMENT BUILDINGS. GRADING TO BE ESTABLISHED DURING BUILDING PERMIT PROCESS.
4. CROSSWALKS TO BE MINIMUM 5.00' WIDE AND MEET ADA REGULATIONS.
5. GRADING DESIGN TO BE COMPLETED AND FINALIZED DURING THE BUILDING PERMIT PROCESS.

PAVING NOTES:

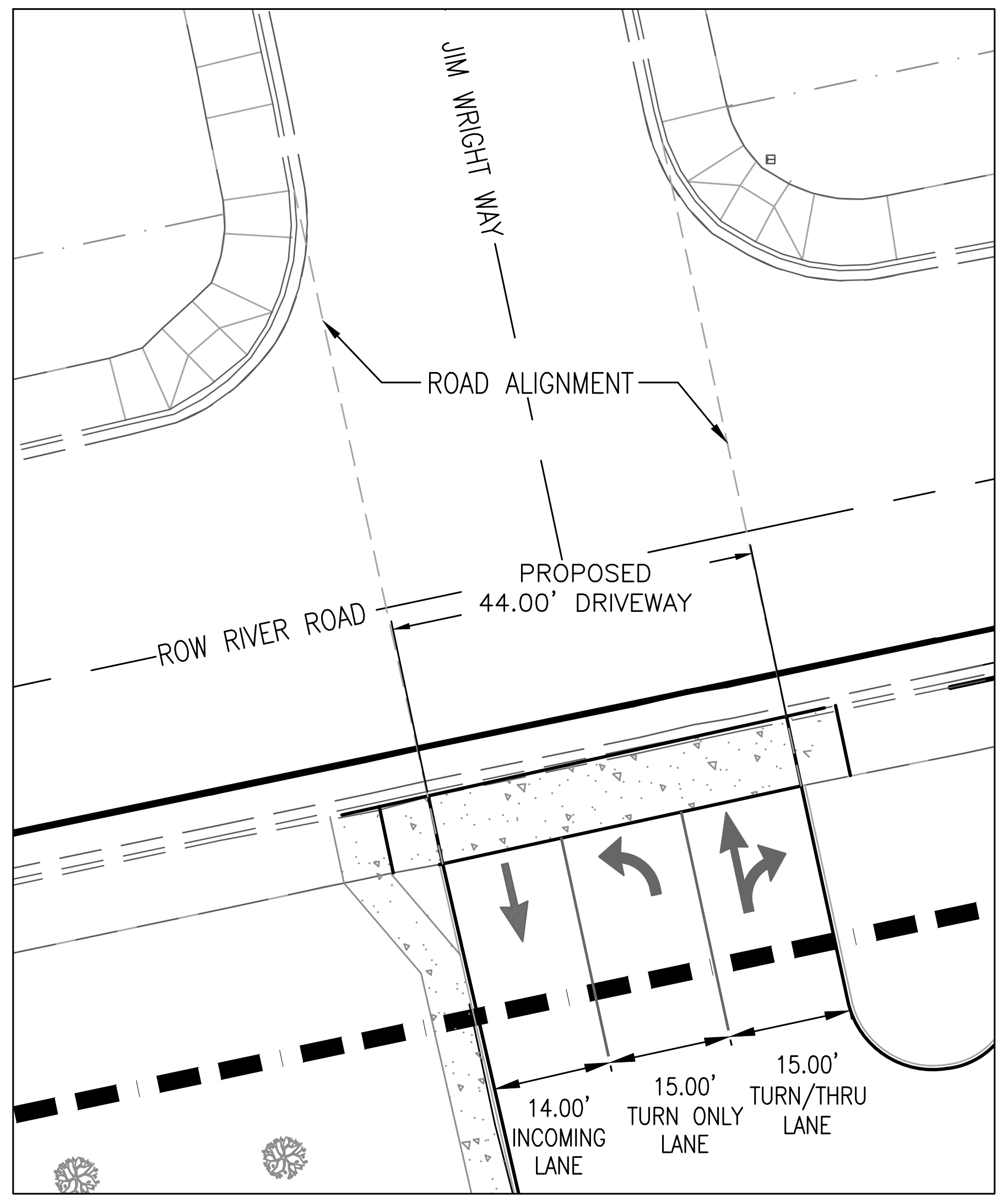
1. ALL CONCRETE WALKWAYS TO MEET ADA REQUIREMENTS FOR SLOPE AND WIDTH.
2. ALL INTERIOR PAVED AREAS TO BE PRIVATELY OWNED AND MAINTAINED.
3. VALLEY GUTTERS TO BE SLOPED A MINIMUM OF 0.50% AND ROUTED TO CATCH BASINS.
4. PARKING SPACES AND CROSSWALKS TO BE STRIPED WITH 4" WIDE TRAFFIC WHITE STRIPE.
5. FOR PARKING SPACE DESIGN SEE DETAILS ON SHEET C–3.0

GRADING LEGEND

AC	ASPHALT
ADG	AREA DRAIN GRATE
BW	BACK OF WALK
CBG	CATCH BASIN GRATE
CONC	CONCRETE
EG	EXISTING GROUND
EX	EXISTING
FFE	FINISH FLOOR ELEVATION
FL	FLOWLINE
GB	GUTTER BAR
HP	HIGH POINT
TC	TOP OF CURB
TOB	TOP OF BANK
←	DIRECTION OF FLOW
VG	VALLEY GUTTER

LEGEND

— · — · —	BOUNDARY LINE
— — —	ADJACENT LOT LINE
401	EXISTING 1' CONTOUR LINE
═ ═ ═	EXISTING CURB & GUTTER
———	PROPOSED CURB
▣	PROPOSED CATCH BASIN
▭	PROPOSED PAVED AREA
▭	PROPOSED SIDEWALK AREA
▨	PROPOSED CROSSWALK AREA
▭	PROPOSED LANDSCAPE BED
●	PROPOSED ROOF DRAINS



DRIVEWAY DETAIL

SCALE: 1"=20'

THESE PLANS ARE FOR PLANNING PURPOSES ONLY AND ARE NOT TO BE USED FOR CONSTRUCTION IN THE FIELD

A & O Engineering L.L.C.
CIVIL ENGINEERING & SITE DEVELOPMENT CONSULTING

380 Q ST. SUITE 200
SPRINGFIELD, OR. 97477
PHONE: (541) 302-9790
scott@aoengineering.biz

PRELIMINARY NOT FOR CONSTRUCTION
PROFESSIONAL
KYLE DEAN
MAY 1
EXPIRES 12/

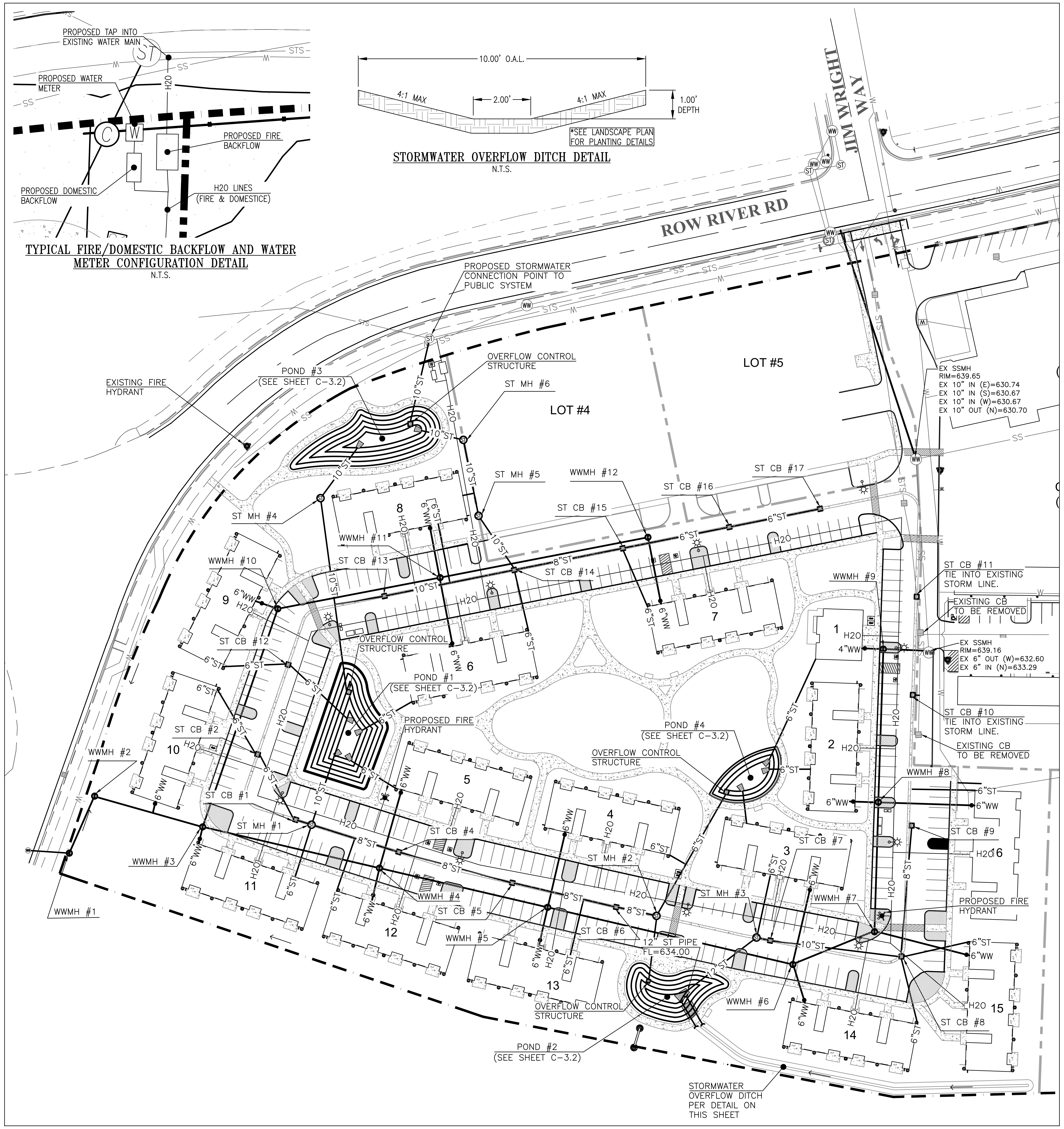
Paving & Grading Plan
for
Pine Springs Master Plan
Cottage Grove Lane County Oregon

DATE: 2–20–23
PROJECT No: 5320
SCALE: HORIZ:
VERT:
DRAWN BY: ACH
DESIGNED BY: KDM
REVIEWED BY: SDM

SUBMITTALS:

REVISIONS:

SHEET
C–1.0
1 OF 5



SCALE: 1"=50'

50' 0 50' 100'

LEGEND

— — · —	BOUNDARY LINE	☼	PROPOSED FIRE HYDRANT
— · — · —	ADJACENT LOT LINE	—— OHE ——	EXISTING OVERHEAD UTILITIES
401	EXISTING 1' CONTOUR LINE	☼	PROPOSED STREET LIGHT
═ ═ ═	EXISTING CURB & GUTTER	▲	EXISTING ELECTRIC TRANSFORMER
W	EXISTING WATER METER	■	EXISTING UTILITY POLE
●	EXISTING FIRE HYDRANT	—)	EXISTING GUY ANCHOR
⊗	EXISTING WATER VALVE	—— GAS ——	EXISTING GAS LINE
12"ST —(ST)	EXISTING STORM DRAINAGE SYSTEM	G	EXISTING GAS RISER
⊡	EXISTING CURB INLET	P	EXISTING PHONE PEDESTAL
▦	EXISTING CATCH BASIN	—— W ——	EXISTING WATER LINE
12"ST —(	EXISTING STORMWATER CULVERT	——	PROPOSED EDGE OF AC PAVING
10"WW —(WW)	EXISTING WASTEWATER SYSTEM	10"ST —(ST)	PROPOSED STORM DRAINAGE SYSTEM
		▦	PROPOSED CATCH BASIN

STORMWATER NOTES:

1. ROOF DRAIN LOCATIONS FROM PROPOSED BUILDINGS TO BE FINALIZED DURING BUILDING PERMIT PROCESS. ALL ROOF DRAINS TO BE HARD PIPED TO MAINLINES. ROOF DRAINS SHOWN FOR REFERENCE ONLY.
2. FOR DETAILS ON DETENTION PONDS REFER TO SHEET C–3.2.
3. INFILTRATION TESTING WAS PERFORMED ON–SITE BY BRANCH ENGINEERING ON FEBRUARY 17, 2022. MEASURED RATES WERE FOUND TO BE BETWEEN 8 AND 66" PER HOUR DEPENDING ON TEST LOCATION. SEE GEOTECHNICAL REPORT FOR MORE INFORMATION.
4. DUE TO INFILTRATION TEST RESULTS, INFILTRATION IS THE PRIMARY STORMWATER DISCHARGE ROUTE FROM THE PROPOSED STORMWATER PONDS. AN INFILTRATION RATE OF 2 INCHES PER HOUR THROUGH THE IMPORTED SOIL MEDIUMS WAS ASSUMED FOR DESIGN PROVIDING ADEQUATE SAFETY FACTOR FROM THE MEASURED INFILTRATION RATES.
5. FOR LARGE DESIGN STORMS, AN OVERFLOW IS PROPOSED INTO THE EXISTING STORM MAIN ON THE WEST SIDE OF ROW RIVER ROAD AS SHOWN FROM POND #3.

FRANCHISE UTILITY NOTES:

1. ALL FRANCHISE UTILITIES (ELECTRIC, CABLE, PHONE, NATURAL GAS) ARE AVAILABLE TO THE SITE.
2. PROPOSED JOINT TRENCH ROUTING SHOWN FOR REFERENCE. FINAL DESIGN TO BE PROVIDED DURING BUILDING PERMIT PROCESS IN COORDINATION WITH PROVIDING UTILITY.
3. JOINT TRENCH DETAIL SHOWN ON SHEET C–3.1.
4. METER AND JUNCTION BOX LOCATIONS TO BE DETERMINED DURING BUILDING PERMIT PROCESS.
5. NEW FRANCHISE UTILITIES ON–SITE ARE PROPOSED TO BE UNDERGROUND.

LIGHTING NOTES:

1. WALL PACK LIGHTS (LED FIXTURES) TO BE INCLUDED ON BUILDINGS WHERE NECESSARY TO PROVIDE ADEQUATE LIGHTING. LOCATIONS TO BE DETERMINED DURING BUILDING PERMIT PROCESS.
2. POLE LIGHTS ARE PROPOSED AND PRELIMINARY LOCATIONS ARE SHOWN ON THIS SHEET. LIGHTS ARE PROPOSED TO BE CSX1 LEDS WITH A 20 FOOT MOUNTING HEIGHT ABOVE PAVEMENT.

WASTEWATER NOTES:

1. WASTEWATER SYSTEM INTERNAL TO SITE TO BE PRIVATELY OWNED AND MAINTAINED.
2. ALL WASTEWATER PIPING DESIGNED WITH MIN. 2.5 FEET OF COVER. PIPE MATERIAL TO BE PVC D3034 SDR 35.
3. WASTEWATER PIPING TO MEET REQUIREMENTS FOUND IN OREGON PLUMBING SPECIALTY CODE 2021.

WATER NOTES:

1. ALL BUILDINGS TO INCLUDE FIRE SPRINKLER SYSTEM. FIRE SPRINKLER SYSTEM TO BE DESIGNED BY QUALIFIED PROFESSIONAL DURING BUILDING PERMIT PROCESS.
2. INTERNAL HYDRANT PLACEMENT TO BE FINALIZED DURING BUILDING PERMIT PROCESS IN COORDINATION WITH COTTAGE GROVE FIRE MARSHALL.
3. DOMESTIC WATER AND FIRE LINE SIZING CALCULATIONS TO BE COMPLETED AS PART OF BUILDING PERMIT PROCESS.
4. DOMESTIC AND FIRE BACKFLOW DEVICES TO MEET CITY OF COTTAGE GROVE REQUIREMENTS.
5. ALL PIPING SHALL MEET REQUIREMENTS IN OREGON STATE PLUMBING SPECIALTY CODE 2021.
6. FIRE DEPARTMENT CONNECTIONS TO BE DESIGNED DURING BUILDING PERMIT PROCESS.
7. BOTH WATER AND FIRE LINES ARE PROPOSED TO BE PRIVATE LINES AND HAVE ONE POINT OF CONNECTION TO PUBLIC SERVICES.
8. DOMESTIC WATER LINES AND FIRE LINES ON–SITE ARE PROPOSED TO BE JOINT TRENCHED PER DETAIL ON SHEET C–3.1.

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PRELIMINARY NOT FOR CONSTRUCTION
PROFESSIONAL
KYLE
EXPIRES

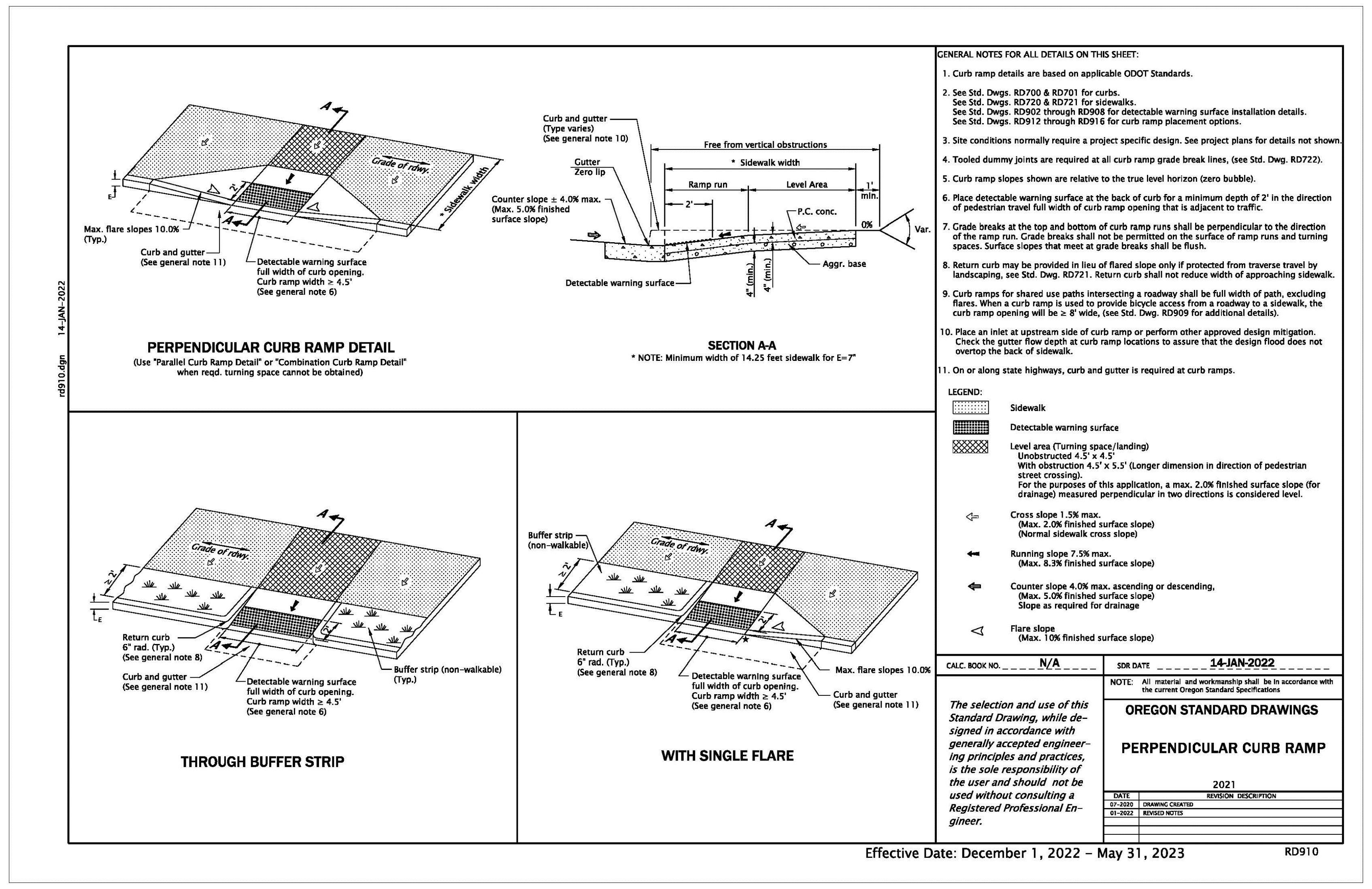
Utility Plan
for
Pine Springs Master Plan
Cottage Grove Lane County Oregon

DATE: 2-20-23
PROJECT No: 5320
SCALE: HORIZ:
VERT:
DRAWN BY: ACH
DESIGNED BY: KDM
REVIEWED BY: SDM

SUBMITTALS:

REVISIONS:

SHEET
C-2.0
2 OF 5



PERPENDICULAR CURB RAMP DETAIL
(Use "Parallel Curb Ramp Detail" or "Combination Curb Ramp Detail" when reqd. turning space cannot be obtained)

SECTION A-A
* NOTE: Minimum width of 14.25 feet sidewalk for E=7"

THROUGH BUFFER STRIP

WITH SINGLE FLARE

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. Curb ramp details are based on applicable ODOT Standards.
2. See Std. Dwgs. RD700 & RD701 for curbs.
   See Std. Dwgs. RD720 & RD721 for sidewalks.
   See Std. Dwgs. RD902 through RD908 for detectable warning surface installation details.
   See Std. Dwgs. RD912 through RD916 for curb ramp placement options.
3. Site conditions normally require a project specific design. See project plans for details not shown.
4. Tooled dummy joints are required at all curb ramp grade break lines, (see Std. Dwg. RD722).
5. Curb ramp slopes shown are relative to the true level horizon (zero bubble).
6. Place detectable warning surface at the back of curb for a minimum depth of 2' in the direction of pedestrian travel full width of curb ramp opening that is adjacent to traffic.
7. Grade breaks at the top and bottom of curb ramp runs shall be perpendicular to the direction of the ramp run. Grade breaks shall not be permitted on the surface of ramp runs and turning spaces. Surface slopes that meet at grade breaks shall be flush.
8. Return curb may be provided in lieu of flared slope only if protected from traverse travel by landscaping, see Std. Dwg. RD721. Return curb shall not reduce width of approaching sidewalk.
9. Curb ramps for shared use paths intersecting a roadway shall be full width of path, excluding flares. When a curb ramp is used to provide bicycle access from a roadway to a sidewalk, the curb ramp opening will be ≥ 8' wide, (see Std. Dwg. RD909 for additional details).
10. Place an inlet at upstream side of curb ramp or perform other approved design mitigation. Check the gutter flow depth at curb ramp locations to assure that the design flood does not overtop the back of sidewalk.
11. On or along state highways, curb and gutter is required at curb ramps.

LEGEND:

░	Sidewalk
▦	Detectable warning surface
▩	Level area (Turning space/landing) Unobstructed 4.5' x 4.5' With obstruction 4.5' x 5.5' (Longer dimension in direction of pedestrian street crossing). For the purposes of this application, a max. 2.0% finished surface slope (for drainage) measured perpendicular in two directions is considered level.
⇦	Cross slope 1.5% max. (Max. 2.0% finished surface slope) (Normal sidewalk cross slope)
←	Running slope 7.5% max. (Max. 8.3% finished surface slope)
⇐	Counter slope 4.0% max. ascending or descending, (Max. 5.0% finished surface slope) Slope as required for drainage
◁	Flare slope (Max. 10% finished surface slope)

CALC. BOOK NO. N/A

SDR DATE 14-JAN-2022

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

OREGON STANDARD DRAWINGS

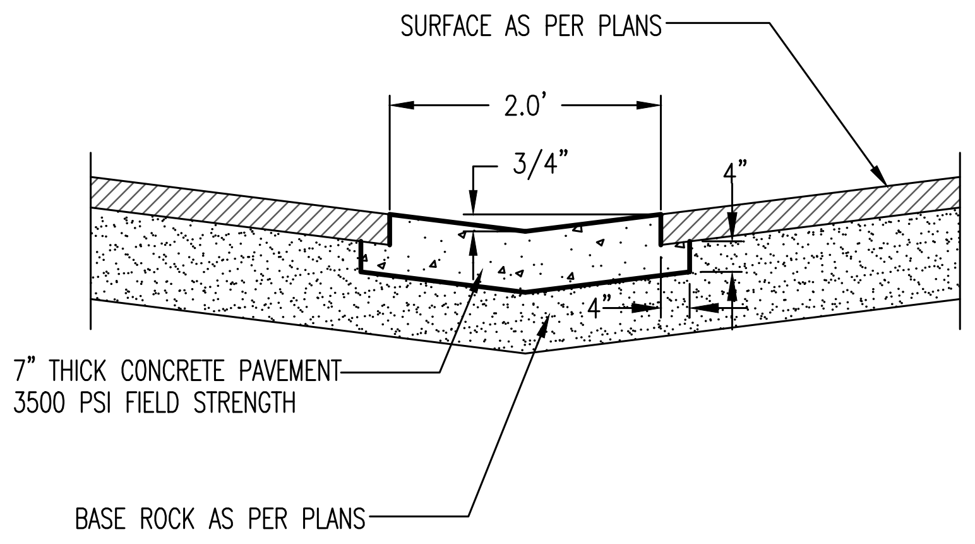
PERPENDICULAR CURB RAMP

2021

DATE	REVISION DESCRIPTION
07-2020	DRAWING CREATED
01-2022	REVISED NOTES

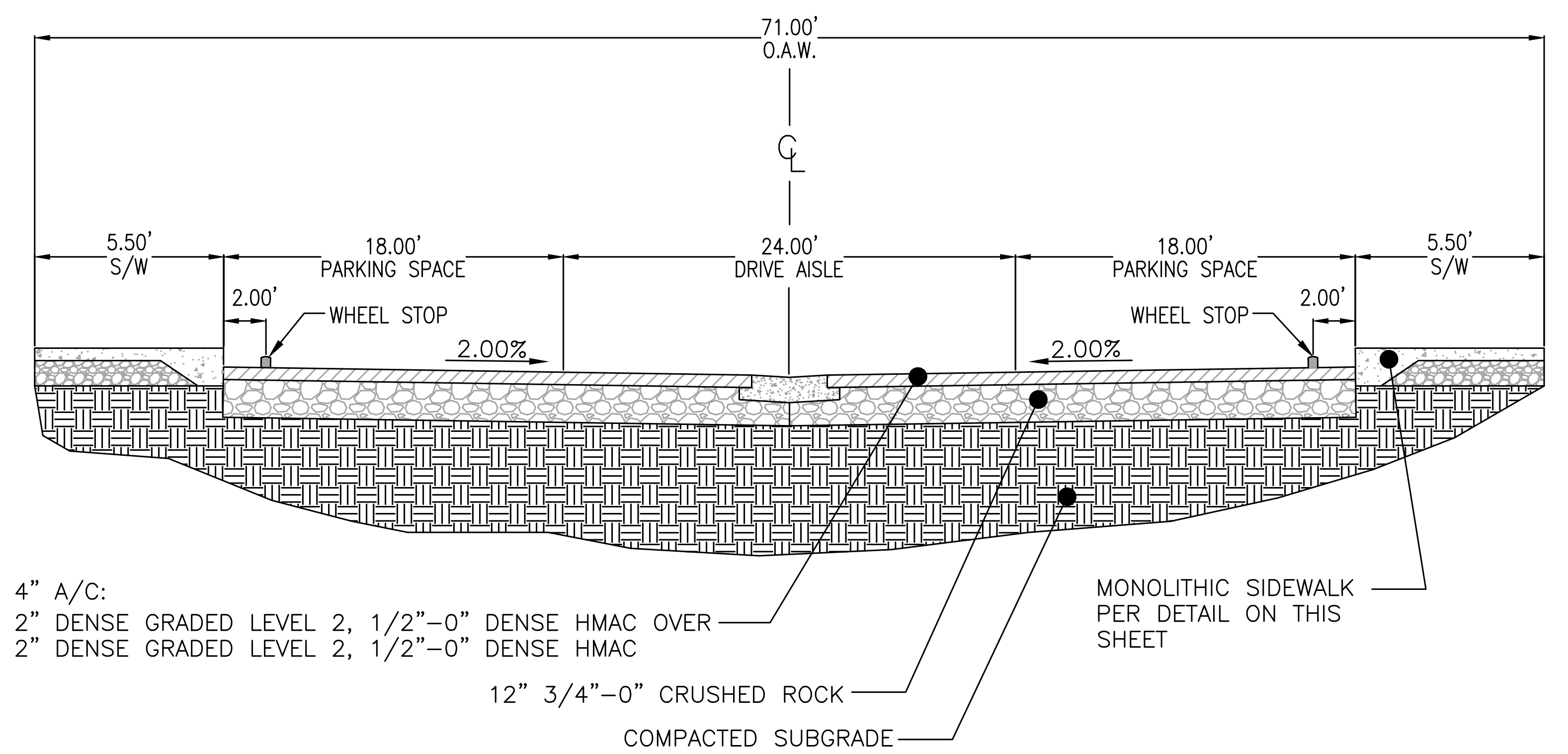
Effective Date: December 1, 2022 – May 31, 2023

RD910



CONCRETE VALLEY GUTTER

N.T.S.



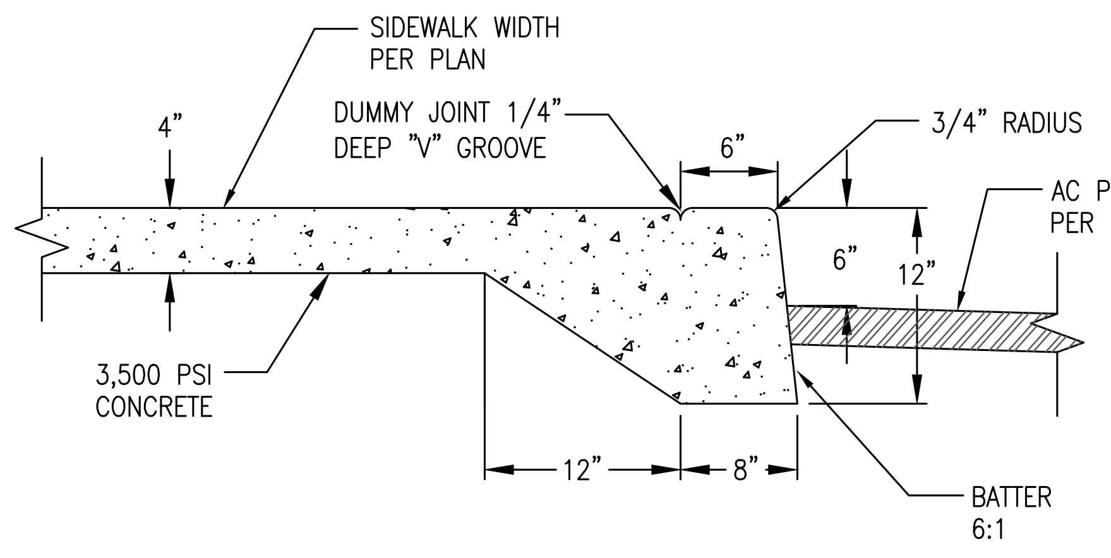
PRIVATE DRIVEWAY CROSS SECTION DETAIL

NTS

HOOP STYLE BIKE RACK – 2 BIKE CAPACITY, BLACK

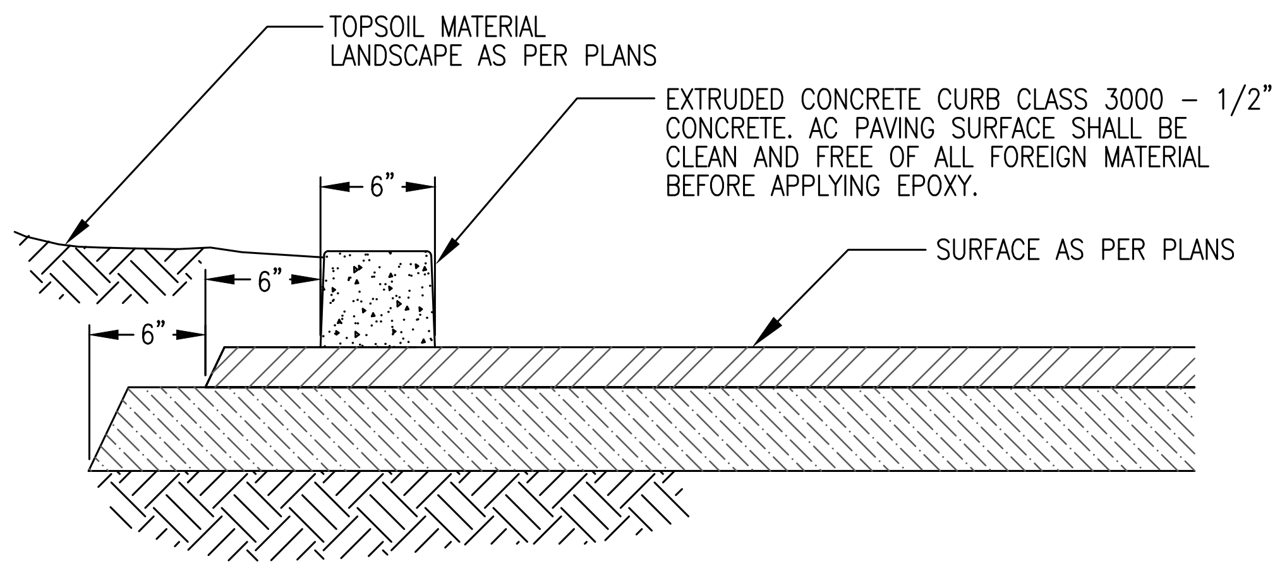
Upscale stylish look for downtown shopping and business districts.

- 10-gauge steel with attractive powder coating.
- 2 3/8" diameter bar.
- Concrete mounting hardware sold separately.



MONOLITHIC CURB/SIDEWALK

NTS

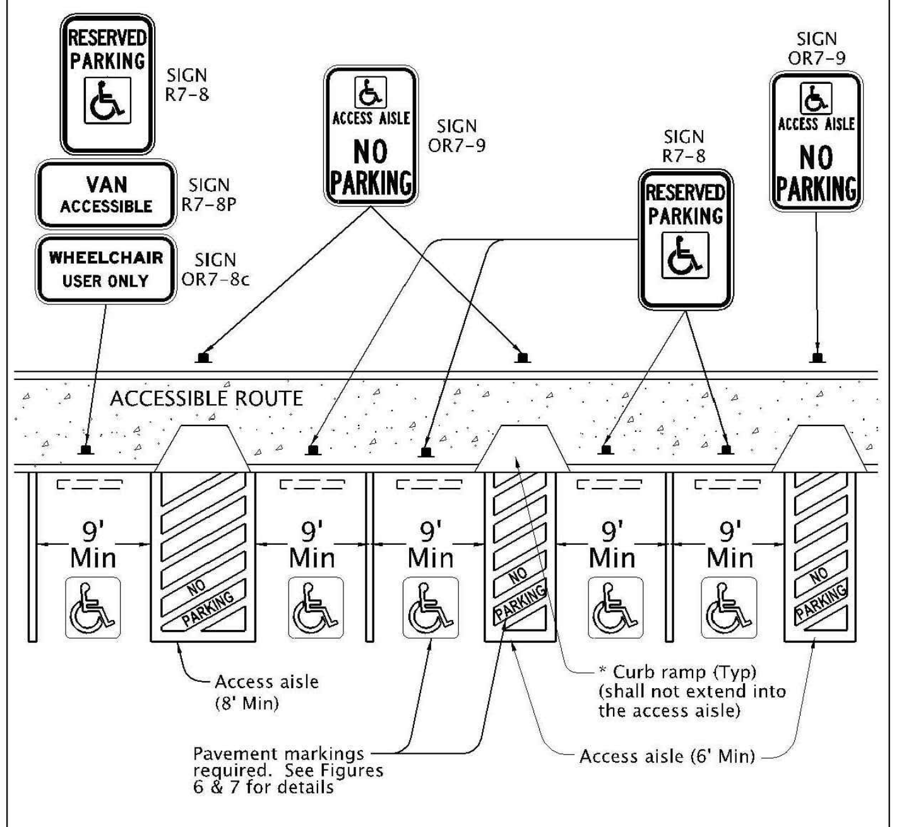


EXTRUDED CONCRETE CURB DETAIL

NTS

OREGON TRANSPORTATION COMMISSION
Standards for Accessible Parking Places
August 2018

MINIMUM STANDARD FIVE- ACCESSIBLE PARKING SPACES
(ONE WHEELCHAIR USER DESIGNATION REQUIRED)

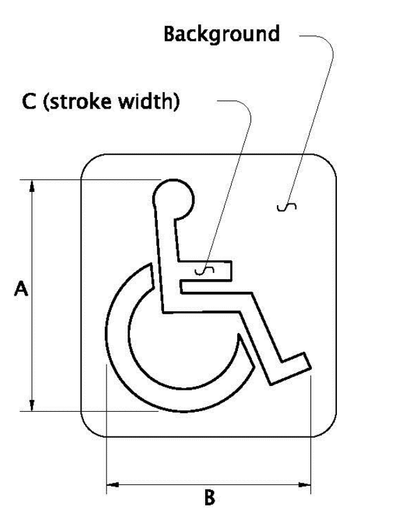


* Detectable warning surface required if curb ramp is located within public right-of-way

Figure 3

OREGON TRANSPORTATION COMMISSION
Standards for Accessible Parking Places
August 2018

PAVEMENT MARKING STENCIL



Pavement Marking Background: Optional: Blue, Retroreflective

Pavement Marking Stencil: White, Retroreflective

LEGEND	DIMENSIONS (INCHES)						
	A	B	C	D	E	F	G
MINIMUM	28	24	3				
STANDARD	41	36	4				

The pavement marking stencil shall be used to designate an accessible parking area reserved for vehicles with DMV permits.

Figure 6

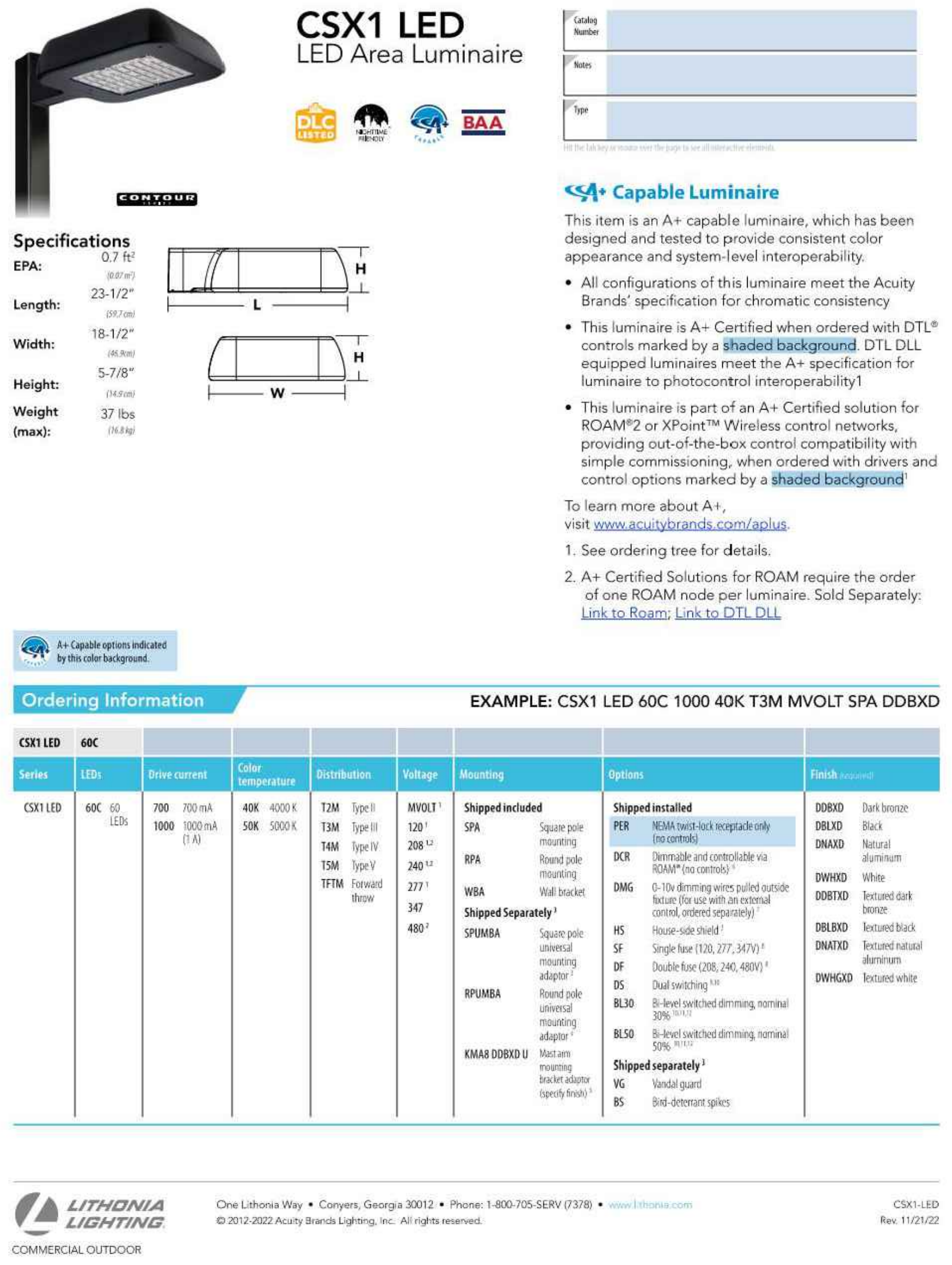
OREGON TRANSPORTATION COMMISSION
Standards for Accessible Parking Places
August 2018

PAVEMENT MARKING LEGEND

Pavement Marking Legend: White or Yellow, Retroreflective

The "No Parking" pavement marking is used to designate an access aisle reserved for persons use parking with a DMV permit. This marking shall be required for all access aisles next to accessible parking spaces. Engineering judgement should be used for placement location to give best visual location to prevent illegal use of access aisle. Yellow may be used instead of white to increase contrast between access aisle white lines and the "No Parking" legend.

Figure 7



CSX1 LED
LED Area Luminaire

Catalog Number

Notes

Type

Specifications

EPA:	0.7 ft² (0.07 m²)
Length:	23-1/2" (59.7 cm)
Width:	18-1/2" (46.9cm)
Height:	5-7/8" (14.9 cm)
Weight (max):	37 lbs (16.8 kg)

A+ Capable Luminaire

This item is an A+ capable luminaire, which has been designed and tested to provide consistent color appearance and system-level interoperability.

- All configurations of this luminaire meet the Acuity Brands' specification for chromatic consistency
- This luminaire is A+ Certified when ordered with DTL® controls marked by a shaded background. DTL DLL equipped luminaires meet the A+ specification for luminaire to photocontrol interoperability1
- This luminaire is part of an A+ Certified solution for ROAM®2 or XPoint™ Wireless control networks, providing out-of-the-box control compatibility with simple commissioning, when ordered with drivers and control options marked by a shaded background[1]

To learn more about A+, visit www.acuitybrands.com/aplus.

1. See ordering tree for details.
2. A+ Certified Solutions for ROAM require the order of one ROAM node per luminaire. Sold Separately: Link to Roam; Link to DTL DLL

A+ Capable options indicated by this color background.

Ordering Information EXAMPLE: CSX1 LED 60C 1000 40K T3M MVOLT SPA DDBXD

CSX1 LED	60C							
Series	LEDs	Drive current	Color temperature	Distribution	Voltage	Mounting	Options	Finish (required)
CSX1 LED	60C 60 LEDs	700 700 mA 1000 1000 mA (1 A)	40K 4000 K 50K 5000 K	T2M Type II T3M Type III T4M Type IV T5M Type V TFTM Forward throw	MVOLT[1] 120[1] 208[1,2] 240[1,2] 277[1] 347 480[2]	**Shipped included** SPA Square pole mounting RPA Round pole mounting WBA Wall bracket **Shipped Separately[3]** SPUMBA Square pole universal mounting adaptor[3] RPUMBA Round pole universal mounting adaptor[3] KMA8 DDBXD U Mast arm mounting bracket adaptor (specify finish)[3]	**Shipped installed** PER NEMA twist-lock receptacle only (no controls) DCR Dimmable and controllable via ROAM® (no controls)[5] DMG 0-10v dimming wires pulled outside fixture (for use with an external control, ordered separately)[7] HS House-side shield[3] SF Single fuse (120, 277, 347V)[8] DF Double fuse (208, 240, 480V)[8] DS Dual switching[9,10] BL30 Bi-level switched dimming, nominal 30%[10,11,12] BL50 Bi-level switched dimming, nominal 50%[10,11,12] **Shipped separately[3]** VG Vandal guard BS Bird-deterrant spikes	DDBXD Dark bronze DBLXD Black DNAXD Natural aluminum DWHXD White DDBTXD Textured dark bronze DBLBXD Textured black DNATXD Textured natural aluminum DWHGXD Textured white

LITHONIA LIGHTING
COMMERCIAL OUTDOOR

One Lithonia Way • Conyers, Georgia 30012 • Phone: 1-800-705-SERV (7378) • www.lithonia.com

CSX1-LED
Rev. 11/21/22

THESE PLANS ARE FOR PLANNING PURPOSES ONLY AND ARE NOT TO BE USED FOR CONSTRUCTION IN THE FIELD

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PRELIMINARY NOT FOR CONSTRUCTION

Civil Details
for
Pine Springs Master Plan
Cottage Grove Lane County Oregon

DATE: 2-20-23
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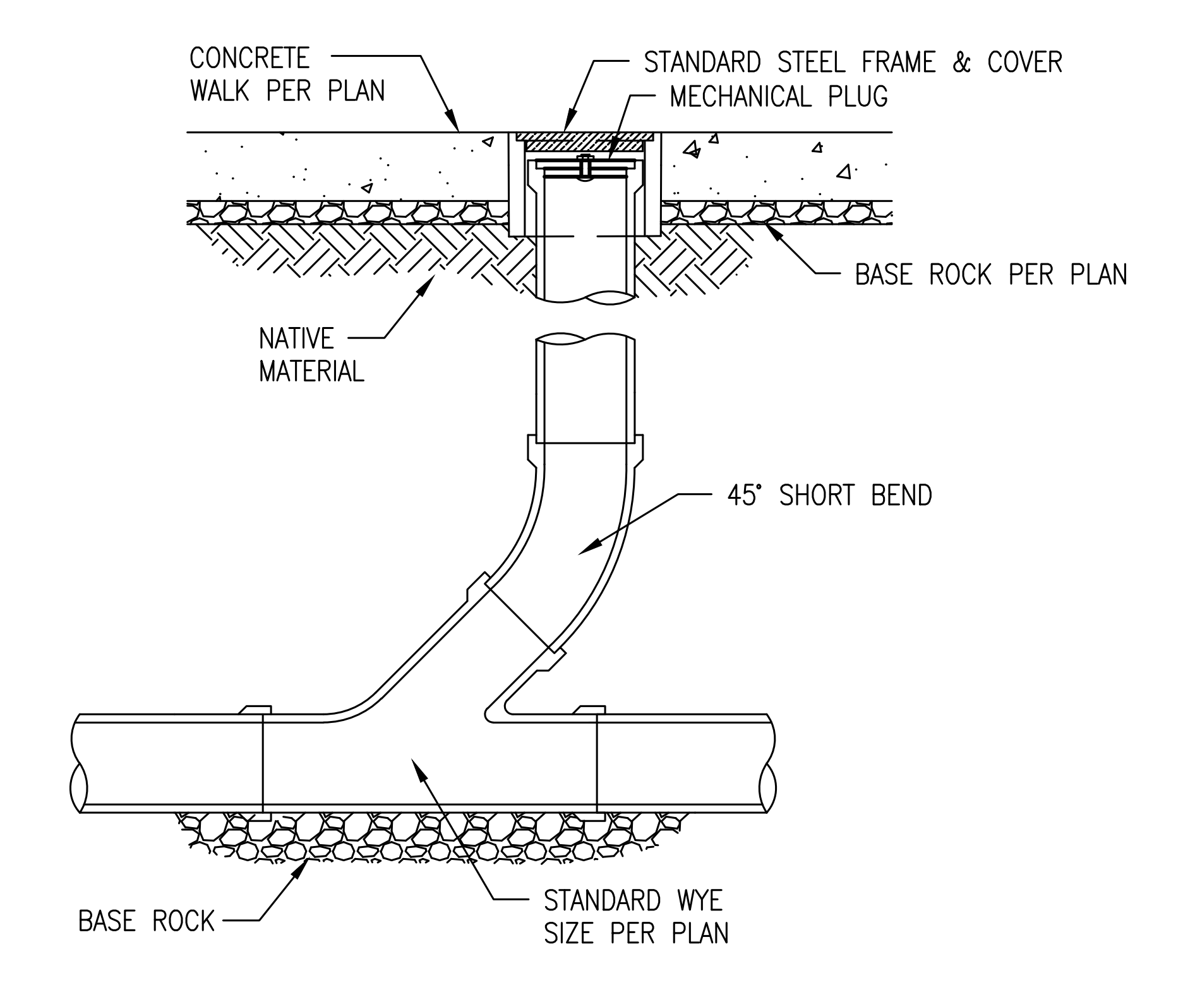
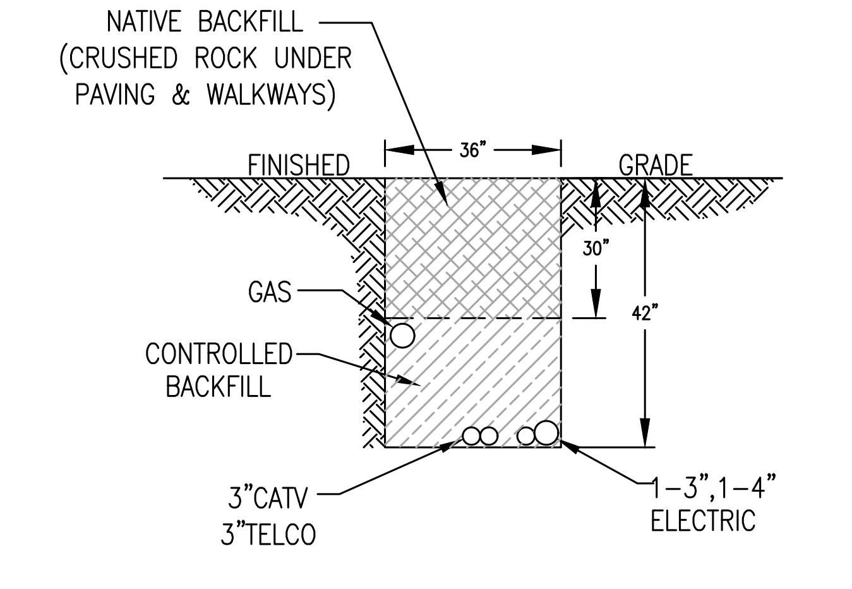
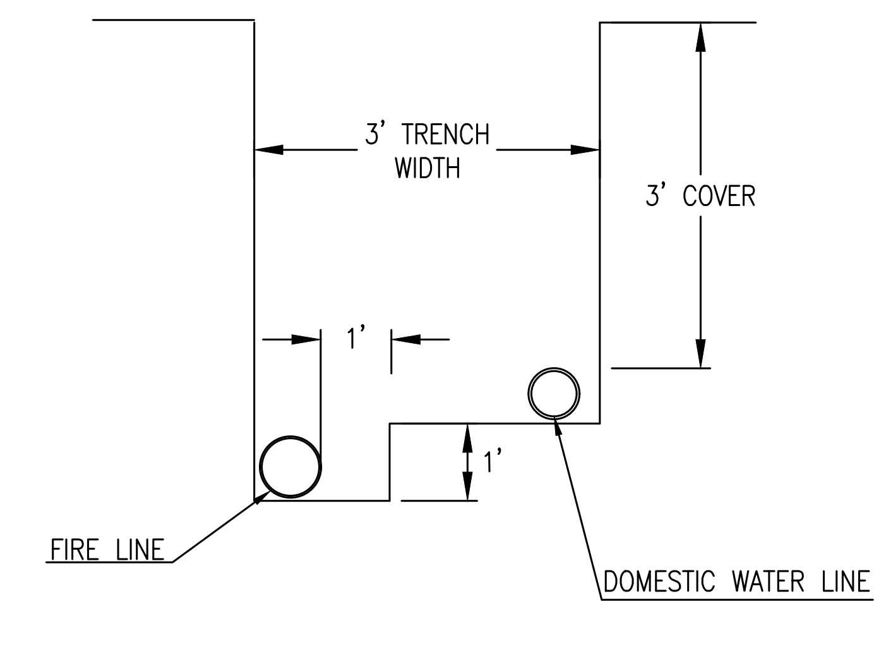


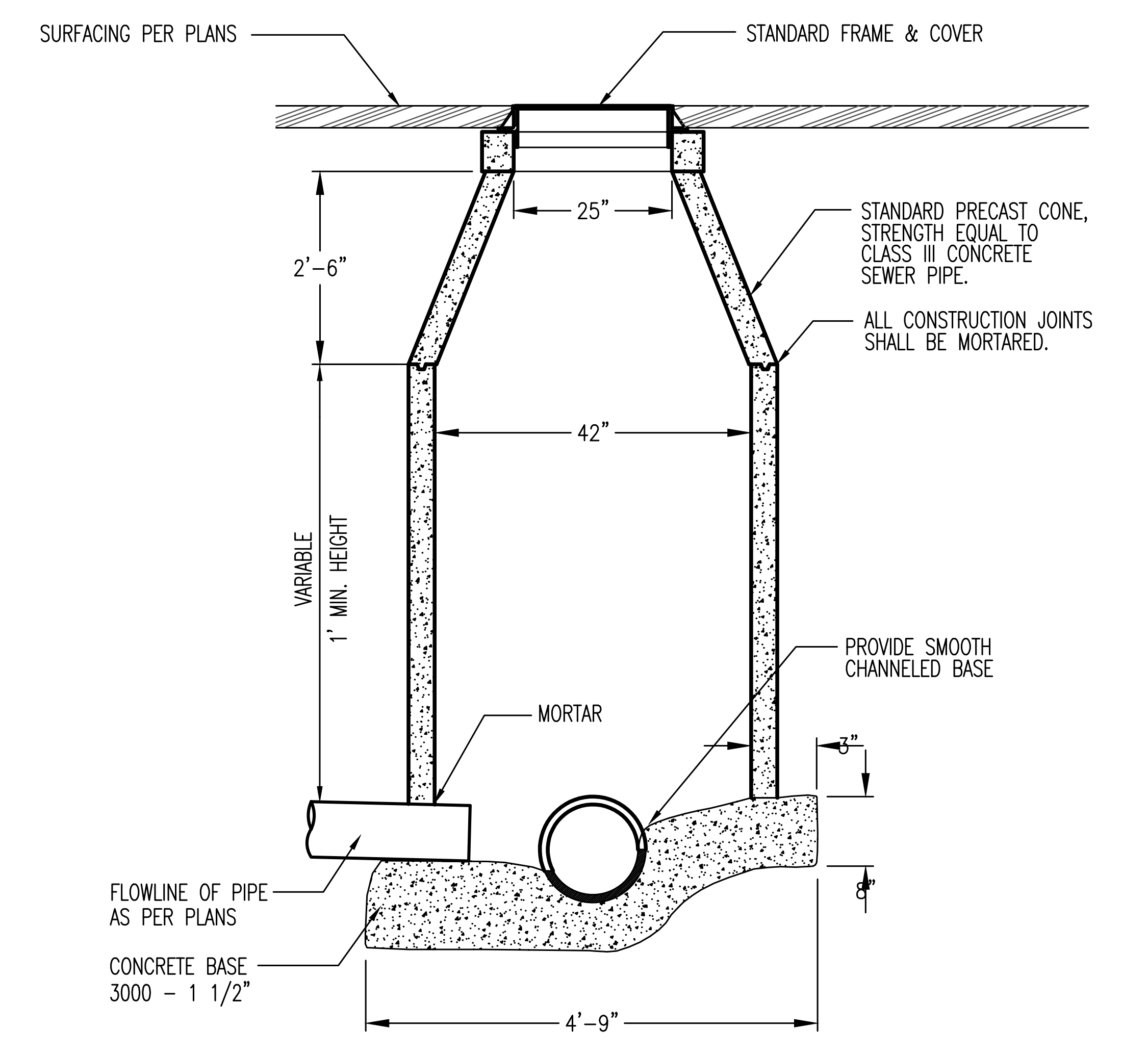
CLEAN OUT DETAIL
N.T.S.



JOINT FRANCHISE UTILITY TRENCH DETAIL
NTS

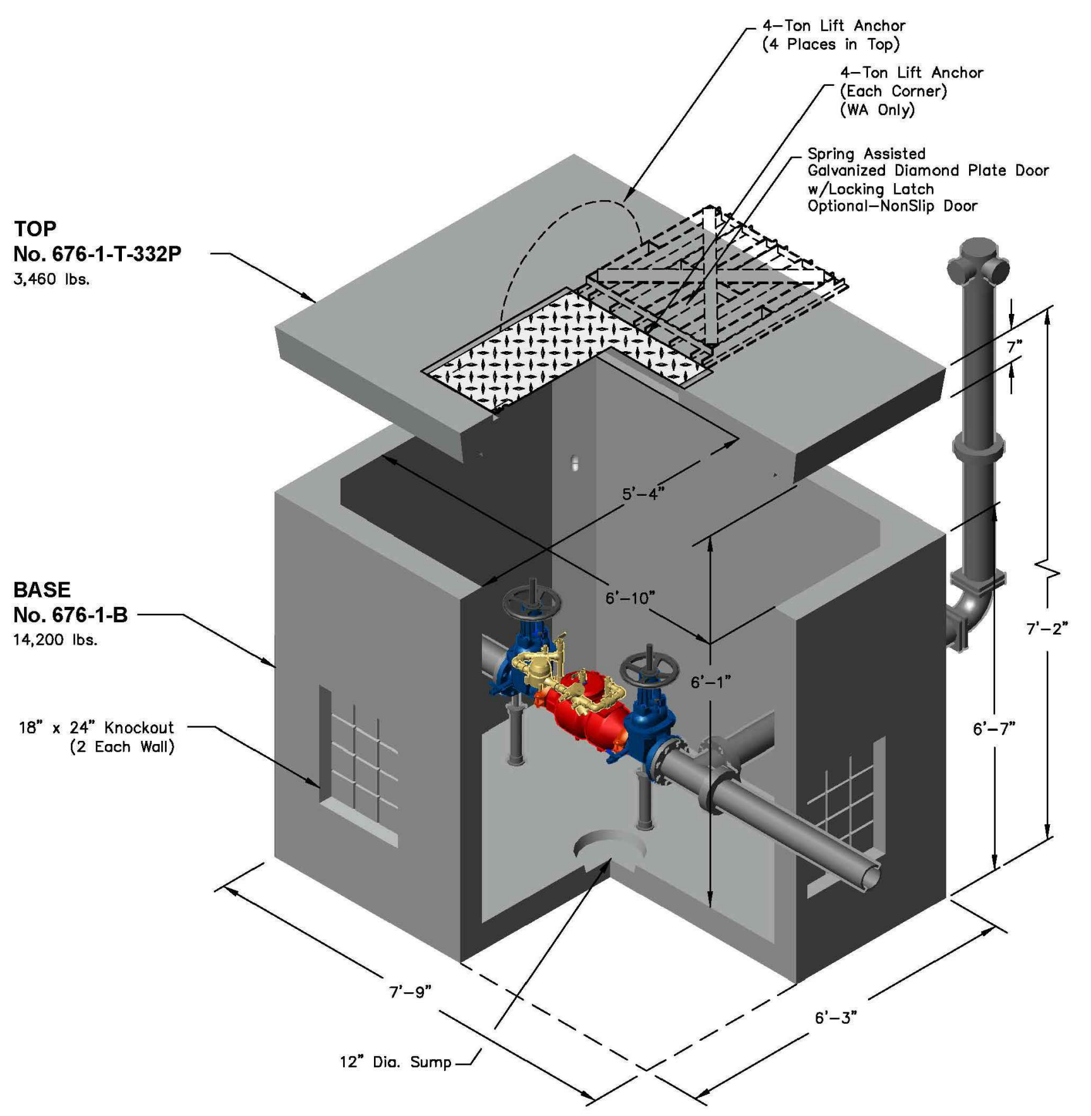


JOINT TRENCH DETAIL WATER SERVICE
NTS



STANDARD MANHOLE DETAIL
N.T.S.

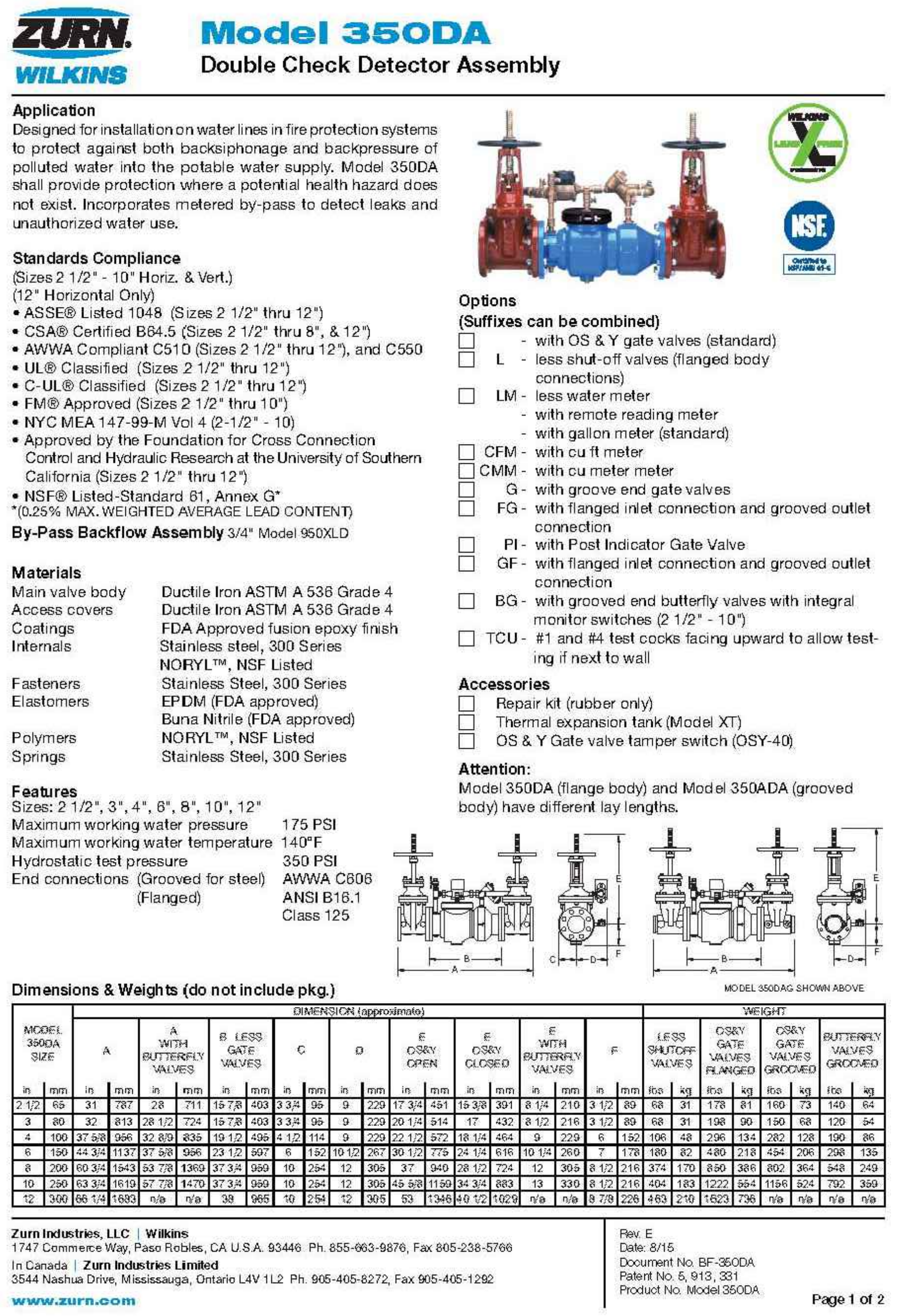
676-1-WA



Note: Designed for 0 to 5'-0" of Cover

Oldcastle Precast® PO Box 323, Wilsonville, Oregon 97070-0323 Tel: (503) 682-2844 Fax: (503) 682-2657	676-1-WA File Name: 020-676-1-WA Issue Date: 2018 oldcastleprecast.com/wilsonville	676-1-WA DCV /DCDV BACK FLOW DEVICE VAULT

4.0



ZURN. WILKINS

Model 350DA

Double Check Detector Assembly

Application

Designed for installation on water lines in fire protection systems to protect against both backsiphonage and backpressure of polluted water into the potable water supply. Model 350DA shall provide protection where a potential health hazard does not exist. Incorporates metered by-pass to detect leaks and unauthorized water use.

Standards Compliance

(Sizes 2 1/2" - 10" Horiz. & Vert.)
(12" Horizontal Only)

- ASSE® Listed 1048 (Sizes 2 1/2" thru 12")
- CSA® Certified B64.5 (Sizes 2 1/2" thru 8", & 12")
- AWWA Compliant C510 (Sizes 2 1/2" thru 12"), and C550
- UL® Classified (Sizes 2 1/2" thru 12")
- C-UL® Classified (Sizes 2 1/2" thru 12")
- FM® Approved (Sizes 2 1/2" thru 10")
- NYC MEA 147-99-M Vol 4 (2-1/2" - 10)
- Approved by the Foundation for Cross Connection Control and Hydraulic Research at the University of Southern California (Sizes 2 1/2" thru 12")
- NSF® Listed-Standard 61, Annex G*

*(0.25% MAX. WEIGHTED AVERAGE LEAD CONTENT)

By-Pass Backflow Assembly 3/4" Model 950XLD

Materials

Main valve body	Ductile Iron ASTM A 536 Grade 4
Access covers	Ductile Iron ASTM A 536 Grade 4
Coatings	FDA Approved fusion epoxy finish
Internals	Stainless steel, 300 Series NORYL™, NSF Listed
Fasteners	Stainless Steel, 300 Series
Elastomers	EPDM (FDA approved) Buna Nitrile (FDA approved)
Polymers	NORYL™, NSF Listed
Springs	Stainless Steel, 300 Series

Features

Sizes: 2 1/2", 3", 4", 6", 8", 10", 12"

Maximum working water pressure	175 PSI
Maximum working water temperature	140°F
Hydrostatic test pressure	350 PSI
End connections (Grooved for steel)	AWWA C606
(Flanged)	ANSI B16.1 Class 125

Options
(Suffixes can be combined)

- ☐ - with OS & Y gate valves (standard)
- ☐ L - less shut-off valves (flanged body connections)
- ☐ LM - less water meter
  - with remote reading meter
  - with gallon meter (standard)
- ☐ CFM - with cu ft meter
- ☐ CMM - with cu meter meter
- ☐ G - with groove end gate valves
- ☐ FG - with flanged inlet connection and grooved outlet connection
- ☐ PI - with Post Indicator Gate Valve
- ☐ GF - with flanged inlet connection and grooved outlet connection
- ☐ BG - with grooved end butterfly valves with integral monitor switches (2 1/2" - 10")
- ☐ TCU - #1 and #4 test cocks facing upward to allow testing if next to wall

Accessories

- ☐ Repair kit (rubber only)
- ☐ Thermal expansion tank (Model XT)
- ☐ OS & Y Gate valve tamper switch (OSY-40)

Attention:

Model 350DA (flange body) and Model 350ADA (grooved body) have different lay lengths.

MODEL 350DAG SHOWN ABOVE

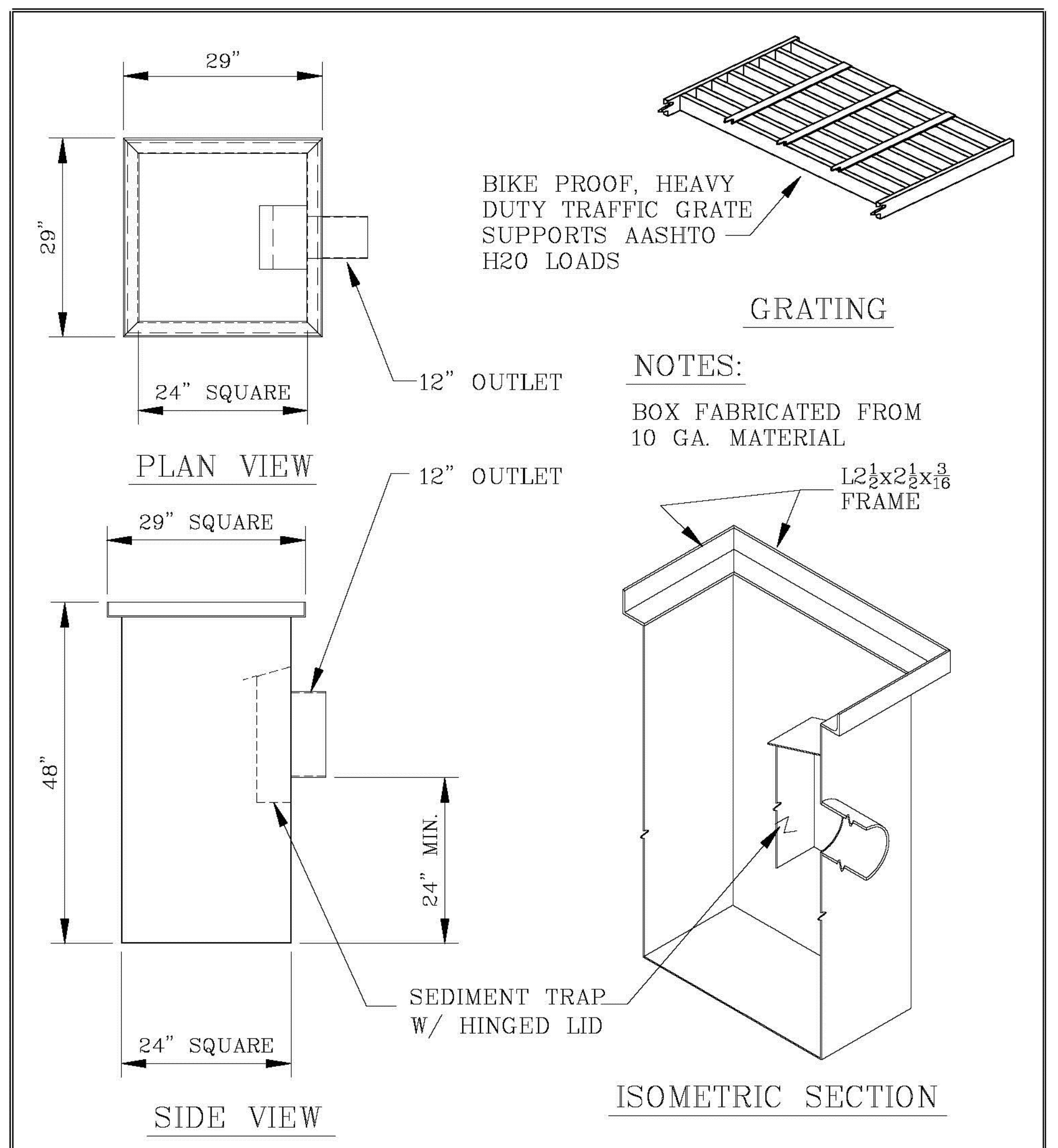
Dimensions & Weights (do not include pkg.)

MODEL 350DA SIZE		DIMENSION (approximate)																		WEIGHT							
		A		A WITH BUTTERFLY VALVES		B LESS GATE VALVES		C		D		E OS&Y OPEN		E OS&Y CLOSED		E WITH BUTTERFLY VALVES		F		LESS SHUTOFF VALVES		OS&Y GATE VALVES FLANGED		OS&Y GATE VALVES GROOVED		BUTTERFLY VALVES GROOVED	
in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	lbs	kg	lbs	kg	lbs	kg	lbs	kg
2 1/2	65	31	787	28	711	15 7/8	403	3 3/4	95	9	229	17 3/4	451	15 3/8	391	8 1/4	210	3 1/2	89	68	31	178	81	160	73	140	64
3	80	32	813	28 1/2	724	15 7/8	403	3 3/4	95	9	229	20 1/4	514	17	432	8 1/2	216	3 1/2	89	68	31	198	90	150	68	120	54
4	100	37 5/8	956	32 8/9	835	19 1/2	495	4 1/2	114	9	229	22 1/2	572	18 1/4	464	9	229	6	152	106	48	296	134	282	128	190	86
6	150	44 3/4	1137	37 5/8	956	23 1/2	597	6	152	10 1/2	267	30 1/2	775	24 1/4	616	10 1/4	260	7	178	180	82	480	218	454	206	298	135
8	200	60 3/4	1543	53 7/8	1369	37 3/4	959	10	254	12	305	37	940	28 1/2	724	12	305	8 1/2	216	374	170	850	386	802	364	548	249
10	250	63 3/4	1619	57 7/8	1470	37 3/4	959	10	254	12	305	45 5/8	1159	34 3/4	883	13	330	8 1/2	216	404	183	1222	554	1156	524	792	359
12	300	66 1/4	1683	n/a	n/a	38	965	10	254	12	305	53	1346	40 1/2	1029	n/a	n/a	8 7/8	225	463	210	1623	736	n/a	n/a	n/a	n/a

Zurn Industries, LLC | **Wilkins**
1747 Commerce Way, Paso Robles, CA U.S.A. 93446 Ph. 855-663-9876, Fax 805-238-5766
In Canada | **Zurn Industries Limited**
3544 Nashua Drive, Mississauga, Ontario L4V 1L2 Ph. 905-405-8272, Fax 905-405-1292
www.zurn.com

Rev. E
Date: 8/15
Document No. BF-350DA
Patent No. 5, 913, 331
Product No. Model 350DA

Page 1 of 2



NOTES:
BOX FABRICATED FROM 10 GA. MATERIAL

STATE APPROVED — ASPHALT DIPPED

24" SQUARE - 12"ø OUTLET	DWG # T4
STORM WATER CATCH BASIN	
MODEL: MPCB10-48HB-12	
DATE: 11/19/2020 SCALE: NONE	

Gibson Steel Basins, Inc.
1040 Arrowsmith St. Eugene Or. 97402
(541) 484-7200 or (800) 574-8096
Visit us at: www.gibsonsteelbasins.com
Email us at: sales@gibsonsteelbasins.com
EST. 1996
CCB 150089

THESE PLANS ARE FOR PLANNING PURPOSES ONLY AND ARE NOT TO BE USED FOR CONSTRUCTION IN THE FIELD

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CIVIL ENGINEERING & SITE
DEVELOPMENT CONSULTING
380 Q ST. SUITE 200
SPRINGFIELD, OR. 97477
PHONE: (541) 302-9790
scott@aoengineering.biz

PRELIMINARY NOT FOR CONSTRUCTION
PROFESSIONAL
KYLE
DEAN
EXPIRES 12

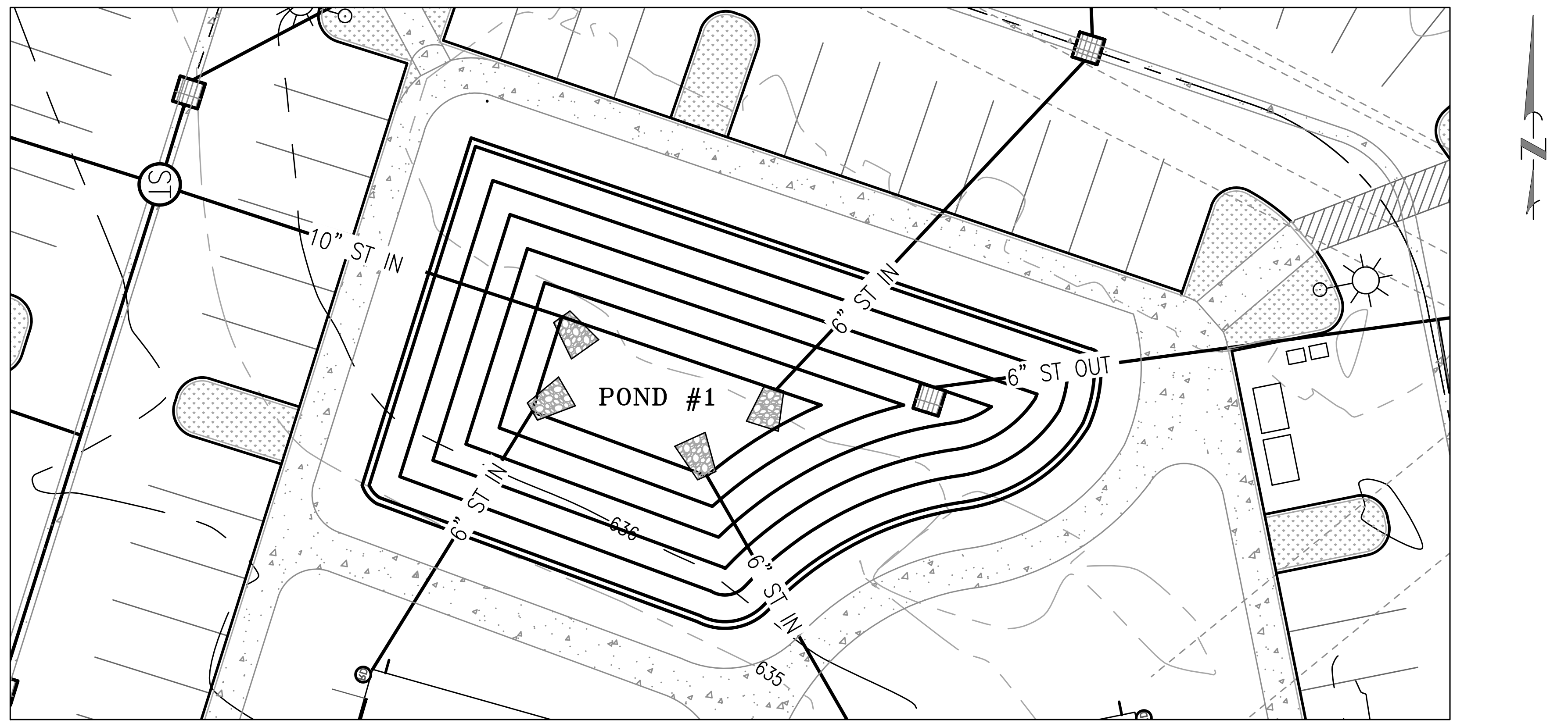
Civil Details
for
Pine Springs Master Plan
Cottage Grove Lane County Oregon

DATE: 2-20-23
PROJECT No: 5320
SCALE: HORIZ:
VERT:
DRAWN BY: ACH
DESIGNED BY: KDM
REVIEWED BY: SDM

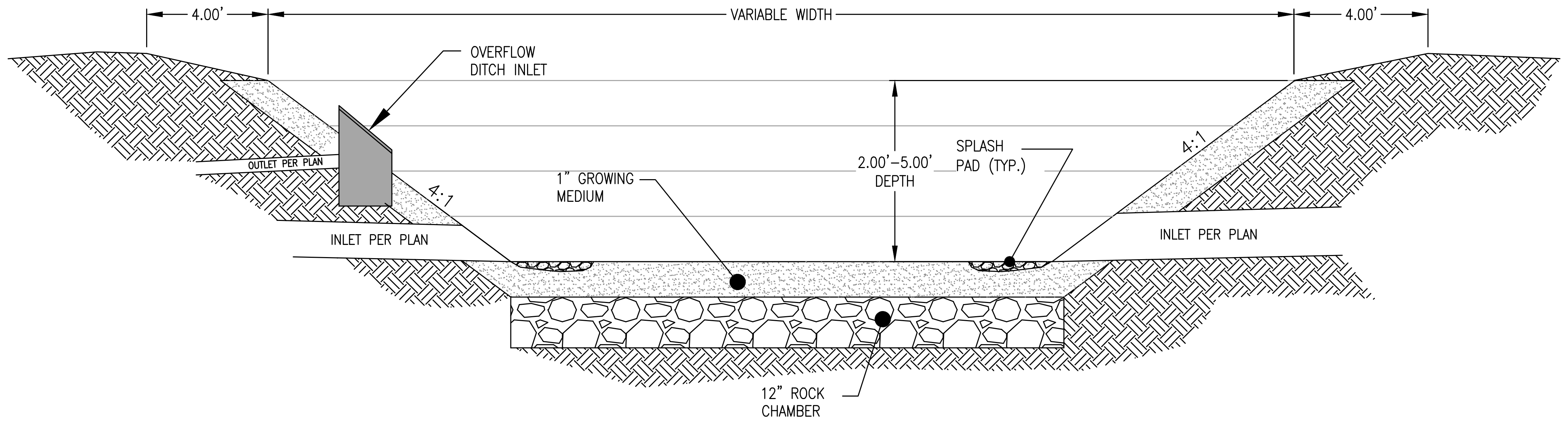
SUBMITTALS:

REVISIONS:

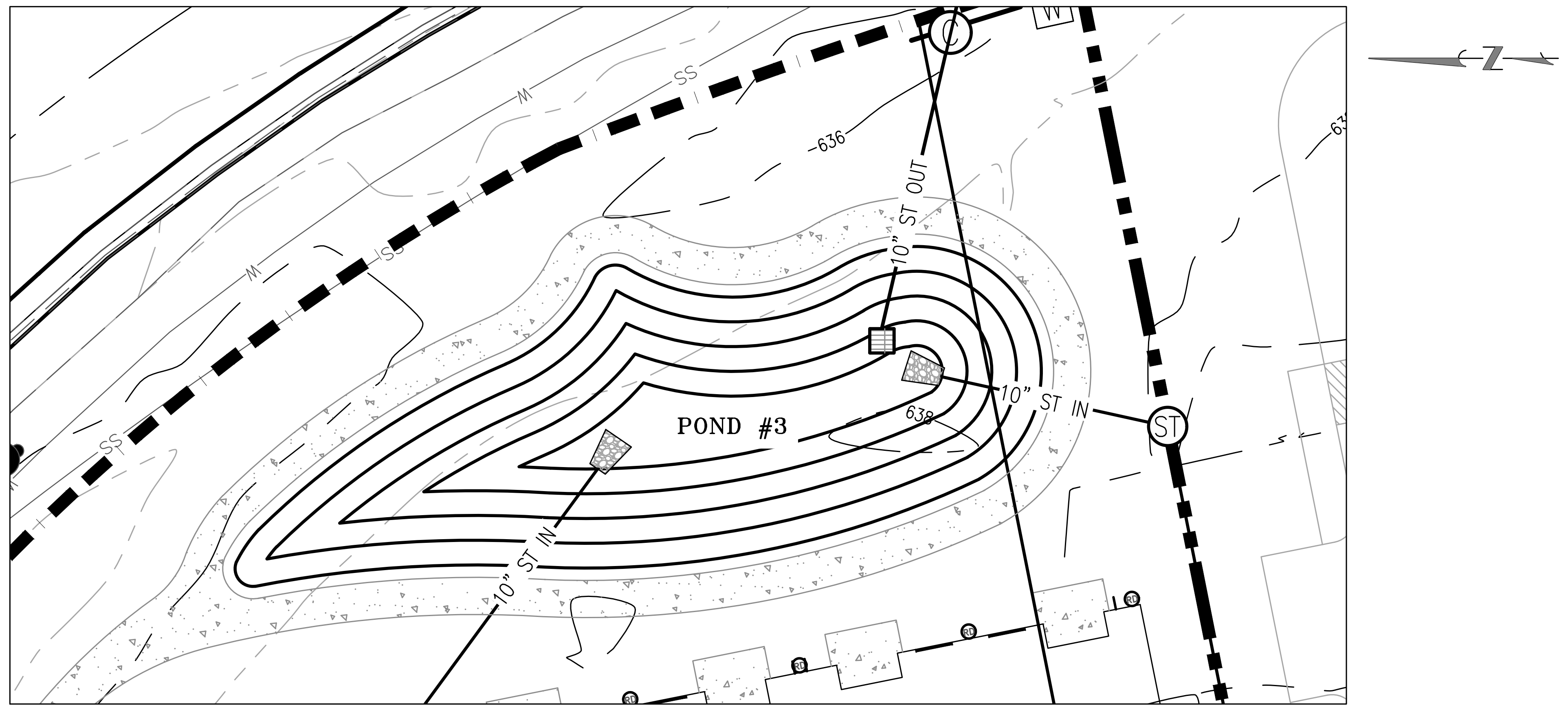
SHEET
C-3.1
4 OF 5



POND #1 DETAIL
SCALE: 1"=20'



TYPICAL POND CROSS-SECTION DETAIL
NTS



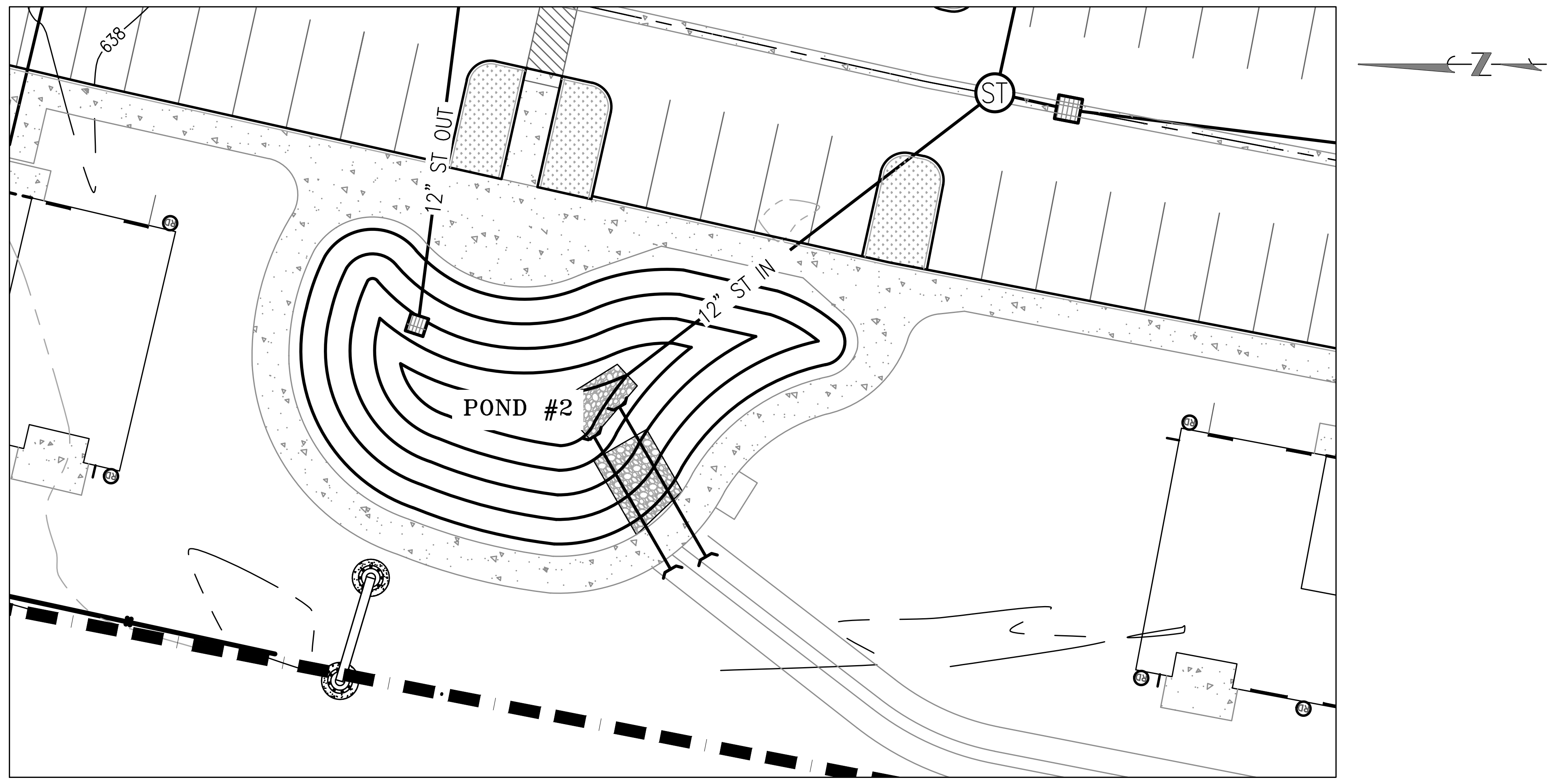
POND #3 DETAIL
SCALE: 1"=20'

LEGEND

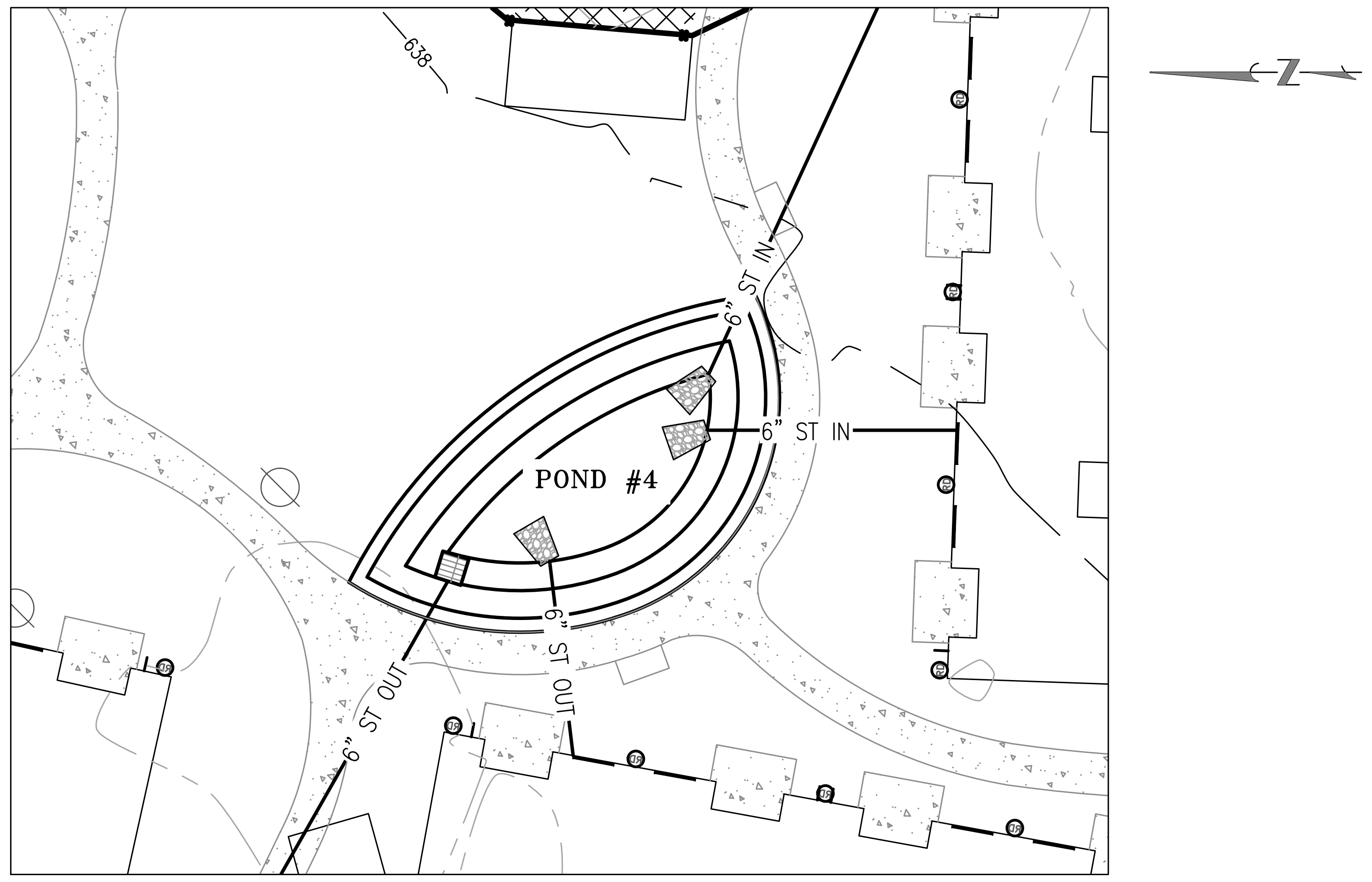
▨	RIP-RAP SPLASH PAD AT POND INLETS AND OUTLETS
─	1' CONTOUR LINE WITHIN POND

NOTES:

1. FINAL DESIGN OF STORM MANAGEMENT FACILITIES TO BE COMPLETED DURING BUILDING PERMIT PROCESS.
2. FOR PLANTING PLAN REFER TO SHEETS DONE BY DLA ARCHITECTS.
3. INFILTRATION PROPOSED AS PRIMARY DISCHARGE FOR STORMWATER PONDS. OVERFLOW PIPE AND DITCH SYSTEM ALSO PROPOSED FOR LARGER STORM EVENTS. SEE STORMWATER REPORT FOR MORE INFORMATION.
4. IMPORTED GROWING MEDIUMS SHALL MEET CITY OF COTTAGE GROVE SPECIFICATIONS AND HAVE HIGH INFILTRATION CHARACTERISTICS. CONTRACTOR SHALL SUBMIT CUT SHEET TO ENGINEER PRIOR TO ORDERING OR INSTALLATION.



POND #2 DETAIL
SCALE: 1"=20'



POND #4 DETAIL
SCALE: 1"=20'

A & O Engineering L.L.C.
CIVIL ENGINEERING & SITE
DEVELOPMENT CONSULTING

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SPRINGFIELD, OR. 97477
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scott@aoengineering.biz

PRELIMINARY NOT FOR CONSTRUCTION
KYLE DEAN
EXPIRES 12

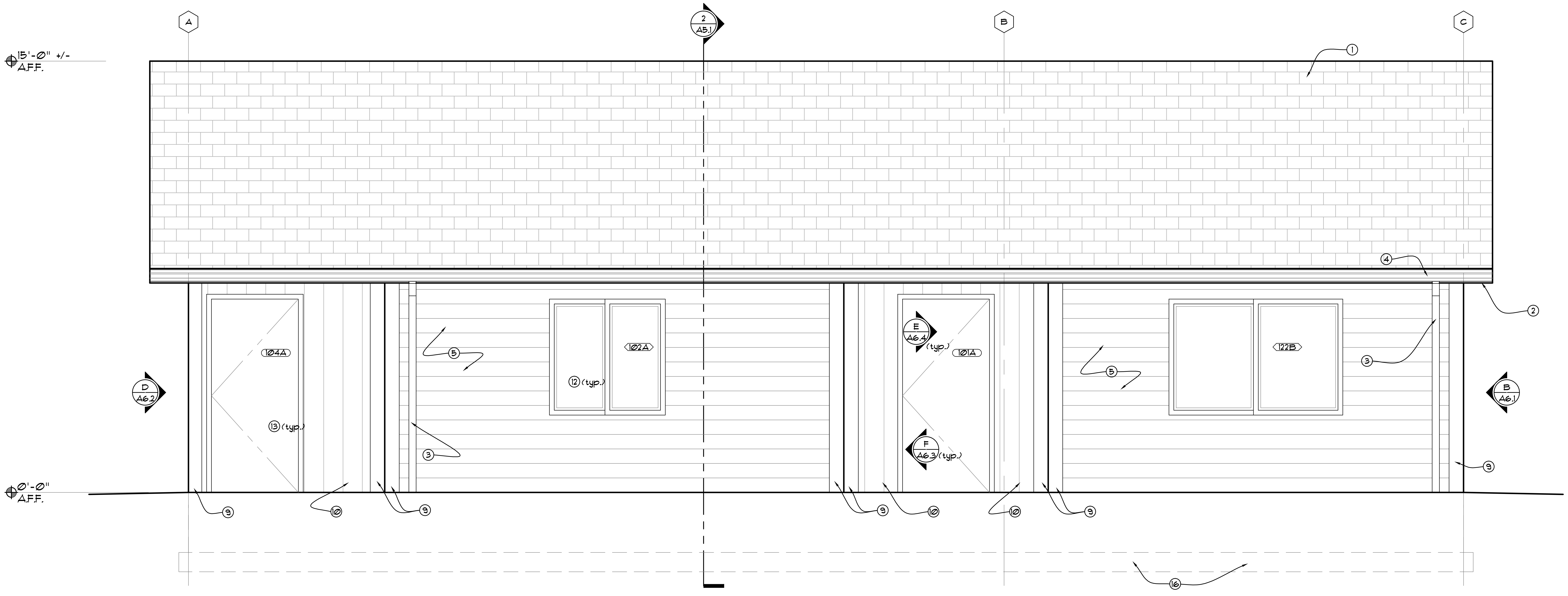
Storm Facility Details
for
Pine Springs Master Plan
Cottage Grove Lane County Oregon

DATE: 2-20-23
PROJECT No: 5320
SCALE: HORIZ:
VERT:
DRAWN BY: ACH
DESIGNED BY: KDM
REVIEWED BY: SDM

SUBMITTALS:

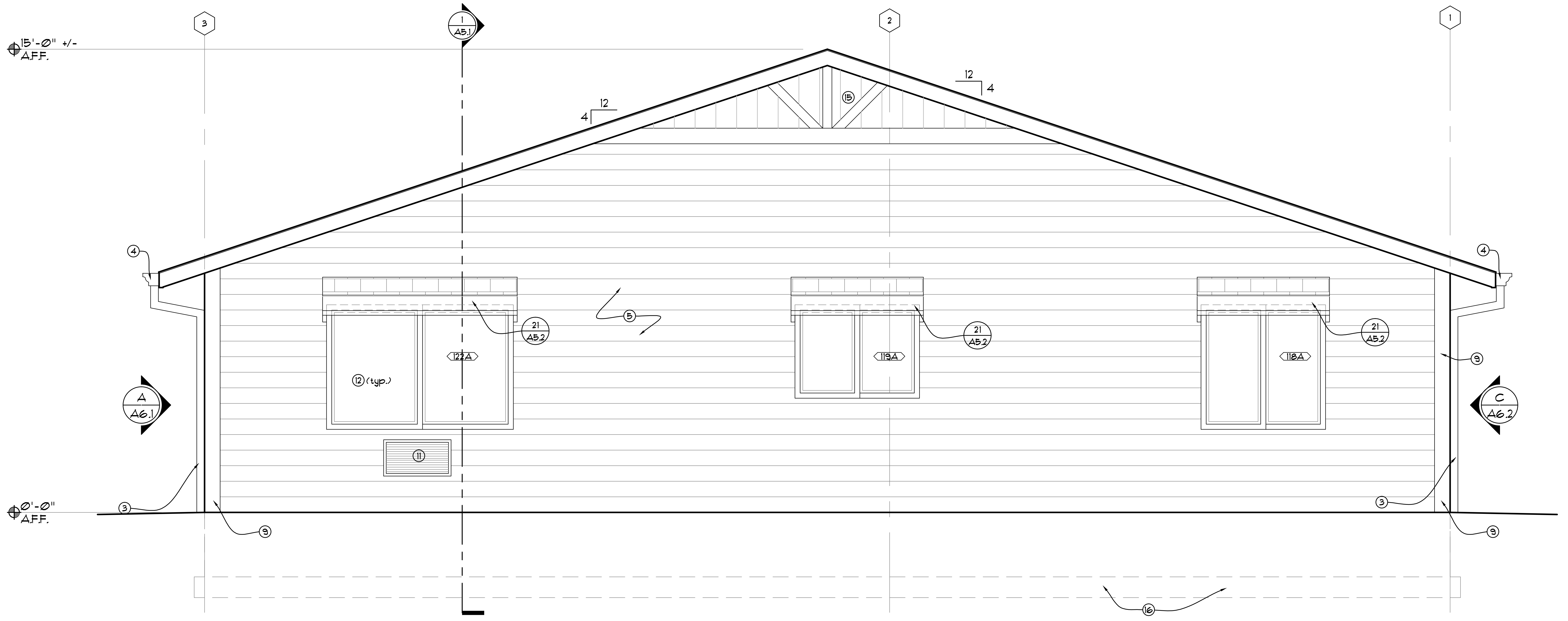
REVISIONS:

SHEET
C-3.2
5 OF 5



A EXTERIOR ELEVATION

SCALE: 1/2" = 1'-0"



B EXTERIOR ELEVATION

SCALE: 1/2" = 1'-0"

KEY NOTE (#)

1. FIBERGLASS ARCHITECTURAL COMP ROOFING / APPROVED VAPOR BARRIER / 1/2" CDX PLY.WD / PRE-ENGINEERED TRUSSES (REFER TO STRUCTURAL DRAWINGS ON SPECIFICATIONS AND LAYOUT) R-49 BLOWN INSULATION)
2. OPEN SOFFIT
3. DOWN SPOUT
4. CONTINUOUS GUTTER
5. LAP SIDING (W/6" EXPOSED) (FIBER CEMENT) / APPROVED VAPOR BARRIER / 1/2" CDX PLY.WD. / 2x4 STUDS @ 16" O.C. (R-21 BATT INSULATION) / 5/8" GYP.BD.
6. 1x10 BAND
7. HIDDEN LINE INDICATES TOP OF SECOND FLOOR
8. 1x6 TRIM BOARD
9. 1x6 CORNER BOARD
10. HARDI-PANEL 8" GROVES
11. PTAC UNIT AS SELECTED
12. WINDOW HEAD, JAMB, SILL DETAILS (REFER TO 25, 29/A7.3)
13. DOOR HEAD, JAMB, SILL DETAILS (REFER TO 26, 30/A7.3
14. 1x3 @ 16" O.C. / T1-11 PANELS
15. 1x4 OVER T1-11 NO GROOVE
16. FOOTINGS (REFER TO STRUCTURAL FOR SPECIFICATIONS)
17. NOT USED
18. SHADED AREA INDICATES INTERIOR OF STRUCTURE
19. ADDRESS IDENTIFICATION TO COMPLY WITH THE EUGENE FIRE CODE SECTION 505. ADDRESS NUMBERS SHALL BE 4" HIGH (min.), 1/2" STROKE WIDTH (min.) AND OF A CONTRASTING COLOR.

PRELIMINARY
SET NOT FOR
CONSTRUCTION

RODD HANSEN, ARCHITECT, L.L.C.
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Fax: (541)-687-1200
E-Mail: rodd@rharchitectural.com

PINE SPRINGS MASTER PLAN

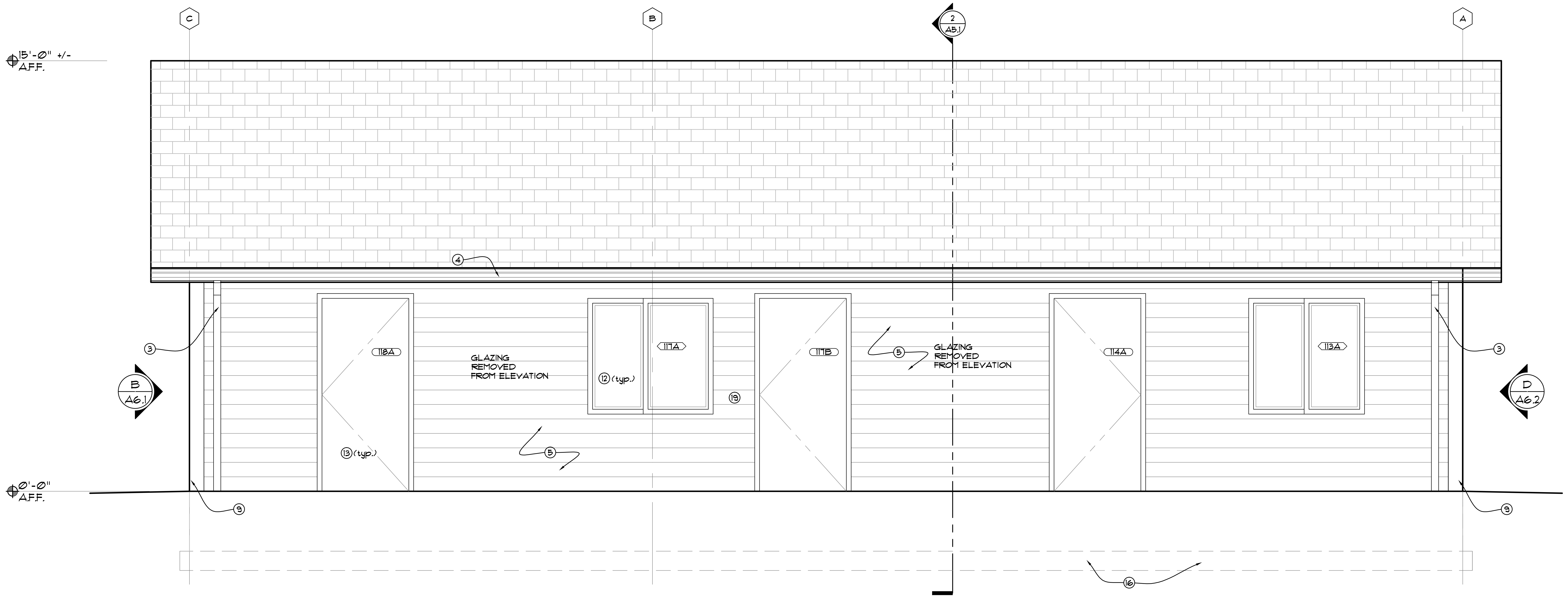
BRENT LANZ

725 ROW RIVER ROAD
COTTAGE GROVE, OREGON
97424

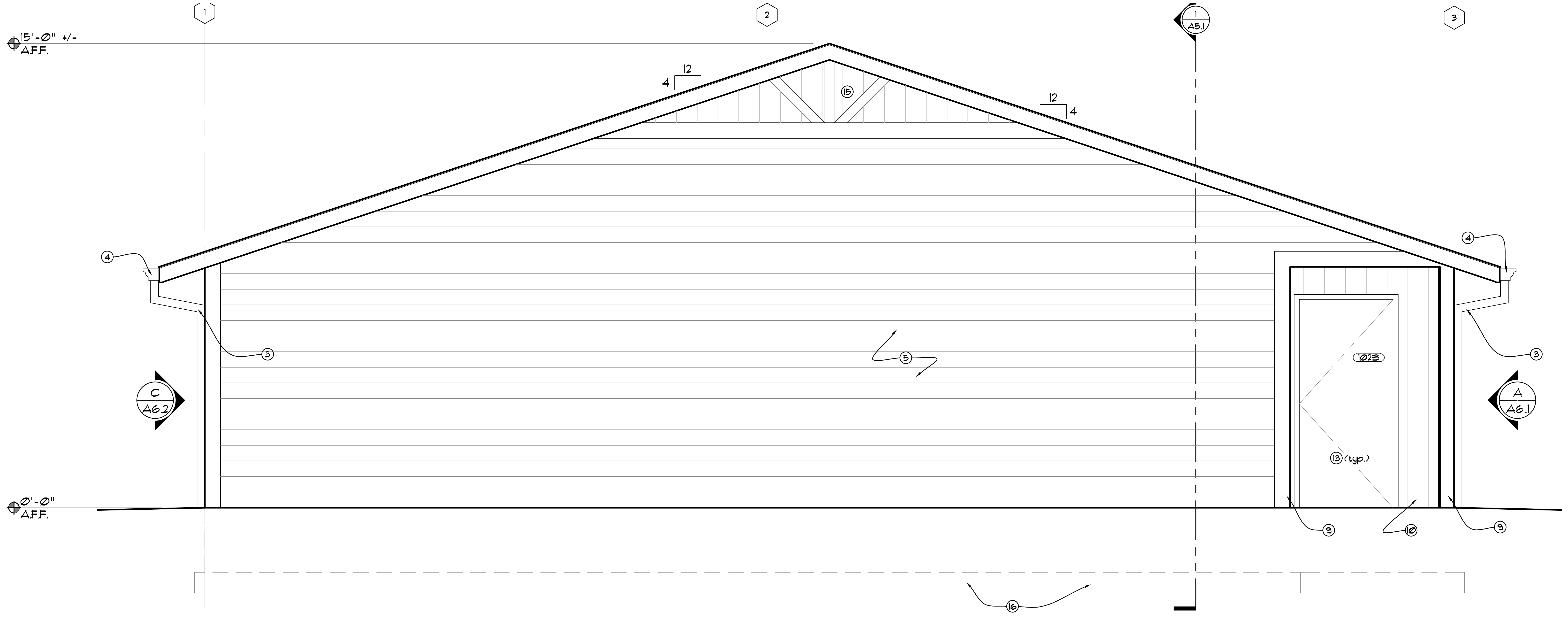
TITLE:	EXTERIOR ELEVATIONS
JOB#:	1485.03212022.LU
DRAWN BY:	JSD
△1	--
△2	--
△3	--
△4	--
ISSUE DATE:	00-00-0000
SCALE:	1/2"=1'-0"

A6.1

LEASING UNIT



C EXTERIOR ELEVATION
SCALE: 1/2" = 1'-0"



D EXTERIOR ELEVATION
SCALE: 1/2" = 1'-0"

KEY NOTE ●

1. FIBERGLASS ARCHITECTURAL COMP ROOFING / APPROVED VAPOR BARRIER / 1/2" CDX PLY.WD / PRE-ENGINEERED TRUSSES (REFER TO STRUCTURAL DRAWINGS ON SPECIFICATIONS AND LAYOUT) R-49 BLOWN INSULATION)
2. OPEN SOFFIT
3. DOWN SPOUT
4. CONTINUOUS GUTTER
5. LAP SIDING (W/6" EXPOSED) (FIBER CEMENT) / APPROVED VAPOR BARRIER / 1/2" CDX PLY.WD. / 2x4 STUDS @ 16" O.C. (R-21 BATT INSULATION) / 5/8" GYP.BD.
6. 1x10 BAND
7. HIDDEN LINE INDICATES TOP OF SECOND FLOOR
8. 1x6 TRIM BOARD
9. 1x6 CORNER BOARD
10. HARDI-PANEL 8" GROVES
11. PTAC UNIT AS SELECTED
12. WINDOW HEAD, JAMB, SILL DETAILS (REFER TO 25, 29/A7.3)
13. DOOR HEAD, JAMB, SILL DETAILS (REFER TO 26, 30/A7.3
14. 1x3 @ 16" O.C. / T1-11 PANELS
15. 1x4 OVER T1-11 NO GROOVE
16. FOOTINGS (REFER TO STRUCTURAL FOR SPECIFICATIONS)
17. NOT USED
18. SHADED AREA INDICATES INTERIOR OF STRUCTURE
19. ADDRESS IDENTIFICATION TO COMPLY WITH THE EUGENE FIRE CODE SECTION 505. ADDRESS NUMBERS SHALL BE 4" HIGH (min.), 1/2" STROKE WIDTH (min.) AND OF A CONTRASTING COLOR.

PRELIMINARY
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E-Mail: rodd@rharchitectural.com

PINE SPRINGS MASTER PLAN

BRENT LANZ

725 ROW RIVER ROAD
COTTAGE GROVE, OREGON
97424

TITLE: EXTERIOR ELEVATIONS

JOB#: 1485.03212022.LU

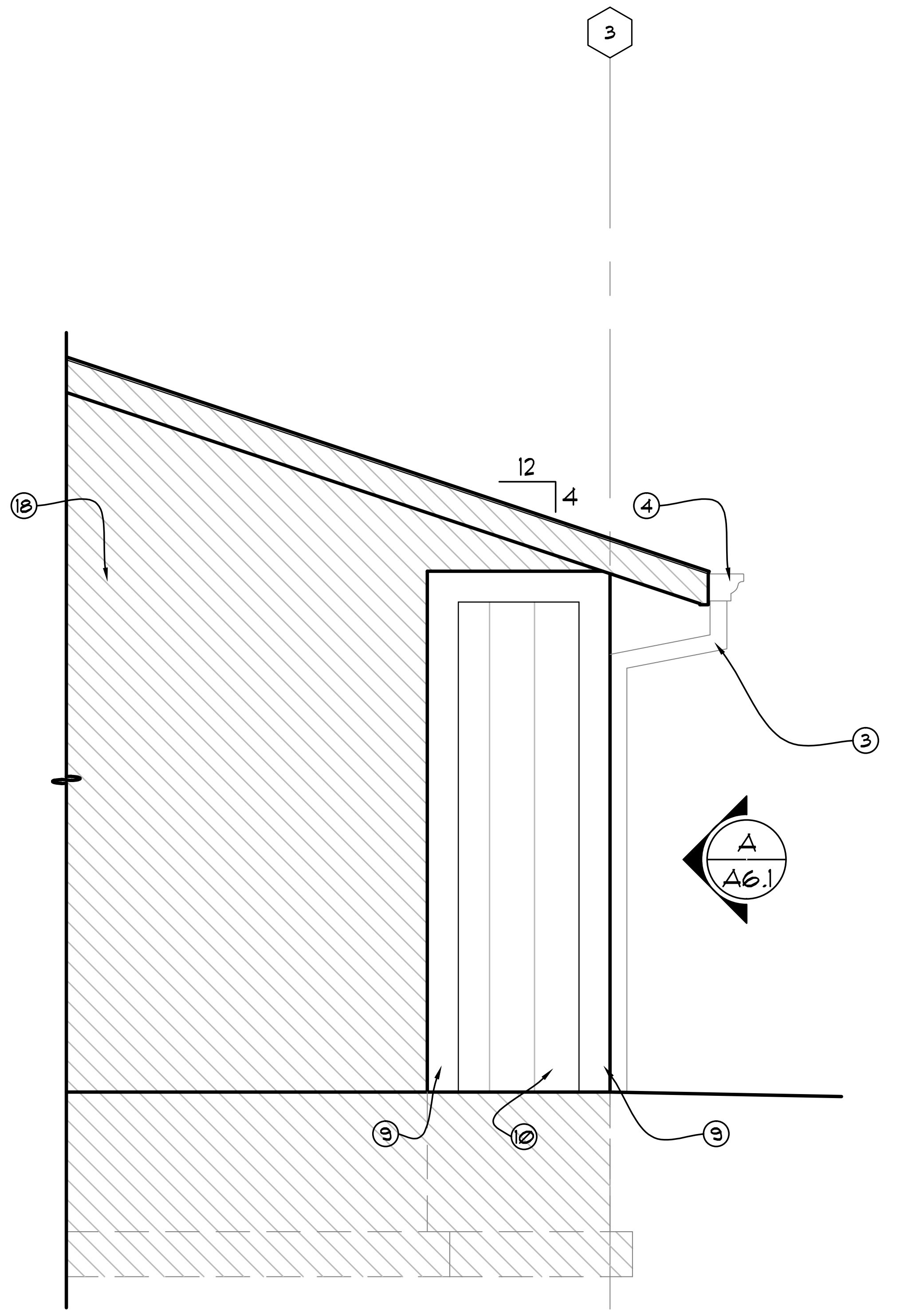
DRAWN BY: JSD

1	--
2	--
3	--
4	--

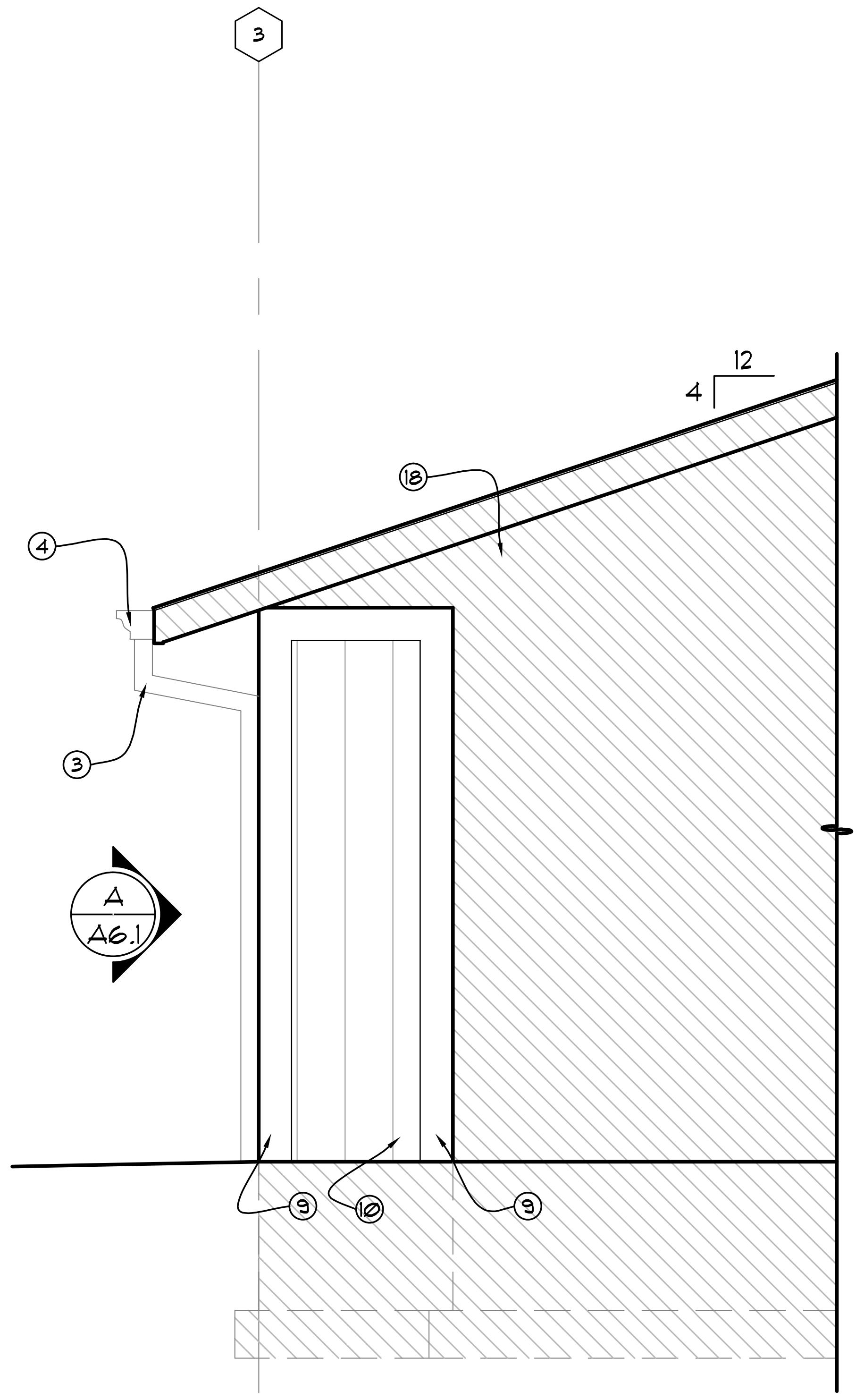
ISSUE DATE: 00-00-0000

SCALE: 1/2"=1'-0"

A6.2
LEASING UNIT



E EXTERIOR ELEVATION
0' 2' 4' 8'
SCALE: 1/2" = 1'-0"



F EXTERIOR ELEVATION
0' 2' 4' 8'
SCALE: 1/2" = 1'-0"

KEY NOTE (#)

1. FIBERGLASS ARCHITECTURAL COMP ROOFING / APPROVED VAPOR BARRIER / 1/2" CDX PLY.WD / PRE-ENGINEERED TRUSSES (REFER TO STRUCTURAL DRAWINGS ON SPECIFICATIONS AND LAYOUT) R-49 BLOWN INSULATION)
2. OPEN SOFFIT
3. DOWN SPOUT
4. CONTINUOUS GUTTER
5. LAP SIDING (W/6" EXPOSED) (FIBER CEMENT) / APPROVED VAPOR BARRIER / 1/2" CDX PLY.WD. / 2x4 STUDS @ 16" O.C. (R-21 BATT INSULATION) / 5/8" GYP.BD.
6. 1x10 BAND
7. HIDDEN LINE INDICATES TOP OF SECOND FLOOR
8. 1x6 TRIM BOARD
9. 1x6 CORNER BOARD
10. HARDI-PANEL 8" GROVES
11. PTAC UNIT AS SELECTED
12. WINDOW HEAD, JAMB, SILL DETAILS (REFER TO 25, 29/A7.3)
13. DOOR HEAD, JAMB, SILL DETAILS (REFER TO 26, 30/A7.3
14. 1x3 @ 16" O.C. / T1-11 PANELS
15. 1x4 OVER T1-11 NO GROOVE
16. FOOTINGS (REFER TO STRUCTURAL FOR SPECIFICATIONS)
17. NOT USED
18. SHADED AREA INDICATES INTERIOR OF STRUCTURE
19. ADDRESS IDENTIFICATION TO COMPLY WITH THE EUGENE FIRE CODE SECTION 505. ADDRESS NUMBERS SHALL BE 4" HIGH (min.), 1/2" STROKE WIDTH (min.) AND OF A CONTRASTING COLOR.

PRELIMINARY
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PINE SPRINGS MASTER PLAN

BRENT LANZ

725 ROW RIVER ROAD
COTTAGE GROVE, OREGON
97424

TITLE: EXTERIOR ELEVATIONS

JOB#: 1485.03212022.LU

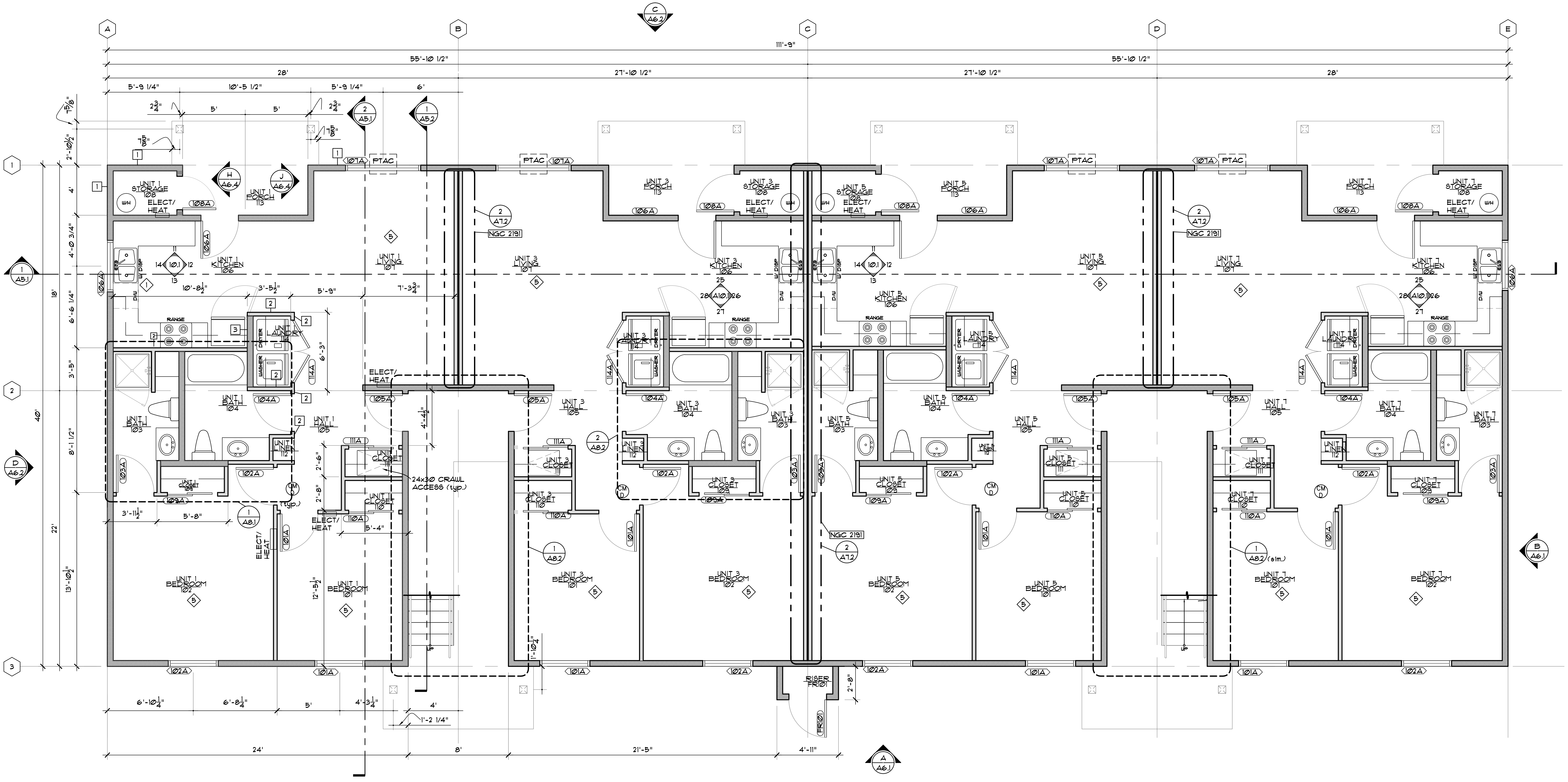
DRAWN BY: JSD

1 --
2 --
3 --
4 --

ISSUE DATE: 00-00-0000

SCALE: 1/2"=1'-0"

A6.3
LEASING UNIT



FIRST FLOOR PLAN

SCALE: 1/4" = 1'-0"

UNIT=968'-0" SQ.FT FIRST FLOOR=3872'-0" SQ.FT

LEGEND

▨	2x6 WOOD FRAMED WALL
▭	EXISTING WALL
▭	2x4 WOOD FRAMED WALL

WALL TYPES ◻

1. SIDING AS SELECTED (REF. TO A6 SHEETS FOR SIDING MATERIAL LOCATION AND TYPES / APPROVED VAPOR BARRIER / 1/2" CDX PLY.WD. / 2x6 STUD WALL @ 16" O.C. (R-21 BATT INSULATION) / 5/8" TYPE "X" GYP. BD.
2. 5/8" TYPE "X" GYP. BD. / 2x4 STUDS @ 16" O.C. (REFER TO STRUCTURAL DRAWING FOR DETAILS) / 5/8" TYPE "X" GYP. BD.
3. 5/8" TYPE "X" GYP. BD. / 2x6 STUD @ 16" O.C. / (REFER TO STRUCTURAL DRAWING FOR DETAILS) / 5/8" TYPE "X" GYP. BD.
4.

GENERAL NOTES: ◇

1. M.R. TYPE "X" GYP. BD. BEHIND ALL WATER FIXTURES TO EXTEND 2' BEYOND THE FIXTURE (typ.) U.O.N.
2. PROVIDE VERTICAL 2x6 STUD (FLAT) IN WALL FRAMING WHERE DOOR HARDWARE STRIKES WALL
3. REFER TO STRUCTURAL DRAWINGS FOR SHEAR WALL LOCATIONS AND TYPES
4. REFER TO SHEET A5.2 FOR FIRE RATING DETAILS
5. TV AND DATA

PRELIMINARY
SET NOT FOR
CONSTRUCTION

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Eugene, Oregon 97401
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PINE SPRINGS MASTER PLAN

BRENT LANZ

725 ROW RIVER ROAD
COTTAGE GROVE, OREGON
97424

TITLE: FIRST FLOOR PLAN

JOB#: 1485.03212022.8P

DRAWN BY: JSD

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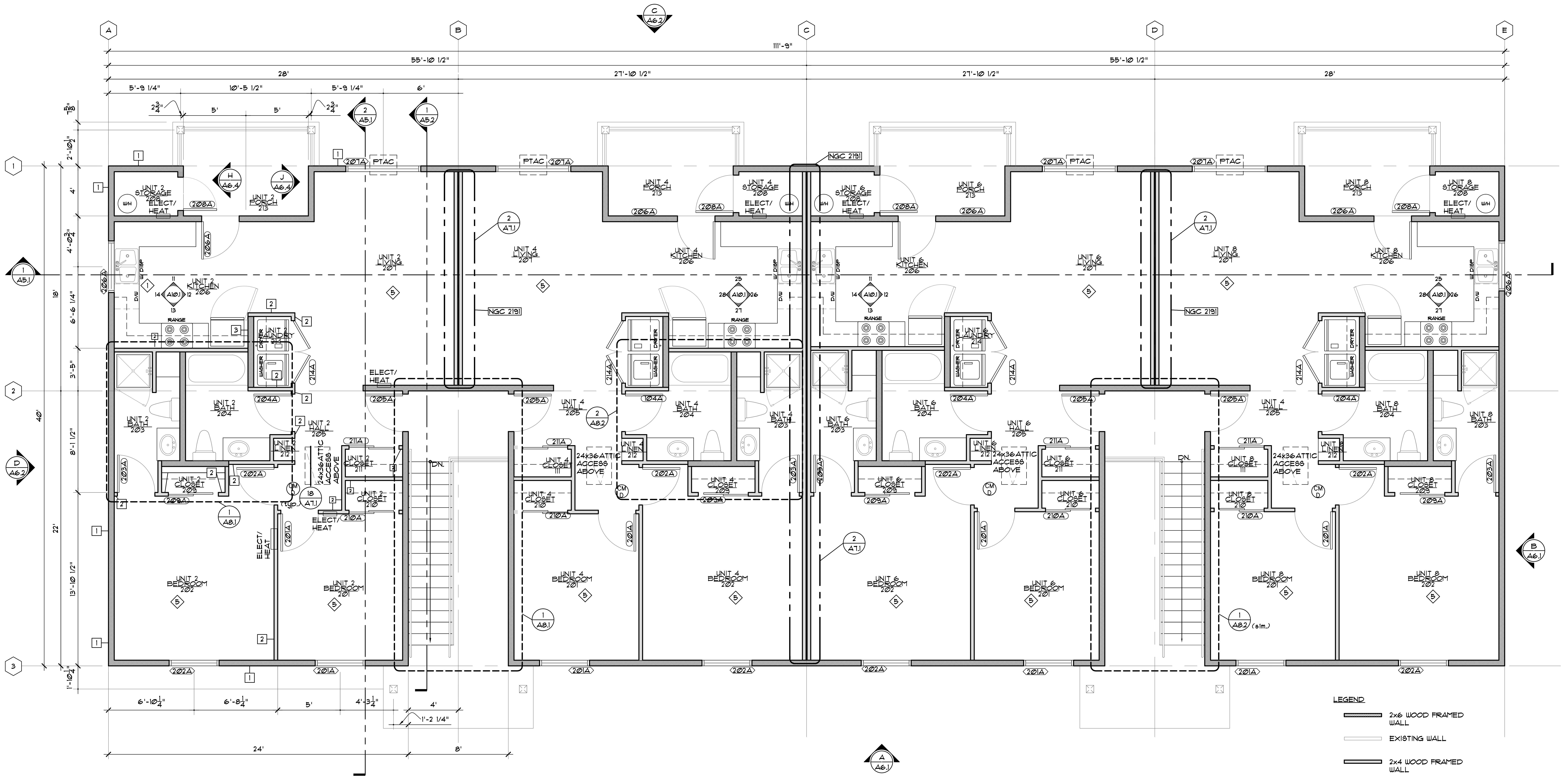
3	--
4	--

ISSUE DATE: 00-00-0000

SCALE: 1/4"=1'-0"

A3.1
8-PLEX



▨	2x6 WOOD FRAMED WALL
☐	EXISTING WALL
▬	2x4 WOOD FRAMED WALL

LEGEND

SECOND FLOOR PLAN BUILDINGS

SCALE: 1/4" = 1'-0"

UNIT=968'-0" SQ.FT

SECOND FLOOR=3872'-0" SQ.FT

WALL TYPES #

1. SIDING AS SELECTED (REF. TO A6 SHEETS FOR SIDING MATERIAL LOCATION AND TYPES / APPROVED VAPOR BARRIER / 1/2" CDX PLY.WD. / 2x6 STUD WALL @ 16" O.C. (R-21 BATT INSULATION) / 5/8" TYPE "X" GYP. BD.
2. 5/8" TYPE "X" GYP. BD. / 2x4 STUDS @ 16" O.C. (REFER TO STRUCTURAL DRAWING FOR DETAILS) / 5/8" TYPE "X" GYP. BD.
3. 5/8" TYPE "X" GYP. BD. / 2x6 STUD @ 16" O.C. / (REFER TO STRUCTURAL DRAWING FOR DETAILS) / 5/8" TYPE "X" GYP. BD.
4.

GENERAL NOTES: #

1. M.R. TYPE "X" GYP. BD. BEHIND ALL WATER FIXTURES TO EXTEND 2' BEYOND THE FIXTURE (typ.) U.O.N.
2. PROVIDE VERTICAL 2x6 STUD (FLAT) IN WALL FRAMING WHERE DOOR HARDWARE STRIKES WALL
3. REFER TO STRUCTURAL DRAWINGS FOR SHEAR WALL LOCATIONS AND TYPES
4. REFER TO SHEET A5.2 FOR FIRE RATING DETAILS
5. TV AND DATA

PRELIMINARY SET NOT FOR CONSTRUCTION

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PINE SPRINGS MASTER PLAN

BRENT LANZ

725 ROW RIVER ROAD
COTTAGE GROVE, OREGON
97424

TITLE: SECOND FLOOR PLAN

JOB#: 1485.03212022.8P

DRAWN BY: JSD

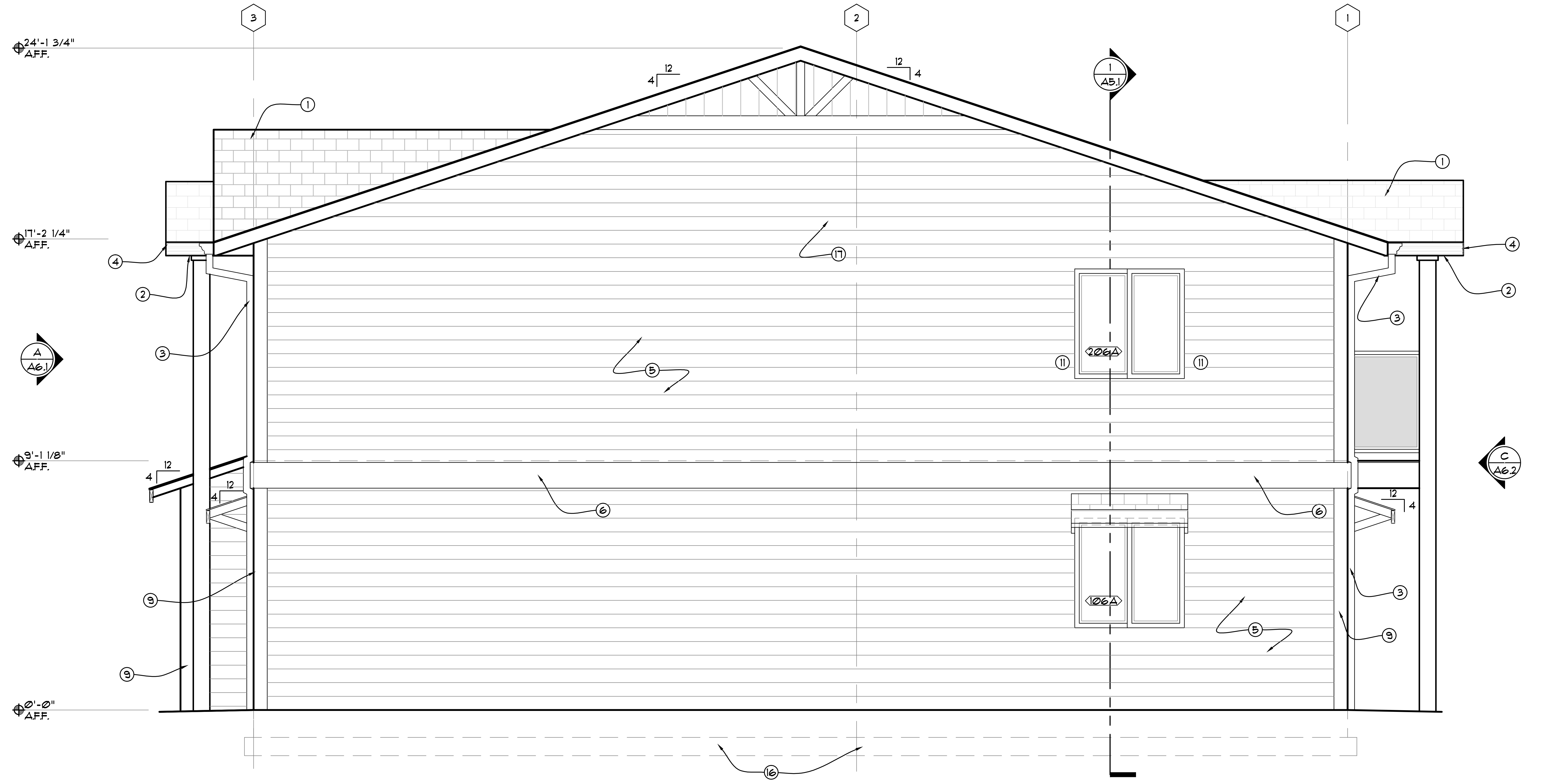
1	--
2	--
3	--
4	--

ISSUE DATE: 00-00-0000

SCALE: 1/4"=1'-0"

A3.2
8-PLEX

A EXTERIOR ELEVATION
SCALE: 1/4" = 1'-0"



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

KEY NOTE ⊛

1. FIBERGLASS ARCHITECTURAL COMP ROOFING / APPROVED VAPOR BARRIER / 1/2" CDX PLY.WD / PRE-ENGINEERED TRUSSES (REFER TO STRUCTURAL DRAWINGS ON SPECIFICATIONS AND LAYOUT) R-49 BLOWN INSULATION)
2. OPEN SOFFIT
3. DOWN SPOUT
4. CONTINUOUS GUTTER
5. LAP SIDING (W/6" EXPOSED) (FIBER CEMENT) / APPROVED VAPOR BARRIER / 1/2" CDX PLY.WD. / 2x4 STUDS @ 16" O.C. (R-21 BATT INSULATION) / 5/8" GYP.BD.
6. 1x10 BAND
7. HIDDEN LINE INDICATES TOP OF SECOND FLOOR
8. 1x6 TRIM BOARD
9. 1x6 CORNER BOARD
10. HARDI-PANEL 8" GROVES
11. PTAC UNIT AS SELECTED
12. WINDOW HEAD, JAMB, SILL DETAILS (REFER TO 25, 29/A7.3)
13. DOOR HEAD, JAMB, SILL DETAILS (REFER TO 26, 30/A7.3
14. 1x3 @ 16" O.C. / T1-11 PANELS
15. 1x4 OVER T1-11 NO GROOVE
16. FOOTINGS (REFER TO STRUCTURAL FOR SPECIFICATIONS)
17. NOT USED
18. SHADED AREA INDICATES INTERIOR OF STRUCTURE
19. ADDRESS IDENTIFICATION NUMBERS SHALL BE 4" HIGH (min.), 1/2" STROKE WIDTH (min.) AND OF A CONTRASTING COLOR.

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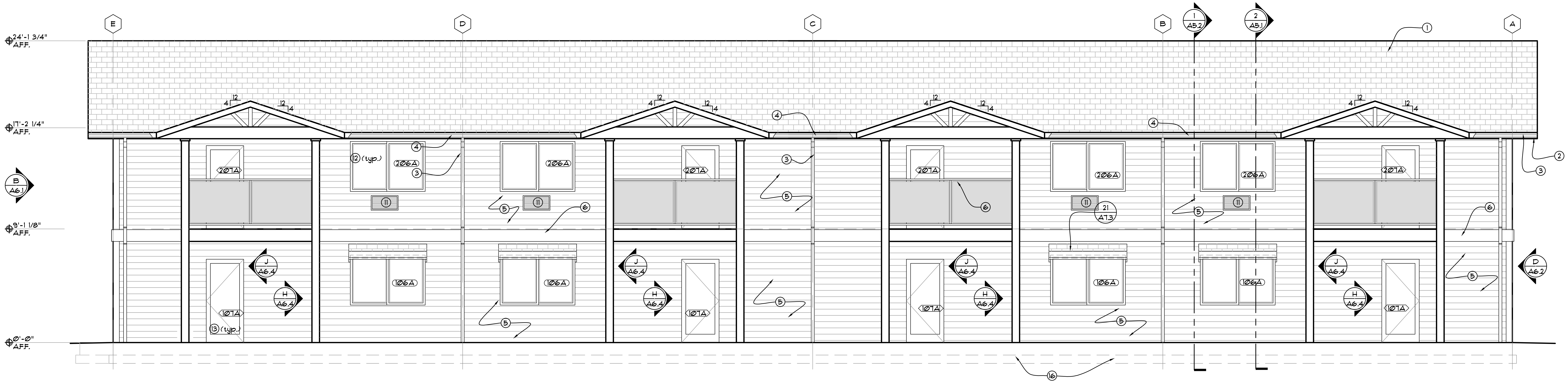
PINE SPRINGS MASTER PLAN

BRENT LANZ

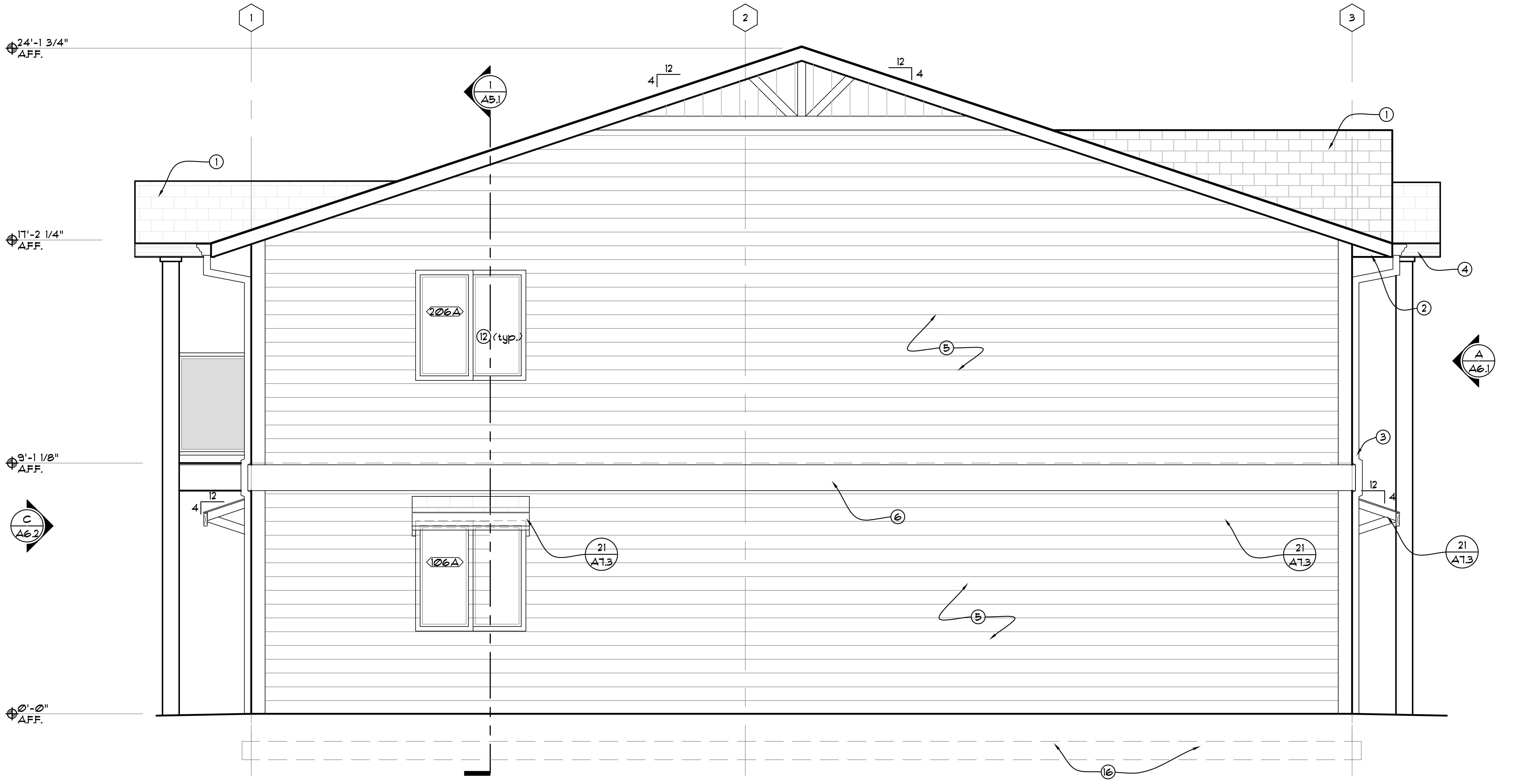
725 ROW RIVER ROAD
COTTAGE GROVE, OREGON
97424

TITLE:	EXTERIOR ELEVATIONS
JOB#:	1485.03212022.8P
DRAWN BY:	JSD
1	--
2	--
3	--
4	--
ISSUE DATE:	00-00-0000
SCALE:	VARIES

A6.1
8-PLEX



C EXTERIOR ELEVATION
SCALE: 1/4" = 1'-0"



D EXTERIOR ELEVATION
SCALE: 3/8" = 1'-0"

KEY NOTE ⊛

1. FIBERGLASS ARCHITECTURAL COMP ROOFING / APPROVED VAPOR BARRIER / 1/2" CDX PLY.WD / PRE-ENGINEERED TRUSSES (REFER TO STRUCTURAL DRAWINGS ON SPECIFICATIONS AND LAYOUT) R-49 BLOWN INSULATION)
2. OPEN SOFFIT
3. DOWN SPOUT
4. CONTINUOUS GUTTER
5. LAP SIDING (W/6" EXPOSED) (FIBER CEMENT) / APPROVED VAPOR BARRIER / 1/2" CDX PLY.WD. / 2x4 STUDS @ 16" O.C. (R-21 BATT INSULATION) / 5/8" GYP.BD.
6. 1x10 BAND
7. HIDDEN LINE INDICATES TOP OF SECOND FLOOR
8. 1x6 TRIM BOARD
9. 1x6 CORNER BOARD
10. HARDI-PANEL 8" GROVES
11. PTAC UNIT AS SELECTED
12. WINDOW HEAD, JAMB, SILL DETAILS (REFER TO 25, 29/A7.3)
13. DOOR HEAD, JAMB, SILL DETAILS (REFER TO 26, 30/A7.3
14. 1x3 @ 16" O.C. / T1-11 PANELS
15. 1x4 OVER T1-11 NO GROOVE
16. FOOTINGS (REFER TO STRUCTURAL FOR SPECIFICATIONS)
17. NOT USED
18. SHADED AREA INDICATES INTERIOR OF STRUCTURE
19. ADDRESS IDENTIFICATION NUMBERS SHALL BE 4" HIGH (min.), 1/2" STROKE WIDTH (min.) AND OF A CONTRASTING COLOR.

PRELIMINARY
SET NOT FOR
CONSTRUCTION

RODD HANSEN, ARCHITECT, L.L.C.
1551 Oak Street Suite A
Eugene, Oregon 97401
Phone: (541)-687-7800
Fax: (541)-687-1200
E-Mail: rodd@rharchitectural.com

PINE SPRINGS MASTER PLAN

BRENT LANZ

725 ROW RIVER ROAD
COTTAGE GROVE, OREGON
97424

EXTERIOR
TITLE: ELEVATIONS

JOB#: 1485.03212022.BP

DRAWN BY: JSD

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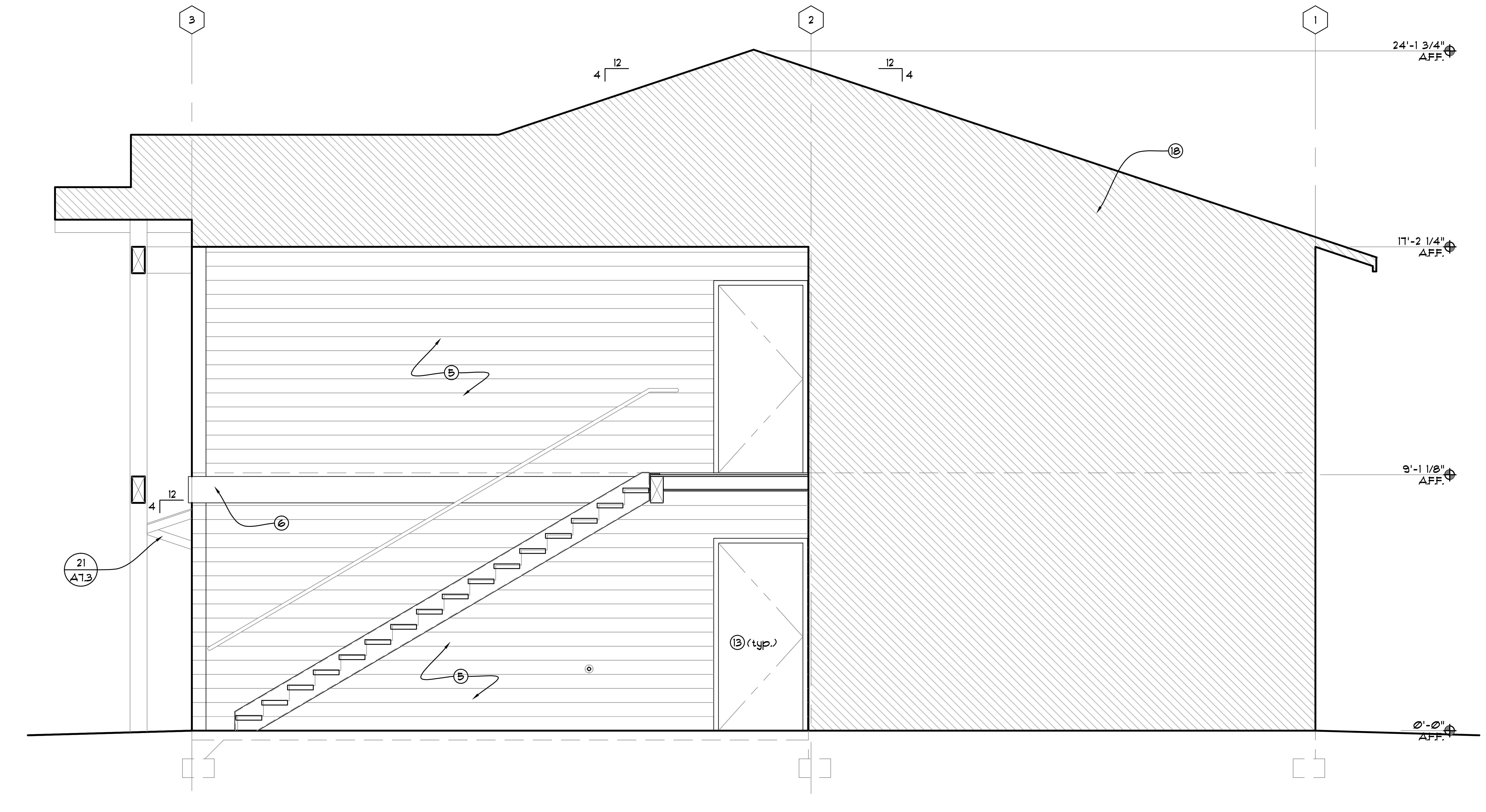
4	--

ISSUE DATE: 00-00-0000

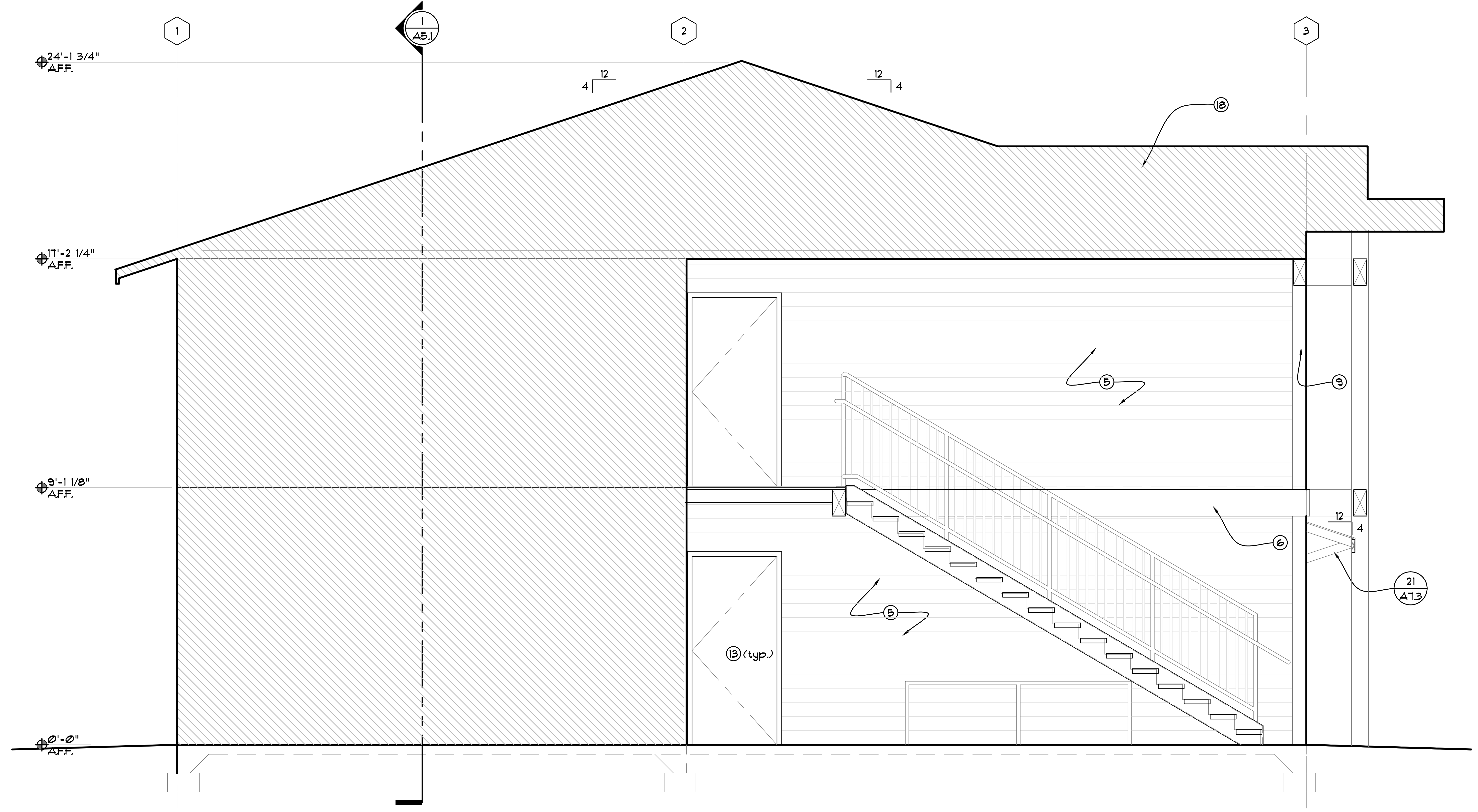
SCALE: VARIES

A6.2
8-PLEX



E EXTERIOR ELEVATION

SCALE: 3/8" = 1'-0"



F EXTERIOR ELEVATION

SCALE: 3/8" = 1'-0"

KEY NOTE (#)

1. FIBERGLASS ARCHITECTURAL COMP ROOFING / APPROVED VAPOR BARRIER / 1/2" CDX PLY.WD / PRE-ENGINEERED TRUSSES (REFER TO STRUCTURAL DRAWINGS ON SPECIFICATIONS AND LAYOUT) R-49 BLOWN INSULATION)
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PINE SPRINGS MASTER PLAN

BRENT LANZ

725 ROW RIVER ROAD
COTTAGE GROVE, OREGON
97424

TITLE: EXTERIOR ELEVATIONS

JOB#: 1485.03212022.8P

DRAWN BY: JSD

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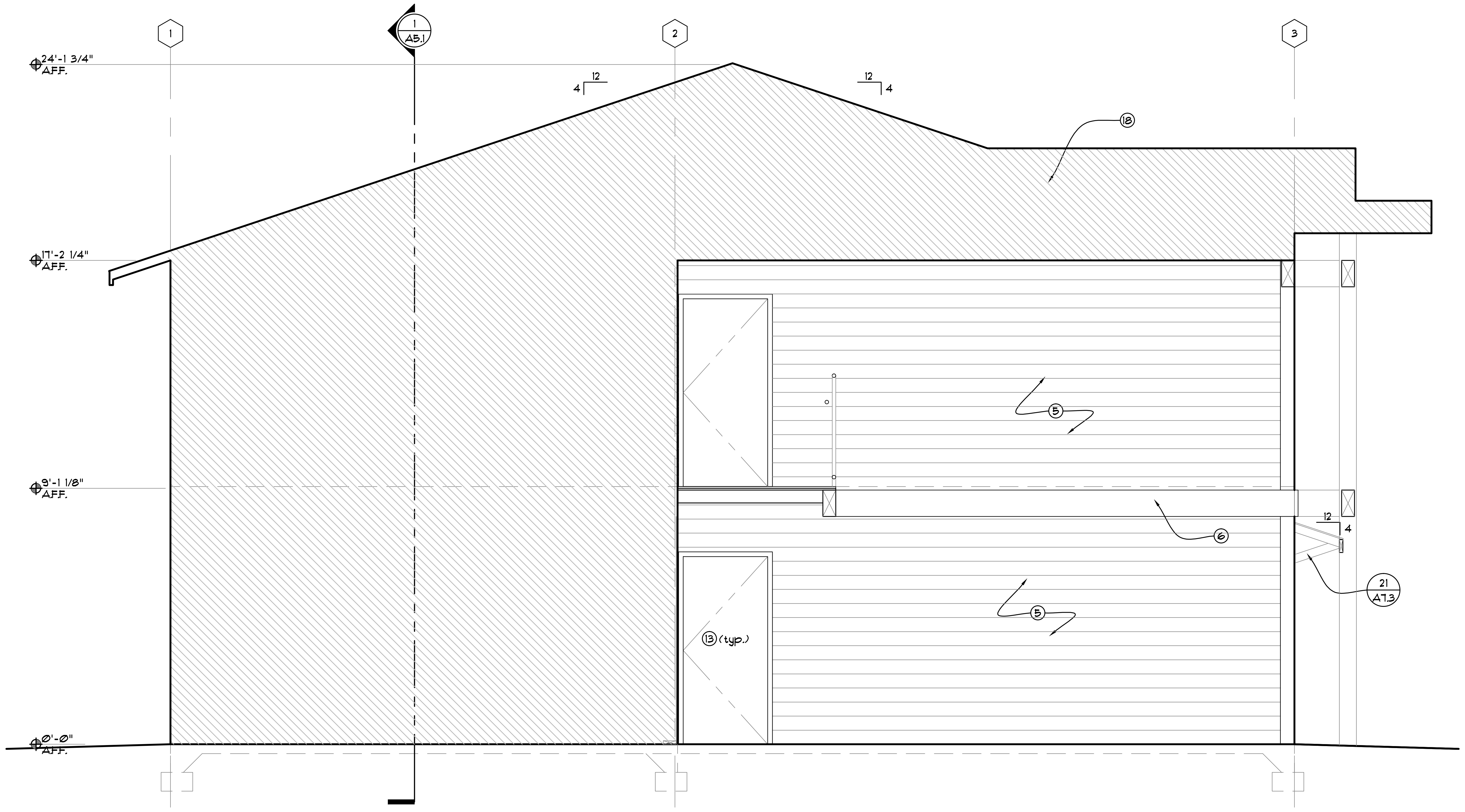
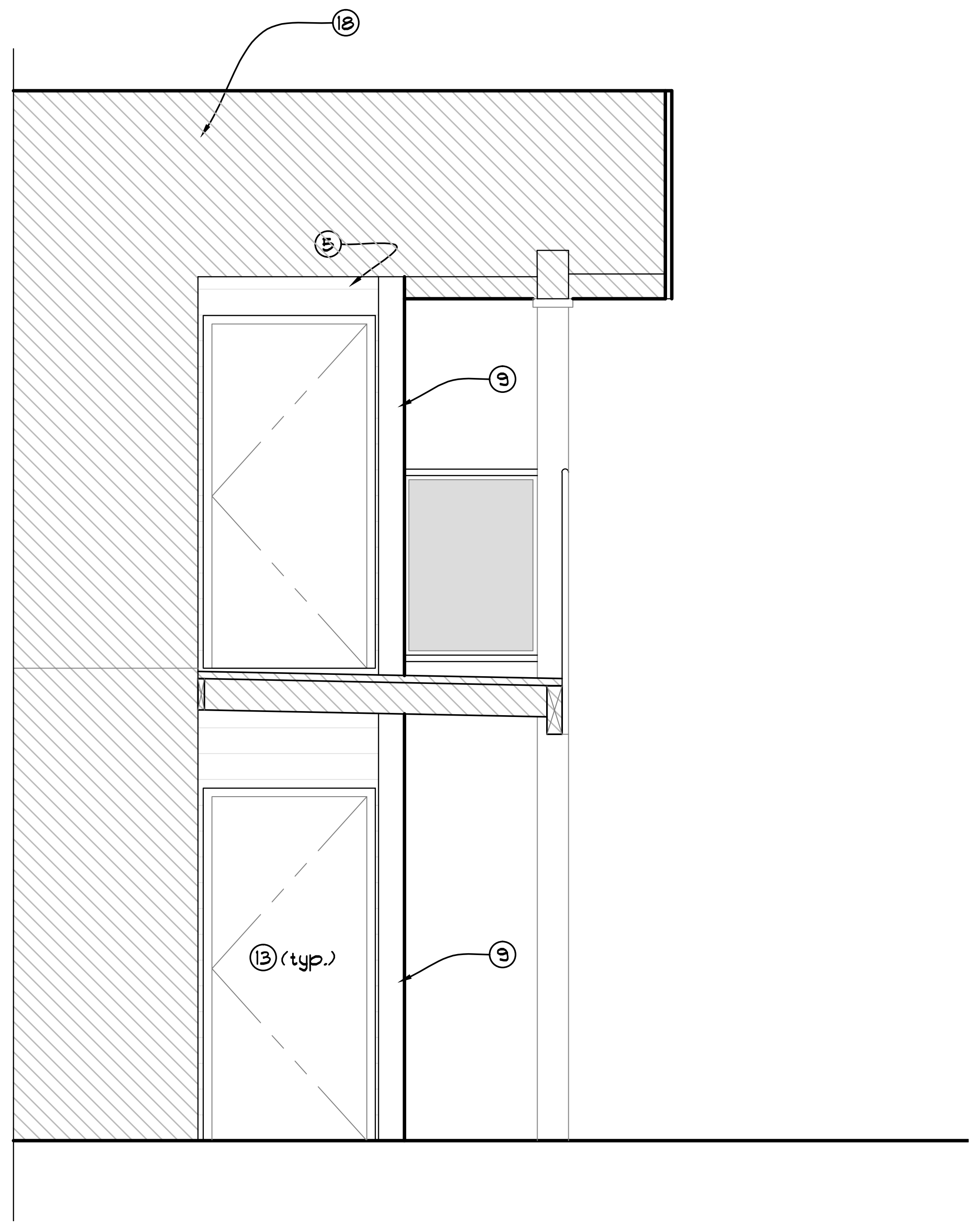
ISSUE DATE: 00-00-0000

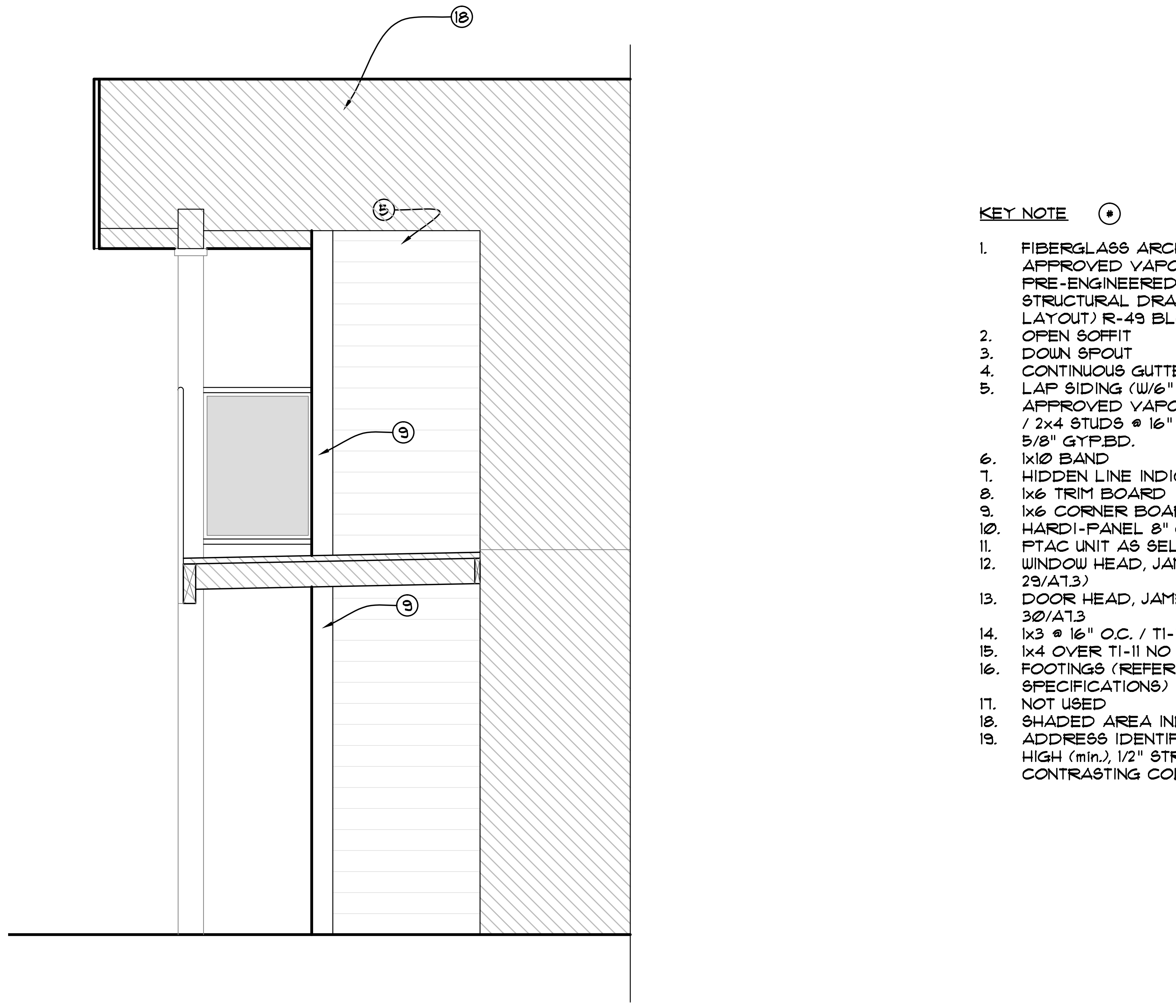
SCALE: 3/8"=1'-0"

A6.3
8-PLEX



G EXTERIOR ELEVATION
SCALE: 3/8" = 1'-0" 0 2' 4' 6' 8'





H EXTERIOR ELEVATION
SCALE: 3/8" = 1'-0" 0 2' 4' 6' 8'

J EXTERIOR ELEVATIONS
SCALE: 3/8" = 1'-0" 0 2' 4' 6' 8'

KEY NOTE (#)

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PINE SPRINGS MASTER PLAN

BRENT LANZ

725 ROW RIVER ROAD
COTTAGE GROVE, OREGON
97424

TITLE: EXTERIOR ELEVATIONS

JOB#: 1485.03212022.8P

DRAWN BY: JSD

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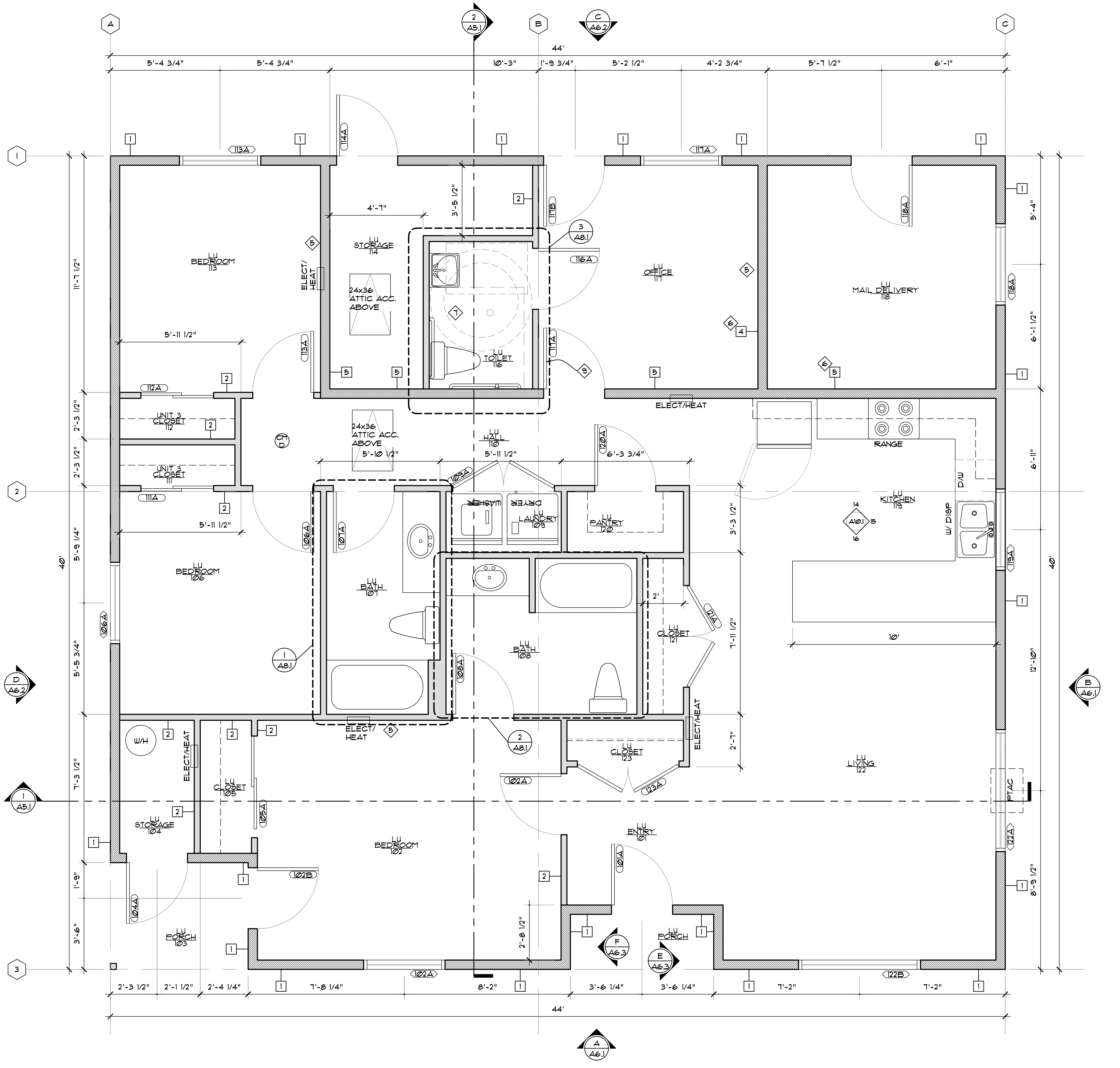
ISSUE DATE: 00-00-0000

SCALE: 3/8"=1'-0"

A6.4
8-PLEX



FIRST FLOOR PLAN BUILDING 8

SCALE: 3/8" = 1'-0"

NORTH 1

UNIT=1675'-0" SQFT

LEGEND

▬	2x6 WOOD FRAMED WALL
▭	EXISTING WALL
▬	2x4 WOOD FRAMED WALL

WALL TYPES ☐

1. SIDING AS SELECTED (REF. TO A6 SHEETS FOR SIDING MATERIAL LOCATION AND TYPES / APPROVED VAPOR BARRIER / 1/2" CDX PLY.WD. / 2x6 STUD WALL @ 16" O.C. (R-21 BATT INSULATION) / 5/8" TYPE "X" GYP. BD.
2. 5/8" TYPE "X" GYP. BD. / 2x4 STUDS @ 16" O.C. (REFER TO STRUCTURAL DRAWING FOR DETAILS) / 5/8" TYPE "X" GYP. BD.
3. 5/8" TYPE "X" GYP. BD. / 2x6 STUD @ 16" O.C. / (REFER TO STRUCTURAL DRAWING FOR DETAILS) / 5/8" TYPE "X" GYP. BD.
4. REFER TO 23/A5.2 WP 3242
5. REFER TO 33/A5.2 WP 4135

GENERAL NOTES: ◇

1. M.R. TYPE "X" GYP. BD. BEHIND ALL WATER FIXTURES TO EXTEND 2' BEYOND THE FIXTURE (typ.) U.O.N.
2. PROVIDE VERTICAL 2x6 STUD (FLAT) IN WALL FRAMING WHERE DOOR HARDWARE STRIKES WALL
3. REFER TO STRUCTURAL DRAWINGS FOR SHEAR WALL LOCATIONS AND TYPES
4. REFER TO SHEET A5.2 FOR FIRE RATING DETAILS
5. TV AND DATA
6. WALLS AND PARTITIONS SEPARATING DWELLING UNITS FROM ... PUBLIC OR SERVICE AREAS SHALL HAVE A SOUND TRANSMISSION CLASS (STC) OF NOT LESS THAN 50 FOR AIR-BORNE NOISE WHEN TESTED IN ACCORDANCE WITH ASTM E-90. PENETRATIONS OR PIPING IN CONSTRUCTION ASSEMBLIES FOR PIPING, ELECTRICAL DEVISES, HEATING, EXHAUST DUCTS ETC. SHALL BE SEALED, LINED, INSULATE OR OTHERWISE TREATED TO MAINTAIN THE REQUIRED RATINGS. PLEASE ADDRESS AND UPDATE CONSTRUCTION DOCUMENTS ACCORDINGLY. 2014 OSSC 1207.2
7. CONTRACTOR TO VERIFY THAT ALL FIXTURE's MEET AND ARE INSTALLED TO COMPLY WITH ADA GUIDELINES (ROOM 116 ONLY)
8. NOT USED
9. DOOR TO MEET 1 HOUR FIRE RATING

PRELIMINARY
SET NOT FOR
CONSTRUCTION

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PINE SPRINGS MASTER PLAN

BRENT LANZ

725 ROW RIVER ROAD
COTTAGE GROVE, OREGON
97424

TITLE: FIRST FLOOR PLAN

JOB#: 1485.03212022.LU

DRAWN BY: JSD

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3	--
4	--

ISSUE DATE: 00-00-0000

SCALE: 3/8"=1'-0"

A3.1

LEASING UNIT

MPD 1-23 EXHIBIT D

T.20S. R.3W. W.M.
County
200'

EXHIBIT A

REVISIONS
09/05/2008 - LCAT130 - CONVERT MAP TO GIS
12/02/2013 - LCAT174 - ADD MISSING ANNOTATION
02/19/2019 - LCAT148 - CODE CHANGE TL 3600
12/04/2019 - LCAT148 - LLA BETWEEN TL 1101 & TL 1200
02/04/2020 - LCAT148 - CANC TL 3202 & TL 3203 INTO 2019-P2912
06/08/2020 - LCAT148 - CANC TL 501 INTO TL 402

20032720
COTTAGE GROVE

LCATSKP - 2020-06-10 08:39

CANCELLED
906
0906
100
101
1700
1801
2100
2101
2200
2500
3400
3401
3700
3800
701
802
902
903
904
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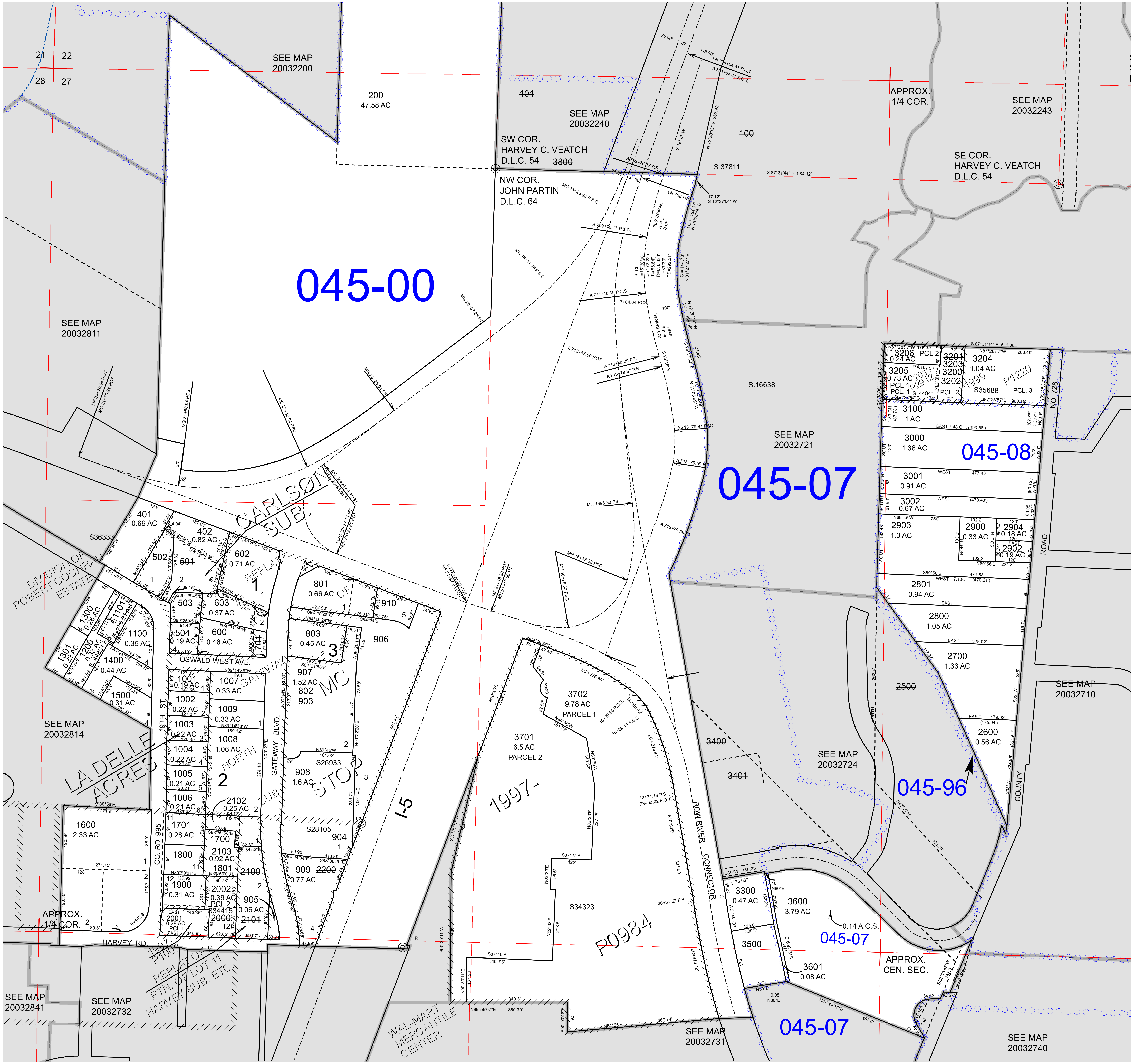
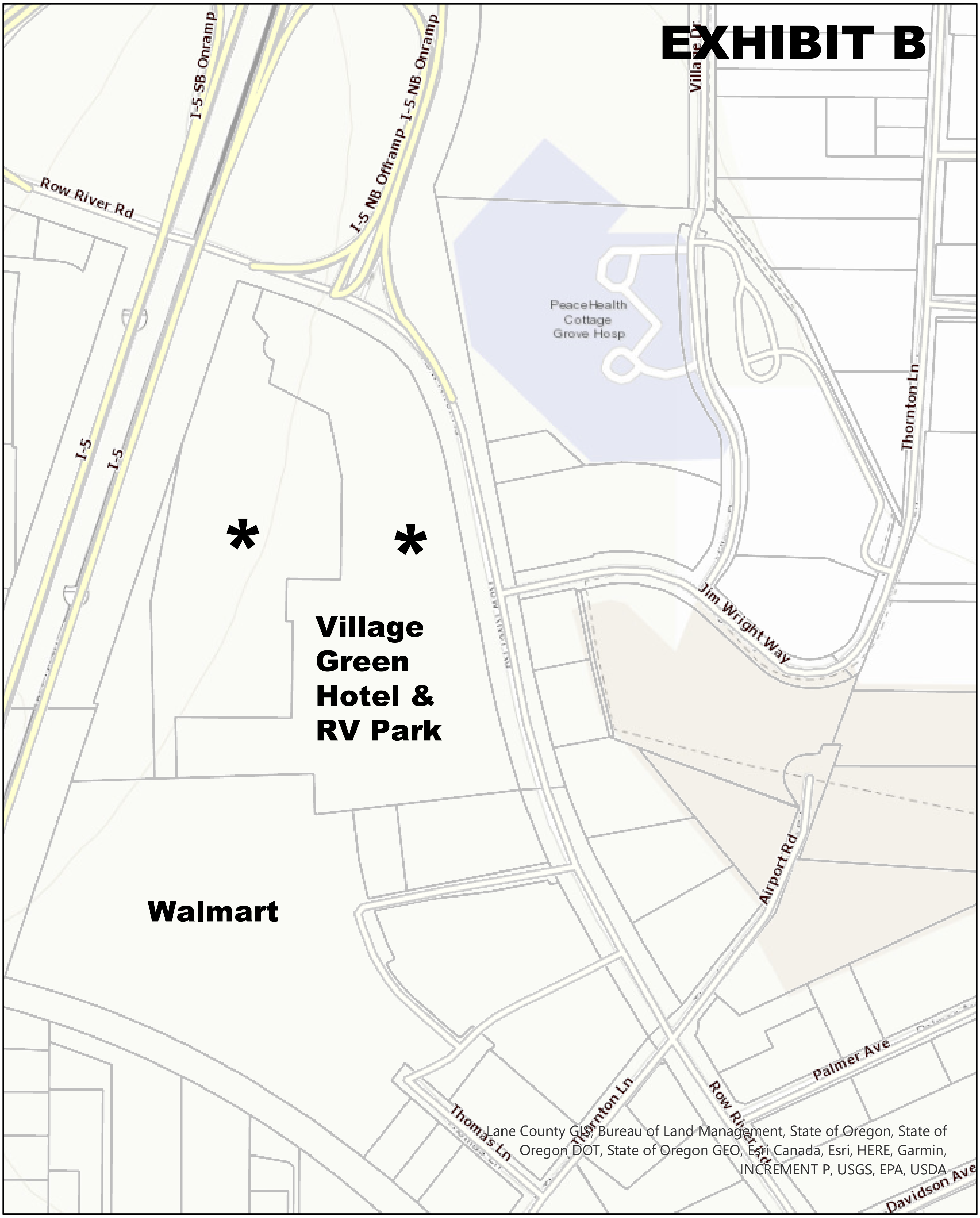
3202
3203
501



COTTAGE GROVE
20032720

EXHIBIT B



Lane County GIS, Bureau of Land Management, State of Oregon, State of Oregon DOT, State of Oregon GEO, Esri Canada, HERE, Garmin, INCREMENT P, USGS, EPA, USDA

N

0 100 200 400 Feet

ArcGIS Web Map

Lane County, Oregon

Cottage Grove Zoning

EXHIBIT C

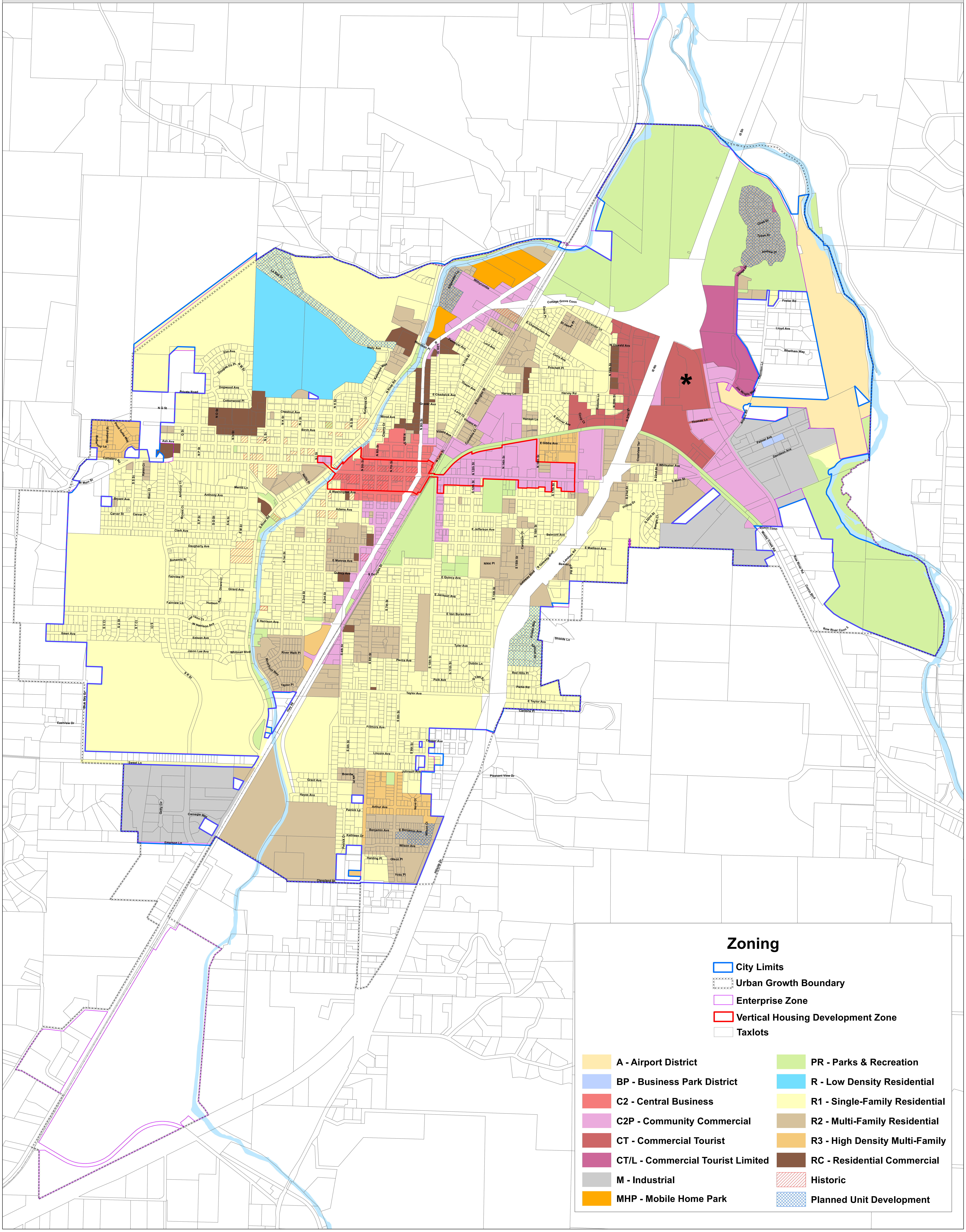


EXHIBIT D

Oregon Statewide Imagery Program (OSIP) - Oregon Imagery Framework Implementation Team, Lane County GIS, Bureau of Land Management, State of Oregon, State of Oregon DOT, State of Oregon GEO, Esri Canada, Esri, HERE, Garmin, INCREMENT P, USGS, EPA, USDA

The information on this map was derived from digital databases on the Lane County regional geographic information system. Care was taken in the creation of this map, but is provided "as is". Lane County cannot accept any responsibility for errors, omissions or positional accuracy in the digital data or the underlying records. Current plan designation, zoning, etc., for specific parcels should be confirmed with the appropriate agency. There are no warranties, expressed or implied, accompanying this product. However, notification of any errors will be appreciated.

N

0 200 400 800

Feet

ArcGIS Web Map

Lane County, Oregon

Branch
ENGINEERING inc
Since 1977
civil · transportation
structural · geotechnical
SURVEYING

April 21, 2022

Mr. Colin Kelly
Timberview Construction
PO Box 20025
Keizer, Oregon 97307

RE: **Geotechnical Engineering Investigation**
Pine Springs at the Village Green Apartments
725 Row River Road
Cottage Grove, Oregon
Branch Engineering Inc. Project No. 21-753

Pursuant to your authorization, Branch Engineering Inc. (BEI) performed a geotechnical engineering investigation at the subject site for the proposed development of a multi-family residential housing development.

The accompanying report presents the results of our site research, field exploration and testing, data analyses, as well as our conclusions and recommended geotechnical design parameters for the project. Based on the results of our study, no geotechnical/geologic hazards were identified at the site that would prohibit the proposed residential subdivision. The site is suitable for the planned development and based on a geotechnical/geological perspective, will not adversely impact adjacent properties, provided that the recommendations of this report are implemented in the design and construction of the project.

Sincerely,
Branch Engineering Inc.

REGISTERED PROFESSIONAL ENGINEER
#16,170
OREGON
SEPT 15, 1992
RONALD J. DERRICK
EXPIRES: 12/31/2023

Samuel Rabe

Sam Rabe EIT
Engineering Technician

Ronald J. Derrick P.E., G.E.
Principal Geotechnical Engineer

EUGENE–SPRINGFIELD
p: 541.746.0637 | www.branchengineering.com

TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 Purpose and Scope of Work

The purpose of this work is to establish and present geotechnical engineering criteria and requirements related to the site and subsurface conditions that may influence the design and construction of the proposed project. Our field investigation scope of work consisted of a site reconnaissance with subsurface investigation and infiltration testing on February 17, 2022.

The subsurface investigation utilized a mini excavator, equipped with a 2-foot-wide toothed bucket to advance seven exploratory test pits to a maximum depth of 7.5-feet below ground surface (BGS). To provide site specific infiltration rates, four locations where test pits where excavated were used for infiltration testing. See the attached Figure-1, Site Exploration Map, for exploratory test pit locations.

Our scope of work also included pertinent site research activities, engineering data review, analysis, and preparation of this report.

1.2 Project Location and Description

The approximately 8-acre subject site is located at coordinates of 43.800129°, North Latitude, and 123.046754° West Longitude in Cottage Grove, Oregon. The rectangularly shaped site is bordered by Interstate-5 on the west, Row River Road on the north and east, and by portions of the Village Green Hotel and open areas to the south.

At the time of this report the site is occupied by the Village Green Hotel and associated pool/hot tub/open spaces, parking and accessways, and garden spaces. The buildings on the northern side of the site had been stripped down and appeared to be in the process of being demolished, the rest of the site is either parking lots and accessways, or open space with gardens. Numerous mature trees are located within the planned development area. Site topography is relatively flat throughout the majority of the site, the exception being a shallow bowl-shaped depression located north of the pool area.

Based on a preliminary drawing provided to BEI geotechnical staff, sixteen multi-family structures are proposed for the site along with open spaces, paved driveways and parking areas. Access to the site is expected to be taken from a driveway on Row River Road. Specific structural loads were not provided; however, two- to three-story wood-framed apartment buildings typically do not exceed 15-kip column loads or two kip/ft line loads on foundations.

1.3 Site Information Resources

The following site investigation activities were performed and literature resources were reviewed for pertinent site information:

- Department of Geologic and Mining Industries (DOGAMI) Online Geologic Map of Oregon.
- USGS OM-110 Geology of the Southern and Southwestern Border Area of the Willamette Valley, Oregon. 1951. By H.E. Vokes, D.A. Myers, and Parke Detweiler Snavely Jr.

- Seven exploratory test pits advanced to a maximum depth of 7.5-feet BGS on February 17, 2021 at the approximate locations shown on the attached Figure-1 Site Exploration Map.

- Four encased falling head infiltration tests performed on February 17, 2022, at the approximate locations shown on Figure-1, Site Exploration Map. See Appendix A for infiltration data sheet.

- Review of the Web Soil Survey of Lane County Area, United States Department of Agricultural (USDA) Natural Resources Conservation Service (NRCS) (attached in Appendix A).

- Oregon Department of Geology and Mineral Industries (DOGAMI) web hazard viewer (HazVu) and Statewide Landslide Information Layer for Oregon (SLIDO).

- Review of available nearby Oregon Department of Water Resources Well Logs (attached in Appendix A).

- Cottage Grove, Oregon, Quadrangle United States Geologic Survey Topographic Map, 2020.

- Oregon Structural Specialty Code 2019 (OSSC 2019), applicable building code criteria.

- Geology of Oregon, sixth edition by Orr, Orr and Baldwin, 2012.

2.0 SITE SUBSURFACE CONDITIONS

The analyses, conclusions, and recommendations contained in this report are based on site conditions as they existed on February 17, 2021 and assume that our exploratory test pit findings presented in Appendix A are representative of the subsurface conditions throughout the site. If during construction subsurface conditions differ from those encountered in the exploratory test pits; BEI requests that we be informed to review the site conditions and adjust our recommendations, if necessary.

2.1 Subsurface Soils

Visual classification of the near surface soils was performed in accordance with the American Society of Testing and Materials (ASTM) Method D-2488 and the Unified Soil Classification System (USCS). Soil samples were collected from test pit sidewalls in the top 5-feet of excavations. Soil samples were taken at depths where noticeable changes in consistency, color, and moisture content were apparent. Subsurface soil conditions were found to be relatively consistent throughout the site, generally consisted of the following.

- Topsoil: Soft, Moist, Dark Brown Clay with Trace Silt and Organics extends to a maximum depth of approximately 30-inches BGS.
- Isolated areas of near-surface silty gravel fill (Fill); IT-2 and IT-3 extending to 2-feet BGS.
- Underlying the near-surface topsoil or fill; brown, moist alluvial Clay (CL); medium-stiff, increasing to stiff in consistency with depth. In the southwest corner of the site, brown, wet, soft, high plasticity Clay (CH) was encountered to 48-inches BGS in Test Pit TP-1.
- Dense alluvial gravel deposits (GP); with sand and minor silt, wet. Depth to gravel ranged from 3-feet to 5-feet deep from ground surface. Depth to the gravel deposits varied.

The NRCS Web Soil Survey mapping unit was used to identify soils at the project site and is summarized below:

Table 1: Site Soil Unit

Unit Name	***Description***
McBee Silty Clay Loam	Moderately well drained silty clay and silt loam deposits derived from recent mixed alluvium. Mapped in central area.
Salem-Urban land complex	Well drained deposits of gravelly clay, sand, and silt derived from gravelly mixed alluvium. Mapped in Hotel Area
Salem gravelly silt loam	Well drained deposits of gravelly silt loam that grade to very gravelly sand derived from a parent material of gravelly mixed alluvium. Mapped across the majority of the site.

The above soil descriptions are consistent with the observations of the test pits excavated at the site. A well log for a site directly across Row River Road fill overlying brown sandy gravel and silty clay with cobbles to at least 12-feet BGS. Well logs in the site vicinity are similar and show fine-grained soil overlying alluvial sand and gravel-cobble deposits to around 50-feet BGS. Underlying the alluvium are sedimentary rocks described as claystone in the well logs to at least 298-feet BGS.

2.2 Groundwater

Groundwater seepage was observed in the gravel deposits at approximately 4-feet BGS in TP-1 and in several isolated near-surface areas of sidewalls in other test pit excavations. Sidewall seepage should be expected during the wet season (typically late October till May) from perched lenses of water during the wet season. A well log from a nearby site was reviewed and lists static water at 8-feet BGS.

Perched groundwater lenses are most likely to be encountered should excavation activities take place during the wet season when rainstorms are more intense and frequent and soils are nearing saturation. Groundwater is not expected to impact shallow foundations, but dewatering may be necessary for in-ground utility work. Utilities deeper than 5-feet BGS will likely require shoring or laying back of sidewalls at a slope of 1:1 (H:V) if soils are wet.

3.0 GEOLOGIC SETTING

The following sections describe the regional and local site geology. Our field findings are consistent with the geologic mapping of the site area by the Oregon Department of Geology and Mineral Industries.

3.1 Regional Geology

The subject site is located near the southernmost portion of the Willamette Valley, where the Coast Range and the Cascade Mountains are differentiated more by geology than topography. In Oregon, the Willamette Valley is an elongate basin which narrows at both ends before terminating in the Calapooya Divide to the south and the Columbia River to the north. The basin is approximately 130 miles long and 40 miles wide. The valley is drained by the Willamette River and drops from an elevation of approximately 400-feet at Eugene, and to near sea level at the northern end of the basin where the Willamette River drains into the Columbia River.

The Willamette River Valley in the area of the subject site is believed to be underlain by undifferentiated sedimentary rock, tuffs, and basalt from the Miocene and Oligocene epochs (approximately 15 to 35 million years ago). Subsequent compression forces and uplifting of the Cascade and Coast Range Mountains depressed the Willamette River Valley. The rapid uplift of the Cascade and Coast Range mountains steepened stream gradients causing increased erosion of the mountains and resulting deposition of thick gravel layers incised within the fluvial deposits.

3.2 Site Geology

The DOGAMI interactive Geologic Map of Oregon and the USGS OM-110 map the geologic unit on the site as recent Quaternary Surficial Deposits which are described as deposits of unconsolidated sediments, including alluvium, colluvium, river and coastal terrace deposits. The underlying geology of the large hillside formation to the southeast of the site is mapped as Oligocene age Volcanic Rocks from the Little Butte Volcanics which is described as basalt with volcanic rocks of widely varying composition.

The nearest mapped active faults are located approximately 16.2-miles southwest and 20-miles to the northeast of the site. Faults are also mapped 2.0-miles west of the site and 4.8-miles north of the site. These faults are not known to be active; however, seismic activity is not uncommon in the Willamette Valley as evidenced by the 1993 Scotts Mills Earthquake east of Salem that registered a 5.7 Richter magnitude, and most recently a 4.2 magnitude earthquake about 12-miles east of Eugene on July 4, 2015.

4.0 CONCLUSIONS

Based on our field observations, subsurface explorations, and data analyses, we conclude that the site is geologically and geotechnically suitable for the proposed development provided that the recommendations of this report are incorporated into the design and construction of the project.

5.0 RECOMMENDATIONS

The following sections present site-specific recommendations for site preparation, drainage, foundations, utility excavations, and slab/pavement design. General material and construction specifications for the items discussed herein are provided in Appendix B.

5.1 Site Preparation and Foundation Subgrade Requirements

The following recommendations are for earthwork in the building foundation areas, public roadway, and private parking areas. Earthwork shall be performed in general accordance with the standard of practice as generally described in Appendix J of the 2019 Oregon Structural Specialty Code and as specified in this report.

All areas intended to directly or laterally support structures, roadways, or pavement areas shall be stripped of vegetation, organic soil, unsuitable fill, and/or other deleterious material such as moisture softened exposed soil. These stripping’s shall be removed from the site or reserved for use in landscaping or non-structural areas. In areas of previously existing trees, vegetation, or previously placed fill, the required depth of site clearing/stripping may be increased.

The subsurface conditions observed in our site investigation test pits are relatively consistent; however, the test pits only represent those specific locations on the site. Should soft or unsuitable soils extend to a depth greater than that described herein, or areas of distinct soil variation be discovered, this office shall be notified to perform site observation and additional excavation may be required.

Building Foundation Subgrade Preparation

The depth to suitable subgrade for shallow building foundations is expected to be at least 24- to 30-inches BGS, below any existing fill, organics, or areas of high plasticity clay as encountered in TP-1. Areas where building and pavement are present were not evaluated during the site explorations, and after demolition BEI asks that they be contacted to assess subgrade depths in these areas. Subgrade preparation for foundations bearing in the upper fine grain soil requires that any soft or saturated fine grain soil be removed to medium stiff soil to maintain a similar consistency across the building pad area. The Geotechnical Engineer of Record (GER) or designated representative should visit the site to approve the subgrade soil prior to the placement of structural fill or foundation forms.

The bearing capacity of the existing subgrade at approximately 2.5-feet is considered to be less than 1000 psf, to provide subgrade suitable for a bearing capacity of 2,000 psf and acceptable settlement qualities, the placement of a compacted aggregate with a minimum thickness of 18-inches is recommended under building foundations bearing in the fine grain alluvial soil. If excavation of building pads occurs during the wet season or heavy precipitation occurs when building pad subgrade is exposed, additional excavation and an increase in aggregate thickness to 18-inches will likely be required. The placement of a bi-axial geogrid atop the separation fabric may be an alternative to additional aggregate thickness. Drainage of building pads will be essential to prevent deterioration of the exposed subgrade. Improvement methods may include excavation and fill and/or placement of geotextile fabric or geogrid composites. A BEI representative shall approve exposed subgrade materials and observe proof-rolling activities.

As the subgrade soil is exposed, placement of compacted aggregate should be completed in a timely manner to minimize moisture fluctuations in the subgrade soil. Installation of a geotextile separation fabric on the subgrade soil is recommended and may minimize the loss of aggregate into the subgrade soil. If building footprint excavation encounters the stiff to hard, gravelly soil observed in the test pits, the recommended aggregate thickness may be decreased at the discretion of the GER after on-site observation.

Compacted aggregate fill shall consist of well graded aggregate compacted to at least 90% relative compaction as determined by ASTM D-1557 (modified Proctor) and should be placed in conformance with the recommendations in Section 5.3 below. Conformance with the recommended compaction levels shall be confirmed with compaction testing by nuclear densometer (ASTM D6938) or proof rolls with a loaded 10 CY haul truck. On site material is not recommended to be used as structural fill under building foundations. An angular 3-inch minus sized aggregate may be used in the lower 6-inches of compacted aggregate in lieu of separation fabric. The excavation and placement of engineered fill shall extend a minimum horizontal distance equal to the depth of the fill beyond the outside edge of footings or 24-inches, whichever is greater.

If bearing capacities higher than 2,000 psf are required for foundation design we recommend transferring foundation loads to the underlying dense gravel material expected at 5-feet or greater.

Driven piles, helical piers, micro-piles, stone columns, or auger cast piles are suitable deep foundation methods. Bearing capacities are discussed in Section 5.6 below.

Prior to placing fill or foundation concrete forms, exposed subgrade materials shall be observed by the GER or designated representative. Areas of soft or saturated soil shall be removed to additional depth, or otherwise improved at the discretion and direction of the GER. Once exposed, suitable subgrade shall be covered with compacted crushed aggregate in a timely manner to mitigate moisture fluctuations in the soil.

Areas of Private Access and Parking Improvements

The depth to suitable subgrade for roadway structural sections is below the organic topsoil zone and any remaining stumps or roots from previously existing trees. Areas of high plasticity clay such as the material encountered to approximately 36-inches BGS in TP-1 shall be removed from structural or pavement areas. Should grading plans require engineered fill, see section 5.2 for engineered fill requirements. Prior to placing compacted crushed rock aggregate for the roadway structural section as described in Section 5.11 below, the exposed subgrade shall be approved by the GER or approved representative.

Localized soft areas may be encountered during excavation activities, particularly during periods of wet weather, and will require removal and replacement with structural fill. Proof rolls with a loaded 10 CY haul truck or equivalent vehicle shall be conducted on the prepared subgrade prior to the placement of compacted aggregate, and areas of deflection under wheel loads shall be corrected prior to placing the recommended section of compacted aggregate. If moisture conditions prohibit proof rolls with loaded trucks on the subgrade, proof rolls shall be conducted on top of the recommended aggregate thickness and any observed areas of deflection under load shall be corrected prior to paving.

Utility trenches excavated to depths below the top of the subgrade elevation shall be backfilled with material compacted to 90% relative compaction as determined by ASTM D1557 or AASHTO T-180 (modified Proctor). We expect that fill placed on the site will be imported granular material; use of the native soil on site for fill will require moisture conditioning and appropriate compaction equipment selection. Sampling of on-site material to be used as engineered fill will be required for Proctor testing to generate moisture-density curves unless provided by the supplier. The compaction of fill material supporting pavement areas shall be confirmed by compaction testing by nuclear densometer and the proof roll process described above.

5.2 Geotechnical Construction Site Observations

Periodic site observations by a geotechnical representative of BEI are recommended during the construction of the project; the specific phases of construction that should be observed are shown in Table 2.

Table 2: Construction Phases

Recommended Construction Phases to be Observed by the Geotechnical Engineer	
At completion of subgrade excavation	Subgrade observation by the geotechnical engineer before aggregate placement.
Imported fill material	Observation of material or information on material type and source.
Placement or Compaction of fill material	Observation by geotechnical engineer or test results by qualified testing agency.

5.3 Structural Fill Recommendations

All engineered fill placed on the site shall consist of homogenous material and shall meet the following recommendations.

- Prior to placement on-site, the aggregate to be used as structural fill shall be approved by the GER. If no Proctor curve (moisture-density relationship) for the material performed within the last 12-months is on file, a material sample will be required for testing to determine the maximum dry density and optimum moisture content of the aggregate or fill material.

- The structural fill shall be moisture conditioned within +/- 2% of optimum moisture content and compacted in lifts with loose lift thickness not exceeding 12- inches.

- Periodic visits to the site to verify lift thickness, source material, and compaction efforts shall be conducted by the GER, or designated representative, and documented.

- The recommended compaction level for crushed aggregate or soil fill is 90% relative compaction, respectively, as determined by ASTM D-1557 (modified Proctor). Compaction shall be measured by testing with nuclear densometer ASTM D-6938, or D-1556 sand cone method on structural fill 12-inches in thickness or greater.

- If on-site or imported non-granular material is approved for structural fill placement, a sample of the material shall be collected for modified Proctor testing to use for field compaction test comparison. If, due to the nature of the on-site material compaction testing is not possible due to factors such as oversize rock content and variable material, proof rolls with a fully loaded 10cy haul-truck, or equivalent equipment, shall be observed at regular intervals. Observed areas of soft soil will require over-excavation and replacement with suitable material.

5.4 Excavations

The site soils are classified as either OSHA Type B or C soils for the upper 10-feet of the site soil profile. Heavy equipment or stored materials should not be placed within 10-feet of open excavations.

5.5 Drainage and Infiltration Testing

An on-site storm drainage system is expected to be engineered for this project. Our understanding is storm water infiltration or filtration facilities will be designed and installed as a primary means to manage surface runoff. Four encased falling head infiltration tests were performed on February 17, 2022. Infiltration tests were conducted with 6-inch diameter pipes set and sealed within the test pit. Infiltration test locations are shown on the attached Figures 2. Results of the infiltration testing are listed below with no factor of safety.

Table 3: Hydraulic Conductivity

Test Location	*Test Depth (Inches)*	*Measured Hydraulic Conductivity, k (in/hr)*
IT-1	57.0	60
IT-2	54.5	66
IT-3	57.0	45
IT-4	45.0	8

Results from the infiltration testing indicate that the disposal of stormwater via on-site infiltration is likely feasible. The slower rate of infiltration measured in IT-4 was likely a result of a higher clay content in the soil at the testing depth. Alteration of existing grades for this project will likely change drainage patterns but should not adversely affect adjacent properties. Perimeter landscape and hardscape grades shall be sloped away from the foundations and water shall not be allowed to pond adjacent to footings during or after construction.

5.6 Soil Bearing Capacity and Settlement

Conventional perimeter style foundations and spread footings for column loads are suitable for the proposed building construction and we recommend that loads are distributed evenly to mitigate the potential for differential settlement. If foundation areas are prepared as described in Section 5.1 of this report with 18-inches of compacted aggregate, an allowable bearing capacity of 2,000 psf can be used for design. For foundation loads bearing on the alluvial gravel deposits a bearing capacity of 4,000 psf may be used. Areas of extensive landscaping may have thicker horizons of softer soil with bearing capacities of less than 1000 psf. Depending on site grading plans and the time of the year in which construction takes place, these areas will likely require over excavation or an increase in aggregate thickness to achieve a bearing capacity of 2000 psf. The extent and location of these areas, in addition to the mitigation method will likely need to be determined as earth work progresses through the site. The bearing capacity may be increased by 1/3 for short term loading, such as wind or seismic events.

5.7 Slabs-On-Grade

After site preparation to expose suitable subgrade, load bearing concrete slabs shall be underlain by a minimum of 12-inches of compacted, crushed aggregate. If soft or saturated subgrade is encountered, over-excavation and replacement with engineered fill will be required. A free draining aggregate is recommended beneath structural slabs.

The modulus of subgrade reaction (K) of the in-situ soil at about 24-inches below existing grade is 120 lb/in^3 and the correlated California Bearing Ratio of the soil is correlated to be four in the onsite fine grain soils.

5.8 In-Situ Moisture Content & Soil Shrink/Swell Potential

In general, the underlying native silty soils have a low to moderate shrink/swell potential with Free Swell (IS 2720) test results ranging from 30% to 50%. Except for a sample of the plastic clay encountered in TP-1 that was collected and tested with a result of 70% which is considered to be high. The underlying alluvial gravel deposits have a low shrink/swell potential. In-situ moisture content of the samples collected from the site ranged from 30% to 32%.

5.9 Friction Coefficient and Earth Pressures

Because of the variable conditions encountered in site test pit excavations, the lateral earth pressures would be best calculated after locations and retaining structure elevations are finalized. Although not expected, should retaining walls be required BEI asks that our office be contacted once plans are finalized so that we may assess the location and provide parameters for wall design.

5.10 Wet Weather/Dry Weather Construction Practices

The site material is moisture sensitive and will soften with exposure to precipitation. The near surface fine grain soil shall be covered with compacted aggregate in a timely manner after excavation to suitable subgrade to minimize soil moisture fluctuations. BEI recommends that foundation subgrade preparation and general site earthwork be performed during the dry season, generally June through September.

Construction during the wet season will likely require special drainage considerations, such as covering of excavations, pumping to mitigate standing water in footing excavations, additional aggregate depth, and/or over-excavation of moisture softened soils.

5.11 Pavement Design Recommendations

For new asphalt concrete (AC) pavement installation in parking areas, we recommend a minimum pavement thickness of 3-inches of AC over a minimum of 12-inches of compacted crushed aggregate base material. We recommend that the AC thickness be increased to 4-inches in areas of heavier traffic, such as refuse truck routes or delivery vehicles with the same rock section as described above.

Prior to placement of base rock, any soft soil, wet soil, or organic soil shall be removed from the parking subgrade. We recommend that the subgrade be moisture conditioned and compacted to at least 90% of the material's maximum dry density as determined by AASHTO T-180/ASTM D-1557 (modified Proctor). If excavation activities take place during the wet season, a thicker rock section can be used in lieu of moisture conditioning of the subgrade soil.

Table 4: Recommended Structural Pavement Section for private road section

Pavement Criteria	***Asphalt Concrete (inches)***	***ABM Section (inches)***
Heavy Traffic Section	4	12
Private Road Section	3	12

The pavement recommendations discussed above are designed for the type of vehicle use on the site after construction completion, not for construction vehicle traffic which is generally heavier, occurs over a short time, and impacts the site before full pavement sections are constructed. The construction traffic may cause subgrade failures and the site contractor should consider over-building designated haul routes through the site to mitigate soft areas at the time of final paving.

5.12 Seismic Site Classification and Hazards

Based on the soil properties encountered in our test pits explorations and nearby well log information, a Seismic Site Class D designation, stiff soil (Table 20.3-1 ASCE 7-16) is recommended for design of site structures. OSSC 2019 (1803.5.11) required criteria for hazards the geotechnical investigation shall address for seismic site class designations C through F are listed below.

- Slope Instability: The site is mapped low to moderate risk for land sliding with isolated areas of the Interstate 5 fill slopes and ridge to southeast of the site mapped at a high risk. No existing landslides are mapped in locations that may impact the site and no signs of recent or existing slope instability such as hummocky terrain or scarp zones were observed during our visit. The risk landslides impacting the site is low.

- Liquefaction: The site is not mapped as having liquefaction risk when viewed in DOGAMI's Statewide Geohazard Viewer. We did not observe highly liquefiable soil during our site investigation. The risk of surface damage due to liquefaction is low.

- Total and Differential Settlement: The estimated amount of total and differential settlement is less than ¾-inch and ½-inch, respectively, over a 20-foot span of similarly loaded footings, provided subgrade preparation follows the recommendations in Section 5.1 of this report.

- Surface Displacement due to faulting or seismically induced lateral spreading or lateral flow: The closest faults to the site are not known to be active. Surface displacement or seismically induced lateral spreading is not expected at the site.

- Tsunami/seiche: The closest water body is the Coast Fork of the Willamette River, which poses no risk of a seiche or tsunami.

6.0 REPORT LIMITATIONS

This report has presented BEI's site observations and research, subsurface explorations, geotechnical engineering analyses, and recommendations for the proposed site development. The conclusions in this report are based on the conditions described in this report and are intended for the exclusive use of Mr. Colin Kelly, Timberview Construction and their representatives for use in design and construction of the development described herein. The analysis and recommendations may not be suitable for other structures or purposes.

Services performed by the geotechnical engineer for this project have been conducted with the level of care and skill exercised by other current geotechnical professionals in this area. No warranty is herein expressed or implied. The conclusions in this report are based on the site conditions as they currently exist and it is assumed that the limited site locations that were physically investigated generally represent the subsurface conditions at the site. Should site development or site conditions change, or if a substantial amount of time goes by between our site investigation and site development, we reserve the right to review this report for its applicability. If you have any questions regarding the contents of this report please contact our office.

LEGEND

◨ Approximate Location of Test Pit Excavation

⊕ Approximate Location of Infiltration Testing

N

APPROXIMATE SCALE

0 ▬ 100'

Site Photo By Licensed BEI UAV Pilot

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SITE EXPLORATION MAP- PINE SPRINGS AT VILLAGE GREEN

COTTAGE GROVE, OREGON

FIGURE-1

3-9-2022

PROJECT NO. 21-753

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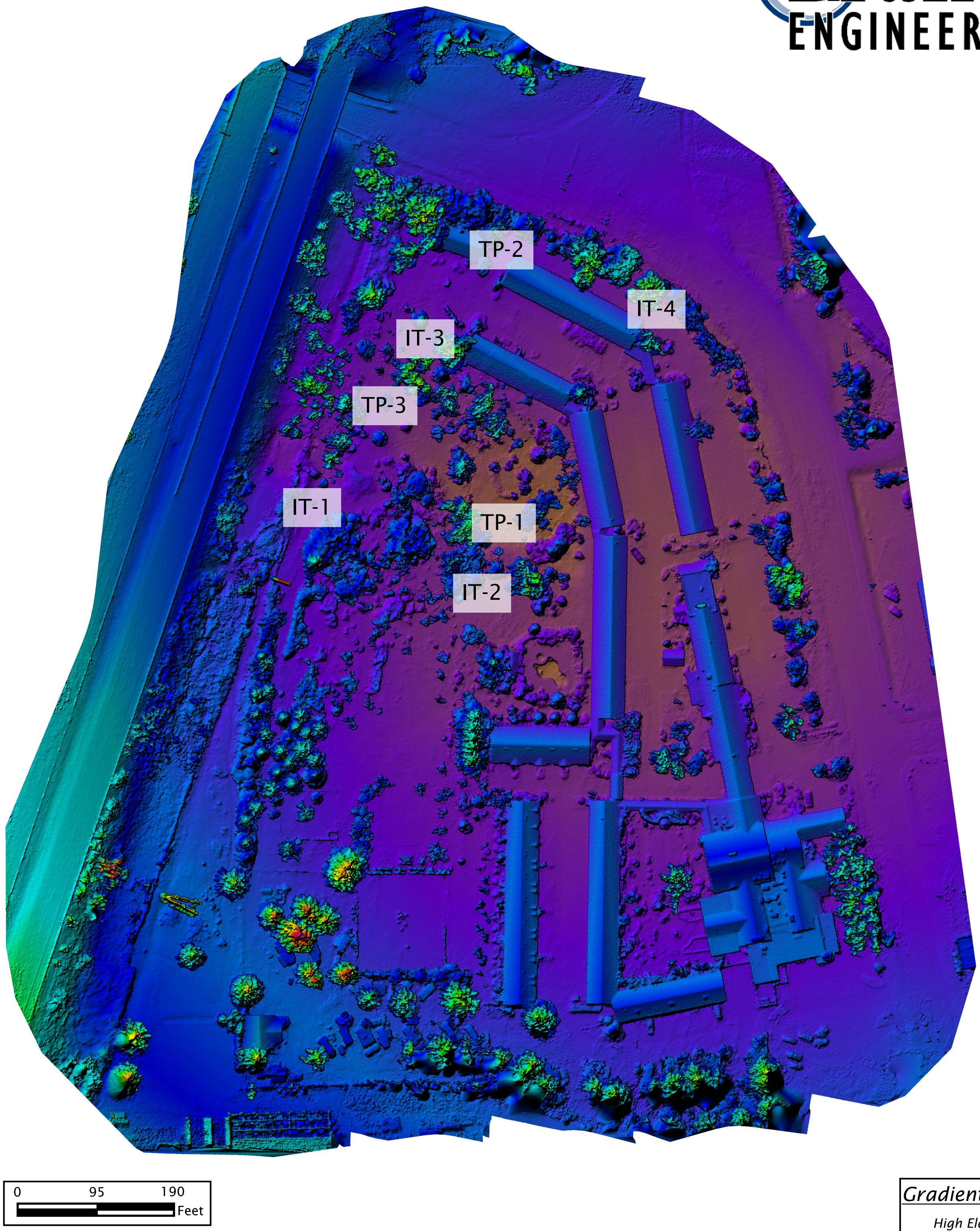

Gradient Legend

High Elevation

🟦

🟧

Low Elevation

NOTE: DEM CAPTURED BY UAV-LICENSED BEI STAFF

SITE GRADIENT - Pine Springs at Village Green

FIGURE-2

COTTAGE GROVE, OREGON

04-12-2022

PROJECT NO. 21-753

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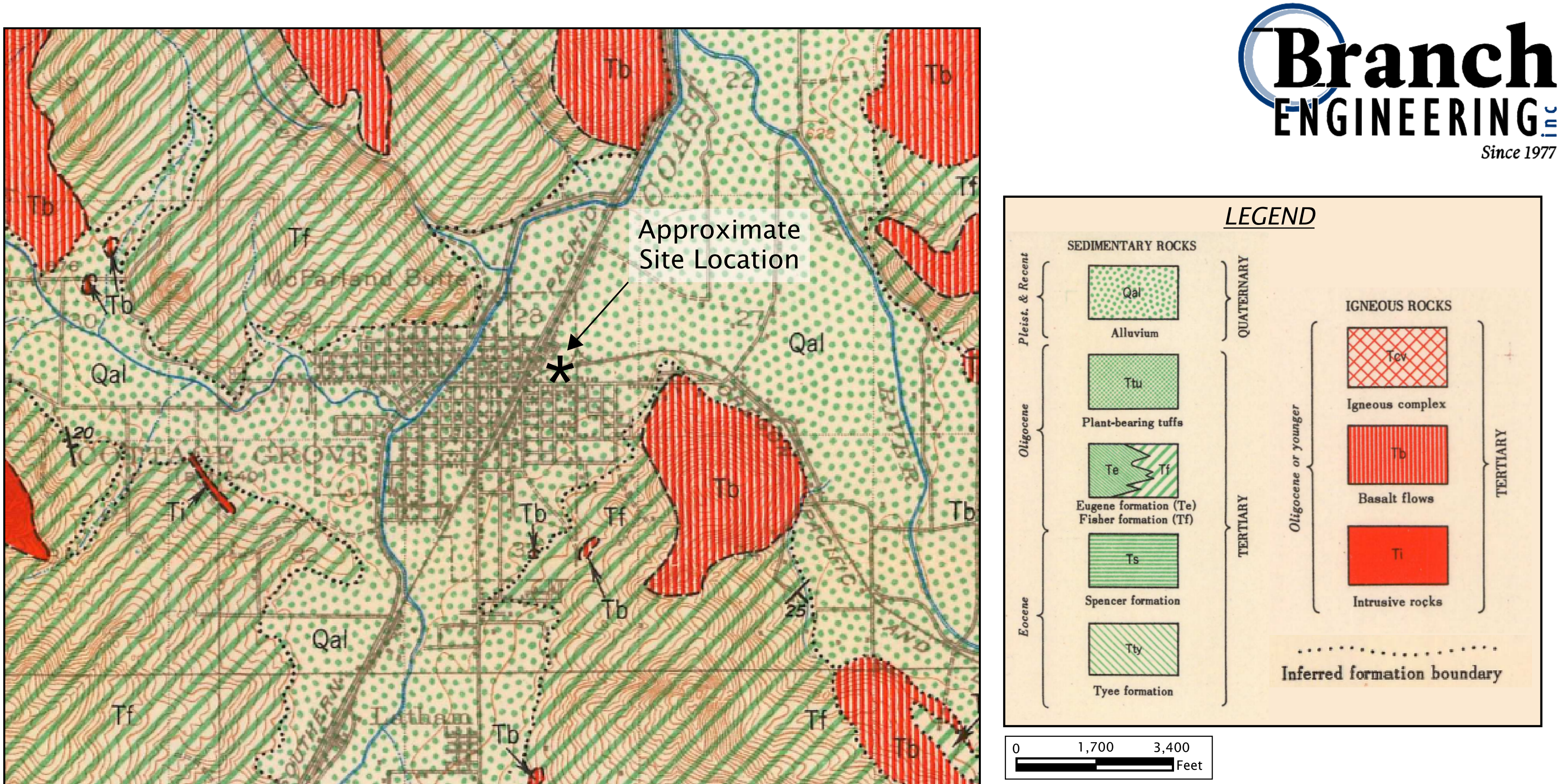

NOTE: SOURCED FROM USGS OM-110 (1951)

SITE GEOLOGY MAP - Pine Springs at Village Green

COTTAGE GROVE, OREGON

FIGURE-3

04-12-2022

PROJECT NO. 21-753

APPENDIX A:

- TEST PIT LOGS
- INFILTRATION TESTING RESULTS
- OWRD WELL LOGS
- USDA SOIL SURVEY

RELATIVE DENSITY - COARSE GRAINED SOILS

RELATIVE DENSITY	SPT N-VALUE	D&M SAMPLER (140 lbs hammer)	D&M SAMPLER (300 lbs hammer)
VERY LOOSE	< 4	< 11	< 4
LOOSE	4 - 10	11 - 26	4 - 10
MEDIUM DENSE	10 - 30	26 - 74	10 - 30
DENSE	30 - 50	74 - 120	30 - 47
VERY DENSE	> 50	> 120	> 47

USCS GRAIN SIZE

FINES		< #200 (.075 mm)
SAND	Fine	#200 - #40 (.425 mm)
	Medium	#40 - #10 (2 mm)
	Coarse	#10 - #4 (4.75 mm)
GRAVEL	Fine	#4 - 0.75 inch
	Coarse	0.75 - 3 inch
COBBLES		3 - 12 inches

CONSISTENCY - FINE GRAINED SOILS

CONSISTENCY	SPT N-VALUE	D&M SAMPLER (140 lbs hammer)	D&M SAMPLER (300 lbs hammer)	POCKET PEN. / UNCONFINED (TSF)	MANUAL PENETRATION TEST
VERY SOFT	< 2	< 3	< 2	< 0.25	Easy several inches by fist
SOFT	2 - 4	3 - 6	2 - 5	0.25 - 0.50	Easy several inches by thumb
MEDIUM STIFF	4 - 8	6 - 12	5 - 9	0.50 - 1.00	Moderate several inches by thumb
STIFF	8 - 15	12 - 25	9 - 19	1.00 - 2.00	Readily indented by thumb
VERY STIFF	15 - 30	25 - 65	19 - 31	2.00 - 4.00	Readily indented by thumbnail
HARD	> 30	> 65	> 31	> 4.00	Difficult by thumbnail

UNIFIED SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			GROUP SYMBOLS AND TYPICAL NAMES	
COARSE-GRAINED SOILS: More than 50% retained on No. 200 sieve	GRAVELS: 50% or more *retained* on the No. 4 sieve	CLEAN GRAVELS	GW	Well-graded gravels and gravel-sand mixtures, little or no fines.
			GP	Poorly-graded gravels and gravel-sand mixtures, little or no fines.
		GRAVELS WITH FINES	GM	Silty gravels, gravel-sand-silt mixtures.
			GC	Clayey gravels, gravel-sand-clay mixtures.
	SANDS: 50% or more *passing* the No. 4 sieve	CLEAN SANDS	SW	Well-graded sands and gravelly sands, little or no fines.
			SP	Poorly-graded sands and gravelly sands, little or no fines.
		SANDS WITH FINES	SM	Silty sands, sand-silt mixtures.
			SC	Clayey sands, sand-clay mixtures.
FINE-GRAINED SOILS: Less than 50% retained on No. 200 sieve	SILT AND CLAY	LIQUID LIMIT LESS THAN 50	ML	Inorganic silts, rock flour, clayey silts.
			CL	Inorganic clays of low to medium plasticity, lean clays.
			OL	Organic silt and organic silty clays of low plasticity.
		LIQUID LIMIT 50 OR GREATER	MH	Inorganic silts, clayey silts.
			CH	Inorganic clays of high plasticity, fat clays.
			OH	Organic clays of medium to high plasticity.
HIGHLY ORGANIC SOILS			PT	Peat, muck, and other highly organic soil.

MOISTURE CONTENT

DRY: Absence of moisture, dusty, dry to the touch
DAMP: Some moisture but leaves no moisture on hand
MOIST: Leaves moisture on hand
WET: Visble free water, usually saturated

	PLASTICITY	DRY STRENGTH	DILATANCY	TOUGHNESS
ML	Non to Low	Non to Low	Slow to Rapid	Low, can't roll
CL	Low to Med.	Med. to High	None to Slow	Medium
MH	Med. to High	Low to Med.	None to Slow	Low to Med.
CH	Med. to High	High to V.High	None	High

STRUCTURE

STRATIFIED: Alternating layers of material or color > 6mm thick.
LAMINATED: Alternating layers < 6mm thick.
FISSURED: Breaks along definate fracture planes.
SLICKENSIDED: Striated, polished, or glossy fracture planes.
BLOCKY: Cohesive soil that can be broken down into small angular lumps which resist further breakdown.
LENSES: Has small pockets of different soils, note thickness.
HOMOGENEOUS: Same color and appearance throughout.

LIST OF ABBREVIATION & EXPLANATIONS

SPT	Standard Penetration Test split barrel sampler
D&M	Dames and Moore sampler
LL	Atterberg Liquid Limit
PL	Atterberg Plastic Limit
PP	Pocket Penetrometer
VS	Vane Shear
G	Grab sample
MC	Moisture Content
MD	Moisture Density
UC	Unconfined Compressive Strength

TABLE A-1

GEOTECHNICAL SITE INVESTIGATION EXPLORATORY KEY

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civil · transportation
structural · geotechnical
SURVEYING

Test Pit ID: IT-1

Sheet 1 of 1

Client: Colin Kelley
Project Name: Pine Springs Devlopment at the Village Green
Project Number: 21-753
Project Location: Row River Road Cottage Grove, Oregon
Date Started: Feb 17 2022 **Completed:** Feb 17 2022
Logged By: SPR **Checked By:** RJD
Contractor: Branch Engineering Inc.
Latitude: **Longitude:** **Elevation:**
Method: Test Pit Excavation
Ground Water Levels
Equipment: Tracked Excavator
▽
Notes:
▼
▽

Depth	Graphic	Material Description	Sample	Pocket Pen. (tsf)	Dry Unit Wt. (pcf)	MC: ⊗ PL LL: ●–■ 10 20 30 40 50 60 70 80 90
		Soft, Moist, Dark Brown Clay with Trace Silt and Organics.				
1						
		Medium Stiff, Moist, Brown-Gray High Plasticity Clay and Fine Roots.				
2						
3						
4						
5		Medium Dense, Moist, Brown Gray Silt, Sand, and Rounded Gravel-Cobble.				
6						
7						
8						
9						
10						

◊ Fines Content ⊗ Moisture Content ●—■ Plastic Limit and Liquid Limit

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Test Pit ID: IT-2

Sheet 1 of 1

Client: Colin Kelley
Project Name: Pine Springs Devlopment at the Village Green
Project Number: 21-753
Project Location: Row River Road Cottage Grove, Oregon
Date Started: Feb 17 2022 **Completed:** Feb 17 2022
Logged By: SPR **Checked By:** RJD
Contractor: Branch Engineering Inc.
Latitude: **Longitude:** **Elevation:**
Method: Test Pit Excavation
Ground Water Levels
Equipment: Tracked Excavator
Notes:

Depth	Graphic	Material Description	Sample	Pocket Pen. (tsf)	Dry Unit Wt. (pcf)	MC: ⊗ PL LL: ●—■ 10 20 30 40 50 60 70 80 90
		Soft, Moist, Dark Brown Clay with Trace Silt and Organics, Interpreted as Fill.				
		Medium Stiff, Moist, Brown Clay with Trace Silt and Sand, Medium Plasticity.				
		Medium Dense, Moist, Brown-Gray Medium Grained Sand with Trace Silt and Rounded Gravel.				

Depth: 1 2 3 4 5 6 7 8 9 10

◊ Fines Content ⊗ Moisture Content ●—■ Plastic Limit and Liquid Limit

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Test Pit ID: IT-3

Sheet 1 of 1

Client: Colin Kelley
Project Name: Pine Springs Devlopment at the Village Green
Project Number: 21-753
Project Location: Row River Road Cottage Grove, Oregon
Date Started: Feb 17 2022 **Completed:** Feb 17 2022
Logged By: SPR **Checked By:** RJD
Contractor: Branch Engineering Inc.
Latitude: **Longitude:** **Elevation:**
Method: Test Pit Excavation
Ground Water Levels
Equipment: Tracked Excavator
▽
Notes:
▼

Depth	Graphic	Material Description	Sample	Pocket Pen. (tsf)	Dry Unit Wt. (pcf)	MC: ⊗ PL LL: ●—■ 10 20 30 40 50 60 70 80 90
		Soft, Moist, Dark Brown Clay with Trace Silt and Organics. PVC Pipe at 10-inches BGS.				
1						
2		Medium Stiff, Moist, Brown Clay with Trace Silt and Sand, Medium Plasticity.				
3						
4						
5						
6						
7						
8						
9						
10						

◊ Fines Content ⊗ Moisture Content ●—■ Plastic Limit and Liquid Limit

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Test Pit ID: IT-4

Sheet 1 of 1

Client: Colin Kelley
Project Name: Pine Springs Devlopment at the Village Green
Project Number: 21-753
Project Location: Row River Road Cottage Grove, Oregon
Date Started: Feb 17 2022 **Completed:** Feb 17 2022
Logged By: SPR **Checked By:** RJD
Contractor: Branch Engineering Inc.
Latitude: **Longitude:** **Elevation:**
Method: Test Pit Excavation
Ground Water Levels
Equipment: Tracked Excavator
▽
Notes:
▼
◮

Depth	Graphic	Material Description	Sample	Pocket Pen. (tsf)	Dry Unit Wt. (pcf)	MC: ⊗ PL LL: ●–■ 10 20 30 40 50 60 70 80 90
1		Soft, Moist, Mottled Brown-Gray Clay with Trace Silt and Organics.				
2 3		Soft to Medium Stiff, Moist, Brown to Reddish Brown Clay, Trace Silt and Sand, Scattered Gravel.				
4 5 6 7 8 9 10						

◊ Fines Content ⊗ Moisture Content ●——■ Plastic Limit and Liquid Limit

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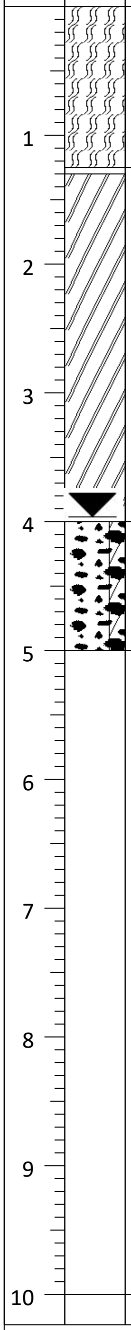
Test Pit ID: TP-1

Sheet 1 of 1

Client: Colin Kelley
Project Name: Pine Springs Devlopment at the Village Green
Project Number: 21-753
Project Location: Row River Road Cottage Grove, Oregon
Date Started: Feb 17 2022 **Completed:** Feb 17 2022
Logged By: SPR **Checked By:** RJD
Contractor: Branch Engineering Inc.
Latitude: **Longitude:** **Elevation:**
Method: Test Pit Excavation
Ground Water Levels
Equipment: Tracked Excavator
▽
Notes:
▼
▽

Depth	Graphic	Material Description	Sample	Pocket Pen. (tsf)	Dry Unit Wt. (pcf)	MC: ⊗ PL LL: ●–■ 10 20 30 40 50 60 70 80 90
		Soft, Moist, Dark Brown Clay with Trace Silt and Organics.				
		Medium Stiff, Moist, Brown-Gray High Plasticity Clay and Fine Roots. Groundwater Seepage in Sidewalls.				
		Medium Dense, Moist, Brown-Gray Medium Grained Sand with Trace Silt and Rounded Gravel-Cobble. Sidewall Collapse at 4-feet BGS.				



◊ Fines Content ⊗ Moisture Content ●—■ Plastic Limit and Liquid Limit

Test Pit ID: TP-2
Sheet 1 of 1

Client: Colin Kelley
Project Name: Pine Springs Devlopment at the Village Green
Project Number: 21-753
Project Location: Row River Road Cottage Grove, Oregon
Date Started: Feb 17 2022 **Completed:** Feb 17 2022
Logged By: SPR **Checked By:** RJD
Contractor: Branch Engineering Inc.
Latitude: **Longitude:** **Elevation:**
Method: Test Pit Excavation
Ground Water Levels
Equipment: Tracked Excavator
▽
Notes:
▼
▽

Depth	Graphic	Material Description	Sample	Pocket Pen. (tsf)	Dry Unit Wt. (pcf)	MC: ⊗ PL LL: ●–■ 10 20 30 40 50 60 70 80 90
		Soft, Moist, Dark Brown Clay with Trace Silt and Organics.				
1						
		Loose, Moist, Well Sorted Rounded Gravel, Interpreted as Drainage Rock (Fill).				
2		Stiff, Moist, Brown Clay with Trace Silt and Sand, Medium Plasticity.				
3						
4						
5		Medium Dense, Moist, Brown-Gray Medium Grained Sand with Trace Silt and Rounded Gravel.				
6						
7		Medium Dense, Moist, Brown-Gray Gravel-Cobble with Minor Sand, Alluvium.				
8						
9						
10						

◊ Fines Content ⊗ Moisture Content ●—■ Plastic Limit and Liquid Limit

Test Pit ID: TP-3

Sheet 1 of 1

Client: Colin Kelley
Project Name: Pine Springs Devlopment at the Village Green
Project Number: 21-753
Project Location: Row River Road Cottage Grove, Oregon
Date Started: Feb 17 2022 **Completed:** Feb 17 2022
Logged By: SPR **Checked By:** RJD
Contractor: Branch Engineering Inc.
Latitude: **Longitude:** **Elevation:**
Method: Test Pit Excavation
Ground Water Levels
Equipment: Tracked Excavator
Notes:

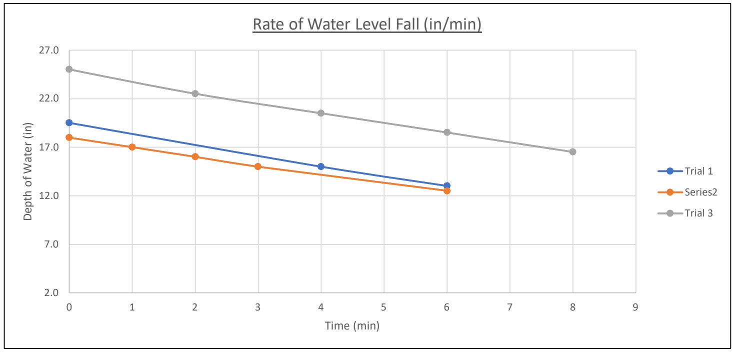
Depth	Graphic	Material Description	Sample	Pocket Pen. (tsf)	Dry Unit Wt. (pcf)	MC: ⊗ PL LL: ●–■ 10 20 30 40 50 60 70 80 90
1		Soft, Moist, Dark Brown Clay with Trace Silt and Organics.				
2		Medium Stiff, Moist, Brown-Gray Clay with Trace Silt.				
3 4 5		Medium Dense, Moist, Brown-Gray Silt, Sand, and Rounded Gravel-Cobble.				
6 7 8 9 10						

◊ Fines Content ⊗ Moisture Content ●–■ Plastic Limit and Liquid Limit

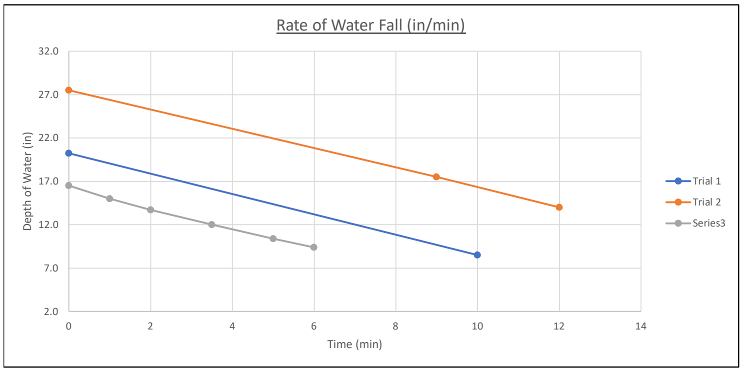
Infiltration Test Results

Project: Pine Springs at Village Green
Testing Date: 2/17/2022
BEI Project Number: 21-753
Test Type: Encased Falling Head Infiltration
Time = 0 at addition of H2O

Infiltration Test 1 Trial 1		**Elapsed Time (min)**	**Depth to Water Surface (in)**	**Depth of Water (in)**	**Rate of Fall (in/min)**	**Rate of Fall (in/hr)**	**Avg Rate of Fall T-1 (in/hr)**
Standpipe Diameter (in)	6	0	45.5	19.5			
Standpipe Height AGS (in)	8	4	50.0	15.0	1.13	67.5	
Test Depth BGS (in)	57	6	52.0	13.0	1.00	60.0	63.8
Volume of Water Added (gal)	2.3						
Clocktime at Start	11:12						
ASTM Soil Type	(GP-GC)						
Infiltration Test 1 Trial 2		**Elapsed Time (min)**	**Depth to Water Surface (in)**	**Depth of Water (in)**	**Rate of Fall (in/min)**	**Rate of Fall (in/hr)**	**Avg Rate of Fall T-2 (in/hr)**
Volume of Water Added (gal)	2.25	0	47.0	18.0			
Clocktime	11:19	1	48.0	17.0	1.00	60.0	
		2	49.0	16.0	1.00	60.0	
		3	50.0	15.0	1.00	60.0	
		6	52.5	12.5	0.83	50.0	57.5
Infiltration Test 1 Trial 3		**Elapsed Time (min)**	**Depth to Water Surface (in)**	**Depth of Water (in)**	**Rate of Fall (in/min)**	**Rate of Fall (in/hr)**	**Avg Rate of Fall T-3 (in/hr)**
Volume of Water Added (gal)	3.1	0	40.0	25.0			
Clocktime	11:49	2	42.5	22.5	1.25	75.0	
		4	44.5	20.5	1.00	60.0	
		6	46.5	18.5	1.00	60.0	
		8	48.5	16.5	1.00	60.0	63.8



Infiltration Test 2 Trial 1		**Elapsed Time (min)**	**Depth to Water Surface (in)**	**Depth of Water (in)**	**Rate of Fall (in/min)**	**Rate of Fall (in/hr)**	**Avg Rate of Fall T-1 (in/hr)**
Standpipe Diameter (in)	6	0	41.3	20.3			
Standpipe Height AGS (in)	7	10	53.0	8.5	1.18	70.5	70.5
Test Depth BGS (in)	54.5						
Volume of Water Added (gal)	2.5						
Clocktime	11:14						
ASTM Soil Type	(GP-GC)						
Infiltration Test 2 Trial 2		**Elapsed Time (min)**	**Depth to Water Surface (in)**	**Depth of Water (in)**	**Rate of Fall (in/min)**	**Rate of Fall (in/hr)**	**AVG Rate of Fall T-2 (in/hr)**
Volume of Water Added (gal)	3.4	0	34.0	27.5			
Clocktime	11:26	9	44.0	17.5	1.11	66.7	
		12	47.5	14.0	1.17	70.0	68.3
Infiltration Test 2 Trial 3		**Elapsed Time (min)**	**Depth to Water Surface (in)**	**Depth of Water (in)**	**Rate of Fall (in/min)**	**Rate of Fall (in/hr)**	**AVG Rate of Fall T-2 (in/hr)**
Volume of Water Added (gal)	0.5	0	45.0	16.5			
Clocktime	11:39	1	46.5	15.0	1.50	90.0	
		2	47.8	13.7	1.30	78.0	
		3.5	49.5	12.0	1.13	68.0	
		5	51.1	10.4	1.07	64.0	
		6	52.1	9.4	1.00	60.0	67.5

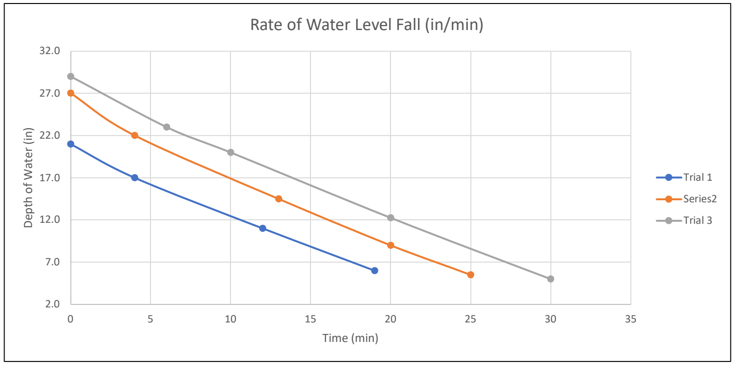


Branch ENGINEERING INC
Since 1977
civil · transportation
structural · geotechnical
SURVEYING

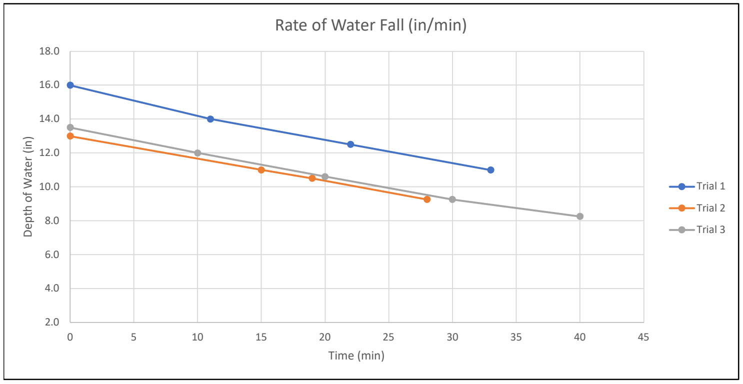
Infiltration Test Results

Project: Pine Springs at Village Green
Testing Date: 2/17/2022
BEI Project Number: 21-753
Test Type: Encased Falling Head Infiltration
Time = 0 at addition of H2O

Infiltration Test 3 Trial 1		**Elapsed Time (min)**	**Depth to Water Surface (in)**	**Depth of Water (in)**	**Rate of Fall (in/min)**	**Rate of Fall (in/hr)**	**Avg Rate of Fall T-1 (in/hr)**
Standpipe Diameter (in)	6	0	42.0	21.0			
Standpipe Height AGS (in)	6	4	46.0	17.0	1.00	60.0	
Test Depth BGS (in)	57	12	52.0	11.0	0.75	45.0	
Volume of Water Added (gal)	2.6	19	57.0	6.0	0.71	42.9	43.9
Clocktime at Start	11:37						
ASTM Soil Type	(GP-GC)						
Infiltration Test 3 Trial 2		**Elapsed Time (min)**	**Depth to Water Surface (in)**	**Depth of Water (in)**	**Rate of Fall (in/min)**	**Rate of Fall (in/hr)**	**Avg Rate of Fall T-2 (in/hr)**
Volume of Water Added (gal)	3.1	0	36.0	27.0			
Clocktime	11:57	4	41.0	22.0	1.25	75.0	
		13	48.5	14.5	0.83	50.0	
		20	54.0	9.0	0.79	47.1	
		25	57.5	5.5	0.70	42.0	46.4
Infiltration Test 3 Trial 3		**Elapsed Time (min)**	**Depth to Water Surface (in)**	**Depth of Water (in)**	**Rate of Fall (in/min)**	**Rate of Fall (in/hr)**	**Avg Rate of Fall T-3 (in/hr)**
Volume of Water Added (gal)	3.5	0	34.0	29.0			
Clocktime	12:34	6	40.0	23.0	1.00	60.0	
		10	43.0	20.0	0.75	45.0	
		20	50.8	12.3	0.78	46.5	
		30	58.0	5.0	0.73	43.5	45.0



Infiltration Test 4 Trial 1		**Elapsed Time (min)**	**Depth to Water Surface (in)**	**Depth of Water (in)**	**Rate of Fall (in/min)**	**Rate of Fall (in/hr)**	**Avg Rate of Fall T-1 (in/hr)**
Standpipe Diameter (in)	6	0	35.0	16.0			
Standpipe Height AGS (in)	6	11	37.0	14.0	0.18	10.9	
Test Depth BGS (in)	45	22	38.5	12.5	0.14	8.2	
Volume of Water Added (gal)	2	33	40.0	11.0	0.14	8.2	8.2
Clocktime	11:52						
ASTM Soil Type	(ML)						
Infiltration Test 4 Trial 2		**Elapsed Time (min)**	**Depth to Water Surface (in)**	**Depth of Water (in)**	**Rate of Fall (in/min)**	**Rate of Fall (in/hr)**	**AVG Rate of Fall T-2 (in/hr)**
Volume of Water Added (gal)	1.6	0	38.0	13.0			
Clocktime	12:26	15	40.0	11.0	0.13	8.0	
		19	40.5	10.5	0.13	7.5	
		28	41.8	9.3	0.14	8.3	7.9
Infiltration Test 4 Trial 3		**Elapsed Time (min)**	**Depth to Water Surface (in)**	**Depth of Water (in)**	**Rate of Fall (in/min)**	**Rate of Fall (in/hr)**	**AVG Rate of Fall T-2 (in/hr)**
Volume of Water Added (gal)	1.5	0	37.5	13.5			
Clocktime	12:55	10	39.0	12.0	0.15	9.0	
		20	40.4	10.6	0.14	8.4	
		30	41.8	9.3	0.14	8.1	
		40	42.8	8.3	0.10	6.0	7.9



NOTICE TO WATER WELL CONTRACTOR
The original and first copy
of this report are to be
filed with the

STATE ENGINEER, SALEM, OREGON 97310
within 30 days from the date
of well completion.

RECEIVED
OCT 13 1971
STATE ENGINEER
SALEM. OREGON

WATER WELL REPORT
STATE OF OREGON
(Please type or print)
(Do not write above this line)

1867
LANE

State Well No. 20/3W-27
State Permit No.

---

(1) OWNER:

Name Pruitt Mink Farm
Address Rt 1 Box 61 Cottage Grove, Oregon

(2) TYPE OF WORK (check):

New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:

Rotary ☒ Driven ☐
Cable ☐ Jetted ☐
Dug ☐ Bored ☐

(4) PROPOSED USE (check):

Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

[illegible] CASING INSTALLED: Threaded ☐ Welded ☒

6" Diam. from 0 ft. to 24½ ft. Gage .250
" Diam. from ft. to ft. Gage
" Diam. from ft. to ft. Gage

[illegible] PERFORATIONS: Perforated? ☐ Yes ☒ No.

[illegible]e of perforator used
Size of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

(7) SCREENS: Well screen installed? ☐ Yes ☒ No

Manufacturer's Name
Type Model No.
Diam. Slot size Set from ft. to ft.
Diam. Slot size Set from ft. to ft.

(8) WELL TESTS: Drawdown is amount water level is lowered below static level

Was a pump test made? ☐ Yes ☒ No If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " "
Tested with air estimated 5 GPM could fluctuate
XXXXXXX gal./min. with 36 ft. drawdown after 1 hrs.
Artesian flow g.p.m.
T[illegible]perature of water Depth artesian flow encountered ft.

[illegible] CONSTRUCTION:

Well seal—Material used Cement Grout
Well sealed from land surface to 24 ft.
Diameter of well bore to bottom of seal 10 in.
Diameter of well bore below seal 6 in.
Number of sacks of cement used in well seal 15 sacks
Number of sacks of bentonite used in well seal sacks
Brand name of bentonite
Number of pounds of bentonite per 100 gallons of water lbs./100 gals.
Was a drive shoe used? ☒ Yes ☐ No Plugs Size: location ft.
Did any strata contain unusable water? ☐ Yes ☒ No
Type of water? depth of strata
Method of sealing strata off
Was well gravel packed? ☐ Yes ☒ No Size of gravel:
Gravel placed from ft. to ft.

(10) LOCATION OF WELL:

County Lane Driller's well number
¼ ¼ Section 27 20S R. 3W W.M.
Bearing and distance from section or subdivision corner

(11) WATER LEVEL: Completed well.

Depth at which water was first found 47 ft.
Static level 19 ft. below land surface. Date 9-30-71
Artesian pressure lbs. per square inch. Date

(12) WELL LOG: Diameter of well below casing 6

Depth drilled 55 ft. Depth of completed well 55 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. *Report each change in position of Static Water Level and indicate principal water-bearing strata.*

MATERIAL	From	To	SWL
Brown Top Soil	0	1	
Clay & Gravel	1	19	
Blue Claystone	19	46	
Black Samdstone	46	48	
Lavender Claystone	48	55	

Work started 9-29-71 19 Completed 9-30-71 19
Date well drilling machine moved off of well 9-20-71 19

Drilling Machine Operator's Certification:

This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.

[Signed] Casey L. Jones Date 10-5-71, 19
(Drilling Machine Operator)
Drilling Machine Operator's License No. 521

Water Well Contractor's Certification:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Name Casey Jones Well D illing Co Inc
(Person, firm or corporation) (Type or print)
Address Route 7 Box 695 Pleasant Hill, Oregon

[Signed] Delbert S Jones
(Water Well Contractor)
Contractor's License No. 103 Date 10-5-71, 19

(USE ADDITIONAL SHEETS IF NECESSARY)

SP*45656-119

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report
are to be filed with the

WATER RESOURCES DEPARTMENT
SALEM, OREGON 97310
within 30 days from the date
of well completion.

RECEIVED
SEP 29 1977
WATER RESOURCES DEPT.
SALEM, OREGON

WATER WELL REPORT
STATE OF OREGON
(Please type or print)
(Do not write above this line)

118688
LANE

State Well No. 20S/3W-27bd
State Permit No.

---

(1) OWNER:
Name Loyde Thweatt
Address 78960 Thornton Rd
Cottage Grove, Ore

(2) TYPE OF WORK (check):
New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary ☐ Driven ☐
Cable ☒ Jetted ☐
Dug ☐ Bored ☐

(4) PROPOSED USE (check):
Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

[illegible] CASING INSTALLED:
Threaded ☐ Welded ☒
6" Diam. from +1 ft. to 52 ft. Gage .250
" Diam. from ft. to ft. Gage
" Diam. from ft. to ft. Gage

[illegible] PERFORATIONS:
Perforated? ☐ Yes ☒ No.
Type of perforator used
Size of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

(7) SCREENS:
Well screen installed? ☐ Yes ☒ No
Manufacturer's Name
Type Model No.
Diam. Slot size Set from ft. to ft.
Diam. Slot size Set from ft. to ft.

(8) WELL TESTS:
Drawdown is amount water level is lowered below static level
Was a pump test made? ☒ Yes ☐ No If yes, by whom? Driller
Yield: 3 gal./min. with 40 ft. drawdown after 4 hrs.
" " "
" " "
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m.
Temperature of water Depth artesian flow encountered ft.

(9) CONSTRUCTION:
Well seal—Material used Cement
Well sealed from land surface to 20 ft.
Diameter of well bore to bottom of seal 10 in.
Diameter of well bore below seal 6 in.
Number of sacks of cement used in well seal 5 sacks
How was cement grout placed? Poured

Was a drive shoe used? ☒ Yes ☐ No Plugs Size: location ft.
Did any strata contain unusable water? ☐ Yes ☒ No
Type of water? depth of strata
Method of sealing strata off
Was well gravel packed? ☐ Yes ☒ No Size of gravel:
Gravel placed from ft. to ft.

(10) LOCATION OF WELL:
County Lane Driller's well number
SE ¼ NW ¼ Section 27 T. 20S R. 3W W.M.
Bearing and distance from section or subdivision corner

(11) WATER LEVEL: Completed well.
Depth at which water was first found 35 ft.
Static level 10 ft. below land surface. Date 8-18-77
Artesian pressure lbs. per square inch. Date

(12) WELL LOG:
Diameter of well below casing 6
Depth drilled 52 ft. Depth of completed well 52 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. **Report each change in position of Static Water Level and indicate principal water-bearing strata.**

MATERIAL	From	To	SWL
Dirt	0	1	
Clay + Gravel	1	20	
Cemented Gravel	20	52	10

Work started 8-17 1977 Completed 8-19 1977
Date well drilling machine moved off of well 8-19 1977

Drilling Machine Operator's Certification:
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] Thomas May (Drilling Machine Operator) Date 8-20, 1977
Drilling Machine Operator's License No. 834

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Name Tom May Well Drilling (Person, firm or corporation) (Type or print)
Address PO Box 875 Cottage Grove
[Signed] Tom May (Water Well Contractor)
Contractor's License No. 646 Date 8-20-, 1977

(USE ADDITIONAL SHEETS IF NECESSARY)

SP*45656-119

2

LANE 2902

JUN - 1 1992
WATER RESOURCES DEPT.
SALEM, OREGON

20S/3W/27ca

STATE OF OREGON
WATER WELL REPORT
(as required by ORS 537.765)

(START CARD) #W 41735

(1) OWNER:
Well Number #1
Name Richard Cantonwine
Address 3800 Bennett Creek Rd.
City Cottage Grove State OR Zip 97424

(2) TYPE OF WORK:
☒ New Well ☐ Deepen ☐ Recondition ☒ Abandon

(3) DRILL METHOD:
☒ Rotary Air ☐ Rotary Mud ☐ Cable
☐ Other

(4) PROPOSED USE:
☒ Domestic ☐ Community ☐ Industrial ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other

(5) BORE HOLE CONSTRUCTION:
Special Construction approval ☐ Yes ☒ No Depth of Completed Well 298 ft.
Explosives used ☐ Yes ☒ No Type Amount

HOLE			SEAL			Amount
Diameter	From	To	Material	From	To	sacks or pounds
10"	0	37'	Cement	0	240'	3 yards
6"	37'	298'				

How was seal placed: Method ☐ A ☐ B ☒ C ☐ D ☐ E
☐ Other
Backfill placed from ft. to ft. Material
Gravel placed from ft. to ft. Size of gravel

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:					☐	☐	☐	☐
					☐	☐	☐	☐

Final location of shoe(s)

(7) PERFORATIONS/SCREENS:
☐ Perforations Method
☐ Screens Type Material

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour
☐ Pump ☐ Bailer ☒ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
3 ½	277'	298'	1 hr.

Temperature of Water 56° Depth Artesian Flow Found
Was a water analysis done? ☐ Yes By whom not tested
Did any strata contain water not suitable for intended use? ☐ Too little
☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other
Depth of strata:

(9) LOCATION OF WELL by legal description:
County Lane Latitude Longitude
Township 20S N or S. Range 3W E or W. WM.
Section 27 NE ¼ SW ¼
Tax Lot 1408 Lot Block Subdivision
Street Address of Well (or nearest address) Across from 33137 Loyd Ave., Cottage Grove

(10) STATIC WATER LEVEL:
21 ft. below land surface. Date 4-30-92
Artesian pressure lb. per square inch. Date

(11) WATER BEARING ZONES:
Depth at which water was first found 250'

From	To	Estimated Flow Rate	SWL
250'	255'	3½ gpm	21'

(12) WELL LOG:
Ground elevation

Material	From	To	SWL
Topsoil	0	3'	
Gravel & sand	3'	29'	
Brown conglomerate	29'	50'	
Blue, green claystone	50'	90'	
Brown claystone	90'	100'	
Gray claystone	100'	115'	
Blue,green claystone	115'	230'	
Gray claystone	230'	235'	
Blue,green claystone	235'	260'	21'
Basalt	260'	270'	
Blue, green claystone	270'	298'	

Date started 4-28-92 Completed 4-30-92

(unbonded) Water Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to my best knowledge and belief.
WWC Number 1564
Signed Mike D Date 5-4-92

(bonded) Water Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.
WWC Number 559
Signed Casey L Jones Date 5-4-92

ORIGINAL & FIRST COPY - WATER RESOURCES DEPARTMENT SECOND COPY - CONSTRUCTOR THIRD COPY - CUSTOMER 9809C 10/91

Lane 3766

STATE OF OREGON
MONITORING WELL REPORT
(as required by ORS 537.765 & OAR 690-240-095)

RECEIVED
MAY 18 1993
WATER RESOURCES DEPT.
SALEM, OREGON

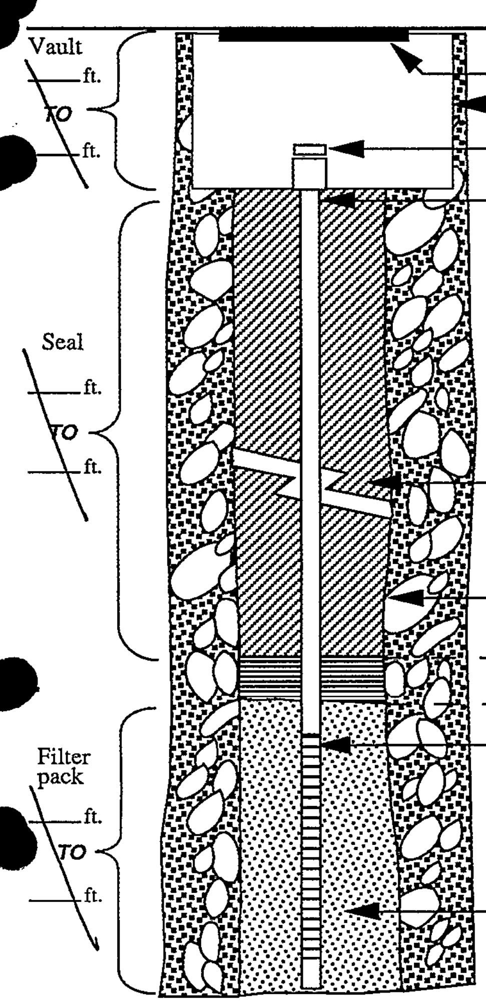
20s/3w/27bd
KCW-01
Start Card # W-50314

(1) OWNER/PROJECT:
WELL NO.
Name Kris Woodward, KCW Properties
Address P. O. Box 10666
City Eugene State Oregon Zip 97440

(2) TYPE OF WORK:
☒ New construction ☐ Repair ☐ Recondition
☐ Conversion ☐ Deepening ☐ Abandonment

(3) DRILLING METHOD
☐ Rotary Air ☐ Rotary Mud ☐ Cable
☒ Hollow Stem Auger ☐ Other

(4) BORE HOLE CONSTRUCTION
Special Standards Yes ☐ No ☒
Depth of completed well --- ft. (Not a well)



Water-tight cover
Surface flush vault
Locking cap
Casing
diameter -- in.
material --
Welded ☐ Threaded ☐ Glued ☐
Liner
diameter -- in.
material --
Welded ☐ Threaded ☐ Glued ☐
Well seal:
Material Bentonite
Amount 3/8" (200 lbs)
Borehole diameter
8" in.
Bentonite plug at least 2 ft. thick
Screen
material ---
interval(s):
From -- To --
From -- To --
Slot size --- in.
Filter pack:
Material ---
Size -- in.

(5) WELL TEST:
☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian
Permeability -- Yield -- GPM
Conductivity -- PH --
Temperature of water 55 °[✓ F]/C Depth artesian flow found -- ft.
Was water analysis done? ☒ Yes ☐ No
By whom? Pacific Northwest Laboratories
Depth of strata to be analyzed. From -- ft. to -- ft.
Remarks:

Name of supervising Geologist/Engineer Daniel F. Mumford

(6) LOCATION OF WELL By legal description
Well Location: County Lane
Township T20S (N or [✓ S]) Range R3W (E or [✓ W]) Section 27
1. SE 1/4 of NW 1/4 of above section.
2. Street address of well location 690 Row River Road
Cottage Grove, OR 97424
3. Tax lot number of well location 3300
4. ATTACH MAP WITH LOCATION IDENTIFIED.

(7) STATIC WATER LEVEL:
8' Ft. below land surface. Date 4-20-93
Artesian Pressure -- lb/sq. in. Date --

(8) WATER BEARING ZONES:
Depth at which water was first found 8'

From	To	Est. Flow Rate	SWL
8'	12'	> 1 gpm	--

(9) WELL LOG:
Ground elevation 635'

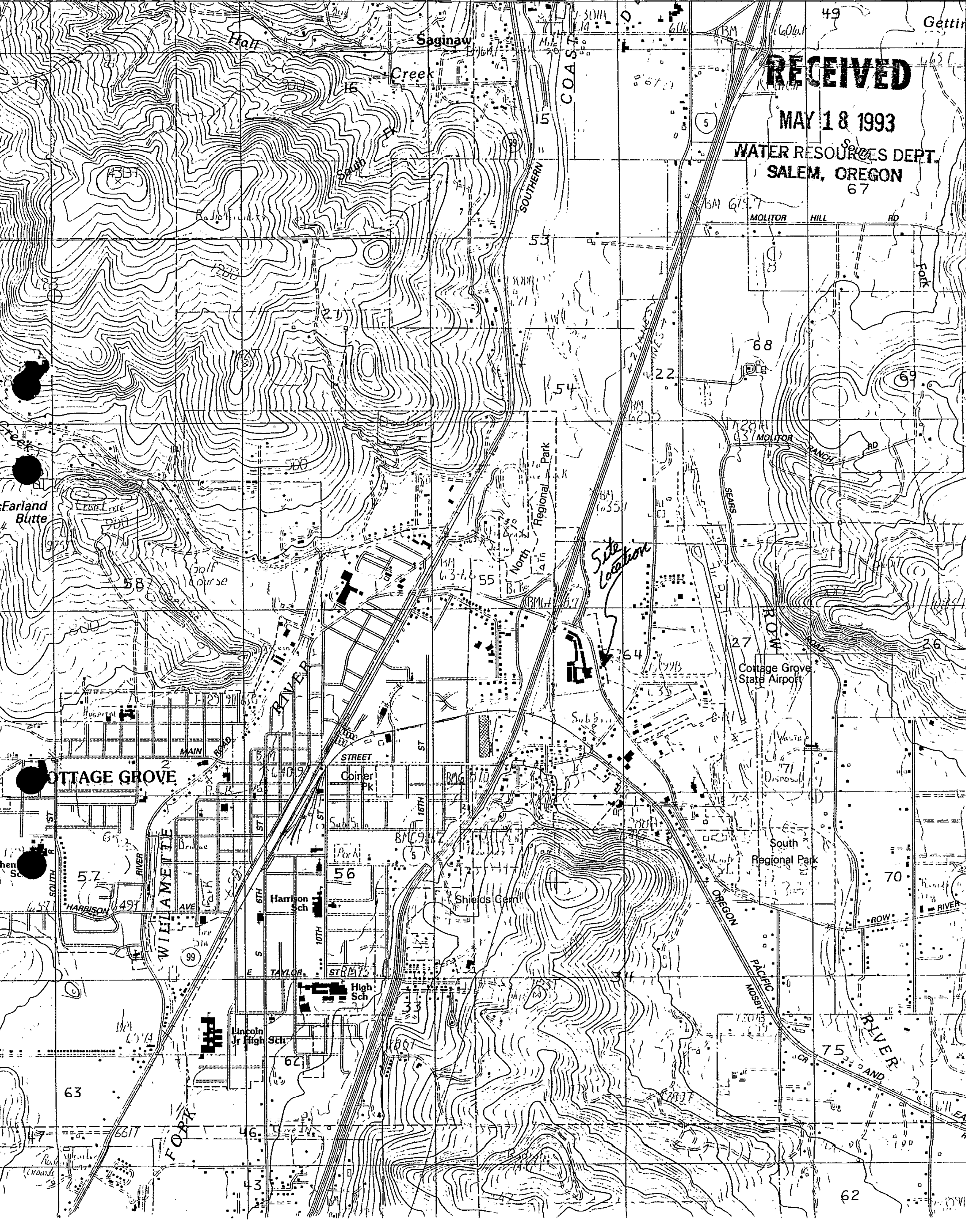
Material	From	To	SWL
Asphalt	0	2"	
Crushed rock fill	2"	10"	
Brown sandy gravel, moist.	10"	10'	
Silty clay matrix brown, w/cobbles up to 6", wet.	10'	12'	

Date started 4/20/93 Completed 4/20/93

(unbonded) Monitor Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to the best knowledge and belief.
MWC Number
Signed Date

(bonded) Monitor Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.
MWC Number 10288
Signed Date 5/17/93

ORIGINAL & FIRST COPY-WATER RESOURCES DEPARTMENT SECOND COPY-CONSTRUCTOR THIRD COPY-CUSTOMER


Saginaw
Hall Creek
South Fk
SOUTHERN
COAST
MOLITOR HILL RD
MOLITOR RANCH RD
SEARS
ROW
RIVER
Fork
Site location
North Regional Park
Bike Path
Golf Course
McFarland Butte
Cottage Grove State Airport
COTTAGE GROVE
MAIN STREET
Coiner Pk
Park
Harrison Sch
High Sch
Lincoln Jr High Sch
Shields Cem
South Regional Park
HARRISON AVE
TAYLOR ST
WILLAMETTE
FORK
OREGON
PACIFIC
MOSBY CR
ROW RIVER
AND
Waste Disposal
Rodeo Grounds
Fire Sta
Sub Sta
Drive In
6TH
10TH
16TH
SOUTH
5
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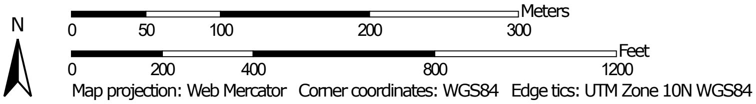
Soil Map—Lane County Area, Oregon
(Pine Springs Development)

Map Scale: 1:5,070 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: Lane County Area, Oregon
Survey Area Data: Version 19, Oct 27, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Oct 30, 2019—Nov 1, 2019

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
24	Chapman loam	6.0	4.9%
79	McBee silty clay loam	9.4	7.7%
89D	Nekia silty clay loam, 12 to 20 percent slopes	0.6	0.5%
118	Salem gravelly silt loam	92.7	75.8%
119	Salem-Urban land complex	13.0	10.6%
2205A	Conser silty clay loam, 0 to 3 percent slopes	0.7	0.5%
Totals for Area of Interest		**122.4**	**100.0%**

Lane County Area, Oregon

79—McBee silty clay loam

Map Unit Setting

National map unit symbol: 238x
Elevation: 100 to 2,500 feet
Mean annual precipitation: 36 to 60 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 150 to 210 days
Farmland classification: Prime farmland if protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Mcbee and similar soils: 85 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mcbee

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Recent mixed alluvium

Typical profile

H1 - 0 to 24 inches: silty clay loam
H2 - 24 to 41 inches: silt loam
H3 - 41 to 62 inches: silt loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately 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: About 24 to 36 inches
Frequency of flooding: FrequentNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 10.9 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C
Ecological site: F002XC003OR - Low Floodplain Group
Forage suitability group: Moderately Well Drained < 15% Slopes (G002XY004OR)

Other vegetative classification: Moderately Well Drained < 15% Slopes (G002XY004OR)
Hydric soil rating: No

Minor Components

Wapato

Percent of map unit: 3 percent
Landform: Flood plains
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Lane County Area, Oregon
Survey Area Data: Version 19, Oct 27, 2021

Lane County Area, Oregon

118—Salem gravelly silt loam

Map Unit Setting

National map unit symbol: 2340
Elevation: 300 to 800 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Salem and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Salem

Setting

Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Gravelly mixed alluvium

Typical profile

H1 - 0 to 7 inches: gravelly silt loam
H2 - 7 to 26 inches: gravelly clay loam
H3 - 26 to 60 inches: very gravelly sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
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 supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: B
Ecological site: R002XC006OR - Stream Terrace Group
Forage suitability group: Well drained < 15% Slopes (G002XY002OR)
Other vegetative classification: Well drained < 15% Slopes (G002XY002OR)

Hydric soil rating: No

Data Source Information

Soil Survey Area: Lane County Area, Oregon
Survey Area Data: Version 19, Oct 27, 2021

Lane County Area, Oregon

119—Salem-Urban land complex

Map Unit Setting

National map unit symbol: 2341
Elevation: 300 to 800 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Salem and similar soils: 50 percent
Urban land: 40 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Salem

Setting

Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Gravelly mixed alluvium

Typical profile

H1 - 0 to 7 inches: gravelly silt loam
H2 - 7 to 26 inches: gravelly clay loam
H3 - 26 to 60 inches: very gravelly sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
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 supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: B
Ecological site: R002XC006OR - Stream Terrace Group
Forage suitability group: Well drained < 15% Slopes (G002XY002OR)
Other vegetative classification: Well drained < 15% Slopes (G002XY002OR)

Hydric soil rating: No

Description of Urban Land

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

Data Source Information

Soil Survey Area: Lane County Area, Oregon
Survey Area Data: Version 19, Oct 27, 2021

APPENDIX B:

Recommended Earthwork Specifications

GEOTECHNICAL SPECIFICATIONS

General Earthwork

1. All areas where structural fills, fill slopes, structures, or roadways are to be constructed shall be stripped of organic topsoil and cleared of surface and subsurface deleterious material, including but limited to vegetation, roots, or other organic material, undocumented fill, construction debris, soft or unsuitable soils as directed by the Geotechnical Engineer of Record. These materials shall be removed from the site or stockpiled in a designated location for reuse in landscape areas if suitable for that purpose. Existing utilities and structures that are not to be used as part of the project design or by neighboring facilities, shall be removed or properly abandoned, and the associated debris removed from the site.
2. Upon completion of site stripping and clearing, the exposed soil and/or rock shall be observed by the Geotechnical Engineer of Record or a designated representative to assess the subgrade condition for the intended overlying use. Pits, depressions, or holes created by the removal of root wads, utilities, structures, or deleterious material shall be properly cleared of loose material, benched and backfilled with fill material approved by the Geotechnical Engineer of Record compacted to the project specifications.
3. In structural fill areas, the subgrade soil shall be scarified to a depth of 4-inches, if soil fill is used, moisture conditioned to within 2% of the materials optimum moisture for compaction, and blended with the first lift of fill material. The fill placement and compaction equipment shall be appropriate for fill material type, required degree of blending, and uncompacted lift thickness. Assuming proper equipment selection, the total uncompacted thickness of the scarified subgrade and first fill lift shall not exceed 8-inches, subsequent lifts of uncompacted fill shall not exceed 8-inches unless otherwise approved by the Geotechnical Engineer of Record. The uncompacted lift thickness shall be assessed based on the type of compaction equipment used and the results of initial compaction testing. Fine-grain soil fill is generally most effectively compacted using a kneading style compactor, such as a sheeps-foot roller; granular materials are more effectively compacted using a smooth, vibratory roller or impact style compactor.
4. All structural soil fill shall be well blended, moisture conditioned to within 2% of the material’s optimum moisture content for compaction and compacted to at least 90% of the material’s maximum dry density as determined by ASTM Method D-1557, or an equivalent method. Soil fill shall not contain more than 10% rock material and no solid material over 3-inches in diameter unless approved by the Geotechnical Engineer of Record. Rocks shall be evenly distributed throughout each lift of fill that they are contained within and shall not be clumped together in such a way that voids can occur.
5. All structural granular fill shall be well blended, moisture conditioned at or up to 3% above of the material’s optimum moisture content for compaction and compacted to at least 90% of the material’s maximum dry density as determined by ASTM Method D-1557, or an equivalent method. 95% relative compaction may be required for pavement base rock or in upper lifts of the granular structural fill where a sufficient thickness of the fill section allows for higher compaction percentages to be achieved. The granular fill shall not contain solid particles over 2-inches in diameter unless special density testing methods or proof-rolling is approved by the Geotechnical Engineer of Record. Granular fill is generally considered to be a crushed aggregate with a fracture surface of at least 70% and a maximum size not exceeding 1.5-inches in diameter, well-graded with less than 10%, by weight, passing the No. 200 Sieve.
6. Structural fill shall be field tested for compliance with project specifications for every 2-feet in vertical rise or 500 cy placed, whichever is less. In-place field density testing shall be performed by a competent individual, trained in the testing and placement of soil and aggregate fill placement, using either ASTM Method D-1556/4959/4944 (Sand Cone), D-6938 (Nuclear Densometer), or D-2937/4959/4944 (Drive Cylinder). Should the fill materials not be suitable for testing by the above methods, then observation of placement, compaction and proof-rolling with a loaded 10 cy dump-truck, or equivalent ground pressure equipment, by a trained individual may be used to assess and document the compliance with structural fill specifications.

Utility Excavations

1. Utility excavations are to be excavated to the design depth for bedding and placement and shall not be over-excavated. Trench widths shall only be of sufficient width to allow placement and proper construction of the utility and backfill of the trench.
2. Backfilling of a utility trench will be dependent on its location, use, depth, and utility line material type. Trenches that are required to meet structural fill specifications, such as those under or near buildings, or within pavement areas, shall have granular material strategically compacted to at least the spring-line of the utility conduit to mitigate pipeline movement and deformation. The initial lift thickness of backfill overlying the pipeline will be dependent on the pipeline material, type of backfill, and the compaction equipment, so as not to cause deflection or deformation of the pipeline. Trench backfill shall conform to the General Earthwork specifications for placement, compaction, and testing of structural fill.

Geotextiles

1. All geotextiles shall be resistant to ultraviolet degradation, and to biological and chemical environments normally found in soils. Geotextiles shall be stored so that they are not in direct sunlight or exposed to chemical products. The use of a geotextile shall be specified and shall meet the following specification for each use.

<u>Subgrade/Aggregate Separation</u>

Woven or nonwoven fabric conforming to the following physical properties:

• Minimum grab tensile strength	ASTM Method D-4632	180 lb
• Minimum puncture strength (CBR)	ASTM Method D-6241	371 lb
• Elongation	ASTM Method D-4632	15%
• Maximum apparent opening size	ASTM Method D-4751	No. 40
• Minimum permittivity	ASTM Method D-4491	0.05 s^{-1}

<u>Drainage Filtration</u>

Woven fabric conforming to the following physical properties:

• Minimum grab tensile strength	ASTM Method D-4632	110 lb
• Minimum puncture strength (CBR)	ASTM Method D-6241	220 lb
• Elongation	ASTM Method D-4632	50%
• Maximum apparent opening size	ASTM Method D-4751	No. 40
• Minimum permittivity	ASTM Method D-4491	0.5 s^{-1}

<u>Geogrid Base Reinforcement</u>

Extruded biaxially or triaxially oriented polypropylene conforming to the following physical properties:

• Peak tensile strength lb/ft	ASTM Method D-6637	925
• Tensile strength at 2% strain lb/ft	ASTM Method D-6637	300
• Tensile strength at 5% strain lb/ft	ASTM Method D-6637	600
• Flexural Rigidity	ASTM Method D-1388	250,000 mg-cm
• Effective Opening Size rock size	ASTM Method D-4751	1.5x

PRELIMINARY TITLE REPORT

CASCADE ESCROW
ATTN: NADJA JUDISH
811 WILLAMETTE STREET
EUGENE, OR 97401

February 22, 2023
Report No: 0338491
Your No: EU23-0222
Seller: REFINANCE
Buyer: PINE SPRINGS, LLC

PRELIMINARY REPORT FOR:

Commercial Extended Loan Policy	$T/C

PREMIUMS:

Commercial Extended Loan Premium	$T/C
OTIRO 209.10-06 Restrict., Encroach., Minerals Endorsement	$TBD
OTIRO 222-06 Location Endorsement	$TBD
OTIRO 208.2-06 Commercial Environmental Lien Endorsement	$TBD
Gov. Lien/Inspect Fee	$35.00
Temporary Billing	$225.00

We are prepared to issue 2006 (6/17/06) ALTA title insurance policy(ies) in the usual form insuring the title to the land described as follows:

Parcels 1 and 2, LAND PARTITION PLAT NO. 97-P0984, filed May 7, 1997, Lane County Oregon Plat Records, in Lane County, Oregon.

Vestee:

PINE SPRINGS, LLC,
an Oregon Limited Liability Company

Estate: FEE SIMPLE

DATED AS OF: FEBRUARY 15, 2023 at 8:00 A.M.

Schedule B of the policy(ies) to be issued will contain the following general and special exceptions unless removed prior to issuance:

GENERAL EXCEPTIONS (Standard Coverage Policy Exceptions):

1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the Public Records; proceedings by a public agency which may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the Public Records.

2. Facts, rights, interests or claims which are not shown by the Public Records but which could be ascertained by an inspection of the Land or by making inquiry of persons in possession thereof.

No liability is assumed hereunder until policy has been issued and full policy premium has been paid.

MAIN OFFICE
811 WILLAMETTE ST.
EUGENE, OREGON 97401
PH: (541) 687-2233 * **FAX:** (541) 485-0307

FLORENCE OFFICE
715 HWY 101 * FLORENCE, OREGON 97439
MAILING: PO BOX 508 * FLORENCE, OREGON 97439
PH: (541) 997-8417 * **FAX:** (541) 997-8246

VILLAGE PLAZA OFFICE
4750 VILLAGE PLAZA LOOP SUITE 100
EUGENE, OREGON 97401
PH: (541) 653-8622 * **FAX:** (541) 844-1626

3. Easements, or claims of easement, not shown by the Public Records; reservations or exceptions in patents or in Acts authorizing the issuance thereof; water rights, claims or title to water.

4. Any encroachment, encumbrance, violation, variation, or adverse circumstance affecting the Title that would be disclosed by an accurate and complete land survey of the Land.

5. Any lien, or right to a lien, for services, labor, material, equipment rental or workers compensation heretofore or hereafter furnished, imposed by law and not shown by the Public Records.

SPECIAL EXCEPTIONS:

6. City liens, if any, as levied by the City of Cottage Grove, for which no search was made. (The City of Cottage Grove charges $15.00 for a lien search on each tax lot number. Please inform us if one is to be ordered.)

7. Rights of the public in and to that portion lying within streets, roads and highways.

8. Rights of the public in and to that portion within the bounds of County Road No. 218. This 30 foot roadway runs Northerly along the East line of the John Cochran Donation Land Claim No. 55, in Township 20 South, Range 3 West of the Willamette Meridian. Established in 1861, this road has apparently been long abandoned, but there is no record of vacation.

9. An Easement for power lines, including the terms and provisions thereof, granted Mountain States Power Company, by instrument dated September 26, 1947, recorded November 1, 1947, Reception No. B359 P651, Lane County Oregon Deed Records. (Blanket Easement)

10. Relinquishment of access restriction contained in Deeds to the State of Oregon, by and through its State Highway Commission, including the terms and provisions thereof, recorded August 25, 1954, Reception No. 1954-036878, and recorded May 26, 1954, Reception No. 1954-030356, and recorded February 1, 1960, Reception No. 1960-089751, and recorded July 2, 1954, Reception No. 1954-033067, and recorded January 29, 1960, Reception No. 1960-089622, Lane County Oregon Deed Records.

11. Billboard restriction contained in Deed from the State of Oregon, by and through its State Highway Commission, to Woodward Hotels, Inc., an Oregon Corporation, including the terms and provisions thereof, recorded February 1, 1960, Reception No. 1960-089751, Lane County Oregon Deed Records.

12. An Easement for power line and road, including the terms and provisions thereof, granted Pacific Power and Light Company, by instrument dated September 26, 1960, recorded October 7, 1960, Reception No. 1960-012216, Lane County Oregon Deed Records. (Blanket Easement)

13. Right of way easement, including the terms and provisions thereof, as granted to Pacific Power & Light Company, by instrument recorded January 17, 1973, Reception No. 1973-002422, Lane County Official Records. (30 feet in width along a portion adjacent to Interstate Five, I-5)

14. Agreement, including the terms and provisions thereof, between the City of Cottage Grove, and Village Green Motor Hotel, recorded July 8, 1987, Reception No. 1987-029291, Lane County Official Records.

15. Cottage Grove Urban Renewal Plan, including the terms and provisions thereof, Ordinance No. 2501, recorded June 26, 1984, Reception No. 1984-026698 and Ordinance No. 2689, recorded September 24, 1991, Reception No. 1991-046061, Lane County Official Records.

16. Terms and provisions of that appurtenant easement agreement dated September 5, 1996, between Zed Corporation, an Oregon corporation, and K.C.W. Properties LTD., an Oregon limited partnership, recorded September 9, 1996, Reception No. 1996-060542, Lane County Official Records.

17. Easement agreement, including the terms and provisions thereof, disclosed by instrument recorded May 5, 1997, Reception No. 1997-030223, Lane County Official Records.

18. Easements, notes, conditions, restrictions and dedications as shown, set forth, and/or delineated on the recorded Land Partition Plat No. 97-P0984, recorded in Reception No. 1997-P0984, Lane County Oregon Plat Records.

19. Deed of Trust, including the terms and provisions thereof, executed by Pine Springs, LLC, an Oregon limited liability company, Grantor, to Cascade Title Company, Trustee, for the benefit of Summit Bank, Beneficiary, dated September 14, 2021, recorded September 30, 2021, Reception No. 2021-062998, Lane County Deeds and Records, to secure payment of a note for $2,160,000.00.

20. Assignment of rents due or to become due and accruing from said property, including the terms and provisions thereof, between Pine Springs, LLC, an Oregon limited liability company, and Summit Bank, dated September 14, 2021, recorded September 30, 2021, Reception No. 2021-062999, Lane County Deeds and Records.

21. Amendments or modifications, if any, to the Operating Agreement of Pine Springs, LLC, **subsequent to September 30, 2021**, should be furnished to Cascade Title Company for the purpose of ascertaining members authorized to execute on behalf of the Limited Liability Company.

22. The rights of tenants holding under unrecorded leases.

23. This report does not include a search for financing statements filed in the office of the Secretary of State, or in a County other than the County wherein the premises are situated, and no liability is assumed if a financing statement is filed in the office of the County Clerk covering fixtures, equipment and/or personal property on the premises wherein the lands are described other than by metes and bounds or under the rectangular survey system.

24. Any lien, or right to a lien, for services, labor, material, equipment rental or workers compensation heretofore or hereafter furnished, imposed by law and not shown by the Public Records.

25. Prior to writing an ALTA MORTGAGEE'S policy, Cascade Title Company should be furnished with a statement as to parties in possession and as to any construction, alterations or repairs to the premises within the last 75 days. We also request that we be notified in the event that any funds are to be used for construction, alterations or repairs. Exception may be taken to such matters as may be shown thereby.

26. An accurate survey of these premises showing boundary lines, and location of improvements and easements, should be furnished for our file prior to our writing an ALTA Mortgagee's Policy. Exception may be taken to such matters as may be shown thereby.

NOTE: The property address as shown on the Assessor's Roll is:

725 Row River Road
Cottage Grove, OR 97424

NOTE: Taxes, Account No. 1597572, Assessor's Map No. 20 03 27 2 0, #3701, Code 45-00, 2022-2023, in the amount of $10,462.38, PAID IN FULL.

Taxes, Account No. 1088507, Assessor's Map No. 20 03 27 2 0, #3702, Code 45-00, 2022-2023, in the amount of $41,646.38, PAID IN FULL.

NOTE: A judgment search has been made on the above named Vestee(s), and we find NONE except as set forth above.

NOTE: According to the public record, the following deed(s) affecting the property herein described have been recorded within 24 months of the effective date of this report:

Warranty Deed recorded September 30, 2021, Reception No. 2021-062997, Lane County Deeds and Records.

NOTE: The premium amount has been reduced by application of a reissue rate.

This report is preliminary to the issuance of a policy of title insurance and shall become null and void unless a policy is issued and the full premium paid.

Cascade Title Co.

rmh: Title Officer: DEBBIE FORSTROM

EXHIBIT F

TRAFFIC IMPACT ANALYS

PINE SPRINGS AT VILLAGE GREEN

Traffic Impact Analysis

COTTAGE GROVE, OREGON

Match 10, 2022

160 Madison Street, Suite A
Eugene, Oregon 97402
541.513.3376

SANDOW
ENGINEERING

Traffic Impact Analysis

PINE SPRINGS AT VILLAGE GREEN

77929PE
JAN. 4, 2011
KELLY R. SANDOW
RENEWAL 06/30/22

Cottage Grove, Oregon
March 10, 2021

Kelly Sandow PE

SANDOW
ENGINEERING
160 Madison Street, Suite A
Eugene Oregon 97402
541.513.3376
sandowengineering.com

project # 5888

EXECUTIVE SUMMARY

This report provides the Traffic Impact Analysis and findings prepared for the Pine Springs at Village Green in Cottage Grove, Oregon. The subject site is located at tax lots 3701 and 3702 of Assessor's Map 20-03-27-20.

This proposal is to replace a portion of the existing hotel with apartments and to expand the existing RV Park on site.

Access to the site is currently from an access that aligns with Jim Wright Way and an access at the south end of the site. The existing access connections will be maintained.

The analysis evaluates the transportation impacts per ODOT criteria, evaluating adjacent roadway and intersection operations.

FINDINGS

The following report recommendations are based on the information and analysis documented in this report.

- The addition of development trips does not trigger intersection mitigation.
- The addition of development trips does not increase queuing conditions at the study area intersections.
- The site accesses will operate safely and efficiently for all modes of travel.
- A separate striped northbound left turn lane is recommended at the site's north/main access.
- A traffic signal is not warranted at the intersection of Row River Road at the main site entrance/Jim Wright way

CONTENTS

LIST OF APPENDICES

1.0 BACKGROUND

1.1 SITE INFORMATION

This report provides the Traffic Impact Analysis and findings prepared for the Pine Springs at Village Green in Cottage Grove, Oregon. The subject site is located at tax lots 3701 and 3702 of Assessor's Map 20-03-27-20.

Figure 1 contains the site location and vicinity map.

1.2 DEVELOPMENT PROPOSAL

This proposal is to replace a portion of the existing hotel with apartments and to expand the existing RV Park on site.

Access to the site is currently from an access that aligns with Jim Wright Way and an access at the south end of the site. The existing access connections will be maintained.

The development proposal is:

- Existing hotel- 96
- Reduce hotel rooms to 40
- Existing RV spaces- 40
- Increase RV spaces to 65
- Add 121 Residential apartments

Appendix A contains the site plan.

1.3 ANALYSIS SCOPE

A Scope of Work was coordinated with ODOT that outlines the analysis requirements and procedures. Appendix B contains the Scope of Work,

The analysis includes:

- Evaluation of site access points on Row River Road

The evaluation is prepared for the AM and Peak Period (6:30-9:30 AM) and the PM Peak Period (3:30-6:30 pm) for the following locations:

The analysis is performed for:

- Existing conditions, year 2022
- Estimated year of completion, year 2024, with and without the proposed development

The evaluation also includes an access evaluation consistent with the access permit requirements of OAR 734-051-4020(3).

Village Green, Cottage Grove, OR

Figure 1: Site Location and Vicinity Map

SANDOWENGINEERING

160 Madison Street Suite A Eugene, Oregon 97402 - 541.513.3376 - sandowengineering.com

2.0 EXISTING ROADWAY CONDITIONS

2.1 STREET NETWORK

Public streets included within the study area are Row River Road and Jim Wright Way. Row River Road from 1-5 interchange to Thornton Road is under the jurisdiction of ODOT. Jim Wright Way is City jurisdictions for approximately 800’, then is under the jurisdiction of Lane County. The roadway characteristics within the study area are included in Table 1.

TABLE 1: ROADWAY CHARACTERISTICS WITHIN STUDY AREA

Characteristic	Row River Road	Jim Wright Way
Jurisdiction	ODOT from interchange to Thornton Road	City
Classification	Minor Arterial	Collector
Speed	35	25
Lanes per Direction	1	1
Center Left-Turn Lane	Yes	Yes
Restrictions in the Median	Ped Crossing South of RV Access	None
Bike Lanes Present	Yes	Yes
Sidewalks Present	Yes	Yes
Transit Route	Yes	No
On-Street Parking	No	No

There is a Rectangular Rapid Flashing (RRFB) with a center median pedestrian crossing located to the south of the RV/South access.

2.2 STUDY INTERSECTIONS

The following locations are included in this study:

Two-Way Stop Controlled

- Row River Road at site access/Jim Wright Way
- Row River Road at south site access

Figure 2 illustrates the study area intersection geometry and control.

2.3 CRASH ANALYSIS

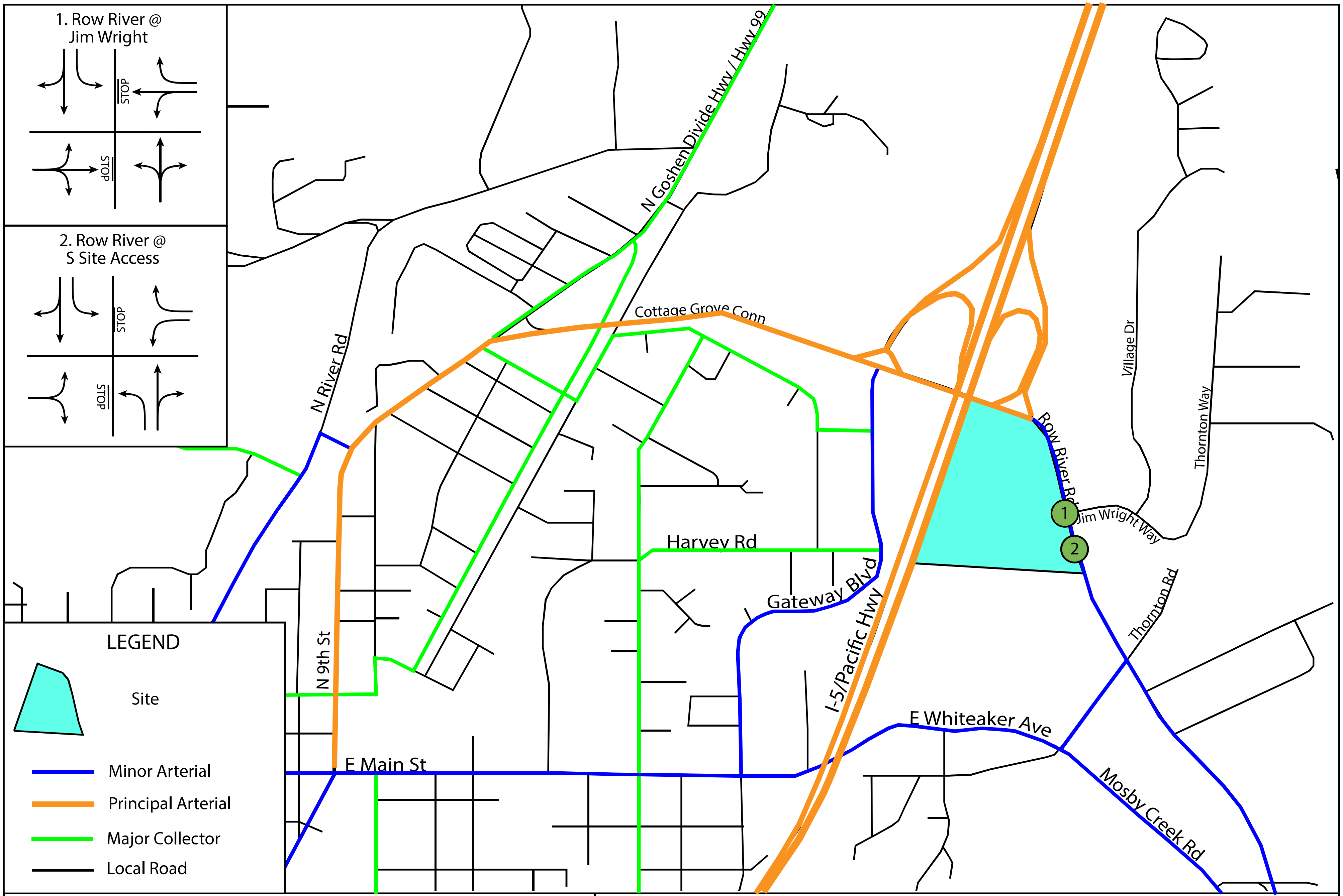
A crash evaluation was performed for the study area intersections. The analysis investigates crash data available for the most recent 5 years, 1/1/2015-12/31/2019, to determine a crash rate in crashes per million entering vehicles and the type of crashes that occurred. Year 2020 crash data has not been provided for use. The crash analysis follows the HCM Critical Crash Rate methodology. The calculated intersection crash rates are compared to the critical crash rate. If the calculated crash rate exceeds the critical crash rate, the location is considered for further mitigation measures. Crash data was provided by ODOT for the study area and is included in Appendix C. The results of the crash analysis are provided in Table 2.

TABLE 2: INTERSECTION CRASH RATES

Location	Intersection Type	Number of Crashes	ADT	MEV	Crash Rate	Critical Crash Rate	Under
Row River Rd at Jim Wright Way	Stop	4	11680	21.32	0.19	0.37	Under

***(crashes/million entering vehicles)**

As illustrated within Table 2, the intersection crash rate does not exceed the critical crash rate for the intersection of Row River Road at Jim Wright Way. Therefore, mitigation for crash history is not triggered by this development.



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3.0 DEVELOPMENT TRIP GENERATION AND DISTRIBUTION

3.1 DEVELOPMENT TRIP GENERATION

The trips to the site are estimated using the ITE Trip Generation Manual 11th Edition. Table 3 illustrates the PM Peak Hour and Table 4 illustrates the AM Peak Hour trip generation, and Table 5 illustrates the Daily Trips.

TABLE 3: TRIP GENERATION- PM PEAK HOUR

Land Use	Size	Rate	Trips	IN	Out
320- Motel	40	0.24(x)+11.16	21	(54%) 11	(46%) 10
416- RV Park	60	ln(t)=0.71ln(x)-0.06	17	(65%) 11	(35%) 6
220- Multi-Family Low Rise	121	0.43(x)+20.55	73	(63%) 46	(37%) 27
Total			**111**	**68**	**42**

TABLE 4: TRIP GENERATION- AM PEAK HOUR

Land Use	Size	Rate	Trips	IN	Out
320- Motel	40	0.28(x)+7.85	19	(37%) 7	(63%) 12
416- RV Park	60	0.16(x)+2.93	13	(36%) 5	(64%) 8
220- Multi-Family Low Rise	121	0.31(x)+22.85	60	(24%) 14	(76%) 46
Total			**92**	**26**	**66**

TABLE 5: TRIP GENERATION- DAILY TRIPS

Land Use	Size	Rate	Trips	IN	Out
320- Motel	40	3.62(x)-29.43	115	(50%) 57	(50%) 58
416- RV Park	60	*	130	(50%) 65	(50%) 65
220- Multi-Family Low Rise	121	6.41(x)+75.31	851	(50%) 426	(50%) 425
Total			**1096**	**548**	**548**

* ADT rate is not provided for the land use; assume peak hour is 10% of ADT

3.2 DEVELOPMENT TRIP DISTRIBUTION

The existing travel patterns from the traffic counts are used to estimate how the development trips will use the surrounding transportation system to access the site with modifications for reasonable origins and destinations. The trip origins/destinations are assumed at:

- North on Highway 99= 65%
- South on Highway 99= 34%
- East on Jim Wright= 1%

Figure 3 illustrates the development trip distribution for the AM Peak Hour and Figure 4 for the PM Peak Hour.

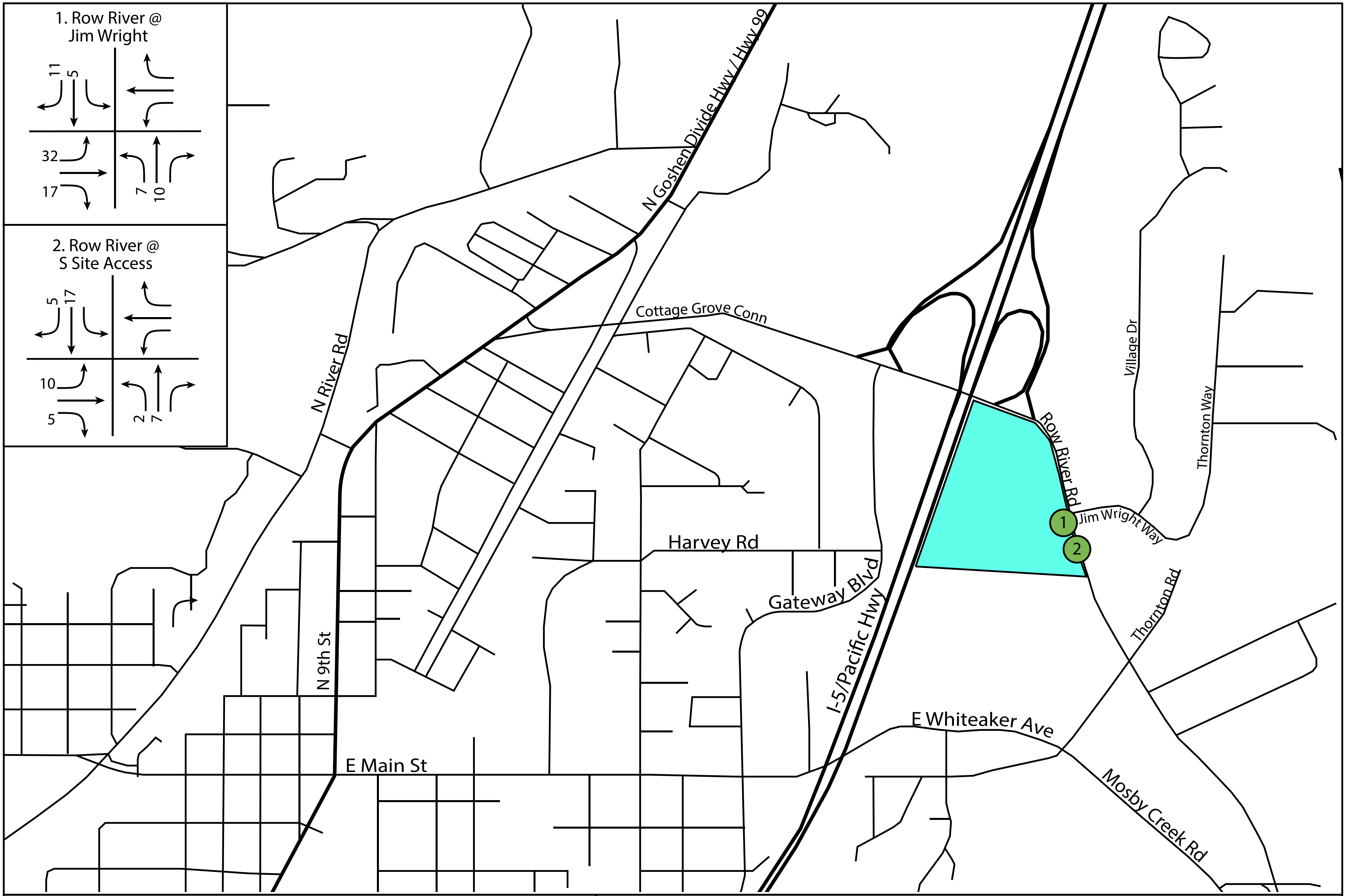

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Figure 3: AM Peak Hour Devevelopment Trips

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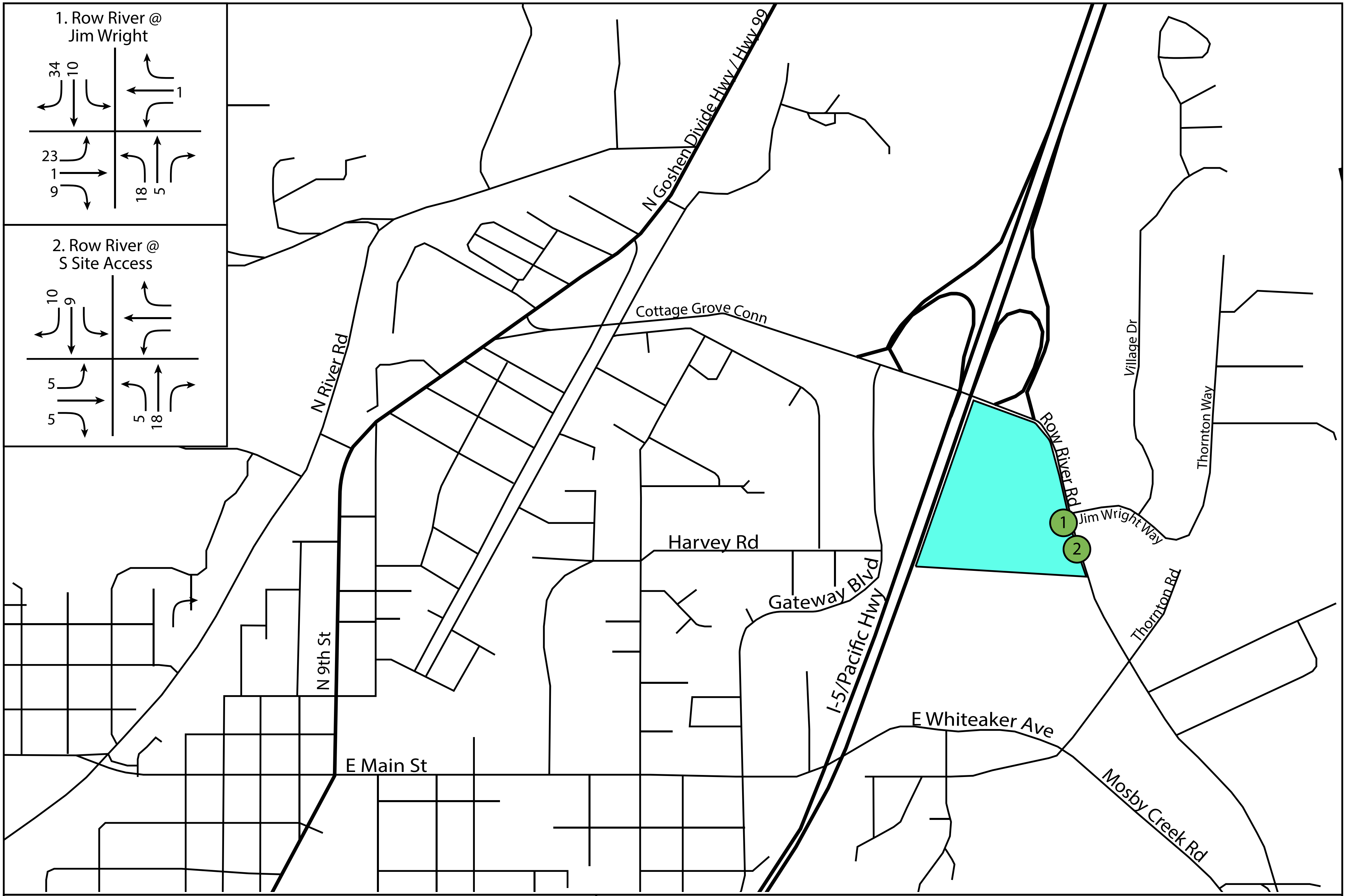

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Figure 4: PM Peak Hour Development Trips

4.0 BACKGROUND TRAFFIC VOLUMES

4.1 INTERSECTION COUNTS

Sandow Engineering collected the AM and PM peak hour counts at the study are intersections. The counts were collected on August 4, 2021, February 23rd, 2022, and February 24th, 2022.

4.2 ADJUSTMENTS

Seasonal Adjustment

The application of seasonal adjustment factors account for the fact that volumes along State Highways and recreational routes tend to fluctuate from month to month due to changes in recreational behavior, etc. Monthly volume variations for routes with recreational traffic show much higher seasonal peaking than routes with predominantly intercity traffic.

ODOT's Analysis Procedures Manual details the methodology for calculating the seasonal adjustment factor. The appropriate method is to use ODOT's Seasonal Trend Table. The peak trends for this area are Commuter and Summer Trends. The Commuter trend has a peak in June, and the Summer trend has a peak in July. The SAF for these trends are averaged, resulting in 1.011 for the August count and 1.336 for the February counts. The SAF is applied to the traffic volumes to reflect peak season conditions. The seasonal adjustment factor calculation is provided in Appendix C.

Covid Adjustments

Counts collected after March 2020 were generally affected by the Covid-19 shutdowns. Therefore, counts from this time need to be adjusted to reflect conditions consistent with non-COVID-19 traffic volumes. ODOT has been monitoring the traffic volume fluctuations on state highways and comparing the current volumes to pre Covid-19 volumes. As of August 2021, all traffic volumes have returned to normal. Therefore, no adjustment is needed.

4.3 FUTURE YEAR BACKGROUND VOLUMES

The proposed site development is projected to be completed by the year 2024. Consistent with the traffic impact analysis criteria, the intersections were evaluated for the year of completion. To account for naturally occurring traffic increases between the count year and the future analysis year, an annual growth rate is applied. The City's TSP is used for determining the growth rate. The growth rate in the study area is 1.2%.

4.4 FINAL TRAFFIC VOLUMES

The existing traffic volumes were adjusted according to the methodology described above. Appendix C provides the traffic volume calculations. The development trips are added to the background traffic volumes to represent the build conditions. The traffic volumes are illustrated in the following figures:

- Figure 5- Year 2022 AM Peak Hour Background
- Figure 6- Year 2022 PM Peak Hour Background
- Figure 7- Year 2024 AM Peak Hour Background

- Figure 8- Year 2024 PM Peak Hour Background
- Figure 9- Year 2024 AM Peak Hour with Development
- Figure 10- Year 2024 PM Peak Hour with Development

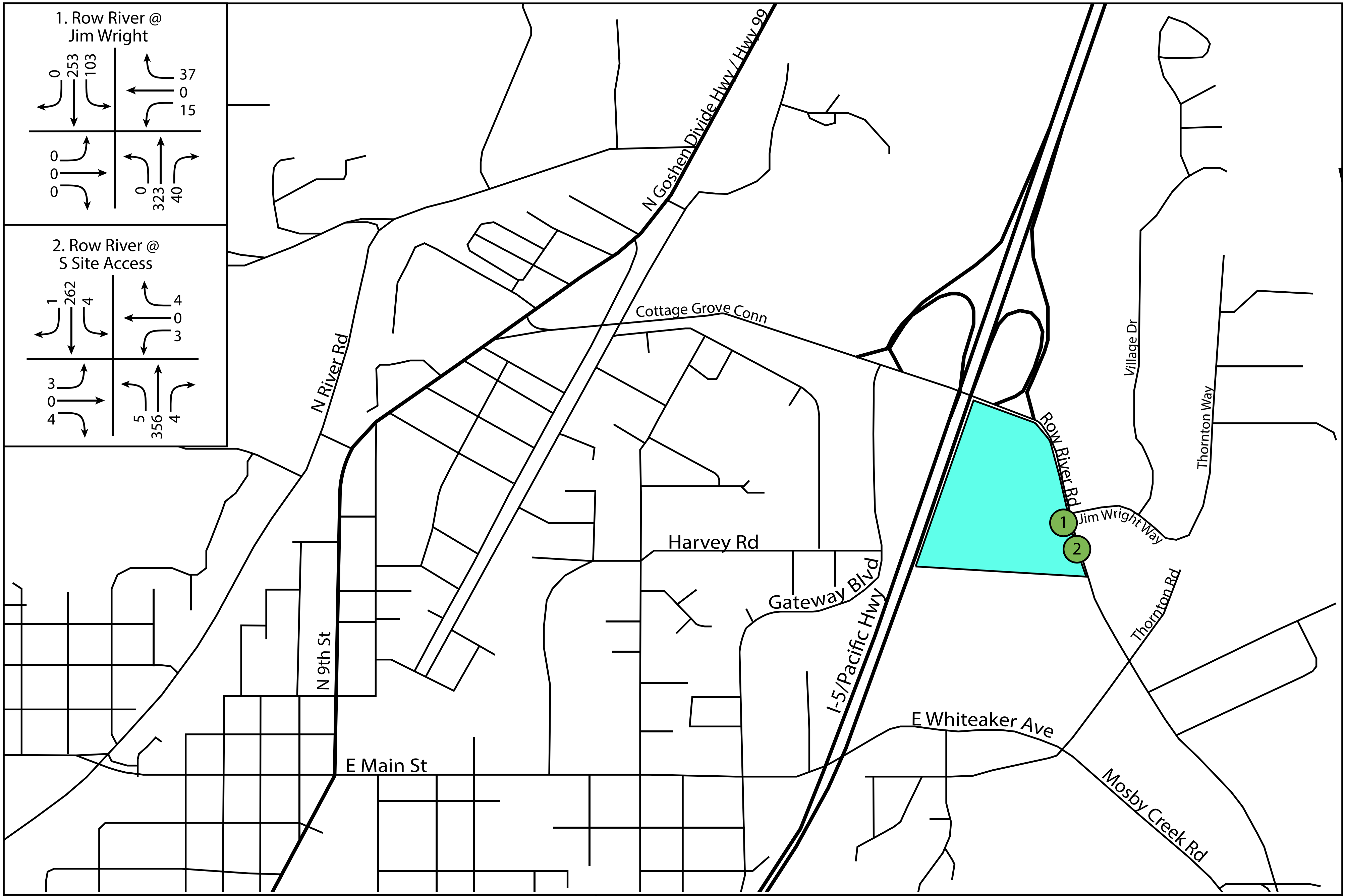

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Figure 5:Year 2022 AM Background Peak Hour Volumes

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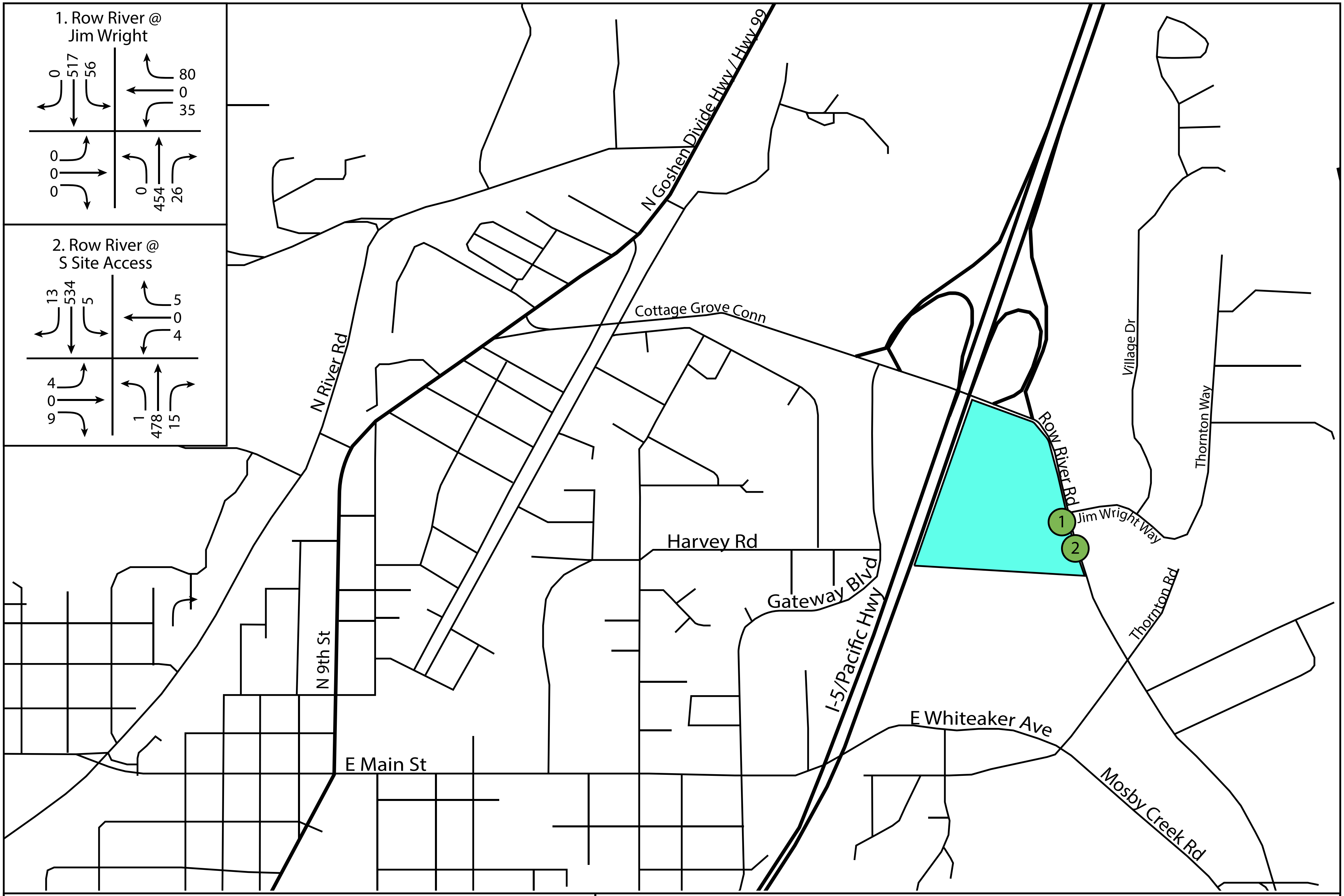

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Figure 6: Year 2022 PM Background Peak Hour Volumes

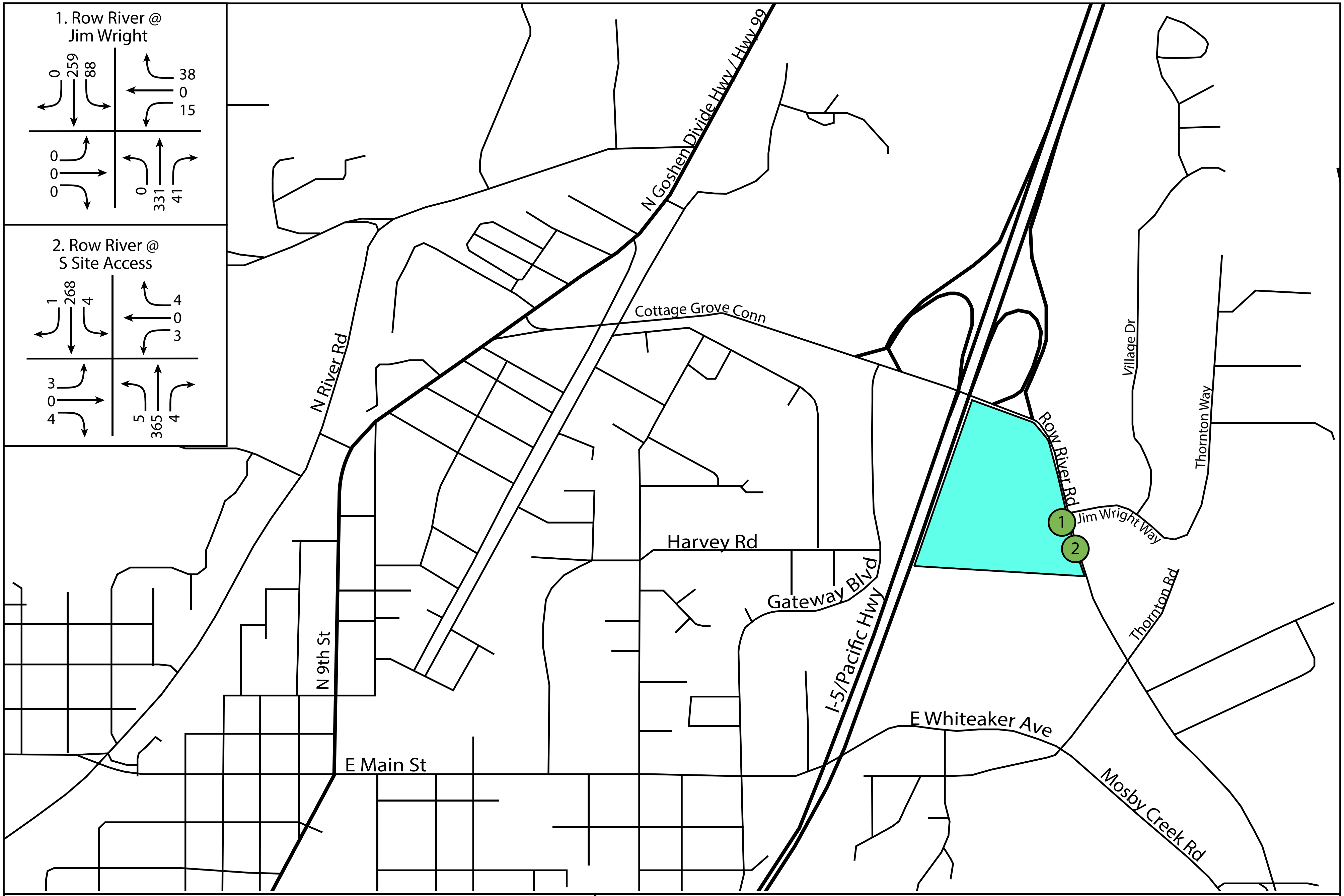

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Figure 7: Year 2024 AM Background Peak Hour Volumes

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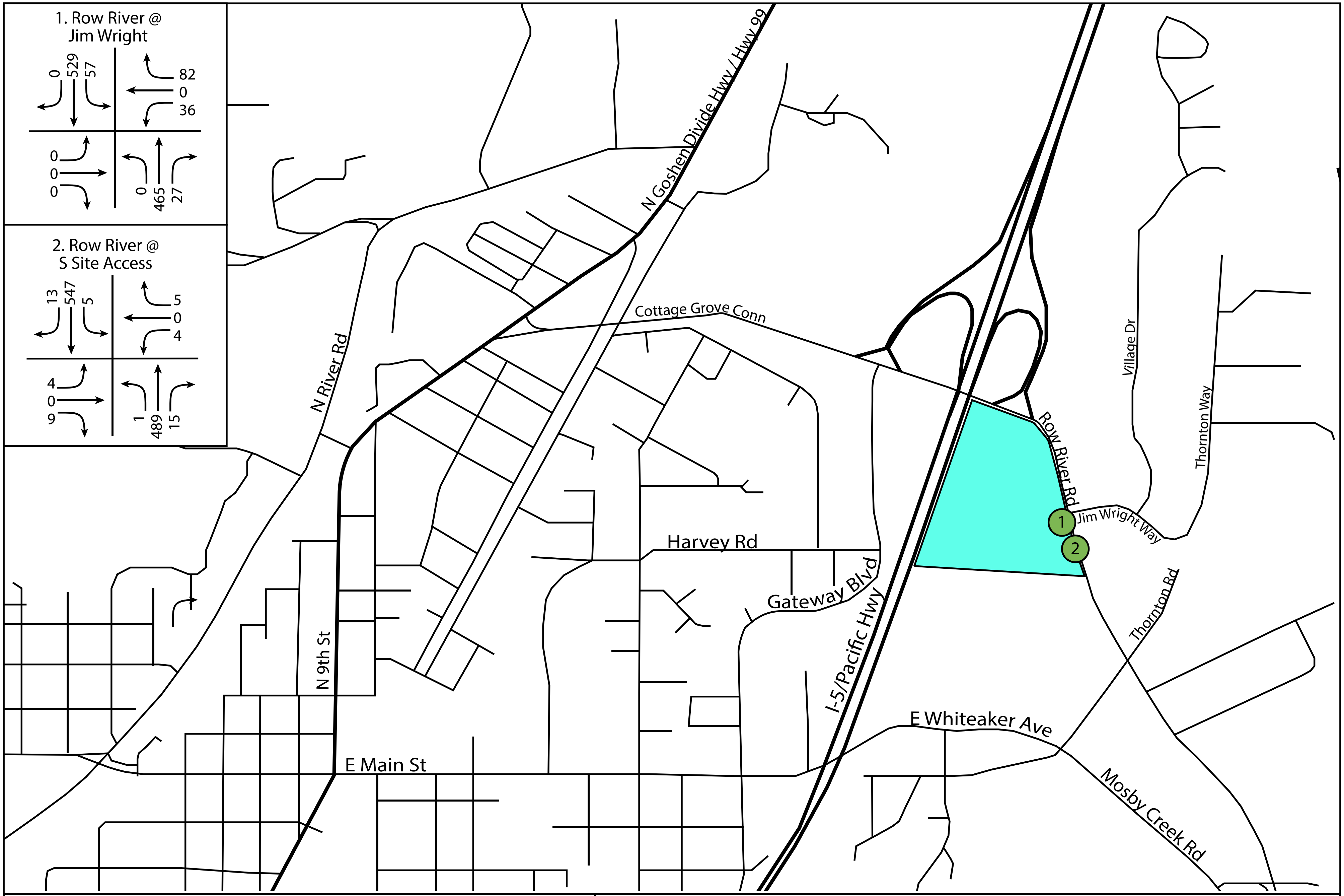

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Figure 8: Year 2024 PM Background Peak Hour Volumes

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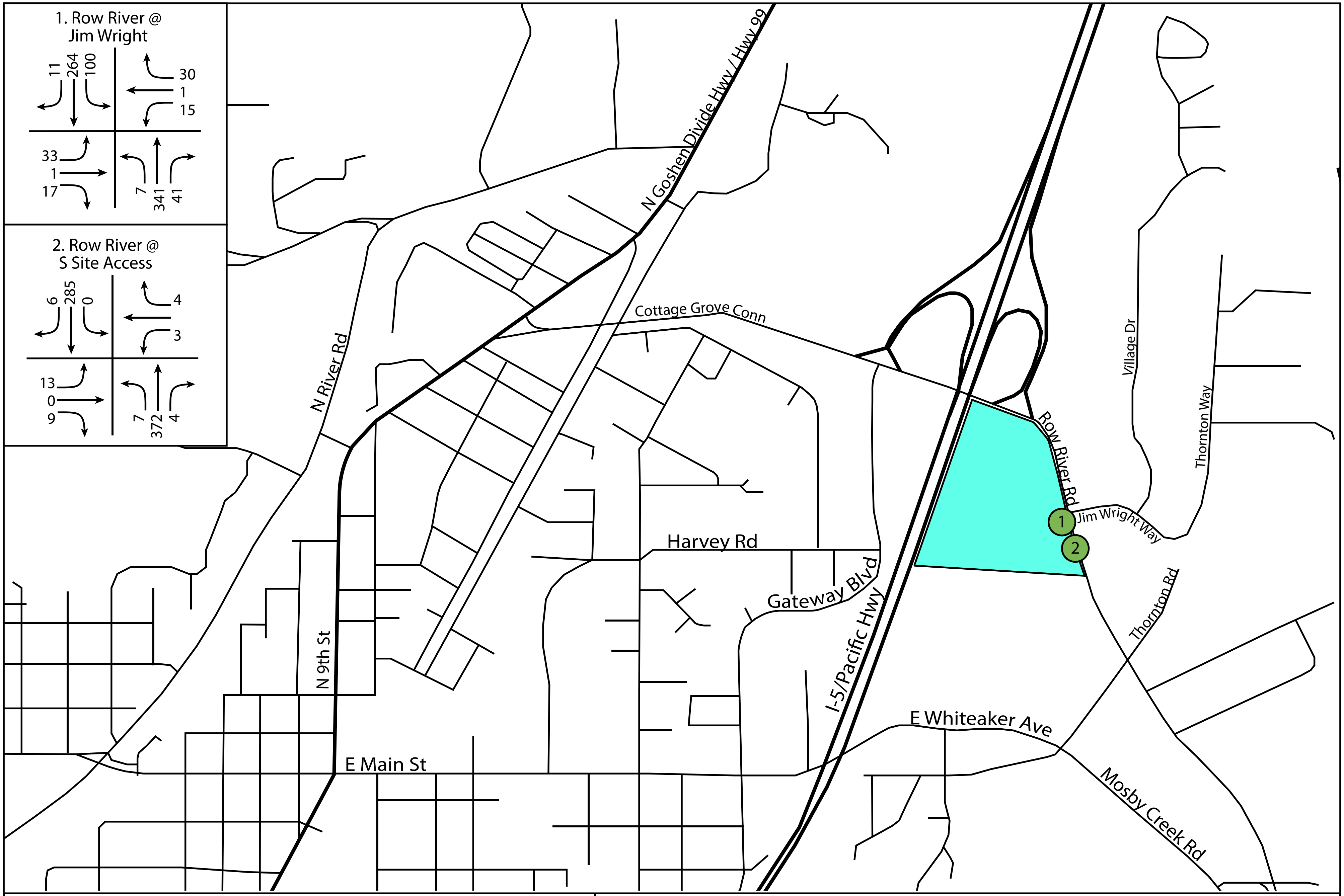

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Figure 9: Year 2024 AM Peak Hour Traffic Volumes With Development

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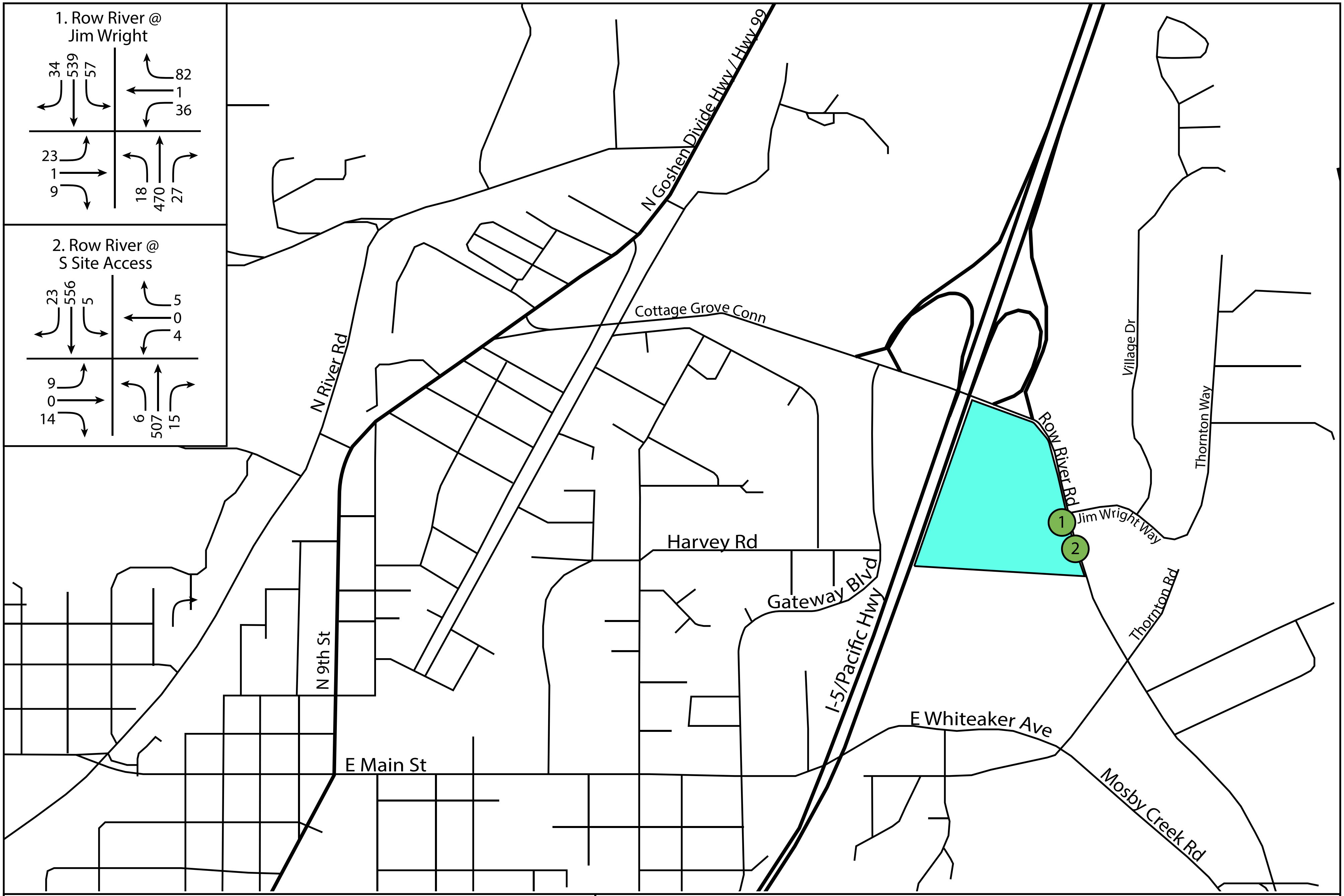

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Figure 10: Year 2024 PM Peak Hour Traffic Volumes with Development

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5.0 INTERSECTION ANALYSIS

5.1 PERFORMANCE MEASURES

The measure of performance for the site access and intersections is the volume-to-capacity ratio (v/c) and Level of Service (LOS).

The volume-to-capacity ratio (v/c) describes the capability of an intersection to meet volume demand based upon the maximum number of vehicles that could be served in an hour.

LOS is a measure of performance for intersections in this analysis is based on the Highway Capacity Manual (HCM). LOS is a concept developed to quantify the degree of comfort (including such elements as travel time, number of stops, total amount of stopped delay, and impediments caused by other vehicles) afforded to drivers as they travel through an intersection or along a roadway segment. It was developed to quantify the quality of service of transportation facilities.

LOS is based on average delay, defined as the average total elapsed time from when a vehicle stops at the end of a queue until the vehicle departs from the stop line. The average delay is measured in seconds per vehicle per hour and then translated into a grade or "level of service" for each intersection. LOS ranges from A to F, with A indicating the most desirable condition and F indicating the most unsatisfactory condition.

The City of Cottage grove uses a LOS D standard for intersections.

The LOS criteria, as defined by the Highway Capacity Manual for signalized intersections, are provided in Table 4.

TABLE 4: HCM LEVEL OF SERVICE FOR INTERSECTIONS

	Stopped Delay Per Vehicle (Seconds per Vehicle)	
	Unsignalized Intersections	**Signalized Intersections**
A	≤ 10.0	≤ 10
B	> 10.0 and ≤ 15.0	> 10 and ≤ 20
C	> 15.0 and ≤ 25.0	> 20 and ≤ 35
D	> 25.0 and ≤ 35.0	> 35 and ≤ 55
E	> 35.0 and ≤ 50.0	> 55 and ≤ 80
F	> 50.0	> 80

ODOT uses a volume to capacity ratio (v/c) as defined by the *1999 Oregon Highway Plan*. Row Rover Road is classified as a Frontage Road. The ODOT evaluates the intersection v/c ratio for intersection using the HCM 6 Critical v/c methodology, as required by Chapter 13 of the Analysis Procedures Manual.

5.2 INTERSECTION ANALYSIS RESULTS

A performance analysis was conducted for the studied intersections for the Year 2022 and 2024 conditions during the AM and PM peak hours. The intersection evaluation was performed using Synchro 10 following HCM 6 critical movement methodology outlined in ODOT's analysis Procedures Manual. The results are shown in Table 5 for the AM peak hour and Table 6 for the PM peak hour. The SYNCHRO outputs are provided in Appendix D.

TABLE 5: INTERSECTION PERFORMANCE: WEEKDAY AM PEAK HOUR

Intersection	Mobility Standard v/c	2022	2024 Background	2024 Build
Row River at Jim Wright	0.95	0.09	0.09	0.18
Row River at south access	0.95	0.02	0.02	0.05

*Results reported for highest movement

TABLE 6: INTERSECTION PERFORMANCE: WEEKDAY PM PEAK HOUR

Intersection	Mobility Standard v/c	2022	2024 Background	2024 Build
Row River at Jim Wright	0.95	0.23	0.24	0.29
Row River at south access	0.95	0.05	0.06	0.12

*Results reported for highest movement

As illustrated in Table 5 all intersections meet the mobility standards.

5.3 QUEUE ANALYSIS

A queuing analysis was conducted for the studied intersections. The analysis was performed using SimTraffic, a microsimulation software tool that uses the HCM defined criteria to estimate the queuing of vehicles within the study area. The average and 95th percentile queuing results are illustrated in Table 7 for the AM Peak Hour and Table 8 for the AM peak hour. All results are rounded to 25 feet to represent the total number of vehicles in the queue, as one vehicle typically occupies 25 feet of space. The SimTraffic outputs are provided in Appendix F.

TABLE 7: INTERSECTION QUEUING: WEEKDAY AM PEAK HOUR

Intersection		Available Storage (Feet)	2022 No-Build (Feet)		2024 No-Build (Feet)		2024 Build (Feet)	
			Average	95th	Average	95th	Average	95th
Row River @ Jim Wright	**EBLTR**	100	0	0	0	0	25	50
	WB L	400	25	50	25	50	25	50
	WBTR	400	25	50	25	50	25	50
	NBLTR	970	25	25	25	25	25	25
	SBL	650	25	75	25	75	25	75
Row River @ South Access	**EB LTR**	50	25	50	25	50	25	50
	WB LTR	150	25	50	25	50	25	25
	NBL	35	25	25	25	25	25	25
	SBL	200	25	25	25	25	25	25

TABLE 8: INTERSECTION QUEUING: WEEKDAY PM PEAK HOUR

Intersection		Available Storage (Feet)	2022 No-Build (Feet)		2024 No-Build (Feet)		2024 Build (Feet)	
			Average	95th	Average	95th	Average	95th
Row River @ Jim Wright	**EBLTR**	100	0	0	0	0	25	50
	WB L	400	25	50	25	50	25	50
	WBTR	400	50	50	25	50	50	50
	NBLTR	970	0	0	0	0	25	75
	SBL	650	25	50	25	50	25	50
Row River @ South Access	**EB LTR**	50	25	50	25	50	25	50
	WB LTR	150	25	50	25	50	25	50
	NBL	35	0	25	0	25	25	25
	SBL	200	25	25	0	25	25	25

As demonstrated in Tables 8 and 9, the addition of development traffic does not substantially increase the queuing conditions at the studied intersections.

6.0 SIGNAL WARRANT INVESTIGATION

As requested, the intersection of Row River Road at Jim Wright Way was investigated for possible installation of a traffic signal.

ODOT requirements for a traffic signal on roadways within their jurisdiction are found within OAR 734-020-0400. For a signal to be installed, it must meet the following requirements:

(3) and Engineering Study is required to demonstrate that the installation of a traffic signal would improve the overall safety and operation of the intersection.

As demonstrated in Tables 5 and 6, the intersection meets the applicable standards for the intersection. Tables 8 and 9 illustrate that the queuing at the intersection will not cause a safety concern. Additionally, the intersection does not have a crash history (Table 2) that can be improved with the installation of a signal. The evaluation within this study does conclude that there are safety concerns that could be mitigated with the installation of a traffic signal.

(4) The Intersections Shall meet the MUTCD Traffic Signal Warrants.

(5) Warrants shall be met on the day of opening

ODOT requires the use of Manual of Uniform Traffic Control Devices (MUTCD) Signal Warrants. ODOT Transportation Planning Analysis Unit uses Signal Warrant 1, Condition A and Condition B (MUTCD), which deal primarily with high volumes on the intersecting minor street and high volumes on the major street. Meeting preliminary signal warrants does not guarantee that a signal shall be installed. Before a signal can be installed a field warrant analysis is conducted by the Region. If warrants are met, the State Traffic-Roadway Engineer will make the final decision on the installation of a signal.

ODOT provides a spreadsheet to calculate Warrant 1. The Spreadsheet is included in Appendix G. The analysis uses the year 2024 traffic volumes with the addition of development trips to the intersection.

The results of the calculation are that Warrant 1 Conditions A and B are not met for this intersection.

The traffic signal warrant is not met for the intersection of Row River Road at Jim Wright way with the development in place.

7.0 SITE ACCESS EVALUATION

Row River Road between the I-5 Interchange and Thornton Road is within the jurisdiction of ODOT. Therefore, the access connections within the section of the roadway are required to comply with ODOT standards and criteria.

As stated previously within the report, the applicant is proposing to maintain the existing access connections to Row River Road. However, the site triggers a “change of use” as defined by ODOT. A “ change of use” as defined by OAR 734-051-3020 is

> *a) The number of peak hour trips increases by fifty (50) trips or more from that of the property’s prior use and the increase represents a twenty (20) percent or greater increase in the number of peak hour trips from that of the property’s prior use; or*

During the project scoping process, it was determined that the site would have an increase of more than 50 trips during the PM peak hour, meeting this threshold (see Appendix B). Therefore, the site needs to demonstrate compliance with ODOT access standards found within OAR 734-051-4020.

As per OAR 734-051-4020 (2), “The standards and criteria for approval of private approaches”, the regional manager shall approve an application for a state highway approach that meets the general approach criteria (a)-(c).

(a) Approach Spacing Standards
(b) Channelization Standards
(c) Sight distance Standards

Additionally, ODOT has requested an evaluation of the following:

(d) Truck Turning Templates
(e) Overlapping Left Turn Movements/Competing use of the center turn lane.

7.1 APPROACH SPACING STANDARDS

Row River Road along the site frontage is classified as a Connector Road, has a posted speed of 35 mph along the site frontage, and has an ADT of 9,102.

As per OAR 734-051-4020 (8) Table 6, the access spacing standard for the segment of Row River Road is 350 feet. The proposed access should be 350 feet from the nearest driveway or road approach on the same side of the street (measured from centerline to centerline).

The access aligned with Jim Wright Way is located more than 350 feet from the nearest intersection or driveway to the north. There is 315 feet between the two access connections, and there 325 feet between the south access/RV Park access and the Walmart Driveway to the south. The illustration below depicts the access spacing.

The access spacing standards are not met for the southern access/RV Park Access. A deviation to the spacing standards is requested as the southern access connection cannot be moved to meet both the spacing to the north and the spacing to the south.

Access Spacing

7.2 CHANNELIZATION STANDARDS

“An application meets the channelization standards if none of the conditions in (A) through (C), below exist; ...”

A. Average daily trips for the proposed development exceed four hundred (400) for the approach on a 2-lane highway and with annual daily traffic of 5,000 or more
B. Average daily trips for the proposed development exceed four hundred (400) for the approach on a 4-lane highway with annual average daily traffic of 10,000 or more.
C. Average daily trips for the proposed development multiplied by the annual average daily traffic on the highway is equal or greater than the products listed in Table 1. (1 lane highway at 35 mph= 3.9)

The ADT of the proposed use is estimated at 1,096 vehicles. The discussion of the Trip Generation is shown in Section 3.0

Row River Road along the property frontage is a 2-lane roadway at 35 mph and has an ADT of 9,102. Item (A) above applies to this site and is not met. Item (B) does not apply. Item (C) the product is 9.97, the standard is not met.

The turn lane warrants are described in the following section.

7.3 TURN LANE WARRANTS

Right and left turn lane warrants were performed for the site access connection on Row River Road. The turn analysis follows the procedures within ODOT’s Analysis Procedures Manual.

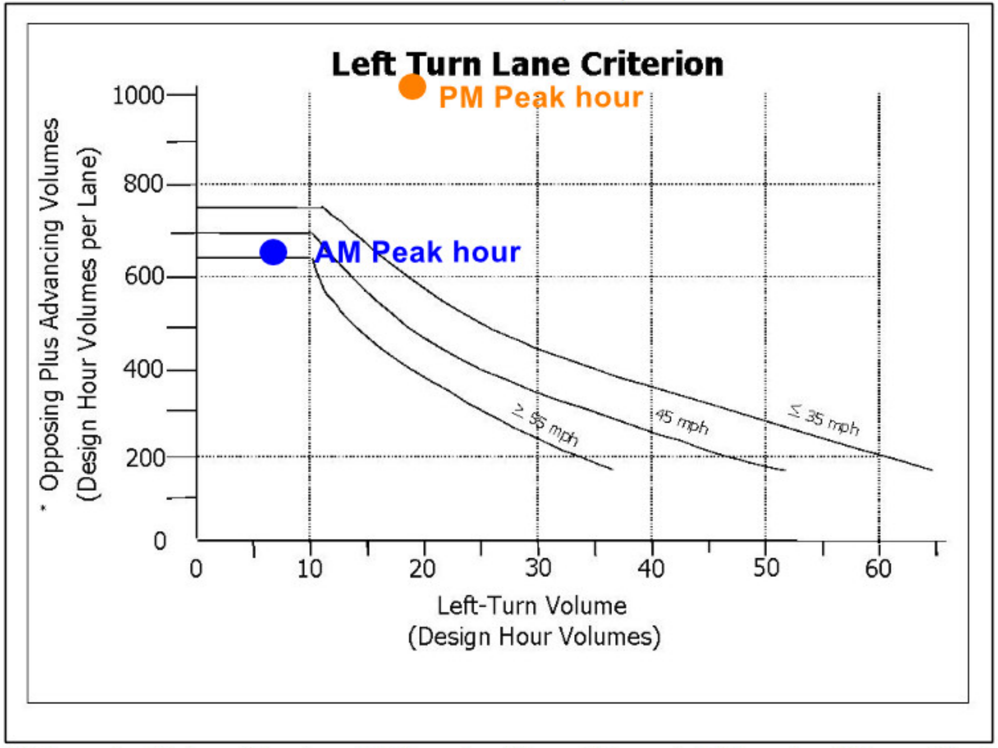
LEFT TURN LANE

The Analysis Procedures Manual has three criteria for determining when a separate left-turn pocket should be installed. Criterion 1 is the comparison of left-turn traffic volumes to advancing and opposing traffic volumes.

There is a center two-way left-turn lane provided on Row River Road. At the main entrance/Jim Wright Way, the two-way left-turn lane is configured to not be a left turn lane for northbound left turns into the development. The turn is evaluated to determine if the two-way left-turn lane should be restriped to a left turn lane at the main entrance/ Jim Wright Way.

As per Figure 9, during the year 2024 AM peak hour, there are 7 left turns, 389 advancing volumes, 274 opposing volumes, 1 advancing, and 1 opposing travel lane, and the speed is 35 mph. As per Figure 10, during the year 2024 PM peak hour, there are 18 left turns, 515 advancing volumes, 573 opposing volumes, 1 advancing and 1 opposing travel lane, and the speed is 35 mph. The illustration below shows the left turn lane criterion.

Exhibit 12-1 Left Turn Lane Criterion (TTI)



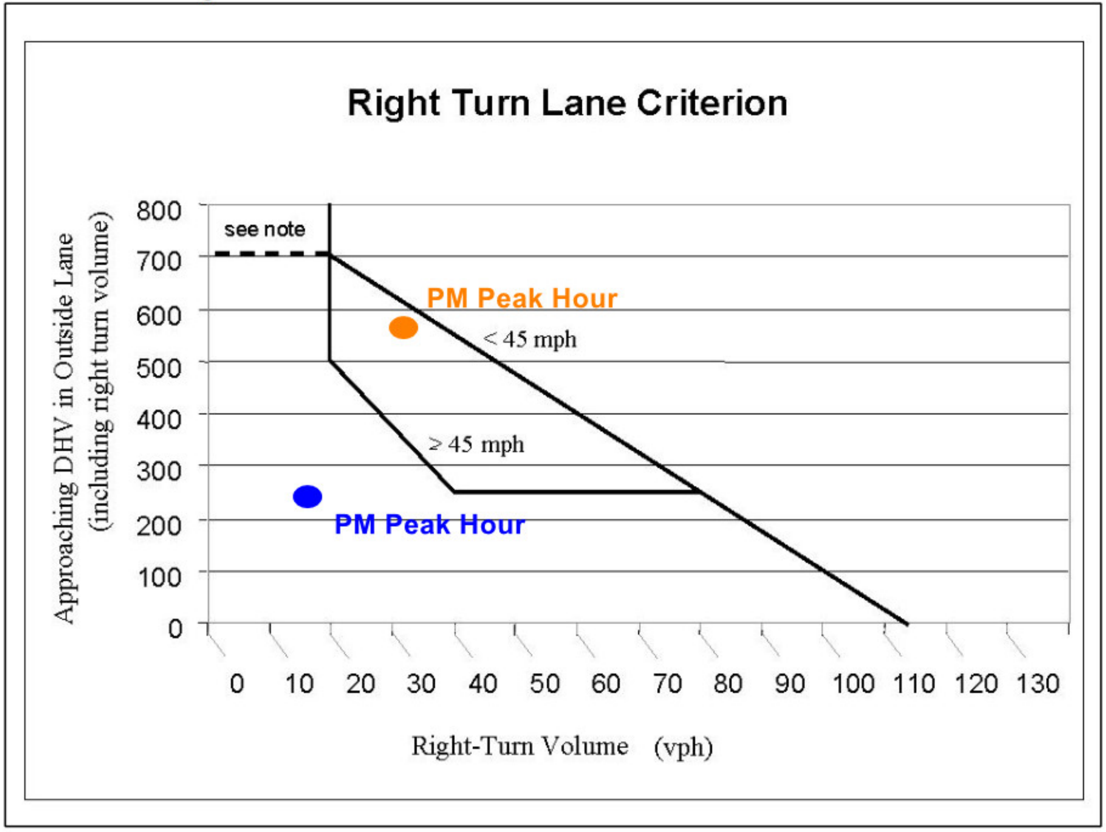
*(Advancing Volume/Number of Advancing Through Lanes) + (Opposing Volume/Number of Opposing Through Lanes)
Opposing left turns are not counted as opposing volumes

As illustrated, the criterion for a left turn based on traffic volumes is met during the PM peak hour. Therefore, the existing center turn lane should be restriped to a northbound left-turn pocket. The year 2024 PM peak hour 95th percentile queue the movement is 75 feet. The left-turn pocket should have a minimum of 75-foot storage.

RIGHT TURN LANE

The Analysis Procedures Manual has three criteria for determining when a separate right-turn pocket should be installed. Criterion 1 is the comparison of right-turn traffic volumes to approaching traffic volumes. As per Figure 9, during the year 2024 AM peak hour, there are 11 right turns, 275 approaching volumes, and the speed 35 mph. As per Figure 10, during the year 2024 PM peak hour, there are 34 right turns, 573 approaching volumes, and the speed 35 mph. The illustration below shows the right turn lane criterion.

Exhibit 12-2 Right Turn Lane Criterion



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

As shown in the illustration, a right turn lane is not warranted for the southbound right-turn movement at the main site access. As the right turn volumes are lower at the south/RV Park access, the warrants are not met for that access.

7.4 SIGHT DISTANCE STANDARDS

The requirements for sight distance follow AASHTO standards and are based upon the speed of Row River Road. The criteria established within OAR 734-15-4020 (2)(c) is based on a vehicle making a left turn exiting the sight.

Sight distances are classified by the stopping sight distance (SSD) for the major roadway and departure/intersection sight distance (ISD) for the site accesses. The stopping sight distance is the length of roadway needed for a vehicle traveling at the design speed to safely stop for a stationary object in the roadway. The required sight distance allows a driver to perceive and react to an object 2 feet high on the roadway visible from a driver's eye height of 3.5 feet above the ground. The departure sight distance (ISD) is a measure of the length of visibility of the roadway given to a stopped driver on a minor road approach. The distance provides time to perceive and react to gaps in traffic. For this calculation, it is assumed that the driver's eye is 3.5 feet above the ground and that the object to be seen is 3.5 feet above the ground of the intersecting road.

The standards for evaluating SSD and ISD follow the methodology in the AASHTO's *A Policy on Geometric Design of Highways and Streets* (2011) and OAR 734-15-4020 Table 2 . As per the AASHTO methodology, intersections and driveways should, at a minimum, meet the SSD requirements. However, it is desirable to achieve the ISD whenever possible.

MAIN ACCESS/ JIM WRIGHT WAY

Stopping Sight Distance

Stopping sight distance is based on the speed of the major roadway. Row River Road has a posted speed of 35 mph, both north, and south of the access. As per AASHTO, the SSD is 250 feet. The available stopping sight distance exceeds this distance. See Figure 11 for an illustration of the stopping sight distance.

Intersection Sight Distance

As per OAR 734-15-4020 Table 2, The recommended intersection sight distance is calculated for the site driveway on Row River Road is 475 feet for this approach. The available ISD exceeds this distance. See Figure 11 for an illustration of the stopping sight distance.

RV PARK ACCESS

Stopping Sight Distance

Stopping sight distance is based on the speed of the major roadway. Row River Road has a posted speed of 35 mph, both north, and south of the access. As per AASHTO, the SSD is 250 feet. The available stopping sight distance exceeds this distance. See Figure 12 for an illustration of the stopping sight distance.

Intersection Sight Distance

As per OAR 734-15-4020 Table 2, The recommended intersection sight distance is calculated for the site driveway on Row River Road is 475 feet for this approach. The available ISD exceeds this distance. See Figure 12 for an illustration of the stopping sight distance.

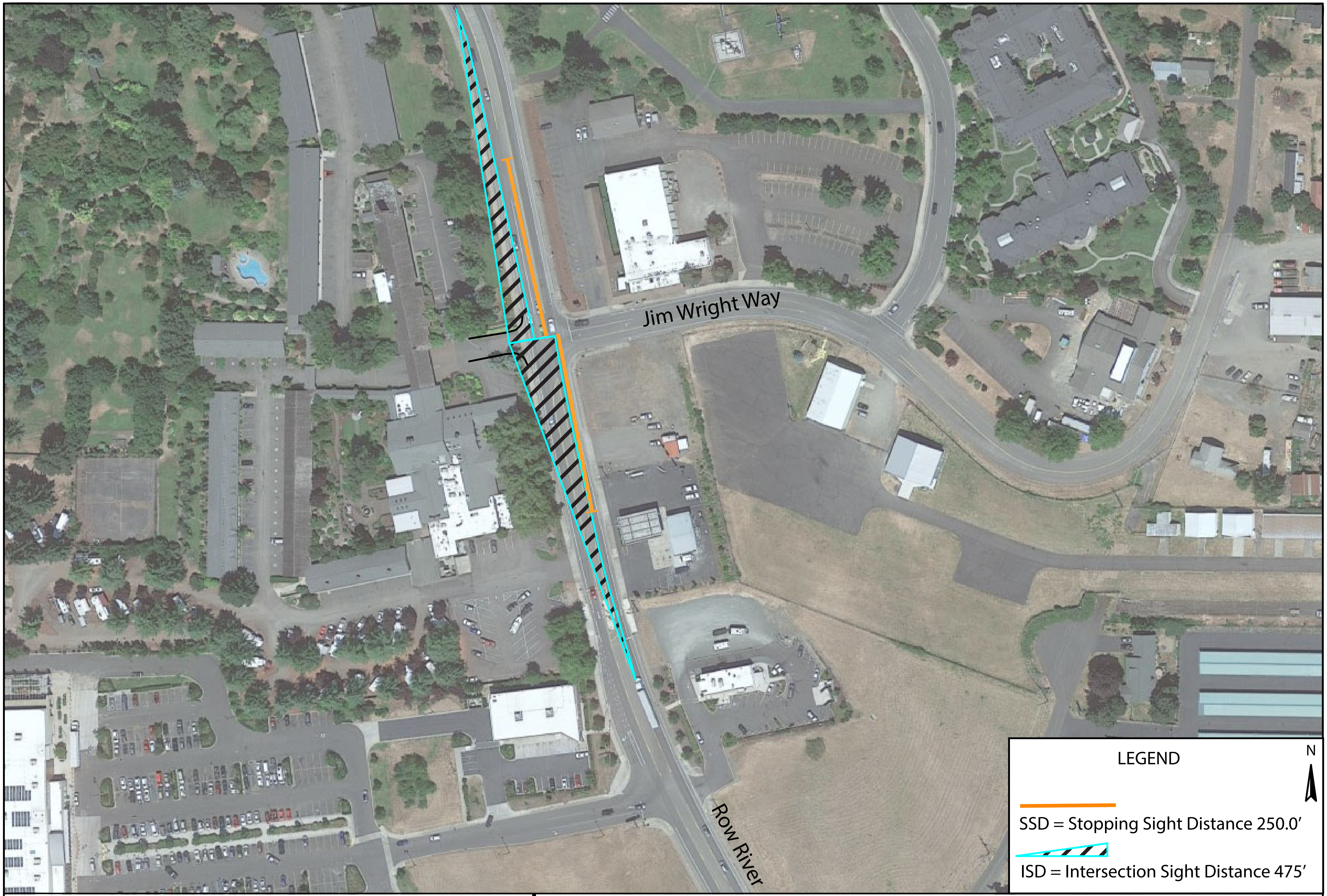


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Figure 11: Intersection and Stopping Sight Distance North Access

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Figure 12: Intersection and Stopping Sight Distance South Access

7.5 TRUCK TURNING TEMPLATES

The site access connections were evaluated for the turning movements for the typical truck usage. The site will have regular usage from typical single-unit trucks, SU-40, and RV usage. Therefore, the design vehicle will be SU-40 and an RV towing a boat. The SU-40 will primarily access the site via the north access, and the RV's will primarily use the south access. The turning movements were modeled using AutoCAD AutoTurns software. The turns movements are provided in Appendix H.

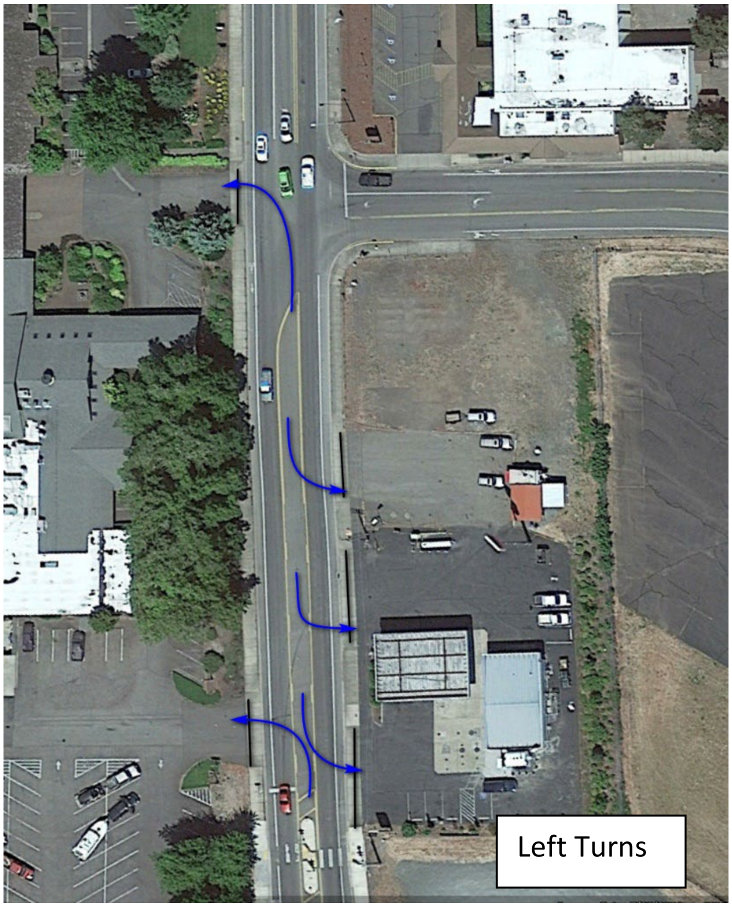
The site access connections can accommodate the design vehicle safely.

7.6 LEFT TURN MOVEMENTS

The site access connections were evaluated for left-turn conflicts and competing left-turn movements.

North Access: As depicted in the illustration below, there are no competing left turns for this access. There is sufficient space between access connections to make the left turns safely.

South Access: The south access and the south access to the gas station have overlapping left turns. However, the access connections are aligned minimizing conflicts. There are no safety concerns with the overlapping left turns.



7.7 ADDITIONAL CONSIDERATIONS

The following describes additional considerations for access permit review.

SAFETY AND OPERATIONS CONCERNS

As per OAR 734-051-4020 (3) ODOT “has the burden of proving safety and highway operations concerns that it relies upon in requiring mitigation or denying an application based on those concern.” Those concerns are limited to:

A) *Regular queuing on the highway that impedes turning movements associated with the approach.*

As illustrated within this report, the anticipated queueing through the year 2024 at the entrances is not projected to cause any concerns with turning movements at the access connections.

B) *Overlapping left turn movements or competing use of center left turn lane*

The south access and the south access to the gas station have overlapping left turns. However, the access connection is aligned, minimizing any conflicts. There are no safety concerns with the overlapping left turns at the south access. There are no overlapping left turn conflicts at the north access

C) *Location of approach on a segment that has a 20% higher crash rate than the statewide average.*

As illustrated within Section 2.3, the Row River at the proposed approach location has a low crash rate.

D) *Location listed within a top 5% of SPIS locations*

Row River at the site frontage is not identified as a SPIS site.

E) *The proposed approach is on a district or regional highway with a posted speed of 50 mph or higher and the spacing is less than the stopping sight distance.*

This criterion is not applicable; Row River Road is a connector road with a posted speed of 35 mph.

F) Insufficient distance for weave movement made by vehicles exiting the proposed approach.

There is sufficient distance to vehicles to merge into traffic from the site entrances.

7.8 TRAFFIC IMPACT ANALYSIS

A Traffic Impact Analysis was prepared to support the request for a deviation for the access spacing standards. As per **ORS 374.312 Rules regarding permits for approach roads (*7*)** *"Applications that do not meet the spacing, channelization or sight distance standards described in ORS 374.311 may be approved with deviations from those standards as follows:"*

(a) A request for one or more deviations from the spacing, channelization or sight distance standards described in ORS 374.311 may be included in an application for one or more private approaches that do not meet the standards.

(b) Unless waived by the department, a request for a deviation must include a traffic impact analysis provided by the applicant that addresses a request for deviations from the spacing, channelization or sight distance standards described in ORS 374.311 for safety and highway operations.

(c) A request for a deviation may be approved based upon a determination by the engineer assigned by the department to analyze the request for a deviation that the approach adequately addresses the safety and highway operations concerns identified by the department as provided in subsection (10)(g) of this section.

(10) (g) The department shall have the burden of proving any safety or highway operations concerns relied upon in the department's decision to approve an application with conditions or deny an application. Safety or highway operations concerns that may be applied to the department's permit decisions on applications submitted under this section are limited to one or more of the following unique safety and highway operations concerns:
(A) Regular queuing on the highway that impedes turning movements associated with the proposed approach.
(B) Offset approaches that may create the potential for overlapping left turn movements or competing use of a center turn lane.
(C) Insufficient distance for weave movements made by vehicles exiting an approach across multiple lanes in the vicinity of signalized intersections, roads classified by the Oregon Transportation Commission as collectors or arterials and on-ramps or off-ramps.
(D) Location of the proposed approach within a highway segment with a crash rate that is 20 percent higher than the statewide average for similar highways.
(E) Location of the proposed approach within a highway segment listed in the top five percent of locations identified by the safety priority index system developed by the department.
(F) Inadequate sight distance from an intersection to the nearest driveway on district highways and regional highways where the speed limit established in ORS 811.111, or the designated speed posted under ORS 810.180 is 50 miles per hour or higher.

A Traffic Analysis was prepared to satisfy the requirements of ORS 374.312 (7)

8.0 CONCLUSION

This report provides the Traffic Impact Analysis and findings prepared for the Pine Springs at Village Green in Cottage Grove, Oregon. The subject site is located at tax lots 3701 and 3702 of Assessor's Map 20-03-27-20.

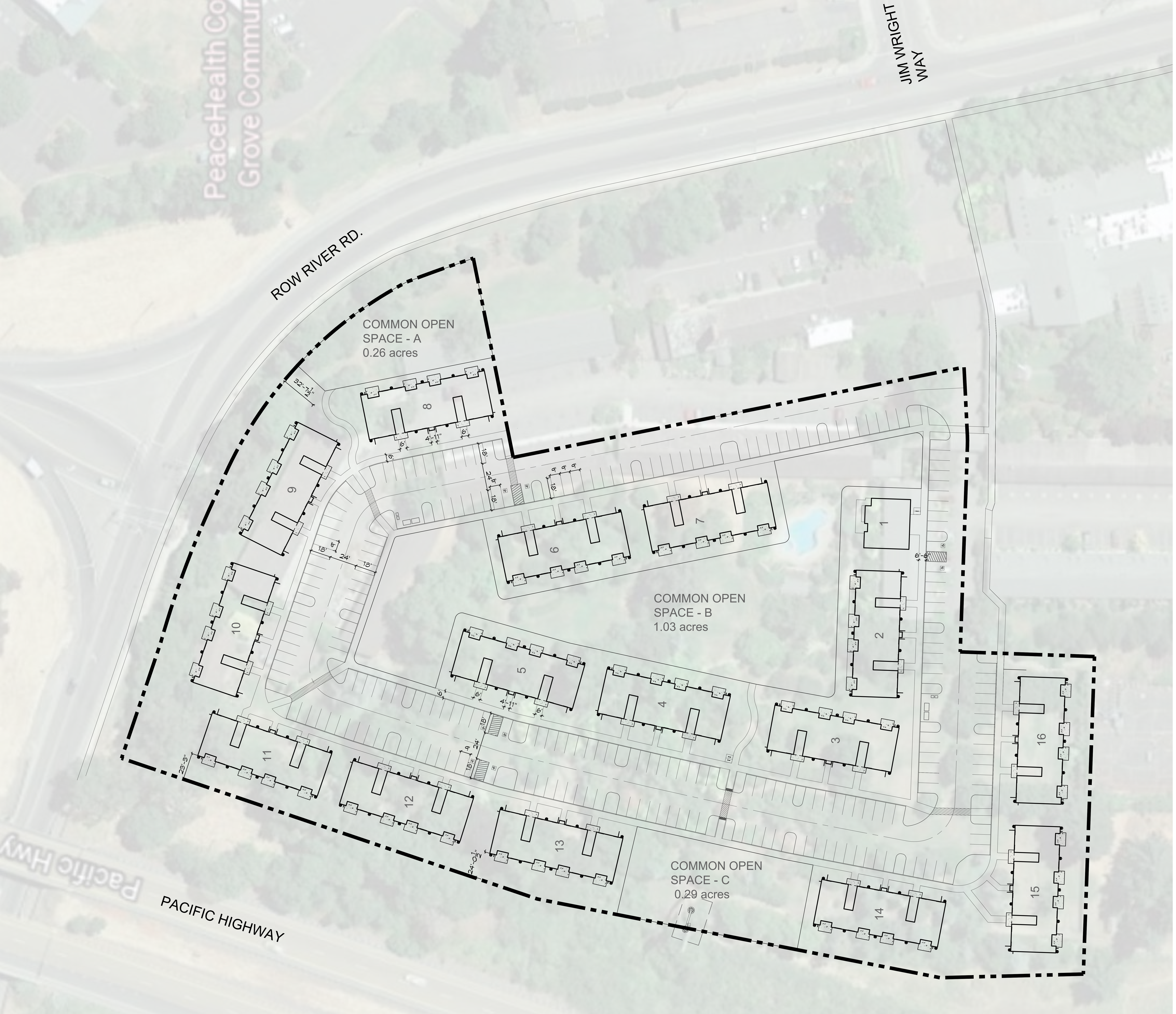
FINDINGS

The following report recommendations are based on the information and analysis documented in this report.

- The addition of development trips does not trigger intersection mitigation.
- The addition of development trips does not increase queuing conditions at the study area intersections.
- The site accesses will operate safely and efficiently for all modes of travel.
- A separate striped northbound left turn lane is recommended at the site's north/main access.
- A traffic signal is not warranted at the intersection of Row River Road at the main site entrance/Jim Wright way

Pine Springs at Village Green

APPENDIX A: SITE PLAN



SITE DATA

ZONING: CT COMMERCIAL TOURIST

PINE SPRINGS AT VILLAGE GREEN
UNITS: 121
AREA: 7.92 ACRES
DENSITY: 15.3 UNITS PER ACRE

VEHICLE PARKING
REQUIRED: 1.5 SPACES/2-BDRM UNIT
1.5 X 121 = 181.5
PROPOSED: STANDARD: 225 SPACES
ADA: 8 SPACES
TOTAL: 233 = 1.9 PER UNIT

BICYCLE PARKING
REQUIRED: 1 PER 4 UNITS (LONG TERM) = 30
1 PER 20 UNITS (SHORT TERM) = 6

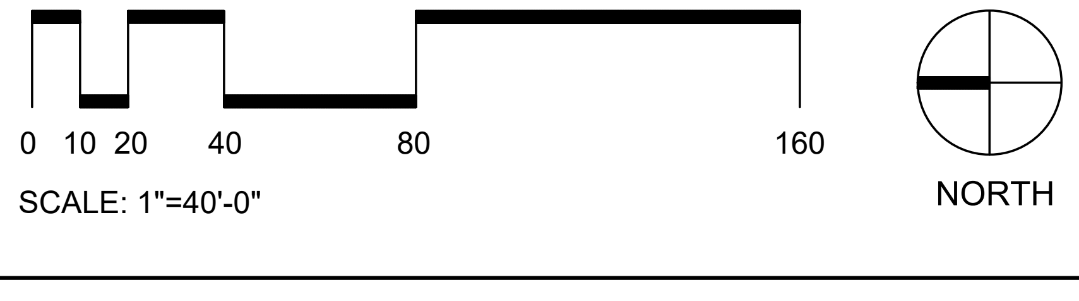
PROPOSED: LONG TERM = 61
(GROUND FLOOR UNITS STORAGE RM)
SHORT TERM = 6

COMMON OPEN SPACE
REQUIRED: 15%
15% X 7.92 ACRES = 1.19 ACRES
PROPOSED: 1.58 ACRES

OTHER OPEN SPACE
PROPOSED:

LOT COVERAGE:
IMPERVIOUS SURFACE AREA:

SITE PLAN



DLA
DOUGHERTY LANDSCAPE ARCHITECTS
474 Willamette Street
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F 541.683.8183
www.DLAdesign.com

PRELIMINARY NOT FOR CONSTRUCTION

Pine Springs Master Plan

XXX ROW RIVER ROAD, COTTAGE GROOVE, OR 97424

Date: 12.28.21
Drawn By: JM
Checked By: DVD
Submission:
Insert Text

Revisions

LA-2

APPENDIX B: SCOPE OF WORK

Pine Springs at Village Green

SANDOW ENGINEERING

Oregon
Kate Brown, Governor

Department of Transportation
Region 2 Tech Center
455 Airport Road SE, Building A
Salem, Oregon 97301-5397
Telephone (503) 986-2990
Fax (503) 986-2839

Date: **February 7, 2022**

To: **Douglas Baumgartner, PE**
Development Review Coordinator

Subject: **Pine Springs Development**
Outright Use
Traffic Impact Analysis Scope of Work
ODOT Region 2 – District 5
Pacific Highway No. 1 (River Row Road)
Milepost 175.00 and 175.12
City of Cottage Grove
Lane County

The purpose of this document is to define the scope of work for a Traffic Impact Analysis (TIA), to evaluate the impacts due to the Pine Springs development located within Cottage Grove. It is the Oregon Department of Transportation's (ODOT) understanding this development will replace a portion of the existing hotel (from 96 rooms to 40 rooms) with apartments (121 low-rise multifamily) and expand the existing RV spaces (from 45 spaces to 60 spaces). This TIA shall be prepared and submitted in accordance with the current version of ODOT's *Analysis Procedures Manual*[1] (*APM-V2*). The proposed development shall require the submittal of an *Application for State Highway Approach*. Any work on a new or modified approach to a state highway or any modifications to existing signalized intersections on the State Highway System (even if modification work will take place entirely within the local jurisdiction's right-of-way) will require ODOT's review, approval, and issuance of a permit to perform such work.

Scope of Work:

I. GENERAL

ODOT State Highway Approach Permit

An ODOT *Application for State Highway Approach*[2] shall be submitted for the approaches located on Pacific Highway No. 1 (River Row Road) at MP 175.00 and MP 175.12 before this traffic analysis will be

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[1] http://www.oregon.gov/ODOT/TD/TP/Pages/APM.aspx
[2] http://www.oregon.gov/ODOT/HWY/ACCESSMGT/Pages/Application-Forms.aspx

accepted by Region 2 Traffic for review. Upon receipt of this application, a *Central Highway Approach/Maintenance Permit System* (*CHAMPS*) number will be associated with this TIA. If the applicant has any questions regarding this application, please contact Douglas Baumgartner.

Methodology and Assumptions Memorandum

Consultant shall prepare and submit a methodology and assumptions memorandum documenting methodology and assumptions to be used for existing conditions (i.e. seasonal factors), future conditions (i.e. volume development/post-processing methodology), and alternative analysis (i.e. peak hour factors, analysis parameters, calibration, etc) to Region 2 Traffic in accordance with Section 2.5.1 of the *APM-V2*. Consultant shall obtain approval of methodology from Region 2 Traffic prior to beginning analysis. By participating in this practice, consultant can proactively reduce or eliminate any need for rework. The methodology and assumptions memorandum shall include at least the following proposed analysis parameters:

- Analysis study area/intersection(s)
- Count date, type, and duration
- Seasonal adjustment
- Analysis years
- Annual growth rate
- Trip generation and distribution
- Mobility targets
- Existing and future peak hour factors (PHFs) and heavy vehicle percentages
- Unadjusted (ideal) saturation flow rate

Executive Summary

The introduction to the TIA shall provide a description of the development, site location and study area (including a site map), and briefly describe the purpose of the analysis, principal findings, recommendations, and conclusions.

Analysis Study Area

Provide a text description (including tax-lot descriptions) of the proposed development and a graphic displaying all intersections and accesses to be evaluated as part of the TIA. Maintain numbering and labeling of intersections for consistency and clarity. The following intersection(s) have been identified for analysis.

Study-Area Intersections:

1. Row River Road at Jim Wright Way/Site Access #1
2. Row River Road at Site Access #2

Note: The traffic distribution and volume determinations may expand the area of investigation or could eliminate some of the above indicated intersections.

II. TRAFFIC DATA

Traffic Counts

Traffic counts shall be collected at all identified study area intersections. At a minimum, traffic data shall be developed from *Three-Hour, Three Vehicle Classification* count (auto, bus, and truck) including turning movements, bicycles, and pedestrians, with 15-minute breakdowns during the AM (6-9 am) and PM (3-6 pm) peak periods. If a new traffic signal is anticipated, a minimum 12-hour count shall be taken, in order to develop a *Manual on Uniform Traffic Control Devices* (*MUTCD*) Traffic Signal Warrant analysis. If major modification of an existing signal is anticipated, a minimum 12-hour count shall be taken, in order to develop a complete operations analysis and design. Existing ODOT manual counts within the study area may be used for this analysis, if less than three years old. If count data older than one year is to be used, it shall be adjusted using an approved growth rate to reflect current conditions. Please consult Don Crownover to request any existing ODOT traffic counts. He may be contacted at (503) 986-4132 or Don.R.Crownover@odot.state.or.us. All traffic data used in this analysis shall be included within the appendix.

Raw traffic data will not be accepted for use in this traffic analysis. All traffic volumes in the base year shall be seasonally adjusted to represent the 30th Highest Hour Volume (30HV) in accordance with Chapter 5 of the *APM-V2*.

Traffic volumes for future year scenarios, also known as design hour volumes (DHV), shall be developed in accordance with Chapter 6 of the *APM-V2*. Areas covered by a travel demand model shall use such model to develop future no-build and build alternative volumes. If model data will be required, the consultant shall submit a model request to ODOT's Transportation Planning Analysis Unit (TPAU) at least three weeks before the data are needed. Model information, including the model request form, is available at http://www.oregon.gov/ODOT/TD/TP/Pages/Tools.aspx. All raw model numbers shall be post-processed or used only in relative (percentage) comparisons.

Site Trip Generation, Distribution and Assignment

Site trip generation shall utilize the most recent edition of the Institute of Transportation Engineers (ITE) *Trip Generation Manual* to estimate average daily trips (ADT) and both AM and PM peak hour trip volumes, originating from, and destined for, the subject development. Trip generation shall utilize the appropriate method (*weighted average rate* or *fitted curve equation*) recommended per Chapter 4 of the most recent edition of the ITE *Trip Generation Handbook*. If the weekend peak trip generation of the proposed development combined with weekend background traffic volumes is greater than the weekday plus development conditions, a weekend traffic analysis shall also be included within the TIA. All assumptions, raw data, and adjustments shall be documented and discussed in the body of the TIA or in the appendix.

Approved computer models, such as *Traffix* or *Vistro*, or manual calculations may be used for determining trip assignments for site-generated traffic volumes on roadways within the study area.

Please refer to the comments regarding *Traffix* output in the below section titled **Intersection Capacity Software Analysis**.

III. ANALYSIS PROCEDURES

Capacity Analysis

Capacity analyses of signalized intersections, unsignalized intersections, roundabouts, and roadway segments shall follow the established methodologies of the current *Highway Capacity Manual 6th Edition* (*HCM 6*), per Chapter 2.5.1 of the *APM-V2*. Methodologies of the *Highway Capacity Manual 2000* (*HCM2000*) will NOT be accepted. For HCM 6 signalized intersection v/c shall be computed manually unless software-calculated. For two-way stop controlled intersections, the highest movement v/c shall be reported, along with an indication of its corresponding movement. For all-way stop controlled intersections and roundabouts, the highest approach leg v/c shall be reported. Roundabout capacity analyses shall follow the procedures listed in Section 12.3.4 of the *APM-V2*.

Standard default values for use in unsignalized intersection, roundabout, and signalized intersection analyses may be found in Appendix 12/A/13A of the *APM-V2*. All intersection capacity analyses shall account for heavy vehicles by approach, as determined from manual counts. Project level mobility results (v/c) from this TIA shall be compared against ODOT's *2012 Highway Design Manual*[3] *(HDM)* mobility requirements (Table 10-2). Planning level mobility results from this TIA shall be compared against Highway Mobility Standards (Policy 1F) and the Volume to Capacity Ratio Targets provided in Table 6 (revised 12/21/2011) of the *1999 Oregon Highway Plan*[4] (*OHP*). During review of an *Application for State Highway Approach*, mobility standards do not apply to turning movements from private approaches except when the v/c ratio on the proposed approach is 1.0 or greater, per *Oregon Administrative Rule (OAR) 734-051-3040(5)(c)*.

Intersection Capacity Software Analysis

Application of computer analysis software shall follow all ODOT-approved methodologies, and all electronic analysis files shall be made available to Region 2 Traffic for review, with the submittal of this TIA. These files may be emailed if the sum-total of all digital files is less than 5 MB. However, if the sum-total of all digital files is greater than 5 MB, the consultant shall notify Region 2 staff for direction on how to best transfer files to Region staff.

Synchro 11 and *HCS7* (for isolated intersections only) are examples of approved analysis software. *Synchro/SimTraffic* is the ODOT standard software program and is the preferred format (files saved as Synchro/SimTraffic 11 compatible shall be provided for review). The only approved roundabout analysis software are *HCS*, SIDRA Intersection, and ODOT's Excel-based Single Lane Roundabout Calculator[5]. The *Traffix* analysis software package may only be used to analyze signalized intersections (as overall

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[3] http://www.oregon.gov/ODOT/HWY/ENGSERVICES/hwy_manuals.shtml

[4] http://www.oregon.gov/ODOT/TD/TP/Registry/OHP%20Policy%201F%20Mobility%20Standards%20Amendments.pdf

[5] http://www.oregon.gov/ODOT/TD/TP/Pages/Tools.aspx

intersection v/c is only available via the *HCM2000* methodology, which *Traffix* uses). *Traffix* shall NOT be used to analyze unsignalized intersections. If *Traffix* is used, reports of all variable input parameters shall be submitted to Region 2 Traffic for review along with all analysis summary sheets. It is recommended consultants who prefer to utilize *Traffix* upgrade to *Vistro* as *Vistro* maintains many aspects of *Traffix*, but also utilize *HCM6* methodologies.

Queue Length Analysis

Intersection operational analyses shall include the effects of queuing and blocking. Average and 95th percentile queue lengths shall be reported for all study area intersections. The 95th percentile queuing is used for design purposes and shall be reported to the next highest 25-foot increment. For signalized intersections, *SimTraffic* is an acceptable queuing analysis software package, while *SimTraffic* or the AASHTO *2-Minute Rule* are examples of acceptable queuing analysis methodologies for unsignalized intersections. *HCM2000* or *Traffix* queuing analysis results will NOT be accepted. Roundabout queuing analyses shall follow the procedures listed in Section 12.3.4 of the *APM-V2*. Simulation should be used if v/c ratios exceed 0.70 and simulation shall be used if v/c ratios are equal to or exceed 0.90. Simulations shall be calibrated in accordance with Chapter 15 of the *APM-V2*.

IV. ANALYSIS REQUIREMENTS

Justification of an Access Management Deviation

Approval of the accompanying *Application for State Highway Approach* may require the approval of at least one deviation from the standards in *OAR 734-051-1040* and *OAR 734-051-4020*. The TIA shall identify:

- Whose standards (ODOT or local jurisdiction) apply and what are those standards (spacing, channelization, sight distance) per *OAR 734-051-1040* and *4020*;
- Which standards are met or not met;
- Required and requested deviations (if multiple deviations are required, any dependency or relationship to one another must be identified); and
- The basis by which all requested deviations may be approved in accordance with *OAR 734-051-3050*.

ODOT's standards, if they indeed apply, are outlined in the following section. Mitigation measures may be required as a condition of approval for a deviation, to address identified safety or operational concerns, or both. For further guidance, please contact Scott Nelson, Region Access Management Engineer, at (503) 986-2882 or Brian.S.Nelson@odot.state.or.us.

ODOT's Access Management Standards

Approval of the accompanying *Application for State Highway Approach* will require compliance with the standards in *OAR 734-051-1040*. Below is information on such standards.

- Spacing – Adequate spacing shall be verified for all approaches accessing the site. Approach spacing should meet the standards identified in *OAR 734-051-4020(2)(a)*, *(8)*, and *(9)* or a current access management plan/strategy adopted by ODOT. A spacing deviation may only be approved in accordance with criteria outlined in *OAR 734-051-3050(5)* and *(6)*.
- Channelization – Adequate channelization shall be verified for all approaches accessing the site. Highway channelization should meet the standards of *OAR 734-051-4020(2)(b)*. A channelization deviation may only be approved in accordance with criteria outlined in *OAR 734-051-3050(7)*.
- Sight Distance – Adequate intersection sight distance shall be verified for all approaches accessing the site. Stop-controlled intersection sight distance should meet the standards of *OAR 734-051-4020(2)(c)*. A sight distance deviation may only be approved in accordance with criteria outlined in *OAR 734-051-3050(8)*.

Consultant shall identify if conditions exist that will not allow the Region Access Management Engineer authority to approve a deviation per *OAR 734-051-3050(9)*. If any such conditions exist, consultant should also provide information to aid the decision of the Region Manager to approve such deviations per *OAR 734-051-3050(10)*.

<u>Safety and Operations Concerns</u>

The development is situated in a location where the Department has determined "safety and operations concerns" exist as defined in *OAR 734-051-4020(3)*. As a result, the TIA shall address the following concern(s) and clearly demonstrate how the access can mitigate this/these concern(s) in accordance with *OAR 734-051-4020(3)*. For guidance, please consult the Region Access Management Engineer.

- Overlapping left turn movements or competing use of a center turn lane from a connection located on the opposite side of the highway.

<u>Change of Use and Justification of Moving in the Direction of Conformity</u>

As the proposed development will trigger "change of use of a private approach" per *OAR 734-051-3020*, the approval of the accompanying *Application for State Highway Approach* may require the application to move the approach "in the direction of conforming to the spacing, channelization or sight distance standards" per *OAR 734-051-3020(7)*. For further guidance, please contact Scott Nelson, Region Access Management Engineer, at (503) 986-2882 or Brian.S.Nelson@odot.state.or.us.

<u>Intersection Sight Distance</u>

Adequate intersection sight distance shall be verified for all study intersections and highway approaches. Stop controlled intersection sight distance should meet the standards of the most recent edition of AASHTO's *A Policy in Geometric Design of Highways and Streets* and Section 3.2.4 of the *HDM*.

<u>Turn Lane Criteria</u>

Unsignalized study intersections and private approach roads without existing right or left turn lanes shall be analyzed to determine if they meet the criteria outlined in Section 12.2 of the *APM-V2* and locations that meet such criteria shall be noted. Installation of a turn lane may be recommended as mitigation for development traffic impacts. However, meeting any criteria does not mean a turn lane will be approved for installation. Engineering judgment shall be used to determine if such installation would be impractical or introduce safety concerns, particularly considering bicycle and pedestrian traffic. Section 6.38 of ODOT's *Traffic Manual*[6] should be consulted for additional guidance. Proposed turn lanes shall meet ODOT installation criteria outlined in *HDM* Sections 8.3.9 and 8.3.10 for unsignalized intersections and highway approach roads and Sections 8.4.1 and 8.4.2 for signalized intersections.

Truck Turning Templates

A truck turning analysis shall be developed for the study area intersections using an appropriate design vehicle (i.e. WB-67). This analysis shall determine if turning trucks could potentially impede opposing traffic and what mitigations may be required to prevent such a conflict. If the consultant has any questions regarding this analysis or appropriate design vehicle, Calvin Larwood should be consulted at (503) 986-2977 or Calvin.R.LARWOOD@odot.oregon.gov.

Traffic Signal Installations & Modifications

Analysis and recommendations related to new and/or modified traffic signals must follow ODOT's *Traffic Signal Policy and Guidelines*[7] and all subsequent revisions. Any recommendations for traffic signals to be installed or modified as part of future mitigation shall be supported by a preliminary signal warrant analysis, as specified in Section 12.4.1 of the *APM-V2*. Any new traffic signal proposal for the Day of Opening shall show, but not limited to, the following:

- A clear indication for the traffic signal, only after other enhancements to nearby signals or intersections are shown to be insufficient to mitigate the new highway related impacts resulting from the proposed development;
- An assessment of the ability of the existing, planned, and proposed public roads to accommodate development traffic at another location;
- A detailed description of the proposed development's effects to the existing and proposed study area intersections; and
- Documentation of traffic volumes and signal warrant satisfaction, if a new signal is determined to be the most appropriate solution.

All proposed signals must indicate a need, as well as meet a warrant as described in *OAR 734-020-0400* through *0500,* Section 6.35 of the *Traffic Manual*, and the *Traffic Signal Policy and Guidelines*.

NOTE: It is the authority of the State Traffic-Roadway Engineer to approve all signal installations, modifications, and deviations on the State Highway System. Simply meeting a Preliminary Signal Warrant does not imply or ensure a signal will be approved by the State Traffic-Roadway Engineer. Consultant should initiate early consultation with ODOT on the analysis and conceptual layout of any proposed signals to avoid delays in the approval process.

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[6] http://www.oregon.gov/ODOT/HWY/TRAFFIC-ROADWAY/pages/traffic_manual.aspx

[7] http://www.oregon.gov/ODOT/HWY/TS/Pages/publications.aspx

Traffic Signal Progression Analysis

If a new traffic signal is proposed, or an existing signal modified, as part of this development, a Traffic Signal Progression Analysis may be necessary. If the new or modified traffic signal meets the requirements of *OAR 734-020-0480* and Section 13.4.6 of the *APM-V2*, then a progression study shall be developed in accordance with procedures outlined within that same section of the *APM-V2*.

Safety Analysis

Traffic safety shall be taken into consideration for development impacts. The consultant shall obtain the most recent five years of crash data for both state and non-state roadways within the study area, including Safety Priority Index System (SPIS) sites, and conduct a crash analysis. Crash data may be requested from Sylvia Vogel with ODOT's Crash Data & Reporting Unit at (503) 986-4240 or Sylvia.M.Vogel@odot.state.or.us.

The standards for safety analyses are covered in Chapter 4 of the *APM-V2* and Exhibit 4-2 recommends AASHTO's *Highway Safety Manual (HSM)*[8] predictive methods as "best practice" methods for development review safety analyses. As such, the safety analysis shall include analysis of the *HSM* predictive methods (net change in predicted crash frequency or predicted crashes, excess expected crash frequency) per Section 4.4.

Intersection crash rates shall be compared to the published 90th percentile intersection crash rate in *APM-V2* Exhibit 4-1. If any rate is close to or exceeds the 90th percentile rate, consultant shall provide analysis of crash patterns and identification of contributing factors and potential countermeasures. Segment crash rates (ODOT State Highway Crash Rate Tables – Part II[9]) must be compared with the current published statewide crash rates for similar facilities (ODOT State Highway Crash Rate Tables - Table II). For segments that are close to or exceed the published statewide crash rate for similar facilities, consultant shall provide analysis of crash patterns and identification of contributing factors and potential countermeasures. Consultant shall map locations of all safety issues along with any SPIS sites. Technical guidance on safety analyses of crash rates[10] and SPIS[11] is available.

V. POTENTIAL MITIGATIONS

This traffic study should present several potential mitigation alternatives and the engineering justification for each. When developing mitigation alternatives for a proposed intersection, or an existing stop-controlled intersection, please consider the following hierarchy for traffic control alternatives:

1. Two-way stop-controlled intersection
2. Four-way stop-controlled intersection

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[8] http://www.highwaysafetymanual.org/

[9] http://www.oregon.gov/ODOT/TD/TDATA/pages/car/car_publications.aspx

[10] http://www.oregon.gov/ODOT/HWY/TECHSERV/docs/tech_bulletins/AM13-10b.pdf

[11] http://www.oregon.gov/ODOT/HWY/TECHSERV/docs/tech_bulletins/AM13-03b.pdf

3. Turn-movement restrictions
4. Modern roundabout
5. Grade separation with stop-controlled connections
6. Grade separation with free-flow connections
7. Signalized intersection

A traffic signal should be the last alternative considered due to the potential for increases in congestion, crashes and pollution and the associated life-cycle costs of the traffic control device. A traffic signal proposed to only serve a single development, and not provide connectivity to other public streets or highways, is unlikely to be approved. Signal timing adjustments will NOT be considered as mitigation. An analysis shall be developed for intersections, where a traffic signal may be proposed as mitigation, to determine if a modern roundabout would be an appropriate traffic control device. If a roundabout on a state highway is to be considered, it should be proposed early in the development review process. ODOT Motor Carrier shall be consulted to ensure any roundabout will meet highway freight and mobility standards. If a studied facility is a formally recognized freight route, compliance with *Oregon Revised Statutes* (*ORS*) *366-215* "Reduction in Capacity" may be necessary if alternative concepts could potentially restrict the roadway width (i.e. curb extensions, medians, etc.). In situations where proposed mitigation is located on a state highway routed over city right-of-way, coordination with the local jurisdiction will be required.

VI. ANALYSIS SCENARIOS

A complete TIA will include analysis of at least the following scenarios.

Traffic Volumes & Operations – Existing Conditions (2022)

Identify current year site conditions at the proposed development location. This includes, but is not limited to, the following:

- A description of the site location, zoning, existing use(s), and proposed use(s) of subject property.
- A description of surrounding vacant or re-developable properties, with anticipated land uses.
- A graphic identifying existing lane configurations and traffic control devices at all study area intersections.
- A graphic showing existing 30HV traffic, reported as average daily traffic (ADT), as well as AM and PM Peak Hour Volumes (PHV). Also include in this graphic, a list of heavy vehicle percentages by approach, seasonal adjustment factors (if any), and all growth rates used to determine future volumes.
- Identify all road segments, public intersections, public or private approaches where the proposed project can be expected to increase traffic volumes by at least 10 percent of the current traffic or generate an additional 300 ADT or 50 peak hour trips. Please refer to Table

3.3.1 in ODOT's *Development Review Guidelines*[12] (*DRG*) for more information. If the local jurisdiction has more conservative thresholds, those thresholds apply.

- An analysis of existing intersection operations, reported in terms of both Volume to Capacity (v/c) and Level of Service (LOS).
- A comparison of ODOT crash rates against the most recent five years' worth of crash data, over at least a one-mile segment. This analysis shall include information on any SPIS sites adjacent to or within the study area.

Traffic Volumes & Operations – Year of Opening (20##)

An analysis shall be made of the study area intersections, for an assumed *Year of Opening*, under both "*background traffic*" and "*total traffic*" scenarios. The "*background traffic*" scenario shall include all in-process traffic (traffic generated by approved and pending development), if any such exist. If none exist, include a statement verifying all jurisdictions were contacted for information on in-process development traffic and that none existed. The "*total traffic*" scenario is considered "*background traffic*" volumes plus trips generated by the proposed development. If this proposal is to be developed in multiple phases, then a *Year of Opening* analysis shall be developed for each phase of the proposal. For each *Year of Opening* analysis scenario, the TIA shall provide at least the following data:

- A graphic showing *Year of Opening* traffic volume, for both "*background traffic*" and "*total traffic*" scenarios;
- A graphic or table showing v/c and LOS analysis results for both "*background traffic*" and "*total traffic*" scenarios;
- A graphic or table itemizing 95th percentile storage length requirements for all approaches, rounded to the next highest 25-foot increment; and
- A graphic showing the existing turn lanes and storage length dimensions.

Traffic Volumes & Operations – Future Year (20##)

A *Future Year* analysis shall be required if either the development's daily trip (ADT) generation meets identified thresholds or if the development includes a plan amendment or zone change. Please refer to Table 3.3.2 of the *DRG* to determine what *Future Year* scenario may be required. If required, analyses shall be made for all study area intersections, under both *Future Year* "*background traffic*" and "*total traffic*" scenarios. The *Future Year* "*background traffic*" scenario shall include all in-process traffic (traffic generated by approved and pending development), if any such exist. If none exist, include a statement verifying all jurisdictions were contacted for information on in-process development traffic and that none existed. The "*total traffic*" scenario is considered *Future Year* "*background traffic*" volumes plus the peak hour trips generated by the proposed development. For each potential *Future Year* analysis scenario, the TIA shall provide at least the following:

- A graphic showing *Future Year* traffic volumes for both "*background traffic*" and "*total traffic*" scenarios;

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[12] http://www.oregon.gov/ODOT/TD/TP/Pages/Plans.aspx

- A graphic or table showing v/c and LOS analysis results for both "*background traffic*" and "*total traffic*" scenarios;
- A graphic or table itemizing 95th percentile storage length requirements for all approaches, rounded to the next highest 25-foot increment; and
- A graphic showing the existing turn lanes and storage length dimensions.

Conclusions and Recommendations

This study shall summarize existing and future conditions and discuss the impacts of the proposed development. Identify any operational or safety deficiencies and recommend mitigation, along with a conclusion on the effectiveness of the proposed mitigation. Summarize how the proposed development will comply with all operational and safety standards.

Appendix Items

The appendix is a necessary component of a complete TIA. This TIA shall include an appendix with at least the following information:

- **this scope of work letter**
- traffic count data sheets
- crash and safety data
- trip generation and volume development calculations
- software input sheets (for verification of default and input parameters)
- software analysis output sheets
- queuing analysis worksheets
- truck turning template
- turn lane criteria worksheets (if applicable)
- traffic signal warrant worksheets (if applicable)

VII. SUBMITTIAL CRITERIA

Digital versions of the submitted TIA and all supporting analysis work are preferred. These files may be emailed if the sum-total of all digital files is less than 5 MB. If the sum-total of all digital files is greater than 5 MB, we request Region 2 staff be notified for direction on how to best transfer files to Region staff. The final version of the TIA will not be accepted until it has been stamped by an Oregon-registered Professional Engineer with license being current and in good standing, with expertise in civil or traffic engineering. Region 2 Traffic staff should require no more than 30 days to review and comment on the draft TIA. *Note: This timeframe may be adjusted, based on staffing and existing workloads*.

We trust this scope will provide enough information to conduct the analysis. However, the Department is prepared to work with the consultant, as necessary, to answer any additional questions that may arise during the course of its work. Additional coordination of traffic analysis data may be required during the TIA review process.

If there are any questions or comments regarding this scope of work, please contact me directly at (503) 986-2857 or Arielle.Ferber@odot.state.or.us. April Jones is the ODOT District 5 Senior Permits Specialist; she may be reached at (541) 726-2577 or April.C.JONES@odot.oregon.gov. Douglas Baumgartner is the ODOT Development Review Coordinator for this project; he may be reached at (503) 798-5793 or Douglas.G.BAUMGARTNER@odot.oregon.gov. If there are any questions or requests for additional information regarding land use issues, please contact Bill Johnston, the ODOT Senior Transportation Planner for Area 5, at (541) 747-1354 or bill.w.johnston@odot.oregon.gov.

Sincerely,

Arielle Ferber, P.E.
Traffic Analysis Engineer
ODOT Region 2 Tech Center
455 Airport Road SE, Building A
Salem, Oregon 97301-5397

SANDOWENGINEERING
160 MADISON STREET, SUITE A • EUGENE, OREGON 97402 • 541.513.3376

TECH MEMO

DATE: January 24, 2022

TO: Doug Baumgartner
ODOT
Region 2 Development Review Coordinator

FROM: Kelly Sandow P.E.
Sandow Engineering

RE: Pine Springs at Village Green Development- TIA Scoping Request

Sandow Engineering would like to request a Scope of Work for the following development project in Cottage Grove.

SITE INFORMATION

The site is located at tax lots 3701 and 3702 of Maps 20-03-27-20. The site is located on Row River Road just south of the interchange. Access to the site is currently from an access that aligns with Jim Wright Way and an access at the south end of the site.

The site is currently occupied by the Village Green Hotel and RV Park.

DEVELOPMENT PROPOSAL

The applicant is proposing to replace a portion of the hotel with apartments and to expand the RV spaces. The total development on site will be:

- Existing hotel rooms- 96
- Reduce hotel rooms to 40
- Existing RV spaces- 45
- Add 15 RV spaces
- Add 121 residential apartment units

TRIP GENERATION AND DISTRIBUTION

The trips to the site are estimated using the ITE Trip Generation Manual 11th Edition. Table 1 illustrates the PM Peak Hour and Table 2 illustrates the AM Peak Hour trip generation.

TABLE 1: TRIP GENERATION- PM

Land Use	Size	Rate	Trips
Existing			
320- Motel	96	0.24(x)+11.16	34
416- RV Park	46	Ln(t)=0.71ln(x)-0.06	14
Total Existing			**48**
Proposed			
320- Motel	40	0.24(x)+11.16	21
416- RV Park	60	ln(t)=0.71ln(x)-0.06	17
220- Multi-Family Low Rise	121	0.43(x)+20.55	73
Total Proposed			**111**
Total New			**63**

TABLE 2: TRIP GENERATION- AM

Land Use	Size	Rate	Trips
Existing			
320- Motel	96	0.28(x)+7.85	35
416- RV Park	46	0.16(x)+2.93	10
Total Existing			**45**
Proposed			
320- Motel	40	0.28(x)+7.85	19
416- RV Park	60	0.16(x)+2.93	13
220- Multi-Family Low Rise	121	0.31(x)+22.85	60
Total Proposed			**92**
Total New			**47**

The proposed site redevelopment is anticipated to generate 63 additional PM Peak Hour trips, and 47 additional PM Peak Hour trips.

The trips are distributed on the street network based on the existing travel patterns with modifications for reasonable origins/destinations. The distribution is estimated as:

- To/from north- 65%
- To/from south- 34%
- To/from east- 1%

The trip distribution is shown in Figure 1 for the AM and Figure 2 for the PM.

CONTEXT DATA

ZONING: CT COMMERCIAL TOURIST
TOTAL CONTEXT SITE: 16.29 ACRES

PINE SPRINGS MASTER PLAN
- UNITS: 121
- AREA: 7.92 ACRES
- DENSITY: 15.3 ACRES

VILLAGE GREEN HOTEL
- HISTORIC GUEST ROOMS: 96
- OPERATIONAL GUEST ROOMS: 72
- PROPOSED GUEST ROOMS: 40

ACRES: 3.90 ACRES

VILLAGE GREEN RV PARK
- EXISTING RV SPACES: 45
- PROPOSED RV SPACES: 60
- AREA: 2.69 ACRES

COMMERCIAL LOTS
- NORTH LOT: 0.83 ACRES
- SOUTH LOT: 0.94 ACRES

CONTEXT PLAN

0 10 25 50 100 200
SCALE: 1" = 50'-0"
NORTH

DLA
DOUGHERTY
LANDSCAPE
ARCHITECTS
474 Willamette Street
Suite 305
Eugene, Oregon 97401
P 541.683.5803
F 541.683.8183
www.DLAdesign.com

279
David J. Dougherty

PRELIMINARY NOT FOR CONSTRUCTION

Pine Springs Master Plan
XXX ROW RIVER ROAD, COTTAGE GROOVE, OR 97424

Date: 12.28.21
Drawn By: JM
Checked By: DVD
Submission:
Insert Text

Revisions

LA-1

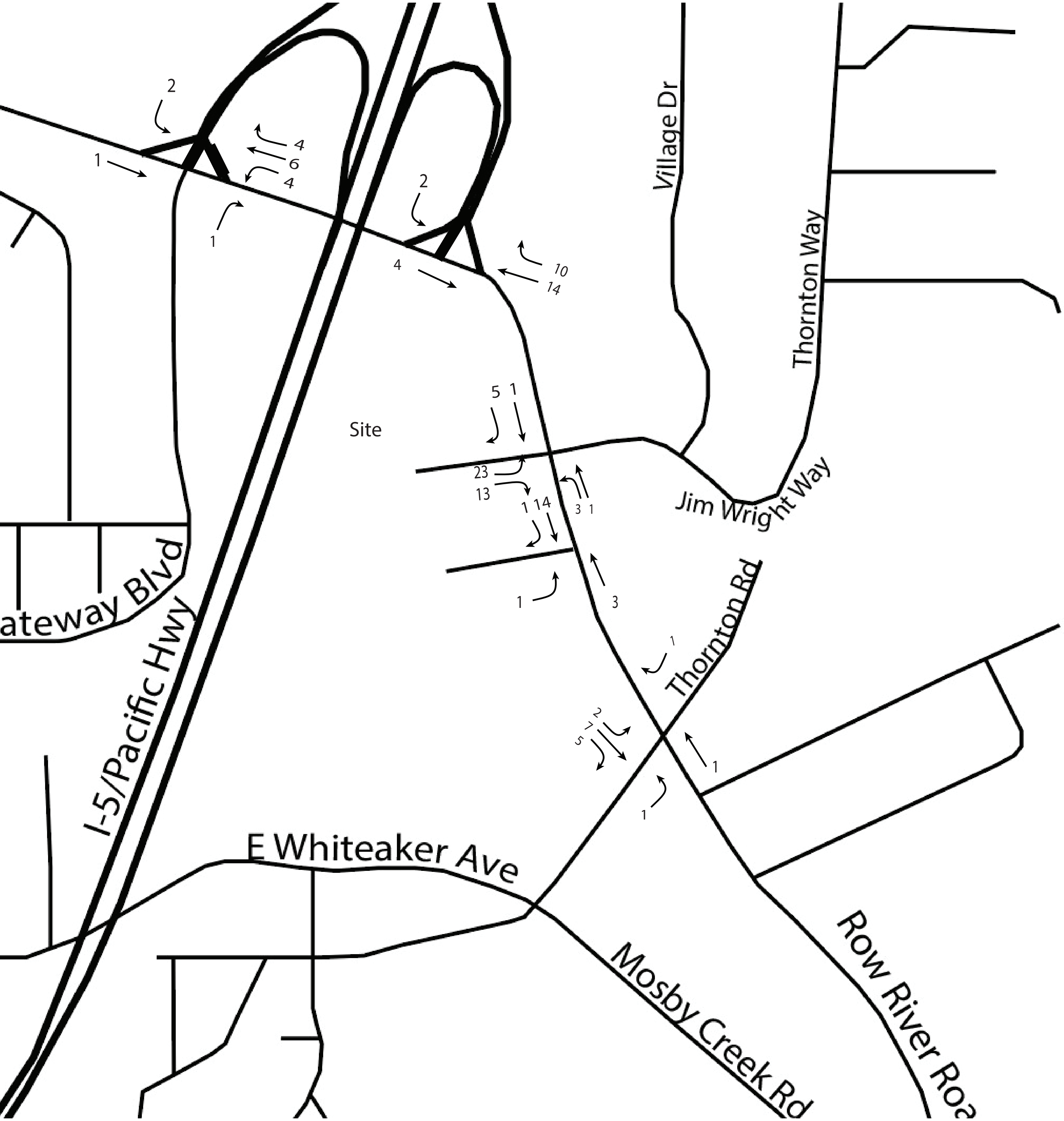


Figure 1: AM Peak Hour Development Trip Distribution

Figure 2: PM Peak Hour Development Trip Distribution

Pine Springs at Village Green

APPENDIX C: CRASH DATA

SANDOW ENGINEERING

CRASH DATA SUMMARY

Jim Wright Way @ Row River Rd

YEAR	PDO	INJURY	FATAL	HEAD	REAR	SIDE	TURN	OTHER	PED	BIKE	TOTAL
2015											0
2016		1					1				1
2017	1	1			1			1			2
2018											0
2019	1						1				1
TOTALS:	2	2	0	0	1	0	2	1	0	0	4

			# Crashes	ADT	MEV	Crash Rate	Critical Crash Rate	
1	Jim Wright Way @ Row River Rd	Stop	4	11680	21.32	0.19	0.37	under
2								
3								
4								
	Weighted Average							
	Stop		4		21.32	0.187652468		

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

CITY OF COTTAGE GROVE, LANE COUNTY

JIM WRIGHT WY at COTTAGE GROVE CONN, City of Cottage Grove, Lane County, 01/01/2015 to 12/31/2019

1 - 4 of 4 Crash records shown.

```
       S   D M
SER#   P   R J S W DATE      CLASS     CITY STREET                   INT-TYPE                                        SPCL USE
INVEST E A U I C O DAY       DIST      FIRST STREET       RD CHAR    (MEDIAN) INT-REL     OFFRD WTHR   CRASH         TRLR QTY     MOVE                      A S
RD DPT E L G N H R TIME      FROM      SECOND STREET      DIRECT       LEGS   TRAF-       RNDBT SURF   COLL          OWNER        FROM         PRTC  INJ    G E   LICNS  PED
UNLOC? D C S V L K LAT       LONG      LRS                LOCTN      (#LANES) CONTL       DRVWY LIGHT  SVRTY       V# TYPE         TO        P# TYPE  SVRTY  E X   RES    LOC    ERROR      ACT EVENT      CAUSE
03695  N N N   N N 10/13/2017    16    JIM WRIGHT WY      INTER     3-LEG     N           Y     RAIN   FIX OBJ    01 NONE  0      TURN-R                                                       040,058    17

CITY               FR                  COTTAGE GROVE CONN N                   STOP SIGN   N     WET    FIX           PRVTE        E -N                                                     000 040,058    00

N                  5P                                     05        0                     N     DAY    INJ           PSNGR CAR              01 DRVR  INJC  67 F   OTH-Y         081        028            17
N                  43 48 7.5  -123 2   0001KC100S00                                                                                                                   N-RES
                              25.01
04838  N N N   N N 12/17/2016    16    JIM WRIGHT WY      INTER     3-LEG     N           N     CLD    O-1 L-TURN 01 NONE  0      STRGHT                                                                  02

CITY               SA                  COTTAGE GROVE CONN CN                  STOP SIGN   N     DRY    TURN          PRVTE        S -N                                                     000            00

N                  3P                                     04        0                     N     DAY    INJ           PSNGR CAR              01 DRVR  NONE  42 M   OR-Y          000        000            00
N                  43 48 7.5  -123 2   0001KC100S00                                                                                                                   OR<25
                              25.01
                                                                                                                  01 NONE  0      STRGHT
                                                                                                                     PRVTE        S -N                                                     000            00
                                                                                                                     PSNGR CAR              02 PSNG  INJC  38 F                 000        000            00

                                                                                                                  01 NONE  0      STRGHT
                                                                                                                     PRVTE        S -N                                                     000            00
                                                                                                                     PSNGR CAR              03 PSNG  INJB  00 M                 000        000            00

                                                                                                                  02 NONE  0      TURN-L
                                                                                                                     PRVTE        N -E                                                     000            00
                                                                                                                     MOTRHOME               01 DRVR  NONE  71 M   OTH-Y         028,004    000            02
                                                                                                                                                                  N-RES
01352  N N N       04/21/2017    16    JIM WRIGHT WY      INTER     3-LEG     N           N     CLR    S-1TURN    01 NONE  9      STRGHT                                                                  29

NO RPT             FR                  COTTAGE GROVE CONN CN                  STOP SIGN   N     DRY    REAR          N/A          N -S                                                     000            00

N                  5P                                     01        0                     Y     DAY    PDO           PSNGR CAR              01 DRVR  NONE  00 Unk UNK           000        000            00
N                  43 48 7.5  -123 2   0001KC100S00                                                                                                                   UNK
                              25.01
                                                                                                                  02 NONE  9      TURN-R
                                                                                                                     N/A          N -W                                                     019            00
                                                                                                                     PSNGR CAR              01 DRVR  NONE  00 Unk UNK           000        000            00
                                                                                                                                                                  UNK
02384  N N N       08/07/2019    16    JIM WRIGHT WY      INTER     3-LEG     N           N     CLD    ANGL-OTH   01 NONE  9      TURN-L                                                                  02

NO RPT             WE                  COTTAGE GROVE CONN CN                  STOP SIGN   N     DRY    TURN          N/A          E -S                                                     015            00

N                  11A                                    01        0                     N     DAY    PDO           PSNGR CAR              01 DRVR  NONE  00 Unk UNK           000        000            00
N                  43 48 7.52 -123 2   0001KC100S00                                                                                                                   UNK
                              25.08
                                                                                                                  02 NONE  9      STRGHT
                                                                                                                     N/A          N -S                                                     000            00
                                                                                                                     PSNGR CAR              01 DRVR  NONE  00 Unk UNK           000        000            00
                                                                                                                                                                  UNK
```

JIM WRIGHT WY at COTTAGE GROVE CONN, City of Cottage Grove, Lane County, 01/01/2015 to 12/31/2019

APPENDIX D: TRAFFIC VOLUMES

Pine Springs at Village Green

1 **Intersection:** **1: Row River Rd @ Rv Park Access** **City:** **Cottage Grove, OR**

Counter: **Sandow Engineering** **Date:** **Wednesday, February 23, 2022**

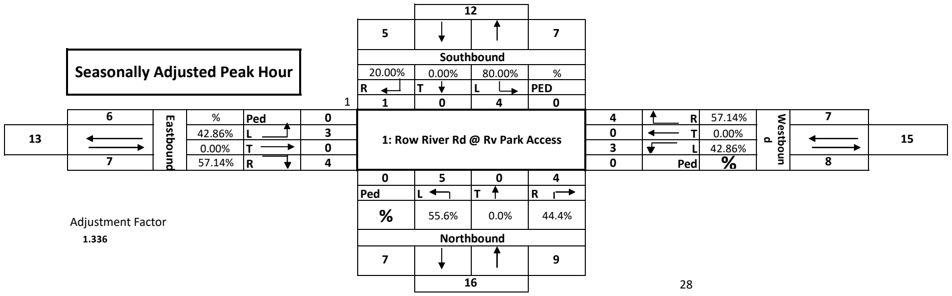
Total of All Vehicles

Time Period		Southbound				Westbound				Northbound				Eastbound				15 Minute Volume	Hourly Volume	Pedestrians			
		Right	Thru	Left	Approach Total	Right	Thru	Left	Approach Total	Right	Thru	Left	Approach Total	Right	Thru	Left	Approach Total			SB	WB	NB	EB
7:00	7:15	0	0	0	0	0	0	0	0	0	0	0	0	2	0	3	5	5		0	0	0	0
7:15	7:30	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1		0	0	0	0
7:30	7:45	0	0	1	1	1	0	2	3	0	0	4	4	1	0	2	3	11		0	0	0	1
7:45	8:00	1	0	0	1	2	0	0	2	3	0	0	3	0	0	0	0	6	23	0	0	0	0
8:00	8:15	0	0	2	2	0	0	0	0	0	0	0	0	1	0	0	1	3	21	0	1	0	1
8:15	8:30	1	0	0	1	1	0	0	1	5	0	0	5	1	0	0	1	8	28	0	0	0	1
8:30	8:45	1	0	1	2	0	0	0	0	4	0	0	4	0	0	1	1	7	24	0	0	0	0
8:45	9:00	0	0	1	1	0	0	1	1	1	0	0	1	0	1	1	2	5	23	0	0	0	0
9:00	9:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0
9:15	9:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0
9:30	9:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0
9:45	10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0
Count Period Total		**3**	**0**	**5**		**4**	**0**	**3**		**13**	**0**	**4**		**6**	**1**	**7**		**46**		**0**	**1**	**0**	**3**

PM Peak Hour Count Summary

	Southbound			Approach	Westbound			Approach	Northbound			Approach	Eastbound			Approach			Pedestrians			
	Right	Thru	Left		Right	Thru	Left		Right	Thru	Left		Right	Thru	Left				SB	WB	NB	EB
Peak Volumes	**1**	**0**	**3**	**4**	**3**	**0**	**2**	**5**	**3**	**0**	**4**	**7**	**3**	**0**	**2**	**5**	**21**		**0**	**0**	**0**	**0**
PHF	0.25	0.00	0.38	0.50	0.38	0.00	0.25	0.42	0.25	0.00	0.25	0.44	0.75	0.00	0.25	0.42	0.48					
Trucks	0	0	0		1	0	0		0	0	1		0	0	1							
% Trucks	0%	0%	0%		33%	0%	0%		0%	0%	25%		0%	0%	50%							

Seasonally Adjusted Peak Hour



Adjustment Factor

1.336

28

1: Row River Rd @ Rv Park Access

Pedestrians and Cars

Time Period	Southbound					Westbound					Northbound					Eastbound					15 Minute Volume	Hourly Volume
	Peds	Right	Thru	Left		Peds	Right	Thru	Left		Peds	Right	Thru	Left		Peds	Right	Thru	Left			
7:00 AM																	2		3		5	
7:15 AM																	1				1	
7:30 AM		0	0	1			1		2			0		3			1	0	1		9	
7:45 AM		1		0			1		0			3		0			0	0	0		5	20
8:00 AM		0		2		1	0		0			0		0		1	1	0	0		3	18
8:15 AM		1		0			1		0			5		0		1	1	0	0		8	25
8:30 AM		1		1			0		0			4		0			0	0	1		7	23
8:45 AM		0		1			0		1			1		0			0	1	1		5	23
9:00 AM		0		0			0		0			0		0			0	0	0		0	20
9:15 AM																					0	12
9:30 AM																					0	5
9:45 AM																					0	0
Total	0	3	0	5		1	3	0	3		0	13	0	3		2	6	1	6			
Peak Hour	**0**	**1**	**0**	**3**	**0**	**1**	**2**	**0**	**2**	**0**	**0**	**3**	**0**	**3**	**0**	**1**	**3**	**0**	**1**	**0**	**18**	**38**

Trucks

Time Period	Southbound				Westbound				Northbound				Eastbound				15 Minute Volume	Hourly Volume
	Right	Thru	Left		Right	Thru	Left		Right	Thru	Left		Right	Thru	Left			
7:00 AM																	0	
7:15 AM																	0	
7:30 AM		0									1				1		2	
7:45 AM					1												1	3
8:00 AM																	0	3
8:15 AM																	0	3
8:30 AM																	0	1
8:45 AM																	0	0
9:00 AM																	0	0
9:15 AM																	0	0
9:30 AM																	0	0
9:45 AM																	0	0
Total	0	0	0		1	0	0		0	0	1		0	0	1			
Peak Hour	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**3**	**6**

Bikes

Time Period	Southbound				Westbound				Northbound				Eastbound			SB	WB	NB	EB
	Right	Thru	Left		Right	Thru	Left		Right	Thru	Left		Right	Thru	Left				
7:00 AM																0	0	0	0
7:15 AM																0	0	0	0
7:30 AM														1		0	0	0	1
7:45 AM																0	0	0	0
8:00 AM																0	0	0	0
8:15 AM																0	0	0	0
8:30 AM																0	0	0	0
8:45 AM																0	0	0	0
9:00 AM																0	0	0	0
9:15 AM																0	0	0	0
9:30 AM																0	0	0	0
9:45 AM																0	0	0	0
Total	0	0	0		0	0	0		0	0	0		0	1	0				
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**1**

Pedestrians

Time Period	NE				NW				SW				SE			SB	WB	NB	EB
	Left	Right	Total		Left	Right	Total		Left	Right	Total		Left	Right	Total				
7:00 AM			0				0				0				0	0	0	0	0
7:15 AM			0				0				0				0	0	0	0	0
7:30 AM			0				0				0				0	0	0	0	0
7:45 AM			0				0				0				0	0	0	0	0
8:00 AM			0				0				0				0	0	0	0	0
8:15 AM			0				0				0				0	0	0	0	0
8:30 AM			0				0				0				0	0	0	0	0
8:45 AM			0				0				0				0	0	0	0	0
9:00 AM			0				0				0				0	0	0	0	0
9:15 AM			0				0				0				0	0	0	0	0
9:30 AM			0				0				0				0	0	0	0	0
9:45 AM			0				0				0				0	0	0	0	0
Total	0	0	0		0	0	0		0	0	0		0	0	0	0	0	0	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Intersection: **2: Row River Rd @ Jim Wright** **City:** **Cottage Grove, OR**

Counter: **Sandow Engineering** **Date:** **Thursday, February 24, 2022**

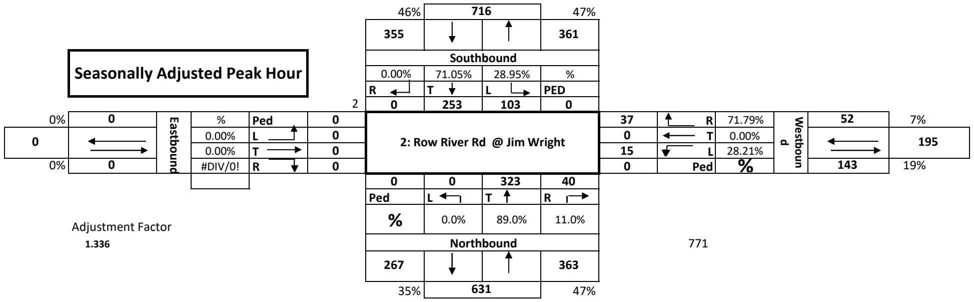
Total of All Vehicles

Time Period		Southbound				Westbound				Northbound				Eastbound				15 Minute Volume	Hourly Volume	Pedestrians			
		Right	Thru	Left	Approach Total	Right	Thru	Left	Approach Total	Right	Thru	Left	Approach Total	Right	Thru	Left	Approach Total			SB	WB	NB	EB
7:00	7:15	0	39	2	41	8	0	3	11	1	63	0	64	0	0	0	0	116		0	0	0	0
7:15	7:30	0	53	20	73	6	0	3	9	7	61	0	68	0	0	0	0	150		0	0	0	0
7:30	7:45	0	36	18	54	5	0	0	5	9	79	0	88	0	0	0	0	147		0	0	0	0
7:45	8:00	0	43	27	70	5	0	4	9	9	49	0	58	0	0	0	0	137	550	0	0	0	0
8:00	8:15	0	57	12	69	12	0	4	16	5	53	0	58	0	0	0	0	143	577	0	0	0	0
8:15	8:30	0	37	18	55	13	0	2	15	5	62	0	67	0	0	0	0	137	564	0	0	0	0
8:30	8:45	0	44	23	67	12	0	4	16	6	49	0	55	0	0	0	0	138	555	0	0	0	0
8:45	9:00	0	47	11	58	15	0	6	21	7	67	0	74	0	0	0	0	153	571	0	0	0	0
9:00	9:15	0	2	0	2	0	0	0	0	1	5	0	6	0	0	0	0	8		0	0	0	0
9:15	9:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0
9:30	9:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0
9:45	10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0
Count Period Total		**0**	**358**	**131**		**76**	**0**	**26**		**50**	**488**	**0**		**0**	**0**	**0**		**1129**		**0**	**0**	**0**	**0**

PM Peak Hour Count Summary

	Southbound				Westbound				Northbound				Eastbound						Pedestrians			
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach			SB	WB	NB	EB
Peak Volumes	**0**	**189**	**77**	**266**	**28**	**0**	**11**	**39**	**30**	**242**	**0**	**272**	**0**	**0**	**0**	**0**	**577**		**0**	**0**	**0**	**0**
PHF	0.00	0.83	0.71	0.91	0.58	0.00	0.69	0.61	0.83	0.77	0.00	0.77	0.00	0.00	0.00	0.00	0.96					
Trucks	0	15	1		0	0	0		0	16	0		0	0	0							
% Trucks	0%	8%	1%		0%	0%	0%		0%	7%	0%		0%	0%	0%							

Seasonally Adjusted Peak Hour



Adjustment Factor
1.336

2: Row River Rd @ Jim Wright

Pedestrians and Cars

Time Period	Southbound					Westbound					Northbound					Eastbound					15 Minute Volume	Hourly Volume
	Peds	Right	Thru	Left		Peds	Right	Thru	Left		Peds	Right	Thru	Left		Peds	Right	Thru	Left			
7:00 AM			34	2			7		3			1	60								107	
7:15 AM			50	20			6		3			7	60								146	
7:30 AM			33	18			5		0			9	69								134	
7:45 AM			42	26			5		4			9	48								134	521
8:00 AM			54	12			12		4			5	49								136	550
8:15 AM			34	18			13		2			5	56								128	532
8:30 AM			40	22			12		4			6	47								131	529
8:45 AM			42	11			15		6			7	63								144	539
9:00 AM			1	0			0		0			1	5								7	410
9:15 AM																					0	282
9:30 AM																					0	151
9:45 AM																					0	7
Total	0	0	330	129		0	75	0	26		0	50	457	0		0	0	0	0			
Peak Hour	**0**	**0**	**163**	**74**	**0**	**0**	**35**	**0**	**10**	**0**	**0**	**28**	**222**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**532**	**1603**

Trucks

Time Period	Southbound				Westbound				Northbound				Eastbound				15 Minute Volume	Hourly Volume
	Right	Thru	Left		Right	Thru	Left		Right	Thru	Left		Right	Thru	Left			
7:00 AM		5	0		1					3							9	
7:15 AM		3	0							1							4	
7:30 AM		3	0							10							13	
7:45 AM		1	1							1							3	29
8:00 AM		3	0							4							7	27
8:15 AM		3	0							6							9	32
8:30 AM		4	1							2							7	26
8:45 AM		5	0							4							9	32
9:00 AM		1	0							0							1	26
9:15 AM																	0	17
9:30 AM																	0	10
9:45 AM																	0	1
Total	0	28	2		1	0	0		0	31	0		0	0	0			
Peak Hour	**0**	**15**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**16**	**0**	**0**	**0**	**0**	**0**	**0**	**32**	**117**

Bikes

Time Period	Southbound				Westbound				Northbound				Eastbound			SB	WB	NB	EB
	Right	Thru	Left		Right	Thru	Left		Right	Thru	Left		Right	Thru	Left				
7:00 AM																0	0	0	0
7:15 AM																0	0	0	0
7:30 AM																0	0	0	0
7:45 AM																0	0	0	0
8:00 AM																0	0	0	0
8:15 AM																0	0	0	0
8:30 AM																0	0	0	0
8:45 AM																0	0	0	0
9:00 AM																0	0	0	0
9:15 AM																0	0	0	0
9:30 AM																0	0	0	0
9:45 AM																0	0	0	0
Total	0	0	0		0	0	0		0	0	0		0	0	0				
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Pedestrians

Time Period	NE				NW				SW				SE			SB	WB	NB	EB
	Left	Right	Total		Left	Right	Total		Left	Right	Total		Left	Right	Total				
7:00 AM																0	0	0	0
7:15 AM																0	0	0	0
7:30 AM																0	0	0	0
7:45 AM																0	0	0	0
8:00 AM																0	0	0	0
8:15 AM																0	0	0	0
8:30 AM																0	0	0	0
8:45 AM																0	0	0	0
9:00 AM																0	0	0	0
9:15 AM																0	0	0	0
9:30 AM																0	0	0	0
9:45 AM																0	0	0	0
Total	0	0	0		0	0	0		0	0	0		0	0	0	0	0	0	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Global Peak Hour

		Intersections				
		1: Row River Rd @ Rv Park Access	2: Row River Rd @ Jim Wright			
Time Period		Volume	Volume	Total		
7:00 AM	8:00 AM	23	550	**573**	7:00 AM	8:00 AM
7:15 AM	8:15 AM	21	577	**598**	7:15 AM	8:15 AM
7:30 AM	8:30 AM	28	564	**592**	7:30 AM	8:30 AM
7:45 AM	8:45 AM	24	555	**579**	7:45 AM	8:45 AM
8:00 AM	9:00 AM	23	571	**594**	8:00 AM	9:00 AM
		28	577	598		

Peak Hour 7:15 AM
7:30 AM
7:45 AM
8:00 AM

2022 Background

			355		361				
			R	T	L	PED			
		1	0	253	103	0			
	Ped	0	2: Row River Rd @ Jim Wright				37	R	52.1
0	L	0					0	T	
	T	0					15	L	143
0	R	0					0	Ped	
			0	0	323	40			
			Ped	L	T	R			
				267		363			

			267		363				
			R	T	L	PED			
		2	1	262	4	0			
	Ped	0	1: Row River Rd @ Rv Park Access				4	R	7
6	L	3					0	T	
	T	0					3	L	8
7	R	4					0	Ped	
			0	5	356	4			
			Ped	L	T	R			
				269		365			

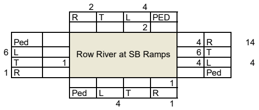
EDIT Highlighted

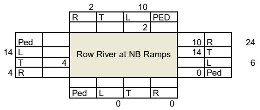
Base Year	2022
Target Year	2024
Years of Growth	2
Growth Rate Per Yea	0.012
Growth Factor	1.024

2024 AM Volumes Background

			364		369				
			R	T	L	PED			
		1	0	259	105	0			
	Ped	0	2: Row River Rd @ Jim Wright				38	R	53
0	L	0					0	T	
	T	0					15	L	146
0	R	0					0	Ped	
			0	0	331	41			
			Ped	L	T	R			
				274		372			

			274		372				
			R	T	L	PED			
		1	1	268	4	0			
	Ped	0	1: Row River Rd @ Rv Park Access				4	R	7.168
6	L	3					0	T	
	T	0					3	L	8.192
7	R	4					0	Ped	
			0	5	365	4			
			0	L	T	R			
				276		374			

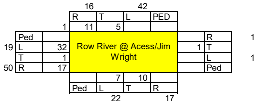


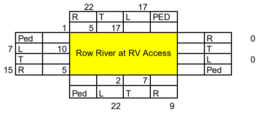


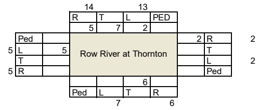
		0	0
North	0.65	0	0
South	0.34	0	0
East	0.01	0	0

26

65







SEASONAL TREND TABLE (Updated: 7/20/2021)[1]

TREND	1-Jan	15-Jan	1-Feb	15-Feb	1-Mar	15-Mar	1-Apr	15-Apr	1-May	15-May	1-Jun	15-Jun	1-Jul	15-Jul	1-Aug	15-Aug	1-Sep	15-Sep	1-Oct	15-Oct	1-Nov	15-Nov	1-Dec	15-Dec	Seasonal Trend Peak Period Factor
INTERSTATE URBANIZED	1.0672	1.0684	1.0922	1.1160	1.0605	1.0050	0.9923	0.9796	0.9781	0.9767	0.9615	0.9463	0.9517	0.9571	0.9551	0.9531	0.9674	0.9816	0.9850	0.9884	1.0045	1.0206	1.0322	1.0438	0.9463
INTERSTATE NONURBANIZED	1.2426	1.2883	1.3750	1.4616	1.2645	1.0673	1.0382	1.0092	0.9798	0.9504	0.9005	0.8506	0.8322	0.8139	0.8221	0.8302	0.8719	0.9135	0.9441	0.9747	1.0178	1.0608	1.1123	1.1638	0.8139
COMMUTER	1.0850	1.0875	1.1183	1.1492	1.0880	1.0268	1.0014	0.9759	0.9705	0.9650	0.9503	0.9355	0.9470	0.9585	0.9509	0.9433	0.9528	0.9623	0.9614	0.9604	0.9938	1.0272	1.0474	1.0676	0.9355
COASTAL DESTINATION	1.1885	1.1712	1.2001	1.2289	1.1242	1.0194	1.0316	1.0437	1.0080	0.9723	0.9347	0.8972	0.8612	0.8252	0.8205	0.8159	0.8686	0.9214	0.9689	1.0164	1.0660	1.1156	1.1580	1.2005	0.8159
COASTAL DESTINATION ROUTE	1.3445	1.3248	1.4108	1.4968	1.2858	1.0747	1.0911	1.1076	1.0274	0.9473	0.8941	0.8409	0.7820	0.7231	0.7218	0.7205	0.8016	0.8827	0.9669	1.0511	1.1133	1.1754	1.2480	1.3206	0.7205
AGRICULTURE	1.4583	1.4827	1.5763	1.6700	1.4596	1.2492	1.1487	1.0482	0.9747	0.9011	0.8579	0.8146	0.8058	0.7970	0.7922	0.7873	0.7772	0.7670	0.8288	0.8905	0.9947	1.0989	1.2462	1.3934	0.7670
RECREATIONAL SUMMER	1.5848	1.6474	1.7861	1.9247	1.6595	1.3942	1.2973	1.2004	1.0517	0.9029	0.8256	0.7484	0.7018	0.6552	0.6708	0.6864	0.7393	0.7922	0.8898	0.9874	1.1242	1.2610	1.3965	1.5320	0.6552
RECREATIONAL SUMMER WINTER	0.8736	0.8525	0.9330	1.0135	1.0146	1.0158	1.1492	1.2825	1.1763	1.0700	0.9760	0.8821	0.8005	0.7190	0.7305	0.7420	0.8897	1.0374	1.2010	1.3645	1.5212	1.6778	1.3812	1.0847	0.7190
RECREATIONAL WINTER	0.6997	0.6389	0.6561	0.6733	0.7219	0.7704	1.0580	1.3455	1.3746	1.4038	1.2832	1.1625	0.9985	0.8344	0.8600	0.8857	1.0560	1.2262	1.4100	1.5937	1.8758	2.1580	1.5328	0.9076	0.6389
SUMMER	1.2151	1.2357	1.3129	1.3901	1.2520	1.1139	1.0620	1.0100	0.9718	0.9336	0.8976	0.8615	0.8457	0.8299	0.8354	0.8410	0.8743	0.9077	0.9357	0.9638	1.0273	1.0908	1.1322	1.1737	0.8299
SUMMER < 2500	1.3035	1.3186	1.3817	1.4448	1.2869	1.1289	1.0598	0.9906	0.9480	0.9053	0.8720	0.8387	0.8237	0.8086	0.8229	0.8373	0.8616	0.8859	0.9233	0.9607	1.0428	1.1249	1.2016	1.2783	0.8086

* Seasonal Trend Table factors are based on previous year ATR data. The table is updated yearly.
* Grey shading indicates months were seasonal factor is greater than or less than 30%
* February 2019 snow event causing lower seasonal factors

[1]Seasonal Trend Table: The 2020 table is based on 2019 values due to the irregularity caused by the Covid epidemic shutdown during the 2020 count year.

	August Count	Peak		
Commutei	0.9433	0.9355	1.008344	
Summer	0.8410	0.8299	1.013358	
			1.011	Average

	Februay Count	Peak		
Commutei	1.0880	0.9355	1.163004	
Summer	1.2520	0.8299	1.508652	
			1.336	Average

Row River

2014	2035	
485	585	
770	958	0.010928
730	885	
410	550	0.012322
420	510	
455	610	0.013333
370	450	
406	545	0.013439
290	350	
305	410	0.013205
315	390	
295	370	0.01171

Average 0.01249

Average Entire Study area
0.012

I-5 SB

2014	2035	
170	205	
895	1090	0.010284

I-5 NB

2014	2035	
475	580	
120	145	0.010404

Thornton

150	205	
145	175	0.013721
105	130	
75	90	0.010582

1 **Intersection:** 1: Row River Rd @ RV Access **City:** Cottage Grove, OR

Counter: Sandow Engineering **Date:** Wednesday, February 23, 2022

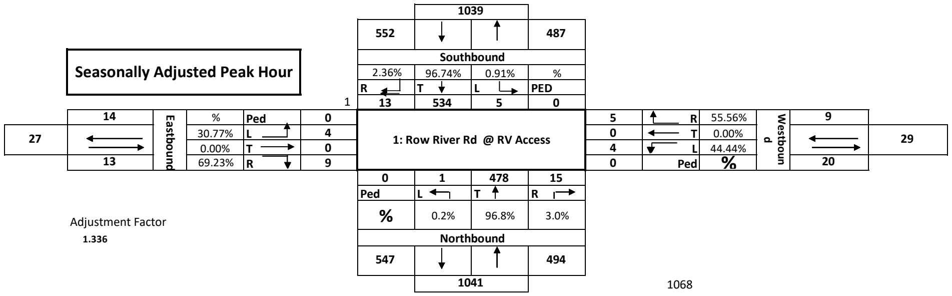
Total of All Vehicles

Time Period		Southbound				Westbound				Northbound				Eastbound				15 Minute Volume	Hourly Volume	Pedestrians			
		Right	Thru	Left	Approach Total	Right	Thru	Left	Approach Total	Right	Thru	Left	Approach Total	Right	Thru	Left	Approach Total			SB	WB	NB	EB
16:00	16:15	2	93	0	95	1	0	2	3	2	86	0	88	0	0	1	1	187		1	0	0	0
16:15	16:30	0	76	0	76	1	0	1	2	1	91	0	92	2	0	0	2	172		1	1	0	0
16:30	16:45	1	79	2	82	2	0	1	3	1	100	3	104	0	0	2	2	191		0	0	0	0
16:45	17:00	1	99	1	101	0	0	0	0	2	83	0	85	1	0	0	1	187	737	0	0	0	0
17:00	17:15	2	90	0	92	2	0	2	4	2	89	0	91	2	0	0	2	189	739	0	0	0	0
17:15	17:30	0	95	0	95	2	0	1	3	2	85	0	87	1	0	1	2	187	754	0	0	0	0
17:30	17:45	7	116	3	126	0	0	0	0	5	101	1	107	3	0	2	5	238	801	0	0	0	0
17:45	18:00	1	73	0	74	2	1	1	4	4	87	1	92	0	0	1	1	171	785	0	0	0	0
18:00	18:15	0	2	0	2	0	0	0	0	1	1	0	2	0	0	0	0	4		0	0	0	0
18:15	18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0
18:30	18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0
18:45	19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0
Count Period Total		**14**	**723**	**6**		**10**	**1**	**8**		**20**	**723**	**5**		**9**	**0**	**7**		**1526**		**2**	**1**	**0**	**0**

PM Peak Hour Count Summary

	Southbound			Approach	Westbound			Approach	Northbound			Approach	Eastbound			Approach			Pedestrians			
	Right	Thru	Left		Right	Thru	Left		Right	Thru	Left		Right	Thru	Left				SB	WB	NB	EB
Peak Volumes	**10**	**400**	**4**	**414**	**4**	**0**	**3**	**7**	**11**	**358**	**1**	**370**	**7**	**0**	**3**	**10**	**801**		**0**	**0**	**0**	**0**
PHF	0.36	0.86	0.33	0.82	0.50	0.00	0.38	0.44	0.55	0.89	0.25	0.86	0.58	0.00	0.38	0.50	0.84					
Trucks	0	8	0		0	0	0		0	15	0		0	0	0							
% Trucks	0%	2%	0%		0%	0%	0%		0%	4%	0%		0%	0%	0%							

Seasonally Adjusted Peak Hour



Adjustment Factor

1.336

1068

1: Row River Rd @ RV Access

Pedestrians and Cars

Time Period	Southbound					Westbound					Northbound					Eastbound					15 Minute Volume	Hourly Volume
	Peds	Right	Thru	Left		Peds	Right	Thru	Left		Peds	Right	Thru	Left		Peds	Right	Thru	Left			
4:00 PM		2	88	0			1	0	2			2	84	0			0		1		180	
4:15 PM		0	75	0		1	1	0	1			1	88	0			2		0		168	
4:30 PM		1	76	2			1	0	1			1	98	3			0		2		185	
4:45 PM		1	98	1			0	0	0			2	81	0			1		0		184	717
5:00 PM		2	86	0			2	0	2			2	83	0			2		0		179	716
5:15 PM		0	92	0			2	0	1			2	83	0			1		1		182	730
5:30 PM		7	116	3			0	0	0			5	96	1			3		2		233	778
5:45 PM		1	73	0			2	1	1			4	87	1			0		1		171	765
6:00 PM		0	2	0			0	0	0			1	1	0			0		0		4	590
6:15 PM																					0	408
6:30 PM																					0	175
6:45 PM																					0	4
Total	0	14	706	6		1	9	1	8		0	20	701	5		0	9	0	7			
Peak Hour	**0**	**4**	**392**	**4**	**0**	**0**	**4**	**0**	**3**	**0**	**0**	**11**	**343**	**1**	**0**	**0**	**7**	**0**	**3**	**0**	**778**	**2941**

Trucks

Time Period	Southbound				Westbound				Northbound				Eastbound				15 Minute Volume	Hourly Volume
	Right	Thru	Left		Right	Thru	Left		Right	Thru	Left		Right	Thru	Left			
4:00 PM		5			0					2							7	
4:15 PM		1			0					3							4	
4:30 PM		3			1					2							6	
4:45 PM		1			0					2							3	20
5:00 PM		4			0					6							10	23
5:15 PM		3			0					2							5	24
5:30 PM		0			0					5							5	23
5:45 PM		0			0					0							0	20
6:00 PM		0			0					0							0	10
6:15 PM																	0	5
6:30 PM																	0	0
6:45 PM																	0	0
Total	0	17	0		1	0	0		0	22	0		0	0	0			
Peak Hour	**0**	**8**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**15**	**0**	**0**	**0**	**0**	**0**	**0**	**23**	**90**

Bikes

Time Period	Southbound				Westbound				Northbound				Eastbound			SB	WB	NB	EB
	Right	Thru	Left		Right	Thru	Left		Right	Thru	Left		Right	Thru	Left				
4:00 PM		1														1	0	0	0
4:15 PM		1														1	0	0	0
4:30 PM																0	0	0	0
4:45 PM																0	0	0	0
5:00 PM																0	0	0	0
5:15 PM																0	0	0	0
5:30 PM																0	0	0	0
5:45 PM																0	0	0	0
6:00 PM																0	0	0	0
6:15 PM																0	0	0	0
6:30 PM																0	0	0	0
6:45 PM																0	0	0	0
Total	0	2	0		0	0	0		0	0	0		0	0	0				
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Pedestrians

Time Period	NE				NW				SW				SE			SB	WB	NB	EB
	Left	Right	Total		Left	Right	Total		Left	Right	Total		Left	Right	Total				
4:00 PM			0				0				0				0	0	0	0	0
4:15 PM			0				0				0				0	0	0	0	0
4:30 PM			0				0				0				0	0	0	0	0
4:45 PM			0				0				0				0	0	0	0	0
5:00 PM			0				0				0				0	0	0	0	0
5:15 PM			0				0				0				0	0	0	0	0
5:30 PM			0				0				0				0	0	0	0	0
5:45 PM			0				0				0				0	0	0	0	0
6:00 PM			0				0				0				0	0	0	0	0
6:15 PM			0				0				0				0	0	0	0	0
6:30 PM			0				0				0				0	0	0	0	0
6:45 PM			0				0				0				0	0	0	0	0
Total	0	0	0		0	0	0		0	0	0		0	0	0	0	0	0	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Intersection: 2: Row River Rd @ Jim Wright Way **City:** Cottage Grove, OR

Counter: Sandow Engineering **Date:** Wednesday, August 4, 2021

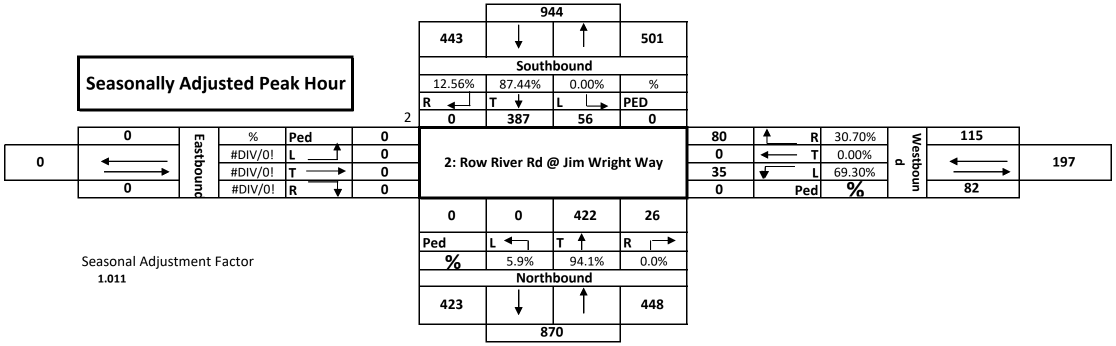
Total of All Vehicles

Time Period		Southbound				Westbound				Northbound				Eastbound				15 Minute Volume	Hourly Volume	Pedestrians			
		Right	Thru	Left	Approach Total	Right	Thru	Left	Approach Total	Right	Thru	Left	Approach Total	Right	Thru	Left	Approach Total			SB	WB	NB	EB
16:00	16:15	0	94	16	110	22	0	10	32	7	110	0	117	3	1	1	5	264		0	0	0	0
16:15	16:30	0	77	20	97	20	0	8	28	7	100	0	107	2	0	1	3	235		0	0	0	0
16:30	16:45	0	82	16	98	25	0	11	36	9	107	0	116	0	0	0	0	250		0	0	0	0
16:45	17:00	0	87	19	106	21	0	8	29	5	103	0	108	0	0	0	0	243	992	0	0	0	0
17:00	17:15	0	98	12	110	20	0	11	31	6	118	0	124	0	0	0	0	265	993	0	0	0	0
17:15	17:30	0	98	11	109	14	0	9	23	8	92	0	100	0	0	0	0	232	990	0	0	0	0
17:30	17:45	0	100	13	113	24	0	7	31	7	104	0	111	0	0	0	0	255	995	0	0	0	0
17:45	18:00	0	76	18	94	14	0	4	18	6	99	0	105	1	0	0	1	218	970	0	0	0	0
18:00	18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	705	0	0	0	0
18:15	18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	473	0	0	0	0
Count Period Total		**0**	**712**	**125**		**160**	**0**	**68**		**55**	**833**	**0**		**6**	**1**	**2**		**1962**		**0**	**0**	**0**	**0**

PM Peak Hour Count Summary

	Southbound				Westbound				Northbound				Eastbound						Pedestrians			
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach			SB	WB	NB	EB
Peak Volumes	**0**	**383**	**55**	**438**	**79**	**0**	**35**	**114**	**26**	**417**	**0**	**443**	**0**	**0**	**0**	**0**	**995**		**0**	**0**	**0**	**0**
PHF	0.00	0.96	0.72	0.97	0.82	0.00	0.80	0.92	0.81	0.88	0.00	0.89	0.00	0.00	0.00	0.00	0.94					
Trucks	0	17	1		0	0	0		0	4	0		0	0	0							
% Trucks	0%	4%	2%		0%	0%	0%		0%	1%	0%		0%	0%	0%							

Seasonally Adjusted Peak Hour



Seasonal Adjustment Factor
1.011

2: Row River Rd @ Jim Wright Way

Pedestrians and Cars

Time Period	Southbound					Westbound					Northbound					Eastbound					15 Minute Volume	Hourly Volume
	Peds	Right	Thru	Left		Peds	Right	Thru	Left		Peds	Right	Thru	Left		Peds	Right	Thru	Left			
4:00 PM	0		89	15		0	22		10		0	7	106			0	3	1	1		254	
4:15 PM	0		74	20		0	18		8		0	6	98			0	2		1		227	
4:30 PM	0		80	16		0	25		11		0	9	107			0					248	
4:45 PM	0		82	18		0	21		8		0	5	102			0					236	965
5:00 PM	0		96	12		0	20		11		0	6	115			0					260	971
5:15 PM	0		94	11		0	14		9		0	8	92			0					228	972
5:30 PM	0		94	13		0	24		7		0	7	104			0					249	973
5:45 PM	0		76	18		0	14		4		0	5	97			0	1				215	952
6:00 PM	0					0					0					0					0	692
6:15 PM	0					0					0					0					0	464
Total	0	0	685	123		0	158	0	68		0	53	821	0		0	6	1	2			
Peak Hour	**0**	**0**	**366**	**54**	**0**	**0**	**79**	**0**	**35**	**0**	**0**	**26**	**413**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**973**	**3881**

Trucks

Time Period	Southbound				Westbound				Northbound				Eastbound				15 Minute Volume	Hourly Volume
	Right	Thru	Left		Right	Thru	Left		Right	Thru	Left		Right	Thru	Left			
4:00 PM		5	1							4							10	
4:15 PM		3	0		2				1	2							8	
4:30 PM		2	0														2	
4:45 PM		5	1							1							7	27
5:00 PM		2								3							5	22
5:15 PM		4															4	18
5:30 PM		6															6	22
5:45 PM		0							1	2							3	18
6:00 PM																	0	13
6:15 PM																	0	9
Total	0	27	2		2	0	0		2	12	0		0	0	0			
Peak Hour	**0**	**17**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**22**	**89**

Bikes

Time Period	Southbound				Westbound				Northbound				Eastbound			SB	WB	NB	EB
	Right	Thru	Left		Right	Thru	Left		Right	Thru	Left		Right	Thru	Left				
4:00 PM																0	0	0	0
4:15 PM																0	0	0	0
4:30 PM																0	0	0	0
4:45 PM																0	0	0	0
5:00 PM																0	0	0	0
5:15 PM																0	0	0	0
5:30 PM																0	0	0	0
5:45 PM																0	0	0	0
6:00 PM																0	0	0	0
6:15 PM																0	0	0	0
Total	0	0	0		0	0	0		0	0	0		0	0	0				
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Pedestrians

Time Period	NE				NW				SW				SE			SB	WB	NB	EB
	Left	Right	Total		Left	Right	Total		Left	Right	Total		Left	Right	Total				
4:00 PM			0				0				0				0	0	0	0	0
4:15 PM			0				0				0				0	0	0	0	0
4:30 PM			0				0				0				0	0	0	0	0
4:45 PM			0				0				0				0	0	0	0	0
5:00 PM			0				0				0				0	0	0	0	0
5:15 PM			0				0				0				0	0	0	0	0
5:30 PM			0				0				0				0	0	0	0	0
5:45 PM			0				0				0				0	0	0	0	0
6:00 PM			0				0				0				0	0	0	0	0
6:15 PM			0				0				0				0	0	0	0	0
Total	0	0	0		0	0	0		0	0	0		0	0	0	0	0	0	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Global Peak Hour

		Intersections				
		1: Row River Rd @ RV Access	2: Row River Rd @ Jim Wright Way			
Time Period		Volume	Volume	Total		
4:00 PM	5:00 PM	737	992	**1729**	4:00 PM	5:00 PM
4:15 PM	5:15 PM	739	993	**1732**	4:15 PM	5:15 PM
4:30 PM	5:30 PM	754	990	**1744**	4:30 PM	5:30 PM
4:45 PM	5:45 PM	801	995	**1796**	4:45 PM	5:45 PM
5:00 PM	6:00 PM	785	970	**1755**	5:00 PM	6:00 PM
		801	995	1796		

Peak Hour	4:45 PM
	5:00 PM
	5:15 PM
	5:30 PM

2022

			573		534				
			R	T	L	PED			
		1	0	517	56	0			
	Ped	0	2: Row River Rd @ Jim Wright Way				80	R	115.3
0	L	0					0	T	
	T	0					35	L	81.89
0	R	0					0	Ped	
			0	0	454	26			
			Ped	L	T	R			
				552		480			1168
							1053		

			552		487				
			R	T	L	PED			
		2	13	534	5	0			
14	Ped	0	1: Row River Rd @ RV Access				5	R	9
	L	4					0	T	
13	T	0					4	L	20
	R	9					0	Ped	
			0	1	478	15			
			Ped	L	T	R			
				547		494			

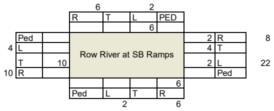
EDIT Highlighted

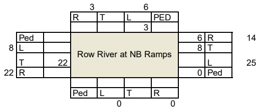
Base Year	2022
Target Year	2024
Years of Growth	2
Growth Rate Per Year	0.012
Growth Factor	1.02

2024 PM Volumes Background

			586		547				
			R	T	L	PED			
		1	0	529	57	0			
	Ped	0	2: Row River Rd @ Jim Wright Way				82	R	118
0	L	0					0	T	
	T	0					36	L	84
0	R	0					0	Ped	
			0	0	465	27			
			Ped	L	T	R			
				566		492			

			565		499				
			R	T	L	PED			
		1	13	547	5	0			
	Ped	0	1: Row River Rd @ RV Access				5	R	9
14	L	4					0	T	
	T	0					4	L	20
13	R	9					0	Ped	
			0	1	489	15			
			Ped	L	T	R			
				560		506			

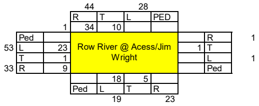


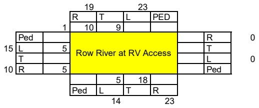


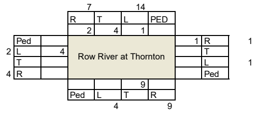
		0	0
North	0.65	0	0
South	0.34	0	0
East	0.01	0	0

68

43







SEASONAL TREND TABLE (Updated: 7/20/2021)[1]

TREND	1-Jan	15-Jan	1-Feb	15-Feb	1-Mar	15-Mar	1-Apr	15-Apr	1-May	15-May	1-Jun	15-Jun	1-Jul	15-Jul	1-Aug	15-Aug	1-Sep	15-Sep	1-Oct	15-Oct	1-Nov	15-Nov	1-Dec	15-Dec	Seasonal Trend Peak Period Factor
INTERSTATE URBANIZED	1.0672	1.0684	1.0922	1.1160	1.0605	1.0050	0.9923	0.9796	0.9781	0.9767	0.9615	0.9463	0.9517	0.9571	0.9551	0.9531	0.9674	0.9816	0.9850	0.9884	1.0045	1.0206	1.0322	1.0438	0.9463
INTERSTATE NONURBANIZED	1.2426	1.2883	1.3750	1.4616	1.2645	1.0673	1.0382	1.0092	0.9798	0.9504	0.9005	0.8506	0.8322	0.8139	0.8221	0.8302	0.8719	0.9135	0.9441	0.9747	1.0178	1.0608	1.1123	1.1638	0.8139
COMMUTER	1.0850	1.0875	1.1183	1.1492	1.0880	1.0268	1.0014	0.9759	0.9705	0.9650	0.9503	0.9355	0.9470	0.9585	0.9509	0.9433	0.9528	0.9623	0.9614	0.9604	0.9938	1.0272	1.0474	1.0676	0.9355
COASTAL DESTINATION	1.1885	1.1712	1.2001	1.2289	1.1242	1.0194	1.0316	1.0437	1.0080	0.9723	0.9347	0.8972	0.8612	0.8252	0.8205	0.8159	0.8686	0.9214	0.9689	1.0164	1.0660	1.1156	1.1580	1.2005	0.8159
COASTAL DESTINATION ROUTE	1.3445	1.3248	1.4108	1.4968	1.2858	1.0747	1.0911	1.1076	1.0274	0.9473	0.8941	0.8409	0.7820	0.7231	0.7218	0.7205	0.8016	0.8827	0.9669	1.0511	1.1133	1.1754	1.2480	1.3206	0.7205
AGRICULTURE	1.4583	1.4827	1.5763	1.6700	1.4596	1.2492	1.1487	1.0482	0.9747	0.9011	0.8579	0.8146	0.8058	0.7970	0.7922	0.7873	0.7772	0.7670	0.8288	0.8905	0.9947	1.0989	1.2462	1.3934	0.7670
RECREATIONAL SUMMER	1.5848	1.6474	1.7861	1.9247	1.6595	1.3942	1.2973	1.2004	1.0517	0.9029	0.8256	0.7484	0.7018	0.6552	0.6708	0.6864	0.7393	0.7922	0.8898	0.9874	1.1242	1.2610	1.3965	1.5320	0.6552
RECREATIONAL SUMMER WINTER	0.8736	0.8525	0.9330	1.0135	1.0146	1.0158	1.1492	1.2825	1.1763	1.0700	0.9760	0.8821	0.8005	0.7190	0.7305	0.7420	0.8897	1.0374	1.2010	1.3645	1.5212	1.6778	1.3812	1.0847	0.7190
RECREATIONAL WINTER	0.6997	0.6389	0.6561	0.6733	0.7219	0.7704	1.0580	1.3455	1.3746	1.4038	1.2832	1.1625	0.9985	0.8344	0.8600	0.8857	1.0560	1.2262	1.4100	1.5937	1.8758	2.1580	1.5328	0.9076	0.6389
SUMMER	1.2151	1.2357	1.3129	1.3901	1.2520	1.1139	1.0620	1.0100	0.9718	0.9336	0.8976	0.8615	0.8457	0.8299	0.8354	0.8410	0.8743	0.9077	0.9357	0.9638	1.0273	1.0908	1.1322	1.1737	0.8299
SUMMER < 2500	1.3035	1.3186	1.3817	1.4448	1.2869	1.1289	1.0598	0.9906	0.9480	0.9053	0.8720	0.8387	0.8237	0.8086	0.8229	0.8373	0.8616	0.8859	0.9233	0.9607	1.0428	1.1249	1.2016	1.2783	0.8086

*** Seasonal Trend Table factors are based on previous year ATR data. The table is updated yearly.**
*** Grey shading indicates months were seasonal factor is greater than or less than 30%**
*** February 2019 snow event causing lower seasonal factors**

[1]Seasonal Trend Table: The 2020 table is based on 2019 values due to the irregularity caused by the Covid epidemic shutdown during the 2020 count year.

	August Count	Peak		
Commuter	0.9433	0.9355	1.008344	
Summer	0.8410	0.8299	1.013358	
			1.011	Average

	Februay Count	Peak		
Commuter	1.0880	0.9355	1.163004	
Summer	1.2520	0.8299	1.508652	
			1.336	Average

Row River

2014	2035	
485	585	
770	958	0.010928
730	885	
410	550	0.012322
420	510	
455	610	0.013333
370	450	
406	545	0.013439
290	350	
305	410	0.013205
315	390	
295	370	0.01171
	Average	0.01249

I-5 SB

2014	2035	
170	205	
895	1090	0.010284

I-5 NB

2014	2035	
475	580	
120	145	0.010404

Thornton

150	205	
145	175	0.013721
105	130	
75	90	0.010582

Pine Springs at Village Green

APPENDIX E: SYNCHRO OUTPUT

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↱		↰	↱	
Traffic Vol, veh/h	3	0	4	3	0	4	5	356	4	4	262	1
Future Vol, veh/h	3	0	4	3	0	4	5	356	4	4	262	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	40	-	-	130	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	0	0	0	0	0	0	0	7	0	0	11	0
Mvmt Flow	3	0	4	3	0	4	5	371	4	4	273	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	667	667	274	667	665	373	274	0	0	375	0	0
Stage 1	282	282	-	383	383	-	-	-	-	-	-	-
Stage 2	385	385	-	284	282	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	375	382	770	375	383	678	1301	-	-	1195	-	-
Stage 1	729	681	-	644	616	-	-	-	-	-	-	-
Stage 2	642	614	-	727	681	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	371	379	770	371	380	678	1301	-	-	1195	-	-
Mov Cap-2 Maneuver	371	379	-	371	380	-	-	-	-	-	-	-
Stage 1	726	679	-	641	614	-	-	-	-	-	-	-
Stage 2	636	612	-	721	679	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.9	12.3	0.1	0.1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1301	-	-	527	501	1195	-	-
HCM Lane V/C Ratio	0.004	-	-	0.014	0.015	0.003	-	-
HCM Control Delay (s)	7.8	-	-	11.9	12.3	8	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0	0	-	-

HCM 6th TWSC
11: Row River /Row River Rd & Jim Wright Way
03/09/2022

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥		↰	↱			✥		↰	↱	
Traffic Vol, veh/h	0	0	0	15	0	37	0	323	40	103	253	0
Future Vol, veh/h	0	0	0	15	0	37	0	323	40	103	253	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	115	-	-	-	-	-	205	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	0	0	0	0	0	0	0	7	0	2	8	0
Mvmt Flow	0	0	0	16	0	39	0	336	42	107	264	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	855	856	264	835	835	357	264	0	0	378	0	0
Stage 1	478	478	-	357	357	-	-	-	-	-	-	-
Stage 2	377	378	-	478	478	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.218	-	-
Pot Cap-1 Maneuver	281	297	780	289	306	692	1312	-	-	1180	-	-
Stage 1	572	559	-	665	632	-	-	-	-	-	-	-
Stage 2	649	619	-	572	559	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	247	270	780	269	278	692	1312	-	-	1180	-	-
Mov Cap-2 Maneuver	247	270	-	269	278	-	-	-	-	-	-	-
Stage 1	572	508	-	665	632	-	-	-	-	-	-	-
Stage 2	613	619	-	520	508	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	13	0	2.4
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1312	-	-	-	269	692	1180	-	-
HCM Lane V/C Ratio	-	-	-	-	0.058	0.056	0.091	-	-
HCM Control Delay (s)	0	-	-	0	19.2	10.5	8.4	-	-
HCM Lane LOS	A	-	-	A	C	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	0.2	0.2	0.3	-	-

HCM 6th TWSC
1: Row River/Row River & RV Access/Gas Access

03/03/2022

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↱		↰	↱	
Traffic Vol, veh/h	4	0	9	4	0	5	1	478	15	5	534	13
Future Vol, veh/h	4	0	9	4	0	5	1	478	15	5	534	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	40	-	-	130	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	84	84	84	84	84	84	84	84	84
Heavy Vehicles, %	0	0	0	0	0	0	0	4	0	0	2	0
Mvmt Flow	5	0	11	5	0	6	1	569	18	6	636	15

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1239	1245	644	1241	1243	578	651	0	0	587	0	0
Stage 1	656	656	-	580	580	-	-	-	-	-	-	-
Stage 2	583	589	-	661	663	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	154	176	476	153	176	519	945	-	-	998	-	-
Stage 1	458	465	-	504	503	-	-	-	-	-	-	-
Stage 2	502	499	-	455	462	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	151	175	476	149	175	519	945	-	-	998	-	-
Mov Cap-2 Maneuver	151	175	-	149	175	-	-	-	-	-	-	-
Stage 1	458	462	-	503	502	-	-	-	-	-	-	-
Stage 2	496	499	-	442	459	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	18.3	20.2	0	0.1
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	945	-	-	286	247	998	-	-
HCM Lane V/C Ratio	0.001	-	-	0.054	0.043	0.006	-	-
HCM Control Delay (s)	8.8	-	-	18.3	20.2	8.6	-	-
HCM Lane LOS	A	-	-	C	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.1	0	-	-

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥		↰	↱			✥		↰	↱	
Traffic Vol, veh/h	0	0	0	35	0	80	0	454	26	56	517	0
Future Vol, veh/h	0	0	0	35	0	80	0	454	26	56	517	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	115	-	-	-	-	-	205	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	0	0	0	0	1	0	2	4	0
Mvmt Flow	0	0	0	37	0	85	0	483	28	60	550	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1210	1181	550	1167	1167	497	550	0	0	511	0	0
Stage 1	670	670	-	497	497	-	-	-	-	-	-	-
Stage 2	540	511	-	670	670	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.218	-	-
Pot Cap-1 Maneuver	161	192	539	172	195	577	1030	-	-	1054	-	-
Stage 1	450	459	-	559	548	-	-	-	-	-	-	-
Stage 2	530	540	-	450	459	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	131	181	539	164	184	577	1030	-	-	1054	-	-
Mov Cap-2 Maneuver	131	181	-	164	184	-	-	-	-	-	-	-
Stage 1	450	433	-	559	548	-	-	-	-	-	-	-
Stage 2	452	540	-	424	433	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	18.7	0	0.8
HCM LOS	A	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1030	-	-	-	164	577	1054	-	-
HCM Lane V/C Ratio	-	-	-	-	0.227	0.147	0.057	-	-
HCM Control Delay (s)	0	-	-	0	33.3	12.3	8.6	-	-
HCM Lane LOS	A	-	-	A	D	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	0.8	0.5	0.2	-	-

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↱		↰	↱	
Traffic Vol, veh/h	3	0	4	3	0	4	5	365	4	4	268	1
Future Vol, veh/h	3	0	4	3	0	4	5	365	4	4	268	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	40	-	-	130	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	0	0	0	0	0	0	0	7	0	0	11	0
Mvmt Flow	3	0	4	3	0	4	5	380	4	4	279	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	682	682	280	682	680	382	280	0	0	384	0	0
Stage 1	288	288	-	392	392	-	-	-	-	-	-	-
Stage 2	394	394	-	290	288	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	367	375	764	367	376	670	1294	-	-	1186	-	-
Stage 1	724	677	-	637	610	-	-	-	-	-	-	-
Stage 2	635	609	-	722	677	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	363	372	764	363	373	670	1294	-	-	1186	-	-
Mov Cap-2 Maneuver	363	372	-	363	373	-	-	-	-	-	-	-
Stage 1	721	675	-	634	608	-	-	-	-	-	-	-
Stage 2	629	607	-	716	675	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12	12.4	0.1	0.1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1294	-	-	519	492	1186	-	-
HCM Lane V/C Ratio	0.004	-	-	0.014	0.015	0.004	-	-
HCM Control Delay (s)	7.8	-	-	12	12.4	8	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0	0	-	-

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣		↰	↱			✣		↰	↱	
Traffic Vol, veh/h	0	0	0	15	0	38	0	331	41	105	259	0
Future Vol, veh/h	0	0	0	15	0	38	0	331	41	105	259	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	115	-	-	-	-	-	205	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	0	0	0	0	0	0	0	7	0	2	8	0
Mvmt Flow	0	0	0	16	0	40	0	345	43	109	270	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	875	876	270	855	855	367	270	0	0	388	0	0
Stage 1	488	488	-	367	367	-	-	-	-	-	-	-
Stage 2	387	388	-	488	488	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.218	-	-
Pot Cap-1 Maneuver	272	290	774	281	298	683	1305	-	-	1170	-	-
Stage 1	565	553	-	657	626	-	-	-	-	-	-	-
Stage 2	641	612	-	565	553	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	238	263	774	261	270	683	1305	-	-	1170	-	-
Mov Cap-2 Maneuver	238	263	-	261	270	-	-	-	-	-	-	-
Stage 1	565	502	-	657	626	-	-	-	-	-	-	-
Stage 2	604	612	-	512	502	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	13.2	0	2.4
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1305	-	-	-	261	683	1170	-	-
HCM Lane V/C Ratio	-	-	-	-	0.06	0.058	0.093	-	-
HCM Control Delay (s)	0	-	-	0	19.7	10.6	8.4	-	-
HCM Lane LOS	A	-	-	A	C	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	0.2	0.2	0.3	-	-

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↱		↰	↱	
Traffic Vol, veh/h	4	0	9	4	0	5	1	489	15	5	547	13
Future Vol, veh/h	4	0	9	4	0	5	1	489	15	5	547	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	40	-	-	130	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	84	84	84	84	84	84	84	84	84
Heavy Vehicles, %	0	0	0	0	0	0	0	4	0	0	2	0
Mvmt Flow	5	0	11	5	0	6	1	582	18	6	651	15

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1267	1273	659	1269	1271	591	666	0	0	600	0	0
Stage 1	671	671	-	593	593	-	-	-	-	-	-	-
Stage 2	596	602	-	676	678	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	147	169	467	147	169	511	933	-	-	987	-	-
Stage 1	449	458	-	496	497	-	-	-	-	-	-	-
Stage 2	494	492	-	446	455	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	145	168	467	143	168	511	933	-	-	987	-	-
Mov Cap-2 Maneuver	145	168	-	143	168	-	-	-	-	-	-	-
Stage 1	449	455	-	496	497	-	-	-	-	-	-	-
Stage 2	488	492	-	433	452	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	18.8	20.8	0	0.1
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	933	-	-	277	238	987	-	-
HCM Lane V/C Ratio	0.001	-	-	0.056	0.045	0.006	-	-
HCM Control Delay (s)	8.9	-	-	18.8	20.8	8.7	-	-
HCM Lane LOS	A	-	-	C	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.1	0	-	-

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣		↰	↱			✣		↰	↱	
Traffic Vol, veh/h	0	0	0	36	0	82	0	465	27	57	529	0
Future Vol, veh/h	0	0	0	36	0	82	0	465	27	57	529	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	115	-	-	-	-	-	205	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	0	0	0	0	1	0	2	4	0
Mvmt Flow	0	0	0	38	0	87	0	495	29	61	563	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1238	1209	563	1195	1195	510	563	0	0	524	0	0
Stage 1	685	685	-	510	510	-	-	-	-	-	-	-
Stage 2	553	524	-	685	685	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.218	-	-
Pot Cap-1 Maneuver	154	184	530	165	188	567	1019	-	-	1043	-	-
Stage 1	441	451	-	550	541	-	-	-	-	-	-	-
Stage 2	521	533	-	441	451	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	124	173	530	158	177	567	1019	-	-	1043	-	-
Mov Cap-2 Maneuver	124	173	-	158	177	-	-	-	-	-	-	-
Stage 1	441	425	-	550	541	-	-	-	-	-	-	-
Stage 2	441	533	-	415	425	-	-	-	-	-	-	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			19.3			0			0.8		
HCM LOS	A			C								

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1019	-	-	-	158	567	1043	-	-
HCM Lane V/C Ratio	-	-	-	-	0.242	0.154	0.058	-	-
HCM Control Delay (s)	0	-	-	0	34.9	12.5	8.7	-	-
HCM Lane LOS	A	-	-	A	D	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	0.9	0.5	0.2	-	-

1: Row River/Row River & RV Access/Gas Access

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↱		↰	↱	
Traffic Vol, veh/h	13	0	9	3	0	4	7	372	4	4	285	6
Future Vol, veh/h	13	0	9	3	0	4	7	372	4	4	285	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	40	-	-	130	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	0	0	0	0	0	0	0	7	0	0	11	0
Mvmt Flow	14	0	9	3	0	4	7	388	4	4	297	6

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	714	714	300	717	715	390	303	0	0	392	0	0
Stage 1	308	308	-	404	404	-	-	-	-	-	-	-
Stage 2	406	406	-	313	311	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	349	359	744	347	359	663	1269	-	-	1178	-	-
Stage 1	706	664	-	627	603	-	-	-	-	-	-	-
Stage 2	626	601	-	702	662	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	344	356	744	340	356	663	1269	-	-	1178	-	-
Mov Cap-2 Maneuver	344	356	-	340	356	-	-	-	-	-	-	-
Stage 1	702	662	-	623	599	-	-	-	-	-	-	-
Stage 2	619	597	-	691	660	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.6	12.8	0.1	0.1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1269	-	-	441	471	1178	-	-
HCM Lane V/C Ratio	0.006	-	-	0.052	0.015	0.004	-	-
HCM Control Delay (s)	7.9	-	-	13.6	12.8	8.1	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0	0	-	-

HCM 6th TWSC
11: Row River /Row River Rd & Jim Wright Way

03/09/2022

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥		↰	↱			✥		↰	↱	
Traffic Vol, veh/h	32	1	17	15	1	38	7	341	41	105	264	11
Future Vol, veh/h	32	1	17	15	1	38	7	341	41	105	264	11
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	115	-	-	-	-	-	205	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	0	0	0	0	0	0	0	7	0	2	8	0
Mvmt Flow	33	1	18	16	1	40	7	355	43	109	275	11

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	910	911	281	899	895	377	286	0	0	398	0	0
Stage 1	499	499	-	391	391	-	-	-	-	-	-	-
Stage 2	411	412	-	508	504	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.218	-	-
Pot Cap-1 Maneuver	258	276	763	262	282	674	1288	-	-	1161	-	-
Stage 1	557	547	-	637	611	-	-	-	-	-	-	-
Stage 2	622	598	-	551	544	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	223	248	763	236	254	674	1288	-	-	1161	-	-
Mov Cap-2 Maneuver	223	248	-	236	254	-	-	-	-	-	-	-
Stage 1	553	496	-	633	607	-	-	-	-	-	-	-
Stage 2	580	594	-	487	493	-	-	-	-	-	-	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	19.9			13.8			0.1			2.3		
HCM LOS	C			B								

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1288	-	-	294	236	647	1161	-	-
HCM Lane V/C Ratio	0.006	-	-	0.177	0.066	0.063	0.094	-	-
HCM Control Delay (s)	7.8	0	-	19.9	21.3	10.9	8.4	-	-
HCM Lane LOS	A	A	-	C	C	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.6	0.2	0.2	0.3	-	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↱		↰	↱	
Traffic Vol, veh/h	9	0	14	4	0	5	6	507	15	5	556	23
Future Vol, veh/h	9	0	14	4	0	5	6	507	15	5	556	23
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	40	-	-	130	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	84	84	84	84	84	84	84	84	84
Heavy Vehicles, %	0	0	0	0	0	0	0	4	0	0	2	0
Mvmt Flow	11	0	17	5	0	6	7	604	18	6	662	27

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1318	1324	676	1323	1328	613	689	0	0	622	0	0
Stage 1	688	688	-	627	627	-	-	-	-	-	-	-
Stage 2	630	636	-	696	701	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	136	157	457	135	157	496	915	-	-	969	-	-
Stage 1	440	450	-	475	479	-	-	-	-	-	-	-
Stage 2	473	475	-	435	444	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	133	155	457	129	155	496	915	-	-	969	-	-
Mov Cap-2 Maneuver	133	155	-	129	155	-	-	-	-	-	-	-
Stage 1	436	447	-	471	475	-	-	-	-	-	-	-
Stage 2	464	471	-	417	441	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	22.4	22.3	0.1	0.1
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	915	-	-	234	219	969	-	-
HCM Lane V/C Ratio	0.008	-	-	0.117	0.049	0.006	-	-
HCM Control Delay (s)	9	-	-	22.4	22.3	8.7	-	-
HCM Lane LOS	A	-	-	C	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.4	0.2	0	-	-

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥		↰	↱			✥		↰	↱	
Traffic Vol, veh/h	23	1	9	36	1	82	18	470	27	57	539	34
Future Vol, veh/h	23	1	9	36	1	82	18	470	27	57	539	34
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	115	-	-	-	-	-	205	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	0	0	0	0	1	0	2	4	0
Mvmt Flow	24	1	10	38	1	87	19	500	29	61	573	36

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1310	1280	591	1272	1284	515	609	0	0	529	0	0
Stage 1	713	713	-	553	553	-	-	-	-	-	-	-
Stage 2	597	567	-	719	731	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.218	-	-
Pot Cap-1 Maneuver	137	167	511	146	166	564	979	-	-	1038	-	-
Stage 1	426	438	-	521	518	-	-	-	-	-	-	-
Stage 2	493	510	-	423	430	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	108	153	511	133	152	564	979	-	-	1038	-	-
Mov Cap-2 Maneuver	108	153	-	133	152	-	-	-	-	-	-	-
Stage 1	414	412	-	506	503	-	-	-	-	-	-	-
Stage 2	404	496	-	390	405	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	39.4	21.9	0.3	0.8
HCM LOS	E	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	979	-	-	139	133	546	1038	-	-
HCM Lane V/C Ratio	0.02	-	-	0.253	0.288	0.162	0.058	-	-
HCM Control Delay (s)	8.8	0	-	39.4	42.7	12.9	8.7	-	-
HCM Lane LOS	A	A	-	E	E	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.9	1.1	0.6	0.2	-	-

APPENDIX F: QUEUING OUTPUT

Pine Springs at Village Green

SANDOW ENGINEERING

SimTraffic Simulation Summary
2022 Background AM

03/03/2022

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	7:00	7:00	7:00	7:00	7:00	7:00
End Time	8:10	8:10	8:10	8:10	8:10	8:10
Total Time (min)	70	70	70	70	70	70
Time Recorded (min)	70	70	70	70	70	70
# of Intervals	3	3	3	3	3	3
# of Recorded Intervals	3	3	3	3	3	3
Vehs Entered	994	962	959	913	958	958
Vehs Exited	990	958	955	908	955	951
Starting Vehs	0	0	0	0	0	0
Ending Vehs	4	4	4	5	3	2
Travel Distance (mi)	137	135	134	128	134	134
Travel Time (hr)	5.2	4.9	5.0	4.6	5.0	4.9
Total Delay (hr)	0.7	0.6	0.6	0.5	0.6	0.6
Total Stops	157	111	118	103	139	125
Fuel Used (gal)	5.6	5.3	5.4	5.0	5.3	5.3

Interval #0 Information Seeding

Start Time	7:00
End Time	7:10
Total Time (min)	10

Volumes adjusted by PHF, Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	143	136	130	131	163	140
Vehs Exited	140	131	126	129	156	137
Starting Vehs	0	0	0	0	0	0
Ending Vehs	3	5	4	2	7	4
Travel Distance (mi)	20	19	18	18	22	19
Travel Time (hr)	0.7	0.7	0.7	0.7	0.8	0.7
Total Delay (hr)	0.1	0.1	0.1	0.1	0.1	0.1
Total Stops	23	16	17	17	21	20
Fuel Used (gal)	0.8	0.7	0.7	0.7	0.9	0.8

Interval #1 Information Recording

Start Time	7:10
End Time	7:25
Total Time (min)	15

Volumes adjusted by PHF, Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	237	211	226	210	231	224
Vehs Exited	237	213	227	208	234	223
Starting Vehs	3	5	4	2	7	4
Ending Vehs	3	3	3	4	4	3
Travel Distance (mi)	33	30	32	29	32	31
Travel Time (hr)	1.3	1.1	1.2	1.0	1.2	1.2
Total Delay (hr)	0.2	0.1	0.2	0.1	0.2	0.2
Total Stops	37	20	23	23	38	27
Fuel Used (gal)	1.4	1.1	1.3	1.1	1.3	1.2

Interval #2 Information Recording 2

Start Time	7:25
End Time	8:10
Total Time (min)	45

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	2	3	4	5	Avg
Vehs Entered	614	615	603	572	564	592
Vehs Exited	613	614	602	571	565	592
Starting Vehs	3	3	3	4	4	3
Ending Vehs	4	4	4	5	3	2
Travel Distance (mi)	84	86	84	81	79	83
Travel Time (hr)	3.2	3.1	3.1	2.9	2.9	3.1
Total Delay (hr)	0.4	0.4	0.4	0.3	0.4	0.4
Total Stops	97	75	78	63	80	77
Fuel Used (gal)	3.4	3.5	3.4	3.2	3.1	3.3

Intersection: 1: Row River/Row River & RV Access/Gas Access, Interval #0

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	L	L
Maximum Queue (ft)	12	22	17	12
Average Queue (ft)	4	8	3	4
95th Queue (ft)	20	28	18	20
Link Distance (ft)	276	141		
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			40	130
Storage Blk Time (%)			0	
Queuing Penalty (veh)			0	

Intersection: 1: Row River/Row River & RV Access/Gas Access, Interval #1

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	L	L
Maximum Queue (ft)	24	33	6	6
Average Queue (ft)	7	9	1	1
95th Queue (ft)	27	33	9	9
Link Distance (ft)	276	141		
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			40	130
Storage Blk Time (%)			0	
Queuing Penalty (veh)			0	

Intersection: 1: Row River/Row River & RV Access/Gas Access, Interval #2

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	L	L
Maximum Queue (ft)	31	29	28	11
Average Queue (ft)	6	7	2	0
95th Queue (ft)	26	27	13	6
Link Distance (ft)	276	141		
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			40	130
Storage Blk Time (%)			0	
Queuing Penalty (veh)			0	

Intersection: 1: Row River/Row River & RV Access/Gas Access, All Intervals

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	L	L
Maximum Queue (ft)	31	33	28	24
Average Queue (ft)	6	8	2	1
95th Queue (ft)	25	29	13	10
Link Distance (ft)	276	141		
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			40	130
Storage Blk Time (%)			0	
Queuing Penalty (veh)			0	

Intersection: 11: Row River /Row River Rd & Jim Wright Way, Interval #0

Movement	WB	WB	SB
Directions Served	L	TR	L
Maximum Queue (ft)	25	27	42
Average Queue (ft)	10	20	23
95th Queue (ft)	30	35	52
Link Distance (ft)		177	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	115		205
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 11: Row River /Row River Rd & Jim Wright Way, Interval #1

Movement	WB	WB	NB	SB
Directions Served	L	TR	LTR	L
Maximum Queue (ft)	34	31	4	46
Average Queue (ft)	10	18	1	23
95th Queue (ft)	34	37	6	53
Link Distance (ft)		177	233	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	115			205
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 11: Row River /Row River Rd & Jim Wright Way, Interval #2

Movement	WB	WB	NB	SB
Directions Served	L	TR	LTR	L
Maximum Queue (ft)	30	41	8	68
Average Queue (ft)	11	17	0	24
95th Queue (ft)	32	37	5	59
Link Distance (ft)		177	233	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	115			205
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 11: Row River /Row River Rd & Jim Wright Way, All Intervals

Movement	WB	WB	NB	SB
Directions Served	L	TR	LTR	L
Maximum Queue (ft)	38	42	12	72
Average Queue (ft)	10	18	0	24
95th Queue (ft)	32	36	5	57
Link Distance (ft)		177	233	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	115			205
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty, Interval #0: 0
Network wide Queuing Penalty, Interval #1: 0
Network wide Queuing Penalty, Interval #2: 0
Network wide Queuing Penalty, All Intervals: 0

SimTraffic Simulation Summary
2022 Background PM

03/03/2022

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	7:00	7:00	7:00	7:00	7:00	7:00
End Time	8:10	8:10	8:10	8:10	8:10	8:10
Total Time (min)	70	70	70	70	70	70
Time Recorded (min)	70	70	70	70	70	70
# of Intervals	3	3	3	3	3	3
# of Recorded Intervals	3	3	3	3	3	3
Vehs Entered	1433	1545	1467	1444	1538	1488
Vehs Exited	1427	1542	1457	1437	1531	1479
Starting Vehs	0	0	0	0	0	0
Ending Vehs	6	3	10	7	7	6
Travel Distance (mi)	202	220	208	205	216	210
Travel Time (hr)	7.5	8.2	7.6	7.6	8.1	7.8
Total Delay (hr)	1.1	1.3	1.1	1.1	1.3	1.2
Total Stops	204	199	179	179	214	195
Fuel Used (gal)	8.5	9.2	8.6	8.4	9.1	8.8

Interval #0 Information Seeding

Start Time	7:00
End Time	7:10
Total Time (min)	10

Volumes adjusted by PHF, Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	209	236	232	258	256	237
Vehs Exited	204	232	222	251	247	232
Starting Vehs	0	0	0	0	0	0
Ending Vehs	5	4	10	7	9	7
Travel Distance (mi)	29	33	31	35	35	33
Travel Time (hr)	1.1	1.3	1.2	1.4	1.3	1.3
Total Delay (hr)	0.2	0.3	0.2	0.2	0.2	0.2
Total Stops	28	32	26	29	28	28
Fuel Used (gal)	1.2	1.4	1.3	1.4	1.5	1.4

Interval #1 Information Recording

Start Time	7:10
End Time	7:25
Total Time (min)	15

Volumes adjusted by PHF, Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	363	399	352	354	379	370
Vehs Exited	364	398	356	356	381	372
Starting Vehs	5	4	10	7	9	7
Ending Vehs	4	5	6	5	7	3
Travel Distance (mi)	51	57	49	50	54	52
Travel Time (hr)	1.9	2.1	1.9	1.9	2.0	2.0
Total Delay (hr)	0.3	0.4	0.3	0.3	0.3	0.3
Total Stops	45	48	49	43	44	46
Fuel Used (gal)	2.2	2.4	2.1	2.1	2.3	2.2

Interval #2 Information Recording 2

Start Time	7:25
End Time	8:10
Total Time (min)	45

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	2	3	4	5	Avg
Vehs Entered	861	910	883	832	903	877
Vehs Exited	859	912	879	830	903	877
Starting Vehs	4	5	6	5	7	3
Ending Vehs	6	3	10	7	7	6
Travel Distance (mi)	122	130	127	119	127	125
Travel Time (hr)	4.5	4.8	4.6	4.3	4.8	4.6
Total Delay (hr)	0.6	0.7	0.6	0.6	0.7	0.6
Total Stops	131	119	104	107	142	121
Fuel Used (gal)	5.1	5.4	5.2	4.9	5.4	5.2

Intersection: 1: Row River/Row River & RV Access/Gas Access, Interval #0

Movement	EB	WB	SB
Directions Served	LTR	LTR	L
Maximum Queue (ft)	35	33	6
Average Queue (ft)	12	8	1
95th Queue (ft)	38	31	11
Link Distance (ft)	276	141	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			130
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 1: Row River/Row River & RV Access/Gas Access, Interval #1

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	L	L	TR
Maximum Queue (ft)	39	29	6	24	11
Average Queue (ft)	13	10	1	4	2
95th Queue (ft)	41	32	9	20	16
Link Distance (ft)	276	141			233
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			40	130	
Storage Blk Time (%)			0		
Queuing Penalty (veh)			0		

Intersection: 1: Row River/Row River & RV Access/Gas Access, Interval #2

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	L	L
Maximum Queue (ft)	31	29	6	30
Average Queue (ft)	9	9	0	2
95th Queue (ft)	32	31	5	15
Link Distance (ft)	276	141		
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			40	130
Storage Blk Time (%)			0	
Queuing Penalty (veh)			0	

Intersection: 1: Row River/Row River & RV Access/Gas Access, All Intervals

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	L	L	TR
Maximum Queue (ft)	40	33	11	31	11
Average Queue (ft)	10	9	0	2	0
95th Queue (ft)	35	31	5	16	7
Link Distance (ft)	276	141			233
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			40	130	
Storage Blk Time (%)			0		
Queuing Penalty (veh)			0		

Intersection: 11: Row River /Row River Rd & Jim Wright Way, Interval #0

Movement	WB	WB	SB
Directions Served	L	TR	L
Maximum Queue (ft)	46	30	28
Average Queue (ft)	23	24	19
95th Queue (ft)	55	41	40
Link Distance (ft)		177	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	115		205
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 11: Row River /Row River Rd & Jim Wright Way, Interval #1

Movement	WB	WB	SB
Directions Served	L	TR	L
Maximum Queue (ft)	38	42	42
Average Queue (ft)	22	26	19
95th Queue (ft)	43	43	46
Link Distance (ft)		177	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	115		205
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 11: Row River /Row River Rd & Jim Wright Way, Interval #2

Movement	WB	WB	SB
Directions Served	L	TR	L
Maximum Queue (ft)	42	51	36
Average Queue (ft)	18	26	15
95th Queue (ft)	39	46	39
Link Distance (ft)		177	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	115		205
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 11: Row River /Row River Rd & Jim Wright Way, All Intervals

Movement	WB	WB	SB
Directions Served	L	TR	L
Maximum Queue (ft)	51	54	46
Average Queue (ft)	20	26	17
95th Queue (ft)	43	44	40
Link Distance (ft)		177	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	115		205
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty, Interval #0: 0
Network wide Queuing Penalty, Interval #1: 0
Network wide Queuing Penalty, Interval #2: 0
Network wide Queuing Penalty, All Intervals: 0

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	7:00	7:00	7:00	7:00	7:00	7:00
End Time	8:10	8:10	8:10	8:10	8:10	8:10
Total Time (min)	70	70	70	70	70	70
Time Recorded (min)	70	70	70	70	70	70
# of Intervals	3	3	3	3	3	3
# of Recorded Intervals	3	3	3	3	3	3
Vehs Entered	964	936	940	899	906	929
Vehs Exited	957	926	939	892	900	922
Starting Vehs	0	0	0	0	0	0
Ending Vehs	7	10	1	7	6	5
Travel Distance (mi)	136	130	132	126	128	130
Travel Time (hr)	5.1	4.8	4.8	4.6	4.6	4.8
Total Delay (hr)	0.7	0.5	0.6	0.5	0.5	0.6
Total Stops	134	139	135	121	109	129
Fuel Used (gal)	5.4	5.2	5.2	5.0	5.0	5.2

Interval #0 Information Seeding

Start Time	7:00
End Time	7:10
Total Time (min)	10

Volumes adjusted by PHF, Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	147	151	139	134	135	142
Vehs Exited	144	147	131	130	131	137
Starting Vehs	0	0	0	0	0	0
Ending Vehs	3	4	8	4	4	5
Travel Distance (mi)	20	21	19	19	18	20
Travel Time (hr)	0.8	0.8	0.7	0.7	0.7	0.7
Total Delay (hr)	0.1	0.1	0.1	0.1	0.1	0.1
Total Stops	21	23	23	18	13	19
Fuel Used (gal)	0.8	0.9	0.7	0.7	0.7	0.8

Interval #1 Information Recording

Start Time	7:10
End Time	7:25
Total Time (min)	15

Volumes adjusted by PHF, Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	206	215	213	199	195	205
Vehs Exited	205	218	216	203	195	207
Starting Vehs	3	4	8	4	4	5
Ending Vehs	4	1	5	0	4	1
Travel Distance (mi)	29	30	30	28	28	29
Travel Time (hr)	1.1	1.1	1.1	1.0	1.0	1.1
Total Delay (hr)	0.1	0.1	0.2	0.1	0.1	0.1
Total Stops	27	24	39	27	23	29
Fuel Used (gal)	1.2	1.2	1.2	1.1	1.1	1.2

Interval #2 Information Recording 2

Start Time	7:25
End Time	8:10
Total Time (min)	45

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	2	3	4	5	Avg
Vehs Entered	611	570	588	566	576	582
Vehs Exited	608	561	592	559	574	579
Starting Vehs	4	1	5	0	4	1
Ending Vehs	7	10	1	7	6	5
Travel Distance (mi)	86	78	83	80	81	82
Travel Time (hr)	3.3	2.9	3.0	2.9	2.9	3.0
Total Delay (hr)	0.4	0.3	0.3	0.3	0.3	0.3
Total Stops	86	92	73	76	73	81
Fuel Used (gal)	3.4	3.2	3.2	3.2	3.2	3.2

Intersection: 1: Row River/Row River & RV Access/Gas Access, Interval #0

Movement	EB	WB
Directions Served	LTR	LTR
Maximum Queue (ft)	30	28
Average Queue (ft)	12	7
95th Queue (ft)	36	26
Link Distance (ft)	276	141
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 1: Row River/Row River & RV Access/Gas Access, Interval #1

Movement	EB	WB	NB
Directions Served	LTR	LTR	L
Maximum Queue (ft)	24	29	11
Average Queue (ft)	5	6	2
95th Queue (ft)	24	26	13
Link Distance (ft)	276	141	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			40
Storage Blk Time (%)			0
Queuing Penalty (veh)			0

Intersection: 1: Row River/Row River & RV Access/Gas Access, Interval #2

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	L	L
Maximum Queue (ft)	31	29	11	18
Average Queue (ft)	8	8	1	1
95th Queue (ft)	30	30	7	9
Link Distance (ft)	276	141		
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			40	130
Storage Blk Time (%)			0	
Queuing Penalty (veh)			0	

Intersection: 1: Row River/Row River & RV Access/Gas Access, All Intervals

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	L	L
Maximum Queue (ft)	31	29	23	18
Average Queue (ft)	8	8	1	1
95th Queue (ft)	30	28	8	7
Link Distance (ft)	276	141		
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			40	130
Storage Blk Time (%)			0	
Queuing Penalty (veh)			0	

Intersection: 11: Row River /Row River Rd & Jim Wright Way, Interval #0

Movement	WB	WB	SB
Directions Served	L	TR	L
Maximum Queue (ft)	29	22	37
Average Queue (ft)	13	14	23
95th Queue (ft)	38	31	46
Link Distance (ft)		177	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	115		205
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 11: Row River /Row River Rd & Jim Wright Way, Interval #1

Movement	WB	WB	NB	SB
Directions Served	L	TR	LTR	L
Maximum Queue (ft)	26	22	12	52
Average Queue (ft)	11	17	2	23
95th Queue (ft)	31	32	11	51
Link Distance (ft)		177	233	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	115			205
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 11: Row River /Row River Rd & Jim Wright Way, Interval #2

Movement	WB	WB	NB	SB
Directions Served	L	TR	LTR	L
Maximum Queue (ft)	34	30	9	61
Average Queue (ft)	10	14	0	23
95th Queue (ft)	31	33	7	56
Link Distance (ft)		177	233	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	115			205
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 11: Row River /Row River Rd & Jim Wright Way, All Intervals

Movement	WB	WB	NB	SB
Directions Served	L	TR	LTR	L
Maximum Queue (ft)	42	30	16	65
Average Queue (ft)	10	14	1	23
95th Queue (ft)	32	33	8	53
Link Distance (ft)		177	233	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	115			205
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty, Interval #0: 0

Network wide Queuing Penalty, Interval #1: 0

Network wide Queuing Penalty, Interval #2: 0

Network wide Queuing Penalty, All Intervals: 0

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	7:00	7:00	7:00	7:00	7:00	7:00
End Time	8:10	8:10	8:10	8:10	8:10	8:10
Total Time (min)	70	70	70	70	70	70
Time Recorded (min)	70	70	70	70	70	70
# of Intervals	3	3	3	3	3	3
# of Recorded Intervals	3	3	3	3	3	3
Vehs Entered	1453	1464	1482	1529	1474	1478
Vehs Exited	1447	1454	1478	1522	1469	1474
Starting Vehs	0	0	0	0	0	0
Ending Vehs	6	10	4	7	5	6
Travel Distance (mi)	207	208	210	217	208	210
Travel Time (hr)	7.6	7.7	7.8	8.2	7.8	7.8
Total Delay (hr)	1.1	1.2	1.2	1.3	1.2	1.2
Total Stops	189	191	192	206	219	198
Fuel Used (gal)	8.6	8.8	8.8	9.0	8.6	8.8

Interval #0 Information Seeding

Start Time	7:00
End Time	7:10
Total Time (min)	10

Volumes adjusted by PHF, Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	232	243	228	246	217	230
Vehs Exited	225	240	219	241	207	227
Starting Vehs	0	0	0	0	0	0
Ending Vehs	7	3	9	5	10	6
Travel Distance (mi)	33	34	32	35	30	33
Travel Time (hr)	1.2	1.3	1.1	1.3	1.1	1.2
Total Delay (hr)	0.2	0.2	0.2	0.2	0.1	0.2
Total Stops	27	33	26	27	27	26
Fuel Used (gal)	1.3	1.4	1.3	1.4	1.2	1.3

Interval #1 Information Recording

Start Time	7:10
End Time	7:25
Total Time (min)	15

Volumes adjusted by PHF, Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	361	341	402	365	385	372
Vehs Exited	360	340	405	363	392	372
Starting Vehs	7	3	9	5	10	6
Ending Vehs	8	4	6	7	3	6
Travel Distance (mi)	50	48	57	51	55	52
Travel Time (hr)	1.8	1.7	2.2	1.9	2.1	2.0
Total Delay (hr)	0.3	0.3	0.4	0.3	0.4	0.3
Total Stops	42	39	53	46	57	47
Fuel Used (gal)	2.1	2.0	2.5	2.2	2.4	2.2

Interval #2 Information Recording 2

Start Time	7:25
End Time	8:10
Total Time (min)	45

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	2	3	4	5	Avg
Vehs Entered	860	880	852	918	872	877
Vehs Exited	862	874	854	918	870	876
Starting Vehs	8	4	6	7	3	6
Ending Vehs	6	10	4	7	5	6
Travel Distance (mi)	123	126	121	132	124	125
Travel Time (hr)	4.6	4.7	4.4	4.9	4.6	4.6
Total Delay (hr)	0.7	0.7	0.6	0.8	0.7	0.7
Total Stops	120	119	113	133	135	124
Fuel Used (gal)	5.1	5.3	5.0	5.4	5.1	5.2

Intersection: 1: Row River/Row River & RV Access/Gas Access, Interval #0

Movement	EB	WB
Directions Served	LTR	LTR
Maximum Queue (ft)	34	29
Average Queue (ft)	15	14
95th Queue (ft)	41	36
Link Distance (ft)	276	141
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 1: Row River/Row River & RV Access/Gas Access, Interval #1

Movement	EB	WB	SB	SB
Directions Served	LTR	LTR	L	TR
Maximum Queue (ft)	34	32	30	9
Average Queue (ft)	14	11	3	1
95th Queue (ft)	41	33	19	14
Link Distance (ft)	276	141		233
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			130	
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 1: Row River/Row River & RV Access/Gas Access, Interval #2

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	L	L
Maximum Queue (ft)	35	29	12	24
Average Queue (ft)	8	8	0	1
95th Queue (ft)	31	30	5	10
Link Distance (ft)	276	141		
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			40	130
Storage Blk Time (%)			0	
Queuing Penalty (veh)			0	

Intersection: 1: Row River/Row River & RV Access/Gas Access, All Intervals

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	L	L	TR
Maximum Queue (ft)	39	33	12	30	9
Average Queue (ft)	11	10	0	1	0
95th Queue (ft)	35	32	4	12	6
Link Distance (ft)	276	141			233
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			40	130	
Storage Blk Time (%)			0		
Queuing Penalty (veh)			0		

Intersection: 11: Row River /Row River Rd & Jim Wright Way, Interval #0

Movement	WB	WB	SB
Directions Served	L	TR	L
Maximum Queue (ft)	41	45	32
Average Queue (ft)	19	25	18
95th Queue (ft)	47	49	42
Link Distance (ft)		177	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	115		205
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 11: Row River /Row River Rd & Jim Wright Way, Interval #1

Movement	WB	WB	SB
Directions Served	L	TR	L
Maximum Queue (ft)	42	50	32
Average Queue (ft)	21	26	16
95th Queue (ft)	46	47	40
Link Distance (ft)		177	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	115		205
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 11: Row River /Row River Rd & Jim Wright Way, Interval #2

Movement	WB	WB	NB	SB
Directions Served	L	TR	LTR	L
Maximum Queue (ft)	55	50	4	51
Average Queue (ft)	22	24	0	16
95th Queue (ft)	46	41	3	43
Link Distance (ft)		177	233	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	115			205
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 11: Row River /Row River Rd & Jim Wright Way, All Intervals

Movement	WB	WB	NB	SB
Directions Served	L	TR	LTR	L
Maximum Queue (ft)	55	58	4	51
Average Queue (ft)	21	25	0	16
95th Queue (ft)	46	44	2	42
Link Distance (ft)		177	233	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	115			205
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty, Interval #0: 0
Network wide Queuing Penalty, Interval #1: 0
Network wide Queuing Penalty, Interval #2: 0
Network wide Queuing Penalty, All Intervals: 0

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	7:00	7:00	7:00	7:00	7:00	7:00
End Time	8:10	8:10	8:10	8:10	8:10	8:10
Total Time (min)	70	70	70	70	70	70
Time Recorded (min)	70	70	70	70	70	70
# of Intervals	3	3	3	3	3	3
# of Recorded Intervals	3	3	3	3	3	3
Vehs Entered	1029	1063	1065	1076	1090	1064
Vehs Exited	1025	1059	1063	1069	1086	1060
Starting Vehs	0	0	0	0	0	0
Ending Vehs	4	4	2	7	4	2
Travel Distance (mi)	140	145	147	146	149	145
Travel Time (hr)	5.5	5.6	5.8	5.8	5.8	5.7
Total Delay (hr)	0.8	0.8	0.9	0.9	0.9	0.9
Total Stops	197	200	217	216	204	205
Fuel Used (gal)	5.8	6.1	6.1	6.1	6.2	6.1

Interval #0 Information Seeding

Start Time	7:00
End Time	7:10
Total Time (min)	10

Volumes adjusted by PHF, Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	157	170	156	143	153	156
Vehs Exited	154	160	153	140	146	151
Starting Vehs	0	0	0	0	0	0
Ending Vehs	3	10	3	3	7	4
Travel Distance (mi)	21	22	21	19	21	21
Travel Time (hr)	0.8	0.9	0.9	0.8	0.8	0.8
Total Delay (hr)	0.1	0.2	0.1	0.1	0.1	0.1
Total Stops	28	36	37	22	29	29
Fuel Used (gal)	0.9	1.0	0.9	0.8	0.9	0.9

Interval #1 Information Recording

Start Time	7:10
End Time	7:25
Total Time (min)	15

Volumes adjusted by PHF, Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	226	215	237	220	245	229
Vehs Exited	224	223	237	215	243	228
Starting Vehs	3	10	3	3	7	4
Ending Vehs	5	2	3	8	9	5
Travel Distance (mi)	31	31	33	30	33	31
Travel Time (hr)	1.2	1.2	1.3	1.2	1.3	1.2
Total Delay (hr)	0.2	0.2	0.2	0.2	0.2	0.2
Total Stops	44	37	45	42	49	43
Fuel Used (gal)	1.2	1.3	1.4	1.2	1.4	1.3

Interval #2 Information Recording 2

Start Time	7:25
End Time	8:10
Total Time (min)	45

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	2	3	4	5	Avg
Vehs Entered	646	678	672	713	692	679
Vehs Exited	647	676	673	714	697	681
Starting Vehs	5	2	3	8	9	5
Ending Vehs	4	4	2	7	4	2
Travel Distance (mi)	88	92	93	96	95	93
Travel Time (hr)	3.4	3.6	3.6	3.8	3.7	3.6
Total Delay (hr)	0.5	0.5	0.5	0.6	0.6	0.5
Total Stops	125	127	135	152	126	133
Fuel Used (gal)	3.7	3.9	3.8	4.1	3.9	3.9

Intersection: 1: Row River/Row River & RV Access/Gas Access, Interval #0

Movement	EB	WB	SB
Directions Served	LTR	LTR	L
Maximum Queue (ft)	30	11	6
Average Queue (ft)	13	2	1
95th Queue (ft)	38	15	11
Link Distance (ft)	276	141	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			130
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 1: Row River/Row River & RV Access/Gas Access, Interval #1

Movement	EB	WB	NB
Directions Served	LTR	LTR	L
Maximum Queue (ft)	31	28	11
Average Queue (ft)	15	6	2
95th Queue (ft)	40	24	12
Link Distance (ft)	276	141	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			40
Storage Blk Time (%)			0
Queuing Penalty (veh)			0

Intersection: 1: Row River/Row River & RV Access/Gas Access, Interval #2

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	L	L
Maximum Queue (ft)	41	29	23	18
Average Queue (ft)	16	6	2	1
95th Queue (ft)	42	24	13	10
Link Distance (ft)	276	141		
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			40	130
Storage Blk Time (%)			0	
Queuing Penalty (veh)			0	

Intersection: 1: Row River/Row River & RV Access/Gas Access, All Intervals

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	L	L
Maximum Queue (ft)	41	29	23	18
Average Queue (ft)	16	5	2	1
95th Queue (ft)	41	23	12	9
Link Distance (ft)	276	141		
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			40	130
Storage Blk Time (%)			0	
Queuing Penalty (veh)			0	

Intersection: 11: Row River /Row River Rd & Jim Wright Way, Interval #0

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	L	TR	LTR	L
Maximum Queue (ft)	40	30	22	20	69
Average Queue (ft)	27	14	14	4	31
95th Queue (ft)	47	37	32	27	79
Link Distance (ft)	99		177	233	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		115			205
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 11: Row River /Row River Rd & Jim Wright Way, Interval #1

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	L	TR	LTR	L
Maximum Queue (ft)	47	25	31	6	44
Average Queue (ft)	24	11	16	1	22
95th Queue (ft)	49	31	38	8	47
Link Distance (ft)	99		177	233	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		115			205
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 11: Row River /Row River Rd & Jim Wright Way, Interval #2

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	L	TR	LTR	L
Maximum Queue (ft)	53	37	37	22	56
Average Queue (ft)	25	11	18	1	25
95th Queue (ft)	50	33	36	11	53
Link Distance (ft)	99		177	233	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		115			205
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 11: Row River /Row River Rd & Jim Wright Way, All Intervals

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	L	TR	LTR	L
Maximum Queue (ft)	54	38	41	31	77
Average Queue (ft)	25	11	17	2	25
95th Queue (ft)	50	33	36	14	56
Link Distance (ft)	99		177	233	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		115			205
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty, Interval #0: 0

Network wide Queuing Penalty, Interval #1: 0

Network wide Queuing Penalty, Interval #2: 0

Network wide Queuing Penalty, All Intervals: 0

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	7:00	7:00	7:00	7:00	7:00	7:00
End Time	8:10	8:10	8:10	8:10	8:10	8:10
Total Time (min)	70	70	70	70	70	70
Time Recorded (min)	70	70	70	70	70	70
# of Intervals	3	3	3	3	3	3
# of Recorded Intervals	3	3	3	3	3	3
Vehs Entered	1666	1672	1647	1692	1672	1670
Vehs Exited	1658	1664	1647	1683	1666	1664
Starting Vehs	0	0	0	0	0	0
Ending Vehs	8	8	0	9	6	5
Travel Distance (mi)	230	231	228	232	231	230
Travel Time (hr)	9.4	9.4	9.0	9.5	9.3	9.3
Total Delay (hr)	1.9	1.9	1.7	2.0	1.8	1.9
Total Stops	278	285	252	296	277	276
Fuel Used (gal)	10.1	10.1	9.8	10.1	10.0	10.0

Interval #0 Information Seeding

Start Time	7:00
End Time	7:10
Total Time (min)	10

Volumes adjusted by PHF, Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	264	249	271	266	283	266
Vehs Exited	258	242	265	261	270	261
Starting Vehs	0	0	0	0	0	0
Ending Vehs	6	7	6	5	13	7
Travel Distance (mi)	36	34	37	36	38	36
Travel Time (hr)	1.6	1.3	1.5	1.5	1.6	1.5
Total Delay (hr)	0.5	0.2	0.3	0.3	0.4	0.3
Total Stops	53	43	32	42	46	42
Fuel Used (gal)	1.6	1.5	1.6	1.6	1.7	1.6

Interval #1 Information Recording

Start Time	7:10
End Time	7:25
Total Time (min)	15

Volumes adjusted by PHF, Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	414	412	377	409	417	407
Vehs Exited	408	402	374	408	419	403
Starting Vehs	6	7	6	5	13	7
Ending Vehs	12	17	9	6	11	8
Travel Distance (mi)	58	56	51	56	56	55
Travel Time (hr)	2.3	2.3	2.0	2.4	2.3	2.3
Total Delay (hr)	0.5	0.5	0.4	0.6	0.5	0.5
Total Stops	50	67	59	74	69	63
Fuel Used (gal)	2.5	2.5	2.2	2.5	2.5	2.4

Interval #2 Information Recording 2

Start Time	7:25
End Time	8:10
Total Time (min)	45

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	2	3	4	5	Avg
Vehs Entered	988	1011	999	1017	972	997
Vehs Exited	992	1020	1008	1014	977	1002
Starting Vehs	12	17	9	6	11	8
Ending Vehs	8	8	0	9	6	5
Travel Distance (mi)	136	141	139	140	137	139
Travel Time (hr)	5.5	5.8	5.5	5.6	5.4	5.6
Total Delay (hr)	1.0	1.2	1.0	1.1	1.0	1.1
Total Stops	175	175	161	180	162	169
Fuel Used (gal)	6.0	6.1	6.0	6.0	5.8	6.0

Intersection: 1: Row River/Row River & RV Access/Gas Access, Interval #0

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	L	L
Maximum Queue (ft)	40	28	6	12
Average Queue (ft)	21	9	2	4
95th Queue (ft)	51	30	14	20
Link Distance (ft)	276	141		
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			40	130
Storage Blk Time (%)			0	
Queuing Penalty (veh)			0	

Intersection: 1: Row River/Row River & RV Access/Gas Access, Interval #1

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	L	L
Maximum Queue (ft)	40	29	12	18
Average Queue (ft)	26	8	3	3
95th Queue (ft)	51	29	18	19
Link Distance (ft)	276	141		
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			40	130
Storage Blk Time (%)			0	
Queuing Penalty (veh)			1	

Intersection: 1: Row River/Row River & RV Access/Gas Access, Interval #2

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	L	L
Maximum Queue (ft)	48	38	28	24
Average Queue (ft)	18	8	3	2
95th Queue (ft)	45	31	18	15
Link Distance (ft)	276	141		
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			40	130
Storage Blk Time (%)			0	
Queuing Penalty (veh)			0	

Intersection: 1: Row River/Row River & RV Access/Gas Access, All Intervals

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	L	L
Maximum Queue (ft)	53	38	28	30
Average Queue (ft)	20	8	3	3
95th Queue (ft)	47	31	18	17
Link Distance (ft)	276	141		
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			40	130
Storage Blk Time (%)			0	
Queuing Penalty (veh)			0	

Intersection: 11: Row River /Row River Rd & Jim Wright Way, Interval #0

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	L	TR	LTR	L
Maximum Queue (ft)	33	37	45	67	32
Average Queue (ft)	22	19	28	26	15
95th Queue (ft)	47	43	48	93	40
Link Distance (ft)	99		177	233	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		115			205
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 11: Row River /Row River Rd & Jim Wright Way, Interval #1

Movement	EB	WB	WB	NB	SB	SB
Directions Served	LTR	L	TR	LTR	L	TR
Maximum Queue (ft)	46	42	44	46	41	6
Average Queue (ft)	19	21	28	10	20	0
95th Queue (ft)	45	47	44	44	51	0
Link Distance (ft)	99		177	233		169
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		115			205	
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 11: Row River /Row River Rd & Jim Wright Way, Interval #2

Movement	EB	WB	WB	NB	SB	SB
Directions Served	LTR	L	TR	LTR	L	TR
Maximum Queue (ft)	54	45	56	103	56	4
Average Queue (ft)	19	18	27	14	22	0
95th Queue (ft)	45	40	47	59	49	3
Link Distance (ft)	99		177	233		169
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		115			205	
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 11: Row River /Row River Rd & Jim Wright Way, All Intervals

Movement	EB	WB	WB	NB	SB	SB
Directions Served	LTR	L	TR	LTR	L	TR
Maximum Queue (ft)	56	46	59	120	59	10
Average Queue (ft)	20	19	27	15	20	0
95th Queue (ft)	46	42	47	63	48	3
Link Distance (ft)	99		177	233		169
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		115			205	
Storage Blk Time (%)						
Queuing Penalty (veh)						

Network Summary

Network wide Queuing Penalty, Interval #0: 0
Network wide Queuing Penalty, Interval #1: 1
Network wide Queuing Penalty, Interval #2: 0
Network wide Queuing Penalty, All Intervals: 0

APPENDIX G: SIGNAL WARRANT

Pine Springs at Village Green

SANDOW ENGINEERING

Major Street:	Row River
Minor Street:	Jim Wright
Project Name:	Pine Springs at Village Green
City/County:	Cottage Grove
Analysis Year:	2024
Alternative:	With Development
Meet 70% Warrants?:	No
	100%

Major **Approach Lanes:**	1
Minor **Approach Lanes:**	1
Major **Approach Volumes (vph):**	1145
Minor **Approach Volume (vph):**	119
Right Turn Volume (vph):	80
Capacity of Shared/Exclusive Right Turn Lane[1]:	546
Right Turn Discount:	464
Right Turn Volume included in Warrant:	0
Minor Approach Volume in Warrant:	39
Major Approach K factor:	10
Minor Approach K factor:	10

[1] Capacity obtained from unsignalized intersection analysis

For guidance on preliminary signal warrant analysis, refer to the Analysis Procedures Manual.

Last Updated: January 2018

Oregon Department of Transportation
Transportation Development Branch
Transportation Planning Analysis Unit

Preliminary Traffic Signal Warrant Analysis[1]

Major Street:	Row River	**Minor Street:**	Jim Wright
Project:	Pine Springs at Village Green	**City/County:**	Cottage Grove
Year:	2024	**Alternative:**	With Development

Preliminary Signal Warrant Volumes

Number of Approach lanes		ADT on major street approaching from both directions		ADT on minor street, highest approaching volume	
Major Street	Minor Street	Percent of standard warrants		Percent of standard warrants	
		100	70	100	70
Case A: Minimum Vehicular Traffic					
1	1	8850	6200	2650	1850
2 or more	1	10600	7400	2650	1850
2 or more	2 or more	10600	7400	3550	2500
1	2 or more	8850	6200	3550	2500
Case B: Interruption of Continuous Traffic					
1	1	13300	9300	1350	950
2 or more	1	15900	11100	1350	950
2 or more	2 or more	15900	11100	1750	1250
1	2 or more	13300	9300	1750	1250
X	100 percent of standard warrants				
	70 percent of standard warrants[2]				

Preliminary Signal Warrant Calculation

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	1	8850	11450	N
	Minor	1	2650	390	
Case B	Major	1	13300	11450	N
	Minor	1	1350	390	

Analyst and Date:	Reviewer and Date:

---

[1] Meeting preliminary signal warrants does **not** guarantee that a signal will be installed. When preliminary signal warrants are met, project analysts need to coordinate with Region Traffic to initiate the traffic signal engineering investigation as outlined in the Traffic Manual. Before a signal can be installed, the engineering investigation must be conducted or reviewed by the Region Traffic Manager who will forward signal recommendations to headquarters. Traffic signal warrants must be met and the State Traffic Engineer's approval obtained before a traffic signal can be installed on a state highway.

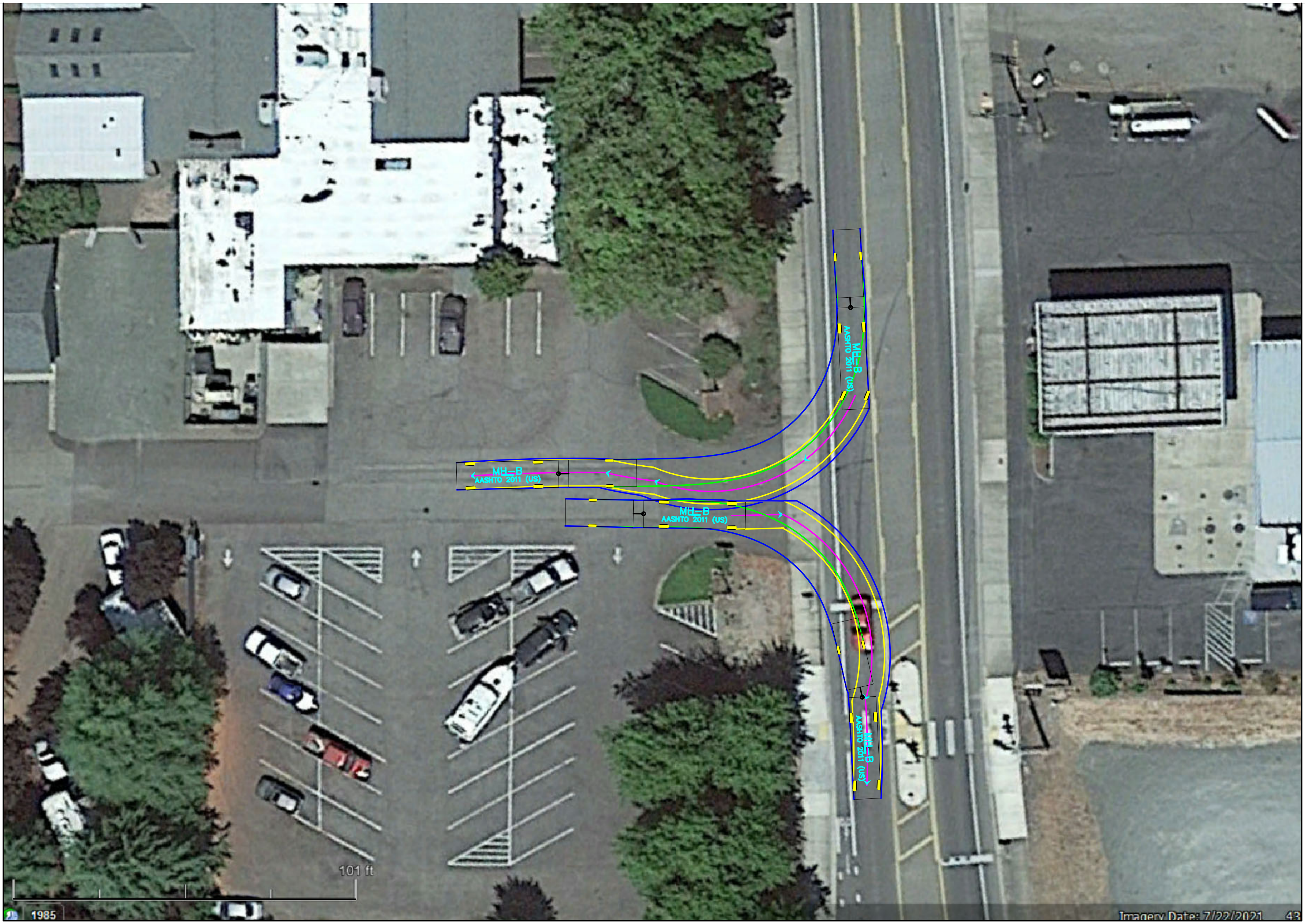
[2] Used due to 85th percentile speed in excess of 40 mph or isolated community with population of less than 10,000.

APPENDIX H: TURNING TEMPLATE

Pine Springs at Village Green

SANDOW ENGINEERING

SU-40 Turning Movements at the North Access



RV with Boat Turning Movements at the South Access

SANDOW
ENGINEERING

160 Madison Street, Suite A
Eugene, Oregon 97402
541.513.3376
sandowengineering.com

EXHIBIT F

380 Q Street, Ste 200
Springfield, Oregon 97477
(541) 302-9790
baileywilliams@ao-engr.com

A & O Engineering LLC

Stormwater Report

To: City of Cottage Grove
Prepared By: Bailey Williams, EIT
Reviewed By: Kyle Morris, PE
Date: 2/21/2023
Taxmap & T.L.: 20-03-27-20 T.L.s 03701 & 03702
Re: Storm Drainage Design for Pine Springs at Village Green, Cottage Grove, OR – Lot 3 of the Village Green Subdivision

REGISTERED PROFESSIONAL
ENGINEER
91412PE
Kyle D Morris
OREGON
MAY 12, 2020
KYLE DEAN MORRIS

Expires: 12/2024

Project Overview

The proposed 7.92-acre development includes 15 multi-family residential apartment buildings, an office, and parking lots. Roof drainage and runoff from impervious surfaces is proposed to be collected by catch basins and storm piping and routed to four water quality detention facilities located around the area of the property. Stormwater facilities are designed to infiltrate up to the 2-year storm event with an emergency overflow pipe for larger events. Emergency overflow piping is proposed to discharge into the existing public 60" storm pipe east of the property in Row River Road right-of-way.

Site Soils

Branch Engineering performed four encased falling head infiltration tests at the site on February 17th, 2022. The measured infiltration rates from the four tests ranged from 8 inches per hour to 66 inches per hour depending on the test location. A safety factor of 2 will be applied to the lowest rate for purposes of design. Therefore, the design infiltration rate for native soils is assumed to be 4 inches per hour. A well log from a nearby site was reviewed and lists static water at 8-feet BGS. The full geotechnical report prepared by Branch Engineering is attached in the appendix.

The current hotel development on the subject property is served by catch basins and private piping that discharge into the existing 60" storm main in the Row River Road right-of-way. To show the proposed development meets detention requirements, the below existing peak flowrates leaving the current hotel development are summarized in the table below:

Table 1: Existing Conditions Variables.

Basin Area	Description	Area [sf]	CN	Tc [mins]
Existing Buildings	Impervious Roof & Adjacent Sidewalk	44,242	98	5.0
Existing Impervious Area	Impervious Pavement & Adjacent Sidewalk	68,924	98	5.0
Existing Landscape Area	Woods/Grass Comb., Fair, HSG B	82,633	65	60.0

Stormwater Calculation Parameters

HydroCAD software was utilized to perform hydraulic and hydrology calculations with the below parameters, taken from the 2014 Eugene Stormwater Management Manual as required by the City of Cottage Grove:

Duration:	24 Hours
On-Site Design Storm:	Destination Storm
Pollution Reduction Precipitation:	1.40”
Destination Precipitation:	3.60”
25-Year Precipitation:	5.18”
Storm Distribution Table:	1A – 24-hour (NRCS SCS Rainfall Distributions)
Manning’s “n” Value:	0.010 for PVC Pipe (COE PIDS Manual)
Runoff Method:	Santa Barbara Urban Hydrograph Method (SBUH)
Time of Concentration:	10 Minutes

Storm Design

The storm management facilities are designed to process drainage from apartment roofs, the office roof and the parking lot and drive aisles serving the new Pine Springs development. All storm management facilities are designed to fully infiltrate up to the 2-year design storm. The primary outlet is infiltration with an assumed infiltration rate of 2.0 in/hr for imported soils, and 4.0 in/hr for native soils. All storm management facilities have an overflow control grate with an outflow pipe into the proposed storm system that eventually discharges into an existing 60” storm main east of the property in the Row River Road right-of-way.

Stormwater runoff is proposed to be collected by catch basins and stormwater roof drain pipes. Impervious areas are summarized in the table below:

Table 2: Impervious Surface Summary.

Surface Description	Impervious Area [sf]	CN
Rooftop Runoff (Bldgs. 1-16)	86,163	98
Paved Surfaces	115,768	98
Pond #1	4,554	98

Pond #2	2,830	98
Pond #3	4,349	98
Pond #4	1,585	98

All ponds will have a 12" growing medium and 12" rock chamber layer beneath the open storage areas. The final pond design will be completed at the time of building permits for the Pine Springs development where the storm report can be revised. Below is a table summarizing the physical characteristics of the proposed ponds:

Table 3: Pond Physical Characteristics.

Pond #	Layer	Top Elev. [ft]	Bottom Elev. [ft]	Side Slopes [H:V]	Top Area [sf]	Bottom Area [sf]
1	Open Storage	637.00	632.00	4:1	4,554	518
	Growing Medium	632.00	631.00	n/a	518	518
	Rock Chamber	631.00	630.00	n/a	518	518
2	Open Storage	637.00	633.00	4:1	2,830	202
	Growing Medium	633.00	632.00	n/a	202	202
	Rock Chamber	632.00	631.00	n/a	202	202
3	Open Storage	636.50	632.50	4:1	4,349	568
	Growing Medium	632.50	631.50	n/a	568	568
	Rock Chamber	631.50	630.50	n/a	568	568
4	Open Storage	638.00	636.00	4:1	1,585	537
	Growing Medium	636.00	635.00	n/a	537	537
	Rock Chamber	635.00	634.00	n/a	537	537

Hydraulic Calculations

HydroCAD software was utilized to perform all hydraulic calculations. To meet the detention requirements, the existing conditions on the proposed development site were analyzed using the input values discussed above in this report. Below is a table comparing the pre-construction and post-construction peak flowrates leaving the site. As shown, detention requirements are met, the full HydroCAD report is attached at the end with more details of the analysis.

Table 4: Pre-Construction and Post-Construction Peak Flowrates.

Storm Event	Pre-Construction Peak Flow [cfs]	Post-Construction Peak Flow [cfs]
Destination	2.23	0.50
25-Year	3.40	2.28

Each pond will have an overflow structure with all ponds on-site being connected hydraulically via piping. Only pond #3 is proposed to have an overflow discharge into the public system, allowing for maximum infiltration to take place prior to discharge. Below is a summary of the outflow structures of each pond:

Table 5: Pond Outlet Summary.

Pond #	Outlet Type	Elevation [ft]	Angle [deg]
1	Exfiltration	630.00	0
	12" Pipe (routed to internal storm system, pond #3)	633.60	0
	6" Orifice	634.10	90
	Overflow Grate	636.50	18
2	Exfiltration	631.00	0
	12" Pipe (routed to internal storm system, pond #1)	633.60	0
	Overflow Grate	636.50	18
3	Exfiltration	630.50	0
	10" Pipe (Routed to Row River Rd, existing storm main)	633.92	0
	Overflow Grate	635.50	18
4	Exfiltration	634.00	0
	8" Pipe (routed to internal storm system, pond #1)	636.00	0
	Overflow Grate	637.00	18

As part of the hydraulic analysis, peak hydraulic grade lines of each pond were analyzed to ensure the safety of the structures and residents. Shown in the table below, all ponds contain the 25-year storm event and thus do not endanger surrounding infrastructure. Below are the analysis results of the storm events outlined in the previous section:

Table 6: Pond Hydraulic Grade Lines.

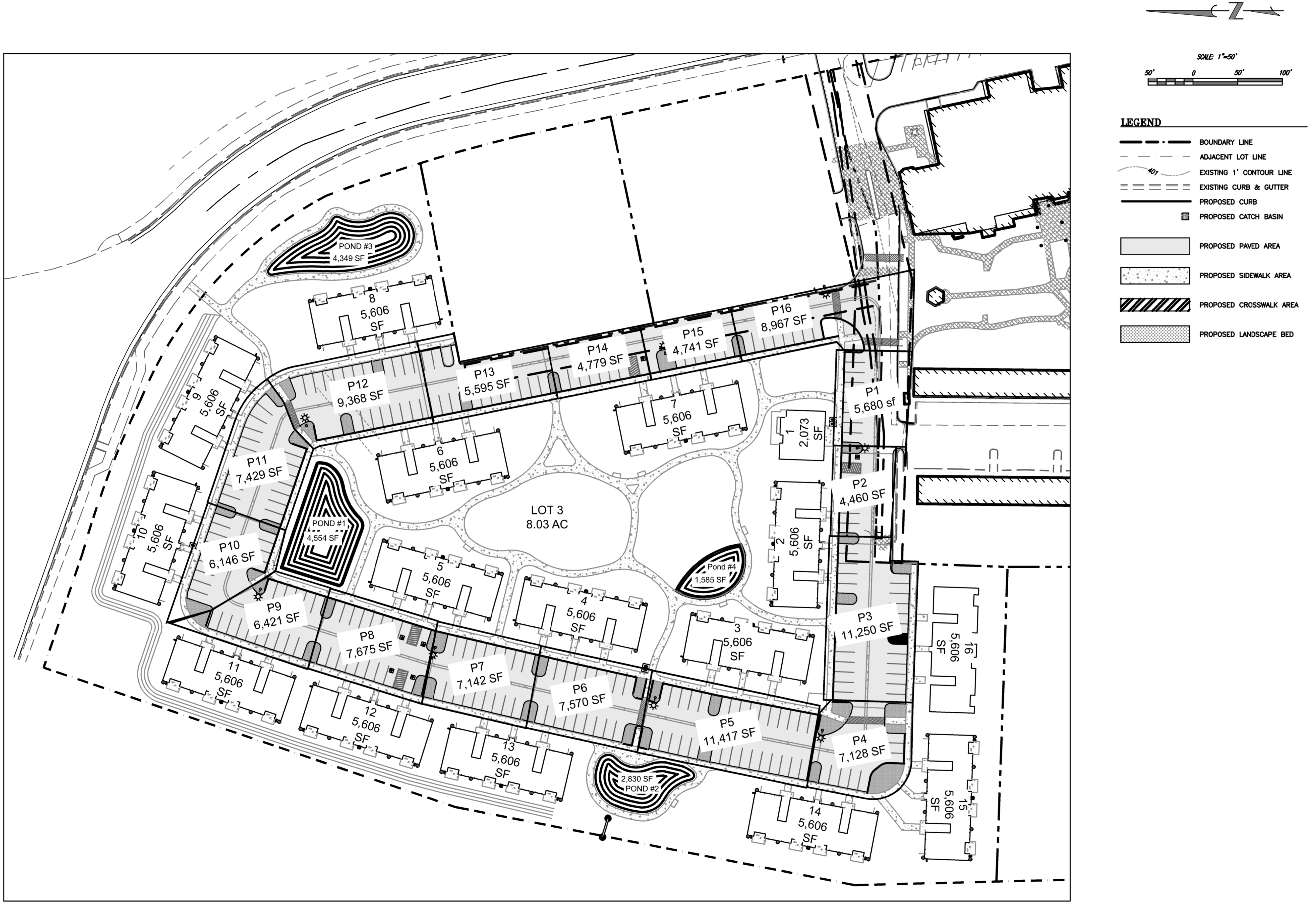
Pond #	FL [IN] Elevation [ft]	FL [OUT] Elevation [ft]	Flood Elevation [ft]	Pollution Reduction HGL [ft]	Destination HGL [ft]	25-Year HGL [ft]
1	632.00	633.60	637.00	634.08	635.83	636.72
2	633.00	633.60	637.00	634.94	636.60	636.78
3	632.50	633.92	636.50	633.29	635.65	635.86
4	636.00	636.00	638.00	635.01	636.73	637.07

Conclusion

For the storm events analyzed, the storm management facilities are adequately sized to fully treat the pollution reduction storm and infiltrate up to the destination storm. For the destination event and larger there is an overflow system that will route runoff into the public stormwater system in Row River Road for an emergency escape route. Therefore, the proposed system will operate safely while meeting City of Cottage Grove requirements for detention and water quality treatment.

Attachments

- Pine Springs Basin Map
- Geotech Report – Prepared by Branch Engineering, Inc. on April 21st, 2022
- Pine Springs at Village Green - HydroCAD Report



A & O Engineering L.L.C.

CIVIL ENGINEERING & SITE
DEVELOPMENT CONSULTING

380 Q ST. SUITE 200
SPRINGFIELD, OR. 97477
PHONE: (541) 302-9790
scott@aoengineering.biz

Drainage Basin Map
for
Pine Springs Master Plan
Cottage Grove Lane County
Oregon

DATE: 2-21-23
PROJECT No: 5320
SCALE: HORIZ:
VERT:
DRAWN BY: ACH
DESIGNED BY: BAW
REVIEWED BY: KDM

SUBMITTALS:

REVISIONS:

SHEET
C-1.0
1 OF 1

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SURVEYING

April 21, 2022

Mr. Colin Kelly
Timberview Construction
PO Box 20025
Keizer, Oregon 97307

**RE: Geotechnical Engineering Investigation
Pine Springs at the Village Green Apartments
725 Row River Road
Cottage Grove, Oregon
Branch Engineering Inc. Project No. 21-753**

Pursuant to your authorization, Branch Engineering Inc. (BEI) performed a geotechnical engineering investigation at the subject site for the proposed development of a multi-family residential housing development.

The accompanying report presents the results of our site research, field exploration and testing, data analyses, as well as our conclusions and recommended geotechnical design parameters for the project. Based on the results of our study, no geotechnical/geologic hazards were identified at the site that would prohibit the proposed residential subdivision. The site is suitable for the planned development and based on a geotechnical/geological perspective, will not adversely impact adjacent properties, provided that the recommendations of this report are implemented in the design and construction of the project.

Sincerely,
Branch Engineering Inc.

Ronald J. Derrick
Digitally signed by Ronald J. Derrick
Date: 2022.04.21 13:28:58 -07'00'

REGISTERED PROFESSIONAL ENGINEER
#16,170
OREGON
SEPT 15, 1992
RONALD J. DERRICK
EXPIRES: 12/31/2023

Samuel Rabe

Sam Rabe EIT
Engineering Technician

Ronald J. Derrick P.E., G.E.
Principal Geotechnical Engineer

EUGENE–SPRINGFIELD
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1.0 INTRODUCTION

1.1 Purpose and Scope of Work

The purpose of this work is to establish and present geotechnical engineering criteria and requirements related to the site and subsurface conditions that may influence the design and construction of the proposed project. Our field investigation scope of work consisted of a site reconnaissance with subsurface investigation and infiltration testing on February 17, 2022.

The subsurface investigation utilized a mini excavator, equipped with a 2-foot-wide toothed bucket to advance seven exploratory test pits to a maximum depth of 7.5-feet below ground surface (BGS). To provide site specific infiltration rates, four locations where test pits where excavated were used for infiltration testing. See the attached Figure-1, Site Exploration Map, for exploratory test pit locations.

Our scope of work also included pertinent site research activities, engineering data review, analysis, and preparation of this report.

1.2 Project Location and Description

The approximately 8-acre subject site is located at coordinates of 43.800129°, North Latitude, and 123.046754° West Longitude in Cottage Grove, Oregon. The rectangularly shaped site is bordered by Interstate-5 on the west, Row River Road on the north and east, and by portions of the Village Green Hotel and open areas to the south.

At the time of this report the site is occupied by the Village Green Hotel and associated pool/hot tub/open spaces, parking and accessways, and garden spaces. The buildings on the northern side of the site had been stripped down and appeared to be in the process of being demolished, the rest of the site is either parking lots and accessways, or open space with gardens. Numerous mature trees are located within the planned development area. Site topography is relatively flat throughout the majority of the site, the exception being a shallow bowl-shaped depression located north of the pool area.

Based on a preliminary drawing provided to BEI geotechnical staff, sixteen multi-family structures are proposed for the site along with open spaces, paved driveways and parking areas. Access to the site is expected to be taken from a driveway on Row River Road. Specific structural loads were not provided; however, two- to three-story wood-framed apartment buildings typically do not exceed 15-kip column loads or two kip/ft line loads on foundations.

1.3 Site Information Resources

The following site investigation activities were performed and literature resources were reviewed for pertinent site information:

- Department of Geologic and Mining Industries (DOGAMI) Online Geologic Map of Oregon.
- USGS OM-110 Geology of the Southern and Southwestern Border Area of the Willamette Valley, Oregon. 1951. By H.E. Vokes, D.A. Myers, and Parke Detweiler Snavely Jr.

- Seven exploratory test pits advanced to a maximum depth of 7.5-feet BGS on February 17, 2021 at the approximate locations shown on the attached Figure-1 Site Exploration Map.

- Four encased falling head infiltration tests performed on February 17, 2022, at the approximate locations shown on Figure-1, Site Exploration Map. See Appendix A for infiltration data sheet.

- Review of the Web Soil Survey of Lane County Area, United States Department of Agricultural (USDA) Natural Resources Conservation Service (NRCS) (attached in Appendix A).

- Oregon Department of Geology and Mineral Industries (DOGAMI) web hazard viewer (HazVu) and Statewide Landslide Information Layer for Oregon (SLIDO).

- Review of available nearby Oregon Department of Water Resources Well Logs (attached in Appendix A).

- Cottage Grove, Oregon, Quadrangle United States Geologic Survey Topographic Map, 2020.

- Oregon Structural Specialty Code 2019 (OSSC 2019), applicable building code criteria.

- Geology of Oregon, sixth edition by Orr, Orr and Baldwin, 2012.

2.0 SITE SUBSURFACE CONDITIONS

The analyses, conclusions, and recommendations contained in this report are based on site conditions as they existed on February 17, 2021 and assume that our exploratory test pit findings presented in Appendix A are representative of the subsurface conditions throughout the site. If during construction subsurface conditions differ from those encountered in the exploratory test pits; BEI requests that we be informed to review the site conditions and adjust our recommendations, if necessary.

2.1 Subsurface Soils

Visual classification of the near surface soils was performed in accordance with the American Society of Testing and Materials (ASTM) Method D-2488 and the Unified Soil Classification System (USCS). Soil samples were collected from test pit sidewalls in the top 5-feet of excavations. Soil samples were taken at depths where noticeable changes in consistency, color, and moisture content were apparent. Subsurface soil conditions were found to be relatively consistent throughout the site, generally consisted of the following.

- Topsoil: Soft, Moist, Dark Brown Clay with Trace Silt and Organics extends to a maximum depth of approximately 30-inches BGS.
- Isolated areas of near-surface silty gravel fill (Fill); IT-2 and IT-3 extending to 2-feet BGS.
- Underlying the near-surface topsoil or fill; brown, moist alluvial Clay (CL); medium-stiff, increasing to stiff in consistency with depth. In the southwest corner of the site, brown, wet, soft, high plasticity Clay (CH) was encountered to 48-inches BGS in Test Pit TP-1.
- Dense alluvial gravel deposits (GP); with sand and minor silt, wet. Depth to gravel ranged from 3-feet to 5-feet deep from ground surface. Depth to the gravel deposits varied.

The NRCS Web Soil Survey mapping unit was used to identify soils at the project site and is summarized below:

Table 1: Site Soil Unit

Unit Name	***Description***
McBee Silty Clay Loam	Moderately well drained silty clay and silt loam deposits derived from recent mixed alluvium. Mapped in central area.
Salem-Urban land complex	Well drained deposits of gravelly clay, sand, and silt derived from gravelly mixed alluvium. Mapped in Hotel Area
Salem gravelly silt loam	Well drained deposits of gravelly silt loam that grade to very gravelly sand derived from a parent material of gravelly mixed alluvium. Mapped across the majority of the site.

The above soil descriptions are consistent with the observations of the test pits excavated at the site. A well log for a site directly across Row River Road fill overlying brown sandy gravel and silty clay with cobbles to at least 12-feet BGS. Well logs in the site vicinity are similar and show fine-grained soil overlying alluvial sand and gravel-cobble deposits to around 50-feet BGS. Underlying the alluvium are sedimentary rocks described as claystone in the well logs to at least 298-feet BGS.

2.2 Groundwater

Groundwater seepage was observed in the gravel deposits at approximately 4-feet BGS in TP-1 and in several isolated near-surface areas of sidewalls in other test pit excavations. Sidewall seepage should be expected during the wet season (typically late October till May) from perched lenses of water during the wet season. A well log from a nearby site was reviewed and lists static water at 8-feet BGS.

Perched groundwater lenses are most likely to be encountered should excavation activities take place during the wet season when rainstorms are more intense and frequent and soils are nearing saturation. Groundwater is not expected to impact shallow foundations, but dewatering may be necessary for in-ground utility work. Utilities deeper than 5-feet BGS will likely require shoring or laying back of sidewalls at a slope of 1:1 (H:V) if soils are wet.

3.0 GEOLOGIC SETTING

The following sections describe the regional and local site geology. Our field findings are consistent with the geologic mapping of the site area by the Oregon Department of Geology and Mineral Industries.

3.1 Regional Geology

The subject site is located near the southernmost portion of the Willamette Valley, where the Coast Range and the Cascade Mountains are differentiated more by geology than topography. In Oregon, the Willamette Valley is an elongate basin which narrows at both ends before terminating in the Calapooya Divide to the south and the Columbia River to the north. The basin is approximately 130 miles long and 40 miles wide. The valley is drained by the Willamette River and drops from an elevation of approximately 400-feet at Eugene, and to near sea level at the northern end of the basin where the Willamette River drains into the Columbia River.

The Willamette River Valley in the area of the subject site is believed to be underlain by undifferentiated sedimentary rock, tuffs, and basalt from the Miocene and Oligocene epochs (approximately 15 to 35 million years ago). Subsequent compression forces and uplifting of the Cascade and Coast Range Mountains depressed the Willamette River Valley. The rapid uplift of the Cascade and Coast Range mountains steepened stream gradients causing increased erosion of the mountains and resulting deposition of thick gravel layers incised within the fluvial deposits.

3.2 Site Geology

The DOGAMI interactive Geologic Map of Oregon and the USGS OM-110 map the geologic unit on the site as recent Quaternary Surficial Deposits which are described as deposits of unconsolidated sediments, including alluvium, colluvium, river and coastal terrace deposits. The underlying geology of the large hillside formation to the southeast of the site is mapped as Oligocene age Volcanic Rocks from the Little Butte Volcanics which is described as basalt with volcanic rocks of widely varying composition.

The nearest mapped active faults are located approximately 16.2-miles southwest and 20-miles to the northeast of the site. Faults are also mapped 2.0-miles west of the site and 4.8-miles north of the site. These faults are not known to be active; however, seismic activity is not uncommon in the Willamette Valley as evidenced by the 1993 Scotts Mills Earthquake east of Salem that registered a 5.7 Richter magnitude, and most recently a 4.2 magnitude earthquake about 12-miles east of Eugene on July 4, 2015.

4.0 CONCLUSIONS

Based on our field observations, subsurface explorations, and data analyses, we conclude that the site is geologically and geotechnically suitable for the proposed development provided that the recommendations of this report are incorporated into the design and construction of the project.

5.0 RECOMMENDATIONS

The following sections present site-specific recommendations for site preparation, drainage, foundations, utility excavations, and slab/pavement design. General material and construction specifications for the items discussed herein are provided in Appendix B.

5.1 Site Preparation and Foundation Subgrade Requirements

The following recommendations are for earthwork in the building foundation areas, public roadway, and private parking areas. Earthwork shall be performed in general accordance with the standard of practice as generally described in Appendix J of the 2019 Oregon Structural Specialty Code and as specified in this report.

All areas intended to directly or laterally support structures, roadways, or pavement areas shall be stripped of vegetation, organic soil, unsuitable fill, and/or other deleterious material such as moisture softened exposed soil. These stripping’s shall be removed from the site or reserved for use in landscaping or non-structural areas. In areas of previously existing trees, vegetation, or previously placed fill, the required depth of site clearing/stripping may be increased.

The subsurface conditions observed in our site investigation test pits are relatively consistent; however, the test pits only represent those specific locations on the site. Should soft or unsuitable soils extend to a depth greater than that described herein, or areas of distinct soil variation be discovered, this office shall be notified to perform site observation and additional excavation may be required.

Building Foundation Subgrade Preparation

The depth to suitable subgrade for shallow building foundations is expected to be at least 24- to 30-inches BGS, below any existing fill, organics, or areas of high plasticity clay as encountered in TP-1. Areas where building and pavement are present were not evaluated during the site explorations, and after demolition BEI asks that they be contacted to assess subgrade depths in these areas. Subgrade preparation for foundations bearing in the upper fine grain soil requires that any soft or saturated fine grain soil be removed to medium stiff soil to maintain a similar consistency across the building pad area. The Geotechnical Engineer of Record (GER) or designated representative should visit the site to approve the subgrade soil prior to the placement of structural fill or foundation forms.

The bearing capacity of the existing subgrade at approximately 2.5-feet is considered to be less than 1000 psf, to provide subgrade suitable for a bearing capacity of 2,000 psf and acceptable settlement qualities, the placement of a compacted aggregate with a minimum thickness of 18-inches is recommended under building foundations bearing in the fine grain alluvial soil. If excavation of building pads occurs during the wet season or heavy precipitation occurs when building pad subgrade is exposed, additional excavation and an increase in aggregate thickness to 18-inches will likely be required. The placement of a bi-axial geogrid atop the separation fabric may be an alternative to additional aggregate thickness. Drainage of building pads will be essential to prevent deterioration of the exposed subgrade. Improvement methods may include excavation and fill and/or placement of geotextile fabric or geogrid composites. A BEI representative shall approve exposed subgrade materials and observe proof-rolling activities.

As the subgrade soil is exposed, placement of compacted aggregate should be completed in a timely manner to minimize moisture fluctuations in the subgrade soil. Installation of a geotextile separation fabric on the subgrade soil is recommended and may minimize the loss of aggregate into the subgrade soil. If building footprint excavation encounters the stiff to hard, gravelly soil observed in the test pits, the recommended aggregate thickness may be decreased at the discretion of the GER after on-site observation.

Compacted aggregate fill shall consist of well graded aggregate compacted to at least 90% relative compaction as determined by ASTM D-1557 (modified Proctor) and should be placed in conformance with the recommendations in Section 5.3 below. Conformance with the recommended compaction levels shall be confirmed with compaction testing by nuclear densometer (ASTM D6938) or proof rolls with a loaded 10 CY haul truck. On site material is not recommended to be used as structural fill under building foundations. An angular 3-inch minus sized aggregate may be used in the lower 6-inches of compacted aggregate in lieu of separation fabric. The excavation and placement of engineered fill shall extend a minimum horizontal distance equal to the depth of the fill beyond the outside edge of footings or 24-inches, whichever is greater.

If bearing capacities higher than 2,000 psf are required for foundation design we recommend transferring foundation loads to the underlying dense gravel material expected at 5-feet or greater.

Driven piles, helical piers, micro-piles, stone columns, or auger cast piles are suitable deep foundation methods. Bearing capacities are discussed in Section 5.6 below.

Prior to placing fill or foundation concrete forms, exposed subgrade materials shall be observed by the GER or designated representative. Areas of soft or saturated soil shall be removed to additional depth, or otherwise improved at the discretion and direction of the GER. Once exposed, suitable subgrade shall be covered with compacted crushed aggregate in a timely manner to mitigate moisture fluctuations in the soil.

Areas of Private Access and Parking Improvements

The depth to suitable subgrade for roadway structural sections is below the organic topsoil zone and any remaining stumps or roots from previously existing trees. Areas of high plasticity clay such as the material encountered to approximately 36-inches BGS in TP-1 shall be removed from structural or pavement areas. Should grading plans require engineered fill, see section 5.2 for engineered fill requirements. Prior to placing compacted crushed rock aggregate for the roadway structural section as described in Section 5.11 below, the exposed subgrade shall be approved by the GER or approved representative.

Localized soft areas may be encountered during excavation activities, particularly during periods of wet weather, and will require removal and replacement with structural fill. Proof rolls with a loaded 10 CY haul truck or equivalent vehicle shall be conducted on the prepared subgrade prior to the placement of compacted aggregate, and areas of deflection under wheel loads shall be corrected prior to placing the recommended section of compacted aggregate. If moisture conditions prohibit proof rolls with loaded trucks on the subgrade, proof rolls shall be conducted on top of the recommended aggregate thickness and any observed areas of deflection under load shall be corrected prior to paving.

Utility trenches excavated to depths below the top of the subgrade elevation shall be backfilled with material compacted to 90% relative compaction as determined by ASTM D1557 or AASHTO T-180 (modified Proctor). We expect that fill placed on the site will be imported granular material; use of the native soil on site for fill will require moisture conditioning and appropriate compaction equipment selection. Sampling of on-site material to be used as engineered fill will be required for Proctor testing to generate moisture-density curves unless provided by the supplier. The compaction of fill material supporting pavement areas shall be confirmed by compaction testing by nuclear densometer and the proof roll process described above.

5.2 Geotechnical Construction Site Observations

Periodic site observations by a geotechnical representative of BEI are recommended during the construction of the project; the specific phases of construction that should be observed are shown in Table 2.

Table 2: Construction Phases

Recommended Construction Phases to be Observed by the Geotechnical Engineer	
At completion of subgrade excavation	Subgrade observation by the geotechnical engineer before aggregate placement.
Imported fill material	Observation of material or information on material type and source.
Placement or Compaction of fill material	Observation by geotechnical engineer or test results by qualified testing agency.

5.3 Structural Fill Recommendations

All engineered fill placed on the site shall consist of homogenous material and shall meet the following recommendations.

- Prior to placement on-site, the aggregate to be used as structural fill shall be approved by the GER. If no Proctor curve (moisture-density relationship) for the material performed within the last 12-months is on file, a material sample will be required for testing to determine the maximum dry density and optimum moisture content of the aggregate or fill material.

- The structural fill shall be moisture conditioned within +/- 2% of optimum moisture content and compacted in lifts with loose lift thickness not exceeding 12- inches.

- Periodic visits to the site to verify lift thickness, source material, and compaction efforts shall be conducted by the GER, or designated representative, and documented.

- The recommended compaction level for crushed aggregate or soil fill is 90% relative compaction, respectively, as determined by ASTM D-1557 (modified Proctor). Compaction shall be measured by testing with nuclear densometer ASTM D-6938, or D-1556 sand cone method on structural fill 12-inches in thickness or greater.

- If on-site or imported non-granular material is approved for structural fill placement, a sample of the material shall be collected for modified Proctor testing to use for field compaction test comparison. If, due to the nature of the on-site material compaction testing is not possible due to factors such as oversize rock content and variable material, proof rolls with a fully loaded 10cy haul-truck, or equivalent equipment, shall be observed at regular intervals. Observed areas of soft soil will require over-excavation and replacement with suitable material.

5.4 Excavations

The site soils are classified as either OSHA Type B or C soils for the upper 10-feet of the site soil profile. Heavy equipment or stored materials should not be placed within 10-feet of open excavations.

5.5 Drainage and Infiltration Testing

An on-site storm drainage system is expected to be engineered for this project. Our understanding is storm water infiltration or filtration facilities will be designed and installed as a primary means to manage surface runoff. Four encased falling head infiltration tests were performed on February 17, 2022. Infiltration tests were conducted with 6-inch diameter pipes set and sealed within the test pit. Infiltration test locations are shown on the attached Figures 2. Results of the infiltration testing are listed below with no factor of safety.

Table 3: Hydraulic Conductivity

Test Location	***Test Depth (Inches)***	***Measured Hydraulic Conductivity, k (in/hr)***
IT-1	57.0	60
IT-2	54.5	66
IT-3	57.0	45
IT-4	45.0	8

Results from the infiltration testing indicate that the disposal of stormwater via on-site infiltration is likely feasible. The slower rate of infiltration measured in IT-4 was likely a result of a higher clay content in the soil at the testing depth. Alteration of existing grades for this project will likely change drainage patterns but should not adversely affect adjacent properties. Perimeter landscape and hardscape grades shall be sloped away from the foundations and water shall not be allowed to pond adjacent to footings during or after construction.

5.6 Soil Bearing Capacity and Settlement

Conventional perimeter style foundations and spread footings for column loads are suitable for the proposed building construction and we recommend that loads are distributed evenly to mitigate the potential for differential settlement. If foundation areas are prepared as described in Section 5.1 of this report with 18-inches of compacted aggregate, an allowable bearing capacity of 2,000 psf can be used for design. For foundation loads bearing on the alluvial gravel deposits a bearing capacity of 4,000 psf may be used. Areas of extensive landscaping may have thicker horizons of softer soil with bearing capacities of less than 1000 psf. Depending on site grading plans and the time of the year in which construction takes place, these areas will likely require over excavation or an increase in aggregate thickness to achieve a bearing capacity of 2000 psf. The extent and location of these areas, in addition to the mitigation method will likely need to be determined as earth work progresses through the site. The bearing capacity may be increased by 1/3 for short term loading, such as wind or seismic events.

5.7 Slabs-On-Grade

After site preparation to expose suitable subgrade, load bearing concrete slabs shall be underlain by a minimum of 12-inches of compacted, crushed aggregate. If soft or saturated subgrade is encountered, over-excavation and replacement with engineered fill will be required. A free draining aggregate is recommended beneath structural slabs.

The modulus of subgrade reaction (K) of the in-situ soil at about 24-inches below existing grade is 120 lb/in^3 and the correlated California Bearing Ratio of the soil is correlated to be four in the onsite fine grain soils.

5.8 In-Situ Moisture Content & Soil Shrink/Swell Potential

In general, the underlying native silty soils have a low to moderate shrink/swell potential with Free Swell (IS 2720) test results ranging from 30% to 50%. Except for a sample of the plastic clay encountered in TP-1 that was collected and tested with a result of 70% which is considered to be high. The underlying alluvial gravel deposits have a low shrink/swell potential. In-situ moisture content of the samples collected from the site ranged from 30% to 32%.

5.9 Friction Coefficient and Earth Pressures

Because of the variable conditions encountered in site test pit excavations, the lateral earth pressures would be best calculated after locations and retaining structure elevations are finalized. Although not expected, should retaining walls be required BEI asks that our office be contacted once plans are finalized so that we may assess the location and provide parameters for wall design.

5.10 Wet Weather/Dry Weather Construction Practices

The site material is moisture sensitive and will soften with exposure to precipitation. The near surface fine grain soil shall be covered with compacted aggregate in a timely manner after excavation to suitable subgrade to minimize soil moisture fluctuations. BEI recommends that foundation subgrade preparation and general site earthwork be performed during the dry season, generally June through September.

Construction during the wet season will likely require special drainage considerations, such as covering of excavations, pumping to mitigate standing water in footing excavations, additional aggregate depth, and/or over-excavation of moisture softened soils.

5.11 Pavement Design Recommendations

For new asphalt concrete (AC) pavement installation in parking areas, we recommend a minimum pavement thickness of 3-inches of AC over a minimum of 12-inches of compacted crushed aggregate base material. We recommend that the AC thickness be increased to 4-inches in areas of heavier traffic, such as refuse truck routes or delivery vehicles with the same rock section as described above.

Prior to placement of base rock, any soft soil, wet soil, or organic soil shall be removed from the parking subgrade. We recommend that the subgrade be moisture conditioned and compacted to at least 90% of the material's maximum dry density as determined by AASHTO T-180/ASTM D-1557 (modified Proctor). If excavation activities take place during the wet season, a thicker rock section can be used in lieu of moisture conditioning of the subgrade soil.

Table 4: Recommended Structural Pavement Section for private road section

Pavement Criteria	***Asphalt Concrete (inches)***	***ABM Section (inches)***
Heavy Traffic Section	4	12
Private Road Section	3	12

The pavement recommendations discussed above are designed for the type of vehicle use on the site after construction completion, not for construction vehicle traffic which is generally heavier, occurs over a short time, and impacts the site before full pavement sections are constructed. The construction traffic may cause subgrade failures and the site contractor should consider over-building designated haul routes through the site to mitigate soft areas at the time of final paving.

5.12 Seismic Site Classification and Hazards

Based on the soil properties encountered in our test pits explorations and nearby well log information, a Seismic Site Class D designation, stiff soil (Table 20.3-1 ASCE 7-16) is recommended for design of site structures. OSSC 2019 (1803.5.11) required criteria for hazards the geotechnical investigation shall address for seismic site class designations C through F are listed below.

- Slope Instability: The site is mapped low to moderate risk for land sliding with isolated areas of the Interstate 5 fill slopes and ridge to southeast of the site mapped at a high risk. No existing landslides are mapped in locations that may impact the site and no signs of recent or existing slope instability such as hummocky terrain or scarp zones were observed during our visit. The risk landslides impacting the site is low.

- Liquefaction: The site is not mapped as having liquefaction risk when viewed in DOGAMI's Statewide Geohazard Viewer. We did not observe highly liquefiable soil during our site investigation. The risk of surface damage due to liquefaction is low.

- Total and Differential Settlement: The estimated amount of total and differential settlement is less than ¾-inch and ½-inch, respectively, over a 20-foot span of similarly loaded footings, provided subgrade preparation follows the recommendations in Section 5.1 of this report.

- Surface Displacement due to faulting or seismically induced lateral spreading or lateral flow: The closest faults to the site are not known to be active. Surface displacement or seismically induced lateral spreading is not expected at the site.

- Tsunami/seiche: The closest water body is the Coast Fork of the Willamette River, which poses no risk of a seiche or tsunami.

6.0 REPORT LIMITATIONS

This report has presented BEI's site observations and research, subsurface explorations, geotechnical engineering analyses, and recommendations for the proposed site development. The conclusions in this report are based on the conditions described in this report and are intended for the exclusive use of Mr. Colin Kelly, Timberview Construction and their representatives for use in design and construction of the development described herein. The analysis and recommendations may not be suitable for other structures or purposes.

Services performed by the geotechnical engineer for this project have been conducted with the level of care and skill exercised by other current geotechnical professionals in this area. No warranty is herein expressed or implied. The conclusions in this report are based on the site conditions as they currently exist and it is assumed that the limited site locations that were physically investigated generally represent the subsurface conditions at the site. Should site development or site conditions change, or if a substantial amount of time goes by between our site investigation and site development, we reserve the right to review this report for its applicability. If you have any questions regarding the contents of this report please contact our office.

LEGEND

◧ Approximate Location of Test Pit Excavation

◕ Approximate Location of Infiltration Testing

N

APPROXIMATE SCALE
0 100'

Site Photo By Licensed BEI UAV Pilot

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SITE EXPLORATION MAP- PINE SPRINGS AT VILLAGE GREEN
COTTAGE GROVE, OREGON

FIGURE-1

3-9-2022

PROJECT NO. 21-753

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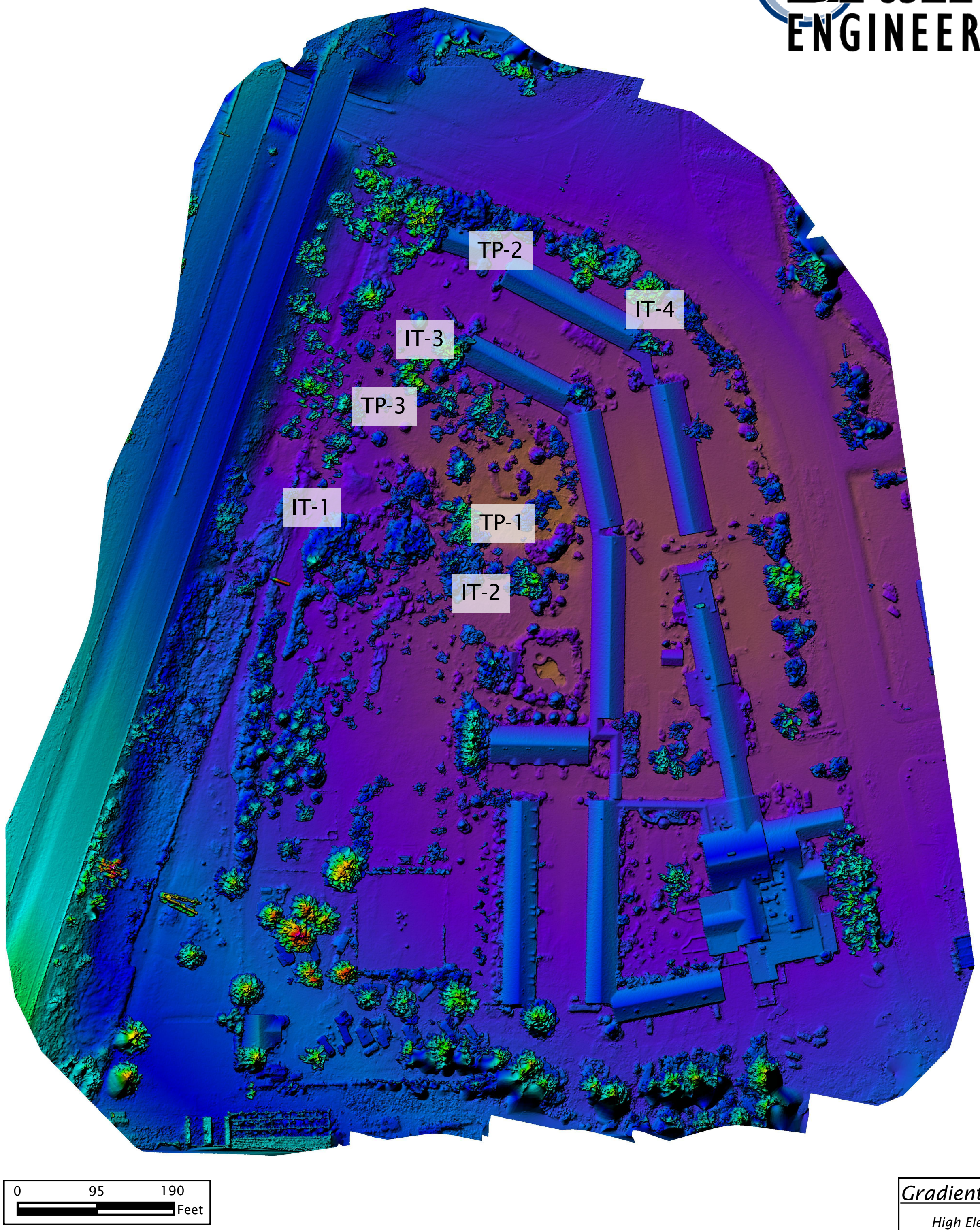

Gradient Legend

High Elevation

🟦

🟧

Low Elevation

NOTE: DEM CAPTURED BY UAV-LICENSED BEI STAFF

SITE GRADIENT - Pine Springs at Village Green

FIGURE-2

COTTAGE GROVE, OREGON

04-12-2022

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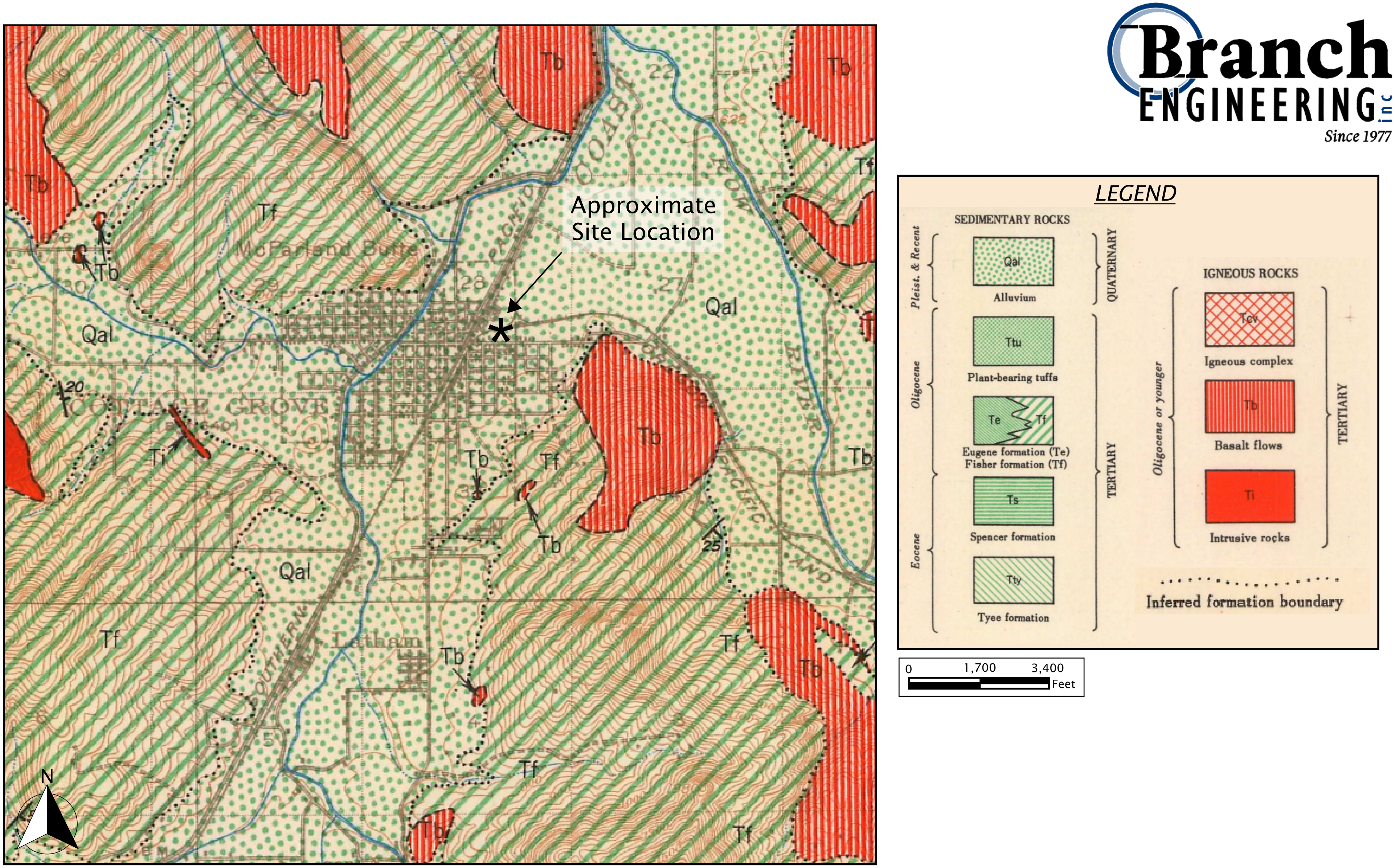


NOTE: SOURCED FROM USGS OM-110 (1951)

SITE GEOLOGY MAP - Pine Springs at Village Green

COTTAGE GROVE, OREGON

FIGURE-3

04-12-2022

PROJECT NO. 21-753

APPENDIX A:

- TEST PIT LOGS
- INFILTRATION TESTING RESULTS
- OWRD WELL LOGS
- USDA SOIL SURVEY

RELATIVE DENSITY - COARSE GRAINED SOILS

RELATIVE DENSITY	SPT N-VALUE	D&M SAMPLER (140 lbs hammer)	D&M SAMPLER (300 lbs hammer)
VERY LOOSE	< 4	< 11	< 4
LOOSE	4 - 10	11 - 26	4 - 10
MEDIUM DENSE	10 - 30	26 - 74	10 - 30
DENSE	30 - 50	74 - 120	30 - 47
VERY DENSE	> 50	> 120	> 47

USCS GRAIN SIZE

FINES		< #200 (.075 mm)
SAND	Fine	#200 - #40 (.425 mm)
	Medium	#40 - #10 (2 mm)
	Coarse	#10 - #4 (4.75 mm)
GRAVEL	Fine	#4 - 0.75 inch
	Coarse	0.75 - 3 inch
COBBLES		3 - 12 inches

CONSISTENCY - FINE GRAINED SOILS

CONSISTENCY	SPT N-VALUE	D&M SAMPLER (140 lbs hammer)	D&M SAMPLER (300 lbs hammer)	POCKET PEN. / UNCONFINED (TSF)	MANUAL PENETRATION TEST
VERY SOFT	< 2	< 3	< 2	< 0.25	Easy several inches by fist
SOFT	2 - 4	3 - 6	2 - 5	0.25 - 0.50	Easy several inches by thumb
MEDIUM STIFF	4 - 8	6 - 12	5 - 9	0.50 - 1.00	Moderate several inches by thumb
STIFF	8 - 15	12 - 25	9 - 19	1.00 - 2.00	Readily indented by thumb
VERY STIFF	15 - 30	25 - 65	19 - 31	2.00 - 4.00	Readily indented by thumbnail
HARD	> 30	> 65	> 31	> 4.00	Difficult by thumbnail

UNIFIED SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			GROUP SYMBOLS AND TYPICAL NAMES	
COARSE-GRAINED SOILS: More than 50% retained on No. 200 sieve	GRAVELS: 50% or more *retained* on the No. 4 sieve	CLEAN GRAVELS	GW	Well-graded gravels and gravel-sand mixtures, little or no fines.
			GP	Poorly-graded gravels and gravel-sand mixtures, little or no fines.
		GRAVELS WITH FINES	GM	Silty gravels, gravel-sand-silt mixtures.
			GC	Clayey gravels, gravel-sand-clay mixtures.
	SANDS: 50% or more *passing* the No. 4 sieve	CLEAN SANDS	SW	Well-graded sands and gravelly sands, little or no fines.
			SP	Poorly-graded sands and gravelly sands, little or no fines.
		SANDS WITH FINES	SM	Silty sands, sand-silt mixtures.
			SC	Clayey sands, sand-clay mixtures.
FINE-GRAINED SOILS: Less than 50% retained on No. 200 sieve	SILT AND CLAY	LIQUID LIMIT LESS THAN 50	ML	Inorganic silts, rock flour, clayey silts.
			CL	Inorganic clays of low to medium plasticity, lean clays.
			OL	Organic silt and organic silty clays of low plasticity.
		LIQUID LIMIT 50 OR GREATER	MH	Inorganic silts, clayey silts.
			CH	Inorganic clays of high plasticity, fat clays.
			OH	Organic clays of medium to high plasticity.
HIGHLY ORGANIC SOILS			PT	Peat, muck, and other highly organic soil.

MOISTURE CONTENT

DRY: Absence of moisture, dusty, dry to the touch
DAMP: Some moisture but leaves no moisture on hand
MOIST: Leaves moisture on hand
WET: Visble free water, usually saturated

	PLASTICITY	DRY STRENGTH	DILATANCY	TOUGHNESS
ML	Non to Low	Non to Low	Slow to Rapid	Low, can't roll
CL	Low to Med.	Med. to High	None to Slow	Medium
MH	Med. to High	Low to Med.	None to Slow	Low to Med.
CH	Med. to High	High to V.High	None	High

STRUCTURE

STRATIFIED: Alternating layers of material or color > 6mm thick.
LAMINATED: Alternating layers < 6mm thick.
FISSURED: Breaks along definate fracture planes.
SLICKENSIDED: Striated, polished, or glossy fracture planes.
BLOCKY: Cohesive soil that can be broken down into small angular lumps which resist further breakdown.
LENSES: Has small pockets of different soils, note thickness.
HOMOGENEOUS: Same color and appearance throughout.

LIST OF ABBREVIATION & EXPLANATIONS

SPT	Standard Penetration Test split barrel sampler
D&M	Dames and Moore sampler
LL	Atterberg Liquid Limit
PL	Atterberg Plastic Limit
PP	Pocket Penetrometer
VS	Vane Shear
G	Grab sample
MC	Moisture Content
MD	Moisture Density
UC	Unconfined Compressive Strength

TABLE A-1

Branch ENGINEERING Inc. Since 1977

GEOTECHNICAL SITE INVESTIGATION EXPLORATORY KEY

Test Pit ID: IT-1

Sheet 1 of 1

Client: Colin Kelley

Project Name: Pine Springs Devlopment at the Village Green

Project Number: 21-753

Project Location: Row River Road Cottage Grove, Oregon

Date Started: Feb 17 2022 **Completed:** Feb 17 2022

Logged By: SPR **Checked By:** RJD

Contractor: Branch Engineering Inc.

Latitude: **Longitude:** **Elevation:**

Method: Test Pit Excavation

Ground Water Levels

Equipment: Tracked Excavator

▽

Notes:

▼

⧨

Depth	Graphic	Material Description	Sample	Pocket Pen. (tsf)	Dry Unit Wt. (pcf)	MC: ⊗ PL LL: ●–■ 10 20 30 40 50 60 70 80 90
		Soft, Moist, Dark Brown Clay with Trace Silt and Organics.				
1						
		Medium Stiff, Moist, Brown-Gray High Plasticity Clay and Fine Roots.				
2						
3						
4						
5		Medium Dense, Moist, Brown Gray Silt, Sand, and Rounded Gravel-Cobble.				
6						
7						
8						
9						
10						

◊ Fines Content ⊗ Moisture Content ●—■ Plastic Limit and Liquid Limit

Test Pit ID: IT-2

Sheet 1 of 1

Client: Colin Kelley

Project Name: Pine Springs Devlopment at the Village Green

Project Number: 21-753

Project Location: Row River Road Cottage Grove, Oregon

Date Started: Feb 17 2022 **Completed:** Feb 17 2022

Logged By: SPR **Checked By:** RJD

Contractor: Branch Engineering Inc.

Latitude: **Longitude:** **Elevation:**

Method: Test Pit Excavation

Ground Water Levels

Equipment: Tracked Excavator

▽

Notes:

▼

▽

Depth	Graphic	Material Description	Sample	Pocket Pen. (tsf)	Dry Unit Wt. (pcf)	MC: ⊗ PL LL: ●–■ 10 20 30 40 50 60 70 80 90
		Soft, Moist, Dark Brown Clay with Trace Silt and Organics, Interpreted as Fill.				
1						
2						
		Medium Stiff, Moist, Brown Clay with Trace Silt and Sand, Medium Plasticity.				
3						
4						
		Medium Dense, Moist, Brown-Gray Medium Grained Sand with Trace Silt and Rounded Gravel.				
5						
6						
7						
8						
9						
10						

◊ Fines Content ⊗ Moisture Content ●—■ Plastic Limit and Liquid Limit

Test Pit ID: IT-3

Sheet 1 of 1

Client: Colin Kelley

Project Name: Pine Springs Devlopment at the Village Green

Project Number: 21-753

Project Location: Row River Road Cottage Grove, Oregon

Date Started: Feb 17 2022 **Completed:** Feb 17 2022

Logged By: SPR **Checked By:** RJD

Contractor: Branch Engineering Inc.

Latitude: **Longitude:** **Elevation:**

Method: Test Pit Excavation

Ground Water Levels

Equipment: Tracked Excavator

Notes:

Depth	**Graphic**	**Material Description**	**Sample**	**Pocket Pen. (tsf)**	**Dry Unit Wt. (pcf)**	**MC: ⊗ PL LL: ●–■** 10 20 30 40 50 60 70 80 90
0–2		Soft, Moist, Dark Brown Clay with Trace Silt and Organics. PVC Pipe at 10-inches BGS.				
2–4.5		Medium Stiff, Moist, Brown Clay with Trace Silt and Sand, Medium Plasticity.				

Depth scale: 1 2 3 4 5 6 7 8 9 10

◊ Fines Content ⊗ Moisture Content ●—■ Plastic Limit and Liquid Limit

Test Pit ID: IT-4

Sheet 1 of 1

Client: Colin Kelley

Project Name: Pine Springs Devlopment at the Village Green

Project Number: 21-753

Project Location: Row River Road Cottage Grove, Oregon

Date Started: Feb 17 2022 **Completed:** Feb 17 2022

Logged By: SPR **Checked By:** RJD

Contractor: Branch Engineering Inc.

Latitude: **Longitude:** **Elevation:**

Method: Test Pit Excavation

Ground Water Levels

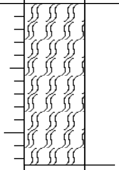
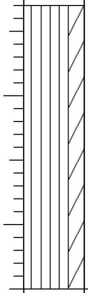
Equipment: Tracked Excavator

▽

Notes:

▼

◪

Depth	Graphic	Material Description	Sample	Pocket Pen. (tsf)	Dry Unit Wt. (pcf)	MC: ⊗ PL LL: ●–■ 10 20 30 40 50 60 70 80 90
1		Soft, Moist, Mottled Brown-Gray Clay with Trace Silt and Organics.				
2 3		Soft to Medium Stiff, Moist, Brown to Reddish Brown Clay, Trace Silt and Sand, Scattered Gravel.				
4 5 6 7 8 9 10						

◊ Fines Content ⊗ Moisture Content ●——■ Plastic Limit and Liquid Limit

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Test Pit ID: TP-1

Sheet 1 of 1

Client: Colin Kelley
Project Name: Pine Springs Devlopment at the Village Green
Project Number: 21-753
Project Location: Row River Road Cottage Grove, Oregon
Date Started: Feb 17 2022 **Completed:** Feb 17 2022
Logged By: SPR **Checked By:** RJD
Contractor: Branch Engineering Inc.
Latitude: **Longitude:** **Elevation:**
Method: Test Pit Excavation
Ground Water Levels
Equipment: Tracked Excavator
▽
Notes:
▼
◪

Depth	Graphic	Material Description	Sample	Pocket Pen. (tsf)	Dry Unit Wt. (pcf)	MC: ⊗ PL LL: ●–■ 10 20 30 40 50 60 70 80 90
		Soft, Moist, Dark Brown Clay with Trace Silt and Organics.				
1		Medium Stiff, Moist, Brown-Gray High Plasticity Clay and Fine Roots. Groundwater Seepage in Sidewalls.				
2						
3						
4	▼	Medium Dense, Moist, Brown-Gray Medium Grained Sand with Trace Silt and Rounded Gravel-Cobble. Sidewall Collapse at 4-feet BGS.				
5						
6						
7						
8						
9						
10						

◊ Fines Content ⊗ Moisture Content ●—■ Plastic Limit and Liquid Limit

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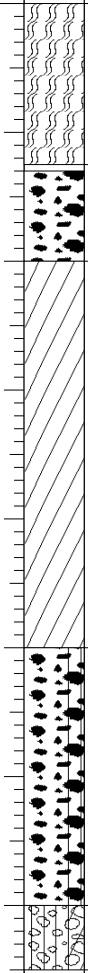
Test Pit ID: TP-2

Sheet 1 of 1

Client: Colin Kelley
Project Name: Pine Springs Devlopment at the Village Green
Project Number: 21-753
Project Location: Row River Road Cottage Grove, Oregon
Date Started: Feb 17 2022 **Completed:** Feb 17 2022
Logged By: SPR **Checked By:** RJD
Contractor: Branch Engineering Inc.
Latitude: **Longitude:** **Elevation:**
Method: Test Pit Excavation
Ground Water Levels
Equipment: Tracked Excavator
Notes:



Depth	Material Description	Sample	Pocket Pen. (tsf)	Dry Unit Wt. (pcf)	MC: ⊗ PL LL: ●–■ 10 20 30 40 50 60 70 80 90
	Soft, Moist, Dark Brown Clay with Trace Silt and Organics.				
1					
	Loose, Moist, Well Sorted Rounded Gravel, Interpreted as Drainage Rock (Fill).				
2	Stiff, Moist, Brown Clay with Trace Silt and Sand, Medium Plasticity.				
3					
4					
5	Medium Dense, Moist, Brown-Gray Medium Grained Sand with Trace Silt and Rounded Gravel.				
6					
7	Medium Dense, Moist, Brown-Gray Gravel-Cobble with Minor Sand, Alluvium.				
8					
9					
10					

◊ Fines Content ⊗ Moisture Content ●—■ Plastic Limit and Liquid Limit

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Test Pit ID: TP-3

Sheet 1 of 1

Client: Colin Kelley
Project Name: Pine Springs Devlopment at the Village Green
Project Number: 21-753
Project Location: Row River Road Cottage Grove, Oregon
Date Started: Feb 17 2022 **Completed:** Feb 17 2022
Logged By: SPR **Checked By:** RJD
Contractor: Branch Engineering Inc.
Latitude: **Longitude:** **Elevation:**
Method: Test Pit Excavation
Ground Water Levels
Equipment: Tracked Excavator
▽
Notes:
▼

Depth	Graphic	Material Description	Sample	Pocket Pen. (tsf)	Dry Unit Wt. (pcf)	MC: ⊗ PL LL: ●–■ 10 20 30 40 50 60 70 80 90
1		Soft, Moist, Dark Brown Clay with Trace Silt and Organics.				
2		Medium Stiff, Moist, Brown-Gray Clay with Trace Silt.				
3 4 5		Medium Dense, Moist, Brown-Gray Silt, Sand, and Rounded Gravel-Cobble.				
6 7 8 9 10						

◊ Fines Content ⊗ Moisture Content ●–■ Plastic Limit and Liquid Limit

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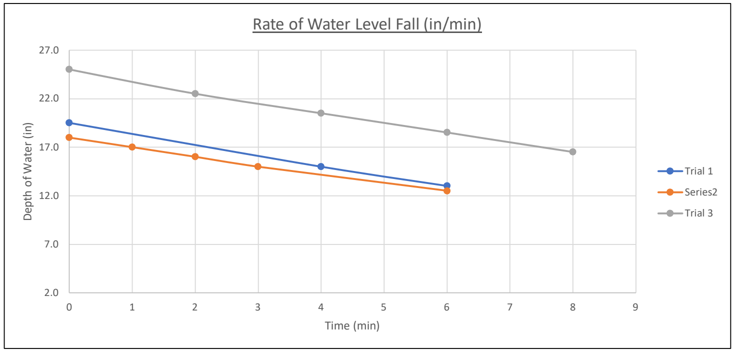
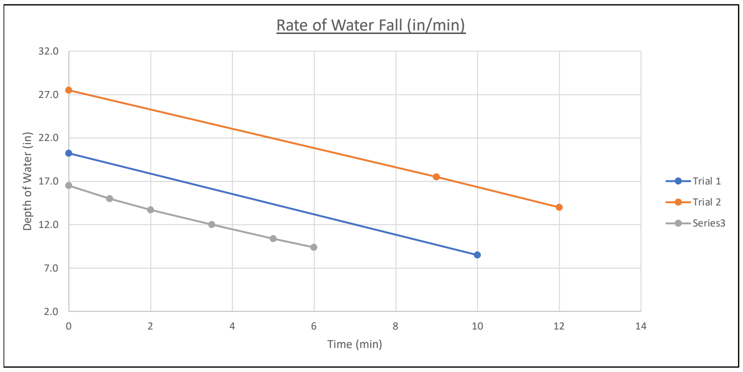
Infiltration Test Results

Project: Pine Springs at Village Green
Testing Date: 2/17/2022
BEI Project Number: 21-753
Test Type: Encased Falling Head Infiltration
Time = 0 at addition of H2O

Infiltration Test 1 Trial 1		**Elapsed Time (min)**	**Depth to Water Surface (in)**	**Depth of Water (in)**	**Rate of Fall (in/min)**	**Rate of Fall (in/hr)**	**Avg Rate of Fall T-1 (in/hr)**
Standpipe Diameter (in)	6	0	45.5	19.5			
Standpipe Height AGS (in)	8	4	50.0	15.0	1.13	67.5	
Test Depth BGS (in)	57	6	52.0	13.0	1.00	60.0	63.8
Volume of Water Added (gal)	2.3						
Clocktime at Start	11:12						
ASTM Soil Type	(GP-GC)						
Infiltration Test 1 Trial 2		**Elapsed Time (min)**	**Depth to Water Surface (in)**	**Depth of Water (in)**	**Rate of Fall (in/min)**	**Rate of Fall (in/hr)**	**Avg Rate of Fall T-2 (in/hr)**
Volume of Water Added (gal)	2.25	0	47.0	18.0			
Clocktime	11:19	1	48.0	17.0	1.00	60.0	
		2	49.0	16.0	1.00	60.0	
		3	50.0	15.0	1.00	60.0	
		6	52.5	12.5	0.83	50.0	57.5
Infiltration Test 1 Trial 3		**Elapsed Time (min)**	**Depth to Water Surface (in)**	**Depth of Water (in)**	**Rate of Fall (in/min)**	**Rate of Fall (in/hr)**	**Avg Rate of Fall T-3 (in/hr)**
Volume of Water Added (gal)	3.1	0	40.0	25.0			
Clocktime	11:49	2	42.5	22.5	1.25	75.0	
		4	44.5	20.5	1.00	60.0	
		6	46.5	18.5	1.00	60.0	
		8	48.5	16.5	1.00	60.0	63.8



Infiltration Test 2 Trial 1		**Elapsed Time (min)**	**Depth to Water Surface (in)**	**Depth of Water (in)**	**Rate of Fall (in/min)**	**Rate of Fall (in/hr)**	**Avg Rate of Fall T-1 (in/hr)**
Standpipe Diameter (in)	6	0	41.3	20.3			
Standpipe Height AGS (in)	7	10	53.0	8.5	1.18	70.5	70.5
Test Depth BGS (in)	54.5						
Volume of Water Added (gal)	2.5						
Clocktime	11:14						
ASTM Soil Type	(GP-GC)						
Infiltration Test 2 Trial 2		**Elapsed Time (min)**	**Depth to Water Surface (in)**	**Depth of Water (in)**	**Rate of Fall (in/min)**	**Rate of Fall (in/hr)**	**AVG Rate of Fall T-2 (in/hr)**
Volume of Water Added (gal)	3.4	0	34.0	27.5			
Clocktime	11:26	9	44.0	17.5	1.11	66.7	
		12	47.5	14.0	1.17	70.0	68.3
Infiltration Test 2 Trial 3		**Elapsed Time (min)**	**Depth to Water Surface (in)**	**Depth of Water (in)**	**Rate of Fall (in/min)**	**Rate of Fall (in/hr)**	**AVG Rate of Fall T-2 (in/hr)**
Volume of Water Added (gal)	0.5	0	45.0	16.5			
Clocktime	11:39	1	46.5	15.0	1.50	90.0	
		2	47.8	13.7	1.30	78.0	
		3.5	49.5	12.0	1.13	68.0	
		5	51.1	10.4	1.07	64.0	
		6	52.1	9.4	1.00	60.0	67.5



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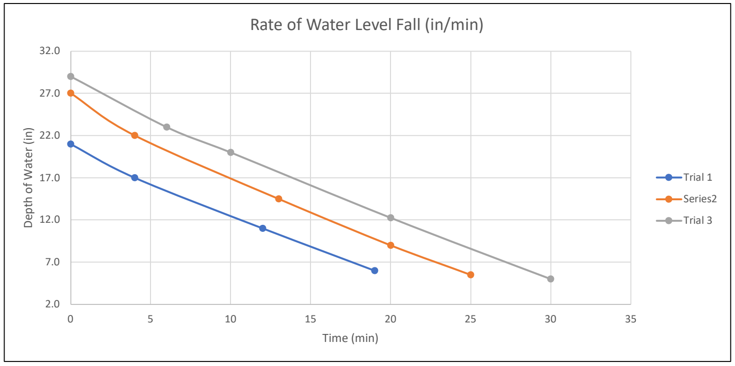
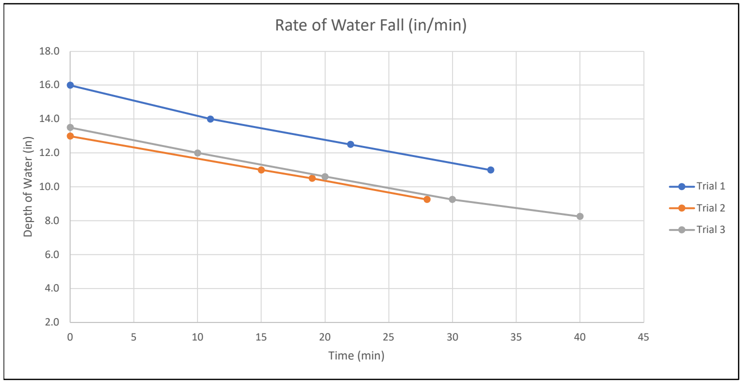
Infiltration Test Results

Project: Pine Springs at Village Green
Testing Date: 2/17/2022
BEI Project Number: 21-753
Test Type: Encased Falling Head Infiltration
Time = 0 at addition of H2O

Infiltration Test 3 Trial 1			**Elapsed Time (min)**	**Depth to Water Surface (in)**	**Depth of Water (in)**	**Rate of Fall (in/min)**	**Rate of Fall (in/hr)**	**Avg Rate of Fall T-1 (in/hr)**
Standpipe Diameter (in)	6		0	42.0	21.0			
Standpipe Height AGS (in)	6		4	46.0	17.0	1.00	60.0	
Test Depth BGS (in)	57		12	52.0	11.0	0.75	45.0	
Volume of Water Added (gal)	2.6		19	57.0	6.0	0.71	42.9	43.9
Clocktime at Start	11:37							
ASTM Soil Type	(GP-GC)							
Infiltration Test 3 Trial 2			**Elapsed Time (min)**	**Depth to Water Surface (in)**	**Depth of Water (in)**	**Rate of Fall (in/min)**	**Rate of Fall (in/hr)**	**Avg Rate of Fall T-2 (in/hr)**
Volume of Water Added (gal)	3.1		0	36.0	27.0			
Clocktime	11:57		4	41.0	22.0	1.25	75.0	
			13	48.5	14.5	0.83	50.0	
			20	54.0	9.0	0.79	47.1	
			25	57.5	5.5	0.70	42.0	46.4
Infiltration Test 3 Trial 3			**Elapsed Time (min)**	**Depth to Water Surface (in)**	**Depth of Water (in)**	**Rate of Fall (in/min)**	**Rate of Fall (in/hr)**	**Avg Rate of Fall T-3 (in/hr)**
Volume of Water Added (gal)	3.5		0	34.0	29.0			
Clocktime	12:34		6	40.0	23.0	1.00	60.0	
			10	43.0	20.0	0.75	45.0	
			20	50.8	12.3	0.78	46.5	
			30	58.0	5.0	0.73	43.5	45.0



Infiltration Test 4 Trial 1			**Elapsed Time (min)**	**Depth to Water Surface (in)**	**Depth of Water (in)**	**Rate of Fall (in/min)**	**Rate of Fall (in/hr)**	**Avg Rate of Fall T-1 (in/hr)**
Standpipe Diameter (in)	6		0	35.0	16.0			
Standpipe Height AGS (in)	6		11	37.0	14.0	0.18	10.9	
Test Depth BGS (in)	45		22	38.5	12.5	0.14	8.2	
Volume of Water Added (gal)	2		33	40.0	11.0	0.14	8.2	8.2
Clocktime	11:52							
ASTM Soil Type	(ML)							
Infiltration Test 4 Trial 2			**Elapsed Time (min)**	**Depth to Water Surface (in)**	**Depth of Water (in)**	**Rate of Fall (in/min)**	**Rate of Fall (in/hr)**	**AVG Rate of Fall T-2 (in/hr)**
Volume of Water Added (gal)	1.6		0	38.0	13.0			
Clocktime	12:26		15	40.0	11.0	0.13	8.0	
			19	40.5	10.5	0.13	7.5	
			28	41.8	9.3	0.14	8.3	7.9
Infiltration Test 4 Trial 3			**Elapsed Time (min)**	**Depth to Water Surface (in)**	**Depth of Water (in)**	**Rate of Fall (in/min)**	**Rate of Fall (in/hr)**	**AVG Rate of Fall T-2 (in/hr)**
Volume of Water Added (gal)	1.5		0	37.5	13.5			
Clocktime	12:55		10	39.0	12.0	0.15	9.0	
			20	40.4	10.6	0.14	8.4	
			30	41.8	9.3	0.14	8.1	
			40	42.8	8.3	0.10	6.0	7.9



NOTICE TO WATER WELL CONTRACTOR
The original and first copy
of this report are to be
filed with the
STATE ENGINEER, SALEM, OREGON 97310
within 30 days from the date
of well completion.

RECEIVED
OCT 13 1971
STATE ENGINEER
SALEM, OREGON

WATER WELL REPORT
STATE OF OREGON
(Please type or print)
(Do not write above this line)

1867
LANE

State Well No. 20/3W-27
State Permit No.

(1) OWNER:
Name Pruitt Mink Farm
Address Rt 1 Box 61 Cottage Grove, Oregon

(2) TYPE OF WORK (check):
New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary ☒ Driven ☐
Cable ☐ Jetted ☐
Dug ☐ Bored ☐

(4) PROPOSED USE (check):
Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

[illegible] CASING INSTALLED:
Threaded ☐ Welded ☒
6" Diam. from 0 ft. to 24½ ft. Gage .250
" Diam. from ft. to ft. Gage
" Diam. from ft. to ft. Gage

[illegible] PERFORATIONS:
Perforated? ☐ Yes ☒ No.
Type of perforator used
Size of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

(7) SCREENS:
Well screen installed? ☐ Yes ☒ No
Manufacturer's Name
Type Model No.
Diam. Slot size Set from ft. to ft.
Diam. Slot size Set from ft. to ft.

(8) WELL TESTS:
Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☒ No If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " "
Tested with air estimated 5 GPM could fluctuate
~~XXXXXXX~~ gal./min. with 36 ft. drawdown after 1 hrs.
Artesian flow g.p.m.
Temperature of water Depth artesian flow encountered ft.

[illegible] CONSTRUCTION:
Well seal—Material used Cement Grout
Well sealed from land surface to 24 ft.
Diameter of well bore to bottom of seal 10 in.
Diameter of well bore below seal 6 in.
Number of sacks of cement used in well seal 15 sacks
Number of sacks of bentonite used in well seal sacks
Brand name of bentonite
Number of pounds of bentonite per 100 gallons of water lbs./100 gals.
Was a drive shoe used? ☒ Yes ☐ No Plugs Size: location ft.
Did any strata contain unusable water? ☐ Yes ☒ No
Type of water? depth of strata
Method of sealing strata off
Was well gravel packed? ☐ Yes ☒ No Size of gravel:
Gravel placed from ft. to ft.

(10) LOCATION OF WELL:
County Lane Driller's well number
¼ ¼ Section 27 20S R. 3W W.M.
Bearing and distance from section or subdivision corner

(11) WATER LEVEL: Completed well.
Depth at which water was first found 47 ft.
Static level 19 ft. below land surface. Date 9-30-71
Artesian pressure lbs. per square inch. Date

(12) WELL LOG:
Diameter of well below casing 6
Depth drilled 55 ft. Depth of completed well 55 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. *Report each change in position of Static Water Level and indicate principal water-bearing strata.*

MATERIAL	From	To	SWL
Brown Top Soil	0	1	
Clay & Gravel	1	19	
Blue Claystone	19	46	
Black Samdstone	46	48	
Lavender Claystone	48	55	

Work started 9-29-71 19 Completed 9-30-71 19
Date well drilling machine moved off of well 9-20-71 19

Drilling Machine Operator's Certification:
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] Casey L. Jones Date 10-5-71, 19
(Drilling Machine Operator)
Drilling Machine Operator's License No. 521

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Name Casey Jones Well D illing Co Inc
(Person, firm or corporation) (Type or print)
Address Route 7 Box 695 Pleasant Hill, Oregon
[Signed] Delbert L Jones
(Water Well Contractor)
Contractor's License No. 103 Date 10-5-71, 19

(USE ADDITIONAL SHEETS IF NECESSARY)

SP*45656-119

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report
are to be filed with the

WATER RESOURCES DEPARTMENT
SALEM, OREGON 97310
within 30 days from the date
of well completion.

RECEIVED
SEP 29 1977
WATER RESOURCES DEPT
SALEM, OREGON

WATER WELL REPORT
STATE OF OREGON
(Please type or print)
(Do not write above this line)

11868 LANE

State Well No. 20S/3W-27bd

State Permit No.

(1) OWNER:
Name Loyde tHweAtt
Address 78960 ThoRNTON Rd
CoTTAge Grove, ORe

(2) TYPE OF WORK (check):
New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary ☐ Driven ☐
Cable ☒ Jetted ☐
Dug ☐ Bored ☐

(4) PROPOSED USE (check):
Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

[illegible] CASING INSTALLED:
Threaded ☐ Welded ☒
6" Diam. from +1 ft. to 52 ft. Gage .250
" Diam. from ft. to ft. Gage
" Diam. from ft. to ft. Gage

[illegible] PERFORATIONS:
Perforated? ☐ Yes ☒ No.
Type of perforator used
Size of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

(7) SCREENS:
Well screen installed? ☐ Yes ☒ No
Manufacturer's Name
Type Model No.
Diam. Slot size Set from ft. to ft.
Diam. Slot size Set from ft. to ft.

(8) WELL TESTS:
Drawdown is amount water level is lowered below static level
Was a pump test made? ☒ Yes ☐ No If yes, by whom? Driller
Yield: 3 gal./min. with 40 ft. drawdown after 4 hrs.
" " "
" " "
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m.
[illegible]perature of water Depth artesian flow encountered ft.

(9) CONSTRUCTION:
Well seal—Material used Cement
Well sealed from land surface to 20 ft.
Diameter of well bore to bottom of seal 10 in.
Diameter of well bore below seal 6 in.
Number of sacks of cement used in well seal 5 sacks
How was cement grout placed? PouRed

Was a drive shoe used? ☒ Yes ☐ No Plugs Size: location ft.
Did any strata contain unusable water? ☐ Yes ☒ No
Type of water? depth of strata
Method of sealing strata off
Was well gravel packed? ☐ Yes ☒ No Size of gravel:
Gravel placed from ft. to ft.

(10) LOCATION OF WELL:
County LANe Driller's well number
SE ¼ N.W ¼ Section 27 T. 20S R. 3W. W.M.
Bearing and distance from section or subdivision corner

(11) WATER LEVEL: Completed well.
Depth at which water was first found 35 ft.
Static level 10 ft. below land surface. Date 8-18-77
Artesian pressure lbs. per square inch. Date

(12) WELL LOG:
Diameter of well below casing 6
Depth drilled 52 ft. Depth of completed well 52 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. **Report each change in position of Static Water Level and indicate principal water-bearing strata.**

MATERIAL	From	To	SWL
DirT	0	1	
ClAy +GrAvel	1	20	
CemenTed GrAvel	20	52	10

Work started 8-17 1977 Completed 8-19 1977
Date well drilling machine moved off of well 8-19 1977

Drilling Machine Operator's Certification:
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] Thomas May Date 8-20, 1977
(Drilling Machine Operator)
Drilling Machine Operator's License No. 834

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Name Tom May Well Drilling
(Person, firm or corporation) (Type or print)
Address Po Box 875 Cottage Grove
[Signed] Tom May
(Water Well Contractor)
Contractor's License No. 646 Date 8-20- , 1977

(USE ADDITIONAL SHEETS IF NECESSARY)

2

STATE OF OREGON
WATER WELL REPORT
(as required by ORS 537.765)

LANG 2902

JUN - 1 1992
WATER RESOURCES DEPT.
SALEM, OREGON

20S/3W/27ca

(START CARD) #W 41735

(1) OWNER:
Well Number #1
Name Richard Cantonwine
Address 3800 Bennett Creek Rd.
City Cottage Grove State OR Zip 97424

(2) TYPE OF WORK:
☒ New Well ☐ Deepen ☐ Recondition ☒ Abandon

(3) DRILL METHOD:
☒ Rotary Air ☐ Rotary Mud ☐ Cable
☐ Other

(4) PROPOSED USE:
☒ Domestic ☐ Community ☐ Industrial ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other

(5) BORE HOLE CONSTRUCTION:
Special Construction approval ☐ Yes ☒ No Depth of Completed Well 298 ft.
Explosives used ☐ Yes ☒ No Type Amount

HOLE			SEAL			Amount
Diameter	From	To	Material	From	To	sacks or pounds
10"	0	37'	Cement	0	240'	3 yards
6"	37'	298'				

How was seal placed: Method ☐ A ☐ B ☒ C ☐ D ☐ E
☐ Other
Backfill placed from ft. to ft. Material
Gravel placed from ft. to ft. Size of gravel

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:					☐	☐	☐	☐
					☐	☐	☐	☐

Final location of shoe(s)

(7) PERFORATIONS/SCREENS:
☐ Perforations Method
☐ Screens Type Material

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour

☐ Pump ☐ Bailer ☒ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
3 ½	277'	298'	1 hr.

Temperature of Water 56° Depth Artesian Flow Found
Was a water analysis done? ☐ Yes By whom not tested
Did any strata contain water not suitable for intended use? ☐ Too little
☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other
Depth of strata:

(9) LOCATION OF WELL by legal description:
County Lane Latitude Longitude
Township 20S N or S. Range 3W E or W. WM.
Section 27 NE ¼ SW ¼
Tax Lot 1408 Lot Block Subdivision
Street Address of Well (or nearest address) Across from 33137 Loyd Ave., Cottage Grove

(10) STATIC WATER LEVEL:
21 ft. below land surface. Date 4-30-92
Artesian pressure lb. per square inch. Date

(11) WATER BEARING ZONES:

Depth at which water was first found 250'

From	To	Estimated Flow Rate	SWL
250'	255'	3½ gpm	21'

(12) WELL LOG:
Ground elevation

Material	From	To	SWL
Topsoil	0	3'	
Gravel & sand	3'	29'	
Brown conglomerate	29'	50'	
Blue, green claystone	50'	90'	
Brown claystone	90'	100'	
Gray claystone	100'	115'	
Blue,green claystone	115'	230'	
Gray claystone	230'	235'	
Blue,green claystone	235'	260'	21'
Basalt	260'	270'	
Blue, green claystone	270'	298'	

Date started 4-28-92 Completed 4-30-92

(unbonded) Water Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to my best knowledge and belief.
WWC Number 1564
Signed Date 5-4-92

(bonded) Water Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.
WWC Number 559
Signed Casey L Jones Date 5-4-92

STATE OF OREGON
MONITORING WELL REPORT
(as required by ORS 537.765 & OAR 690-240-095)

Lane
3766

RECEIVED
MAY 18 1993
WATER RESOURCES DEPT.
SALEM, OREGON

20s/3w/27bd
KCW-01/
Start Card # W-50314

(1) OWNER/PROJECT:
WELL NO.

Name Kris Woodward, KCW Properties

Address P. O. Box 10666

City Eugene State Oregon Zip 97440

(2) TYPE OF WORK:
☒ New construction ☐ Repair ☐ Recondition

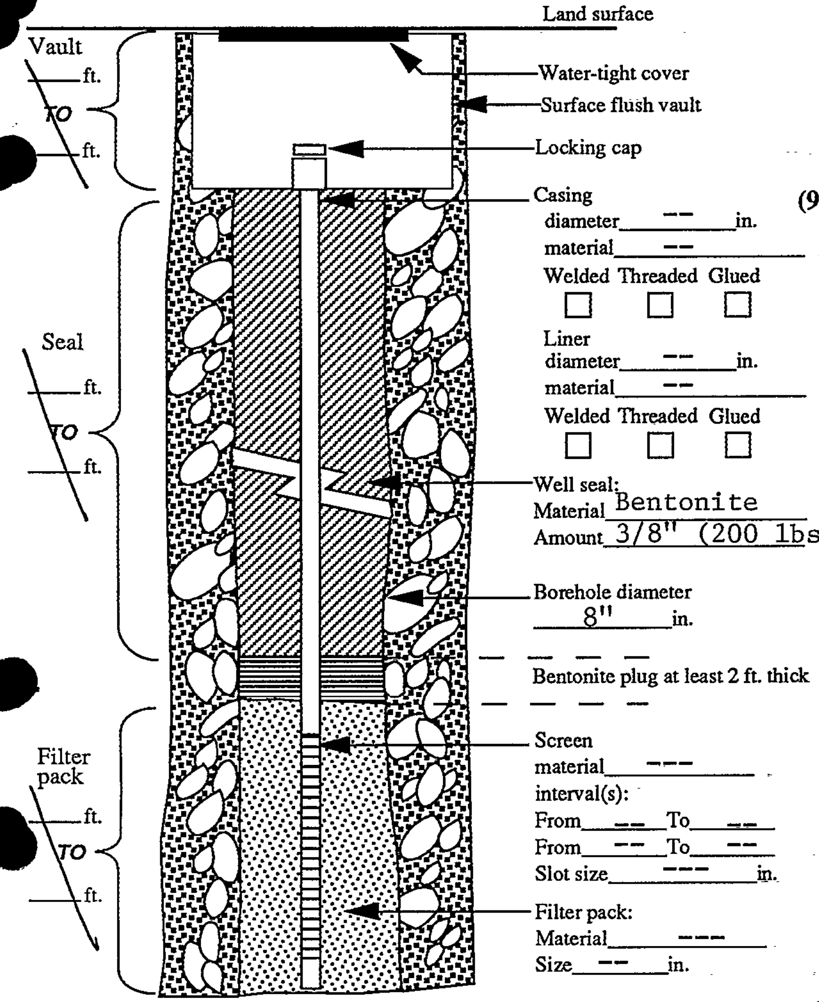
☐ Conversion ☐ Deepening ☐ Abandonment

(3) DRILLING METHOD
☐ Rotary Air ☐ Rotary Mud ☐ Cable

☒ Hollow Stem Auger ☐ Other

(4) BORE HOLE CONSTRUCTION
Special Standards Yes ☐ No ☒

Depth of completed well --- ft. (Not a well)



Casing diameter -- in.
material --

Welded ☐ Threaded ☐ Glued ☐

Liner diameter -- in.
material --

Welded ☐ Threaded ☐ Glued ☐

Well seal:
Material Bentonite
Amount 3/8" (200 lbs)

Borehole diameter 8" in.

Screen material ---
interval(s):
From -- To --
From -- To --
Slot size --- in.

Filter pack:
Material ---
Size -- in.

(5) WELL TEST:
☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Permeability -- Yield -- GPM

Conductivity -- PH --

Temperature of water 55 [✓ °F]/C Depth artesian flow found -- ft.

Was water analysis done? ☒ Yes ☐ No

By whom? Pacific Northwest Laboratories

Depth of strata to be analyzed. From -- ft. to ft.

Remarks:

Name of supervising Geologist/Engineer Daniel F. Mumford

(6) LOCATION OF WELL By legal description
Well Location: County Lane

Township T20S (N or [✓ S]) Range R3W (E or [✓ W]) Section 27

1. SE 1/4 of NW 1/4 of above section.
2. Street address of well location 690 Row River Road
Cottage Grove, OR 97424
3. Tax lot number of well location 3300
4. ATTACH MAP WITH LOCATION IDENTIFIED.

(7) STATIC WATER LEVEL:
8' Ft. below land surface. Date 4-20-93

Artesian Pressure -- lb/sq. in. Date --

(8) WATER BEARING ZONES:
Depth at which water was first found 8'

From	To	Est. Flow Rate	SWL
8'	12'	> 1 gpm	--

(9) WELL LOG:
Ground elevation 635'

Material	From	To	SWL
Asphalt	0	2"	
Crushed rock fill	2"	10"	
Brown sandy gravel,	10"	10'	
moist.			
Silty clay matrix	10'	12'	
brown, w/cobbles			
up to 6", wet.			

Date started 4/20/93 Completed 4/20/93

(unbonded) Monitor Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to the best knowledge and belief.

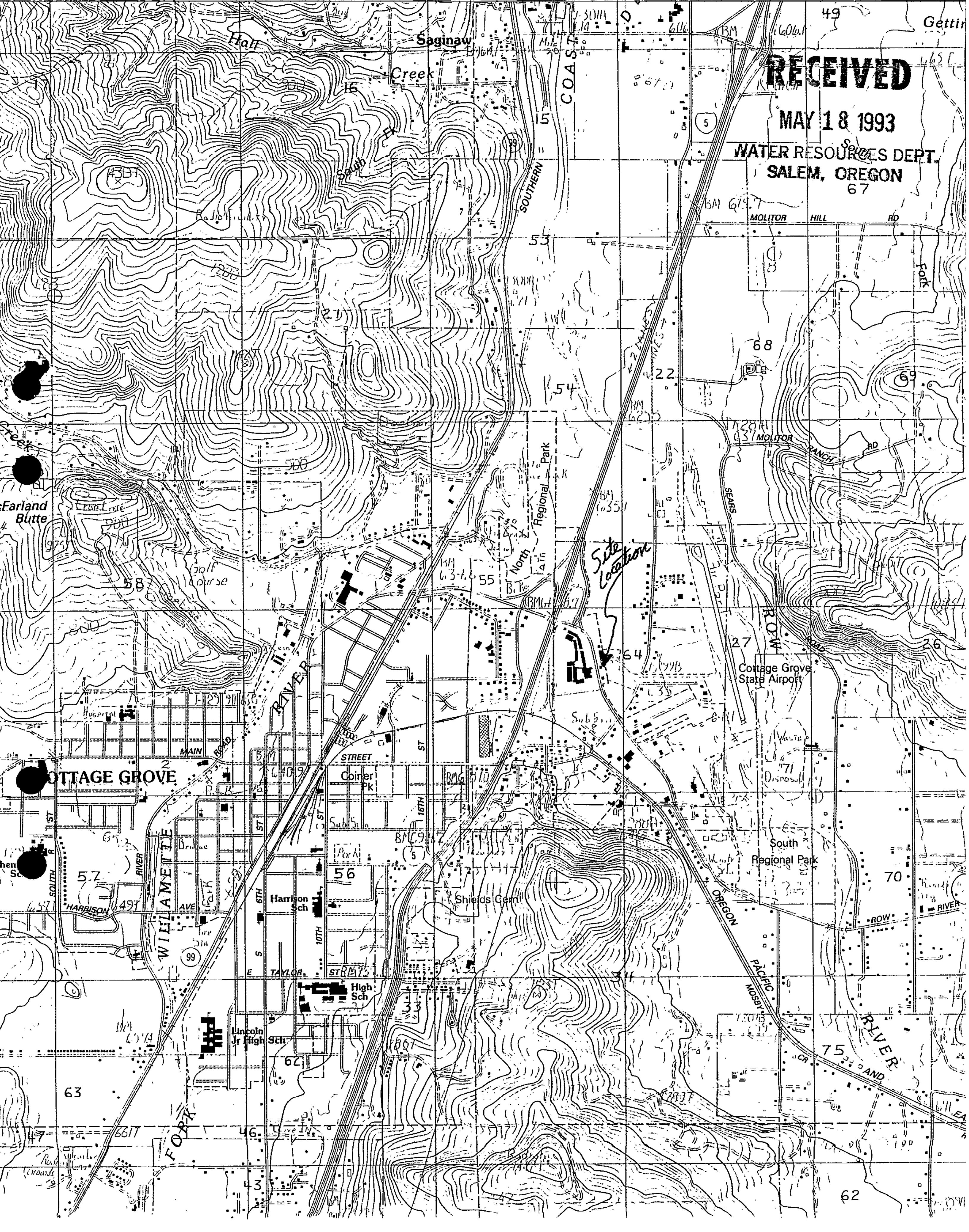
MWC Number
Signed Date

(bonded) Monitor Well Constructor Certification:

I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.

MWC Number 10288
Signed Robert L. Boese Date 5/17/93

ORIGINAL & FIRST COPY-WATER RESOURCES DEPARTMENT SECOND COPY-CONSTRUCTOR THIRD COPY-CUSTOMER


Saginaw
Hall Creek
South Fk
SOUTHERN
COAST
5
99
MOLITOR HILL RD
MOLITOR RANCH RD
SEARS
ROW
North Regional Park
Site location
Cottage Grove State Airport
Golf Course
cFarland Butte
RIVER
MAIN
ROAD
STREET
Coiner Pk
COTTAGE GROVE
16TH
10TH
6TH
WILLAMETTE
HARRISON AVE
TAYLOR
Harrison Sch
High Sch
Lincoln Jr High Sch
Shields Cem
South Regional Park
OREGON
PACIFIC
MOSBY
RIVER
ROW RIVER
AND
FORK
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Soil Map—Lane County Area, Oregon
(Pine Springs Development)

Map Scale: 1:5,070 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: Lane County Area, Oregon
Survey Area Data: Version 19, Oct 27, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Oct 30, 2019—Nov 1, 2019

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
24	Chapman loam	6.0	4.9%
79	McBee silty clay loam	9.4	7.7%
89D	Nekia silty clay loam, 12 to 20 percent slopes	0.6	0.5%
118	Salem gravelly silt loam	92.7	75.8%
119	Salem-Urban land complex	13.0	10.6%
2205A	Conser silty clay loam, 0 to 3 percent slopes	0.7	0.5%
Totals for Area of Interest		**122.4**	**100.0%**

Lane County Area, Oregon

79—McBee silty clay loam

Map Unit Setting

National map unit symbol: 238x
Elevation: 100 to 2,500 feet
Mean annual precipitation: 36 to 60 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 150 to 210 days
Farmland classification: Prime farmland if protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Mcbee and similar soils: 85 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mcbee

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Recent mixed alluvium

Typical profile

H1 - 0 to 24 inches: silty clay loam
H2 - 24 to 41 inches: silt loam
H3 - 41 to 62 inches: silt loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately 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: About 24 to 36 inches
Frequency of flooding: FrequentNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 10.9 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C
Ecological site: F002XC003OR - Low Floodplain Group
Forage suitability group: Moderately Well Drained < 15% Slopes (G002XY004OR)

Other vegetative classification: Moderately Well Drained < 15% Slopes (G002XY004OR)
Hydric soil rating: No

Minor Components

Wapato

Percent of map unit: 3 percent
Landform: Flood plains
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Lane County Area, Oregon
Survey Area Data: Version 19, Oct 27, 2021

Lane County Area, Oregon

118—Salem gravelly silt loam

Map Unit Setting

National map unit symbol: 2340
Elevation: 300 to 800 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Salem and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Salem

Setting

Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Gravelly mixed alluvium

Typical profile

H1 - 0 to 7 inches: gravelly silt loam
H2 - 7 to 26 inches: gravelly clay loam
H3 - 26 to 60 inches: very gravelly sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
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 supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: B
Ecological site: R002XC006OR - Stream Terrace Group
Forage suitability group: Well drained < 15% Slopes (G002XY002OR)
Other vegetative classification: Well drained < 15% Slopes (G002XY002OR)

Hydric soil rating: No

Data Source Information

Soil Survey Area: Lane County Area, Oregon
Survey Area Data: Version 19, Oct 27, 2021

Lane County Area, Oregon

119—Salem-Urban land complex

Map Unit Setting

National map unit symbol: 2341
Elevation: 300 to 800 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Salem and similar soils: 50 percent
Urban land: 40 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Salem

Setting

Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Gravelly mixed alluvium

Typical profile

H1 - 0 to 7 inches: gravelly silt loam
H2 - 7 to 26 inches: gravelly clay loam
H3 - 26 to 60 inches: very gravelly sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
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 supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: B
Ecological site: R002XC006OR - Stream Terrace Group
Forage suitability group: Well drained < 15% Slopes (G002XY002OR)
Other vegetative classification: Well drained < 15% Slopes (G002XY002OR)

Hydric soil rating: No

Description of Urban Land

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

Data Source Information

Soil Survey Area: Lane County Area, Oregon
Survey Area Data: Version 19, Oct 27, 2021

APPENDIX B:

Recommended Earthwork Specifications

GEOTECHNICAL SPECIFICATIONS

General Earthwork

1. All areas where structural fills, fill slopes, structures, or roadways are to be constructed shall be stripped of organic topsoil and cleared of surface and subsurface deleterious material, including but limited to vegetation, roots, or other organic material, undocumented fill, construction debris, soft or unsuitable soils as directed by the Geotechnical Engineer of Record. These materials shall be removed from the site or stockpiled in a designated location for reuse in landscape areas if suitable for that purpose. Existing utilities and structures that are not to be used as part of the project design or by neighboring facilities, shall be removed or properly abandoned, and the associated debris removed from the site.
2. Upon completion of site stripping and clearing, the exposed soil and/or rock shall be observed by the Geotechnical Engineer of Record or a designated representative to assess the subgrade condition for the intended overlying use. Pits, depressions, or holes created by the removal of root wads, utilities, structures, or deleterious material shall be properly cleared of loose material, benched and backfilled with fill material approved by the Geotechnical Engineer of Record compacted to the project specifications.
3. In structural fill areas, the subgrade soil shall be scarified to a depth of 4-inches, if soil fill is used, moisture conditioned to within 2% of the materials optimum moisture for compaction, and blended with the first lift of fill material. The fill placement and compaction equipment shall be appropriate for fill material type, required degree of blending, and uncompacted lift thickness. Assuming proper equipment selection, the total uncompacted thickness of the scarified subgrade and first fill lift shall not exceed 8-inches, subsequent lifts of uncompacted fill shall not exceed 8-inches unless otherwise approved by the Geotechnical Engineer of Record. The uncompacted lift thickness shall be assessed based on the type of compaction equipment used and the results of initial compaction testing. Fine-grain soil fill is generally most effectively compacted using a kneading style compactor, such as a sheeps-foot roller; granular materials are more effectively compacted using a smooth, vibratory roller or impact style compactor.
4. All structural soil fill shall be well blended, moisture conditioned to within 2% of the material's optimum moisture content for compaction and compacted to at least 90% of the material's maximum dry density as determined by ASTM Method D-1557, or an equivalent method. Soil fill shall not contain more than 10% rock material and no solid material over 3-inches in diameter unless approved by the Geotechnical Engineer of Record. Rocks shall be evenly distributed throughout each lift of fill that they are contained within and shall not be clumped together in such a way that voids can occur.
5. All structural granular fill shall be well blended, moisture conditioned at or up to 3% above of the material's optimum moisture content for compaction and compacted to at least 90% of the material's maximum dry density as determined by ASTM Method D-1557, or an equivalent method. 95% relative compaction may be required for pavement base rock or in upper lifts of the granular structural fill where a sufficient thickness of the fill section allows for higher compaction percentages to be achieved. The granular fill shall not contain solid particles over 2-inches in diameter unless special density testing methods or proof-rolling is approved by the Geotechnical Engineer of Record. Granular fill is generally considered to be a crushed aggregate with a fracture surface of at least 70% and a maximum size not exceeding 1.5-inches in diameter, well-graded with less than 10%, by weight, passing the No. 200 Sieve.
6. Structural fill shall be field tested for compliance with project specifications for every 2-feet in vertical rise or 500 cy placed, whichever is less. In-place field density testing shall be performed by a competent individual, trained in the testing and placement of soil and aggregate fill placement, using either ASTM Method D-1556/4959/4944 (Sand Cone), D-6938 (Nuclear Densometer), or D-2937/4959/4944 (Drive Cylinder). Should the fill materials not be suitable for testing by the above methods, then observation of placement, compaction and proof-rolling with a loaded 10 cy dump-truck, or equivalent ground pressure equipment, by a trained individual may be used to assess and document the compliance with structural fill specifications.

Utility Excavations

1. Utility excavations are to be excavated to the design depth for bedding and placement and shall not be over-excavated. Trench widths shall only be of sufficient width to allow placement and proper construction of the utility and backfill of the trench.
2. Backfilling of a utility trench will be dependent on its location, use, depth, and utility line material type. Trenches that are required to meet structural fill specifications, such as those under or near buildings, or within pavement areas, shall have granular material strategically compacted to at least the spring-line of the utility conduit to mitigate pipeline movement and deformation. The initial lift thickness of backfill overlying the pipeline will be dependent on the pipeline material, type of backfill, and the compaction equipment, so as not to cause deflection or deformation of the pipeline. Trench backfill shall conform to the General Earthwork specifications for placement, compaction, and testing of structural fill.

Geotextiles

1. All geotextiles shall be resistant to ultraviolet degradation, and to biological and chemical environments normally found in soils. Geotextiles shall be stored so that they are not in direct sunlight or exposed to chemical products. The use of a geotextile shall be specified and shall meet the following specification for each use.

<u>Subgrade/Aggregate Separation</u>

Woven or nonwoven fabric conforming to the following physical properties:

• Minimum grab tensile strength	ASTM Method D-4632	180 lb
• Minimum puncture strength (CBR)	ASTM Method D-6241	371 lb
• Elongation	ASTM Method D-4632	15%
• Maximum apparent opening size	ASTM Method D-4751	No. 40
• Minimum permittivity	ASTM Method D-4491	0.05 s^{-1}

<u>Drainage Filtration</u>

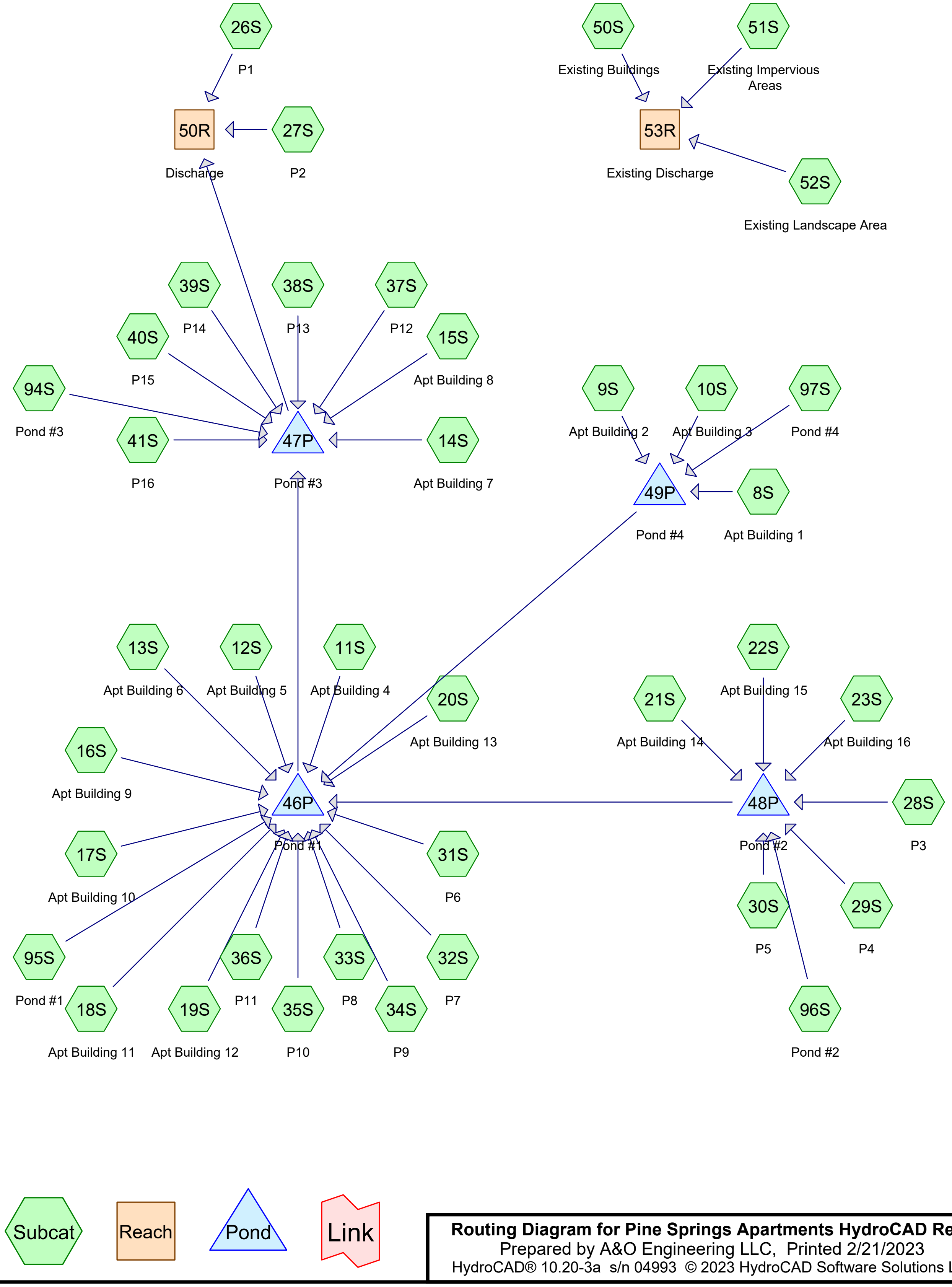
Woven fabric conforming to the following physical properties:

• Minimum grab tensile strength	ASTM Method D-4632	110 lb
• Minimum puncture strength (CBR)	ASTM Method D-6241	220 lb
• Elongation	ASTM Method D-4632	50%
• Maximum apparent opening size	ASTM Method D-4751	No. 40
• Minimum permittivity	ASTM Method D-4491	0.5 s^{-1}

<u>Geogrid Base Reinforcement</u>

Extruded biaxially or triaxially oriented polypropylene conforming to the following physical properties:

• Peak tensile strength lb/ft	ASTM Method D-6637	925
• Tensile strength at 2% strain lb/ft	ASTM Method D-6637	300
• Tensile strength at 5% strain lb/ft	ASTM Method D-6637	600
• Flexural Rigidity	ASTM Method D-1388	250,000 mg-cm
• Effective Opening Size rock size	ASTM Method D-4751	1.5x



Routing Diagram for Pine Springs Apartments HydroCAD Report
Prepared by A&O Engineering LLC, Printed 2/21/2023
HydroCAD® 10.20-3a s/n 04993 © 2023 HydroCAD Software Solutions LLC

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	25-Year	Type IA 24-hr		Default	24.00	1	5.18	2
2	Destination	Type IA 24-hr		Default	24.00	1	3.60	2
3	Pollution Reduction	Type IA 24-hr		Default	24.00	1	1.40	2

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.016	98	Impervious Roof & Adjacent Sidewalk (50S)
2.658	98	Impervious Surface (26S, 27S, 28S, 29S, 30S, 31S, 32S, 33S, 34S, 35S, 36S, 37S, 38S, 39S, 40S, 41S)
1.582	98	Impervious pavement and sidewalk (51S)
1.978	98	Unconnected roofs, HSG B (8S, 9S, 10S, 11S, 12S, 13S, 14S, 15S, 16S, 17S, 18S, 19S, 20S, 21S, 22S, 23S)
0.306	98	Water Surface, HSG B (94S, 95S, 96S, 97S)
1.897	65	Woods/grass comb., Fair, HSG B (52S)
9.436	**91**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
4.181	HSG B	8S, 9S, 10S, 11S, 12S, 13S, 14S, 15S, 16S, 17S, 18S, 19S, 20S, 21S, 22S, 23S, 52S, 94S, 95S, 96S, 97S
0.000	HSG C	
0.000	HSG D	
5.256	Other	26S, 27S, 28S, 29S, 30S, 31S, 32S, 33S, 34S, 35S, 36S, 37S, 38S, 39S, 40S, 41S, 50S, 51S
9.436		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatch Numbers
0.000	0.000	0.000	0.000	1.016	1.016	Impervious Roof & Adjacent Sidewalk	
0.000	0.000	0.000	0.000	2.658	2.658	Impervious Surface	
0.000	0.000	0.000	0.000	1.582	1.582	Impervious pavement and sidewalk	
0.000	1.978	0.000	0.000	0.000	1.978	Unconnected roofs	
0.000	0.306	0.000	0.000	0.000	0.306	Water Surface	
0.000	1.897	0.000	0.000	0.000	1.897	Woods/grass comb., Fair	
0.000	**4.181**	**0.000**	**0.000**	**5.256**	**9.436**	**TOTAL AREA**	

Pipe Listing (selected nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)
1	46P	633.60	632.00	400.0	0.0040	0.010	0.0	12.0	0.0
2	47P	633.92	632.00	480.0	0.0040	0.010	0.0	10.0	0.0
3	48P	633.60	632.00	400.0	0.0040	0.010	0.0	12.0	0.0
4	49P	636.00	634.00	125.0	0.0160	0.010	0.0	8.0	0.0

Notes Listing (selected nodes)

Line#	Node Number	Notes
1	26S	Includes area from common drive aisle that serves Village Green Hotel.
2	27S	Includes drive aisle that serves Village Green Hotel.
3	50S	Includes the roofs from existing buildings 1-8 and some adjacent sidewalks for areas within master plan (apartments). See existing drainage basin map for corresponding areas.
4	51S	Includes existing impervious pavement within the new master plan development area (apartments). See existing drainage basin map for corresponding areas.

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment8S: Apt Building 1 Runoff Area=2,073 sf 100.00% Impervious Runoff Depth=4.94"
Tc=5.0 min CN=0/98 Runoff=0.06 cfs 0.020 af

Subcatchment9S: Apt Building 2 Runoff Area=5,606 sf 100.00% Impervious Runoff Depth=4.94"
Tc=5.0 min CN=0/98 Runoff=0.16 cfs 0.053 af

Subcatchment10S: Apt Building 3 Runoff Area=5,606 sf 100.00% Impervious Runoff Depth=4.94"
Tc=5.0 min CN=0/98 Runoff=0.16 cfs 0.053 af

Subcatchment11S: Apt Building 4 Runoff Area=5,606 sf 100.00% Impervious Runoff Depth=4.94"
Tc=5.0 min CN=0/98 Runoff=0.16 cfs 0.053 af

Subcatchment12S: Apt Building 5 Runoff Area=5,606 sf 100.00% Impervious Runoff Depth=4.94"
Tc=5.0 min CN=0/98 Runoff=0.16 cfs 0.053 af

Subcatchment13S: Apt Building 6 Runoff Area=5,606 sf 100.00% Impervious Runoff Depth=4.94"
Tc=5.0 min CN=0/98 Runoff=0.16 cfs 0.053 af

Subcatchment14S: Apt Building 7 Runoff Area=5,606 sf 100.00% Impervious Runoff Depth=4.94"
Tc=5.0 min CN=0/98 Runoff=0.16 cfs 0.053 af

Subcatchment15S: Apt Building 8 Runoff Area=5,606 sf 100.00% Impervious Runoff Depth=4.94"
Tc=5.0 min CN=0/98 Runoff=0.16 cfs 0.053 af

Subcatchment16S: Apt Building 9 Runoff Area=5,606 sf 100.00% Impervious Runoff Depth=4.94"
Tc=5.0 min CN=0/98 Runoff=0.16 cfs 0.053 af

Subcatchment17S: Apt Building 10 Runoff Area=5,606 sf 100.00% Impervious Runoff Depth=4.94"
Tc=5.0 min CN=0/98 Runoff=0.16 cfs 0.053 af

Subcatchment18S: Apt Building 11 Runoff Area=5,606 sf 100.00% Impervious Runoff Depth=4.94"
Tc=5.0 min CN=0/98 Runoff=0.16 cfs 0.053 af

Subcatchment19S: Apt Building 12 Runoff Area=5,606 sf 100.00% Impervious Runoff Depth=4.94"
Tc=5.0 min CN=0/98 Runoff=0.16 cfs 0.053 af

Subcatchment20S: Apt Building 13 Runoff Area=5,606 sf 100.00% Impervious Runoff Depth=4.94"
Tc=5.0 min CN=0/98 Runoff=0.16 cfs 0.053 af

Subcatchment21S: Apt Building 14 Runoff Area=5,606 sf 100.00% Impervious Runoff Depth=4.94"
Tc=5.0 min CN=0/98 Runoff=0.16 cfs 0.053 af

Subcatchment22S: Apt Building 15 Runoff Area=5,606 sf 100.00% Impervious Runoff Depth=4.94"
Tc=5.0 min CN=0/98 Runoff=0.16 cfs 0.053 af

Subcatchment23S: Apt Building 16 Runoff Area=5,606 sf 100.00% Impervious Runoff Depth=4.94"
Tc=5.0 min CN=0/98 Runoff=0.16 cfs 0.053 af

Subcatchment26S: P1 Runoff Area=5,680 sf 100.00% Impervious Runoff Depth=4.94"
Tc=5.0 min CN=0/98 Runoff=0.16 cfs 0.054 af

Subcatchment27S: P2 Runoff Area=4,460 sf 100.00% Impervious Runoff Depth=4.94"
Tc=5.0 min CN=0/98 Runoff=0.13 cfs 0.042 af

Subcatchment28S: P3 Runoff Area=11,250 sf 100.00% Impervious Runoff Depth=4.94"
Tc=5.0 min CN=0/98 Runoff=0.32 cfs 0.106 af

Subcatchment29S: P4 Runoff Area=7,128 sf 100.00% Impervious Runoff Depth=4.94"
Tc=5.0 min CN=0/98 Runoff=0.20 cfs 0.067 af

Subcatchment30S: P5 Runoff Area=11,417 sf 100.00% Impervious Runoff Depth=4.94"
Tc=5.0 min CN=0/98 Runoff=0.32 cfs 0.108 af

Subcatchment31S: P6 Runoff Area=7,570 sf 100.00% Impervious Runoff Depth=4.94"
Tc=5.0 min CN=0/98 Runoff=0.21 cfs 0.072 af

Subcatchment32S: P7 Runoff Area=7,142 sf 100.00% Impervious Runoff Depth=4.94"
Tc=5.0 min CN=0/98 Runoff=0.20 cfs 0.068 af

Subcatchment33S: P8 Runoff Area=7,675 sf 100.00% Impervious Runoff Depth=4.94"
Tc=5.0 min CN=0/98 Runoff=0.22 cfs 0.073 af

Subcatchment34S: P9 Runoff Area=6,421 sf 100.00% Impervious Runoff Depth=4.94"
Tc=5.0 min CN=0/98 Runoff=0.18 cfs 0.061 af

Subcatchment35S: P10 Runoff Area=6,146 sf 100.00% Impervious Runoff Depth=4.94"
Tc=5.0 min CN=0/98 Runoff=0.17 cfs 0.058 af

Subcatchment36S: P11 Runoff Area=7,429 sf 100.00% Impervious Runoff Depth=4.94"
Tc=5.0 min CN=0/98 Runoff=0.21 cfs 0.070 af

Subcatchment37S: P12 Runoff Area=9,368 sf 100.00% Impervious Runoff Depth=4.94"
Tc=5.0 min CN=0/98 Runoff=0.26 cfs 0.089 af

Subcatchment38S: P13 Runoff Area=5,595 sf 100.00% Impervious Runoff Depth=4.94"
Tc=5.0 min CN=0/98 Runoff=0.16 cfs 0.053 af

Subcatchment39S: P14 Runoff Area=4,779 sf 100.00% Impervious Runoff Depth=4.94"
Tc=5.0 min CN=0/98 Runoff=0.13 cfs 0.045 af

Subcatchment40S: P15 Runoff Area=4,741 sf 100.00% Impervious Runoff Depth=4.94"
Tc=5.0 min CN=0/98 Runoff=0.13 cfs 0.045 af

Subcatchment41S: P16 Runoff Area=8,967 sf 100.00% Impervious Runoff Depth=4.94"
Tc=5.0 min CN=0/98 Runoff=0.25 cfs 0.085 af

Subcatchment50S: Existing Buildings Runoff Area=44,242 sf 100.00% Impervious Runoff Depth=4.94"
Tc=5.0 min CN=0/98 Runoff=1.24 cfs 0.418 af

Subcatchment51S: Existing Impervious Runoff Area=68,924 sf 100.00% Impervious Runoff Depth=4.94"
Tc=5.0 min CN=0/98 Runoff=1.94 cfs 0.652 af

Subcatchment52S: Existing Landscape Runoff Area=82,633 sf 0.00% Impervious Runoff Depth=1.77"
Tc=60.0 min CN=65/0 Runoff=0.31 cfs 0.281 af

Subcatchment94S: Pond #3 Runoff Area=4,349 sf 100.00% Impervious Runoff Depth=4.94"
Tc=5.0 min CN=0/98 Runoff=0.12 cfs 0.041 af

Subcatchment95S: Pond #1 Runoff Area=4,554 sf 100.00% Impervious Runoff Depth=4.94"
Tc=5.0 min CN=0/98 Runoff=0.13 cfs 0.043 af

Subcatchment96S: Pond #2 Runoff Area=2,830 sf 100.00% Impervious Runoff Depth=4.94"
Tc=5.0 min CN=0/98 Runoff=0.08 cfs 0.027 af

Subcatchment97S: Pond #4 Runoff Area=1,585 sf 100.00% Impervious Runoff Depth=4.94"
Tc=5.0 min CN=0/98 Runoff=0.04 cfs 0.015 af

Reach 50R: Discharge Inflow=2.28 cfs 0.657 af
Outflow=2.28 cfs 0.657 af

Reach 53R: Existing Discharge Inflow=3.40 cfs 1.351 af
Outflow=3.40 cfs 1.351 af

Pond 46P: Pond #1 Peak Elev=636.72' Storage=10,201 cf Inflow=3.73 cfs 1.032 af
Discarded=0.24 cfs 0.471 af Primary=1.75 cfs 0.561 af Outflow=1.99 cfs 1.032 af

Pond 47P: Pond #3 Peak Elev=635.86' Storage=6,678 cf Inflow=2.51 cfs 1.024 af
Discarded=0.22 cfs 0.464 af Primary=2.11 cfs 0.561 af Outflow=2.33 cfs 1.025 af

Pond 48P: Pond #2 Peak Elev=636.78' Storage=4,774 cf Inflow=1.39 cfs 0.468 af
Discarded=0.14 cfs 0.311 af Primary=1.19 cfs 0.156 af Outflow=1.33 cfs 0.468 af

Pond 49P: Pond #4 Peak Elev=637.07' Storage=1,075 cf Inflow=0.42 cfs 0.141 af
Discarded=0.10 cfs 0.133 af Primary=0.14 cfs 0.008 af Outflow=0.24 cfs 0.141 af

Total Runoff Area = 9.436 ac Runoff Volume = 3.386 af Average Runoff Depth = 4.31"
20.10% Pervious = 1.897 ac 79.90% Impervious = 7.539 ac

Summary for Subcatchment 8S: Apt Building 1

[49] Hint: Tc<2dt may require smaller dt

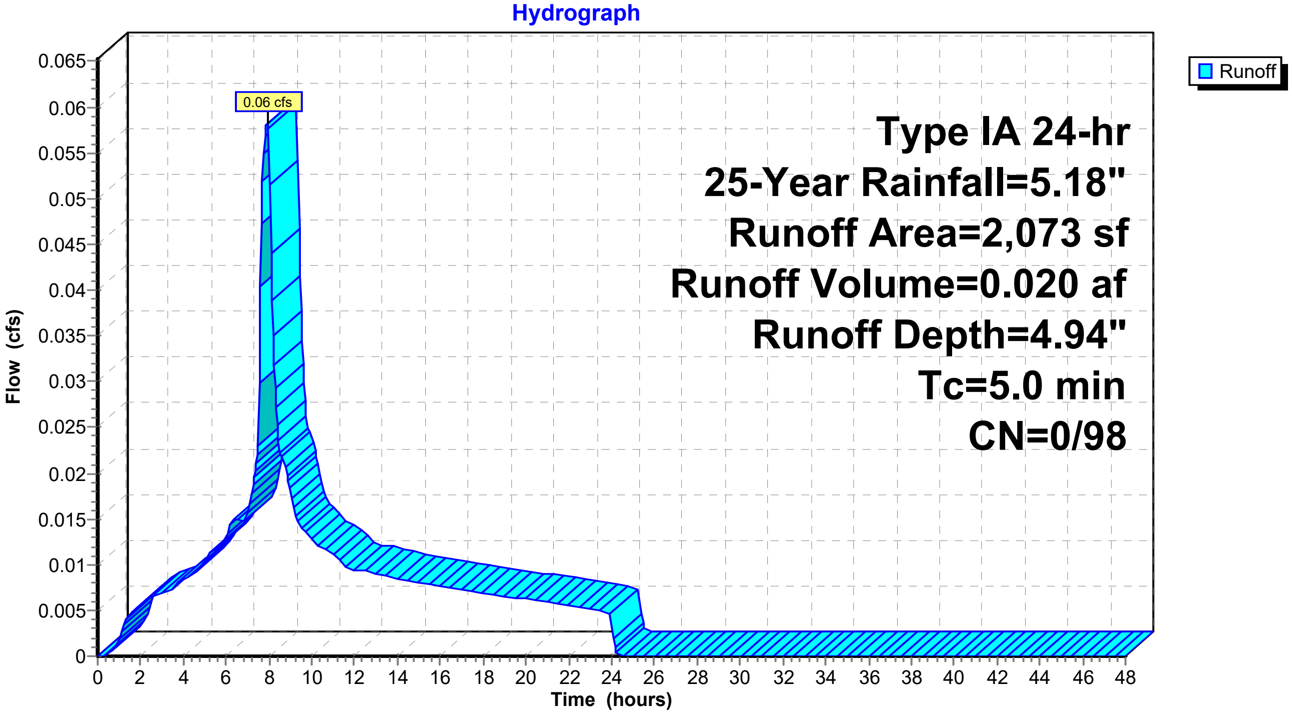
Runoff = 0.06 cfs @ 7.89 hrs, Volume= 0.020 af, Depth= 4.94"
Routed to Pond 49P : Pond #4

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-Year Rainfall=5.18"

Area (sf)	CN	Description
2,073	98	Unconnected roofs, HSG B
2,073	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 8S: Apt Building 1



Summary for Subcatchment 9S: Apt Building 2

[49] Hint: Tc<2dt may require smaller dt

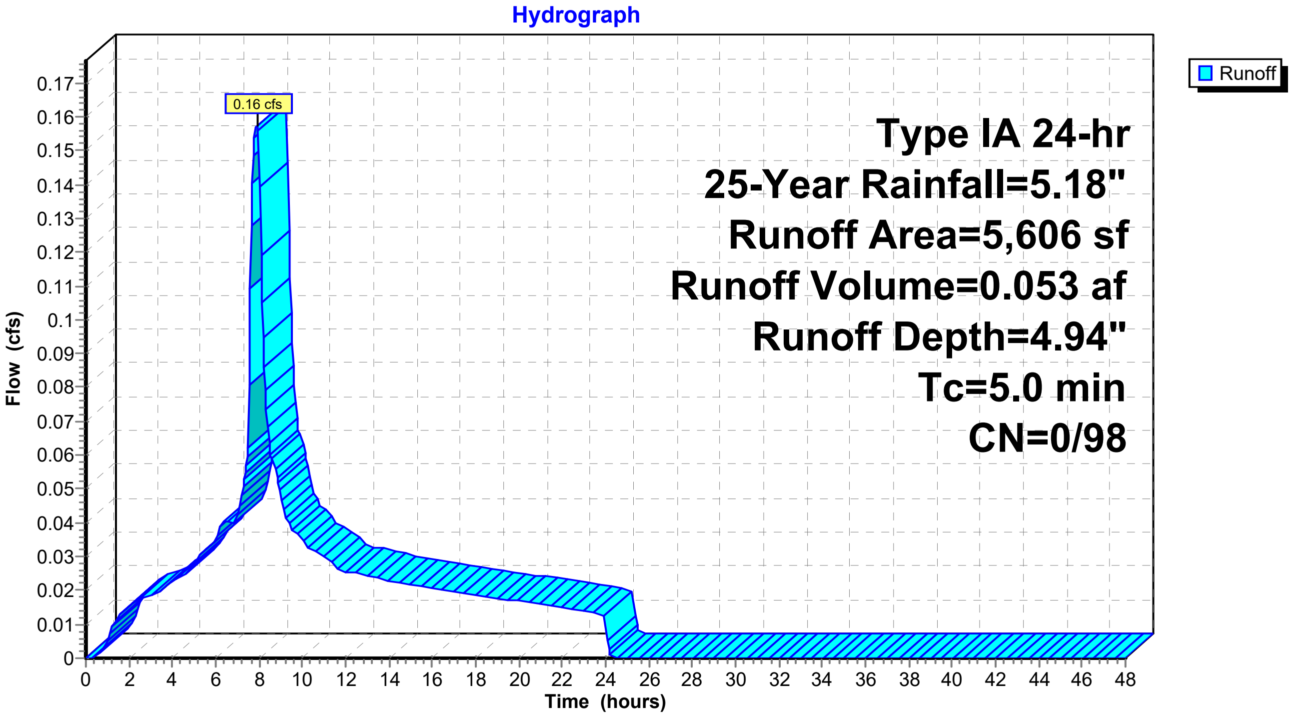
Runoff = 0.16 cfs @ 7.89 hrs, Volume= 0.053 af, Depth= 4.94"
Routed to Pond 49P : Pond #4

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-Year Rainfall=5.18"

Area (sf)	CN	Description
5,606	98	Unconnected roofs, HSG B
5,606	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 9S: Apt Building 2



Summary for Subcatchment 10S: Apt Building 3

[49] Hint: Tc<2dt may require smaller dt

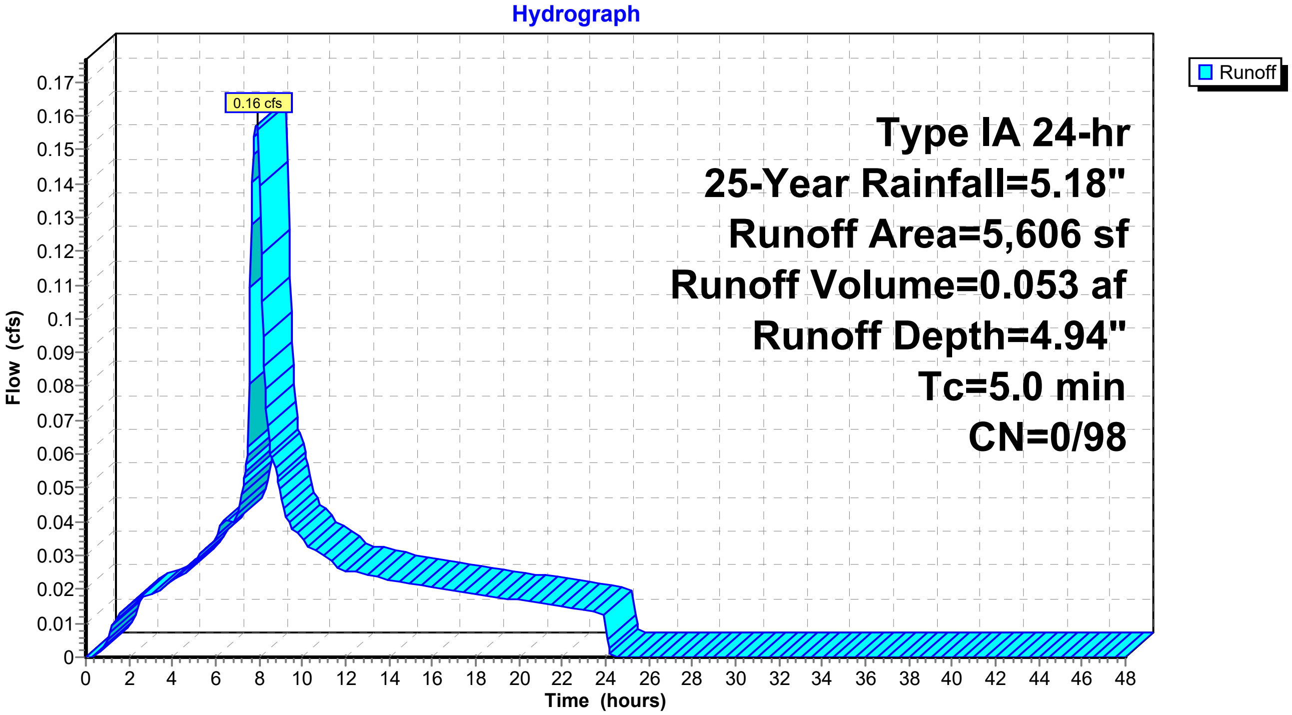
Runoff = 0.16 cfs @ 7.89 hrs, Volume= 0.053 af, Depth= 4.94"
Routed to Pond 49P : Pond #4

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-Year Rainfall=5.18"

Area (sf)	CN	Description
5,606	98	Unconnected roofs, HSG B
5,606	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 10S: Apt Building 3



Summary for Subcatchment 11S: Apt Building 4

[49] Hint: Tc<2dt may require smaller dt

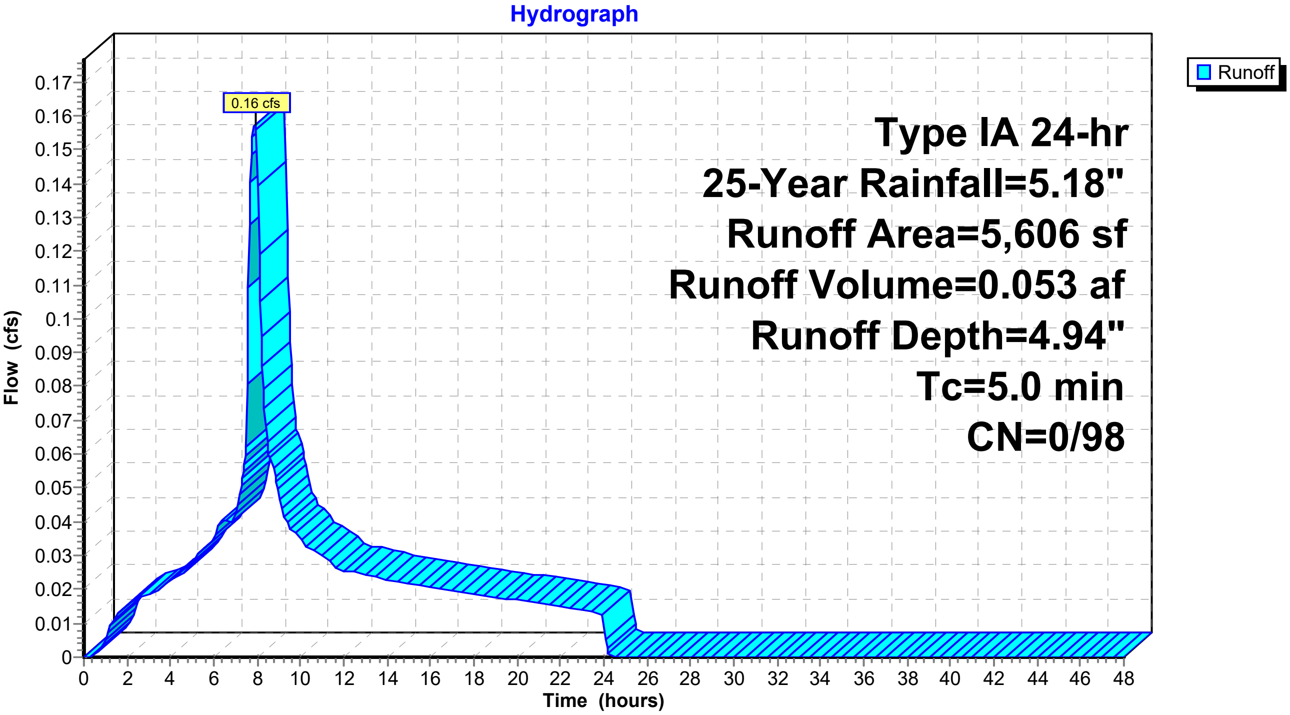
Runoff = 0.16 cfs @ 7.89 hrs, Volume= 0.053 af, Depth= 4.94"
Routed to Pond 46P : Pond #1

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-Year Rainfall=5.18"

Area (sf)	CN	Description
5,606	98	Unconnected roofs, HSG B
5,606	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 11S: Apt Building 4



Summary for Subcatchment 12S: Apt Building 5

[49] Hint: Tc<2dt may require smaller dt

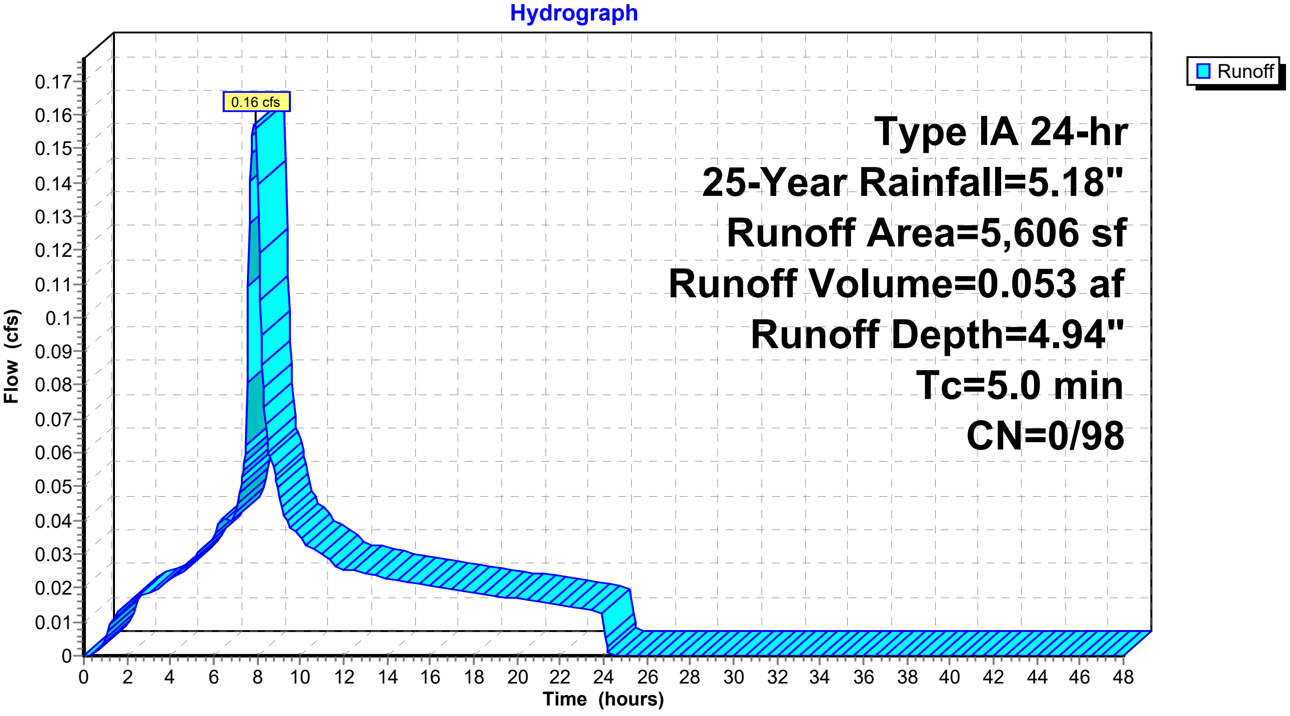
Runoff = 0.16 cfs @ 7.89 hrs, Volume= 0.053 af, Depth= 4.94"
Routed to Pond 46P : Pond #1

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-Year Rainfall=5.18"

Area (sf)	CN	Description
5,606	98	Unconnected roofs, HSG B
5,606	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 12S: Apt Building 5



Summary for Subcatchment 13S: Apt Building 6

[49] Hint: Tc<2dt may require smaller dt

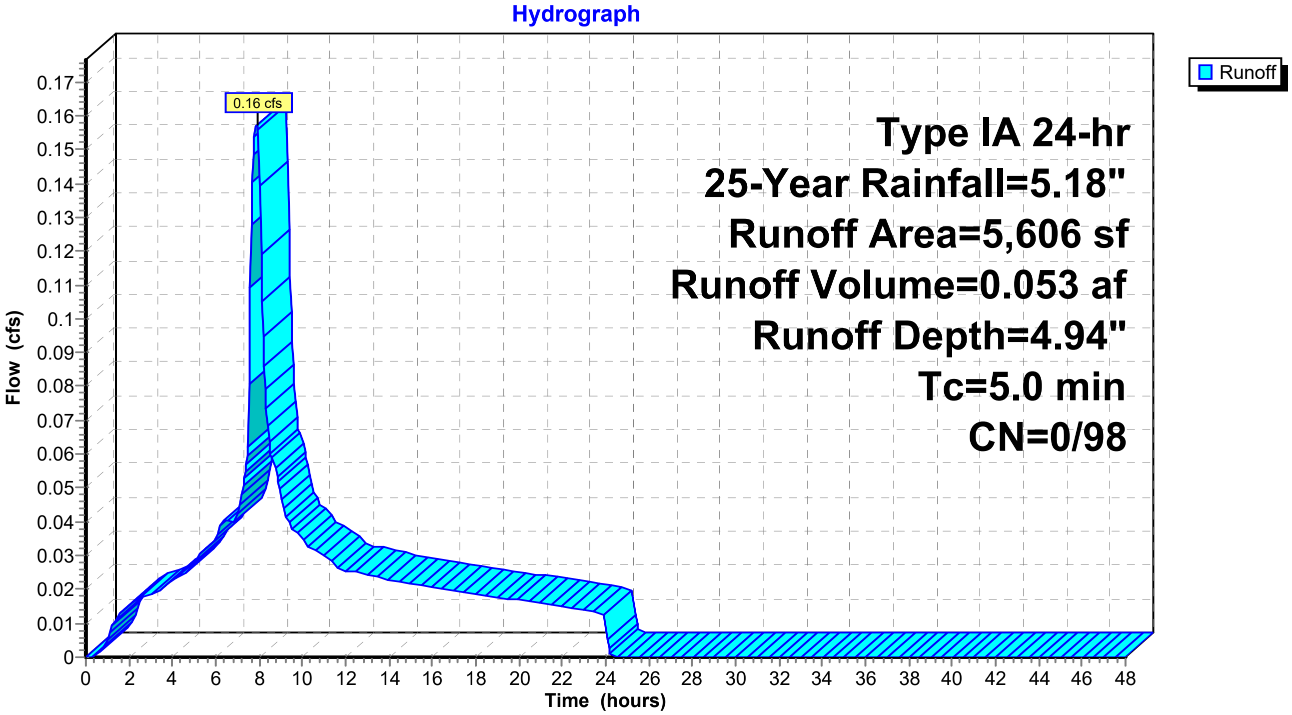
Runoff = 0.16 cfs @ 7.89 hrs, Volume= 0.053 af, Depth= 4.94"
Routed to Pond 46P : Pond #1

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-Year Rainfall=5.18"

Area (sf)	CN	Description
5,606	98	Unconnected roofs, HSG B
5,606	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 13S: Apt Building 6



Summary for Subcatchment 14S: Apt Building 7

[49] Hint: Tc<2dt may require smaller dt

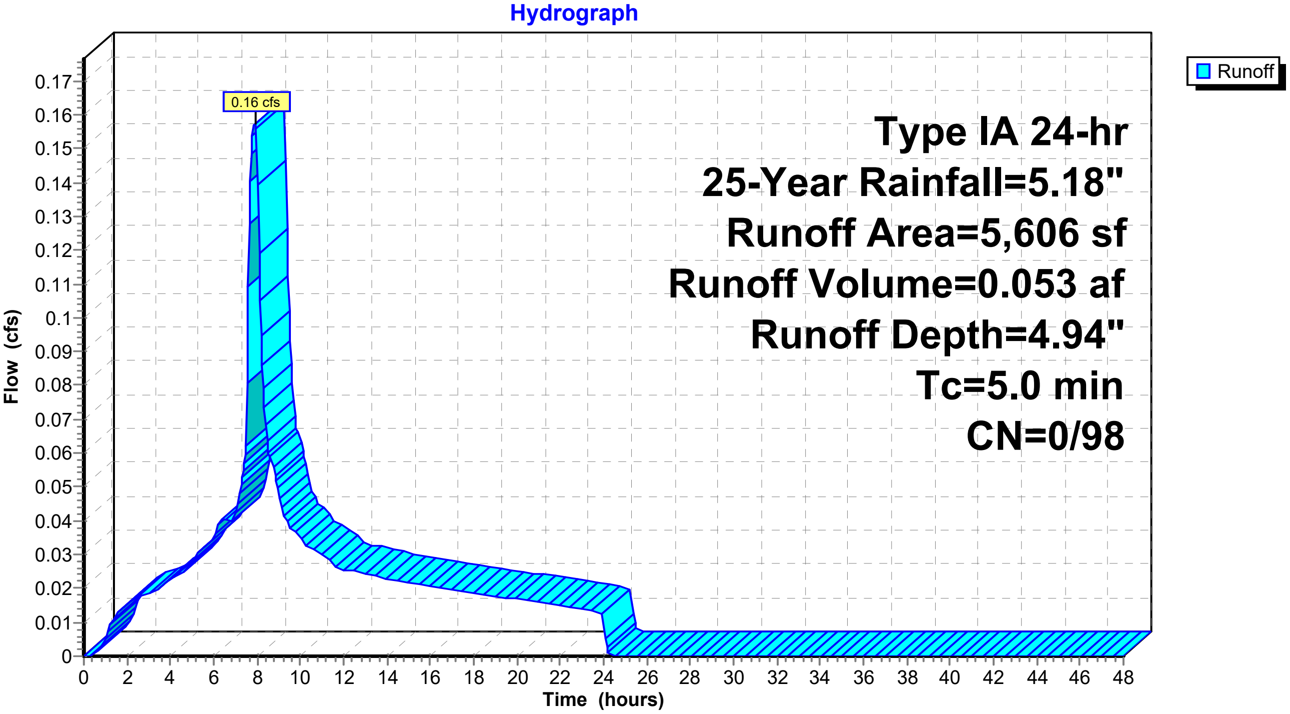
Runoff = 0.16 cfs @ 7.89 hrs, Volume= 0.053 af, Depth= 4.94"
Routed to Pond 47P : Pond #3

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-Year Rainfall=5.18"

Area (sf)	CN	Description
5,606	98	Unconnected roofs, HSG B
5,606	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 14S: Apt Building 7



Summary for Subcatchment 15S: Apt Building 8

[49] Hint: Tc<2dt may require smaller dt

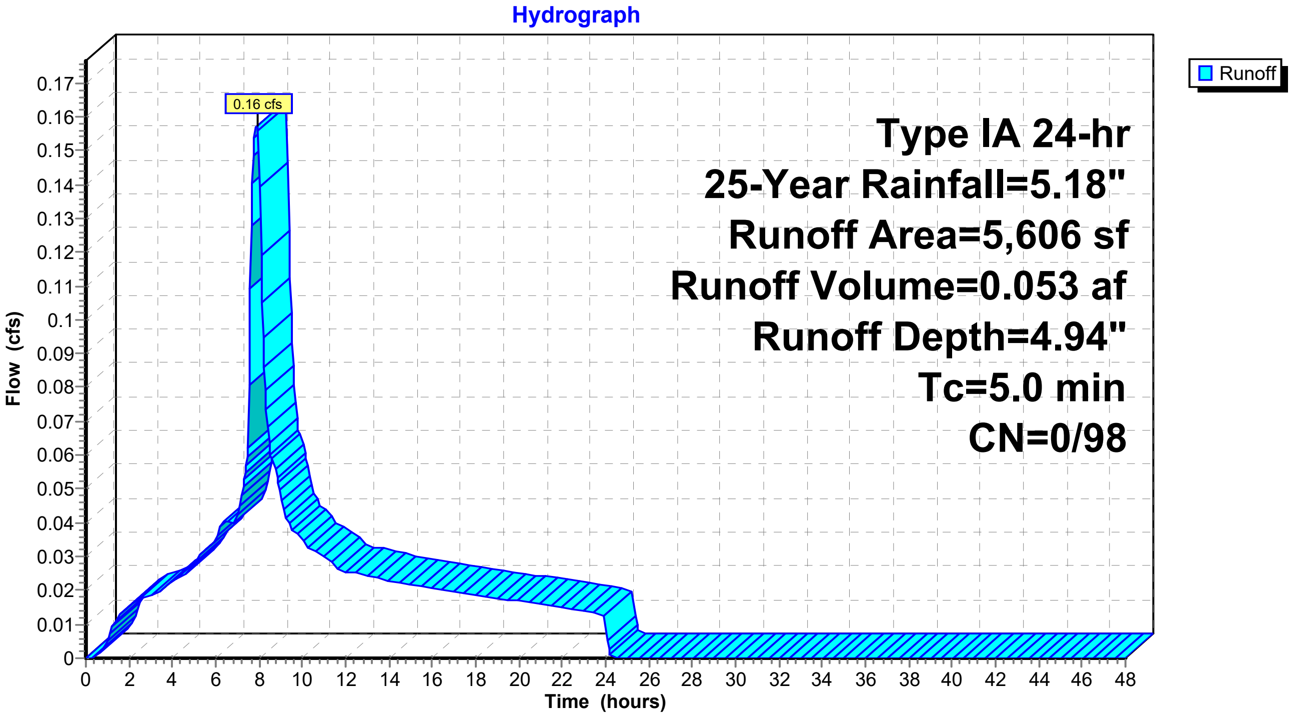
Runoff = 0.16 cfs @ 7.89 hrs, Volume= 0.053 af, Depth= 4.94"
Routed to Pond 47P : Pond #3

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-Year Rainfall=5.18"

Area (sf)	CN	Description
5,606	98	Unconnected roofs, HSG B
5,606	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 15S: Apt Building 8



Summary for Subcatchment 16S: Apt Building 9

[49] Hint: Tc<2dt may require smaller dt

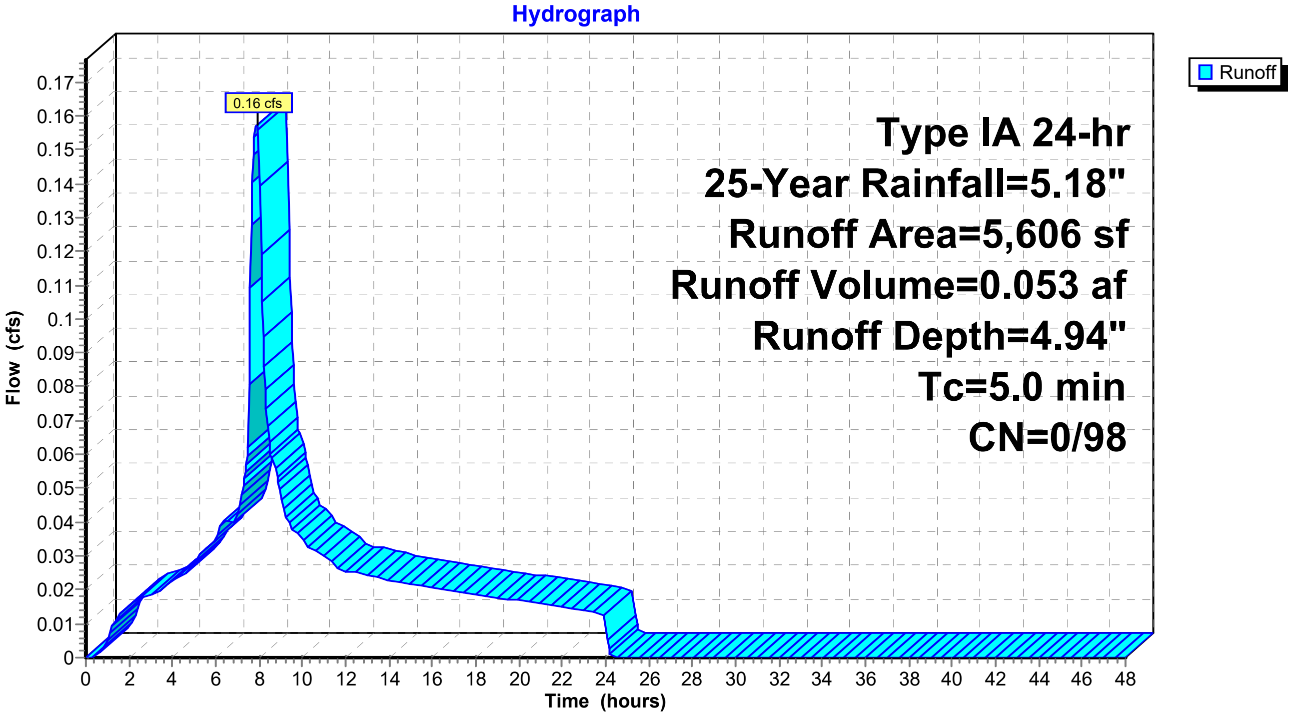
Runoff = 0.16 cfs @ 7.89 hrs, Volume= 0.053 af, Depth= 4.94"
Routed to Pond 46P : Pond #1

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-Year Rainfall=5.18"

Area (sf)	CN	Description
5,606	98	Unconnected roofs, HSG B
5,606	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 16S: Apt Building 9



Summary for Subcatchment 17S: Apt Building 10

[49] Hint: Tc<2dt may require smaller dt

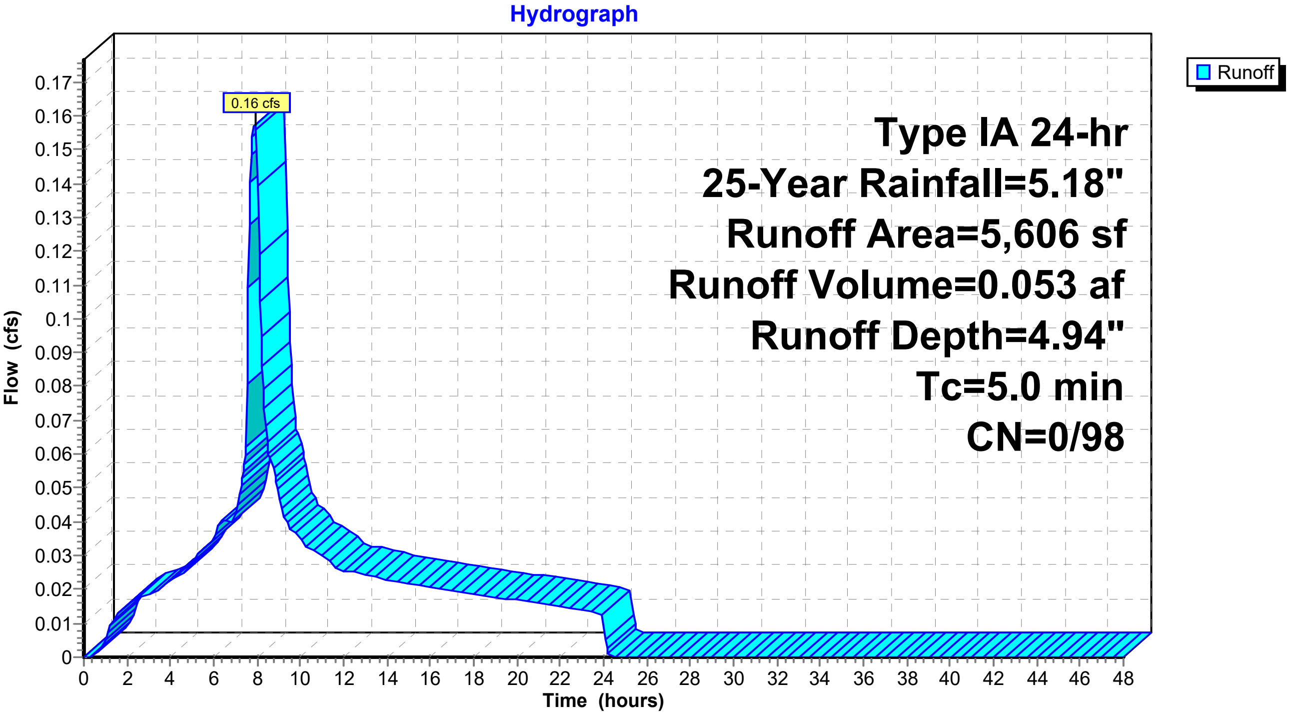
Runoff = 0.16 cfs @ 7.89 hrs, Volume= 0.053 af, Depth= 4.94"
Routed to Pond 46P : Pond #1

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-Year Rainfall=5.18"

Area (sf)	CN	Description
5,606	98	Unconnected roofs, HSG B
5,606	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 17S: Apt Building 10



Summary for Subcatchment 18S: Apt Building 11

[49] Hint: Tc<2dt may require smaller dt

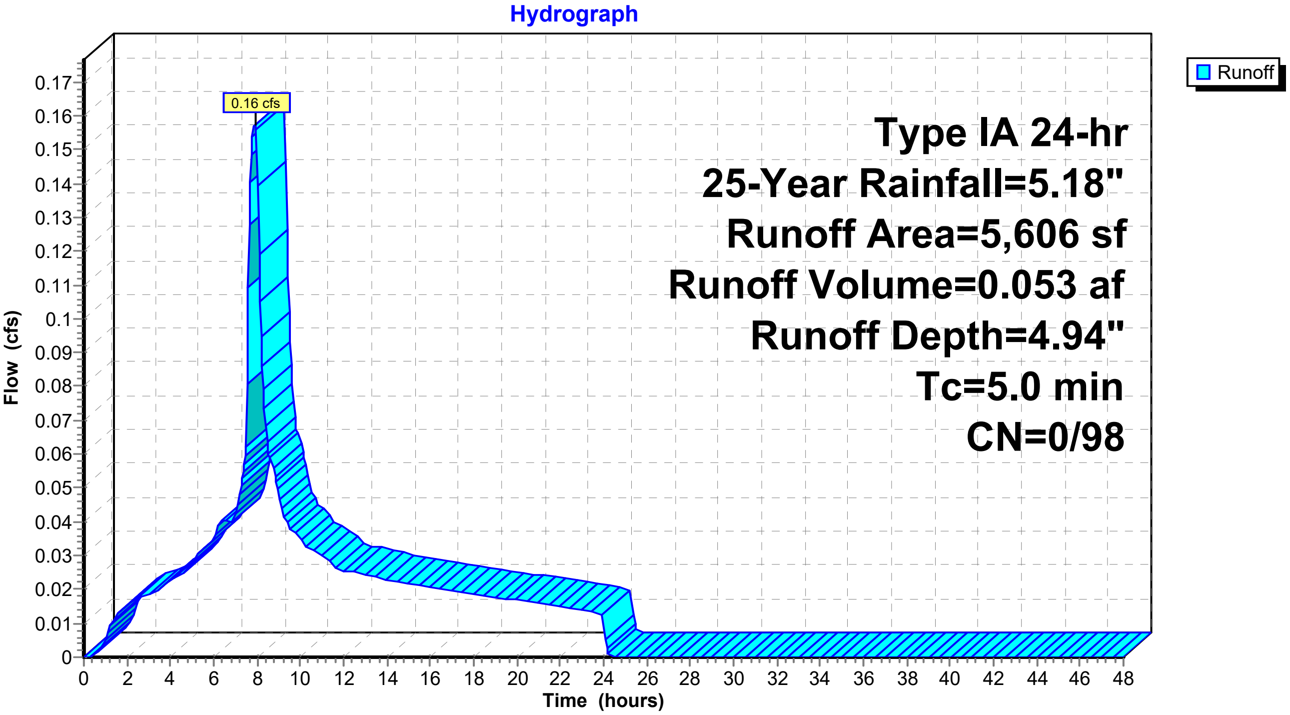
Runoff = 0.16 cfs @ 7.89 hrs, Volume= 0.053 af, Depth= 4.94"
Routed to Pond 46P : Pond #1

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-Year Rainfall=5.18"

Area (sf)	CN	Description
5,606	98	Unconnected roofs, HSG B
5,606	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 18S: Apt Building 11



Summary for Subcatchment 19S: Apt Building 12

[49] Hint: Tc<2dt may require smaller dt

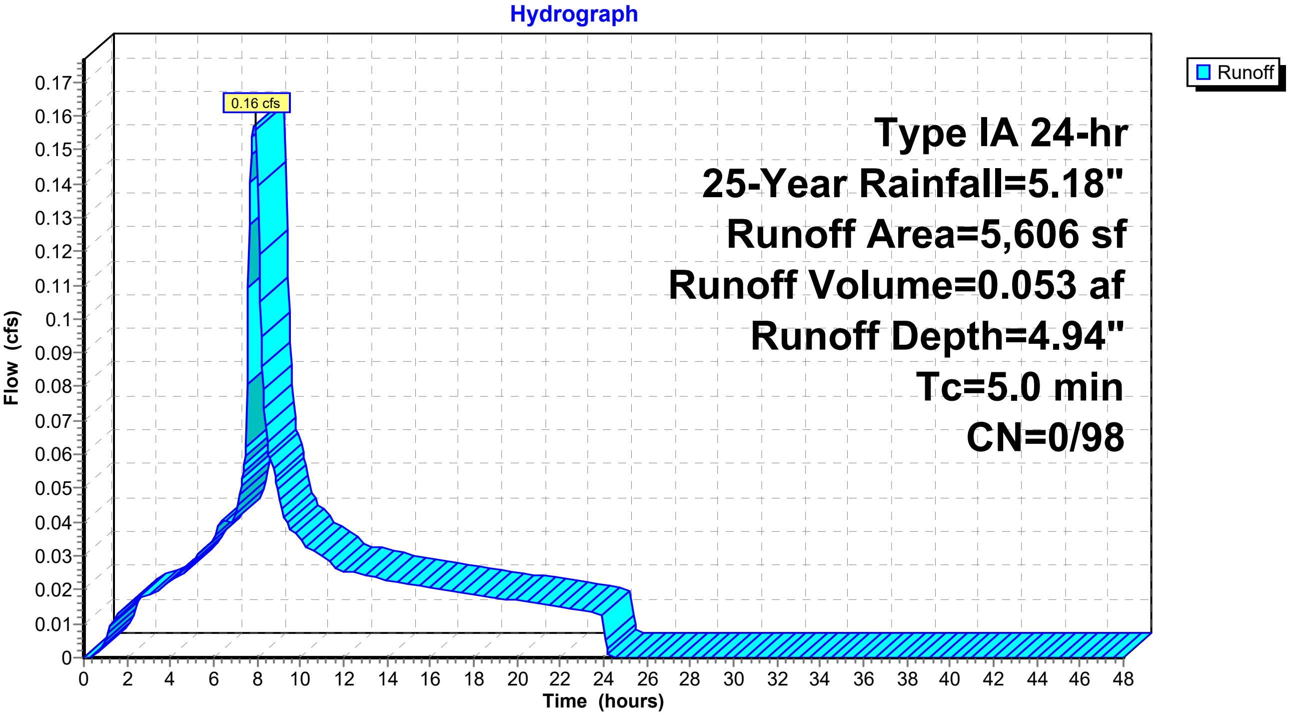
Runoff = 0.16 cfs @ 7.89 hrs, Volume= 0.053 af, Depth= 4.94"
Routed to Pond 46P : Pond #1

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-Year Rainfall=5.18"

Area (sf)	CN	Description
5,606	98	Unconnected roofs, HSG B
5,606	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 19S: Apt Building 12



Summary for Subcatchment 20S: Apt Building 13

[49] Hint: Tc<2dt may require smaller dt

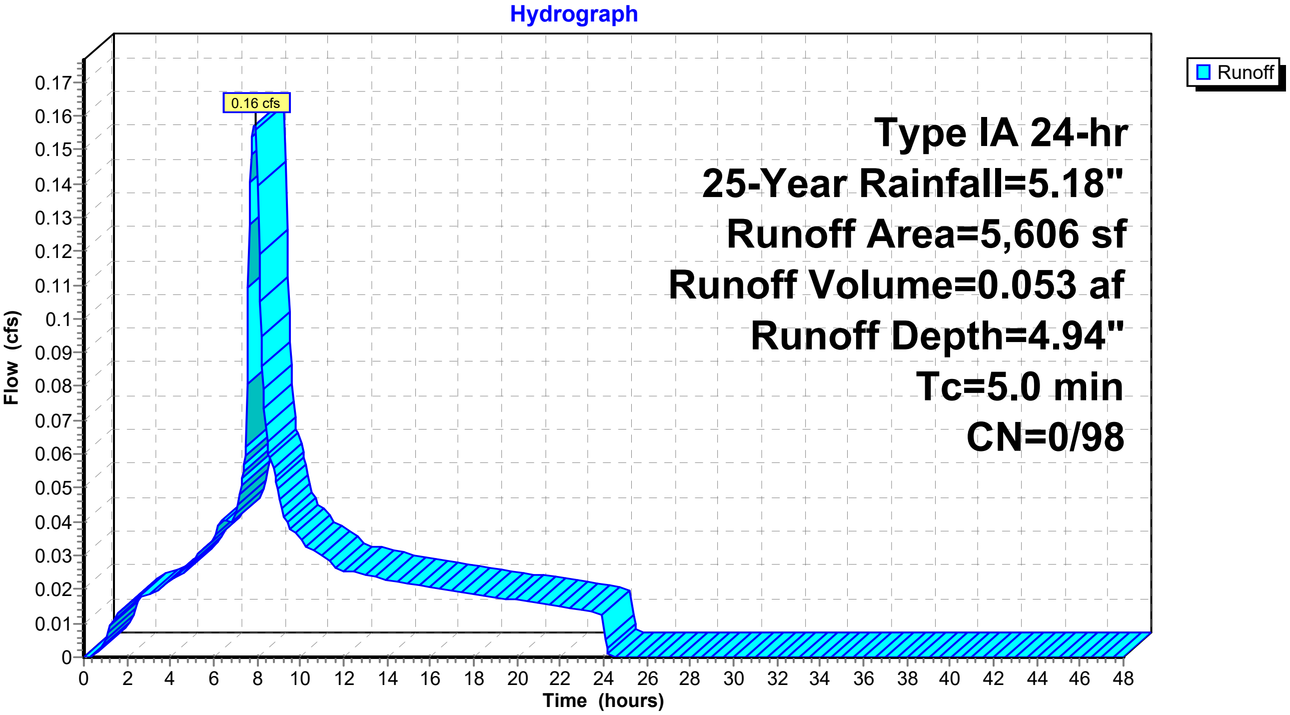
Runoff = 0.16 cfs @ 7.89 hrs, Volume= 0.053 af, Depth= 4.94"
Routed to Pond 46P : Pond #1

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-Year Rainfall=5.18"

Area (sf)	CN	Description
5,606	98	Unconnected roofs, HSG B
5,606	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 20S: Apt Building 13



Summary for Subcatchment 21S: Apt Building 14

[49] Hint: Tc<2dt may require smaller dt

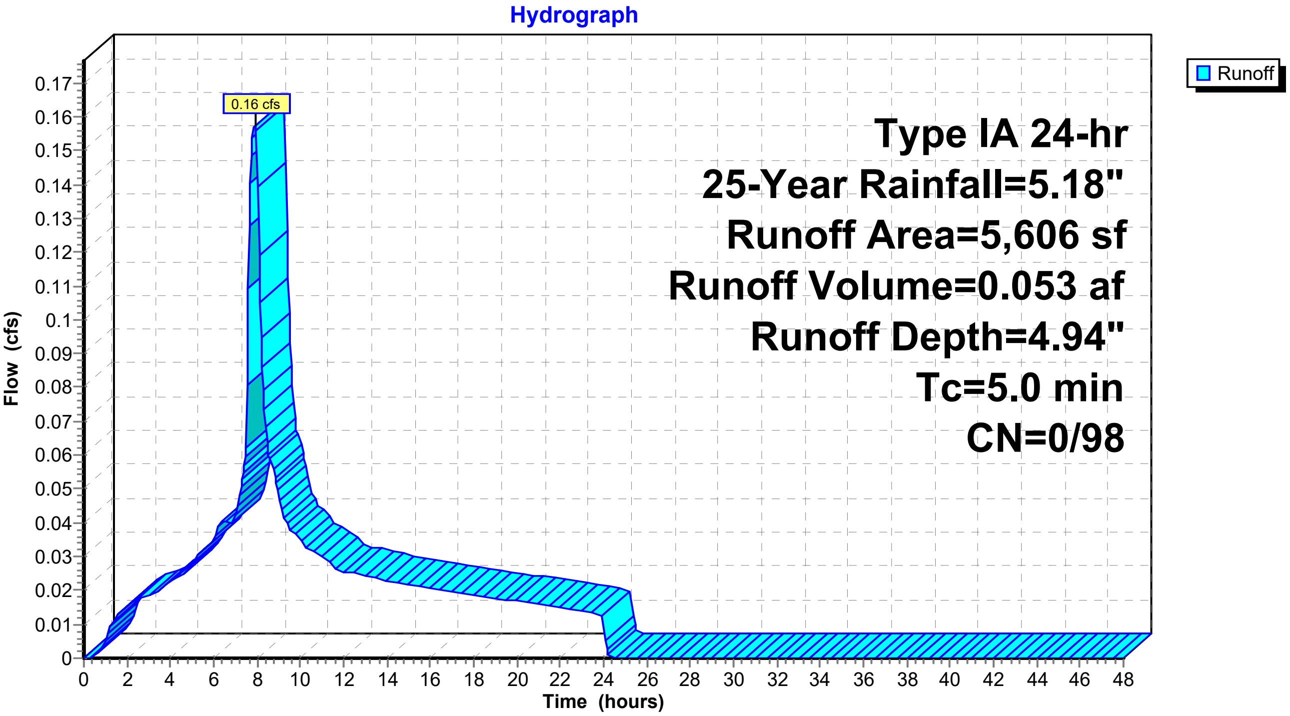
Runoff = 0.16 cfs @ 7.89 hrs, Volume= 0.053 af, Depth= 4.94"
Routed to Pond 48P : Pond #2

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-Year Rainfall=5.18"

Area (sf)	CN	Description
5,606	98	Unconnected roofs, HSG B
5,606	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 21S: Apt Building 14



Summary for Subcatchment 22S: Apt Building 15

[49] Hint: Tc<2dt may require smaller dt

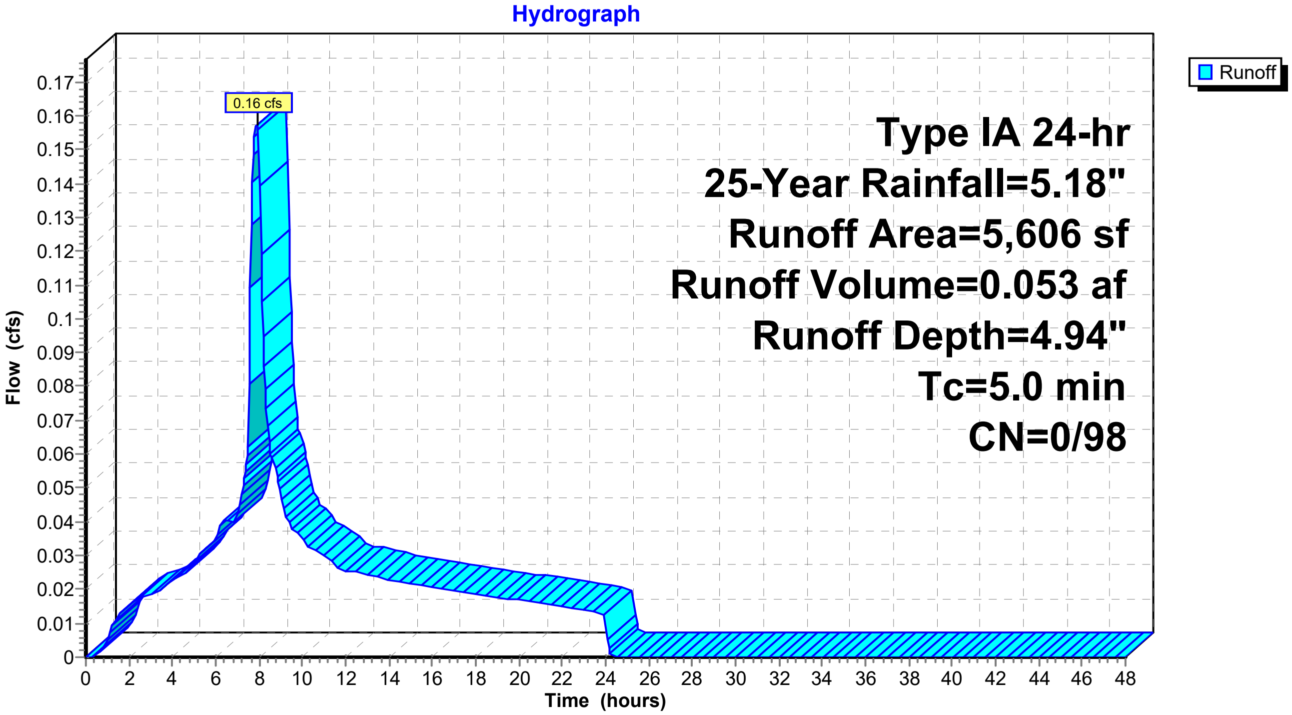
Runoff = 0.16 cfs @ 7.89 hrs, Volume= 0.053 af, Depth= 4.94"
Routed to Pond 48P : Pond #2

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-Year Rainfall=5.18"

Area (sf)	CN	Description
5,606	98	Unconnected roofs, HSG B
5,606	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 22S: Apt Building 15



Summary for Subcatchment 23S: Apt Building 16

[49] Hint: Tc<2dt may require smaller dt

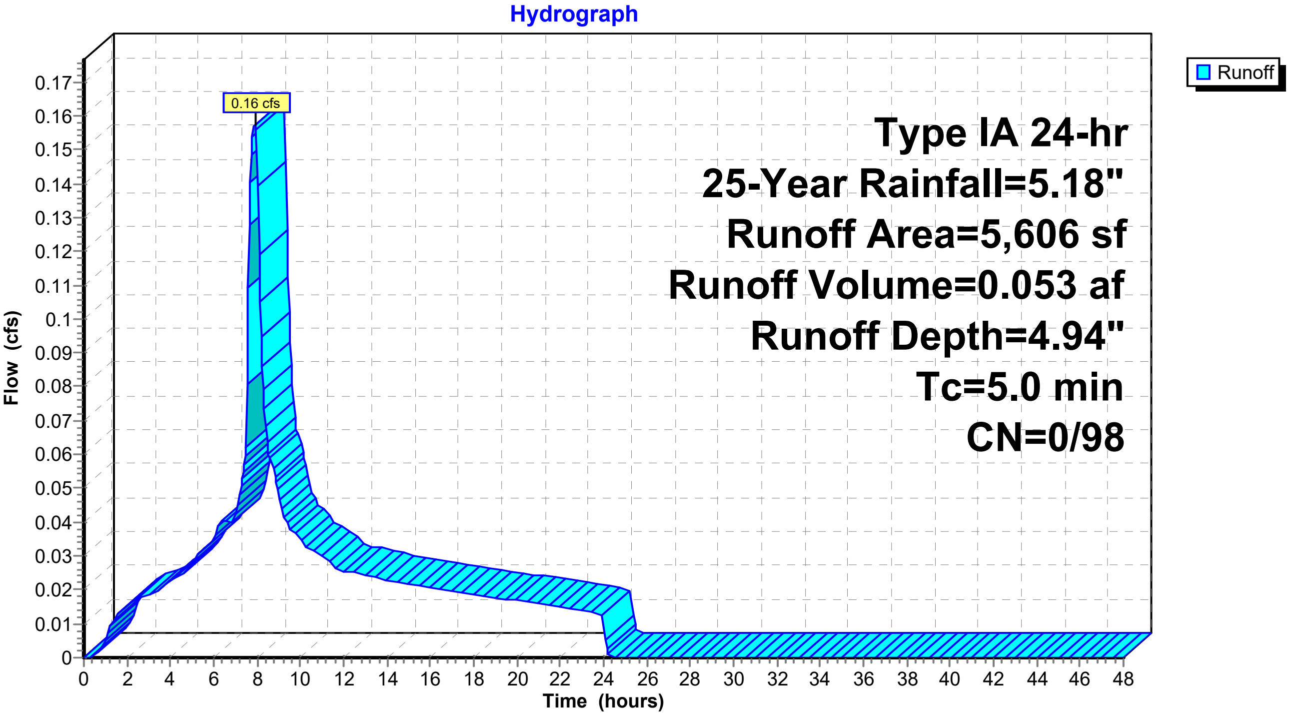
Runoff = 0.16 cfs @ 7.89 hrs, Volume= 0.053 af, Depth= 4.94"
Routed to Pond 48P : Pond #2

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-Year Rainfall=5.18"

Area (sf)	CN	Description
5,606	98	Unconnected roofs, HSG B
5,606	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 23S: Apt Building 16



Summary for Subcatchment 26S: P1

Includes area from common drive aisle that serves Village Green Hotel.

---

[49] Hint: Tc<2dt may require smaller dt

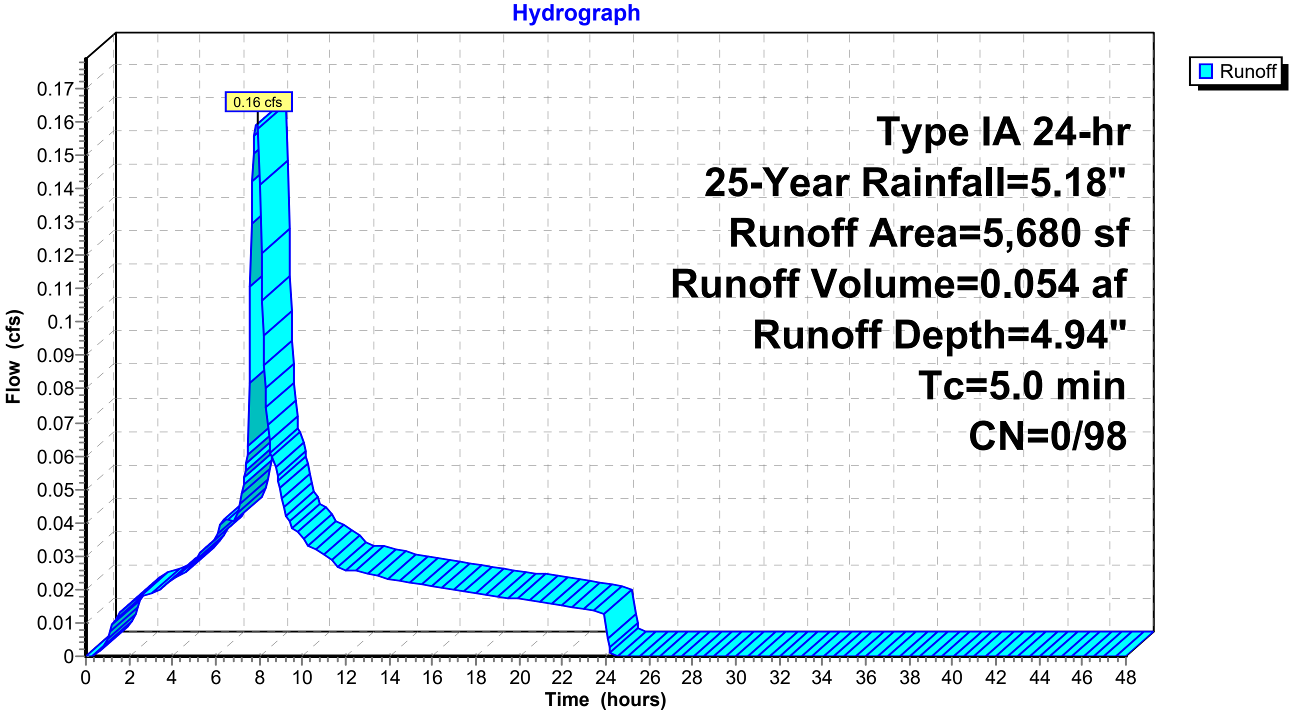
```
Runoff      =         0.16 cfs @    7.89 hrs,  Volume=          0.054 af,  Depth=  4.94"
    Routed to Reach 50R : Discharge
```

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-Year Rainfall=5.18"

	Area (sf)	CN	Description
*	5,680	98	Impervious Surface
	5,680	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 26S: P1



Summary for Subcatchment 27S: P2

Includes drive aisle that serves Village Green Hotel.

---

[49] Hint: Tc<2dt may require smaller dt

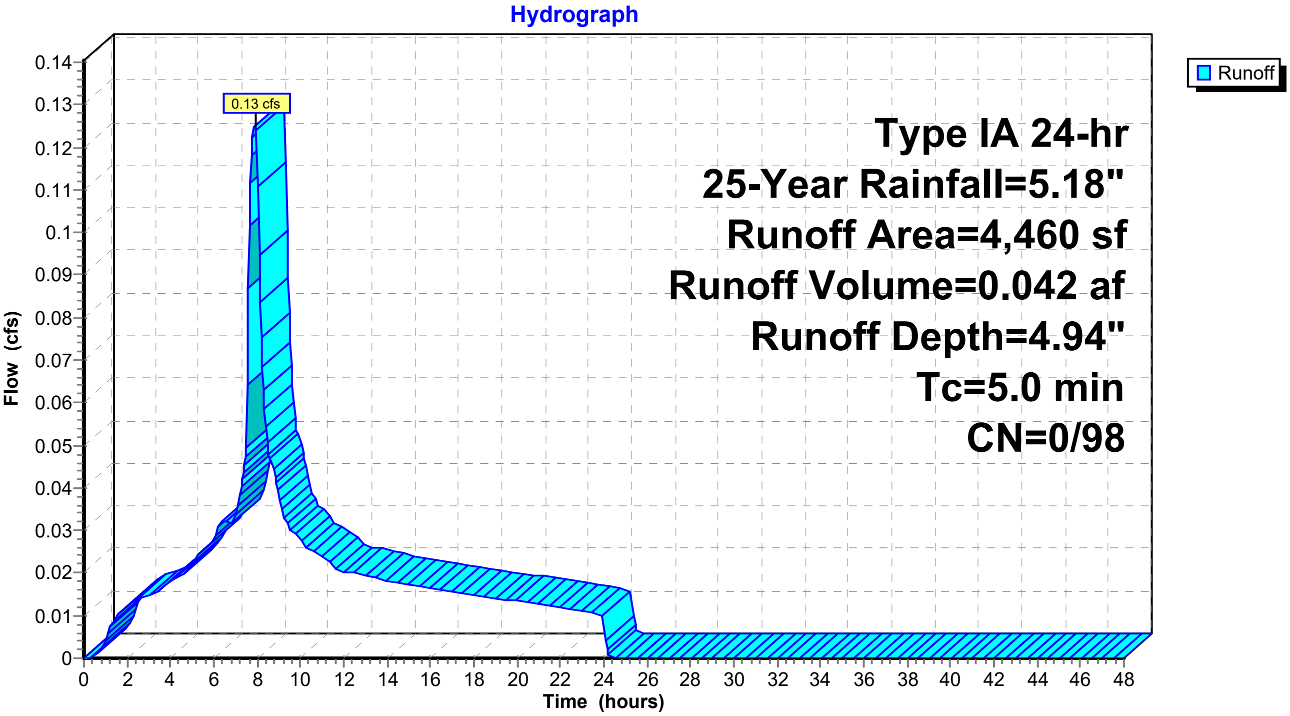
Runoff = 0.13 cfs @ 7.89 hrs, Volume= 0.042 af, Depth= 4.94"
Routed to Reach 50R : Discharge

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-Year Rainfall=5.18"

	Area (sf)	CN	Description
*	4,460	98	Impervious Surface
	4,460	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 27S: P2



Summary for Subcatchment 28S: P3

[49] Hint: Tc<2dt may require smaller dt

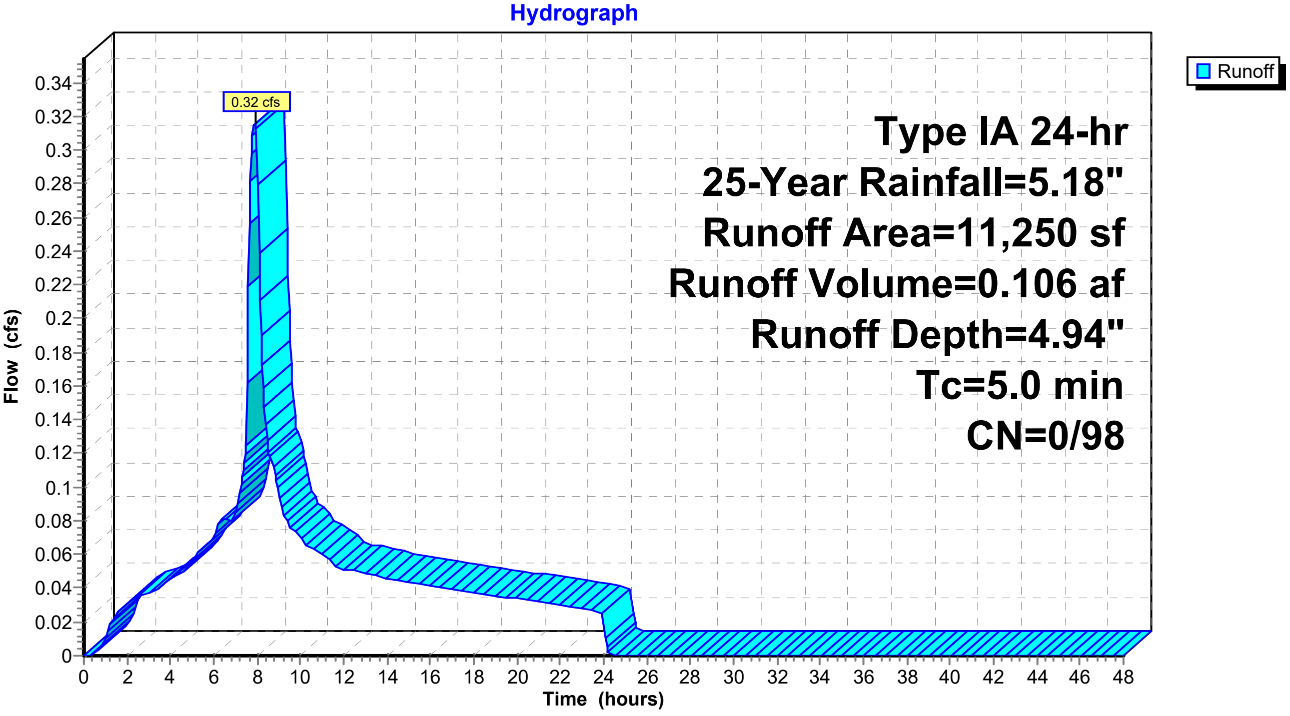
Runoff = 0.32 cfs @ 7.89 hrs, Volume= 0.106 af, Depth= 4.94"
Routed to Pond 48P : Pond #2

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-Year Rainfall=5.18"

	Area (sf)	CN	Description
*	11,250	98	Impervious Surface
	11,250	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 28S: P3



Summary for Subcatchment 29S: P4

[49] Hint: Tc<2dt may require smaller dt

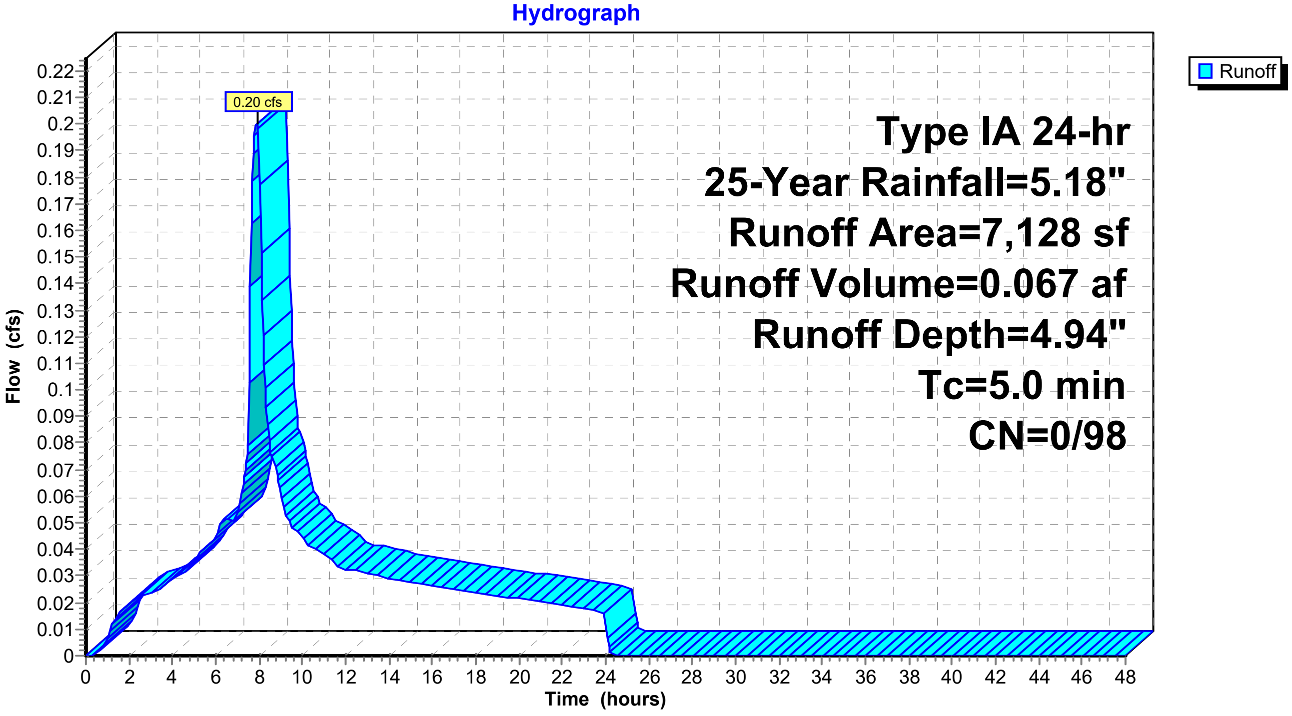
Runoff = 0.20 cfs @ 7.89 hrs, Volume= 0.067 af, Depth= 4.94"
Routed to Pond 48P : Pond #2

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-Year Rainfall=5.18"

	Area (sf)	CN	Description
*	7,128	98	Impervious Surface
	7,128	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 29S: P4



Summary for Subcatchment 30S: P5

[49] Hint: Tc<2dt may require smaller dt

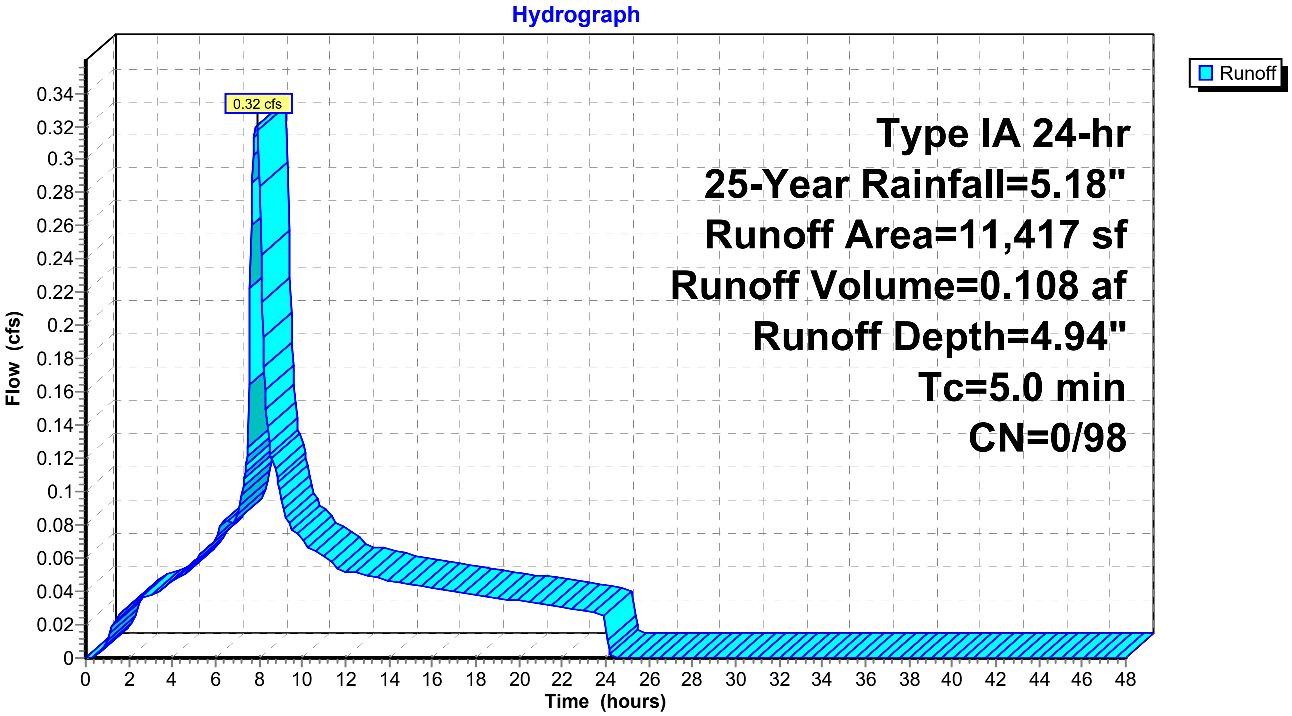
Runoff = 0.32 cfs @ 7.89 hrs, Volume= 0.108 af, Depth= 4.94"
Routed to Pond 48P : Pond #2

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-Year Rainfall=5.18"

	Area (sf)	CN	Description
*	11,417	98	Impervious Surface
	11,417	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 30S: P5



Summary for Subcatchment 31S: P6

[49] Hint: Tc<2dt may require smaller dt

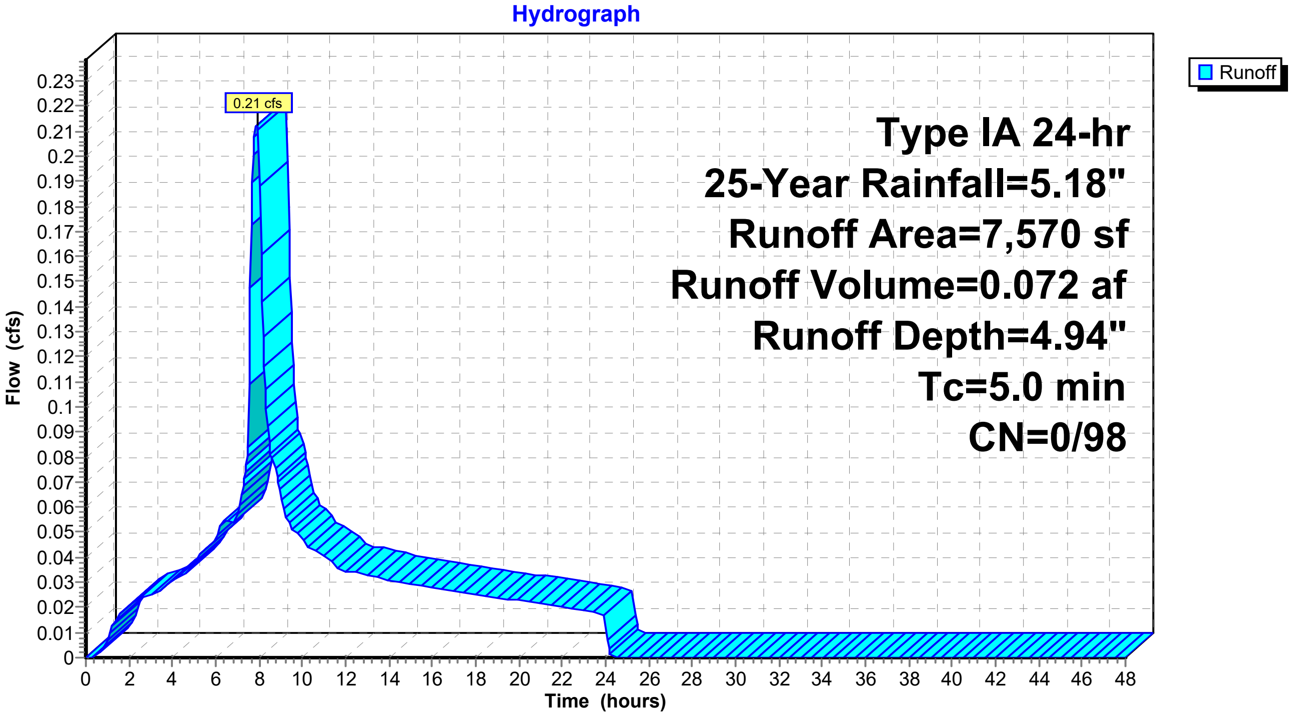
Runoff = 0.21 cfs @ 7.89 hrs, Volume= 0.072 af, Depth= 4.94"
Routed to Pond 46P : Pond #1

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-Year Rainfall=5.18"

	Area (sf)	CN	Description
*	7,570	98	Impervious Surface
	7,570	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 31S: P6



Summary for Subcatchment 32S: P7

[49] Hint: Tc<2dt may require smaller dt

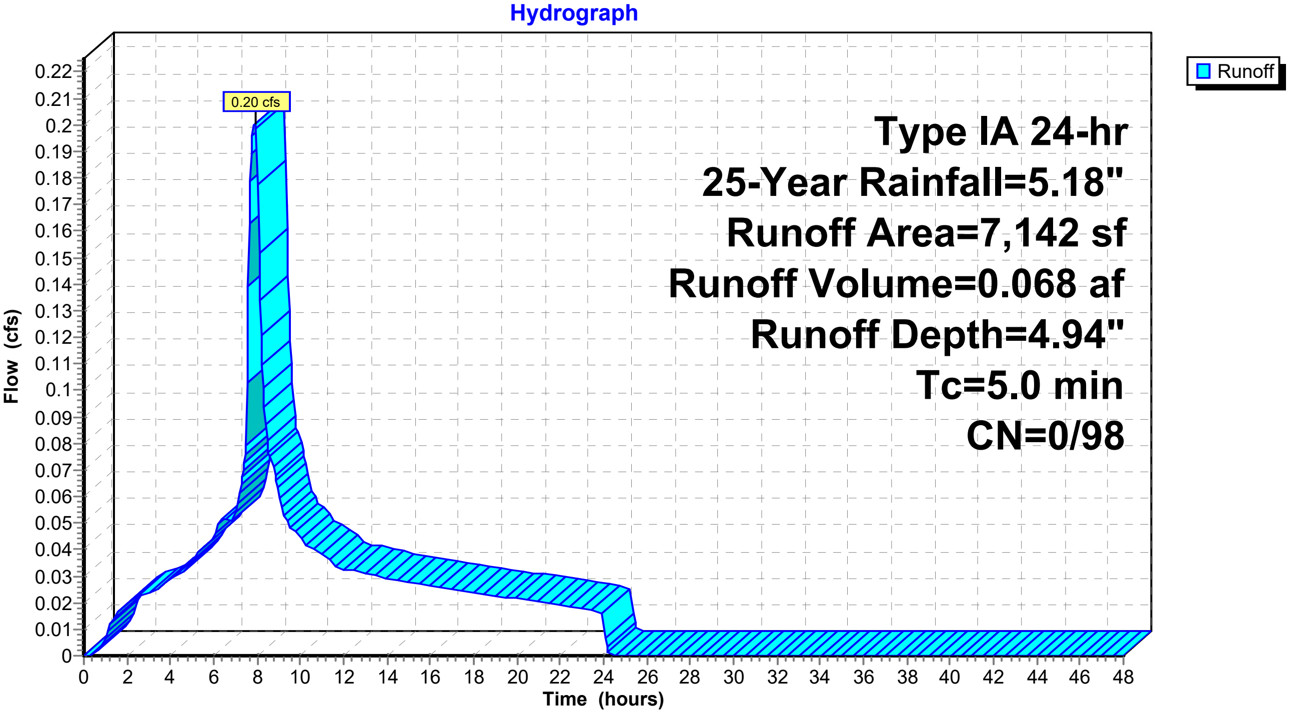
Runoff = 0.20 cfs @ 7.89 hrs, Volume= 0.068 af, Depth= 4.94"
Routed to Pond 46P : Pond #1

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-Year Rainfall=5.18"

	Area (sf)	CN	Description
*	7,142	98	Impervious Surface
	7,142	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 32S: P7



Summary for Subcatchment 33S: P8

[49] Hint: Tc<2dt may require smaller dt

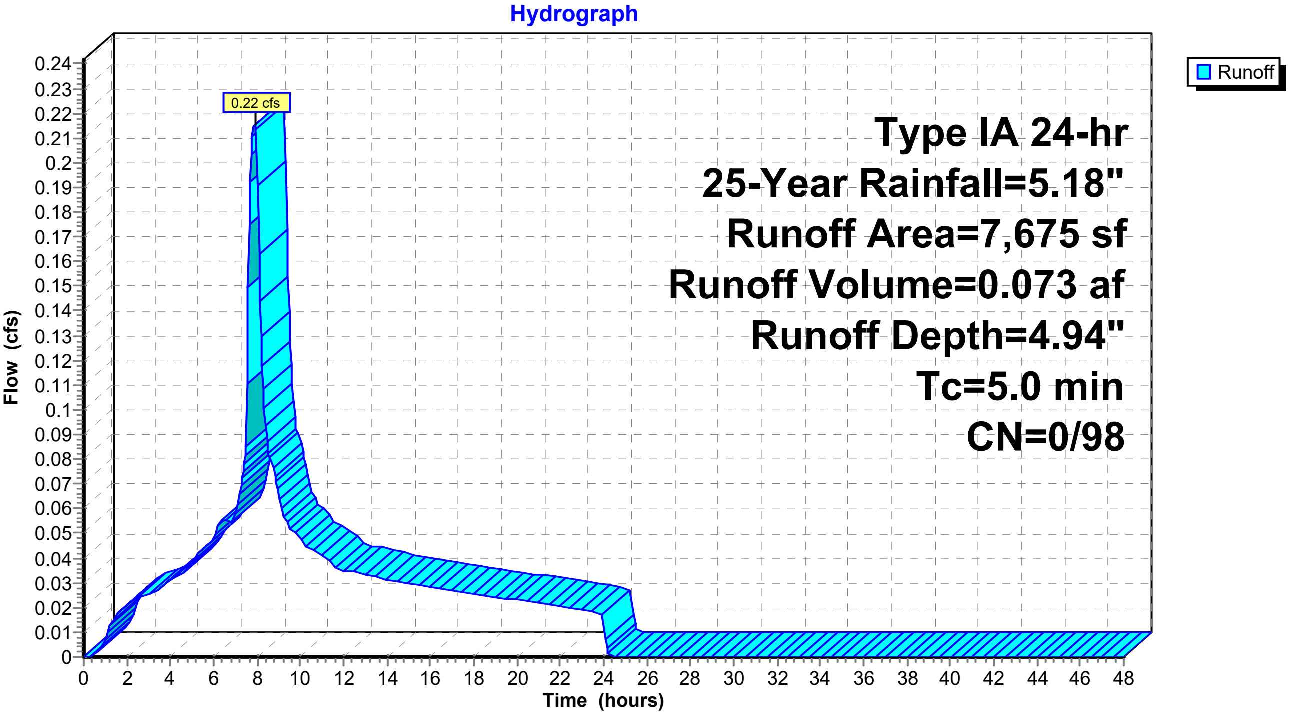
Runoff = 0.22 cfs @ 7.89 hrs, Volume= 0.073 af, Depth= 4.94"
Routed to Pond 46P : Pond #1

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-Year Rainfall=5.18"

	Area (sf)	CN	Description
*	7,675	98	Impervious Surface
	7,675	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 33S: P8



Summary for Subcatchment 34S: P9

[49] Hint: Tc<2dt may require smaller dt

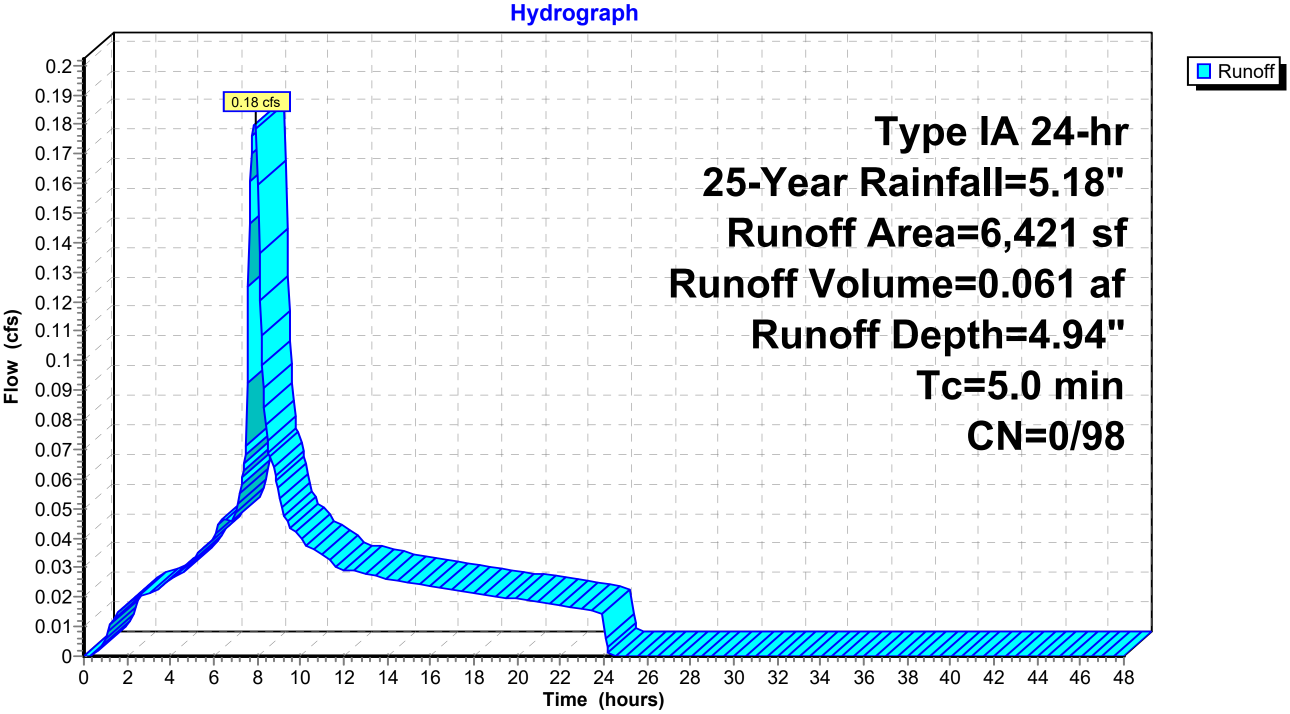
Runoff = 0.18 cfs @ 7.89 hrs, Volume= 0.061 af, Depth= 4.94"
Routed to Pond 46P : Pond #1

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-Year Rainfall=5.18"

	Area (sf)	CN	Description
*	6,421	98	Impervious Surface
	6,421	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 34S: P9



Summary for Subcatchment 35S: P10

[49] Hint: Tc<2dt may require smaller dt

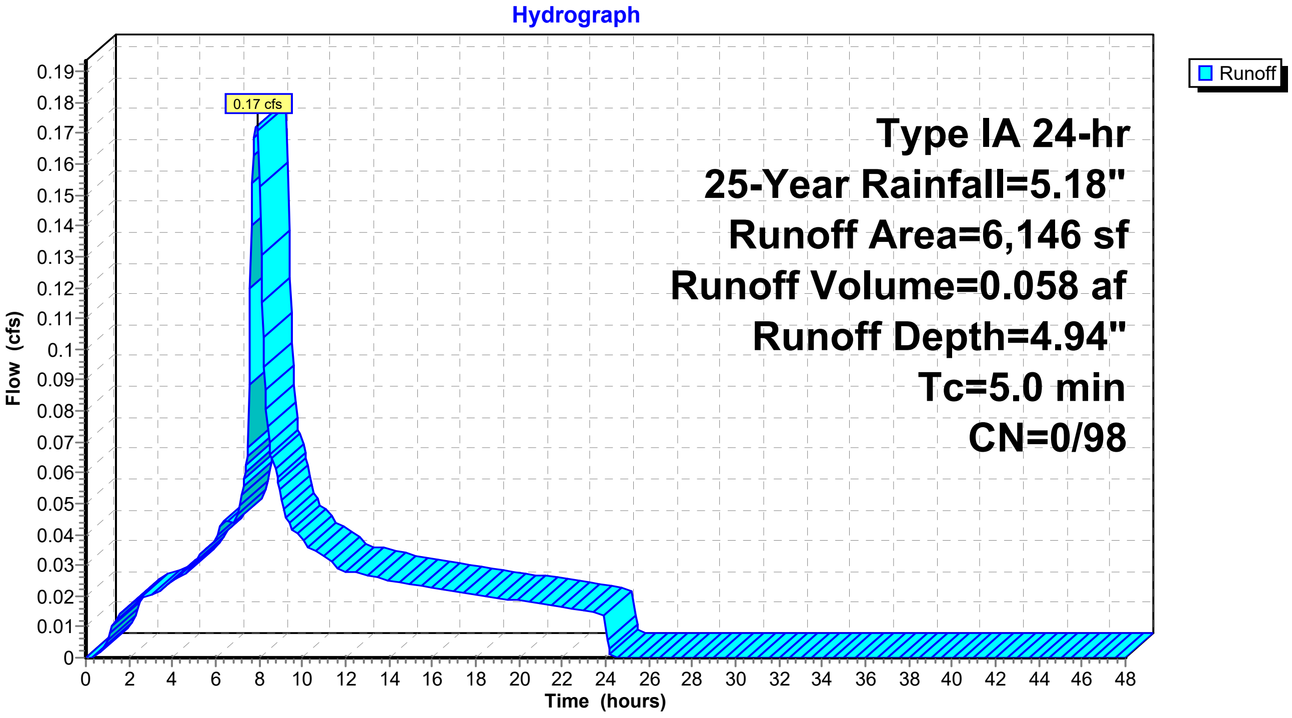
Runoff = 0.17 cfs @ 7.89 hrs, Volume= 0.058 af, Depth= 4.94"
Routed to Pond 46P : Pond #1

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-Year Rainfall=5.18"

	Area (sf)	CN	Description
*	6,146	98	Impervious Surface
	6,146	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 35S: P10



Summary for Subcatchment 36S: P11

[49] Hint: Tc<2dt may require smaller dt

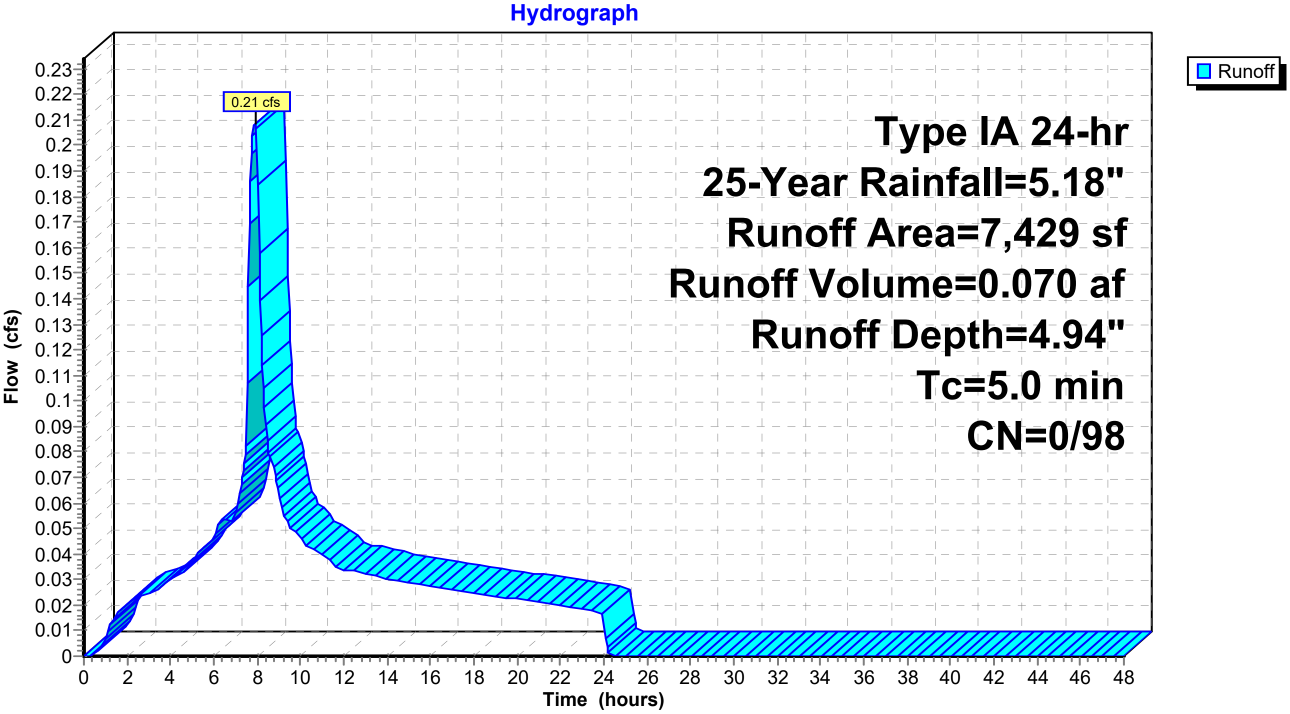
Runoff = 0.21 cfs @ 7.89 hrs, Volume= 0.070 af, Depth= 4.94"
Routed to Pond 46P : Pond #1

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-Year Rainfall=5.18"

	Area (sf)	CN	Description
*	7,429	98	Impervious Surface
	7,429	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 36S: P11



Summary for Subcatchment 37S: P12

[49] Hint: Tc<2dt may require smaller dt

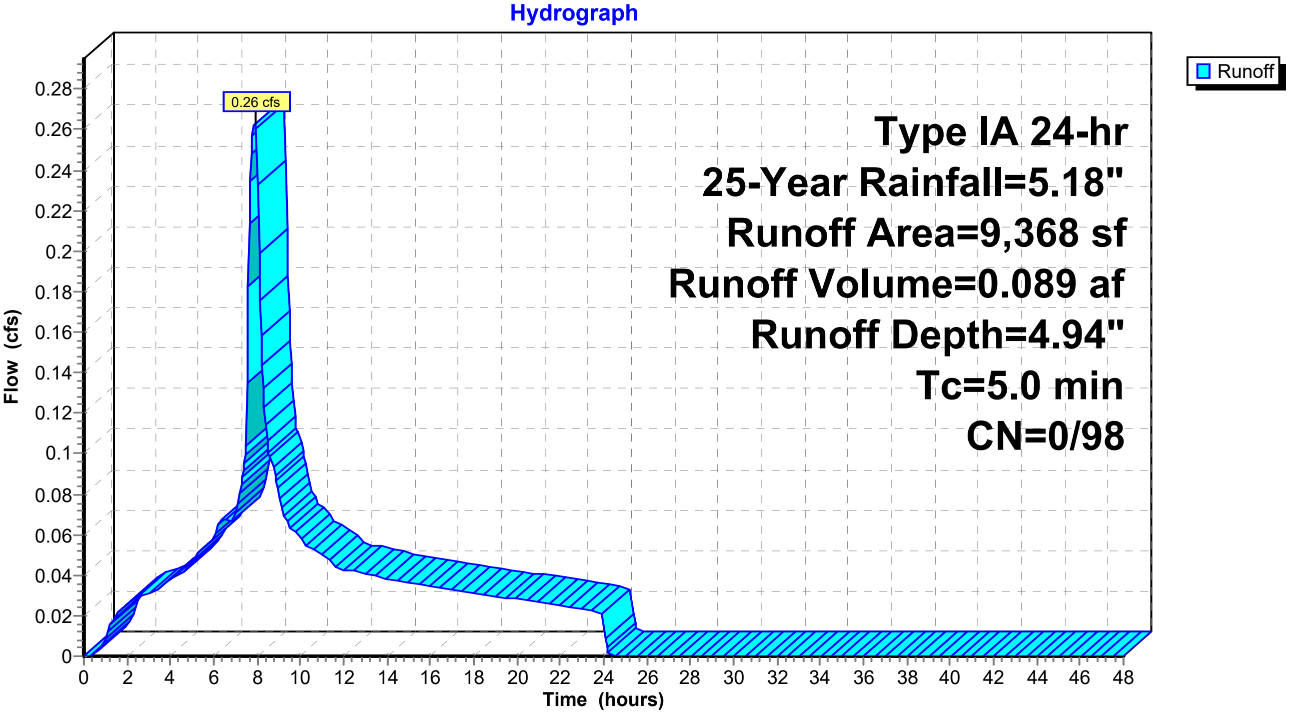
Runoff = 0.26 cfs @ 7.89 hrs, Volume= 0.089 af, Depth= 4.94"
Routed to Pond 47P : Pond #3

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-Year Rainfall=5.18"

	Area (sf)	CN	Description
*	9,368	98	Impervious Surface
	9,368	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 37S: P12



Summary for Subcatchment 38S: P13

[49] Hint: Tc<2dt may require smaller dt

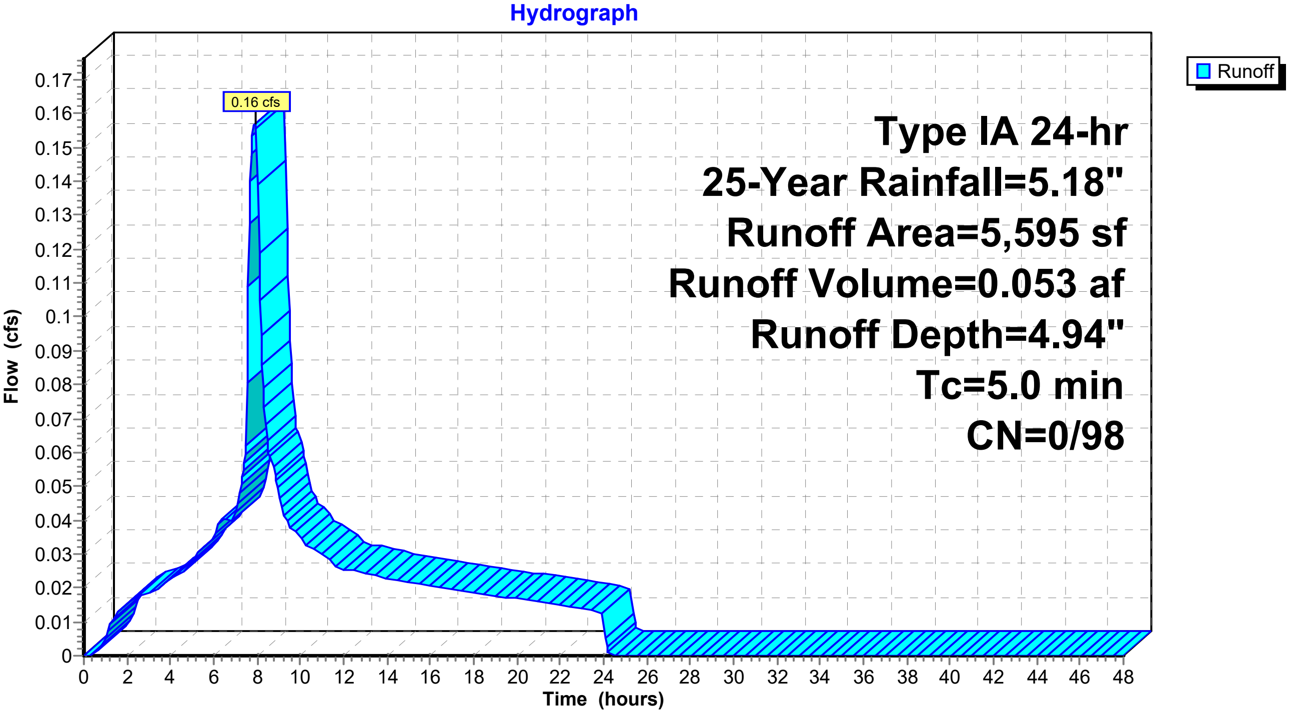
Runoff = 0.16 cfs @ 7.89 hrs, Volume= 0.053 af, Depth= 4.94"
Routed to Pond 47P : Pond #3

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-Year Rainfall=5.18"

	Area (sf)	CN	Description
*	5,595	98	Impervious Surface
	5,595	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 38S: P13



Summary for Subcatchment 39S: P14

[49] Hint: Tc<2dt may require smaller dt

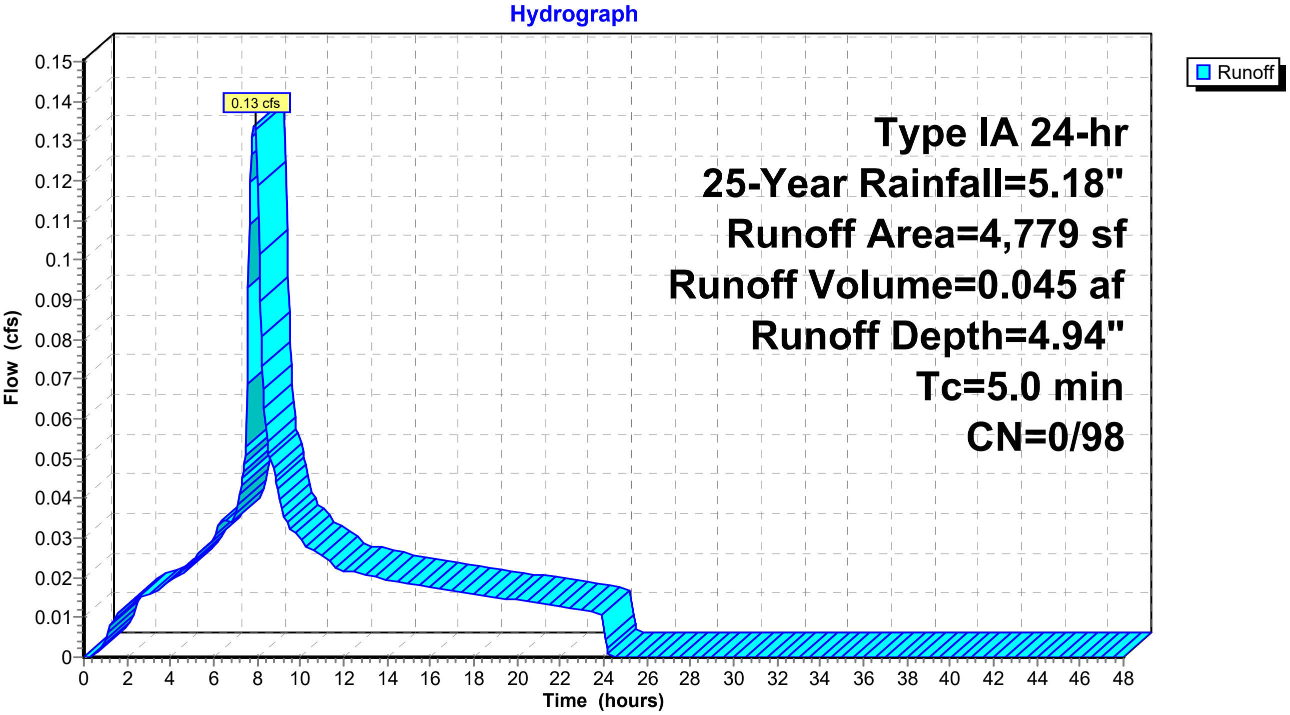
Runoff = 0.13 cfs @ 7.89 hrs, Volume= 0.045 af, Depth= 4.94"
Routed to Pond 47P : Pond #3

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-Year Rainfall=5.18"

	Area (sf)	CN	Description
*	4,779	98	Impervious Surface
	4,779	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 39S: P14



Summary for Subcatchment 40S: P15

[49] Hint: Tc<2dt may require smaller dt

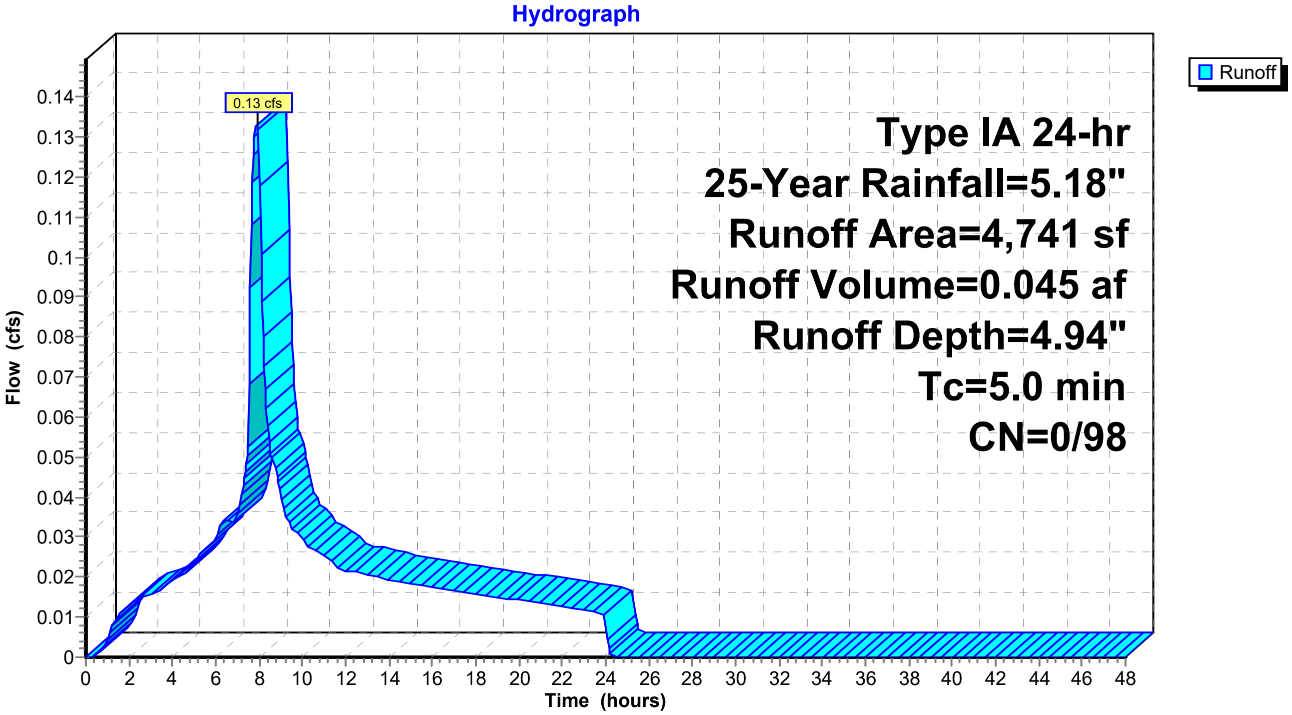
Runoff = 0.13 cfs @ 7.89 hrs, Volume= 0.045 af, Depth= 4.94"
Routed to Pond 47P : Pond #3

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-Year Rainfall=5.18"

	Area (sf)	CN	Description
*	4,741	98	Impervious Surface
	4,741	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 40S: P15



Summary for Subcatchment 41S: P16

[49] Hint: Tc<2dt may require smaller dt

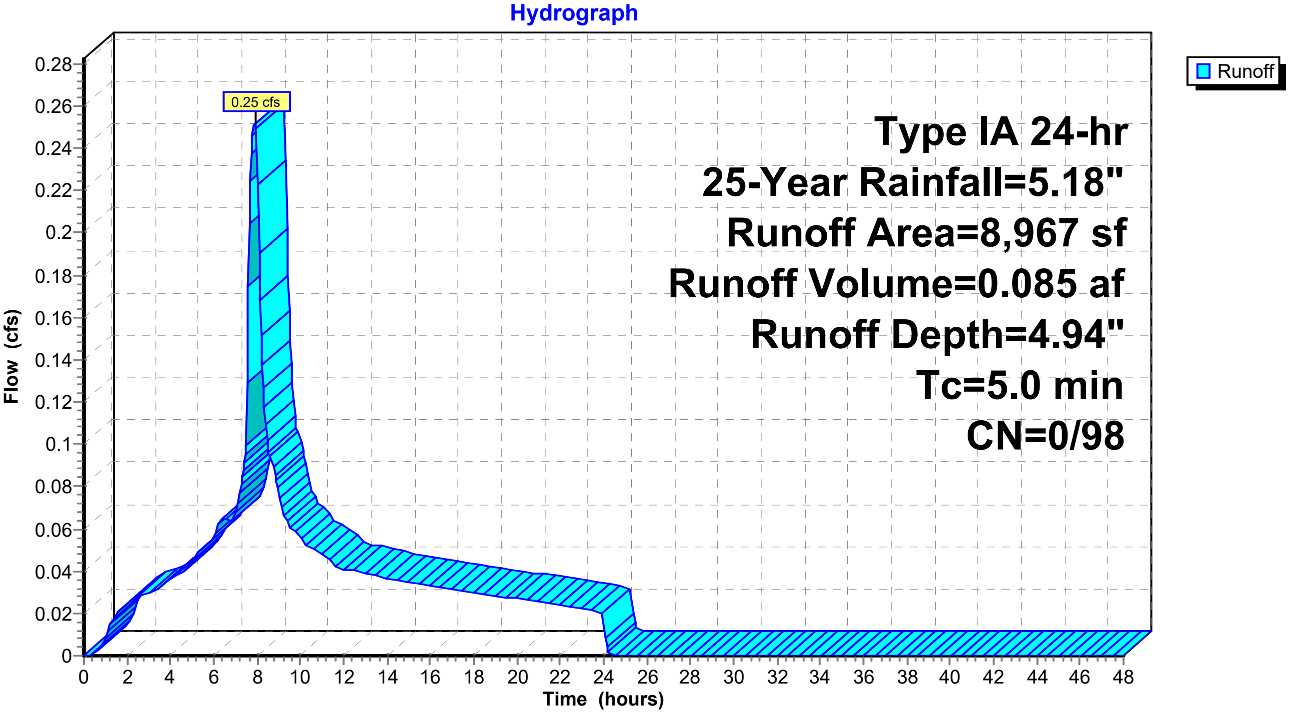
Runoff = 0.25 cfs @ 7.89 hrs, Volume= 0.085 af, Depth= 4.94"
Routed to Pond 47P : Pond #3

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-Year Rainfall=5.18"

	Area (sf)	CN	Description
*	8,967	98	Impervious Surface
	8,967	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 41S: P16



Summary for Subcatchment 50S: Existing Buildings

Includes the roofs from existing buildings 1-8 and some adjacent sidewalks for areas within master plan (apartments). See existing drainage basin map for corresponding areas.

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[49] Hint: Tc<2dt may require smaller dt

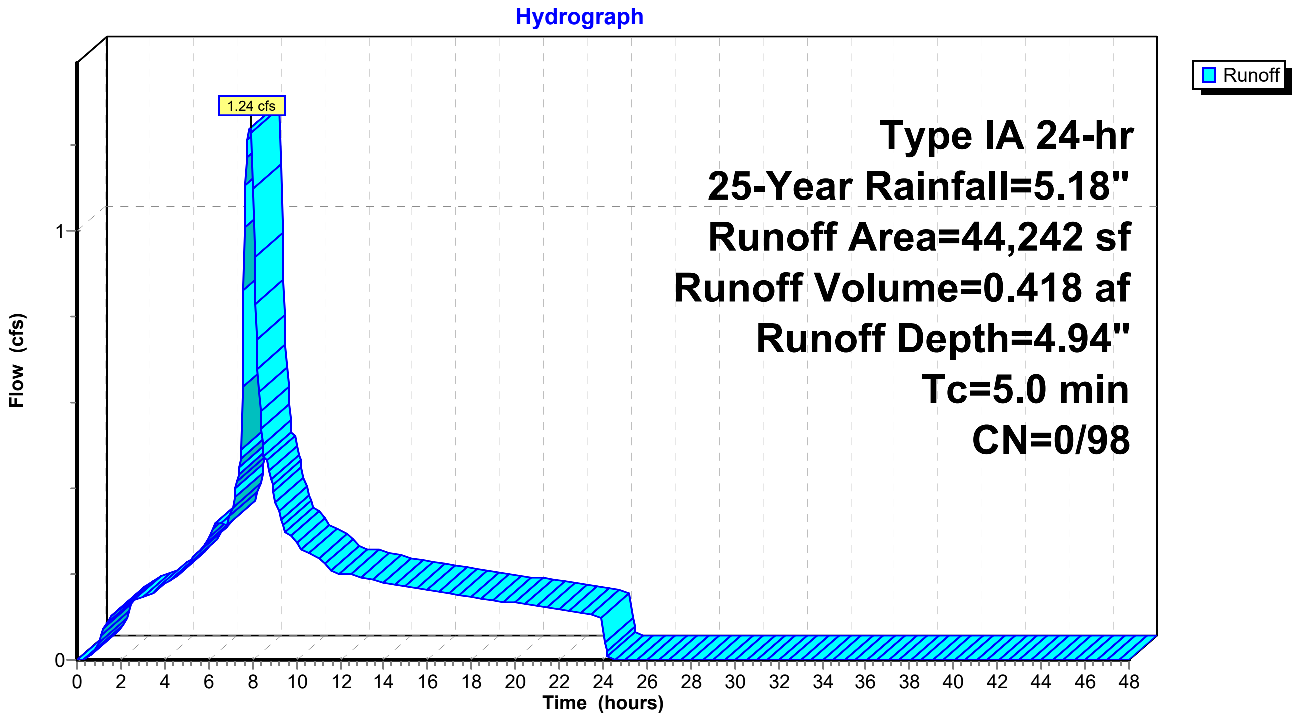
```
Runoff      =        1.24 cfs @     7.89 hrs,  Volume=           0.418 af,  Depth=  4.94"
    Routed to Reach 53R : Existing Discharge
```

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-Year Rainfall=5.18"

	Area (sf)	CN	Description
*	44,242	98	Impervious Roof & Adjacent Sidewalk
	44,242	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 50S: Existing Buildings



Summary for Subcatchment 51S: Existing Impervious Areas

Includes existing impervious pavement within the new master plan development area (apartments). See existing drainage basin map for corresponding areas.

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[49] Hint: Tc<2dt may require smaller dt

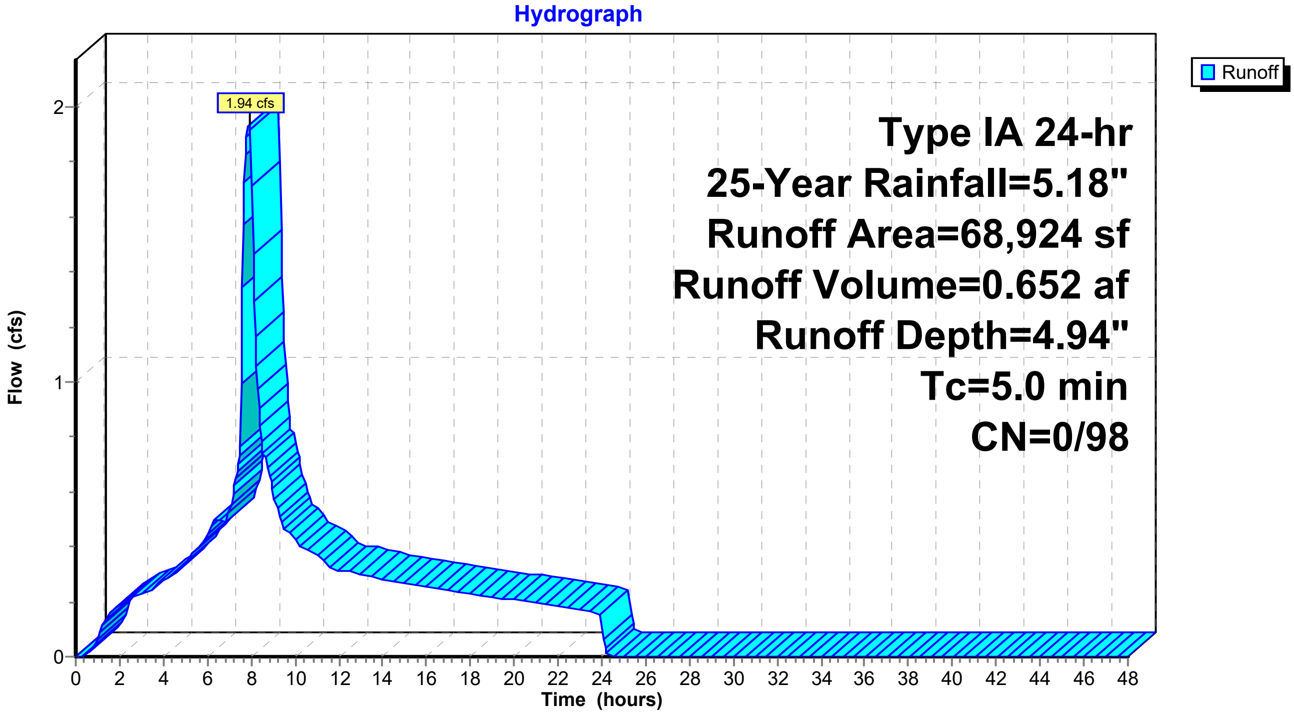
Runoff = 1.94 cfs @ 7.89 hrs, Volume= 0.652 af, Depth= 4.94"
Routed to Reach 53R : Existing Discharge

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-Year Rainfall=5.18"

	Area (sf)	CN	Description
*	68,924	98	Impervious pavement and sidewalk
	68,924	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 51S: Existing Impervious Areas



Summary for Subcatchment 52S: Existing Landscape Area

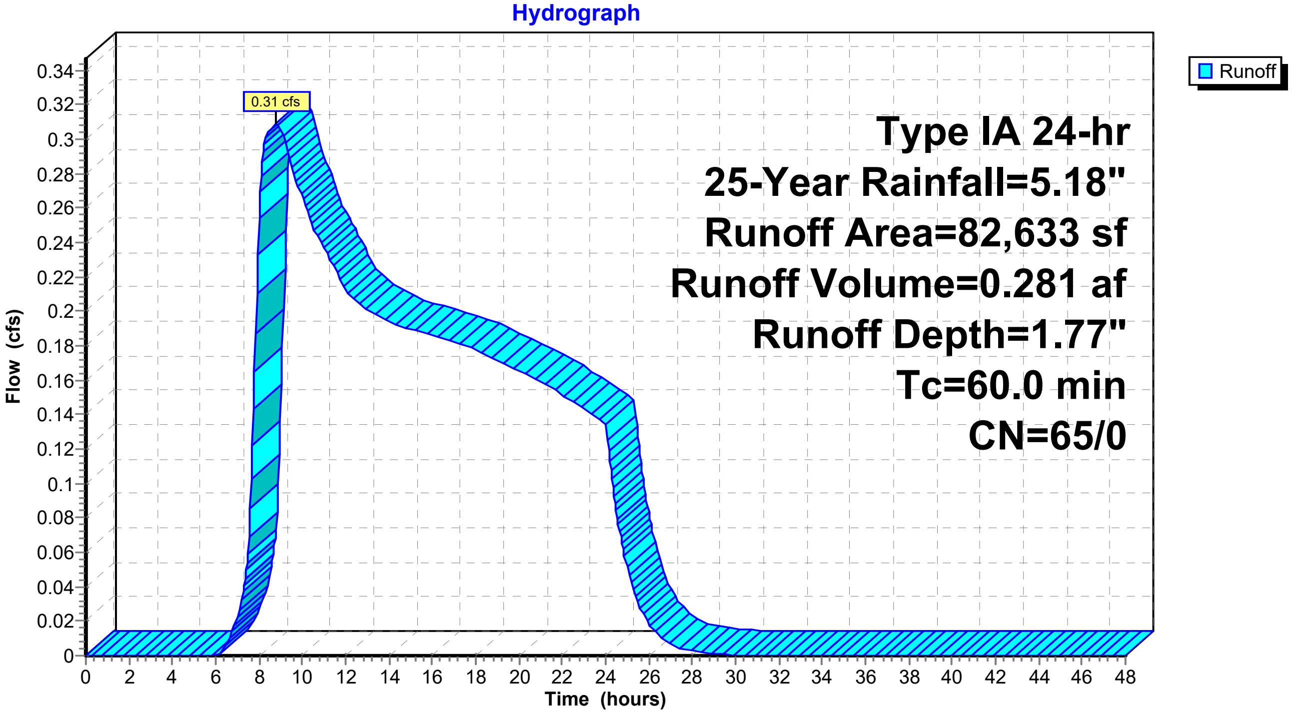
Runoff = 0.31 cfs @ 8.77 hrs, Volume= 0.281 af, Depth= 1.77"
Routed to Reach 53R : Existing Discharge

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-Year Rainfall=5.18"

Area (sf)	CN	Description
82,633	65	Woods/grass comb., Fair, HSG B
82,633	65	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
60.0					**Direct Entry,**

Subcatchment 52S: Existing Landscape Area



Summary for Subcatchment 94S: Pond #3

[49] Hint: Tc<2dt may require smaller dt

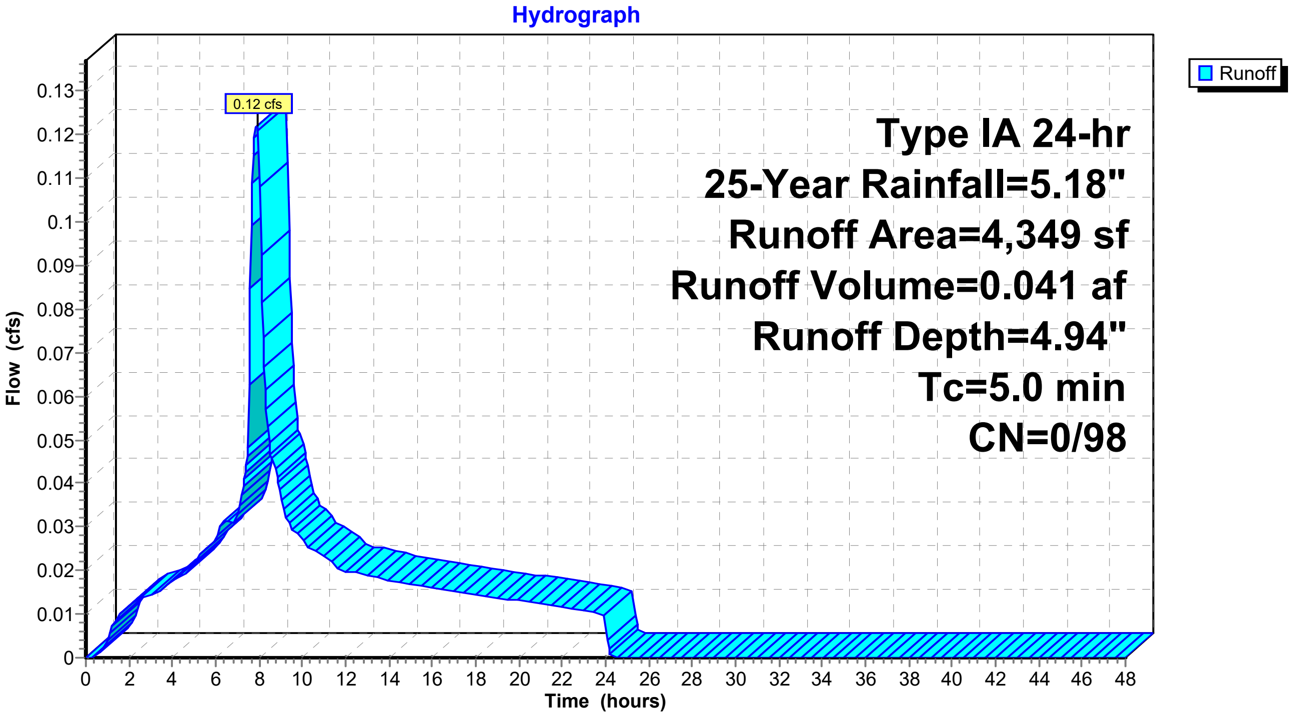
Runoff = 0.12 cfs @ 7.89 hrs, Volume= 0.041 af, Depth= 4.94"
Routed to Pond 47P : Pond #3

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-Year Rainfall=5.18"

Area (sf)	CN	Description
4,349	98	Water Surface, HSG B
4,349	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 94S: Pond #3



Summary for Subcatchment 95S: Pond #1

[49] Hint: Tc<2dt may require smaller dt

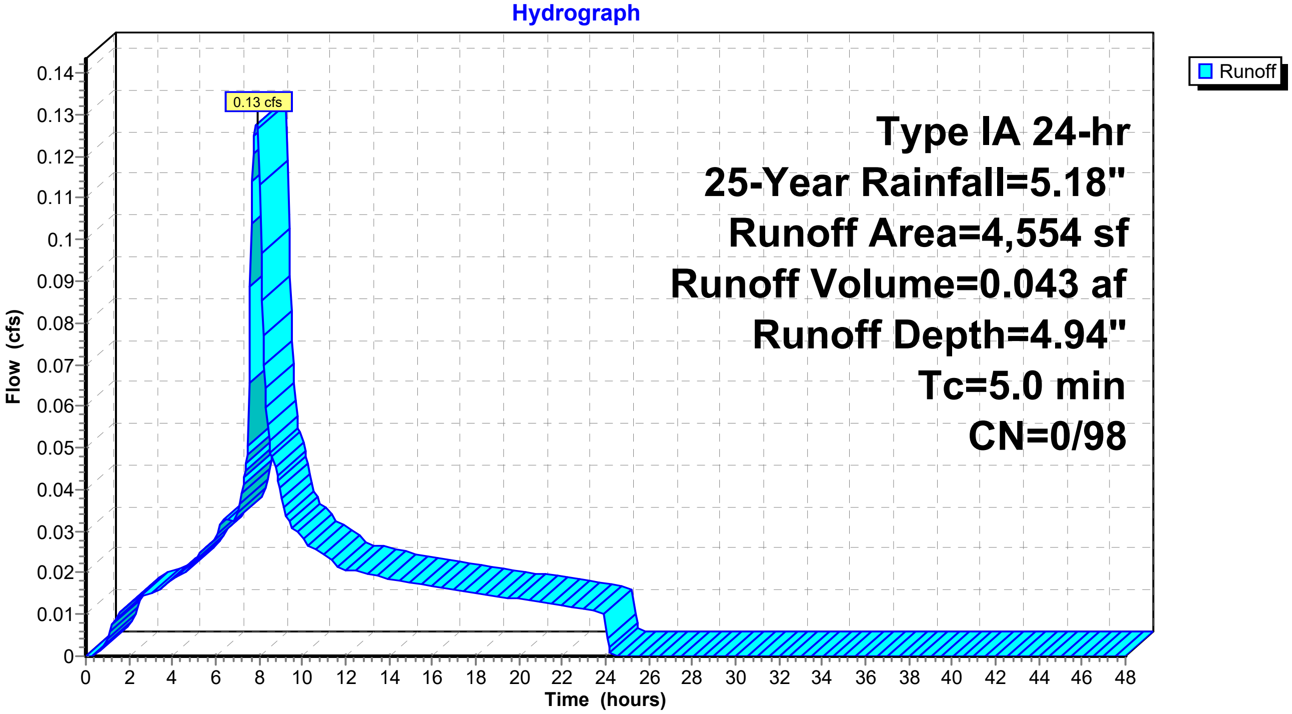
Runoff = 0.13 cfs @ 7.89 hrs, Volume= 0.043 af, Depth= 4.94"
Routed to Pond 46P : Pond #1

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-Year Rainfall=5.18"

Area (sf)	CN	Description
4,554	98	Water Surface, HSG B
4,554	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 95S: Pond #1



Summary for Subcatchment 96S: Pond #2

[49] Hint: Tc<2dt may require smaller dt

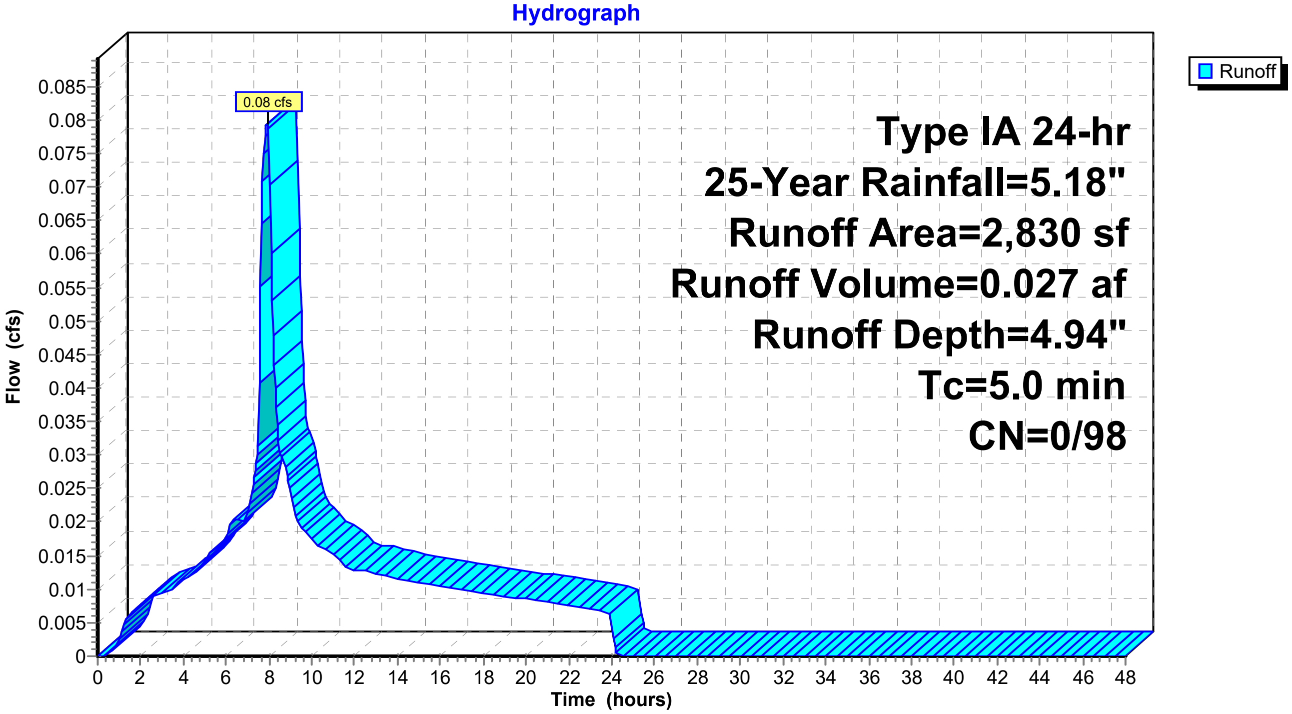
Runoff = 0.08 cfs @ 7.89 hrs, Volume= 0.027 af, Depth= 4.94"
Routed to Pond 48P : Pond #2

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-Year Rainfall=5.18"

Area (sf)	CN	Description
2,830	98	Water Surface, HSG B
2,830	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 96S: Pond #2



Summary for Subcatchment 97S: Pond #4

[49] Hint: Tc<2dt may require smaller dt

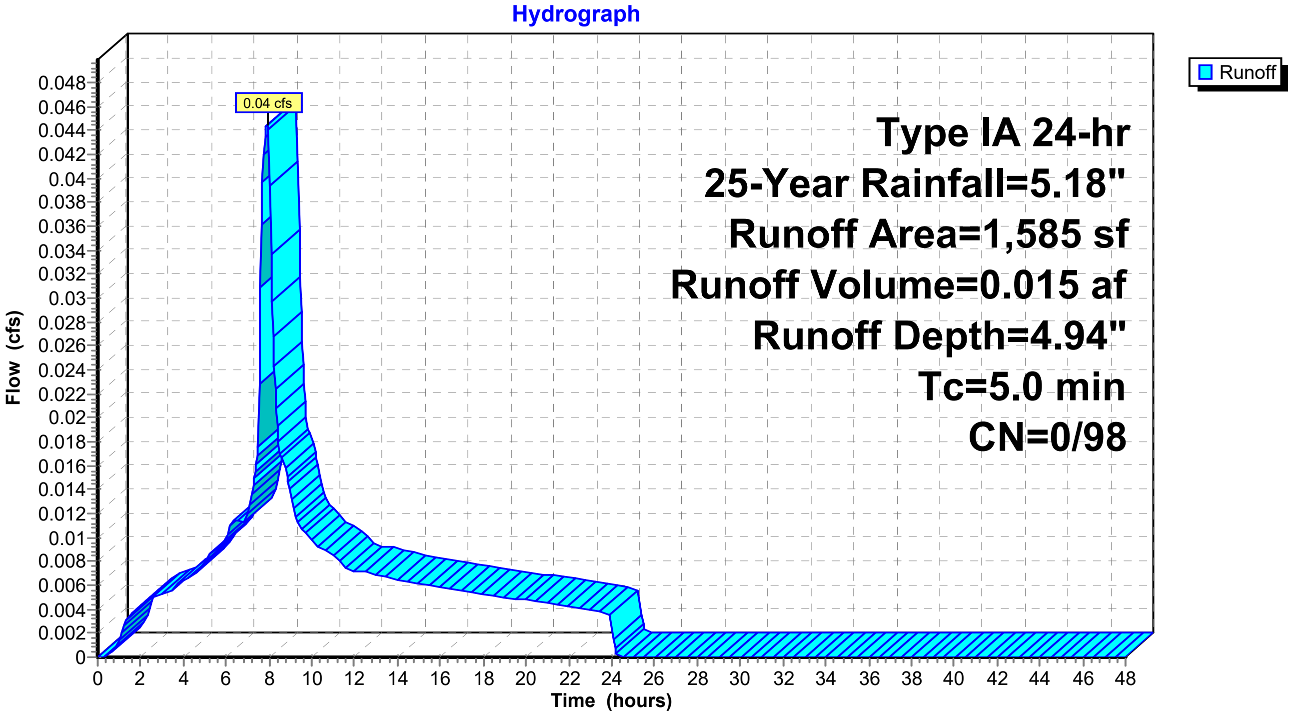
Runoff = 0.04 cfs @ 7.89 hrs, Volume= 0.015 af, Depth= 4.94"
Routed to Pond 49P : Pond #4

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-Year Rainfall=5.18"

Area (sf)	CN	Description
1,585	98	Water Surface, HSG B
1,585	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 97S: Pond #4



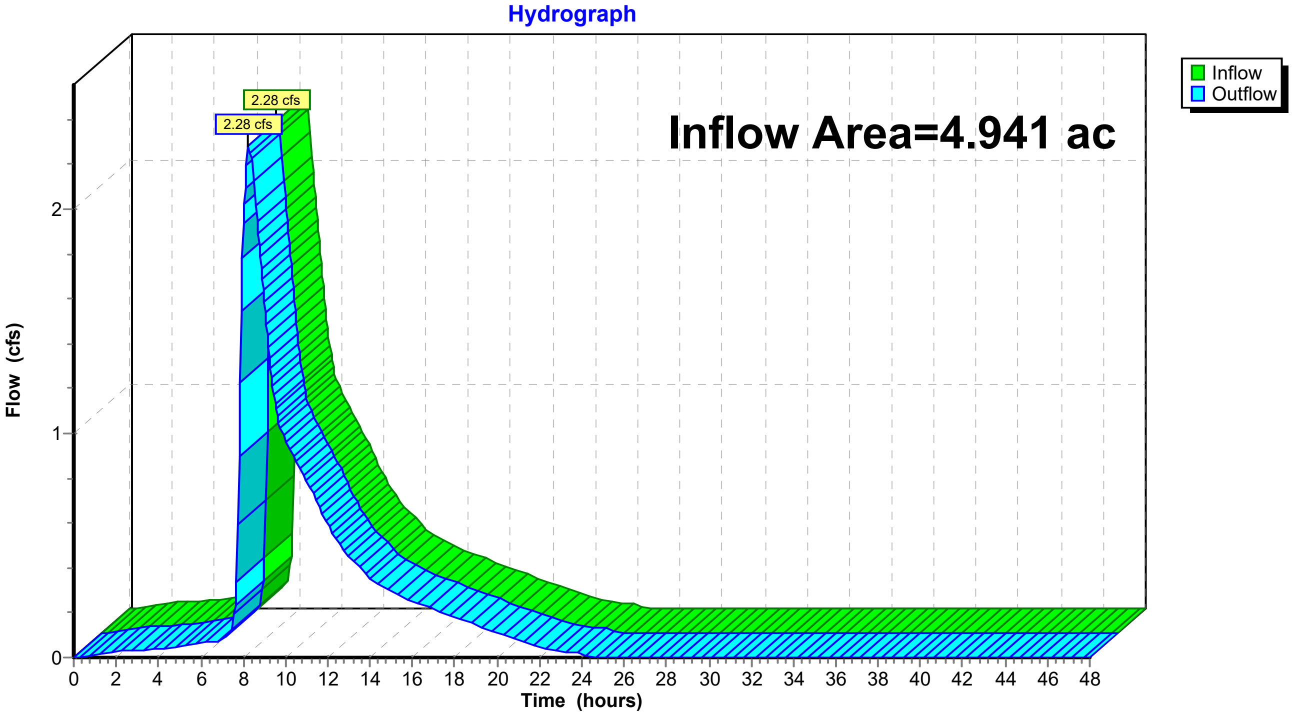
Summary for Reach 50R: Discharge

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area =	4.941 ac,100.00% Impervious,	Inflow Depth = 1.59"	for 25-Year event		
Inflow =	2.28 cfs @	8.22 hrs, Volume=	0.657 af		
Outflow =	2.28 cfs @	8.22 hrs, Volume=	0.657 af,	Atten= 0%,	Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Reach 50R: Discharge

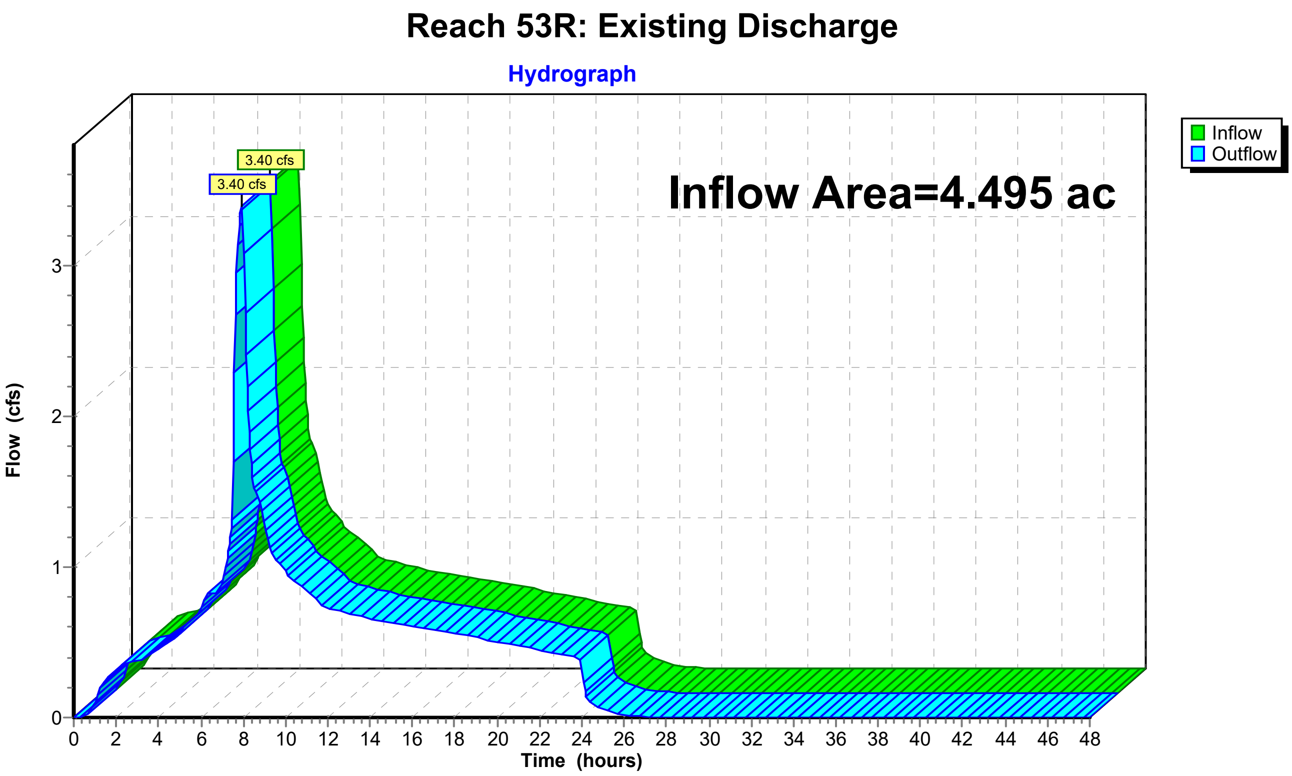


Summary for Reach 53R: Existing Discharge

[40] Hint: Not Described (Outflow=Inflow)

```
Inflow Area =         4.495 ac,  57.80% Impervious,  Inflow Depth =   3.61"    for  25-Year event
Inflow      =        3.40 cfs @     7.92 hrs,  Volume=            1.351 af
Outflow     =        3.40 cfs @     7.92 hrs,  Volume=            1.351 af,  Atten= 0%,  Lag= 0.0 min
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs



Summary for Pond 46P: Pond #1

Inflow Area = 3.584 ac,100.00% Impervious, Inflow Depth = 3.46" for 25-Year event
Inflow = 3.73 cfs @ 7.96 hrs, Volume= 1.032 af
Outflow = 1.99 cfs @ 8.27 hrs, Volume= 1.032 af, Atten= 47%, Lag= 18.6 min
Discarded = 0.24 cfs @ 8.28 hrs, Volume= 0.471 af
Primary = 1.75 cfs @ 8.27 hrs, Volume= 0.561 af
Routed to Pond 47P : Pond #3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 636.72' @ 8.28 hrs Surf.Area= 5,277 sf Storage= 10,201 cf
Flood Elev= 637.00' Surf.Area= 5,590 sf Storage= 11,426 cf

Plug-Flow detention time= 212.5 min calculated for 1.031 af (100% of inflow)
Center-of-Mass det. time= 213.1 min (865.2 - 652.1)

Volume	Invert	Avail.Storage	Storage Description
#1	632.00'	11,193 cf	**Open Storage (Irregular)**Listed below (Recalc)
#2	631.00'	52 cf	**Growing Medium (Irregular)**Listed below (Recalc) 518 cf Overall x 10.0% Voids
#3	630.00'	181 cf	**Rock Chamber (Irregular)**Listed below (Recalc) 518 cf Overall x 35.0% Voids
		11,426 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
632.00	518	104.0	0	0	518
633.00	1,018	147.0	754	754	1,386
634.00	1,697	191.0	1,343	2,097	2,581
635.00	2,527	224.0	2,098	4,195	3,691
636.00	3,482	253.0	2,992	7,187	4,817
637.00	4,554	282.0	4,006	11,193	6,081

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
631.00	518	104.0	0	0	518
632.00	518	104.0	518	518	622

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
630.00	518	104.0	0	0	518
631.00	518	104.0	518	518	622

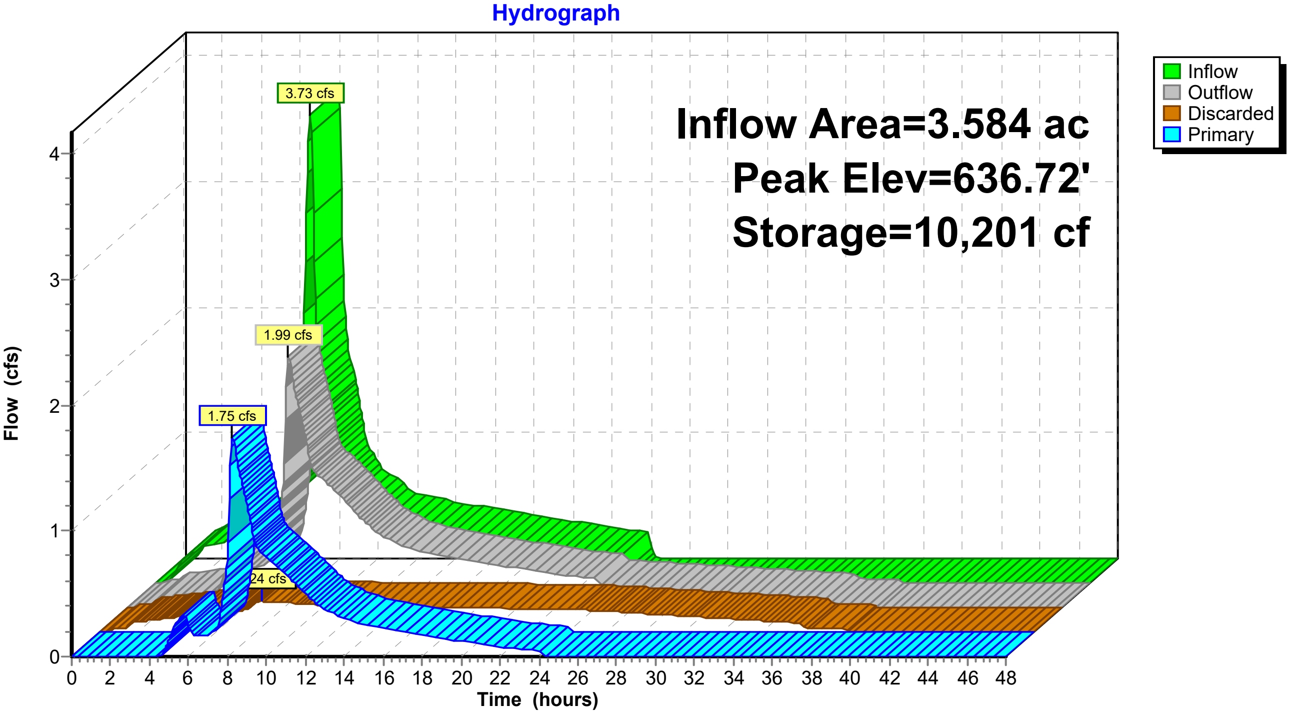
Device	Routing	Invert	Outlet Devices
#1	Discarded	630.00'	**2.000 in/hr Exfiltration over Surface area**
#2	Primary	633.60'	**12.0" Round 12" Pipe** L= 400.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 633.60' / 632.00' S= 0.0040 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf
#3	Device 2	634.10'	**6.0" Vert. 6" Orifice** C= 0.600 Limited to weir flow at low heads

#4	Device 2	636.50'	**24.0" W x 8.0" H 18° Overflow Grate** C= 0.600 Limited to weir flow at low heads

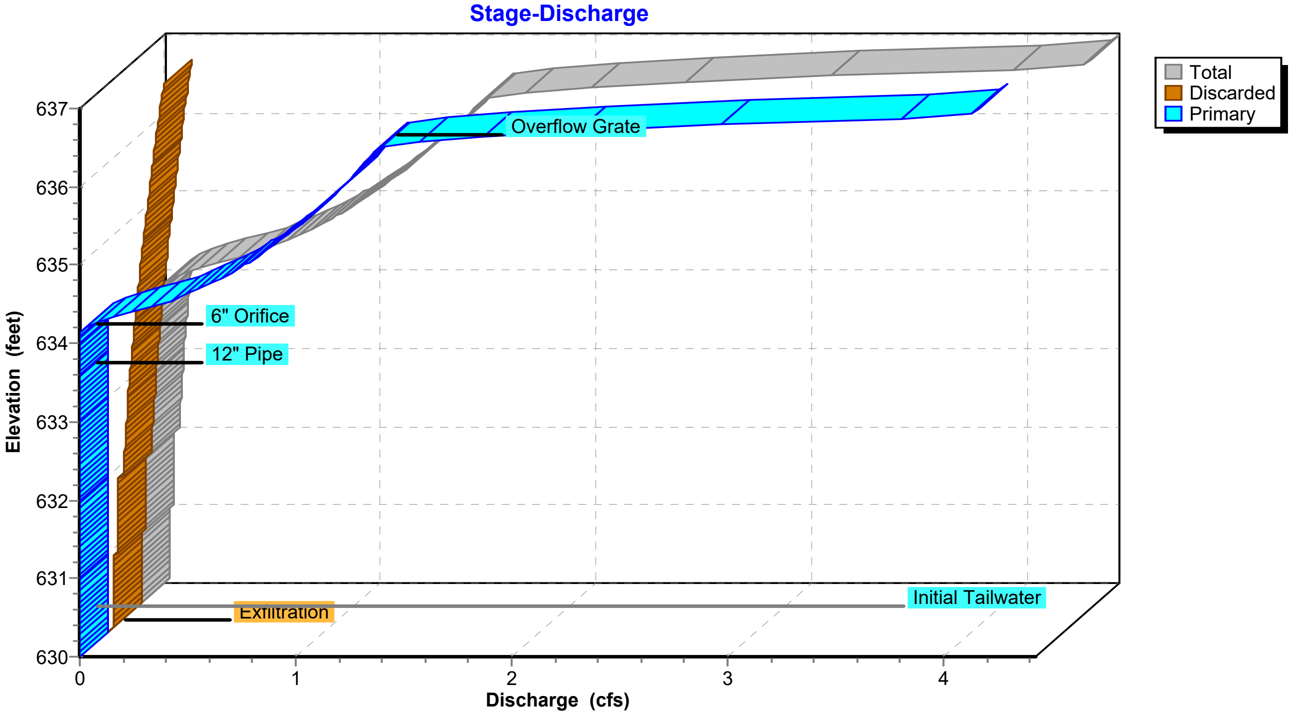
Discarded OutFlow Max=0.24 cfs @ 8.28 hrs HW=636.72' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.24 cfs)

Primary OutFlow Max=1.74 cfs @ 8.27 hrs HW=636.72' TW=635.86' (Dynamic Tailwater)
└─**2=12" Pipe** (Passes 1.74 cfs of 1.94 cfs potential flow)
  ├─**3=6" Orifice** (Orifice Controls 0.88 cfs @ 4.47 fps)
  └─**4=Overflow Grate** (Weir Controls 0.86 cfs @ 1.38 fps)

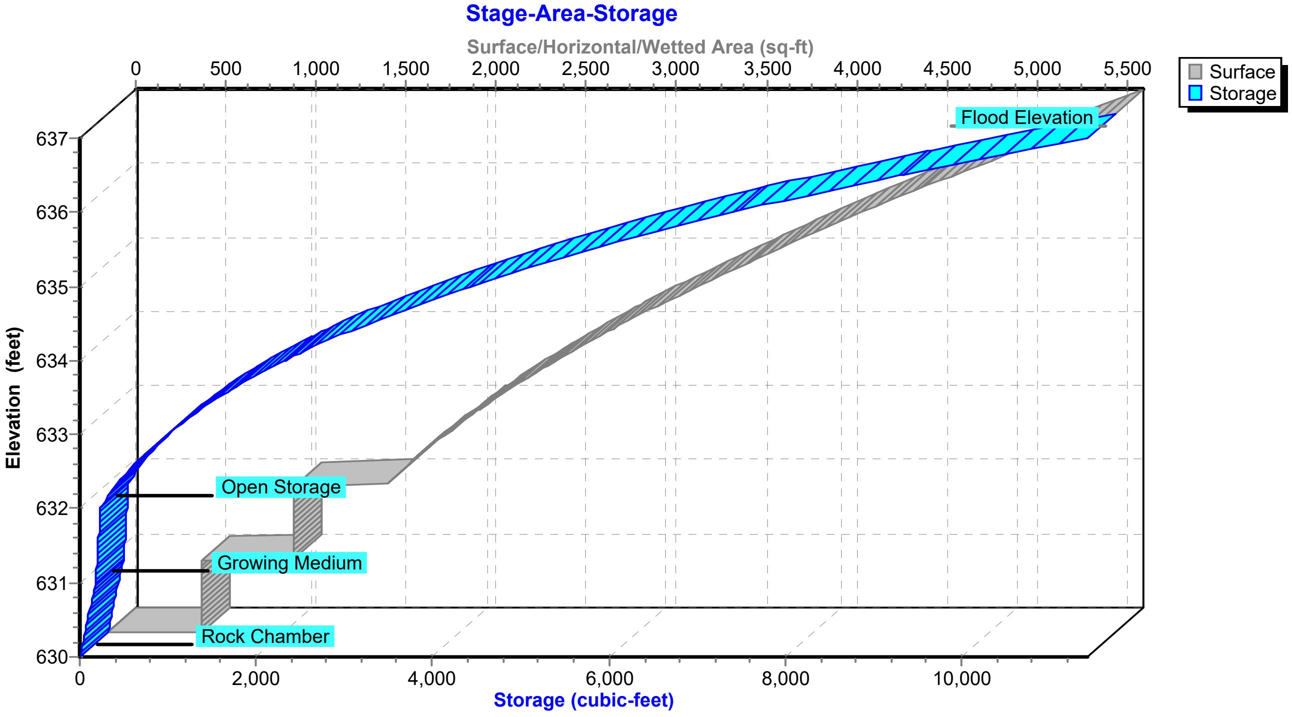
Pond 46P: Pond #1



Pond 46P: Pond #1



Pond 46P: Pond #1



Summary for Pond 47P: Pond #3

Inflow Area = 4.709 ac,100.00% Impervious, Inflow Depth = 2.61" for 25-Year event
Inflow = 2.51 cfs @ 8.22 hrs, Volume= 1.024 af
Outflow = 2.33 cfs @ 8.36 hrs, Volume= 1.025 af, Atten= 7%, Lag= 8.5 min
Discarded = 0.22 cfs @ 8.36 hrs, Volume= 0.464 af
Primary = 2.11 cfs @ 8.36 hrs, Volume= 0.561 af
Routed to Reach 50R : Discharge

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 635.86' @ 8.36 hrs Surf.Area= 4,713 sf Storage= 6,678 cf
Flood Elev= 636.50' Surf.Area= 5,485 sf Storage= 9,193 cf

Plug-Flow detention time= 176.8 min calculated for 1.023 af (100% of inflow)
Center-of-Mass det. time= 177.3 min (851.4 - 674.1)

Volume	Invert	Avail.Storage	Storage Description
#1	632.50'	8,937 cf	**Open Storage (Irregular)**Listed below (Recalc)
#2	631.50'	57 cf	**Growing Medium (Irregular)**Listed below (Recalc) 568 cf Overall x 10.0% Voids
#3	630.50'	199 cf	**Rock Chamber (Irregular)**Listed below (Recalc) 568 cf Overall x 35.0% Voids
		9,193 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
632.50	568	149.0	0	0	568
633.50	1,258	195.0	890	890	1,839
634.50	2,127	239.0	1,674	2,564	3,374
635.50	3,168	281.0	2,630	5,194	5,131
636.50	4,349	308.0	3,743	8,937	6,431

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
631.50	568	149.0	0	0	568
632.50	568	149.0	568	568	717

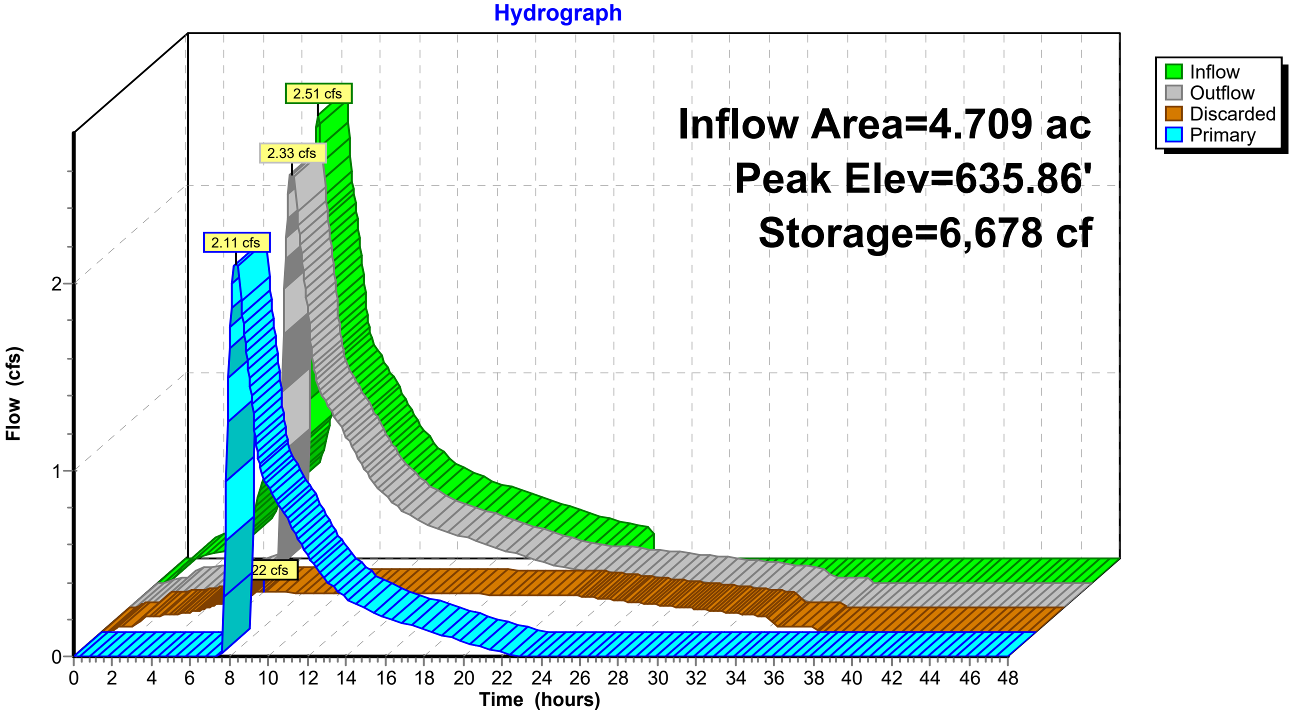
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
630.50	568	149.0	0	0	568
631.50	568	149.0	568	568	717

Device	Routing	Invert	Outlet Devices
#1	Discarded	630.50'	**2.000 in/hr Exfiltration over Surface area**
#2	Primary	633.92'	**10.0" Round 10" Pipe** L= 480.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 633.92' / 632.00' S= 0.0040 '/' Cc= 0.900 n= 0.010, Flow Area= 0.55 sf
#3	Device 2	635.50'	**24.0" W x 8.0" H 18° Overflow Grate** C= 0.600 Limited to weir flow at low heads

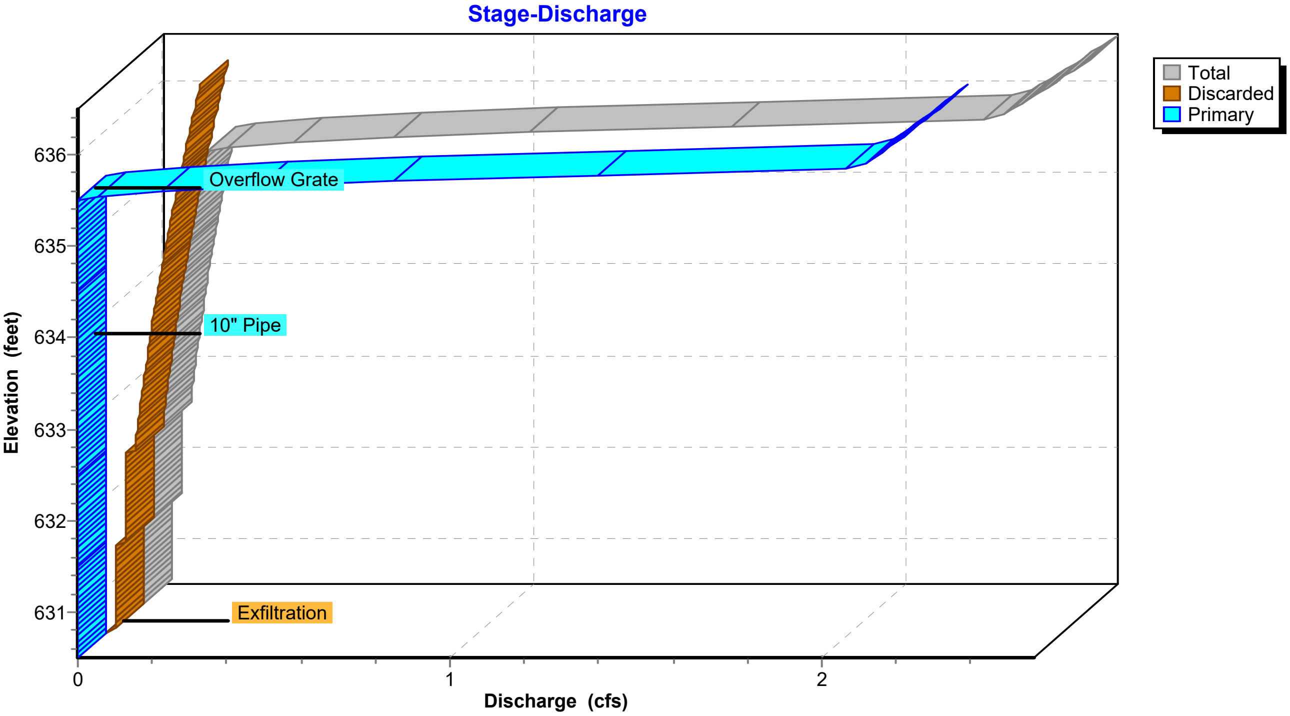
Discarded OutFlow Max=0.22 cfs @ 8.36 hrs HW=635.86' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.22 cfs)

Primary OutFlow Max=2.11 cfs @ 8.36 hrs HW=635.86' TW=0.00' (Dynamic Tailwater)
↑—**2=10" Pipe** (Barrel Controls 2.11 cfs @ 3.86 fps)
  ↑—**3=Overflow Grate** (Passes 2.11 cfs of 2.37 cfs potential flow)

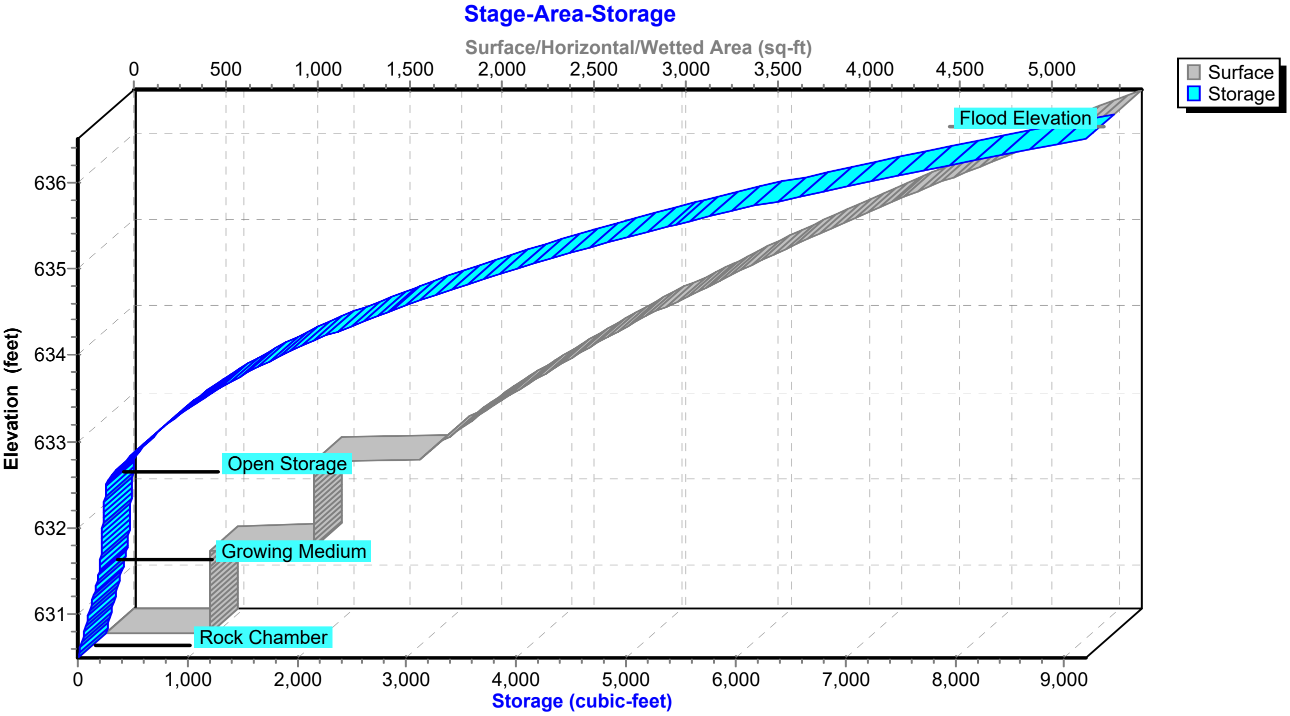
Pond 47P: Pond #3



Pond 47P: Pond #3



Pond 47P: Pond #3



Summary for Pond 48P: Pond #2

```
Inflow Area =          1.135 ac,100.00% Impervious,  Inflow Depth =   4.94"    for  25-Year event
Inflow      =         1.39 cfs @    7.89 hrs,  Volume=            0.468 af
Outflow     =         1.33 cfs @    8.00 hrs,  Volume=            0.468 af,  Atten= 4%,  Lag= 6.4 min
Discarded  =          0.14 cfs @    8.35 hrs,  Volume=            0.311 af
Primary     =         1.19 cfs @    8.00 hrs,  Volume=            0.156 af
    Routed to Pond 46P : Pond #1
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 636.78' @ 8.35 hrs   Surf.Area= 3,031 sf   Storage= 4,774 cf
Flood Elev= 637.00'   Surf.Area= 3,234 sf   Storage= 5,376 cf

Plug-Flow detention time= 301.8 min calculated for 0.467 af (100% of inflow)
Center-of-Mass det. time= 302.5 min (957.7 - 655.2)

Volume	Invert	Avail.Storage	Storage Description
#1	633.00'	5,285 cf	**Open Storage (Irregular)**Listed below (Recalc)
#2	632.00'	20 cf	**Growing Medium (Irregular)**Listed below (Recalc) 202 cf Overall x 10.0% Voids
#3	631.00'	71 cf	**Rock Chamber (Irregular)**Listed below (Recalc) 202 cf Overall x 35.0% Voids
		5,376 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
633.00	202	86.0	0	0	202
634.00	636	129.0	399	399	946
635.00	1,228	167.0	916	1,315	1,853
636.00	1,969	202.0	1,584	2,899	2,897
637.00	2,830	228.0	2,387	5,285	3,812

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
632.00	202	86.0	0	0	202
633.00	202	86.0	202	202	288

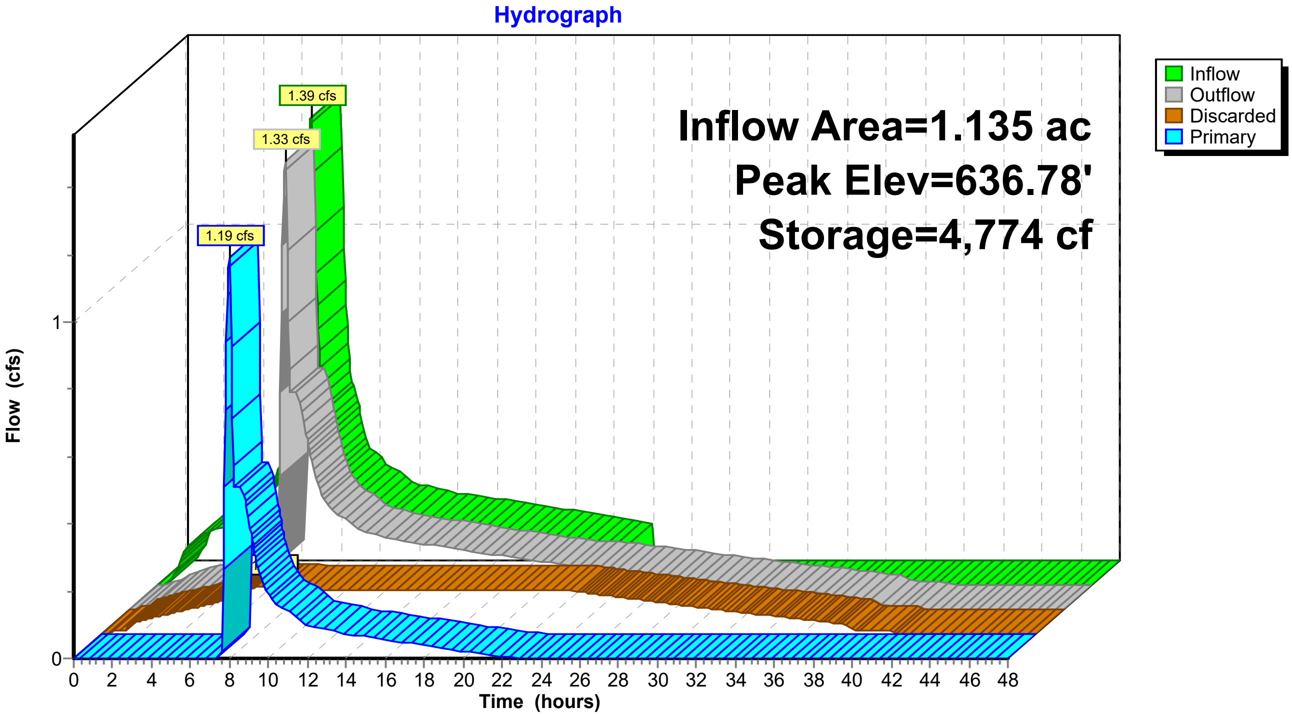
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
631.00	202	86.0	0	0	202
632.00	202	86.0	202	202	288

Device	Routing	Invert	Outlet Devices
#1	Discarded	631.00'	**2.000 in/hr Exfiltration over Surface area**
#2	Primary	633.60'	**12.0" Round 12" Pipe** L= 400.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 633.60' / 632.00' S= 0.0040 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf
#3	Device 2	636.50'	**24.0" W x 8.0" H 18° Overflow Grate** C= 0.600 Limited to weir flow at low heads

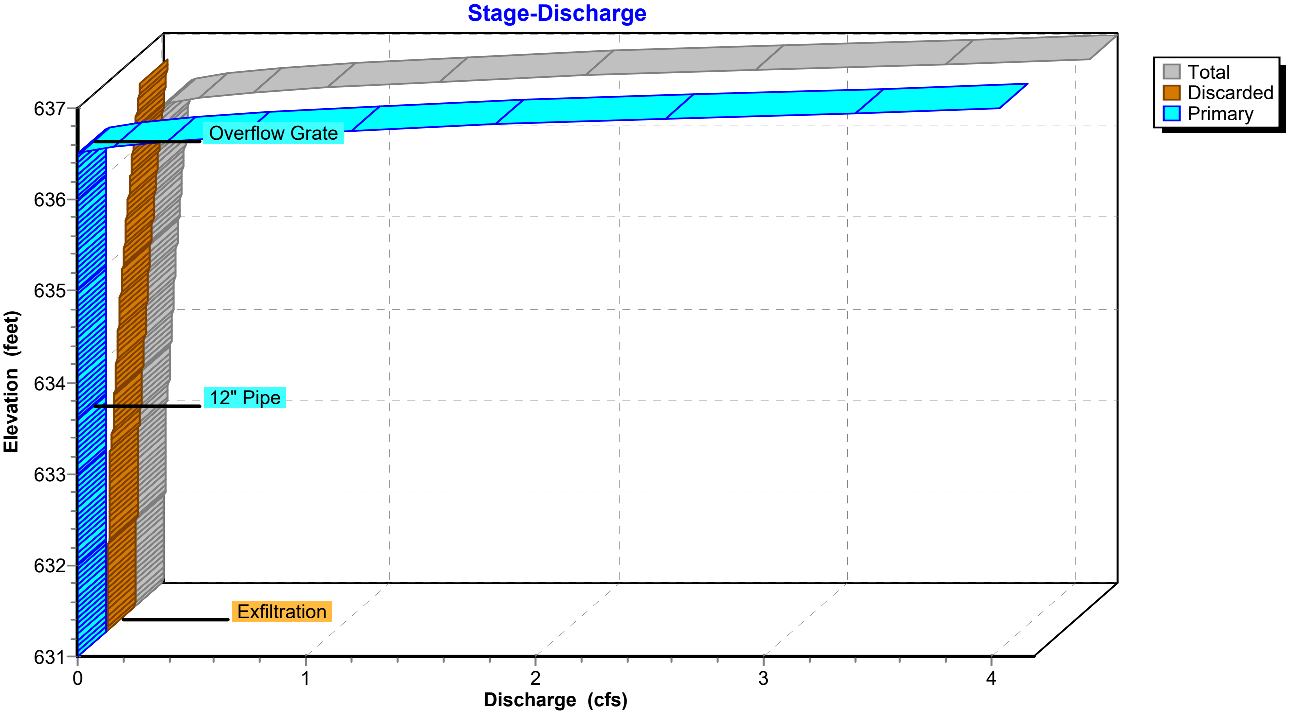
Discarded OutFlow Max=0.14 cfs @ 8.35 hrs HW=636.78' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.14 cfs)

Primary OutFlow Max=1.16 cfs @ 8.00 hrs HW=636.76' TW=636.45' (Dynamic Tailwater)
↑—**2=12" Pipe** (Outlet Controls 1.16 cfs @ 1.48 fps)
  ↑—**3=Overflow Grate** (Passes 1.16 cfs of 1.19 cfs potential flow)

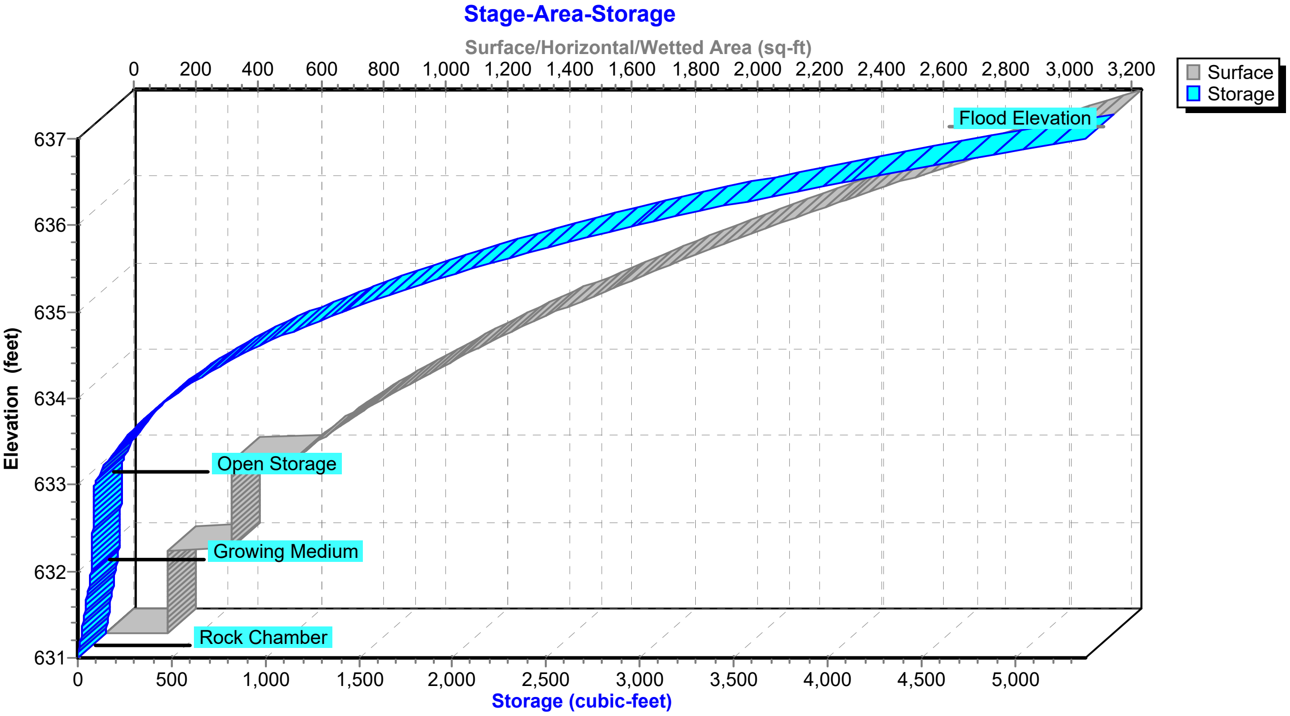
Pond 48P: Pond #2



Pond 48P: Pond #2



Pond 48P: Pond #2



Summary for Pond 49P: Pond #4

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=23)

Inflow Area = 0.341 ac,100.00% Impervious, Inflow Depth = 4.94" for 25-Year event
Inflow = 0.42 cfs @ 7.89 hrs, Volume= 0.141 af
Outflow = 0.24 cfs @ 8.24 hrs, Volume= 0.141 af, Atten= 43%, Lag= 20.4 min
Discarded = 0.10 cfs @ 8.24 hrs, Volume= 0.133 af
Primary = 0.14 cfs @ 8.24 hrs, Volume= 0.008 af
Routed to Pond 46P : Pond #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 637.07' @ 8.24 hrs Surf.Area= 2,115 sf Storage= 1,075 cf
Flood Elev= 638.00' Surf.Area= 2,659 sf Storage= 2,283 cf

Plug-Flow detention time= 104.0 min calculated for 0.140 af (100% of inflow)
Center-of-Mass det. time= 104.1 min (759.4 - 655.2)

Volume	Invert	Avail.Storage	Storage Description
#1	636.00'	2,041 cf	**Open Storage (Irregular)**Listed below (Recalc)
#2	635.00'	54 cf	**Growing Medium (Irregular)**Listed below (Recalc) 537 cf Overall x 10.0% Voids
#3	634.00'	188 cf	**Rock Chamber (Irregular)**Listed below (Recalc) 537 cf Overall x 35.0% Voids
		2,283 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
636.00	537	102.0	0	0	537
637.00	1,003	131.0	758	758	1,087
638.00	1,585	159.0	1,283	2,041	1,749

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
635.00	537	102.0	0	0	537
636.00	537	102.0	537	537	639

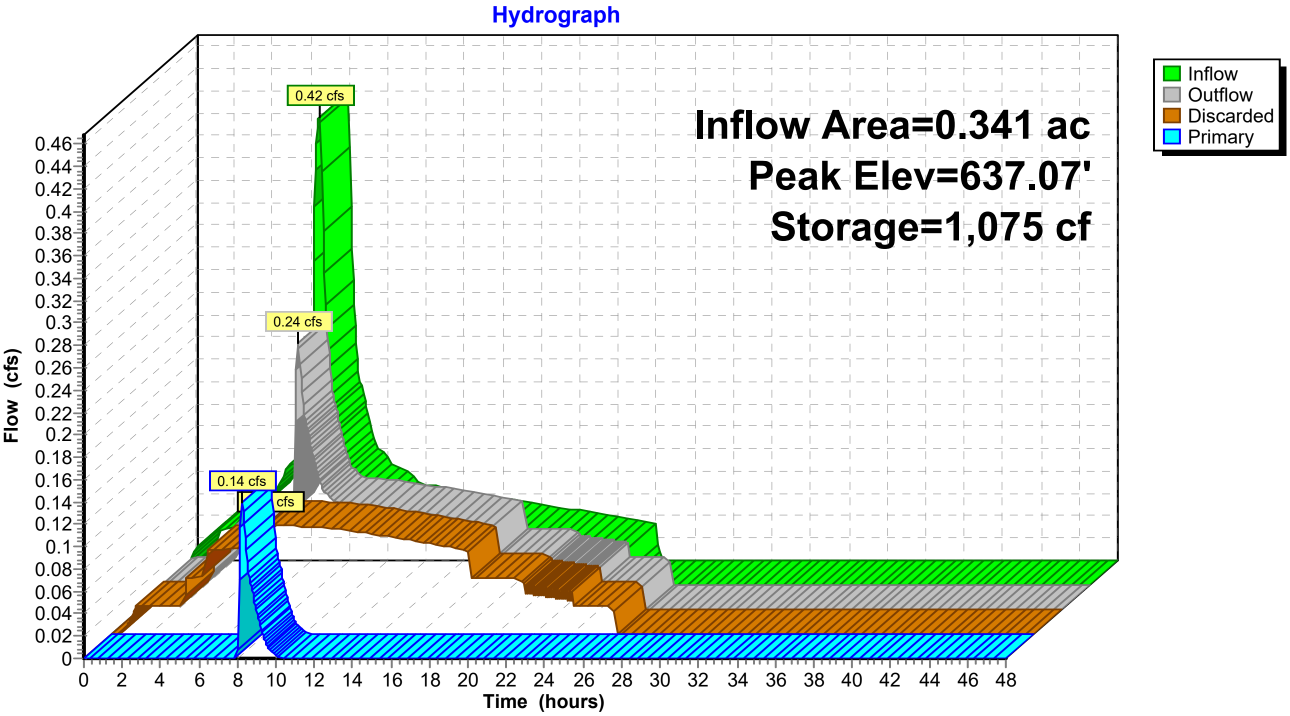
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
634.00	537	102.0	0	0	537
635.00	537	102.0	537	537	639

Device	Routing	Invert	Outlet Devices
#1	Discarded	634.00'	**2.000 in/hr Exfiltration over Surface area**
#2	Primary	636.00'	**8.0" Round 8" Pipe** L= 125.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 636.00' / 634.00' S= 0.0160 '/' Cc= 0.900 n= 0.010, Flow Area= 0.35 sf
#3	Device 2	637.00'	**24.0" W x 8.0" H 18° Overflow Grate** C= 0.600 Limited to weir flow at low heads

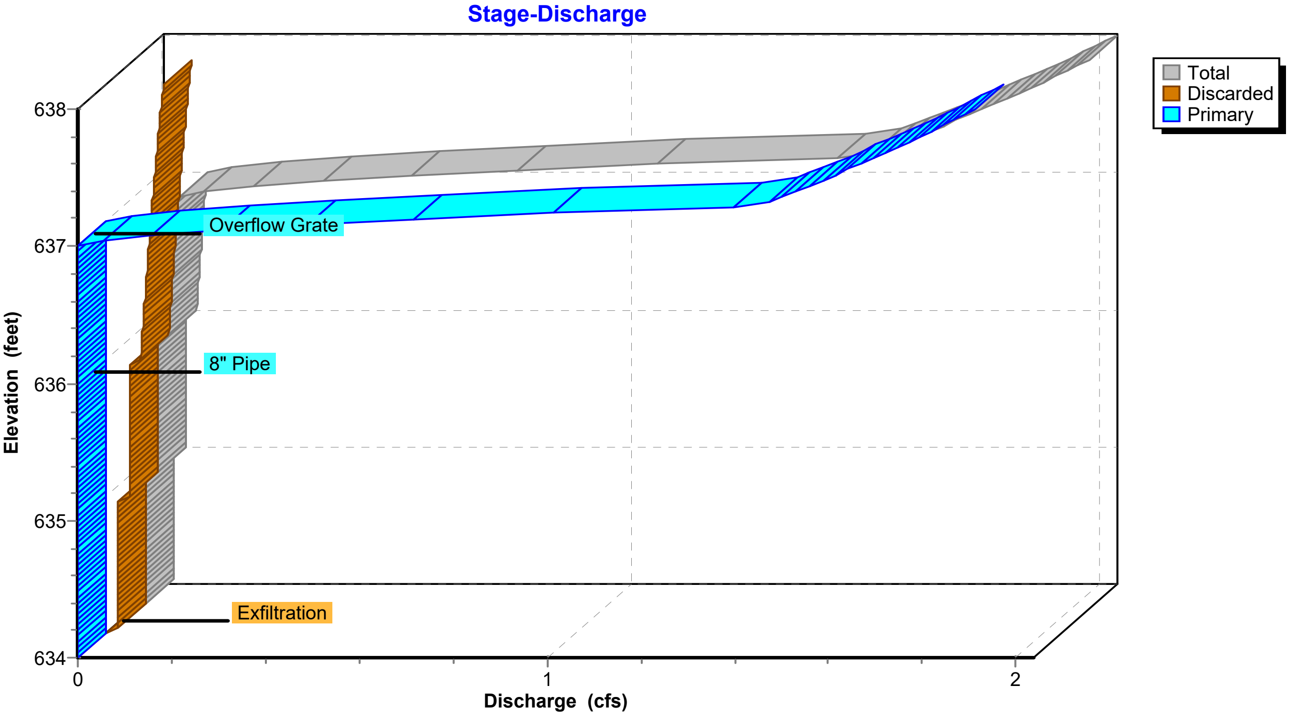
Discarded OutFlow Max=0.10 cfs @ 8.24 hrs HW=637.07' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.10 cfs)

Primary OutFlow Max=0.14 cfs @ 8.24 hrs HW=637.07' TW=636.72' (Dynamic Tailwater)
↑—**2=8" Pipe** (Passes 0.14 cfs of 0.70 cfs potential flow)
  ↑—**3=Overflow Grate** (Weir Controls 0.14 cfs @ 0.85 fps)

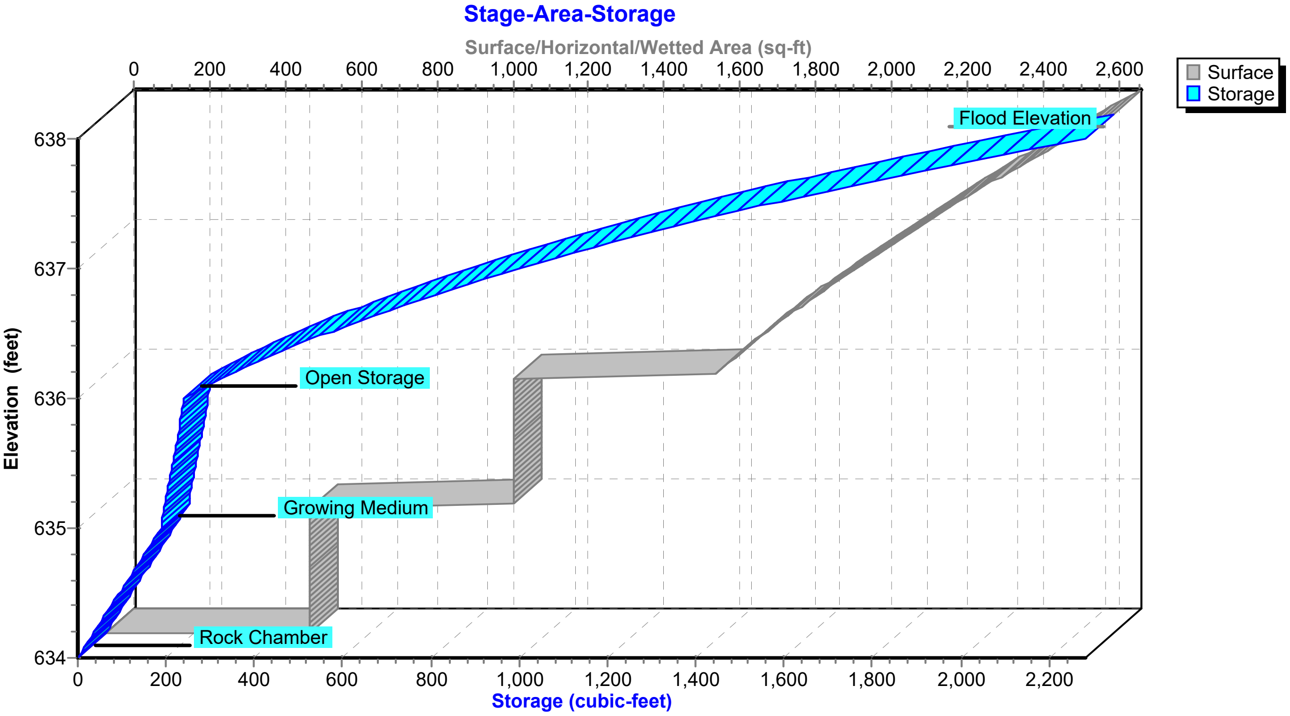
Pond 49P: Pond #4



Pond 49P: Pond #4



Pond 49P: Pond #4



Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment8S: Apt Building 1 Runoff Area=2,073 sf 100.00% Impervious Runoff Depth=3.37"
Tc=5.0 min CN=0/98 Runoff=0.04 cfs 0.013 af

Subcatchment9S: Apt Building 2 Runoff Area=5,606 sf 100.00% Impervious Runoff Depth=3.37"
Tc=5.0 min CN=0/98 Runoff=0.11 cfs 0.036 af

Subcatchment10S: Apt Building 3 Runoff Area=5,606 sf 100.00% Impervious Runoff Depth=3.37"
Tc=5.0 min CN=0/98 Runoff=0.11 cfs 0.036 af

Subcatchment11S: Apt Building 4 Runoff Area=5,606 sf 100.00% Impervious Runoff Depth=3.37"
Tc=5.0 min CN=0/98 Runoff=0.11 cfs 0.036 af

Subcatchment12S: Apt Building 5 Runoff Area=5,606 sf 100.00% Impervious Runoff Depth=3.37"
Tc=5.0 min CN=0/98 Runoff=0.11 cfs 0.036 af

Subcatchment13S: Apt Building 6 Runoff Area=5,606 sf 100.00% Impervious Runoff Depth=3.37"
Tc=5.0 min CN=0/98 Runoff=0.11 cfs 0.036 af

Subcatchment14S: Apt Building 7 Runoff Area=5,606 sf 100.00% Impervious Runoff Depth=3.37"
Tc=5.0 min CN=0/98 Runoff=0.11 cfs 0.036 af

Subcatchment15S: Apt Building 8 Runoff Area=5,606 sf 100.00% Impervious Runoff Depth=3.37"
Tc=5.0 min CN=0/98 Runoff=0.11 cfs 0.036 af

Subcatchment16S: Apt Building 9 Runoff Area=5,606 sf 100.00% Impervious Runoff Depth=3.37"
Tc=5.0 min CN=0/98 Runoff=0.11 cfs 0.036 af

Subcatchment17S: Apt Building 10 Runoff Area=5,606 sf 100.00% Impervious Runoff Depth=3.37"
Tc=5.0 min CN=0/98 Runoff=0.11 cfs 0.036 af

Subcatchment18S: Apt Building 11 Runoff Area=5,606 sf 100.00% Impervious Runoff Depth=3.37"
Tc=5.0 min CN=0/98 Runoff=0.11 cfs 0.036 af

Subcatchment19S: Apt Building 12 Runoff Area=5,606 sf 100.00% Impervious Runoff Depth=3.37"
Tc=5.0 min CN=0/98 Runoff=0.11 cfs 0.036 af

Subcatchment20S: Apt Building 13 Runoff Area=5,606 sf 100.00% Impervious Runoff Depth=3.37"
Tc=5.0 min CN=0/98 Runoff=0.11 cfs 0.036 af

Subcatchment21S: Apt Building 14 Runoff Area=5,606 sf 100.00% Impervious Runoff Depth=3.37"
Tc=5.0 min CN=0/98 Runoff=0.11 cfs 0.036 af

Subcatchment22S: Apt Building 15 Runoff Area=5,606 sf 100.00% Impervious Runoff Depth=3.37"
Tc=5.0 min CN=0/98 Runoff=0.11 cfs 0.036 af

Subcatchment23S: Apt Building 16 Runoff Area=5,606 sf 100.00% Impervious Runoff Depth=3.37"
Tc=5.0 min CN=0/98 Runoff=0.11 cfs 0.036 af

Subcatchment26S: P1 Runoff Area=5,680 sf 100.00% Impervious Runoff Depth=3.37"
Tc=5.0 min CN=0/98 Runoff=0.11 cfs 0.037 af

Subcatchment27S: P2 Runoff Area=4,460 sf 100.00% Impervious Runoff Depth=3.37"
Tc=5.0 min CN=0/98 Runoff=0.09 cfs 0.029 af

Subcatchment28S: P3 Runoff Area=11,250 sf 100.00% Impervious Runoff Depth=3.37"
Tc=5.0 min CN=0/98 Runoff=0.22 cfs 0.072 af

Subcatchment29S: P4 Runoff Area=7,128 sf 100.00% Impervious Runoff Depth=3.37"
Tc=5.0 min CN=0/98 Runoff=0.14 cfs 0.046 af

Subcatchment30S: P5 Runoff Area=11,417 sf 100.00% Impervious Runoff Depth=3.37"
Tc=5.0 min CN=0/98 Runoff=0.22 cfs 0.074 af

Subcatchment31S: P6 Runoff Area=7,570 sf 100.00% Impervious Runoff Depth=3.37"
Tc=5.0 min CN=0/98 Runoff=0.15 cfs 0.049 af

Subcatchment32S: P7 Runoff Area=7,142 sf 100.00% Impervious Runoff Depth=3.37"
Tc=5.0 min CN=0/98 Runoff=0.14 cfs 0.046 af

Subcatchment33S: P8 Runoff Area=7,675 sf 100.00% Impervious Runoff Depth=3.37"
Tc=5.0 min CN=0/98 Runoff=0.15 cfs 0.049 af

Subcatchment34S: P9 Runoff Area=6,421 sf 100.00% Impervious Runoff Depth=3.37"
Tc=5.0 min CN=0/98 Runoff=0.12 cfs 0.041 af

Subcatchment35S: P10 Runoff Area=6,146 sf 100.00% Impervious Runoff Depth=3.37"
Tc=5.0 min CN=0/98 Runoff=0.12 cfs 0.040 af

Subcatchment36S: P11 Runoff Area=7,429 sf 100.00% Impervious Runoff Depth=3.37"
Tc=5.0 min CN=0/98 Runoff=0.14 cfs 0.048 af

Subcatchment37S: P12 Runoff Area=9,368 sf 100.00% Impervious Runoff Depth=3.37"
Tc=5.0 min CN=0/98 Runoff=0.18 cfs 0.060 af

Subcatchment38S: P13 Runoff Area=5,595 sf 100.00% Impervious Runoff Depth=3.37"
Tc=5.0 min CN=0/98 Runoff=0.11 cfs 0.036 af

Subcatchment39S: P14 Runoff Area=4,779 sf 100.00% Impervious Runoff Depth=3.37"
Tc=5.0 min CN=0/98 Runoff=0.09 cfs 0.031 af

Subcatchment40S: P15 Runoff Area=4,741 sf 100.00% Impervious Runoff Depth=3.37"
Tc=5.0 min CN=0/98 Runoff=0.09 cfs 0.031 af

Subcatchment41S: P16 Runoff Area=8,967 sf 100.00% Impervious Runoff Depth=3.37"
Tc=5.0 min CN=0/98 Runoff=0.17 cfs 0.058 af

Subcatchment50S: Existing Buildings Runoff Area=44,242 sf 100.00% Impervious Runoff Depth=3.37"
Tc=5.0 min CN=0/98 Runoff=0.86 cfs 0.285 af

Subcatchment 51S: Existing Impervious Runoff Area=68,924 sf 100.00% Impervious Runoff Depth=3.37"
Tc=5.0 min CN=0/98 Runoff=1.33 cfs 0.444 af

Subcatchment 52S: Existing Landscape Runoff Area=82,633 sf 0.00% Impervious Runoff Depth=0.81"
Tc=60.0 min CN=65/0 Runoff=0.10 cfs 0.127 af

Subcatchment 94S: Pond #3 Runoff Area=4,349 sf 100.00% Impervious Runoff Depth=3.37"
Tc=5.0 min CN=0/98 Runoff=0.08 cfs 0.028 af

Subcatchment 95S: Pond #1 Runoff Area=4,554 sf 100.00% Impervious Runoff Depth=3.37"
Tc=5.0 min CN=0/98 Runoff=0.09 cfs 0.029 af

Subcatchment 96S: Pond #2 Runoff Area=2,830 sf 100.00% Impervious Runoff Depth=3.37"
Tc=5.0 min CN=0/98 Runoff=0.05 cfs 0.018 af

Subcatchment 97S: Pond #4 Runoff Area=1,585 sf 100.00% Impervious Runoff Depth=3.37"
Tc=5.0 min CN=0/98 Runoff=0.03 cfs 0.010 af

Reach 50R: Discharge Inflow=0.50 cfs 0.182 af
Outflow=0.50 cfs 0.182 af

Reach 53R: Existing Discharge Inflow=2.23 cfs 0.856 af
Outflow=2.23 cfs 0.856 af

Pond 46P: Pond #1 Peak Elev=635.83' Storage=6,851 cf Inflow=1.78 cfs 0.627 af
Discarded=0.20 cfs 0.415 af Primary=0.40 cfs 0.213 af Outflow=0.60 cfs 0.627 af

Pond 47P: Pond #3 Peak Elev=635.65' Storage=5,943 cf Inflow=1.33 cfs 0.528 af
Discarded=0.21 cfs 0.411 af Primary=0.45 cfs 0.117 af Outflow=0.66 cfs 0.528 af

Pond 48P: Pond #2 Peak Elev=636.60' Storage=4,305 cf Inflow=0.96 cfs 0.318 af
Discarded=0.13 cfs 0.282 af Primary=0.21 cfs 0.036 af Outflow=0.34 cfs 0.318 af

Pond 49P: Pond #4 Peak Elev=636.73' Storage=745 cf Inflow=0.29 cfs 0.096 af
Discarded=0.09 cfs 0.096 af Primary=0.00 cfs 0.000 af Outflow=0.09 cfs 0.096 af

Total Runoff Area = 9.436 ac Runoff Volume = 2.242 af Average Runoff Depth = 2.85"
20.10% Pervious = 1.897 ac 79.90% Impervious = 7.539 ac

Summary for Subcatchment 8S: Apt Building 1

[49] Hint: Tc<2dt may require smaller dt

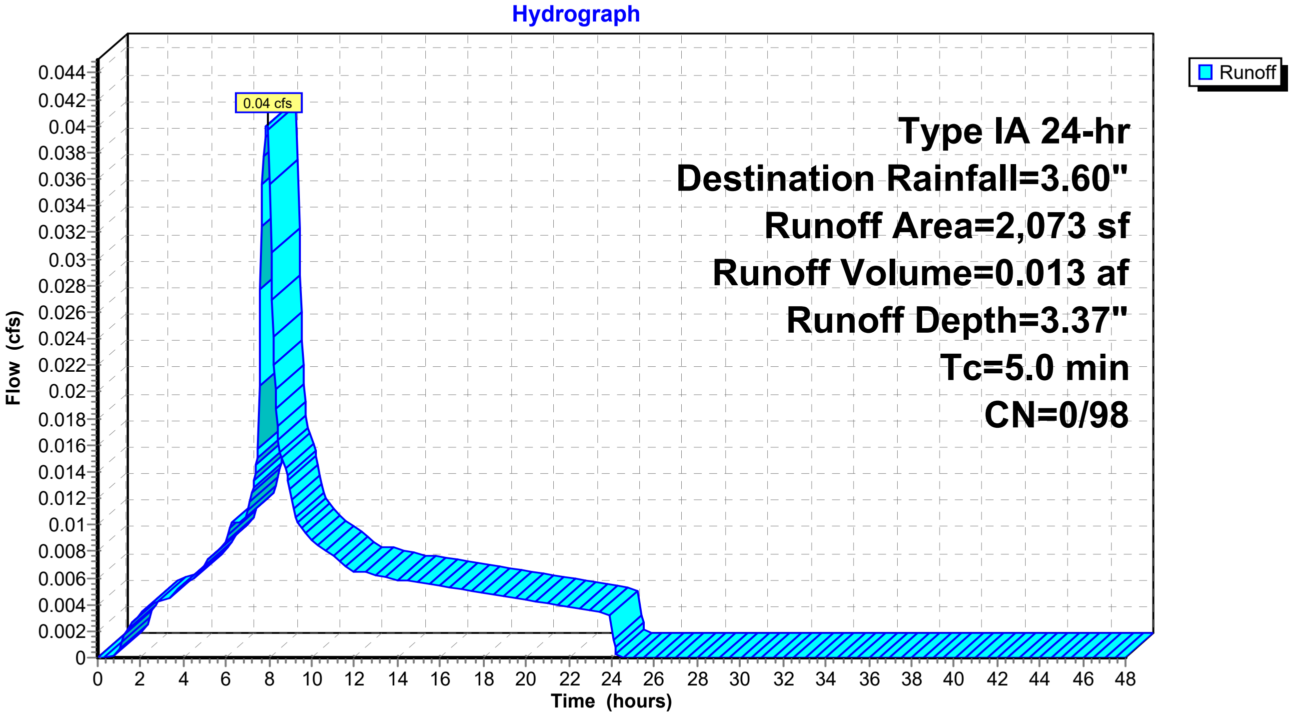
Runoff = 0.04 cfs @ 7.90 hrs, Volume= 0.013 af, Depth= 3.37"
Routed to Pond 49P : Pond #4

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Destination Rainfall=3.60"

Area (sf)	CN	Description
2,073	98	Unconnected roofs, HSG B
2,073	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 8S: Apt Building 1



Summary for Subcatchment 9S: Apt Building 2

[49] Hint: Tc<2dt may require smaller dt

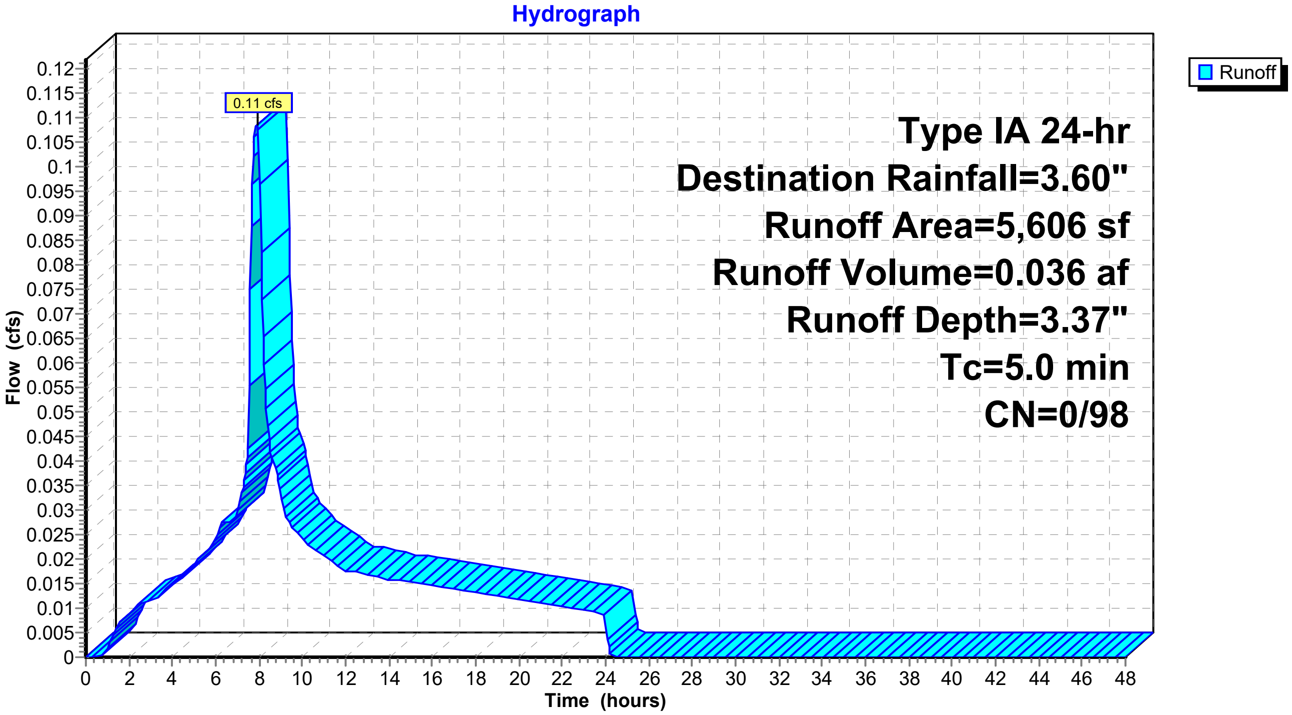
Runoff = 0.11 cfs @ 7.90 hrs, Volume= 0.036 af, Depth= 3.37"
Routed to Pond 49P : Pond #4

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Destination Rainfall=3.60"

Area (sf)	CN	Description
5,606	98	Unconnected roofs, HSG B
5,606	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 9S: Apt Building 2



Summary for Subcatchment 10S: Apt Building 3

[49] Hint: Tc<2dt may require smaller dt

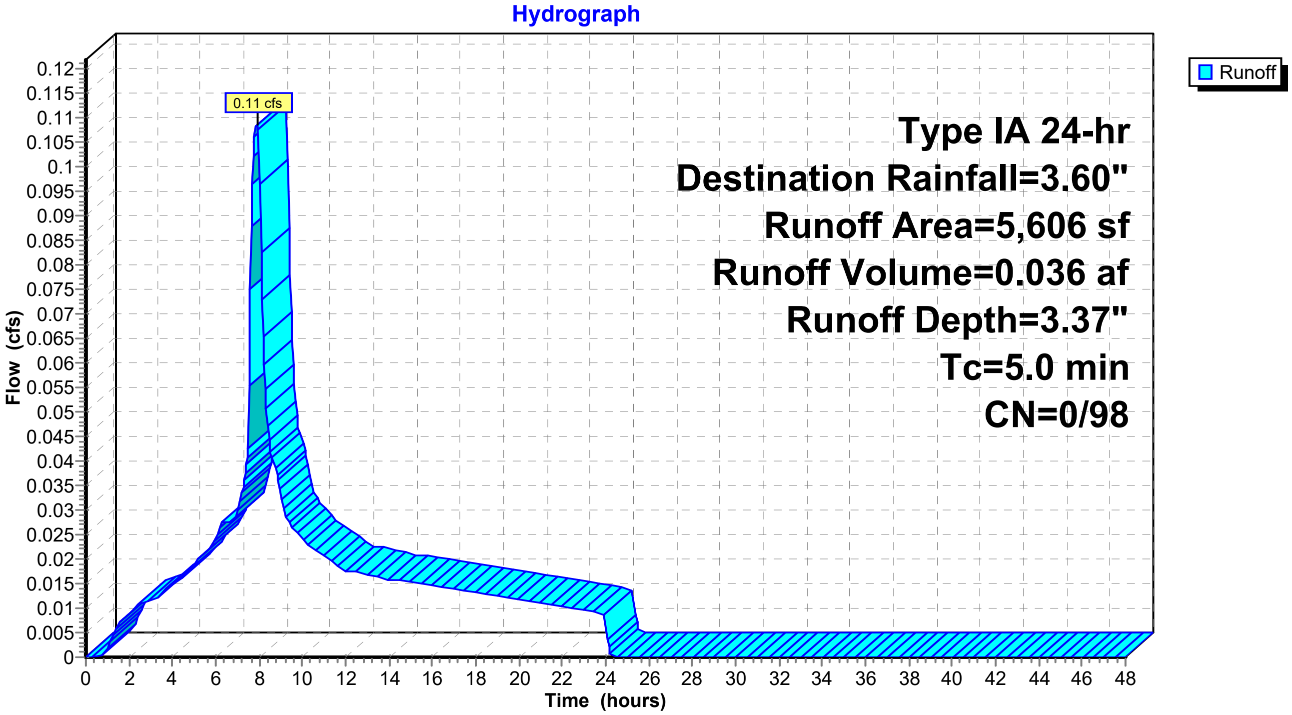
Runoff = 0.11 cfs @ 7.90 hrs, Volume= 0.036 af, Depth= 3.37"
Routed to Pond 49P : Pond #4

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Destination Rainfall=3.60"

Area (sf)	CN	Description
5,606	98	Unconnected roofs, HSG B
5,606	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 10S: Apt Building 3



Summary for Subcatchment 11S: Apt Building 4

[49] Hint: Tc<2dt may require smaller dt

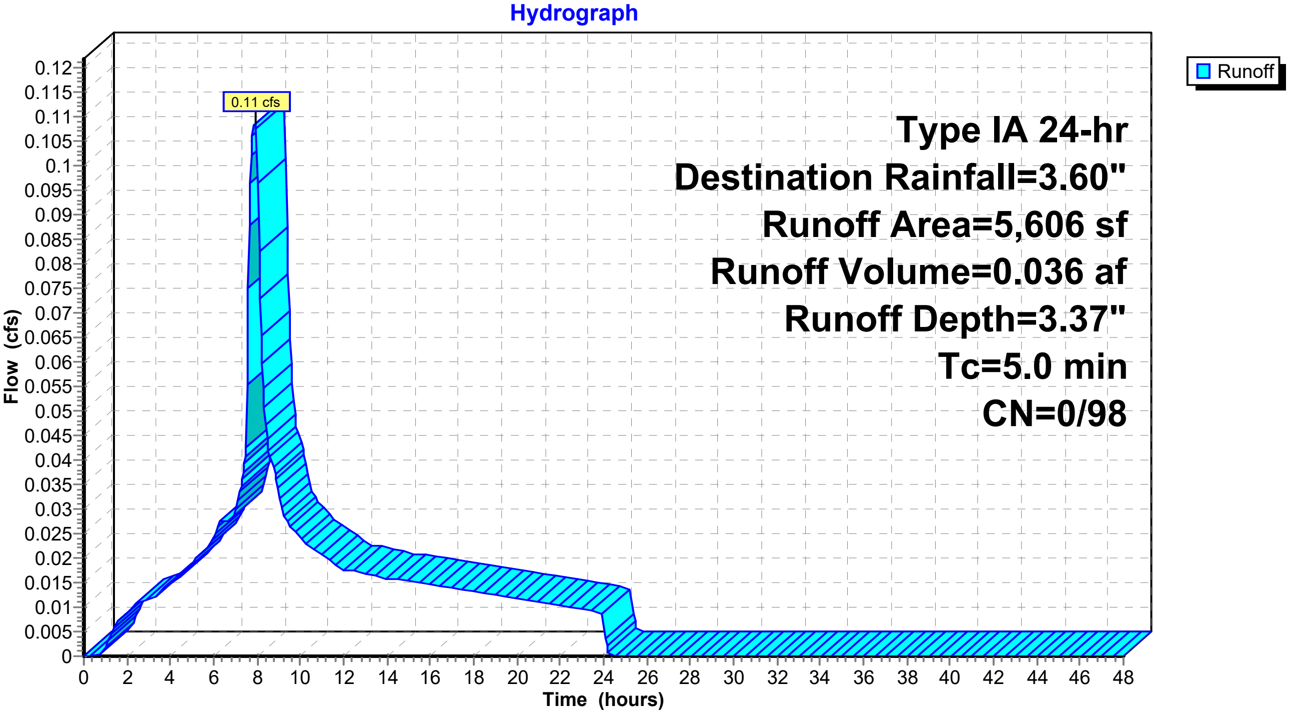
Runoff = 0.11 cfs @ 7.90 hrs, Volume= 0.036 af, Depth= 3.37"
Routed to Pond 46P : Pond #1

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Destination Rainfall=3.60"

Area (sf)	CN	Description
5,606	98	Unconnected roofs, HSG B
5,606	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 11S: Apt Building 4



Summary for Subcatchment 12S: Apt Building 5

[49] Hint: Tc<2dt may require smaller dt

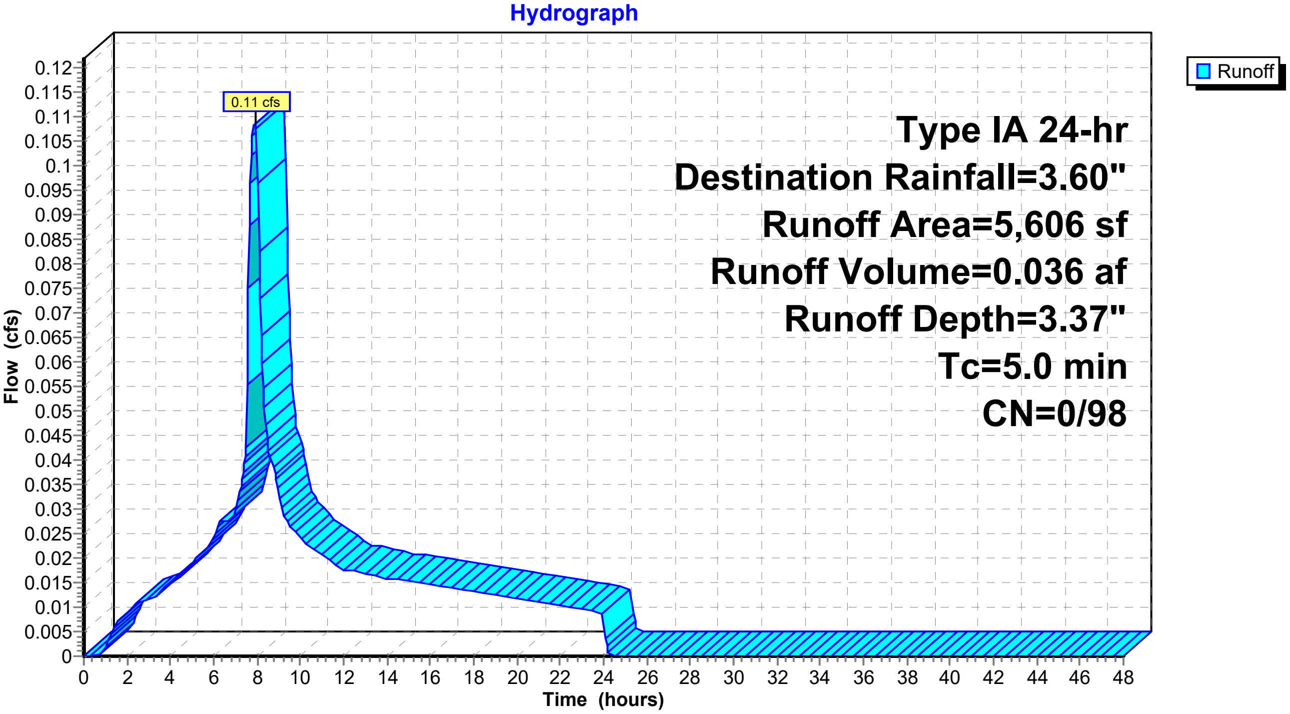
Runoff = 0.11 cfs @ 7.90 hrs, Volume= 0.036 af, Depth= 3.37"
Routed to Pond 46P : Pond #1

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Destination Rainfall=3.60"

Area (sf)	CN	Description
5,606	98	Unconnected roofs, HSG B
5,606	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 12S: Apt Building 5



Summary for Subcatchment 13S: Apt Building 6

[49] Hint: Tc<2dt may require smaller dt

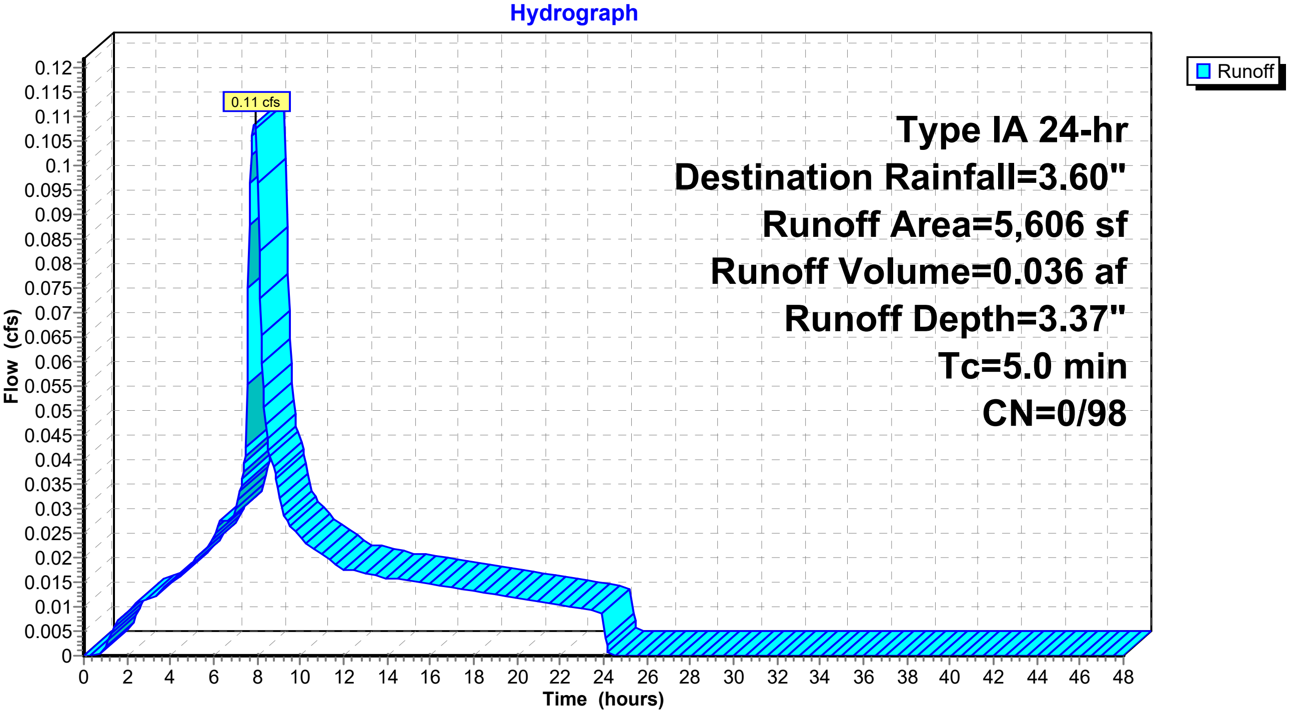
Runoff = 0.11 cfs @ 7.90 hrs, Volume= 0.036 af, Depth= 3.37"
Routed to Pond 46P : Pond #1

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Destination Rainfall=3.60"

Area (sf)	CN	Description
5,606	98	Unconnected roofs, HSG B
5,606	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 13S: Apt Building 6



Summary for Subcatchment 14S: Apt Building 7

[49] Hint: Tc<2dt may require smaller dt

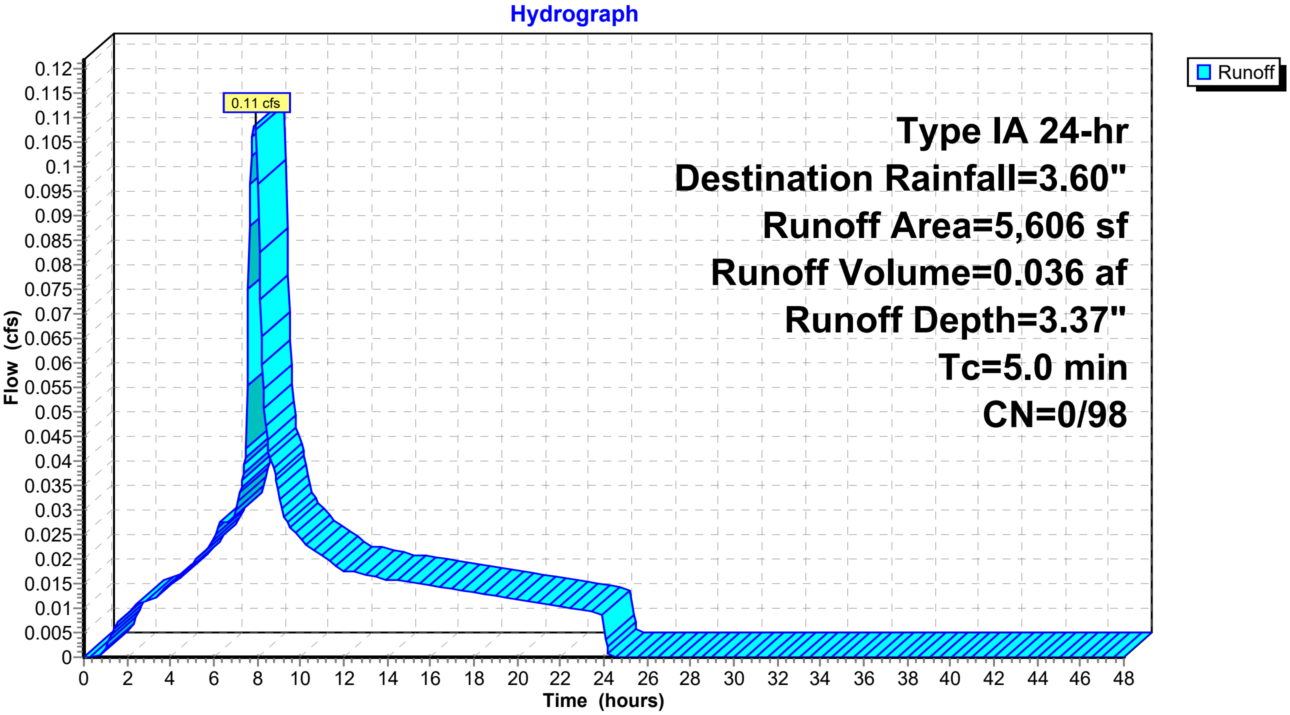
Runoff = 0.11 cfs @ 7.90 hrs, Volume= 0.036 af, Depth= 3.37"
Routed to Pond 47P : Pond #3

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Destination Rainfall=3.60"

Area (sf)	CN	Description
5,606	98	Unconnected roofs, HSG B
5,606	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 14S: Apt Building 7



Summary for Subcatchment 15S: Apt Building 8

[49] Hint: Tc<2dt may require smaller dt

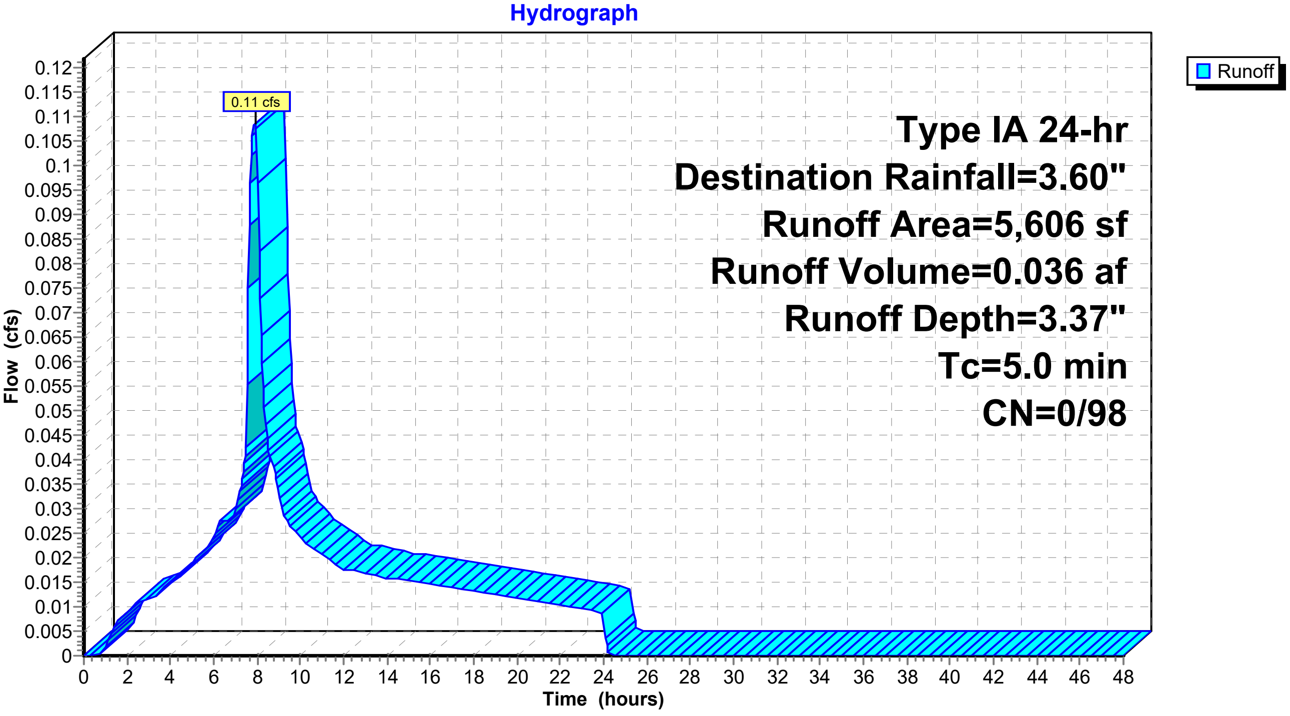
Runoff = 0.11 cfs @ 7.90 hrs, Volume= 0.036 af, Depth= 3.37"
Routed to Pond 47P : Pond #3

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Destination Rainfall=3.60"

Area (sf)	CN	Description
5,606	98	Unconnected roofs, HSG B
5,606	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 15S: Apt Building 8



Summary for Subcatchment 16S: Apt Building 9

[49] Hint: Tc<2dt may require smaller dt

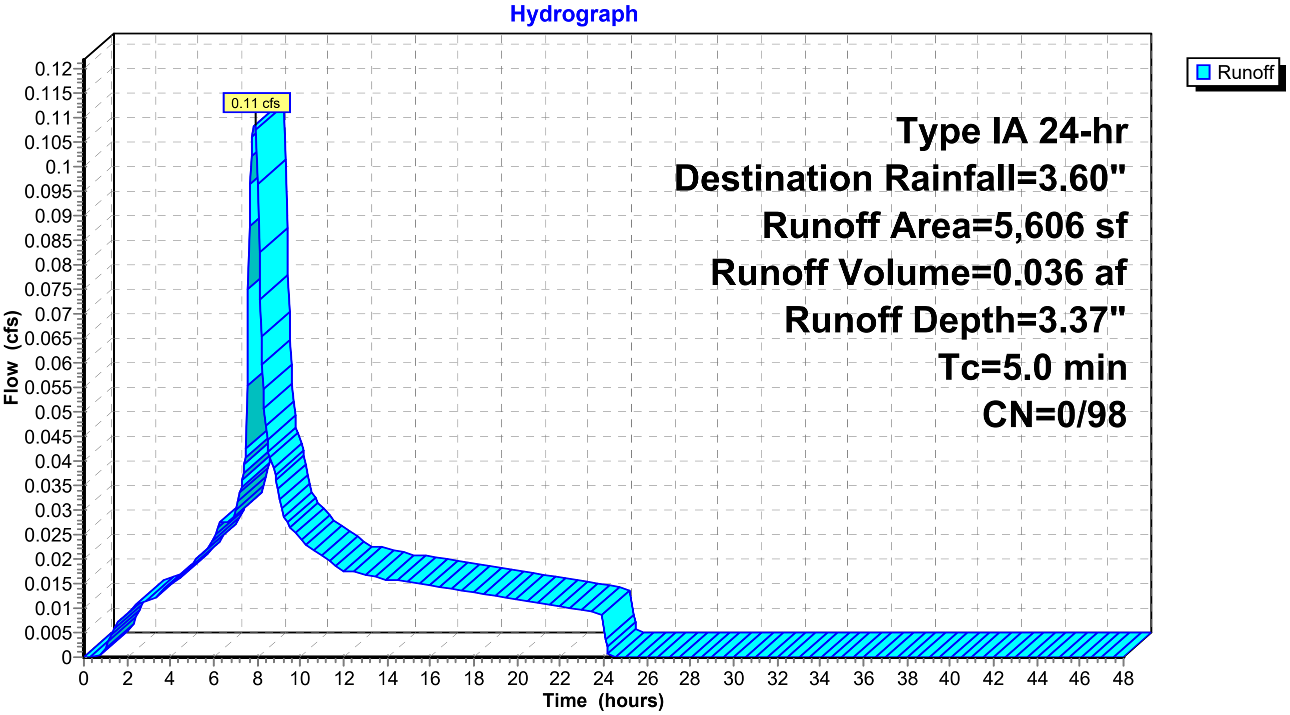
Runoff = 0.11 cfs @ 7.90 hrs, Volume= 0.036 af, Depth= 3.37"
Routed to Pond 46P : Pond #1

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Destination Rainfall=3.60"

Area (sf)	CN	Description
5,606	98	Unconnected roofs, HSG B
5,606	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 16S: Apt Building 9



Summary for Subcatchment 17S: Apt Building 10

[49] Hint: Tc<2dt may require smaller dt

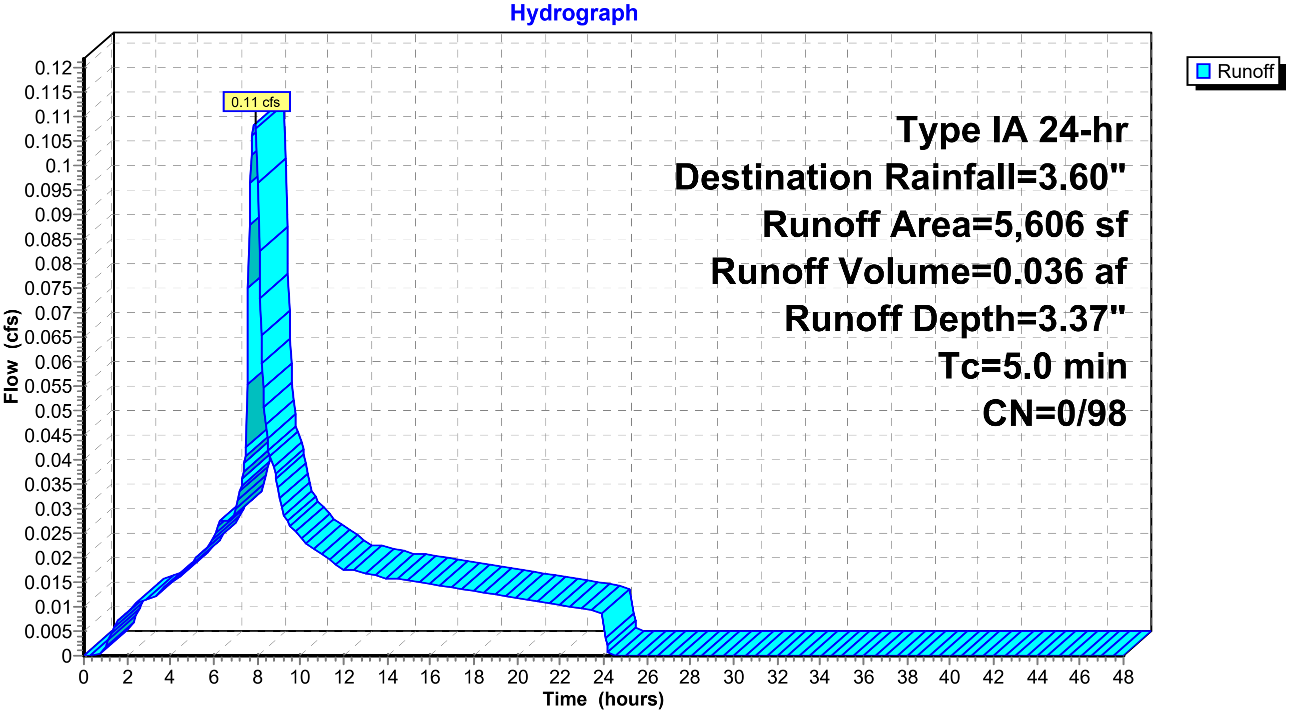
```
Runoff      =         0.11 cfs @     7.90 hrs,  Volume=            0.036 af,  Depth=  3.37"
    Routed to Pond 46P : Pond #1
```

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Destination Rainfall=3.60"

Area (sf)	CN	Description
5,606	98	Unconnected roofs, HSG B
5,606	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 17S: Apt Building 10



Summary for Subcatchment 18S: Apt Building 11

[49] Hint: Tc<2dt may require smaller dt

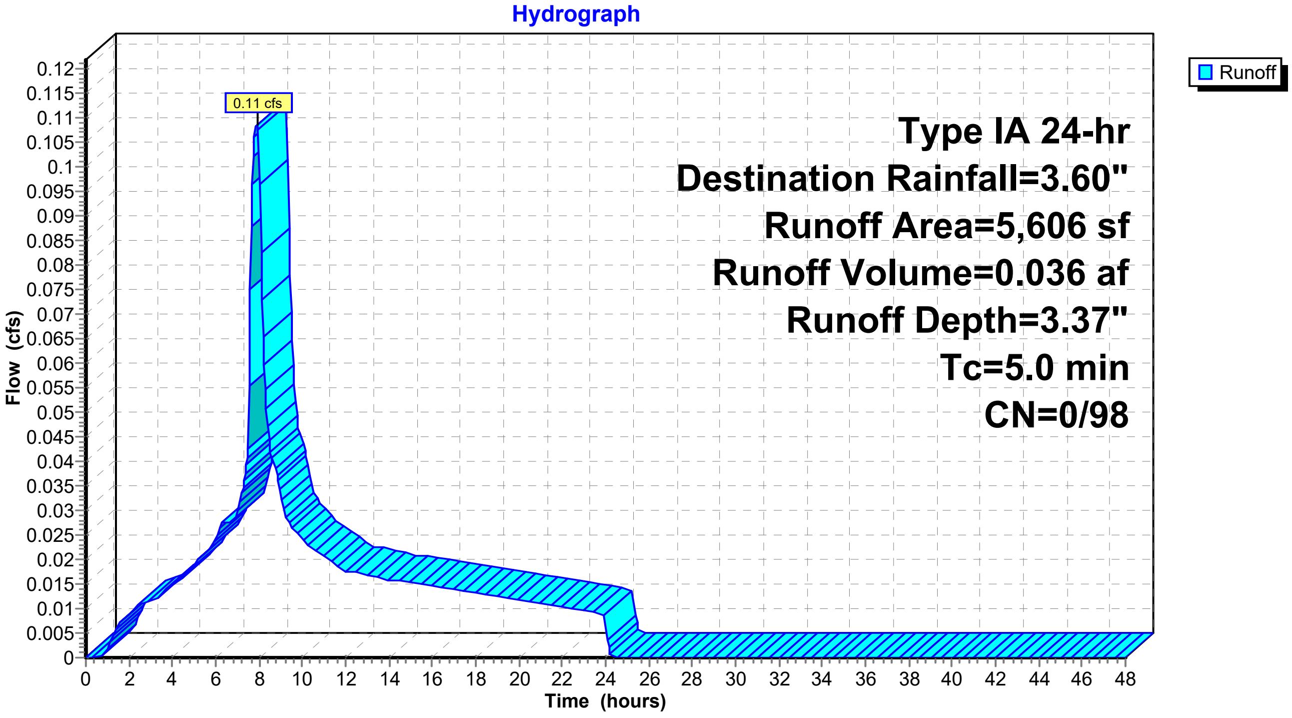
Runoff = 0.11 cfs @ 7.90 hrs, Volume= 0.036 af, Depth= 3.37"
Routed to Pond 46P : Pond #1

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Destination Rainfall=3.60"

Area (sf)	CN	Description
5,606	98	Unconnected roofs, HSG B
5,606	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 18S: Apt Building 11



Summary for Subcatchment 19S: Apt Building 12

[49] Hint: Tc<2dt may require smaller dt

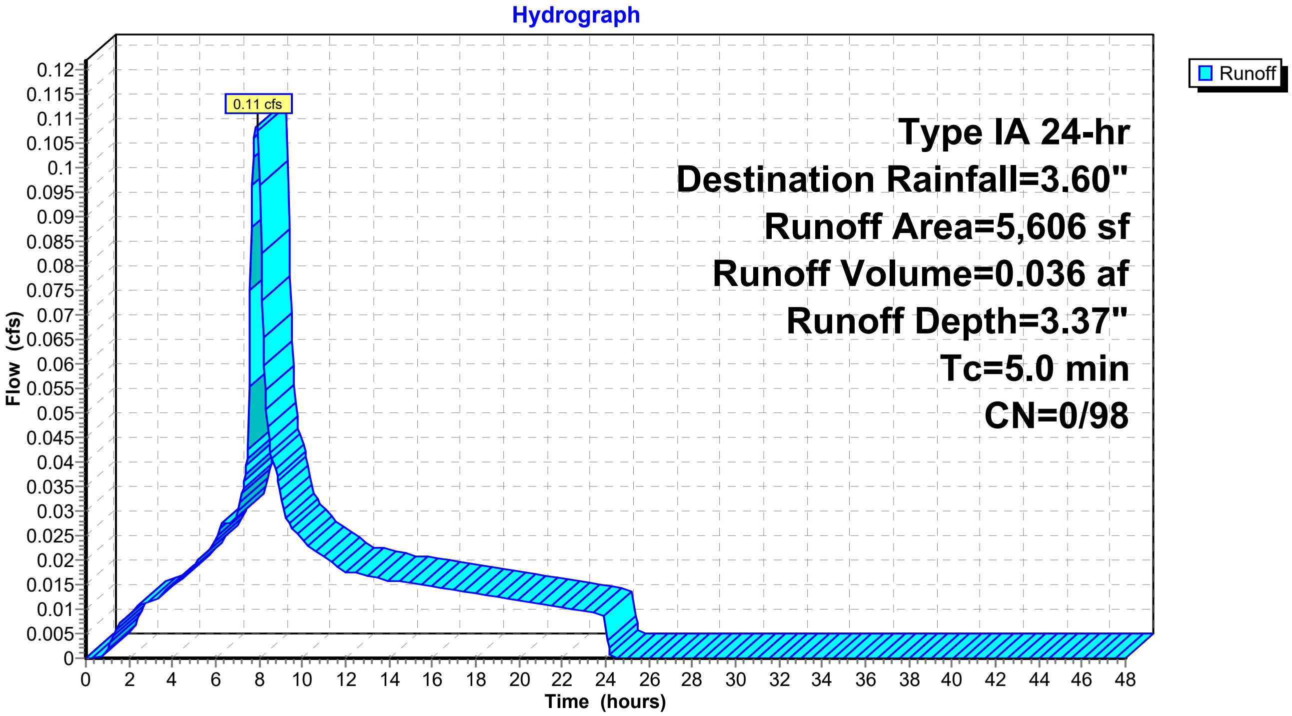
Runoff = 0.11 cfs @ 7.90 hrs, Volume= 0.036 af, Depth= 3.37"
Routed to Pond 46P : Pond #1

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Destination Rainfall=3.60"

Area (sf)	CN	Description
5,606	98	Unconnected roofs, HSG B
5,606	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 19S: Apt Building 12



Summary for Subcatchment 20S: Apt Building 13

[49] Hint: Tc<2dt may require smaller dt

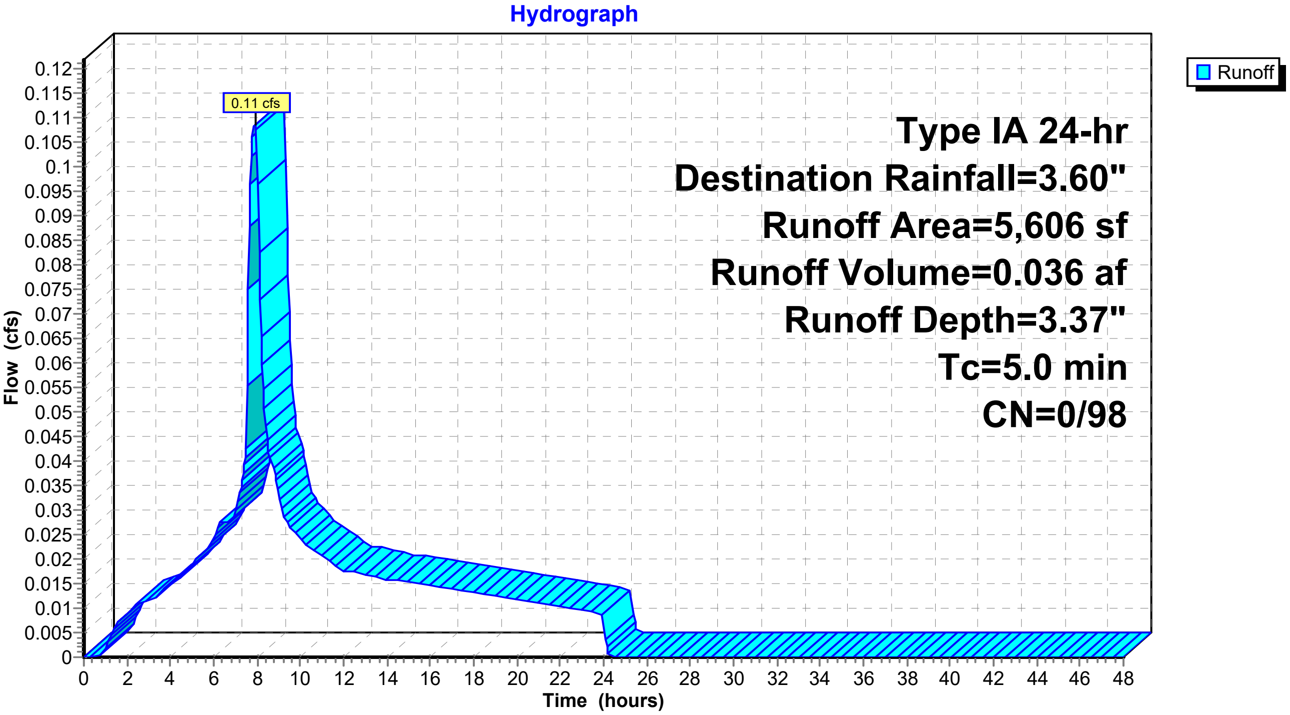
Runoff = 0.11 cfs @ 7.90 hrs, Volume= 0.036 af, Depth= 3.37"
Routed to Pond 46P : Pond #1

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Destination Rainfall=3.60"

Area (sf)	CN	Description
5,606	98	Unconnected roofs, HSG B
5,606	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 20S: Apt Building 13



Summary for Subcatchment 21S: Apt Building 14

[49] Hint: Tc<2dt may require smaller dt

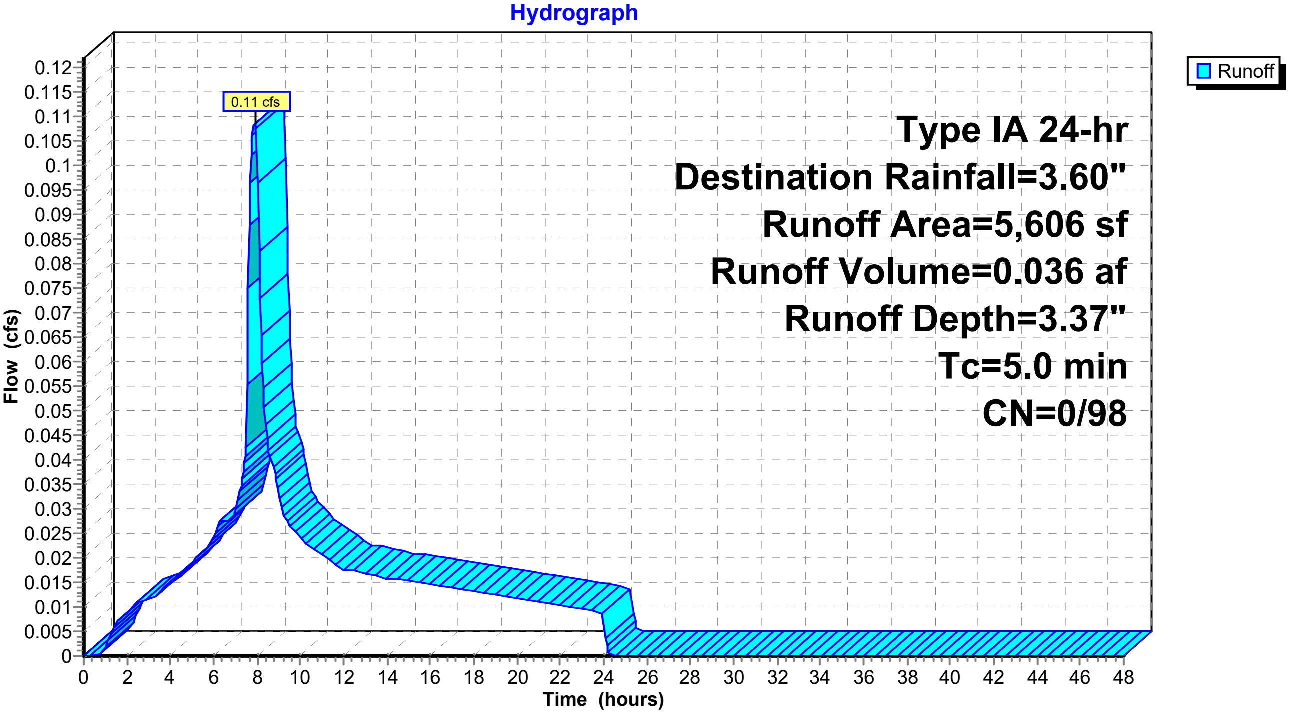
Runoff = 0.11 cfs @ 7.90 hrs, Volume= 0.036 af, Depth= 3.37"
Routed to Pond 48P : Pond #2

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Destination Rainfall=3.60"

Area (sf)	CN	Description
5,606	98	Unconnected roofs, HSG B
5,606	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 21S: Apt Building 14



Summary for Subcatchment 22S: Apt Building 15

[49] Hint: Tc<2dt may require smaller dt

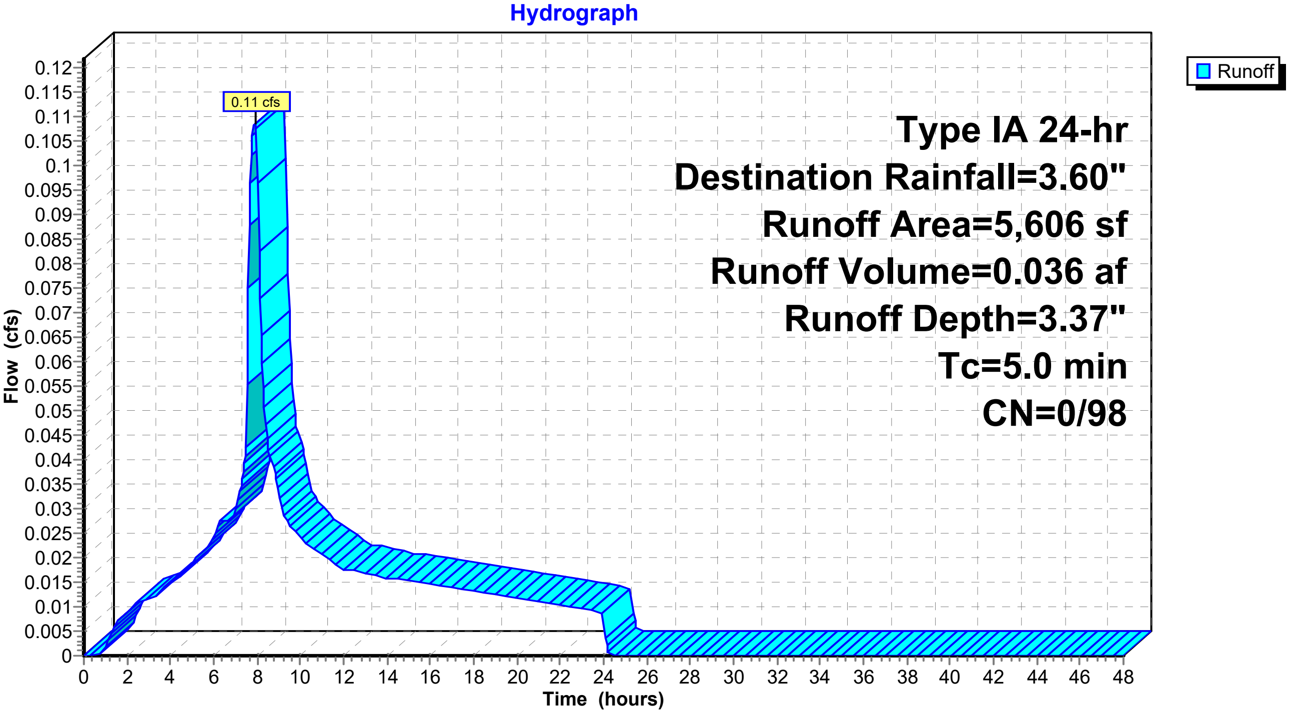
Runoff = 0.11 cfs @ 7.90 hrs, Volume= 0.036 af, Depth= 3.37"
Routed to Pond 48P : Pond #2

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Destination Rainfall=3.60"

Area (sf)	CN	Description
5,606	98	Unconnected roofs, HSG B
5,606	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 22S: Apt Building 15



Summary for Subcatchment 23S: Apt Building 16

[49] Hint: Tc<2dt may require smaller dt

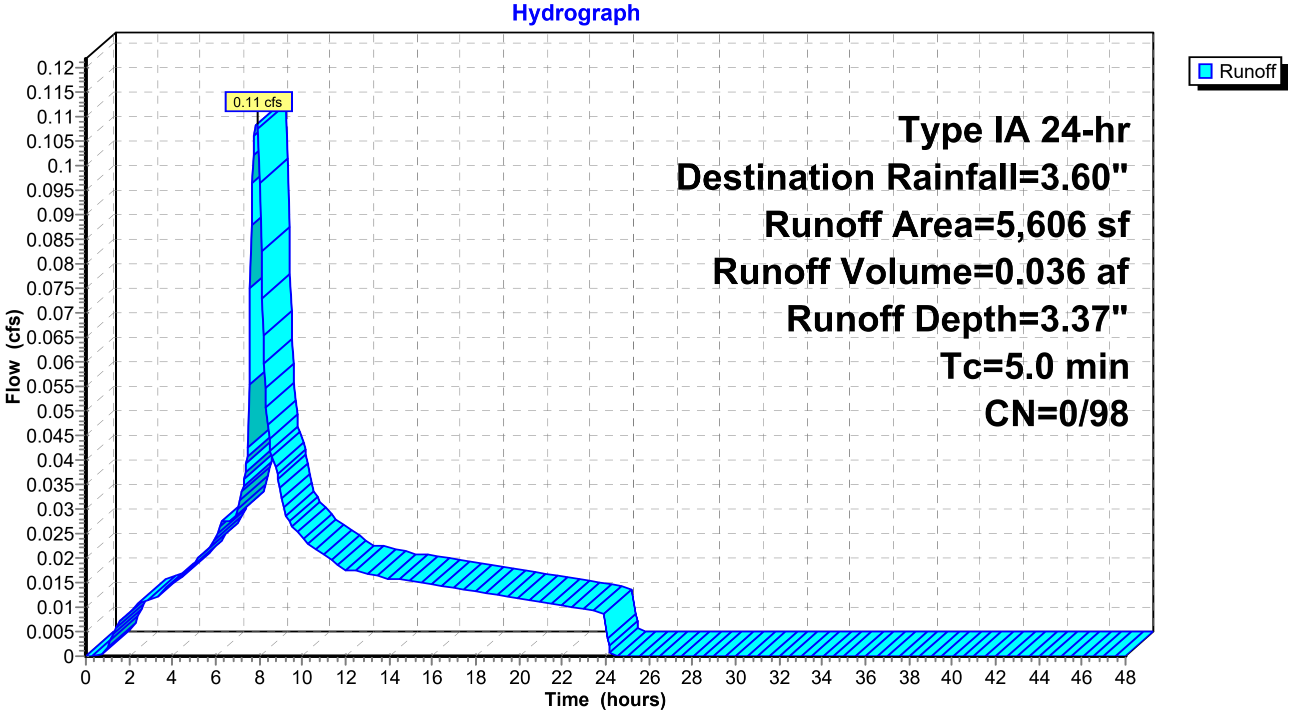
Runoff = 0.11 cfs @ 7.90 hrs, Volume= 0.036 af, Depth= 3.37"
Routed to Pond 48P : Pond #2

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Destination Rainfall=3.60"

Area (sf)	CN	Description
5,606	98	Unconnected roofs, HSG B
5,606	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 23S: Apt Building 16



Summary for Subcatchment 26S: P1

Includes area from common drive aisle that serves Village Green Hotel.

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[49] Hint: Tc<2dt may require smaller dt

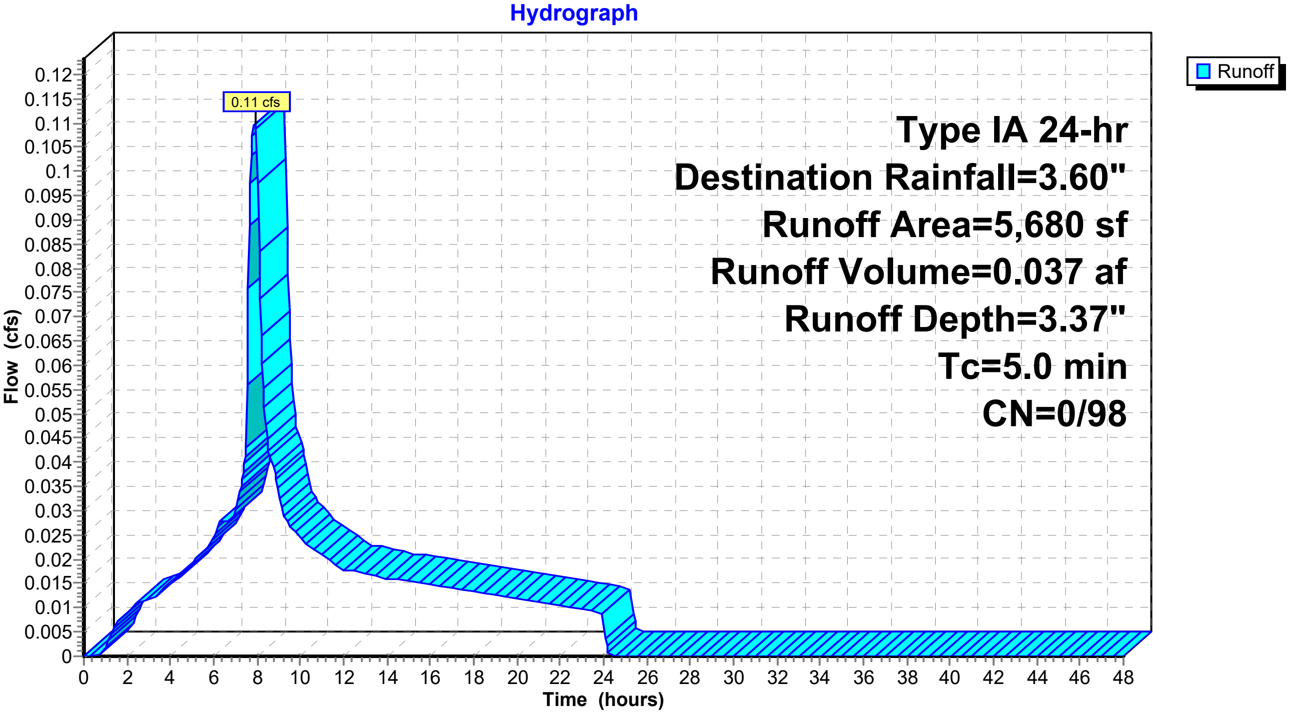
Runoff = 0.11 cfs @ 7.90 hrs, Volume= 0.037 af, Depth= 3.37"
Routed to Reach 50R : Discharge

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Destination Rainfall=3.60"

	Area (sf)	CN	Description
*	5,680	98	Impervious Surface
	5,680	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 26S: P1



Summary for Subcatchment 27S: P2

Includes drive aisle that serves Village Green Hotel.

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[49] Hint: Tc<2dt may require smaller dt

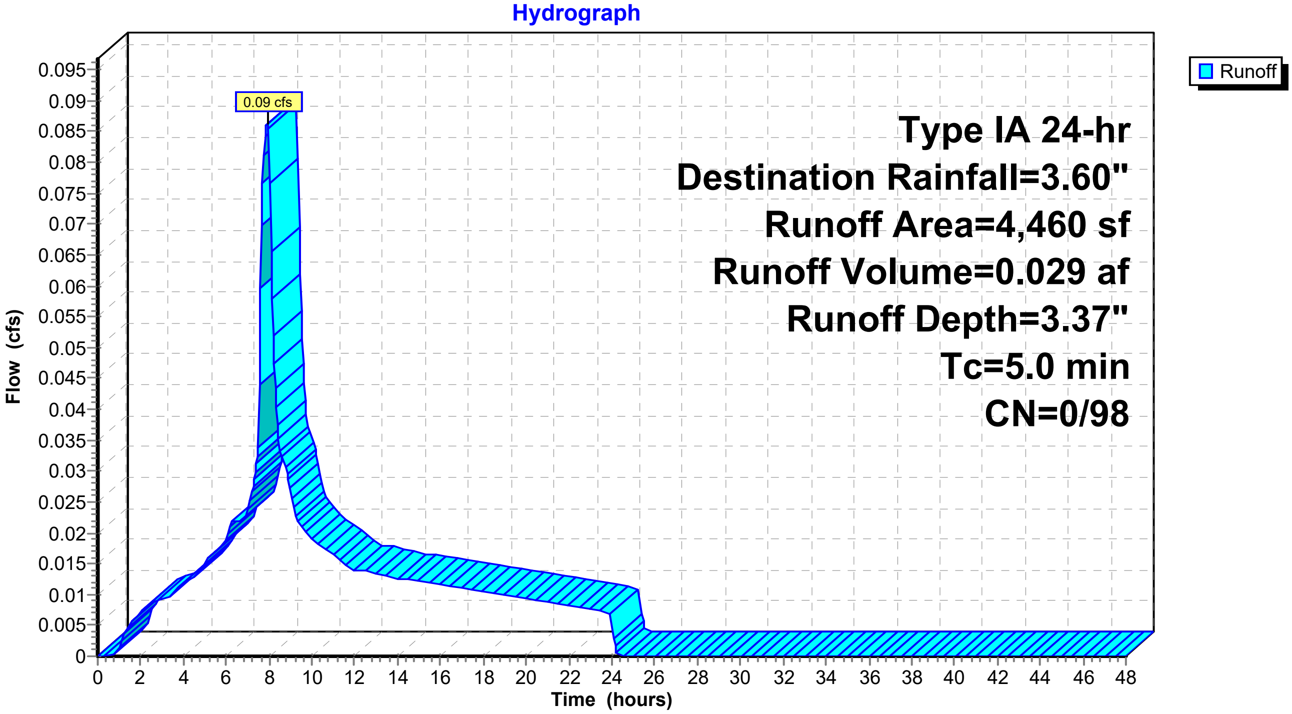
Runoff = 0.09 cfs @ 7.90 hrs, Volume= 0.029 af, Depth= 3.37"
Routed to Reach 50R : Discharge

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Destination Rainfall=3.60"

	Area (sf)	CN	Description
*	4,460	98	Impervious Surface
	4,460	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 27S: P2



Summary for Subcatchment 28S: P3

[49] Hint: Tc<2dt may require smaller dt

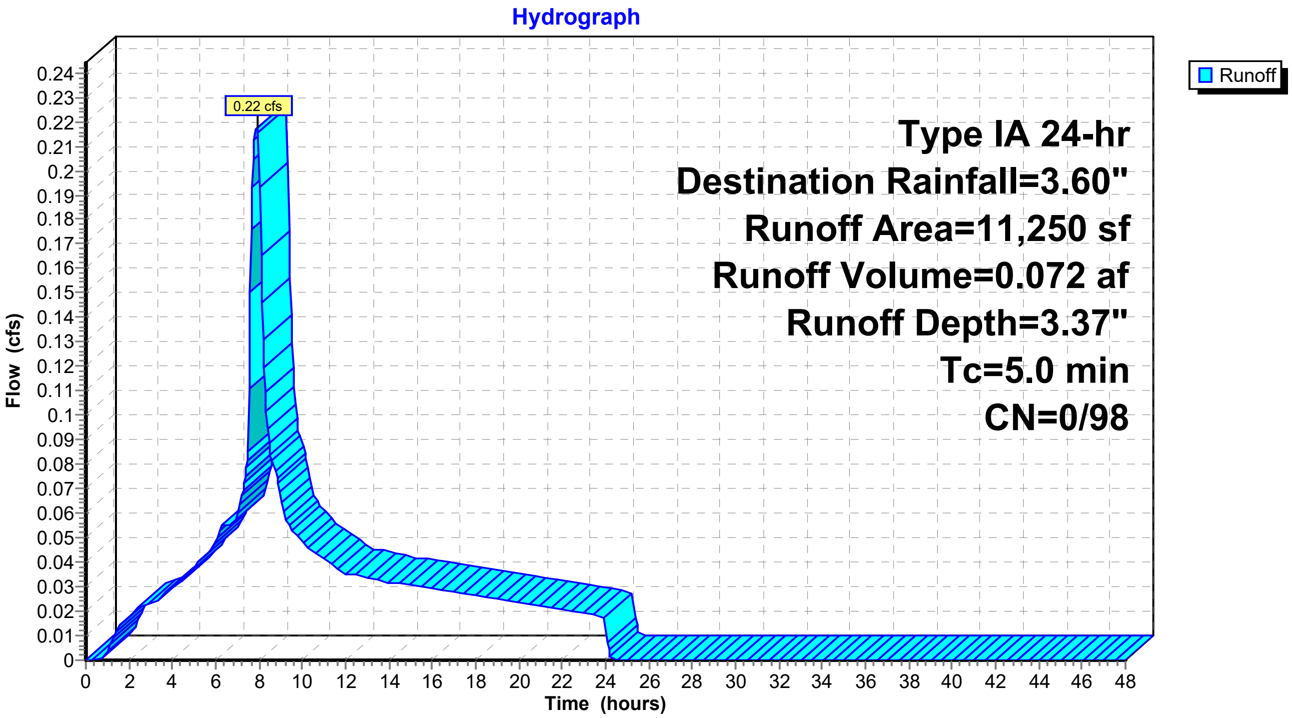
Runoff = 0.22 cfs @ 7.90 hrs, Volume= 0.072 af, Depth= 3.37"
Routed to Pond 48P : Pond #2

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Destination Rainfall=3.60"

	Area (sf)	CN	Description
*	11,250	98	Impervious Surface
	11,250	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 28S: P3



Summary for Subcatchment 29S: P4

[49] Hint: Tc<2dt may require smaller dt

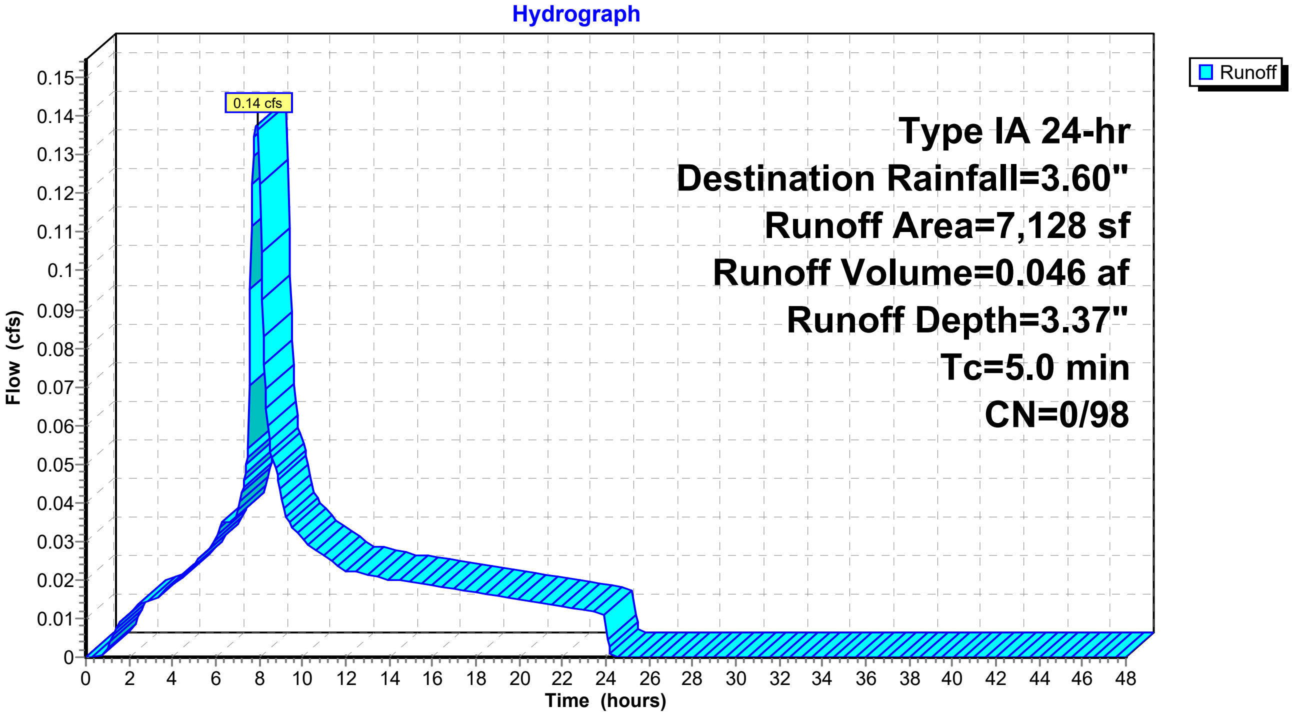
Runoff = 0.14 cfs @ 7.90 hrs, Volume= 0.046 af, Depth= 3.37"
Routed to Pond 48P : Pond #2

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Destination Rainfall=3.60"

	Area (sf)	CN	Description
*	7,128	98	Impervious Surface
	7,128	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 29S: P4



Summary for Subcatchment 30S: P5

[49] Hint: Tc<2dt may require smaller dt

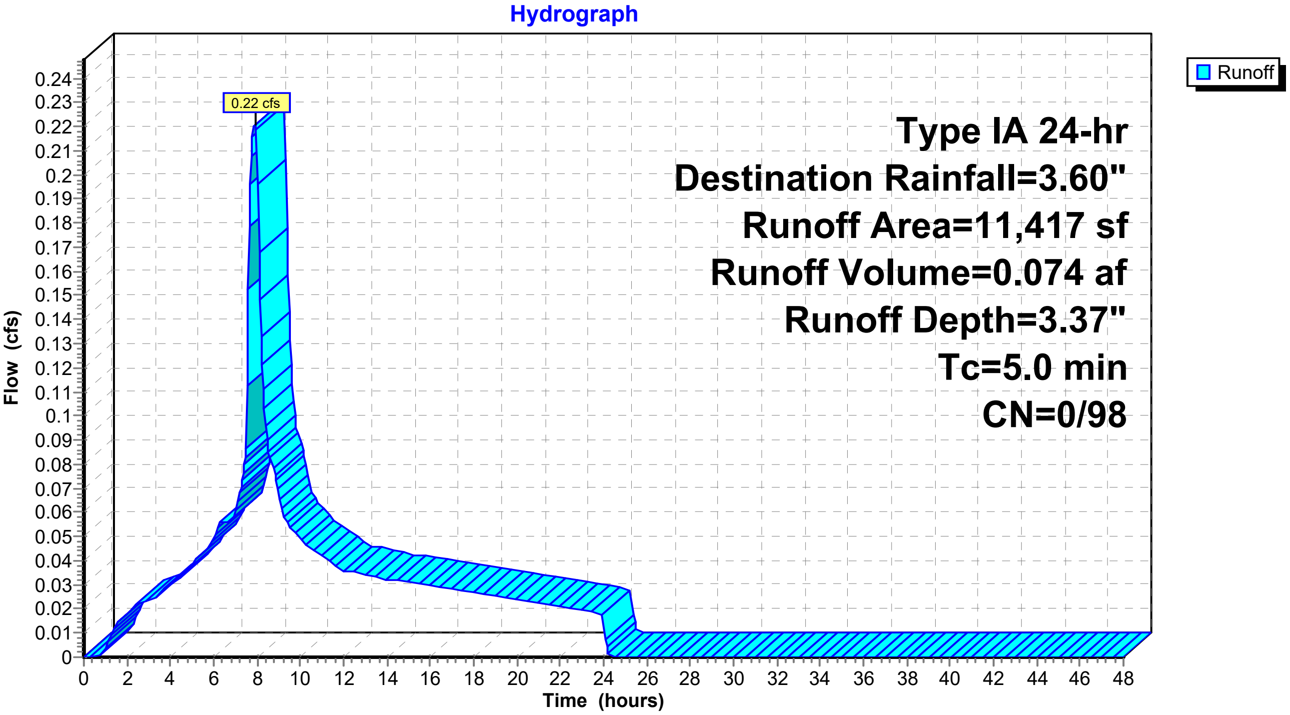
Runoff = 0.22 cfs @ 7.90 hrs, Volume= 0.074 af, Depth= 3.37"
Routed to Pond 48P : Pond #2

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Destination Rainfall=3.60"

	Area (sf)	CN	Description
*	11,417	98	Impervious Surface
	11,417	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 30S: P5



Summary for Subcatchment 31S: P6

[49] Hint: Tc<2dt may require smaller dt

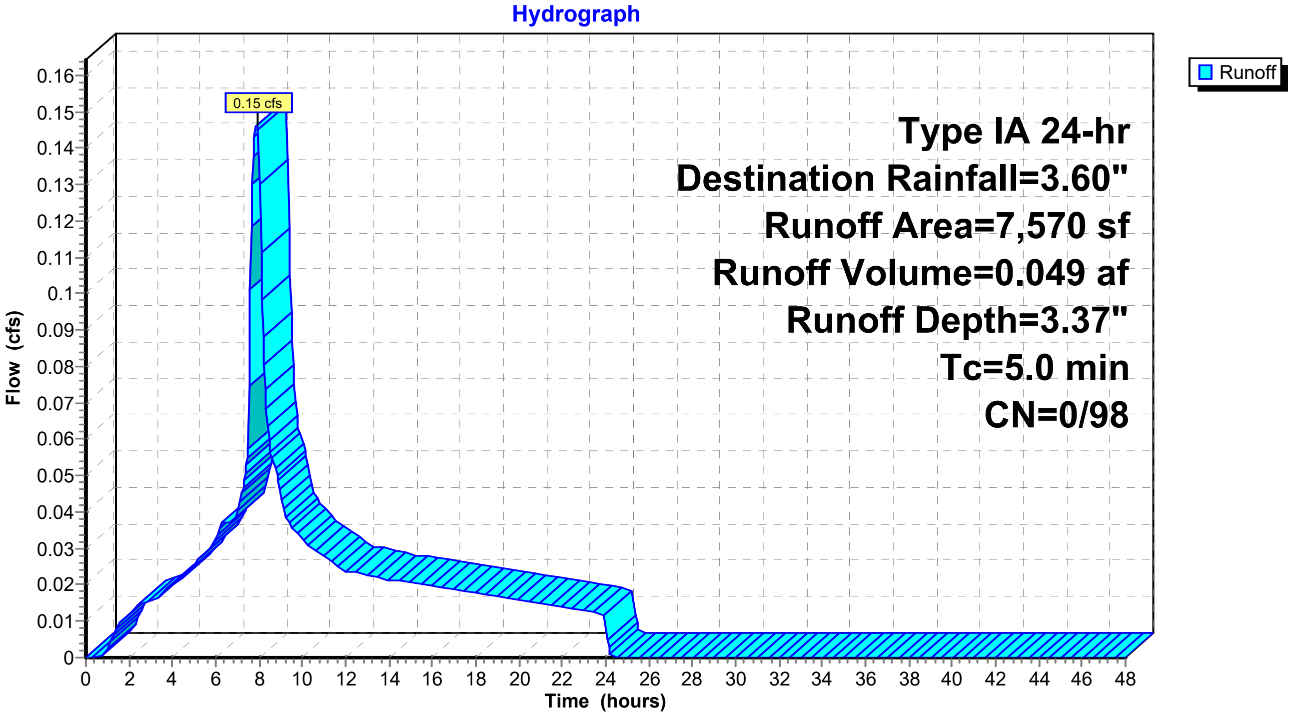
Runoff = 0.15 cfs @ 7.90 hrs, Volume= 0.049 af, Depth= 3.37"
Routed to Pond 46P : Pond #1

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Destination Rainfall=3.60"

	Area (sf)	CN	Description
*	7,570	98	Impervious Surface
	7,570	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 31S: P6



Summary for Subcatchment 32S: P7

[49] Hint: Tc<2dt may require smaller dt

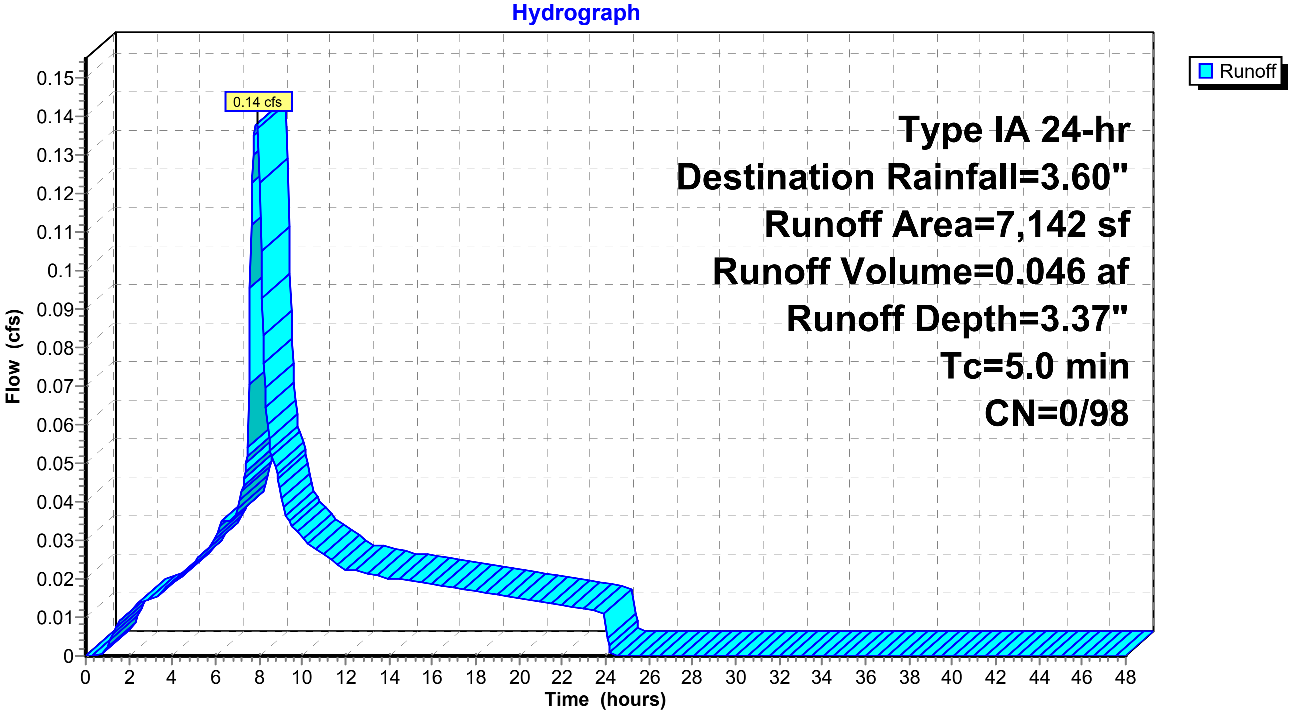
```
Runoff      =      0.14 cfs @    7.90 hrs,  Volume=         0.046 af,  Depth=  3.37"
    Routed to Pond 46P : Pond #1
```

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Destination Rainfall=3.60"

	Area (sf)	CN	Description
*	7,142	98	Impervious Surface
	7,142	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 32S: P7



Summary for Subcatchment 33S: P8

[49] Hint: Tc<2dt may require smaller dt

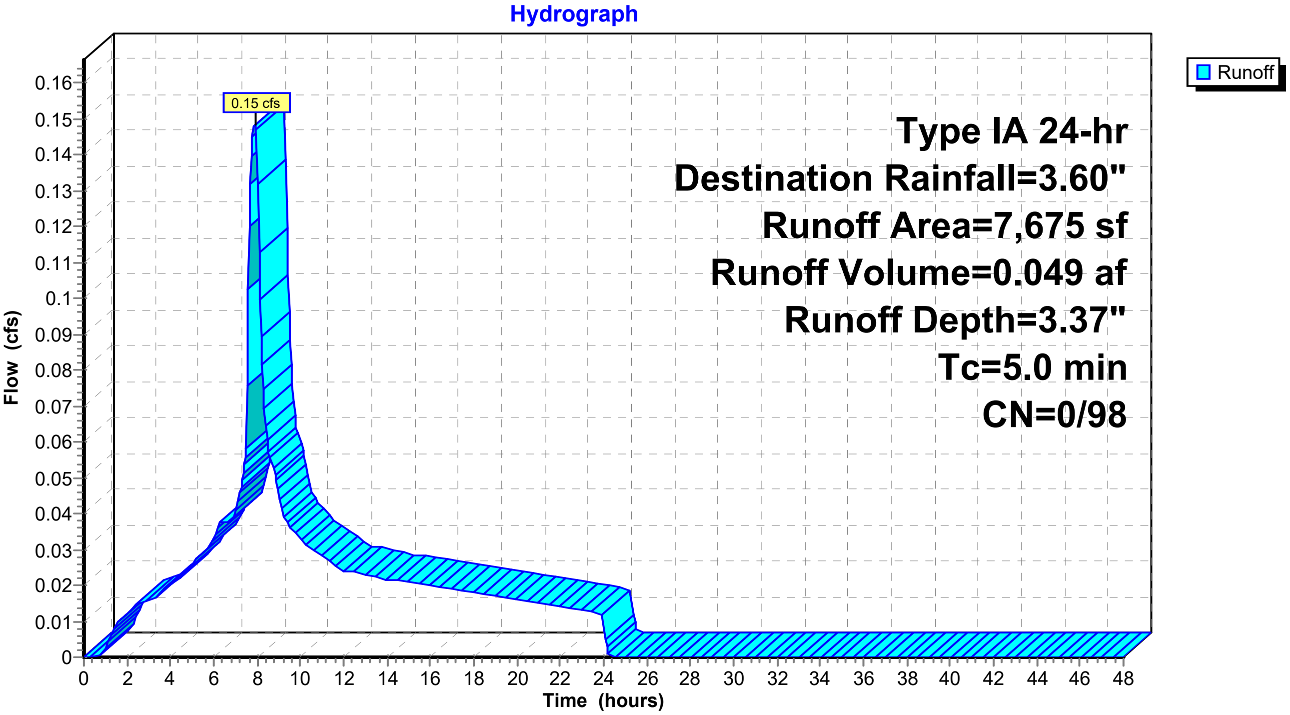
Runoff = 0.15 cfs @ 7.90 hrs, Volume= 0.049 af, Depth= 3.37"
Routed to Pond 46P : Pond #1

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Destination Rainfall=3.60"

	Area (sf)	CN	Description
*	7,675	98	Impervious Surface
	7,675	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 33S: P8



Summary for Subcatchment 34S: P9

[49] Hint: Tc<2dt may require smaller dt

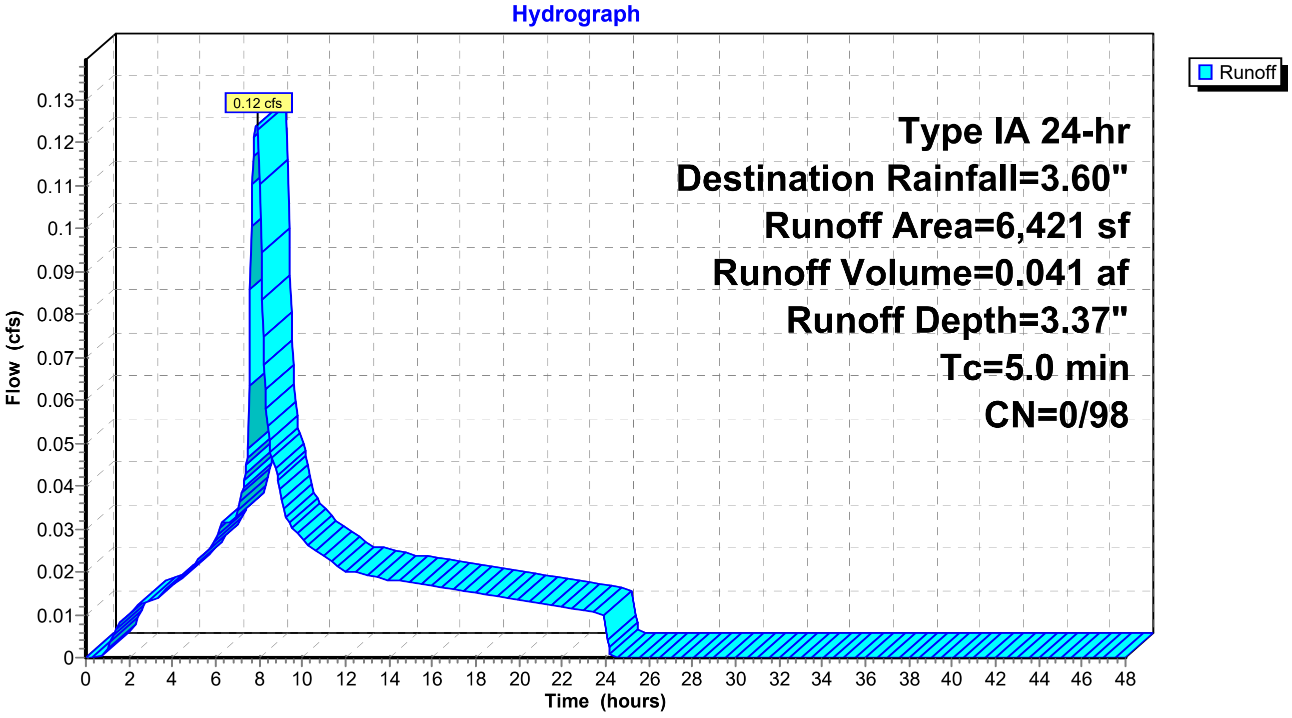
Runoff = 0.12 cfs @ 7.90 hrs, Volume= 0.041 af, Depth= 3.37"
Routed to Pond 46P : Pond #1

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Destination Rainfall=3.60"

	Area (sf)	CN	Description
*	6,421	98	Impervious Surface
	6,421	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 34S: P9



Summary for Subcatchment 35S: P10

[49] Hint: Tc<2dt may require smaller dt

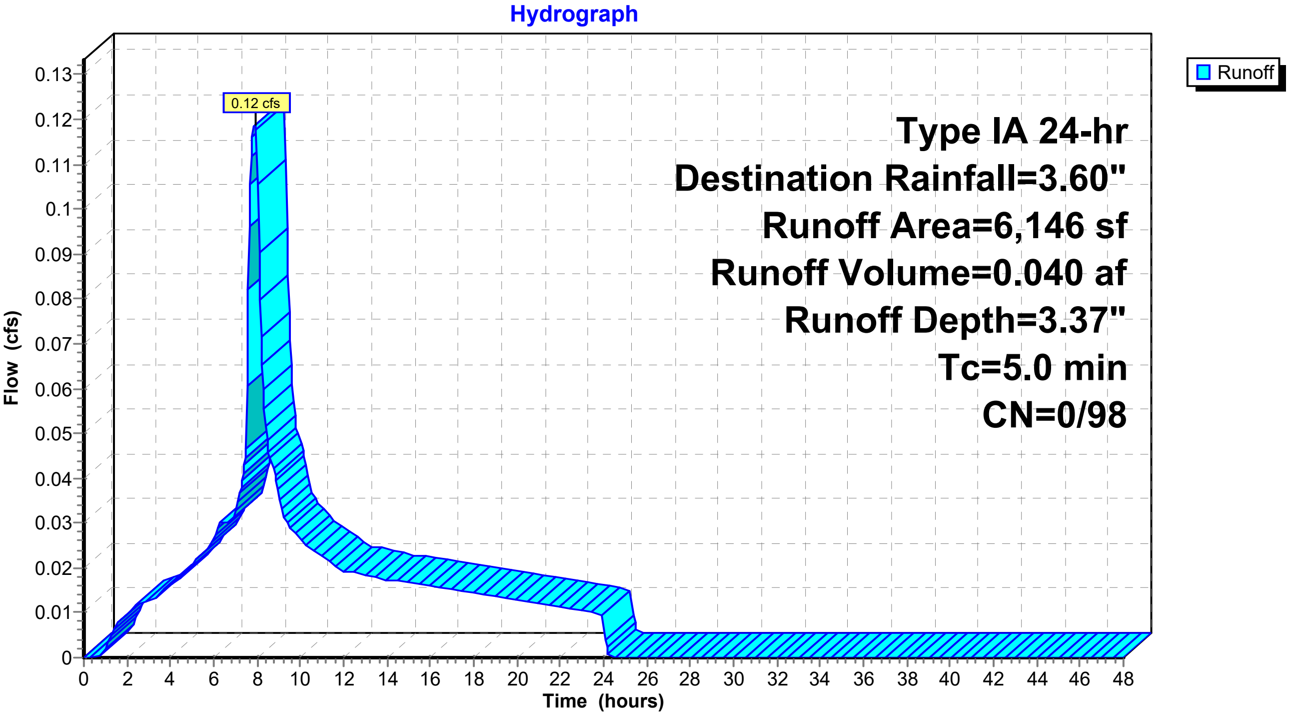
Runoff = 0.12 cfs @ 7.90 hrs, Volume= 0.040 af, Depth= 3.37"
Routed to Pond 46P : Pond #1

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Destination Rainfall=3.60"

	Area (sf)	CN	Description
*	6,146	98	Impervious Surface
	6,146	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 35S: P10



Summary for Subcatchment 36S: P11

[49] Hint: Tc<2dt may require smaller dt

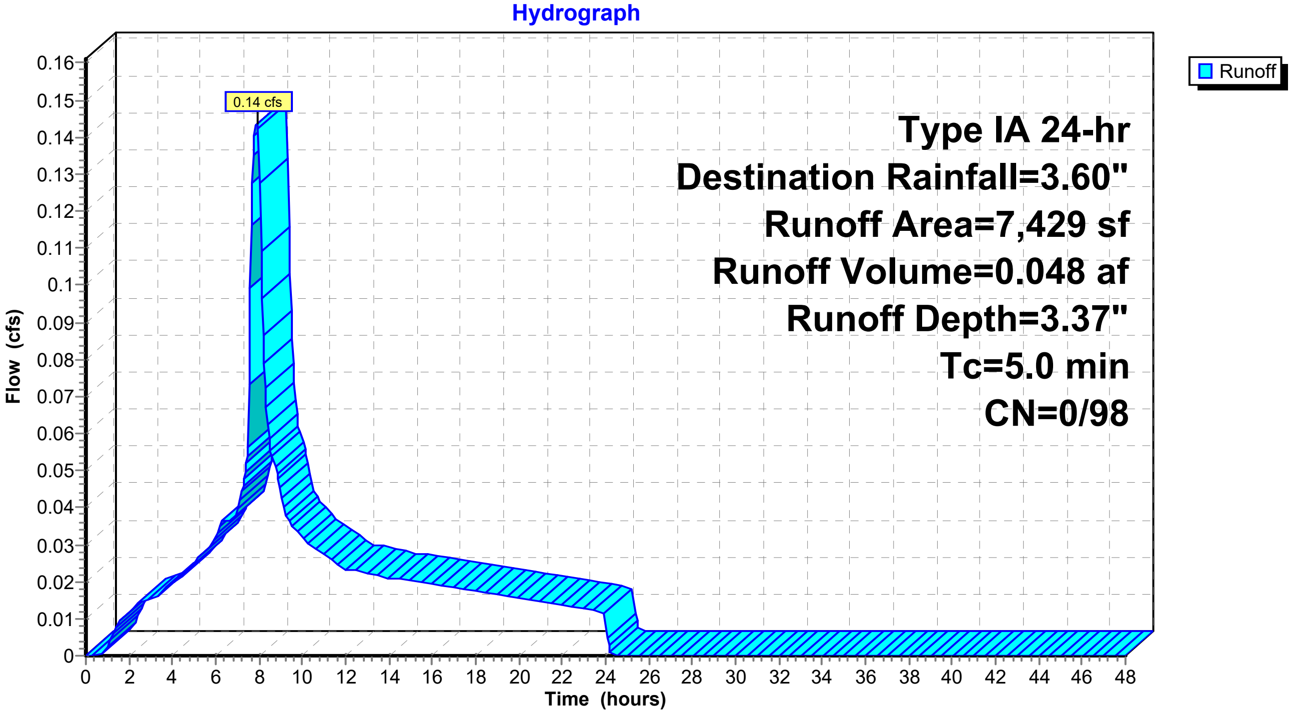
Runoff = 0.14 cfs @ 7.90 hrs, Volume= 0.048 af, Depth= 3.37"
Routed to Pond 46P : Pond #1

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Destination Rainfall=3.60"

	Area (sf)	CN	Description
*	7,429	98	Impervious Surface
	7,429	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 36S: P11



Summary for Subcatchment 37S: P12

[49] Hint: Tc<2dt may require smaller dt

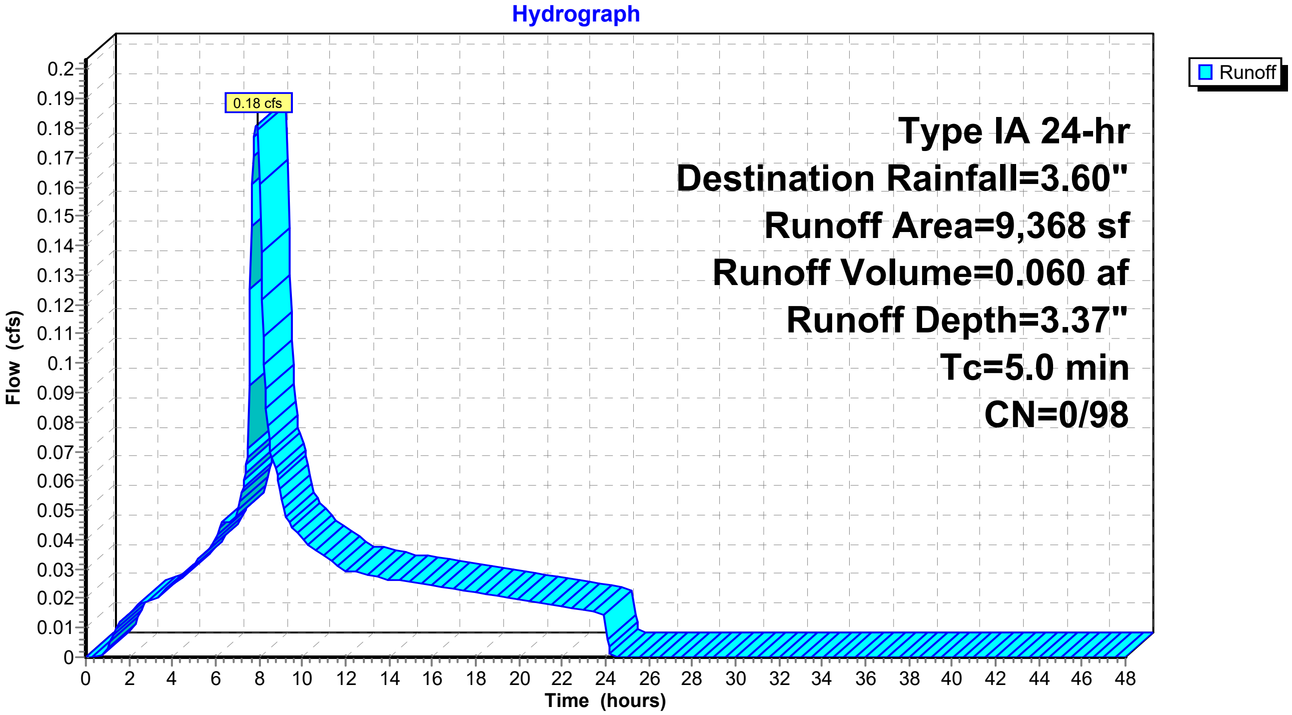
Runoff = 0.18 cfs @ 7.90 hrs, Volume= 0.060 af, Depth= 3.37"
Routed to Pond 47P : Pond #3

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Destination Rainfall=3.60"

	Area (sf)	CN	Description
*	9,368	98	Impervious Surface
	9,368	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 37S: P12



Summary for Subcatchment 38S: P13

[49] Hint: Tc<2dt may require smaller dt

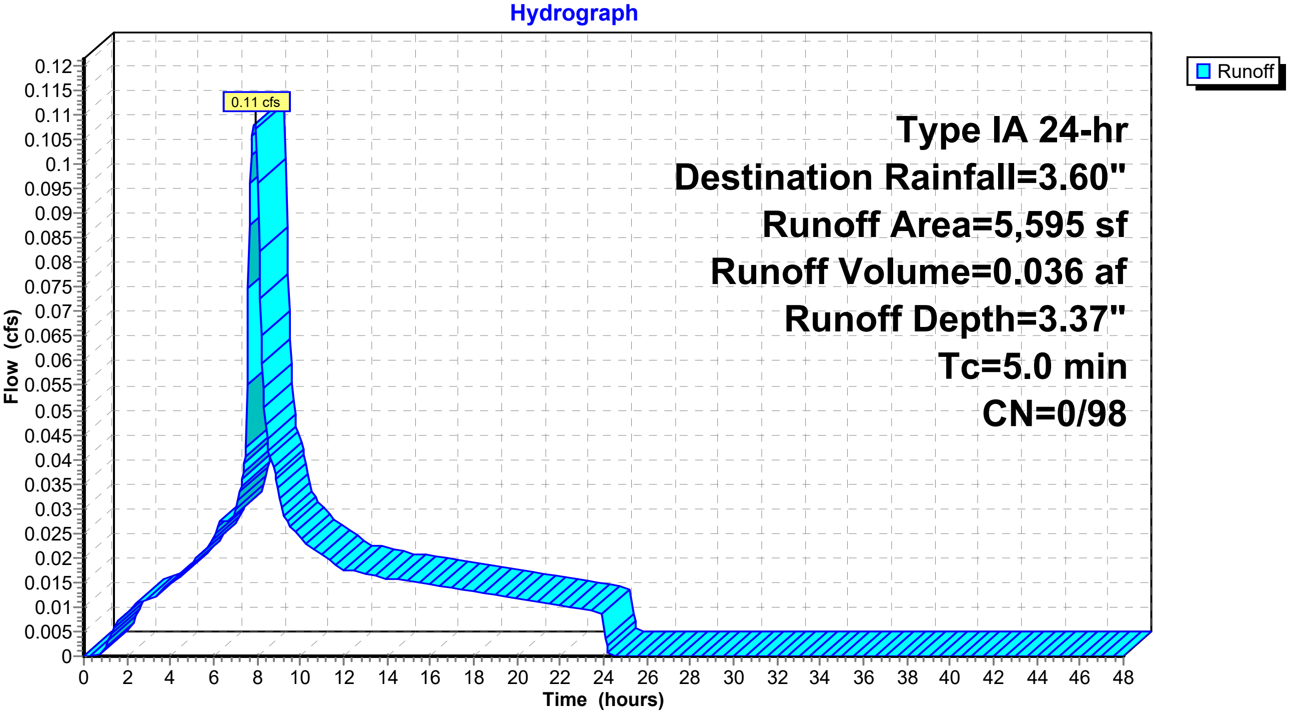
Runoff = 0.11 cfs @ 7.90 hrs, Volume= 0.036 af, Depth= 3.37"
Routed to Pond 47P : Pond #3

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Destination Rainfall=3.60"

	Area (sf)	CN	Description
*	5,595	98	Impervious Surface
	5,595	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 38S: P13



Summary for Subcatchment 39S: P14

[49] Hint: Tc<2dt may require smaller dt

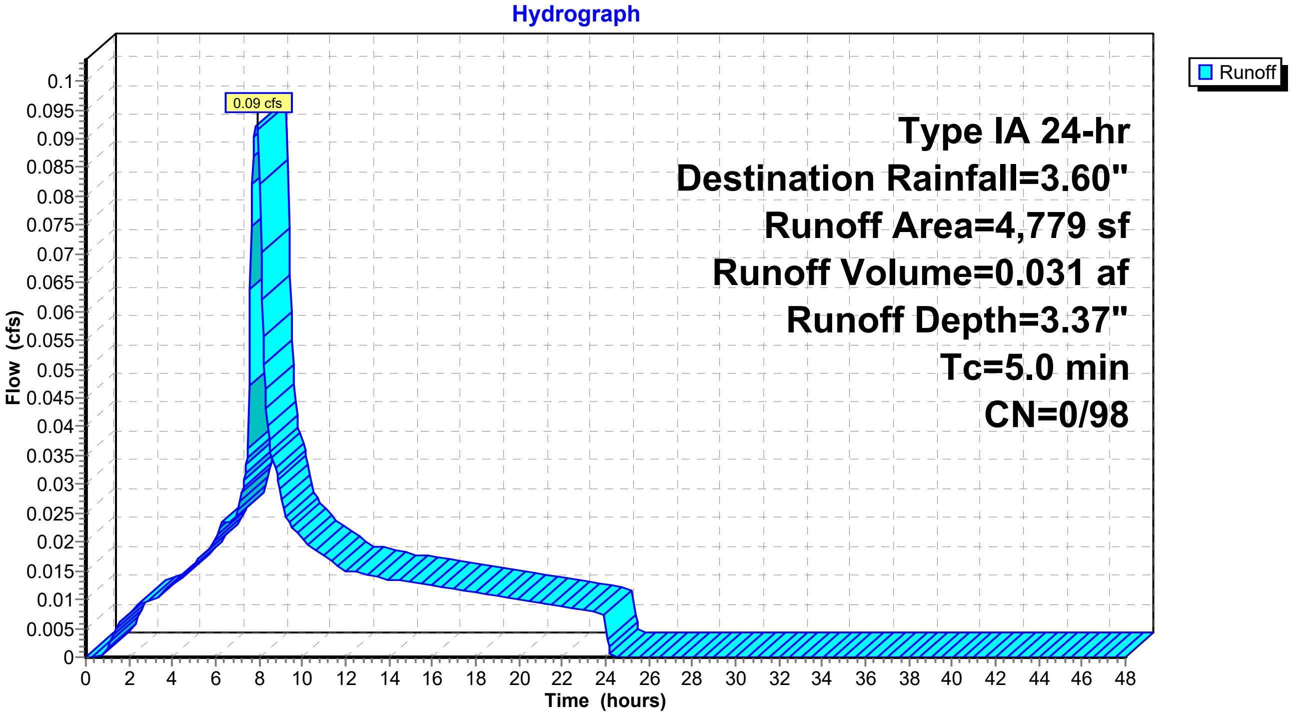
Runoff = 0.09 cfs @ 7.90 hrs, Volume= 0.031 af, Depth= 3.37"
Routed to Pond 47P : Pond #3

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Destination Rainfall=3.60"

	Area (sf)	CN	Description
*	4,779	98	Impervious Surface
	4,779	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 39S: P14



Summary for Subcatchment 40S: P15

[49] Hint: Tc<2dt may require smaller dt

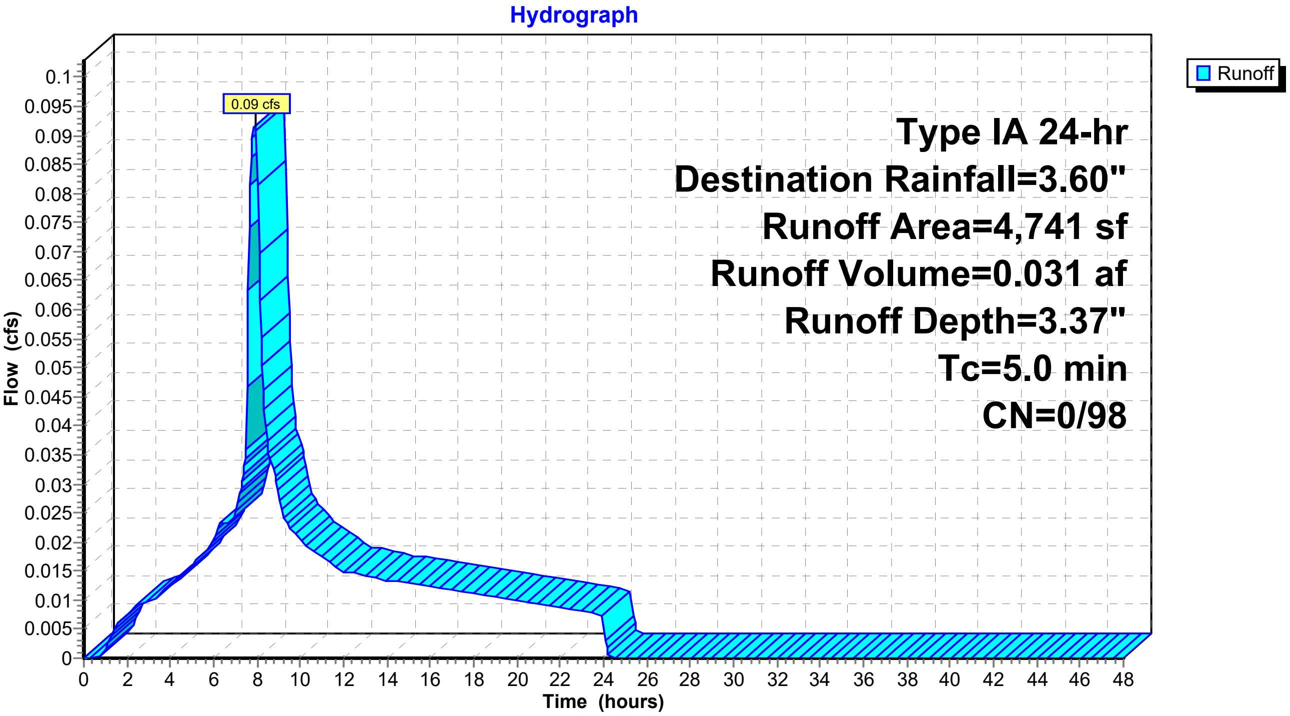
Runoff = 0.09 cfs @ 7.90 hrs, Volume= 0.031 af, Depth= 3.37"
Routed to Pond 47P : Pond #3

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Destination Rainfall=3.60"

	Area (sf)	CN	Description
*	4,741	98	Impervious Surface
	4,741	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 40S: P15



Summary for Subcatchment 41S: P16

[49] Hint: Tc<2dt may require smaller dt

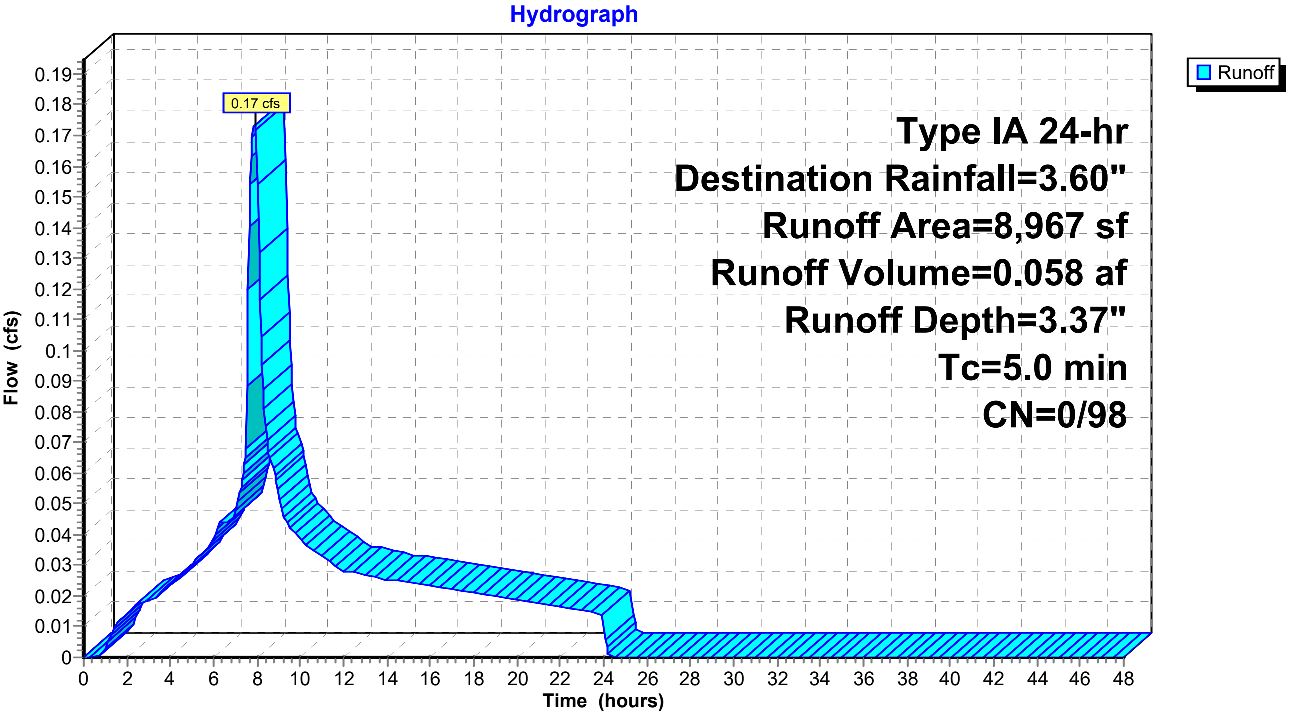
Runoff = 0.17 cfs @ 7.90 hrs, Volume= 0.058 af, Depth= 3.37"
Routed to Pond 47P : Pond #3

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Destination Rainfall=3.60"

	Area (sf)	CN	Description
*	8,967	98	Impervious Surface
	8,967	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 41S: P16



Summary for Subcatchment 50S: Existing Buildings

Includes the roofs from existing buildings 1-8 and some adjacent sidewalks for areas within master plan (apartments). See existing drainage basin map for corresponding areas.

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[49] Hint: Tc<2dt may require smaller dt

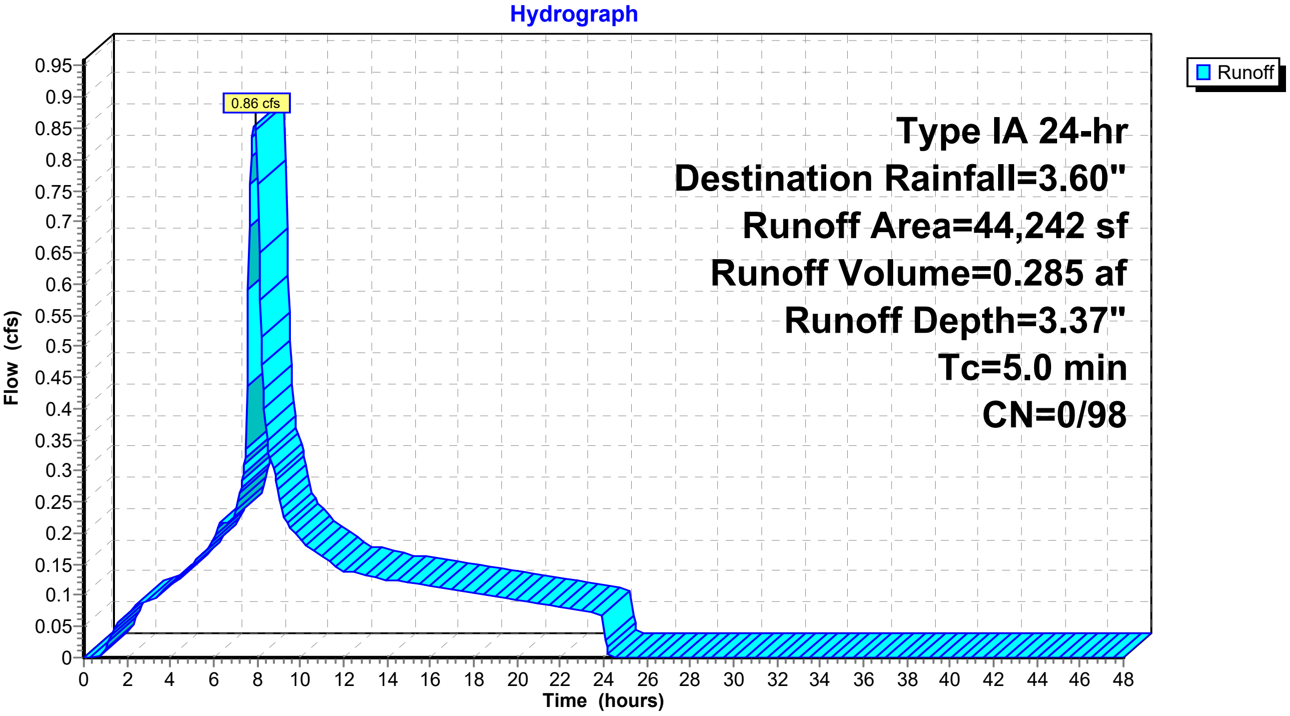
Runoff = 0.86 cfs @ 7.90 hrs, Volume= 0.285 af, Depth= 3.37"
Routed to Reach 53R : Existing Discharge

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Destination Rainfall=3.60"

	Area (sf)	CN	Description
*	44,242	98	Impervious Roof & Adjacent Sidewalk
	44,242	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 50S: Existing Buildings



Summary for Subcatchment 51S: Existing Impervious Areas

Includes existing impervious pavement within the new master plan development area (apartments). See existing drainage basin map for corresponding areas.

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[49] Hint: Tc<2dt may require smaller dt

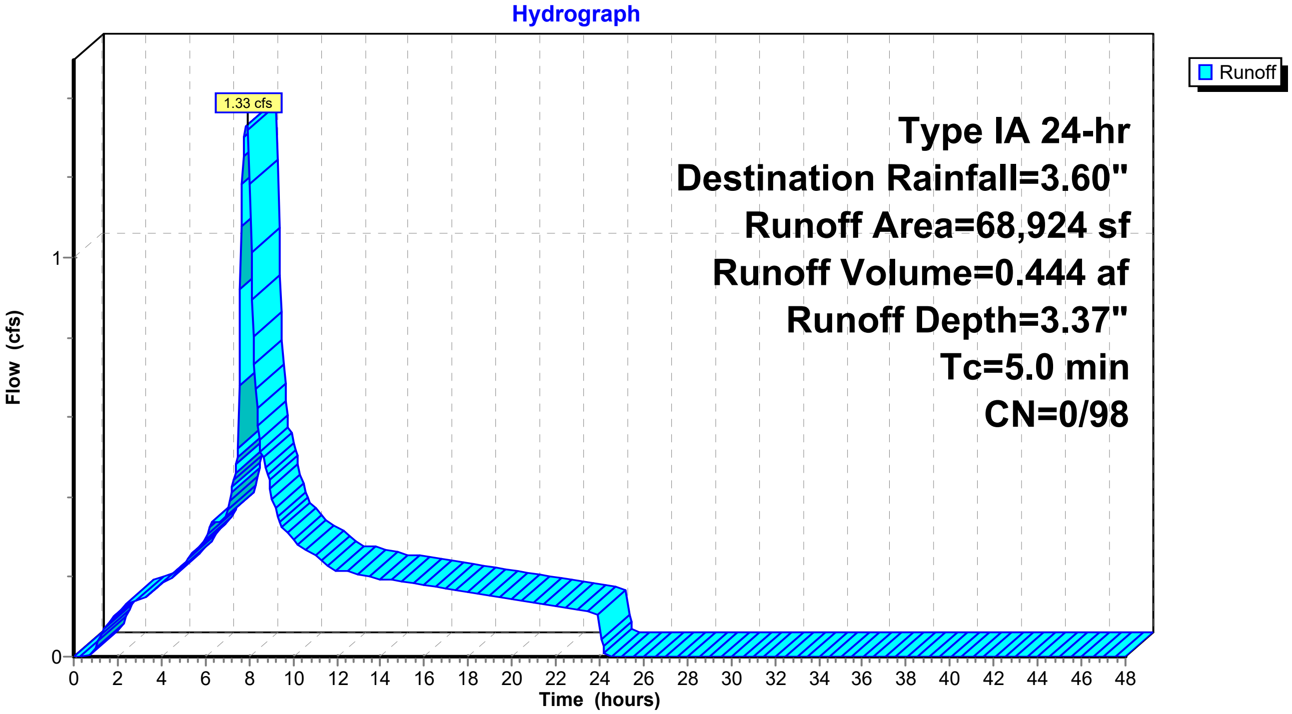
Runoff = 1.33 cfs @ 7.90 hrs, Volume= 0.444 af, Depth= 3.37"
Routed to Reach 53R : Existing Discharge

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Destination Rainfall=3.60"

	Area (sf)	CN	Description
*	68,924	98	Impervious pavement and sidewalk
	68,924	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 51S: Existing Impervious Areas



Summary for Subcatchment 52S: Existing Landscape Area

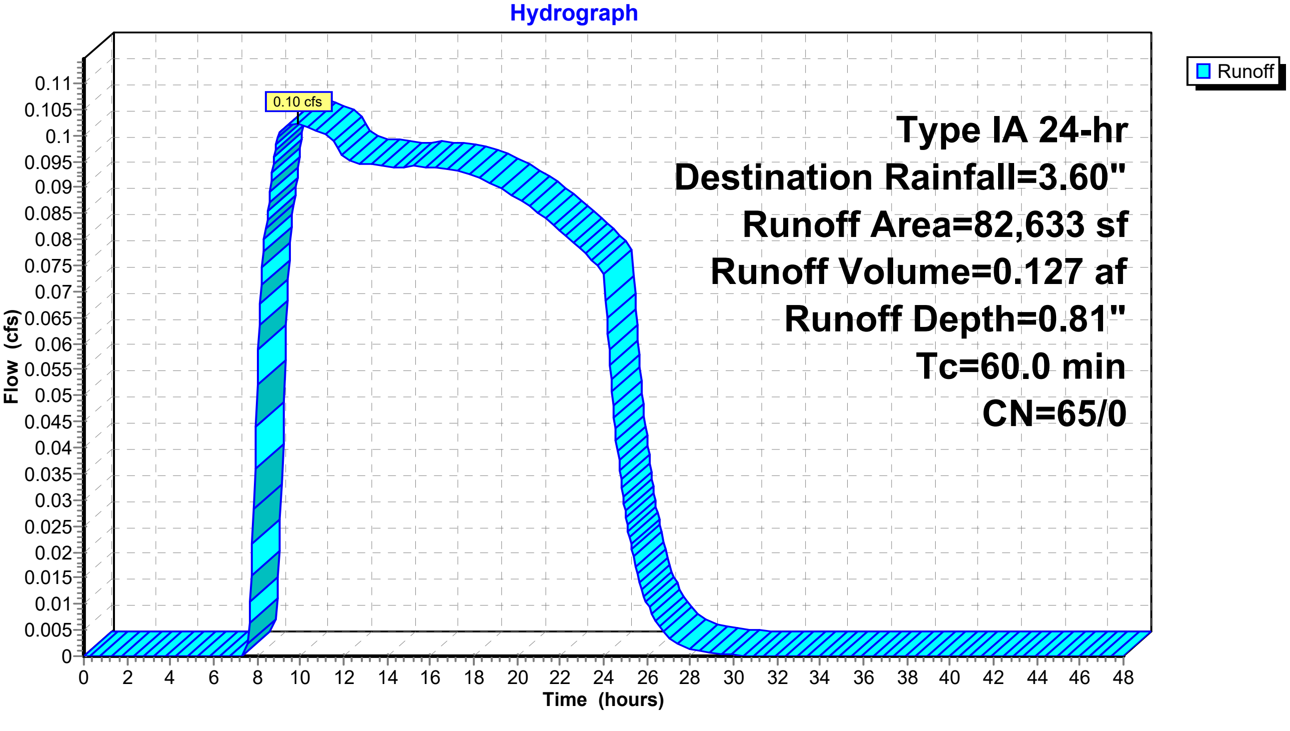
Runoff = 0.10 cfs @ 9.91 hrs, Volume= 0.127 af, Depth= 0.81"
Routed to Reach 53R : Existing Discharge

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Destination Rainfall=3.60"

Area (sf)	CN	Description
82,633	65	Woods/grass comb., Fair, HSG B
82,633	65	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
60.0					**Direct Entry,**

Subcatchment 52S: Existing Landscape Area



Summary for Subcatchment 94S: Pond #3

[49] Hint: Tc<2dt may require smaller dt

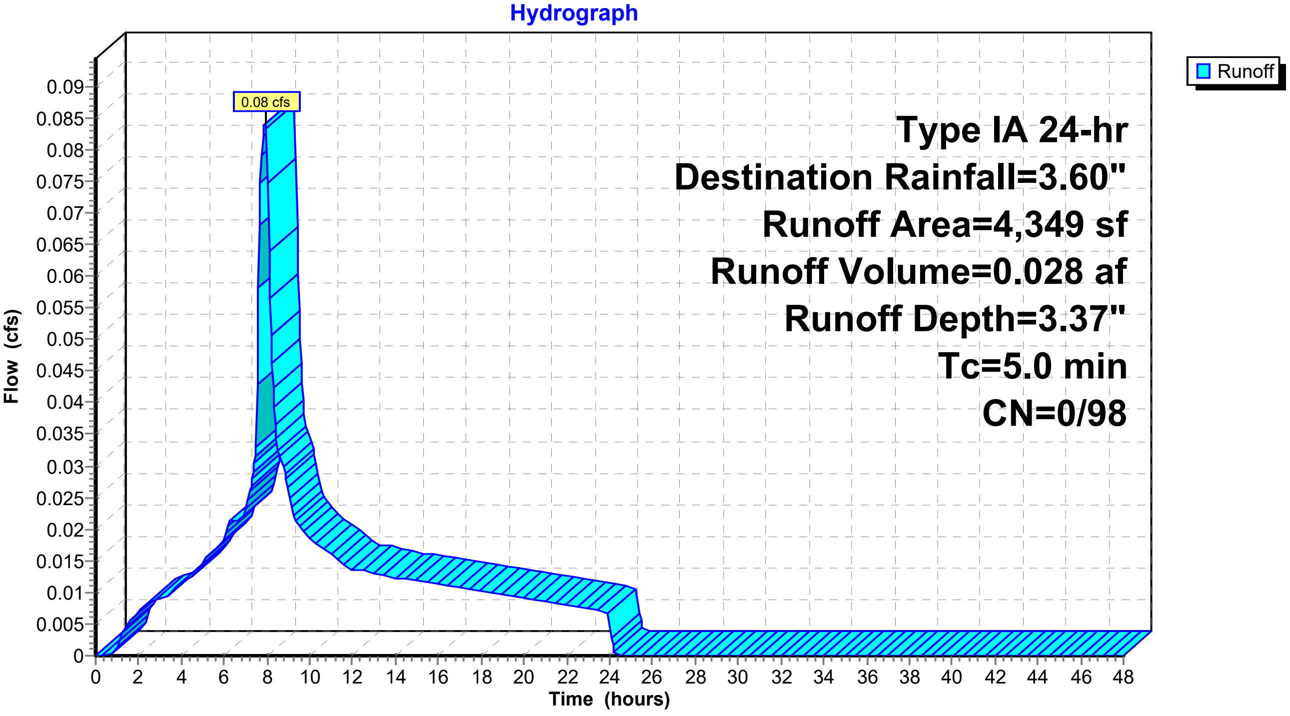
Runoff = 0.08 cfs @ 7.90 hrs, Volume= 0.028 af, Depth= 3.37"
Routed to Pond 47P : Pond #3

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Destination Rainfall=3.60"

Area (sf)	CN	Description
4,349	98	Water Surface, HSG B
4,349	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 94S: Pond #3



Summary for Subcatchment 95S: Pond #1

[49] Hint: Tc<2dt may require smaller dt

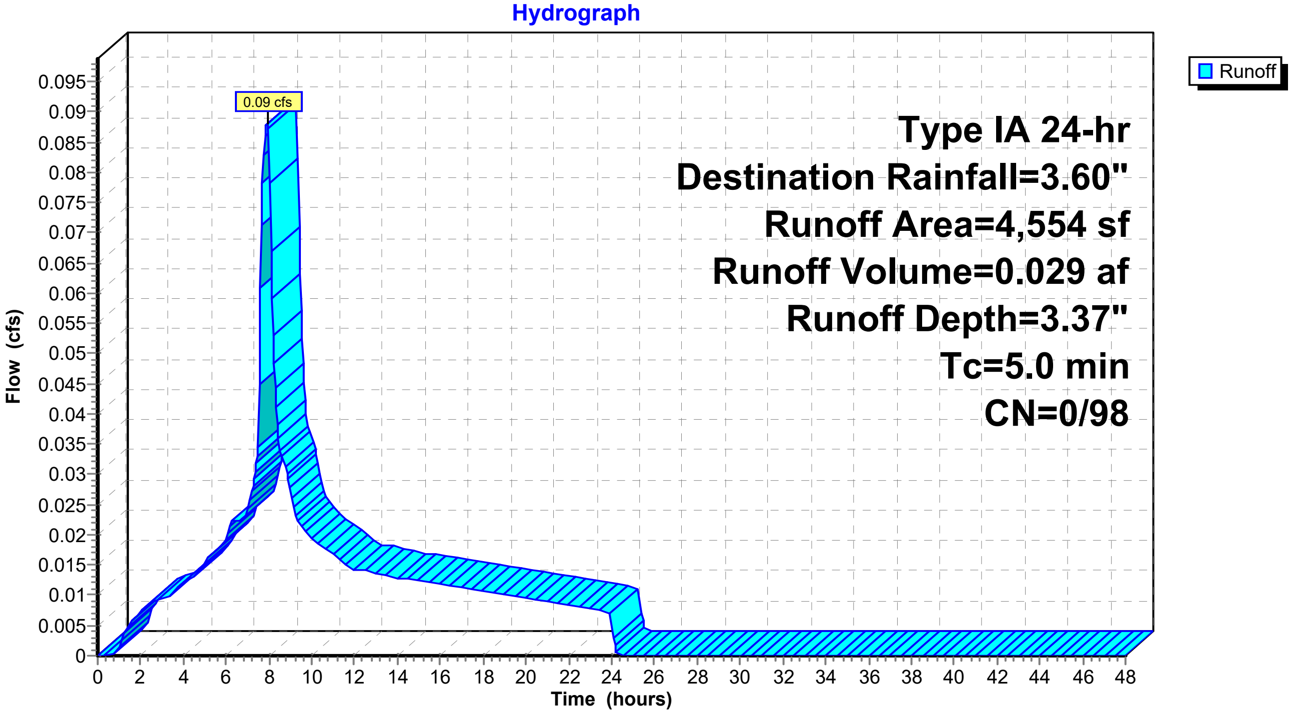
Runoff = 0.09 cfs @ 7.90 hrs, Volume= 0.029 af, Depth= 3.37"
Routed to Pond 46P : Pond #1

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Destination Rainfall=3.60"

Area (sf)	CN	Description
4,554	98	Water Surface, HSG B
4,554	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 95S: Pond #1



Summary for Subcatchment 96S: Pond #2

[49] Hint: Tc<2dt may require smaller dt

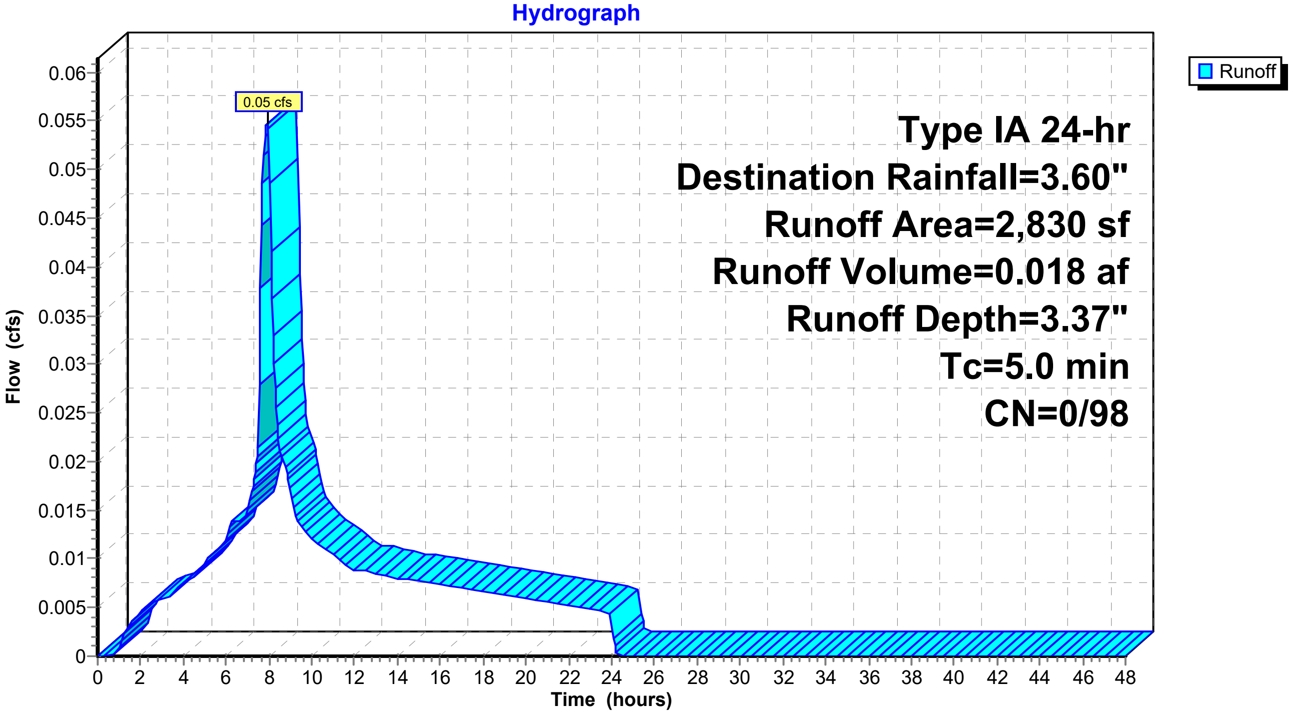
Runoff = 0.05 cfs @ 7.90 hrs, Volume= 0.018 af, Depth= 3.37"
Routed to Pond 48P : Pond #2

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Destination Rainfall=3.60"

Area (sf)	CN	Description
2,830	98	Water Surface, HSG B
2,830	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 96S: Pond #2



Summary for Subcatchment 97S: Pond #4

[49] Hint: Tc<2dt may require smaller dt

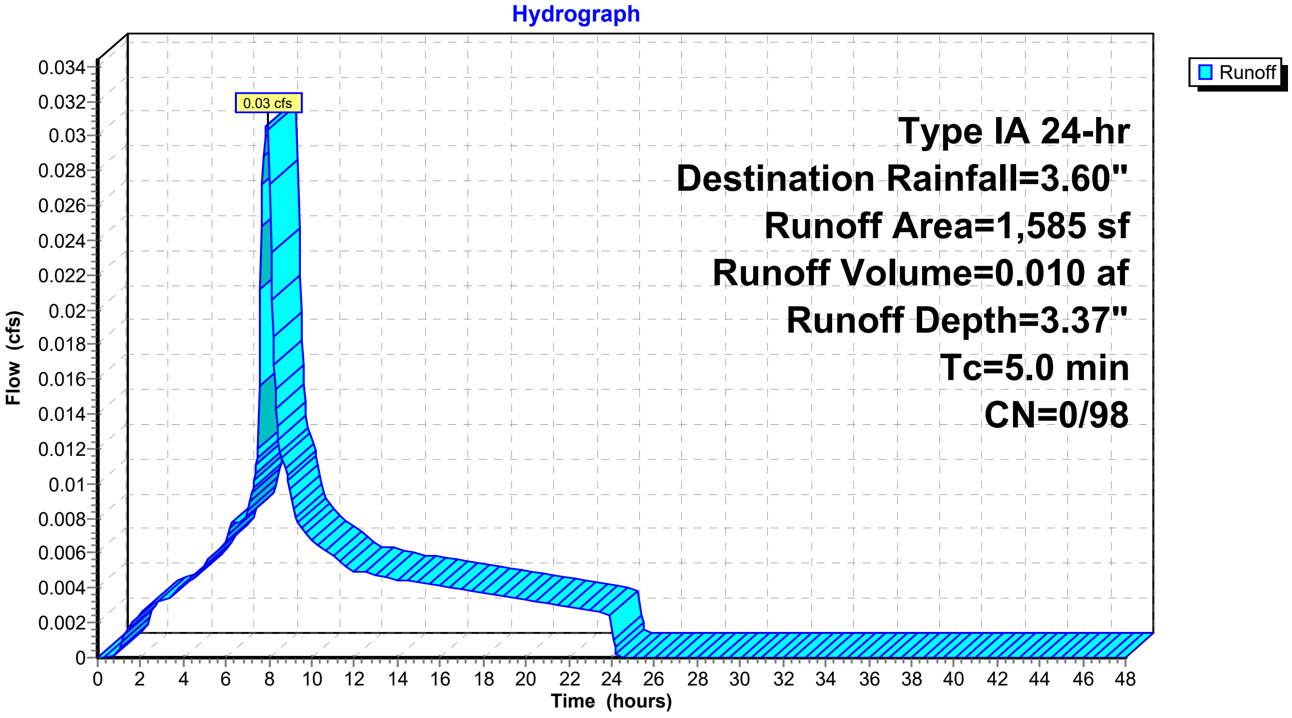
Runoff = 0.03 cfs @ 7.90 hrs, Volume= 0.010 af, Depth= 3.37"
Routed to Pond 49P : Pond #4

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Destination Rainfall=3.60"

Area (sf)	CN	Description
1,585	98	Water Surface, HSG B
1,585	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 97S: Pond #4



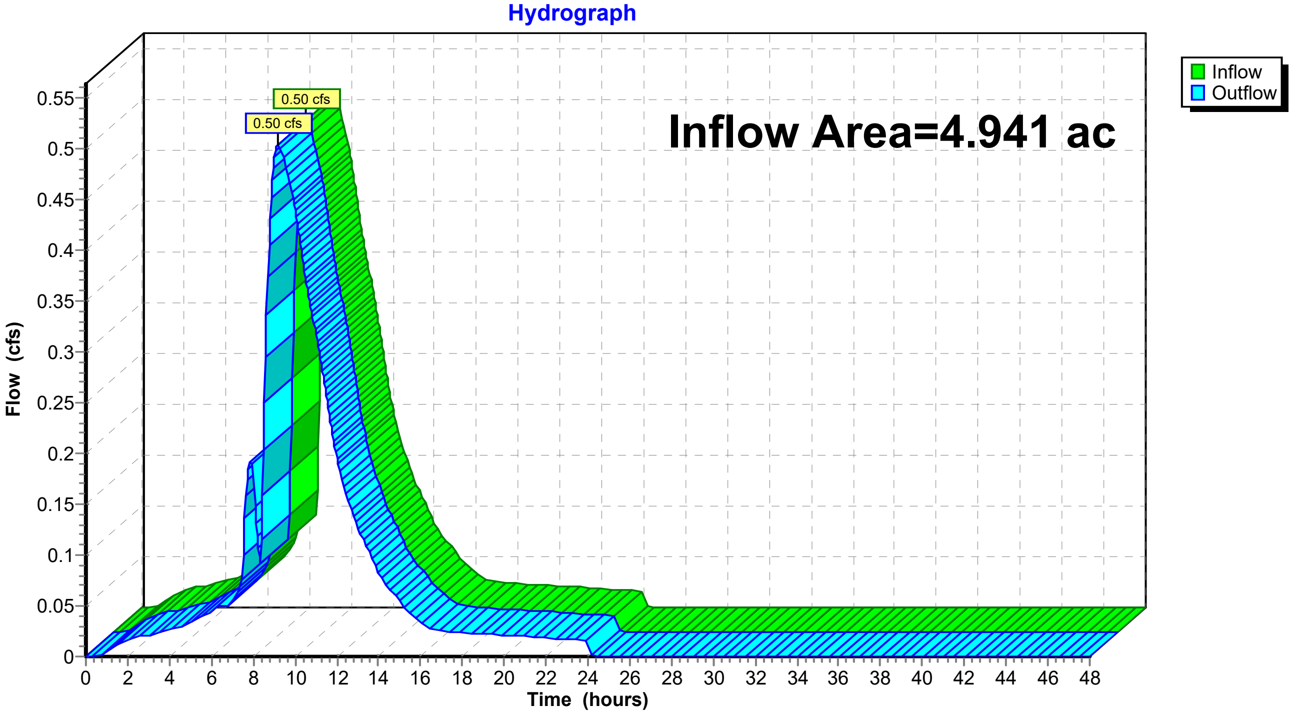
Summary for Reach 50R: Discharge

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4.941 ac,100.00% Impervious, Inflow Depth = 0.44" for Destination event
Inflow = 0.50 cfs @ 9.18 hrs, Volume= 0.182 af
Outflow = 0.50 cfs @ 9.18 hrs, Volume= 0.182 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Reach 50R: Discharge



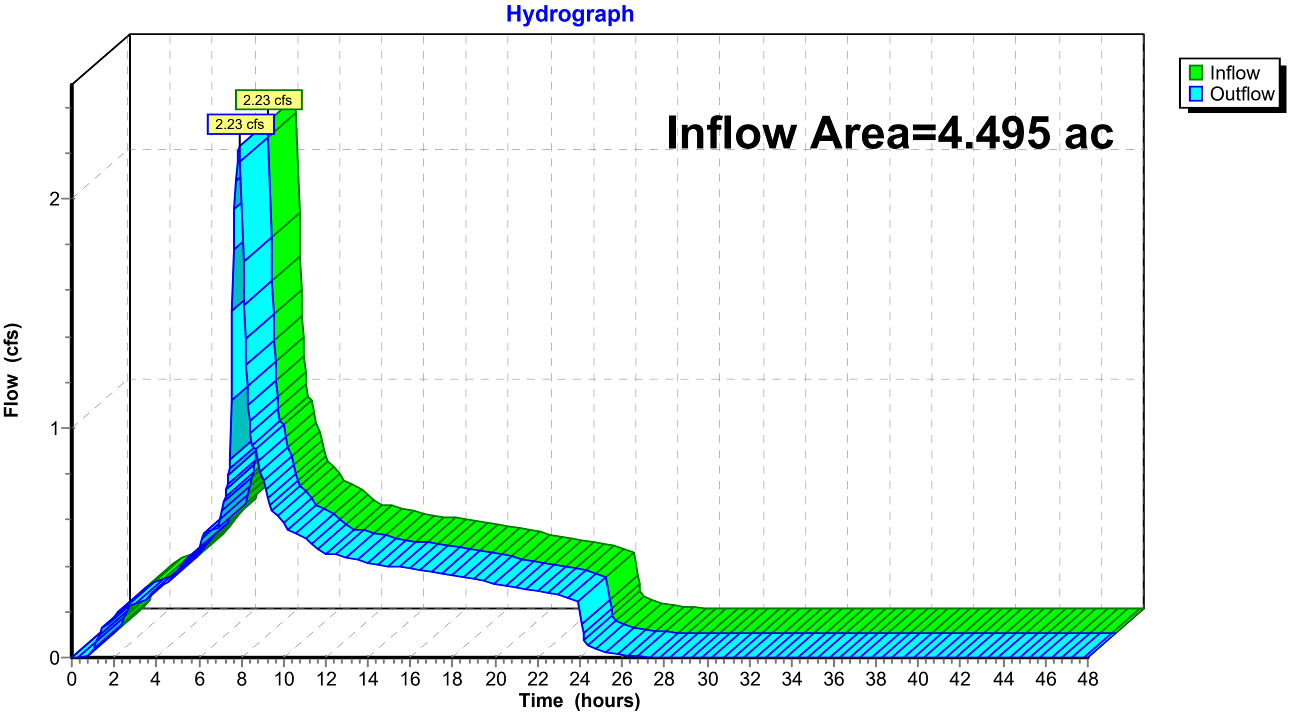
Summary for Reach 53R: Existing Discharge

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4.495 ac, 57.80% Impervious, Inflow Depth = 2.29" for Destination event
Inflow = 2.23 cfs @ 7.91 hrs, Volume= 0.856 af
Outflow = 2.23 cfs @ 7.91 hrs, Volume= 0.856 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Reach 53R: Existing Discharge



Summary for Pond 46P: Pond #1

Inflow Area = 3.584 ac,100.00% Impervious, Inflow Depth = 2.10" for Destination event
Inflow = 1.78 cfs @ 7.90 hrs, Volume= 0.627 af
Outflow = 0.60 cfs @ 9.34 hrs, Volume= 0.627 af, Atten= 66%, Lag= 86.6 min
Discarded = 0.20 cfs @ 9.33 hrs, Volume= 0.415 af
Primary = 0.40 cfs @ 9.34 hrs, Volume= 0.213 af
Routed to Pond 47P : Pond #3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 635.83' @ 9.33 hrs Surf.Area= 4,347 sf Storage= 6,851 cf
Flood Elev= 637.00' Surf.Area= 5,590 sf Storage= 11,426 cf

Plug-Flow detention time= 279.2 min calculated for 0.627 af (100% of inflow)
Center-of-Mass det. time= 279.7 min (940.0 - 660.2)

Volume	Invert	Avail.Storage	Storage Description
#1	632.00'	11,193 cf	**Open Storage (Irregular)**Listed below (Recalc)
#2	631.00'	52 cf	**Growing Medium (Irregular)**Listed below (Recalc) 518 cf Overall x 10.0% Voids
#3	630.00'	181 cf	**Rock Chamber (Irregular)**Listed below (Recalc) 518 cf Overall x 35.0% Voids
		11,426 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
632.00	518	104.0	0	0	518
633.00	1,018	147.0	754	754	1,386
634.00	1,697	191.0	1,343	2,097	2,581
635.00	2,527	224.0	2,098	4,195	3,691
636.00	3,482	253.0	2,992	7,187	4,817
637.00	4,554	282.0	4,006	11,193	6,081

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
631.00	518	104.0	0	0	518
632.00	518	104.0	518	518	622

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
630.00	518	104.0	0	0	518
631.00	518	104.0	518	518	622

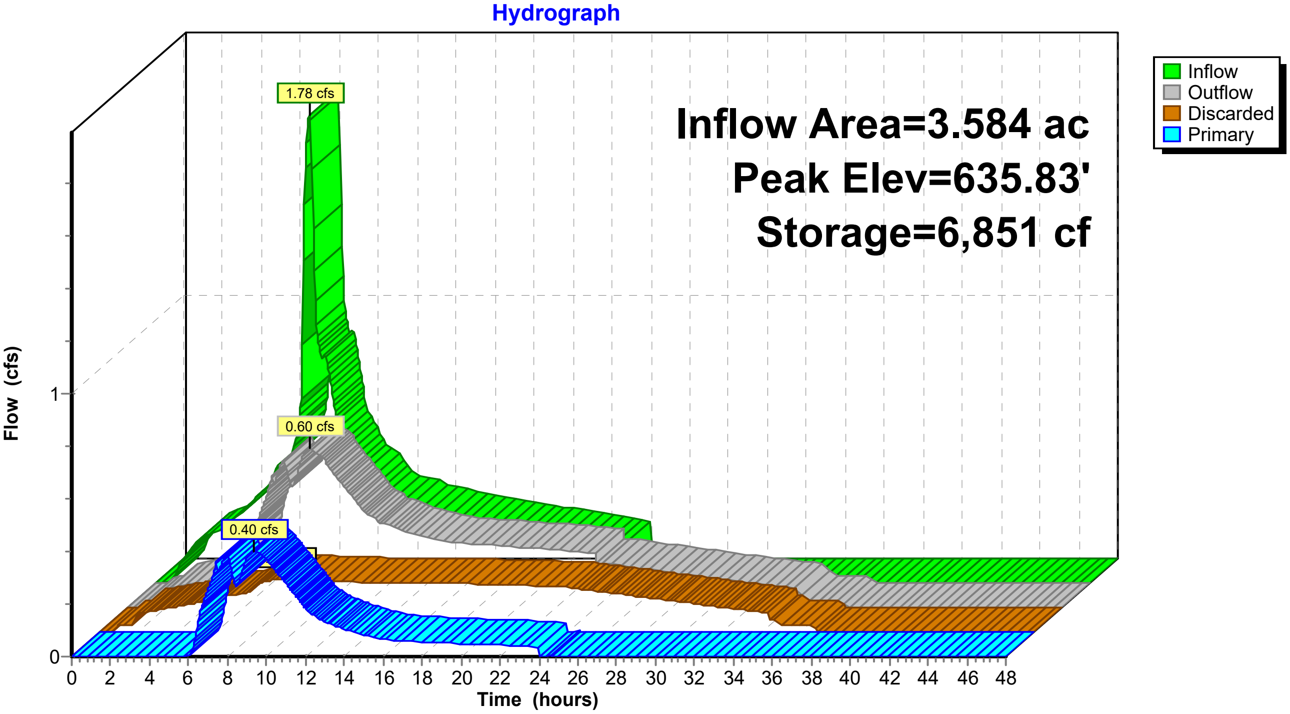
Device	Routing	Invert	Outlet Devices
#1	Discarded	630.00'	**2.000 in/hr Exfiltration over Surface area**
#2	Primary	633.60'	**12.0" Round 12" Pipe** L= 400.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 633.60' / 632.00' S= 0.0040 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf
#3	Device 2	634.10'	**6.0" Vert. 6" Orifice** C= 0.600 Limited to weir flow at low heads

#4	Device 2	636.50'	**24.0" W x 8.0" H 18° Overflow Grate** C= 0.600 Limited to weir flow at low heads

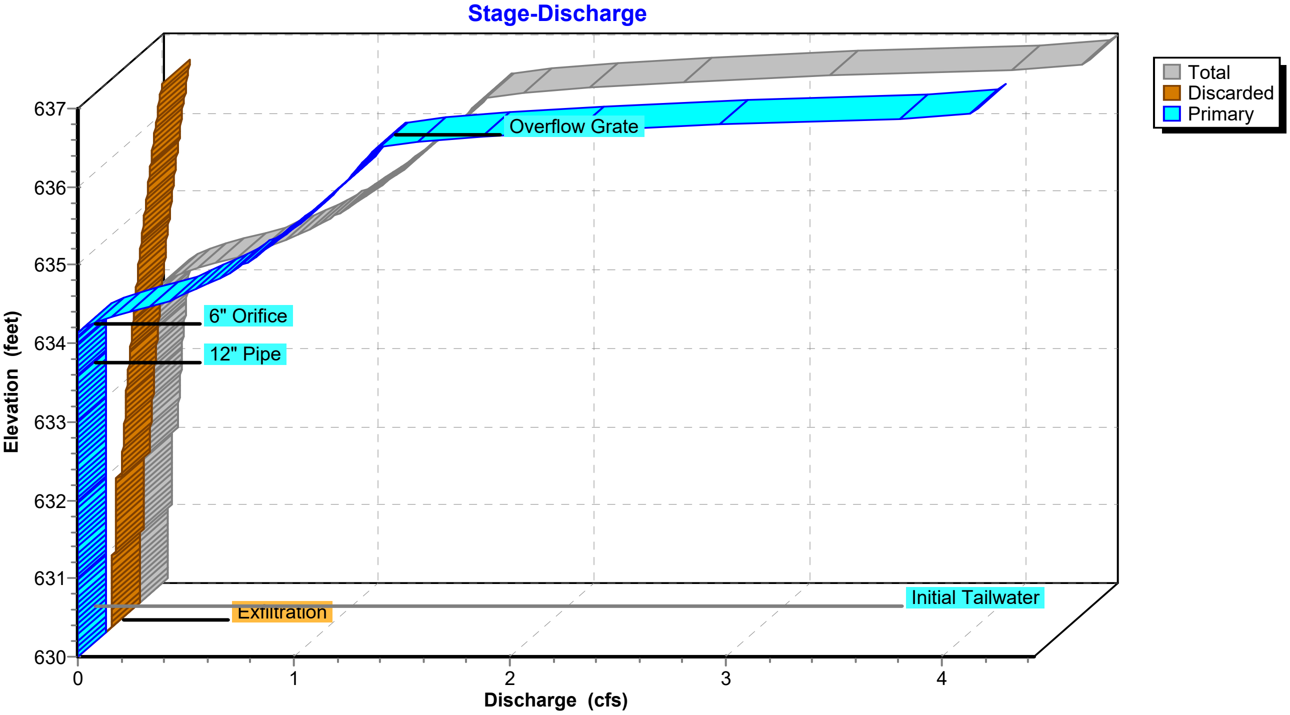
Discarded OutFlow Max=0.20 cfs @ 9.33 hrs HW=635.83' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.20 cfs)

Primary OutFlow Max=0.40 cfs @ 9.34 hrs HW=635.83' TW=635.65' (Dynamic Tailwater)
↑**2=12" Pipe** (Passes 0.40 cfs of 0.89 cfs potential flow)
  ↑**3=6" Orifice** (Orifice Controls 0.40 cfs @ 2.05 fps)
  4=Overflow Grate (Controls 0.00 cfs)

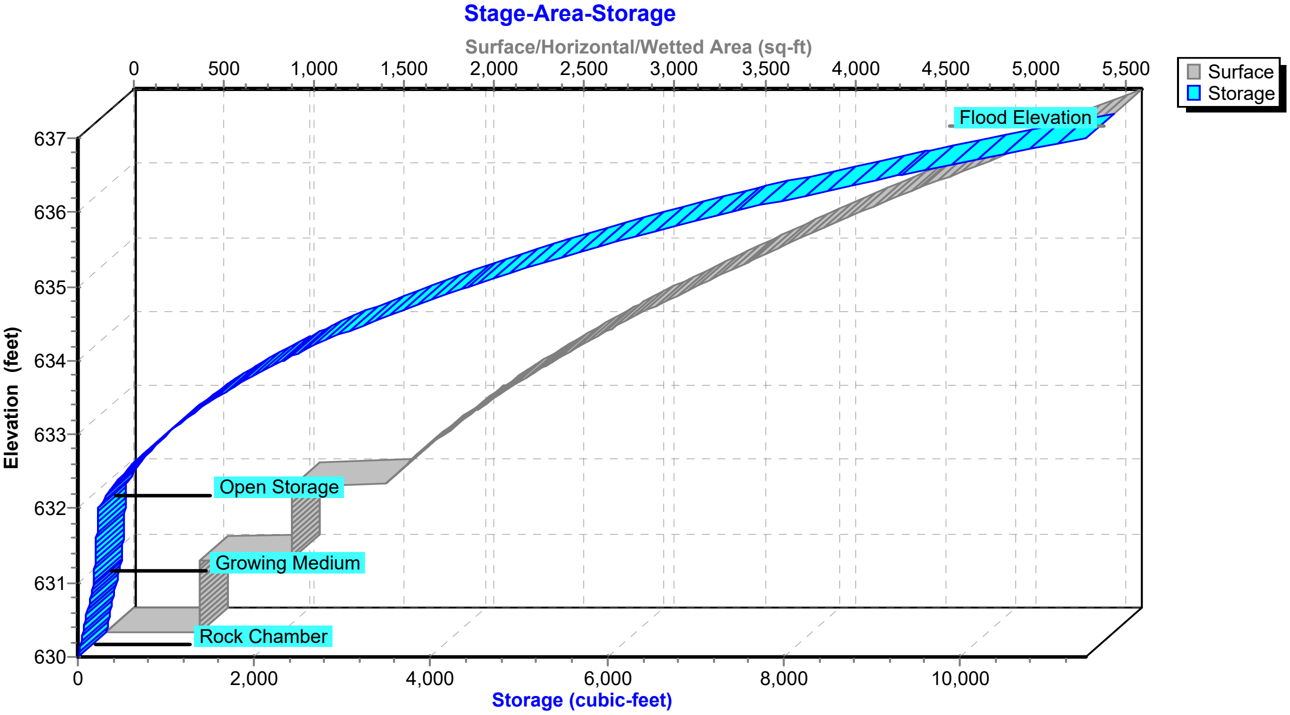
Pond 46P: Pond #1



Pond 46P: Pond #1



Pond 46P: Pond #1



Summary for Pond 47P: Pond #3

Inflow Area = 4.709 ac,100.00% Impervious, Inflow Depth = 1.35" for Destination event
Inflow = 1.33 cfs @ 7.91 hrs, Volume= 0.528 af
Outflow = 0.66 cfs @ 9.23 hrs, Volume= 0.528 af, Atten= 51%, Lag= 79.2 min
Discarded = 0.21 cfs @ 9.23 hrs, Volume= 0.411 af
Primary = 0.45 cfs @ 9.23 hrs, Volume= 0.117 af
Routed to Reach 50R : Discharge

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 635.65' @ 9.23 hrs Surf.Area= 4,471 sf Storage= 5,943 cf
Flood Elev= 636.50' Surf.Area= 5,485 sf Storage= 9,193 cf

Plug-Flow detention time= 285.8 min calculated for 0.528 af (100% of inflow)
Center-of-Mass det. time= 286.1 min (963.0 - 676.9)

Volume	Invert	Avail.Storage	Storage Description
#1	632.50'	8,937 cf	**Open Storage (Irregular)**Listed below (Recalc)
#2	631.50'	57 cf	**Growing Medium (Irregular)**Listed below (Recalc) 568 cf Overall x 10.0% Voids
#3	630.50'	199 cf	**Rock Chamber (Irregular)**Listed below (Recalc) 568 cf Overall x 35.0% Voids
		9,193 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
632.50	568	149.0	0	0	568
633.50	1,258	195.0	890	890	1,839
634.50	2,127	239.0	1,674	2,564	3,374
635.50	3,168	281.0	2,630	5,194	5,131
636.50	4,349	308.0	3,743	8,937	6,431

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
631.50	568	149.0	0	0	568
632.50	568	149.0	568	568	717

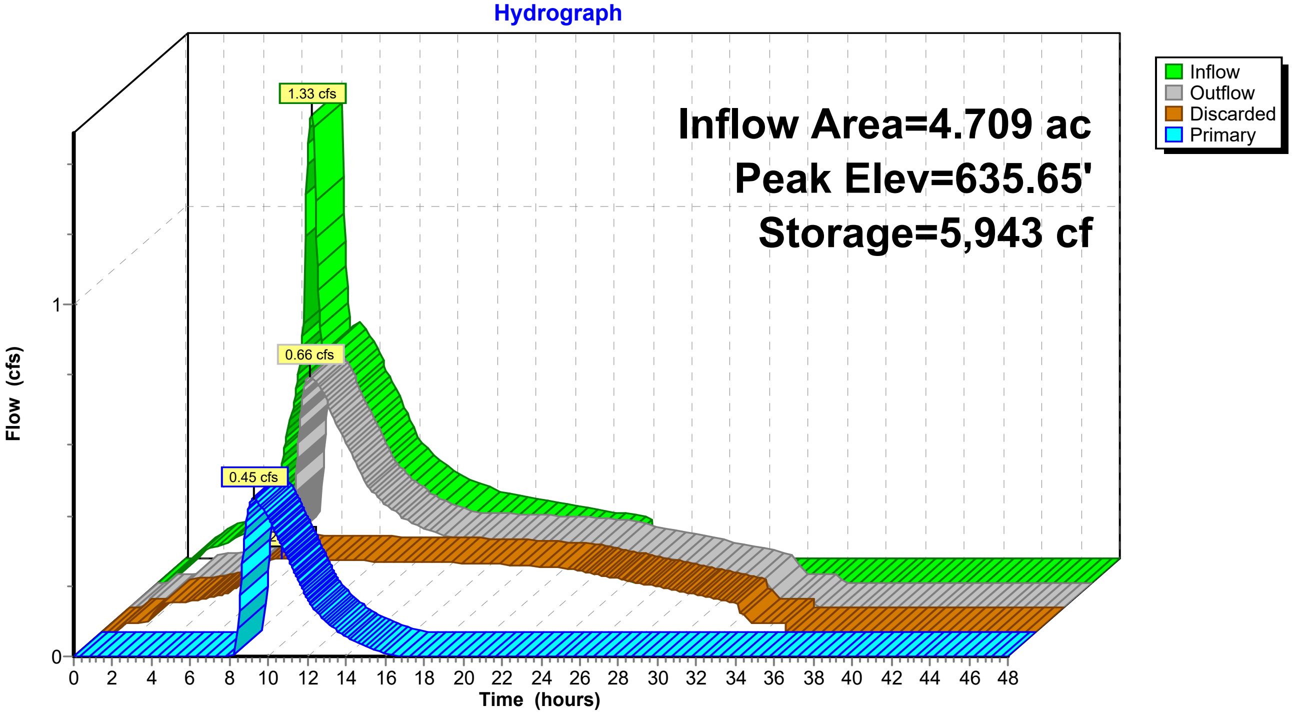
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
630.50	568	149.0	0	0	568
631.50	568	149.0	568	568	717

Device	Routing	Invert	Outlet Devices
#1	Discarded	630.50'	**2.000 in/hr Exfiltration over Surface area**
#2	Primary	633.92'	**10.0" Round 10" Pipe** L= 480.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 633.92' / 632.00' S= 0.0040 '/' Cc= 0.900 n= 0.010, Flow Area= 0.55 sf
#3	Device 2	635.50'	**24.0" W x 8.0" H 18° Overflow Grate** C= 0.600 Limited to weir flow at low heads

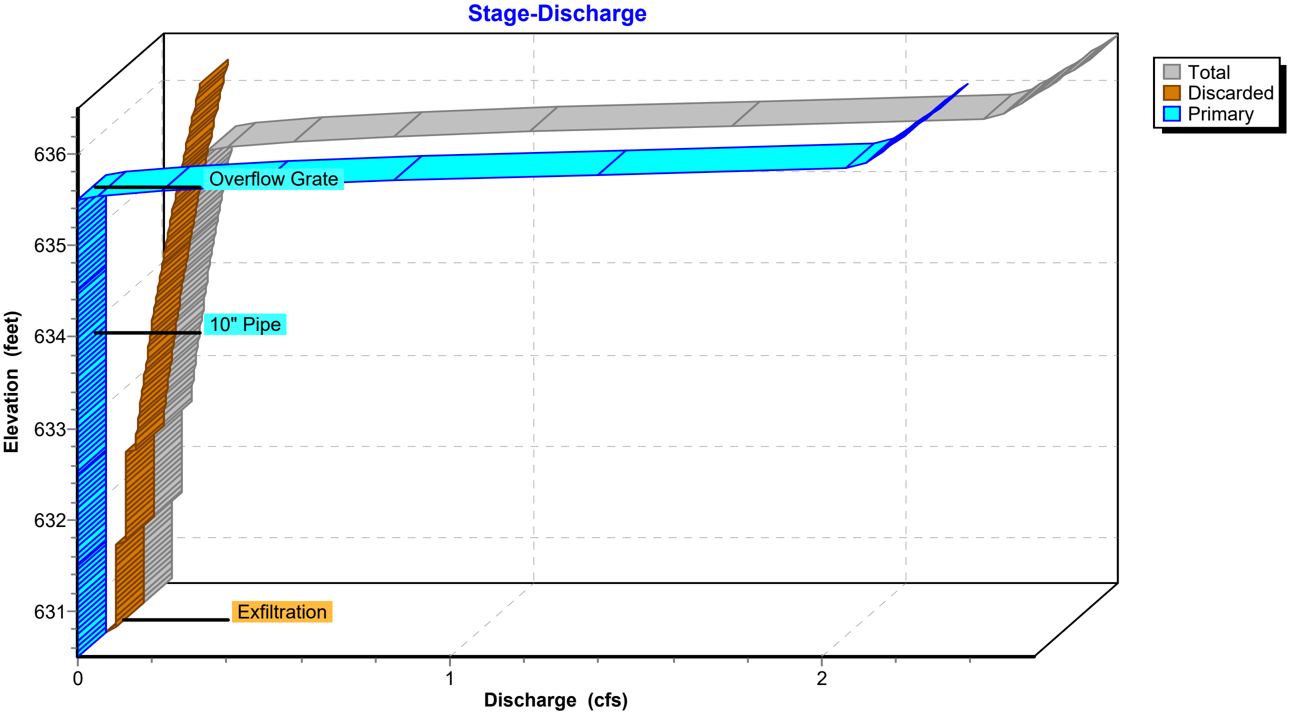
Discarded OutFlow Max=0.21 cfs @ 9.23 hrs HW=635.65' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.21 cfs)

Primary OutFlow Max=0.45 cfs @ 9.23 hrs HW=635.65' TW=0.00' (Dynamic Tailwater)
↑—**2=10" Pipe** (Passes 0.45 cfs of 2.03 cfs potential flow)
  ↑—**3=Overflow Grate** (Weir Controls 0.45 cfs @ 1.20 fps)

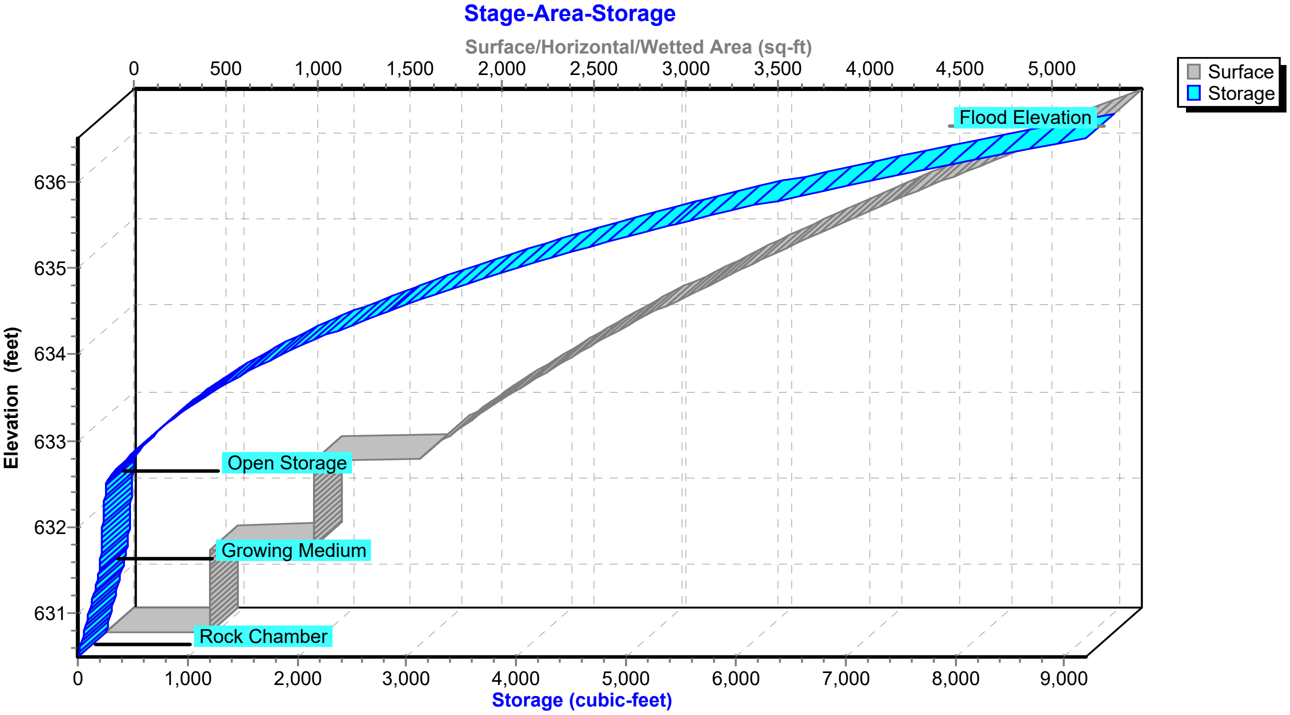
Pond 47P: Pond #3



Pond 47P: Pond #3



Pond 47P: Pond #3



Summary for Pond 48P: Pond #2

```
Inflow Area =        1.135 ac,100.00% Impervious,  Inflow Depth =   3.37"    for  Destination event
Inflow       =       0.96 cfs @    7.90 hrs,  Volume=           0.318 af
Outflow      =       0.34 cfs @    8.76 hrs,  Volume=           0.318 af,  Atten= 64%,  Lag= 52.0 min
Discarded  =         0.13 cfs @    8.76 hrs,  Volume=           0.282 af
Primary      =       0.21 cfs @    8.76 hrs,  Volume=           0.036 af
    Routed to Pond 46P : Pond #1
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 636.60' @ 8.76 hrs Surf.Area= 2,867 sf Storage= 4,305 cf
Flood Elev= 637.00' Surf.Area= 3,234 sf Storage= 5,376 cf

Plug-Flow detention time= 386.6 min calculated for 0.318 af (100% of inflow)
Center-of-Mass det. time= 387.2 min (1,050.5 - 663.3)

Volume	Invert	Avail.Storage	Storage Description
#1	633.00'	5,285 cf	**Open Storage (Irregular)**Listed below (Recalc)
#2	632.00'	20 cf	**Growing Medium (Irregular)**Listed below (Recalc) 202 cf Overall x 10.0% Voids
#3	631.00'	71 cf	**Rock Chamber (Irregular)**Listed below (Recalc) 202 cf Overall x 35.0% Voids
		5,376 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
633.00	202	86.0	0	0	202
634.00	636	129.0	399	399	946
635.00	1,228	167.0	916	1,315	1,853
636.00	1,969	202.0	1,584	2,899	2,897
637.00	2,830	228.0	2,387	5,285	3,812

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
632.00	202	86.0	0	0	202
633.00	202	86.0	202	202	288

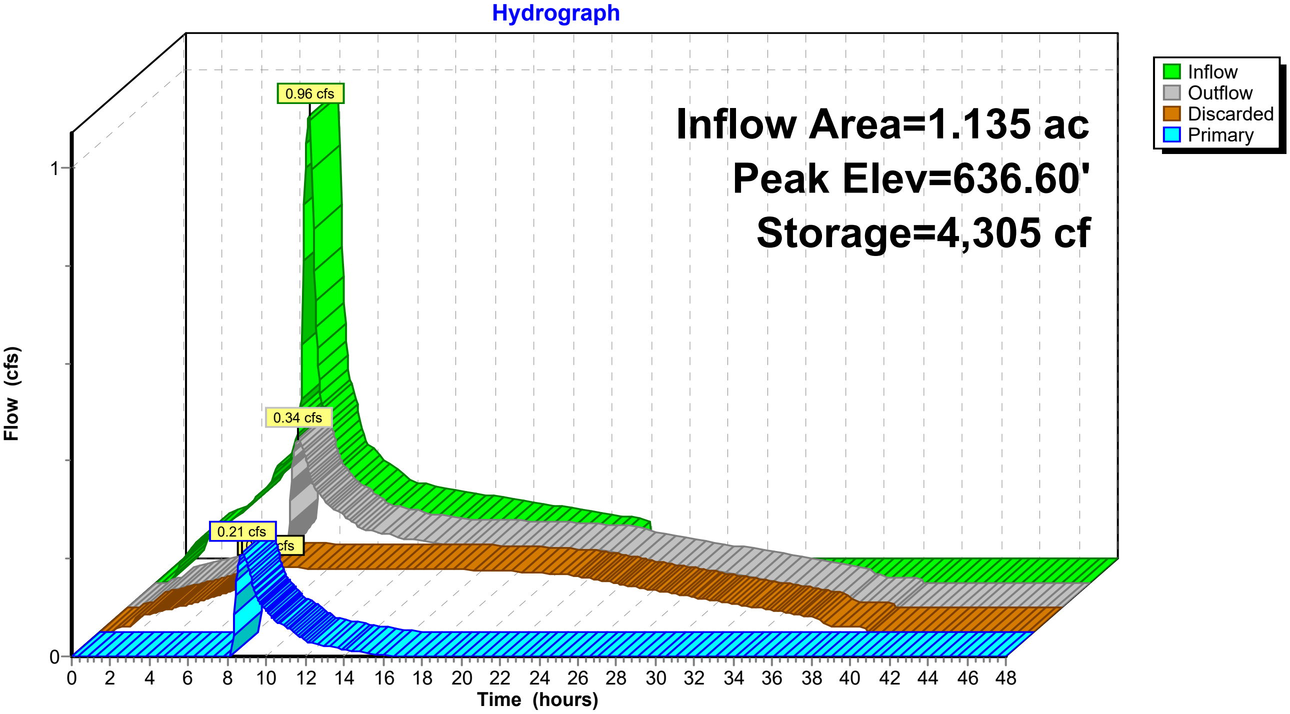
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
631.00	202	86.0	0	0	202
632.00	202	86.0	202	202	288

Device	Routing	Invert	Outlet Devices
#1	Discarded	631.00'	**2.000 in/hr Exfiltration over Surface area**
#2	Primary	633.60'	**12.0" Round 12" Pipe** L= 400.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 633.60' / 632.00' S= 0.0040 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf
#3	Device 2	636.50'	**24.0" W x 8.0" H 18° Overflow Grate** C= 0.600 Limited to weir flow at low heads

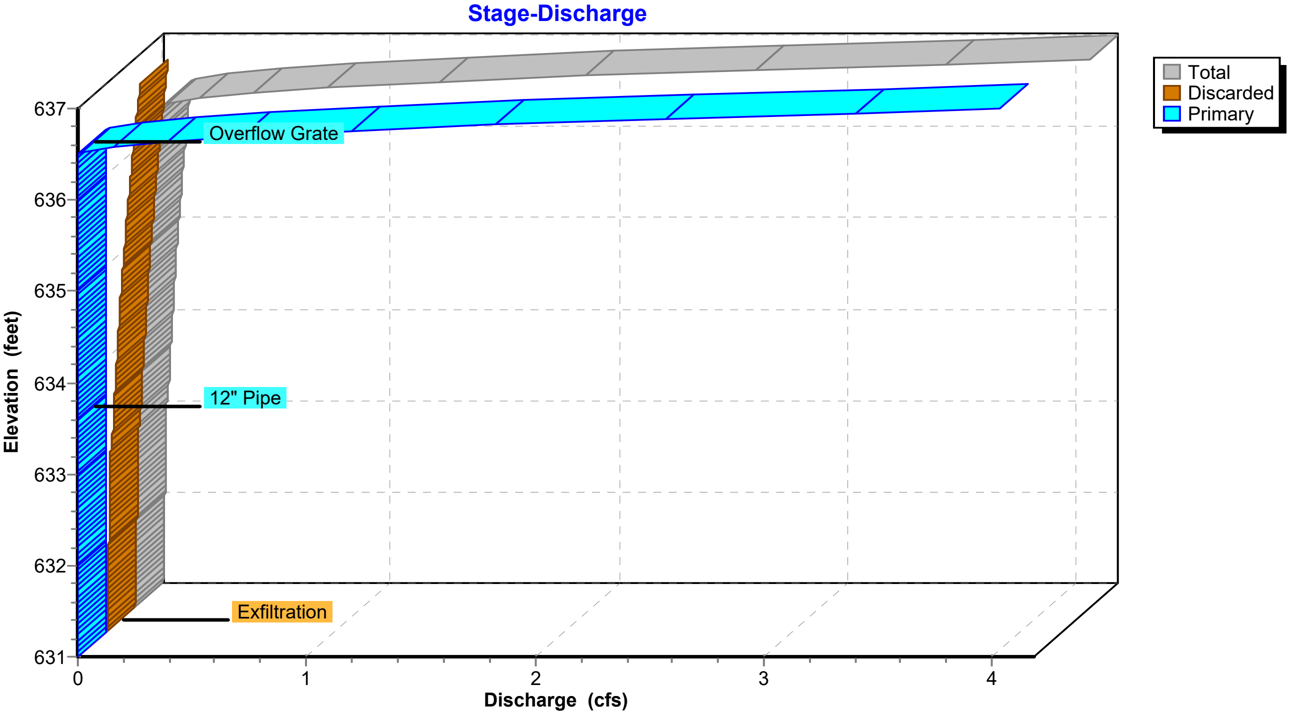
Discarded OutFlow Max=0.13 cfs @ 8.76 hrs HW=636.59' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.13 cfs)

Primary OutFlow Max=0.21 cfs @ 8.76 hrs HW=636.59' TW=635.74' (Dynamic Tailwater)
└─**2=12" Pipe** (Passes 0.21 cfs of 1.93 cfs potential flow)
  └─**3=Overflow Grate** (Weir Controls 0.21 cfs @ 0.96 fps)

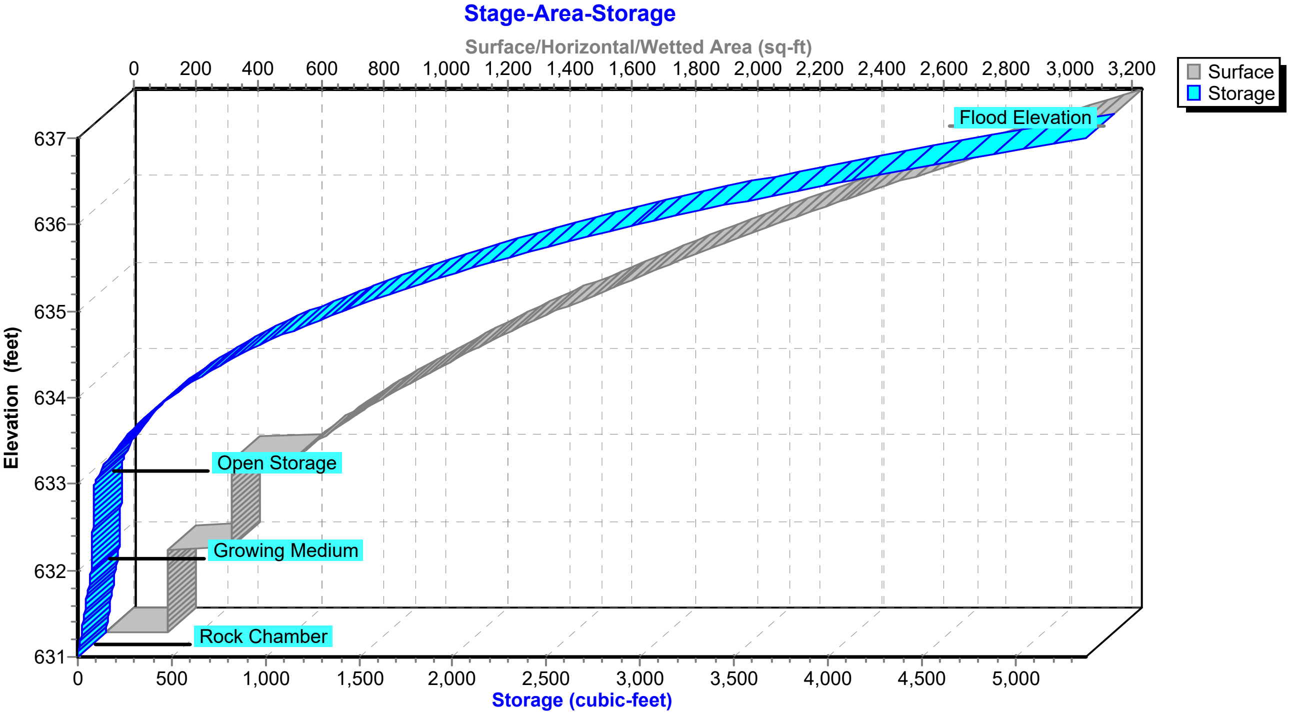
Pond 48P: Pond #2



Pond 48P: Pond #2



Pond 48P: Pond #2



Summary for Pond 49P: Pond #4

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=62)

```
Inflow Area =        0.341 ac,100.00% Impervious,  Inflow Depth =   3.37"    for  Destination event
Inflow      =        0.29 cfs @    7.90 hrs,  Volume=           0.096 af
Outflow     =        0.09 cfs @    9.00 hrs,  Volume=           0.096 af,  Atten= 69%,  Lag= 66.1 min
Discarded  =         0.09 cfs @    9.00 hrs,  Volume=           0.096 af
Primary     =        0.00 cfs @    0.00 hrs,  Volume=           0.000 af
    Routed to Pond 46P : Pond #1
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 636.73' @ 9.00 hrs   Surf.Area= 1,936 sf   Storage= 745 cf
Flood Elev= 638.00'   Surf.Area= 2,659 sf   Storage= 2,283 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 89.9 min (753.2 - 663.3)

Volume	Invert	Avail.Storage	Storage Description
#1	636.00'	2,041 cf	**Open Storage (Irregular)**Listed below (Recalc)
#2	635.00'	54 cf	**Growing Medium (Irregular)**Listed below (Recalc) 537 cf Overall x 10.0% Voids
#3	634.00'	188 cf	**Rock Chamber (Irregular)**Listed below (Recalc) 537 cf Overall x 35.0% Voids
		2,283 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
636.00	537	102.0	0	0	537
637.00	1,003	131.0	758	758	1,087
638.00	1,585	159.0	1,283	2,041	1,749

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
635.00	537	102.0	0	0	537
636.00	537	102.0	537	537	639

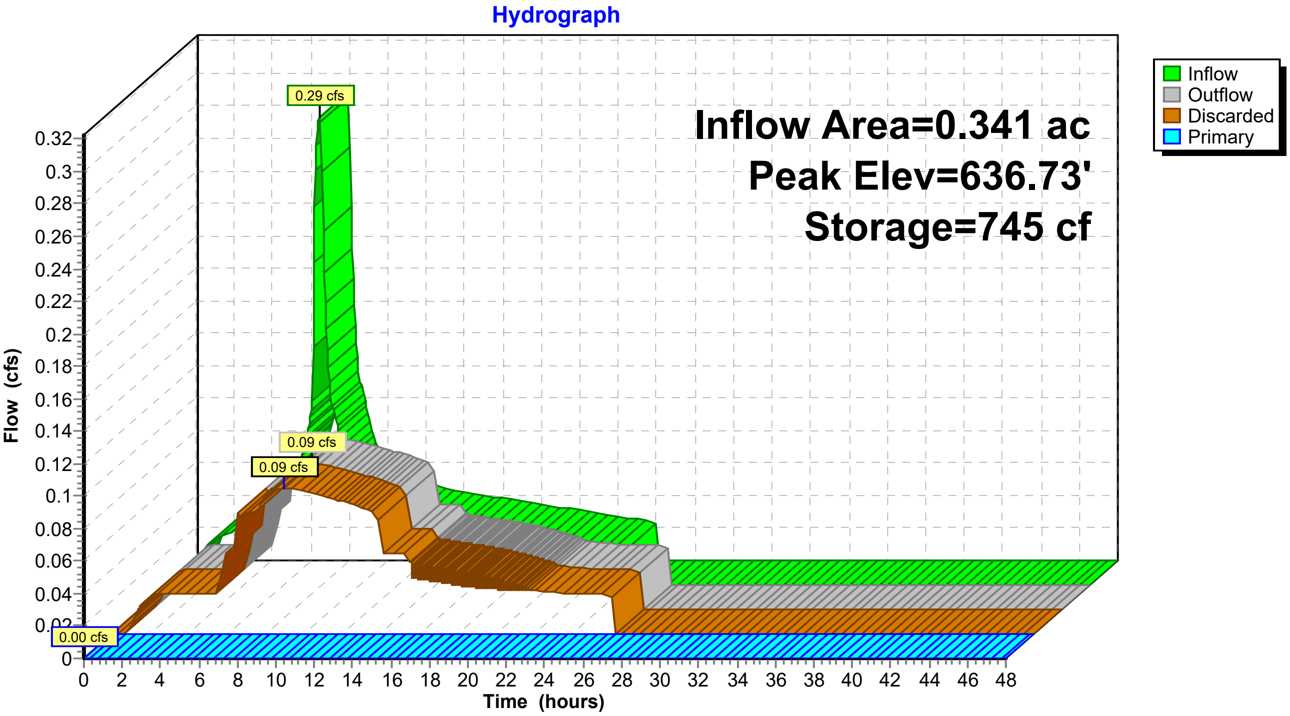
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
634.00	537	102.0	0	0	537
635.00	537	102.0	537	537	639

Device	Routing	Invert	Outlet Devices
#1	Discarded	634.00'	**2.000 in/hr Exfiltration over Surface area**
#2	Primary	636.00'	**8.0" Round 8" Pipe** L= 125.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 636.00' / 634.00' S= 0.0160 '/' Cc= 0.900 n= 0.010, Flow Area= 0.35 sf
#3	Device 2	637.00'	**24.0" W x 8.0" H 18° Overflow Grate** C= 0.600 Limited to weir flow at low heads

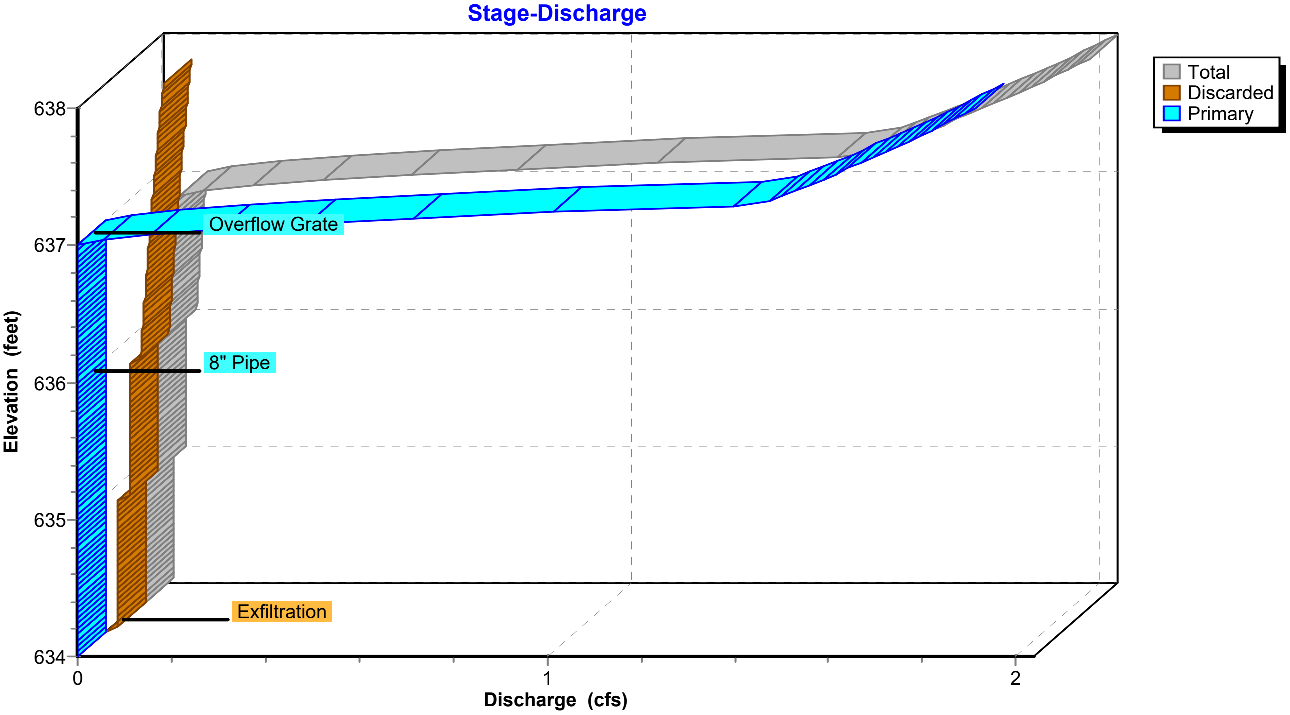
Discarded OutFlow Max=0.09 cfs @ 9.00 hrs HW=636.73' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.09 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=634.00' TW=630.00' (Dynamic Tailwater)
↑—**2=8" Pipe** (Controls 0.00 cfs)
  ↑—**3=Overflow Grate** (Controls 0.00 cfs)

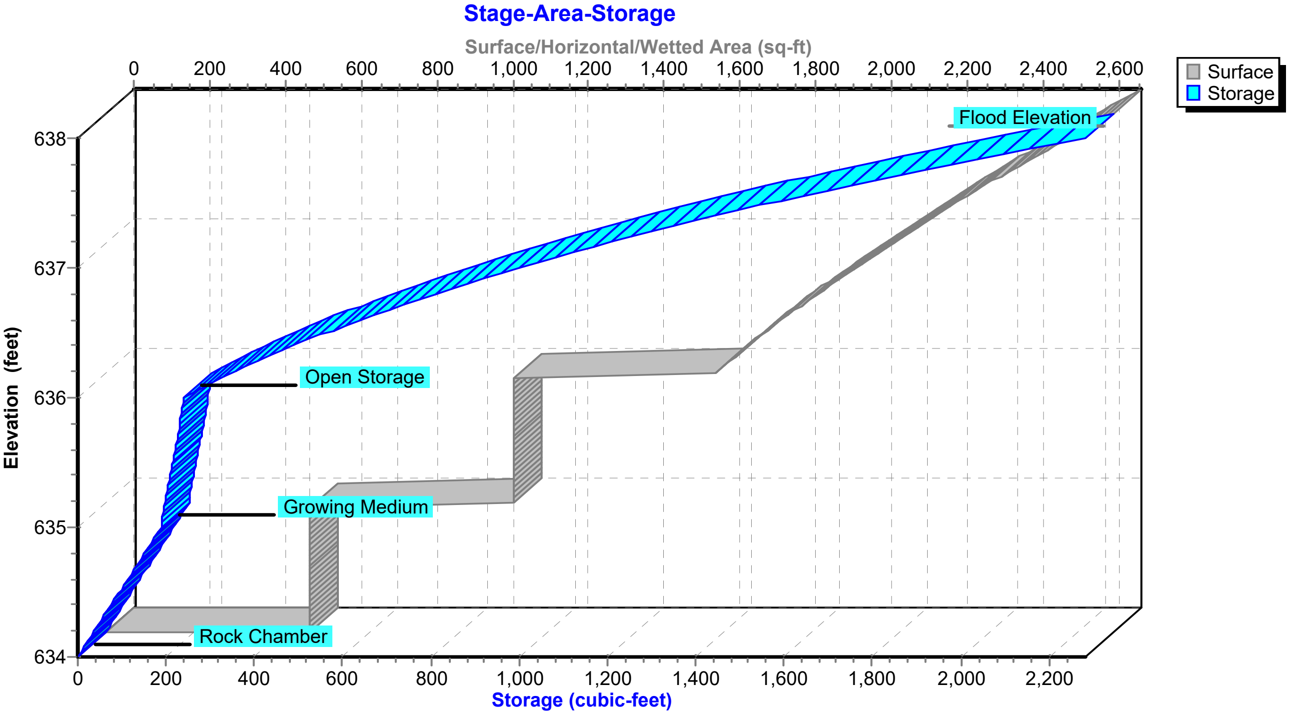
Pond 49P: Pond #4



Pond 49P: Pond #4



Pond 49P: Pond #4



Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment8S: Apt Building 1 Runoff Area=2,073 sf 100.00% Impervious Runoff Depth=1.18"
Tc=5.0 min CN=0/98 Runoff=0.01 cfs 0.005 af

Subcatchment9S: Apt Building 2 Runoff Area=5,606 sf 100.00% Impervious Runoff Depth=1.18"
Tc=5.0 min CN=0/98 Runoff=0.04 cfs 0.013 af

Subcatchment10S: Apt Building 3 Runoff Area=5,606 sf 100.00% Impervious Runoff Depth=1.18"
Tc=5.0 min CN=0/98 Runoff=0.04 cfs 0.013 af

Subcatchment11S: Apt Building 4 Runoff Area=5,606 sf 100.00% Impervious Runoff Depth=1.18"
Tc=5.0 min CN=0/98 Runoff=0.04 cfs 0.013 af

Subcatchment12S: Apt Building 5 Runoff Area=5,606 sf 100.00% Impervious Runoff Depth=1.18"
Tc=5.0 min CN=0/98 Runoff=0.04 cfs 0.013 af

Subcatchment13S: Apt Building 6 Runoff Area=5,606 sf 100.00% Impervious Runoff Depth=1.18"
Tc=5.0 min CN=0/98 Runoff=0.04 cfs 0.013 af

Subcatchment14S: Apt Building 7 Runoff Area=5,606 sf 100.00% Impervious Runoff Depth=1.18"
Tc=5.0 min CN=0/98 Runoff=0.04 cfs 0.013 af

Subcatchment15S: Apt Building 8 Runoff Area=5,606 sf 100.00% Impervious Runoff Depth=1.18"
Tc=5.0 min CN=0/98 Runoff=0.04 cfs 0.013 af

Subcatchment16S: Apt Building 9 Runoff Area=5,606 sf 100.00% Impervious Runoff Depth=1.18"
Tc=5.0 min CN=0/98 Runoff=0.04 cfs 0.013 af

Subcatchment17S: Apt Building 10 Runoff Area=5,606 sf 100.00% Impervious Runoff Depth=1.18"
Tc=5.0 min CN=0/98 Runoff=0.04 cfs 0.013 af

Subcatchment18S: Apt Building 11 Runoff Area=5,606 sf 100.00% Impervious Runoff Depth=1.18"
Tc=5.0 min CN=0/98 Runoff=0.04 cfs 0.013 af

Subcatchment19S: Apt Building 12 Runoff Area=5,606 sf 100.00% Impervious Runoff Depth=1.18"
Tc=5.0 min CN=0/98 Runoff=0.04 cfs 0.013 af

Subcatchment20S: Apt Building 13 Runoff Area=5,606 sf 100.00% Impervious Runoff Depth=1.18"
Tc=5.0 min CN=0/98 Runoff=0.04 cfs 0.013 af

Subcatchment21S: Apt Building 14 Runoff Area=5,606 sf 100.00% Impervious Runoff Depth=1.18"
Tc=5.0 min CN=0/98 Runoff=0.04 cfs 0.013 af

Subcatchment22S: Apt Building 15 Runoff Area=5,606 sf 100.00% Impervious Runoff Depth=1.18"
Tc=5.0 min CN=0/98 Runoff=0.04 cfs 0.013 af

Subcatchment23S: Apt Building 16 Runoff Area=5,606 sf 100.00% Impervious Runoff Depth=1.18"
Tc=5.0 min CN=0/98 Runoff=0.04 cfs 0.013 af

Subcatchment26S: P1 Runoff Area=5,680 sf 100.00% Impervious Runoff Depth=1.18"
Tc=5.0 min CN=0/98 Runoff=0.04 cfs 0.013 af

Subcatchment27S: P2 Runoff Area=4,460 sf 100.00% Impervious Runoff Depth=1.18"
Tc=5.0 min CN=0/98 Runoff=0.03 cfs 0.010 af

Subcatchment28S: P3 Runoff Area=11,250 sf 100.00% Impervious Runoff Depth=1.18"
Tc=5.0 min CN=0/98 Runoff=0.08 cfs 0.025 af

Subcatchment29S: P4 Runoff Area=7,128 sf 100.00% Impervious Runoff Depth=1.18"
Tc=5.0 min CN=0/98 Runoff=0.05 cfs 0.016 af

Subcatchment30S: P5 Runoff Area=11,417 sf 100.00% Impervious Runoff Depth=1.18"
Tc=5.0 min CN=0/98 Runoff=0.08 cfs 0.026 af

Subcatchment31S: P6 Runoff Area=7,570 sf 100.00% Impervious Runoff Depth=1.18"
Tc=5.0 min CN=0/98 Runoff=0.05 cfs 0.017 af

Subcatchment32S: P7 Runoff Area=7,142 sf 100.00% Impervious Runoff Depth=1.18"
Tc=5.0 min CN=0/98 Runoff=0.05 cfs 0.016 af

Subcatchment33S: P8 Runoff Area=7,675 sf 100.00% Impervious Runoff Depth=1.18"
Tc=5.0 min CN=0/98 Runoff=0.05 cfs 0.017 af

Subcatchment34S: P9 Runoff Area=6,421 sf 100.00% Impervious Runoff Depth=1.18"
Tc=5.0 min CN=0/98 Runoff=0.04 cfs 0.015 af

Subcatchment35S: P10 Runoff Area=6,146 sf 100.00% Impervious Runoff Depth=1.18"
Tc=5.0 min CN=0/98 Runoff=0.04 cfs 0.014 af

Subcatchment36S: P11 Runoff Area=7,429 sf 100.00% Impervious Runoff Depth=1.18"
Tc=5.0 min CN=0/98 Runoff=0.05 cfs 0.017 af

Subcatchment37S: P12 Runoff Area=9,368 sf 100.00% Impervious Runoff Depth=1.18"
Tc=5.0 min CN=0/98 Runoff=0.07 cfs 0.021 af

Subcatchment38S: P13 Runoff Area=5,595 sf 100.00% Impervious Runoff Depth=1.18"
Tc=5.0 min CN=0/98 Runoff=0.04 cfs 0.013 af

Subcatchment39S: P14 Runoff Area=4,779 sf 100.00% Impervious Runoff Depth=1.18"
Tc=5.0 min CN=0/98 Runoff=0.03 cfs 0.011 af

Subcatchment40S: P15 Runoff Area=4,741 sf 100.00% Impervious Runoff Depth=1.18"
Tc=5.0 min CN=0/98 Runoff=0.03 cfs 0.011 af

Subcatchment41S: P16 Runoff Area=8,967 sf 100.00% Impervious Runoff Depth=1.18"
Tc=5.0 min CN=0/98 Runoff=0.06 cfs 0.020 af

Subcatchment50S: Existing Buildings Runoff Area=44,242 sf 100.00% Impervious Runoff Depth=1.18"
Tc=5.0 min CN=0/98 Runoff=0.31 cfs 0.100 af

Subcatchment51S: Existing Impervious Runoff Area=68,924 sf 100.00% Impervious Runoff Depth=1.18"
Tc=5.0 min CN=0/98 Runoff=0.48 cfs 0.156 af

Subcatchment52S: Existing Landscape Runoff Area=82,633 sf 0.00% Impervious Runoff Depth=0.02"
Tc=60.0 min CN=65/0 Runoff=0.01 cfs 0.003 af

Subcatchment94S: Pond #3 Runoff Area=4,349 sf 100.00% Impervious Runoff Depth=1.18"
Tc=5.0 min CN=0/98 Runoff=0.03 cfs 0.010 af

Subcatchment95S: Pond #1 Runoff Area=4,554 sf 100.00% Impervious Runoff Depth=1.18"
Tc=5.0 min CN=0/98 Runoff=0.03 cfs 0.010 af

Subcatchment96S: Pond #2 Runoff Area=2,830 sf 100.00% Impervious Runoff Depth=1.18"
Tc=5.0 min CN=0/98 Runoff=0.02 cfs 0.006 af

Subcatchment97S: Pond #4 Runoff Area=1,585 sf 100.00% Impervious Runoff Depth=1.18"
Tc=5.0 min CN=0/98 Runoff=0.01 cfs 0.004 af

Reach 50R: Discharge Inflow=0.07 cfs 0.023 af
Outflow=0.07 cfs 0.023 af

Reach 53R: Existing Discharge Inflow=0.79 cfs 0.259 af
Outflow=0.79 cfs 0.259 af

Pond 46P: Pond #1 Peak Elev=634.08' Storage=2,463 cf Inflow=0.64 cfs 0.208 af
Discarded=0.13 cfs 0.208 af Primary=0.00 cfs 0.000 af Outflow=0.13 cfs 0.208 af

Pond 47P: Pond #3 Peak Elev=633.29' Storage=904 cf Inflow=0.34 cfs 0.111 af
Discarded=0.10 cfs 0.111 af Primary=0.00 cfs 0.000 af Outflow=0.10 cfs 0.111 af

Pond 48P: Pond #2 Peak Elev=634.94' Storage=1,329 cf Inflow=0.35 cfs 0.112 af
Discarded=0.07 cfs 0.112 af Primary=0.00 cfs 0.000 af Outflow=0.07 cfs 0.112 af

Pond 49P: Pond #4 Peak Elev=635.01' Storage=189 cf Inflow=0.10 cfs 0.034 af
Discarded=0.05 cfs 0.034 af Primary=0.00 cfs 0.000 af Outflow=0.05 cfs 0.034 af

Total Runoff Area = 9.436 ac Runoff Volume = 0.745 af Average Runoff Depth = 0.95"
20.10% Pervious = 1.897 ac 79.90% Impervious = 7.539 ac

Summary for Subcatchment 8S: Apt Building 1

[49] Hint: Tc<2dt may require smaller dt

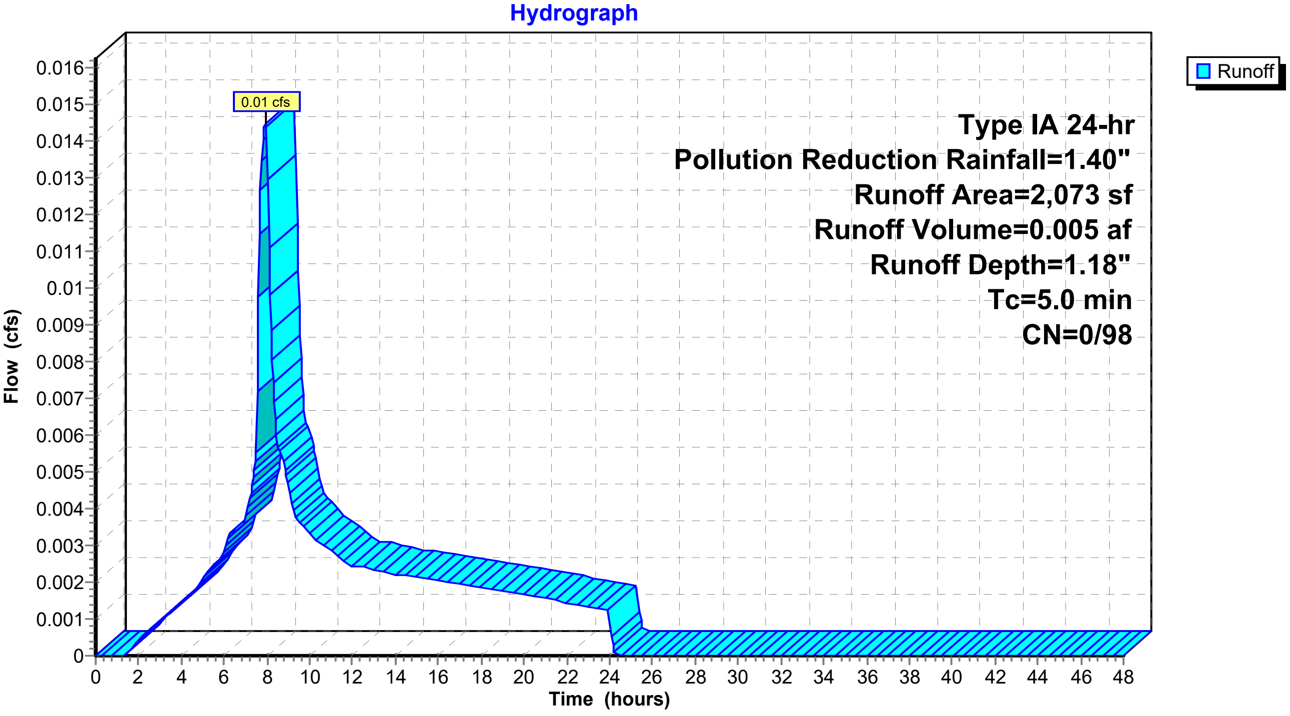
Runoff = 0.01 cfs @ 7.91 hrs, Volume= 0.005 af, Depth= 1.18"
Routed to Pond 49P : Pond #4

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Pollution Reduction Rainfall=1.40"

Area (sf)	CN	Description
2,073	98	Unconnected roofs, HSG B
2,073	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 8S: Apt Building 1



Summary for Subcatchment 9S: Apt Building 2

[49] Hint: Tc<2dt may require smaller dt

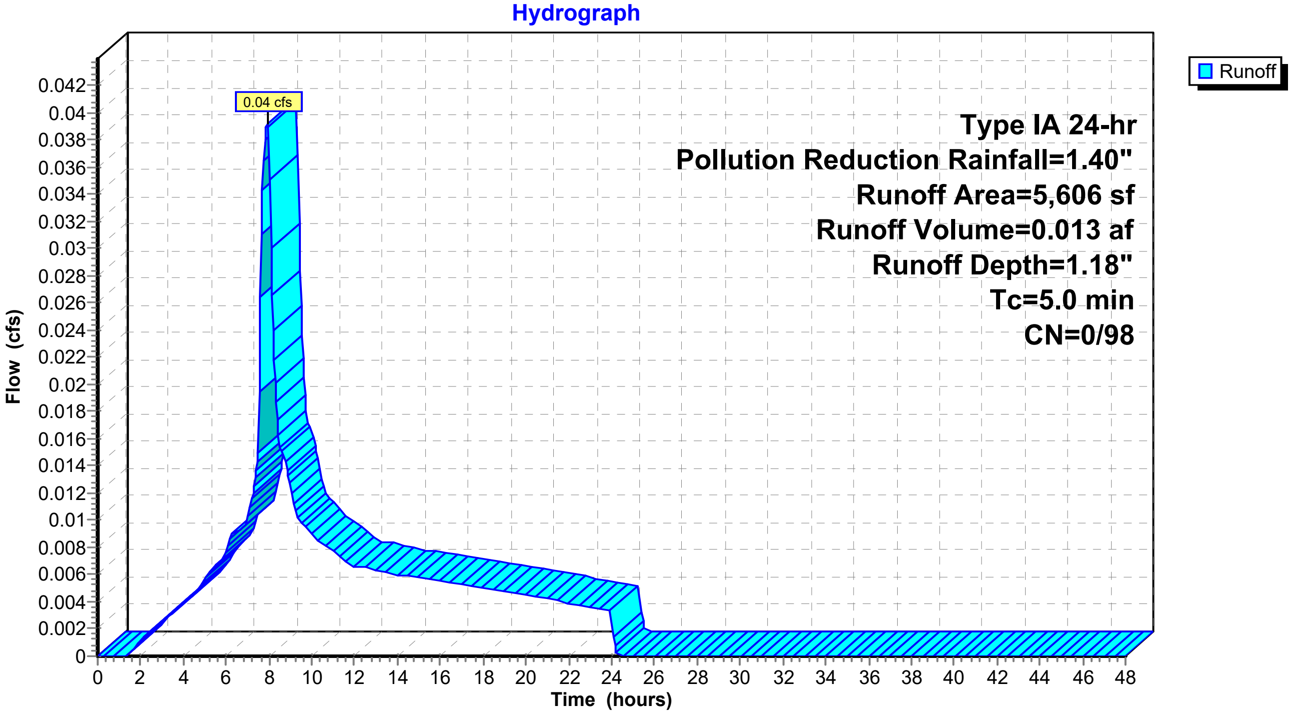
Runoff = 0.04 cfs @ 7.91 hrs, Volume= 0.013 af, Depth= 1.18"
Routed to Pond 49P : Pond #4

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Pollution Reduction Rainfall=1.40"

Area (sf)	CN	Description
5,606	98	Unconnected roofs, HSG B
5,606	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 9S: Apt Building 2



Summary for Subcatchment 10S: Apt Building 3

[49] Hint: Tc<2dt may require smaller dt

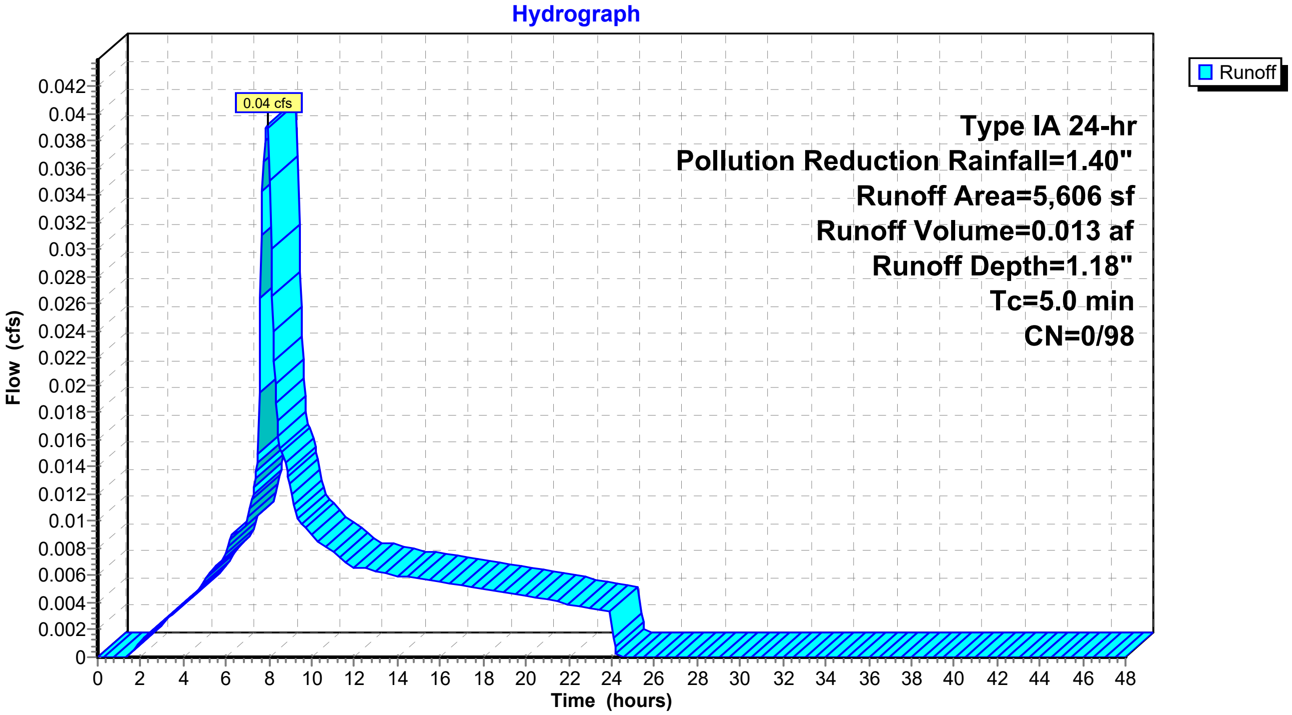
Runoff = 0.04 cfs @ 7.91 hrs, Volume= 0.013 af, Depth= 1.18"
Routed to Pond 49P : Pond #4

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Pollution Reduction Rainfall=1.40"

Area (sf)	CN	Description
5,606	98	Unconnected roofs, HSG B
5,606	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 10S: Apt Building 3



Summary for Subcatchment 11S: Apt Building 4

[49] Hint: Tc<2dt may require smaller dt

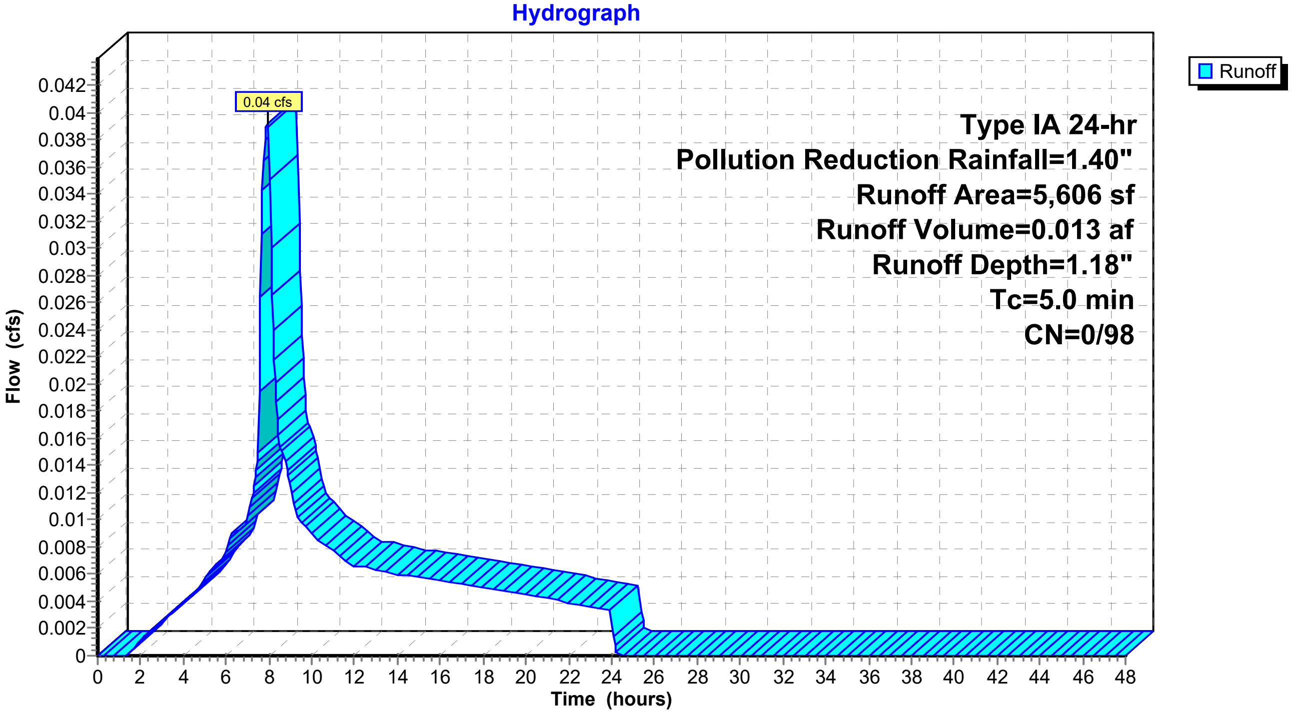
Runoff = 0.04 cfs @ 7.91 hrs, Volume= 0.013 af, Depth= 1.18"
Routed to Pond 46P : Pond #1

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Pollution Reduction Rainfall=1.40"

Area (sf)	CN	Description
5,606	98	Unconnected roofs, HSG B
5,606	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 11S: Apt Building 4



Summary for Subcatchment 12S: Apt Building 5

[49] Hint: Tc<2dt may require smaller dt

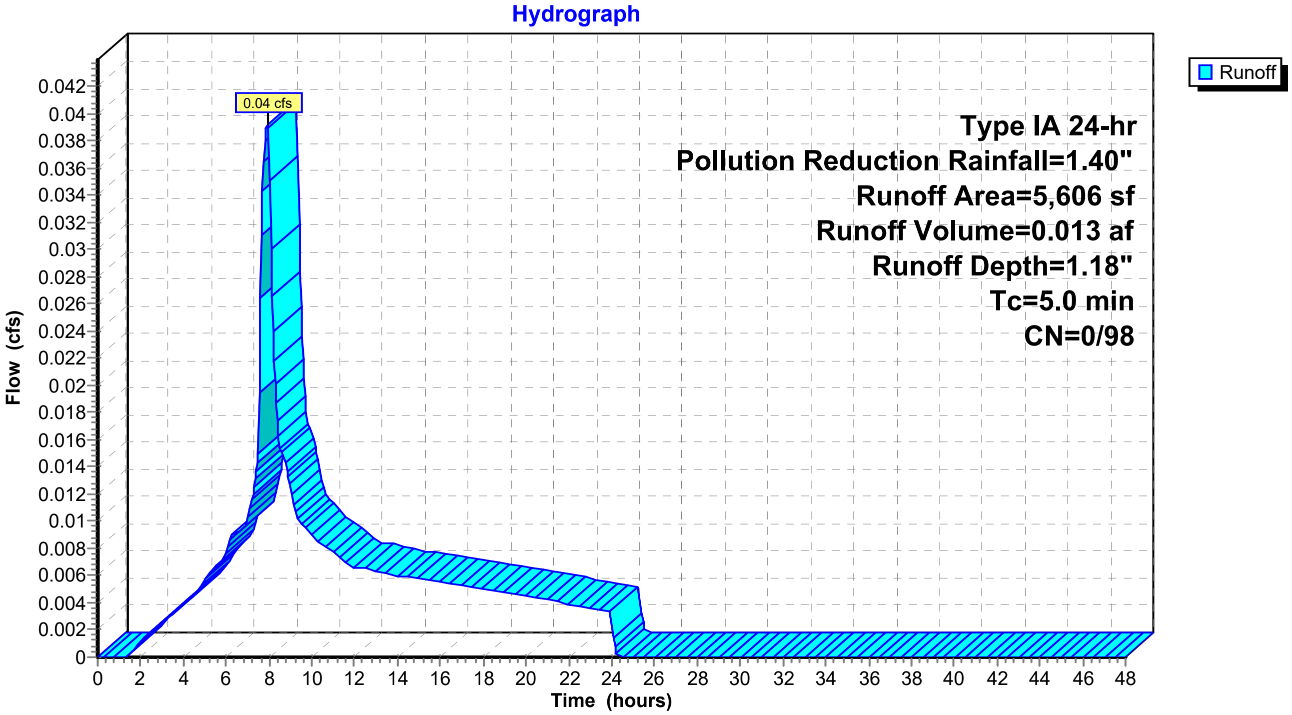
Runoff = 0.04 cfs @ 7.91 hrs, Volume= 0.013 af, Depth= 1.18"
Routed to Pond 46P : Pond #1

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Pollution Reduction Rainfall=1.40"

Area (sf)	CN	Description
5,606	98	Unconnected roofs, HSG B
5,606	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 12S: Apt Building 5



Summary for Subcatchment 13S: Apt Building 6

[49] Hint: Tc<2dt may require smaller dt

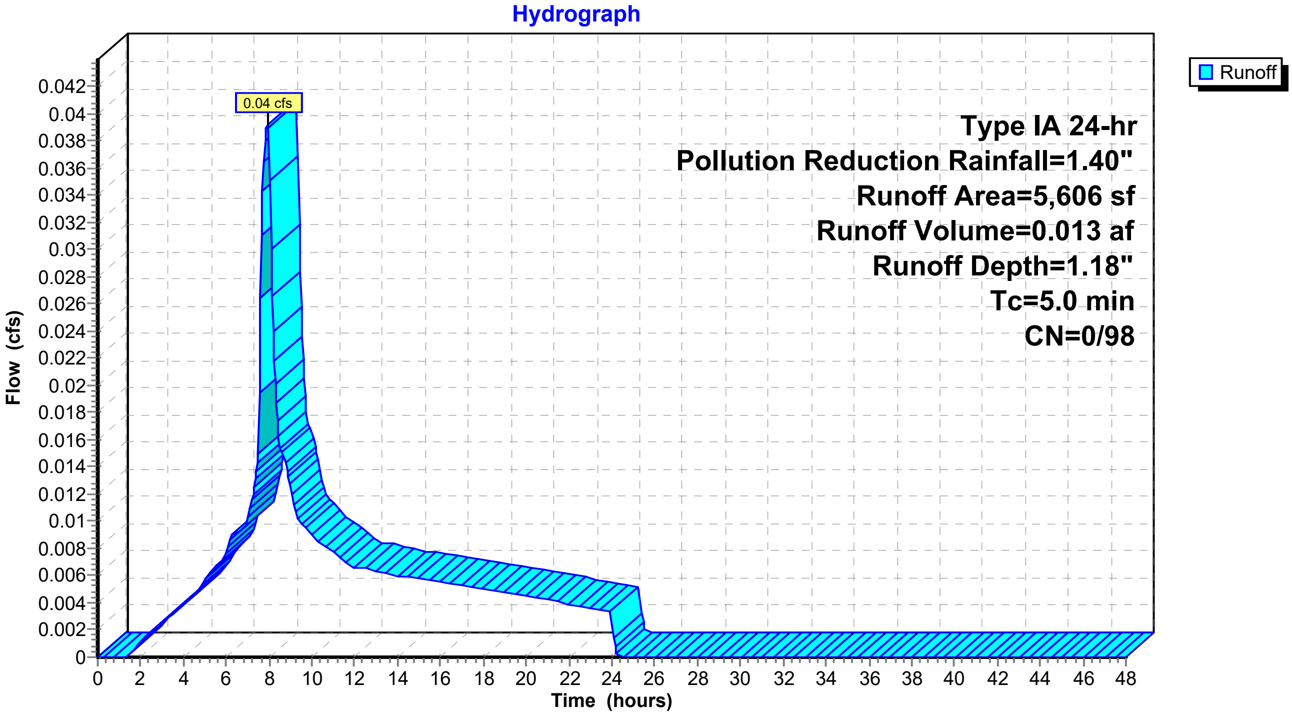
Runoff = 0.04 cfs @ 7.91 hrs, Volume= 0.013 af, Depth= 1.18"
Routed to Pond 46P : Pond #1

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Pollution Reduction Rainfall=1.40"

Area (sf)	CN	Description
5,606	98	Unconnected roofs, HSG B
5,606	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 13S: Apt Building 6



Summary for Subcatchment 14S: Apt Building 7

[49] Hint: Tc<2dt may require smaller dt

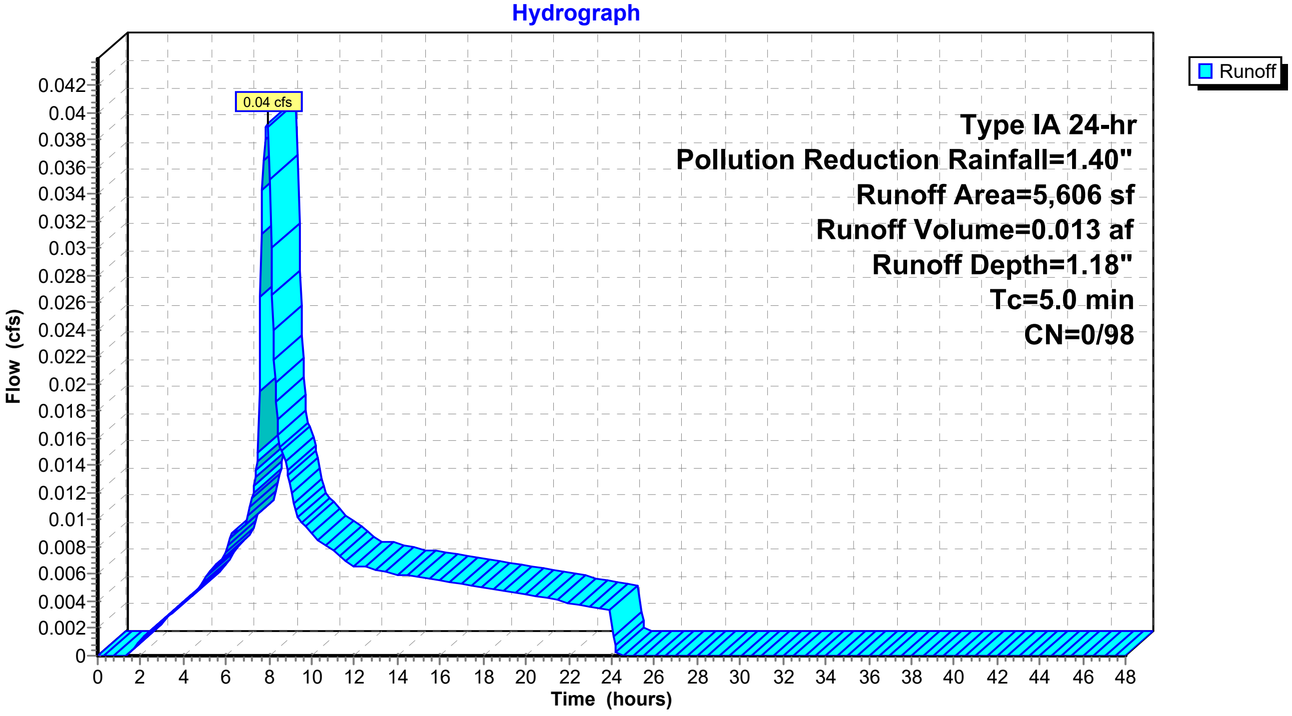
Runoff = 0.04 cfs @ 7.91 hrs, Volume= 0.013 af, Depth= 1.18"
Routed to Pond 47P : Pond #3

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Pollution Reduction Rainfall=1.40"

Area (sf)	CN	Description
5,606	98	Unconnected roofs, HSG B
5,606	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 14S: Apt Building 7



Summary for Subcatchment 15S: Apt Building 8

[49] Hint: Tc<2dt may require smaller dt

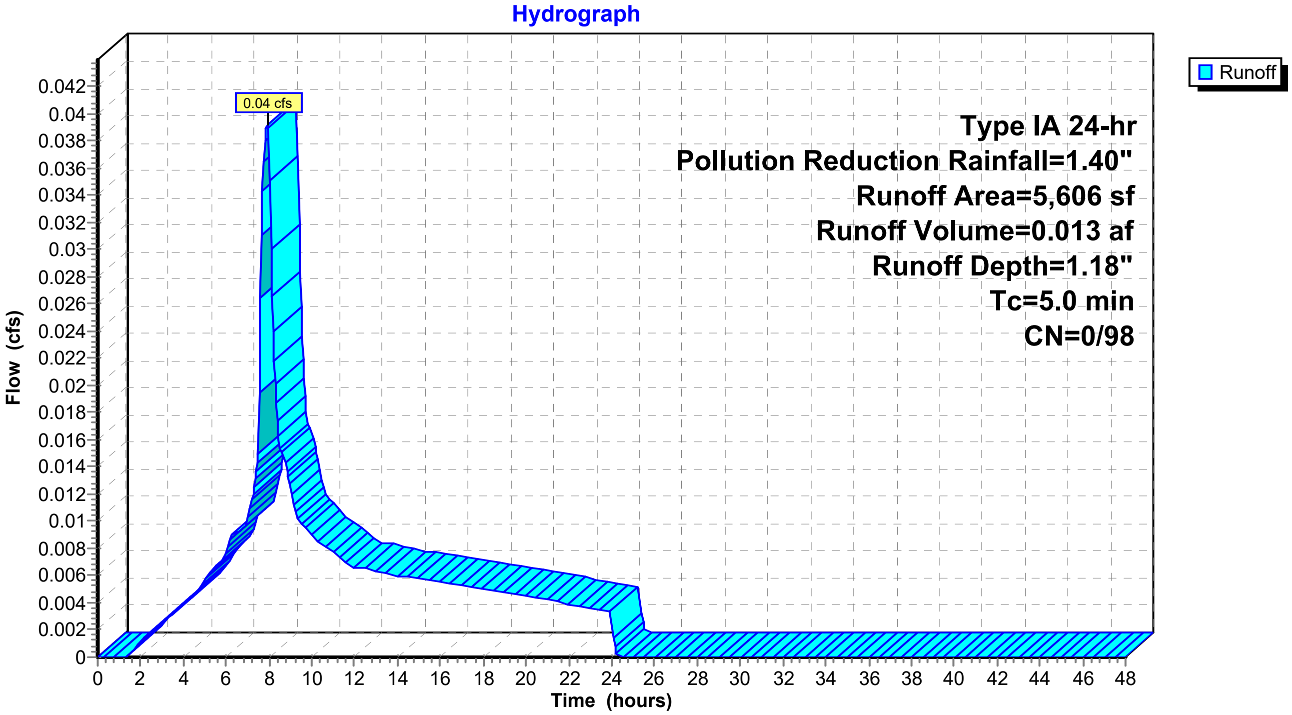
Runoff = 0.04 cfs @ 7.91 hrs, Volume= 0.013 af, Depth= 1.18"
Routed to Pond 47P : Pond #3

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Pollution Reduction Rainfall=1.40"

Area (sf)	CN	Description
5,606	98	Unconnected roofs, HSG B
5,606	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 15S: Apt Building 8



Summary for Subcatchment 16S: Apt Building 9

[49] Hint: Tc<2dt may require smaller dt

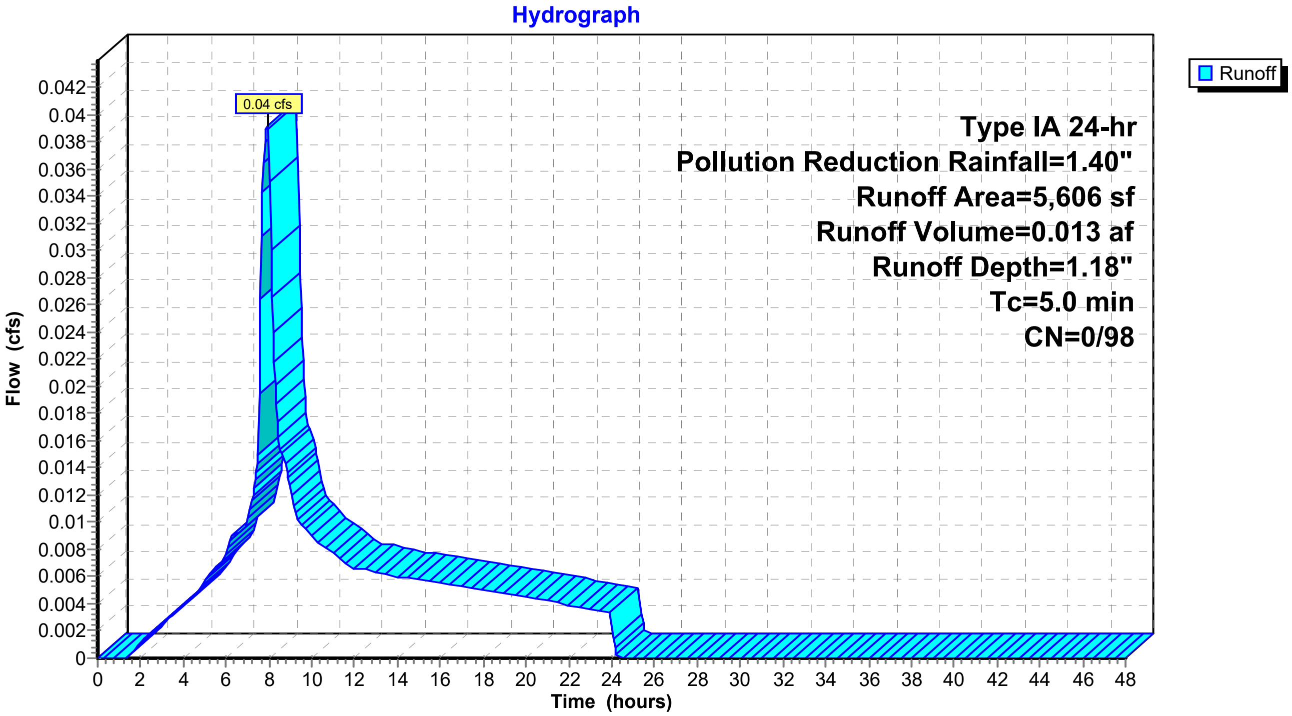
Runoff = 0.04 cfs @ 7.91 hrs, Volume= 0.013 af, Depth= 1.18"
Routed to Pond 46P : Pond #1

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Pollution Reduction Rainfall=1.40"

Area (sf)	CN	Description
5,606	98	Unconnected roofs, HSG B
5,606	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 16S: Apt Building 9



Summary for Subcatchment 17S: Apt Building 10

[49] Hint: Tc<2dt may require smaller dt

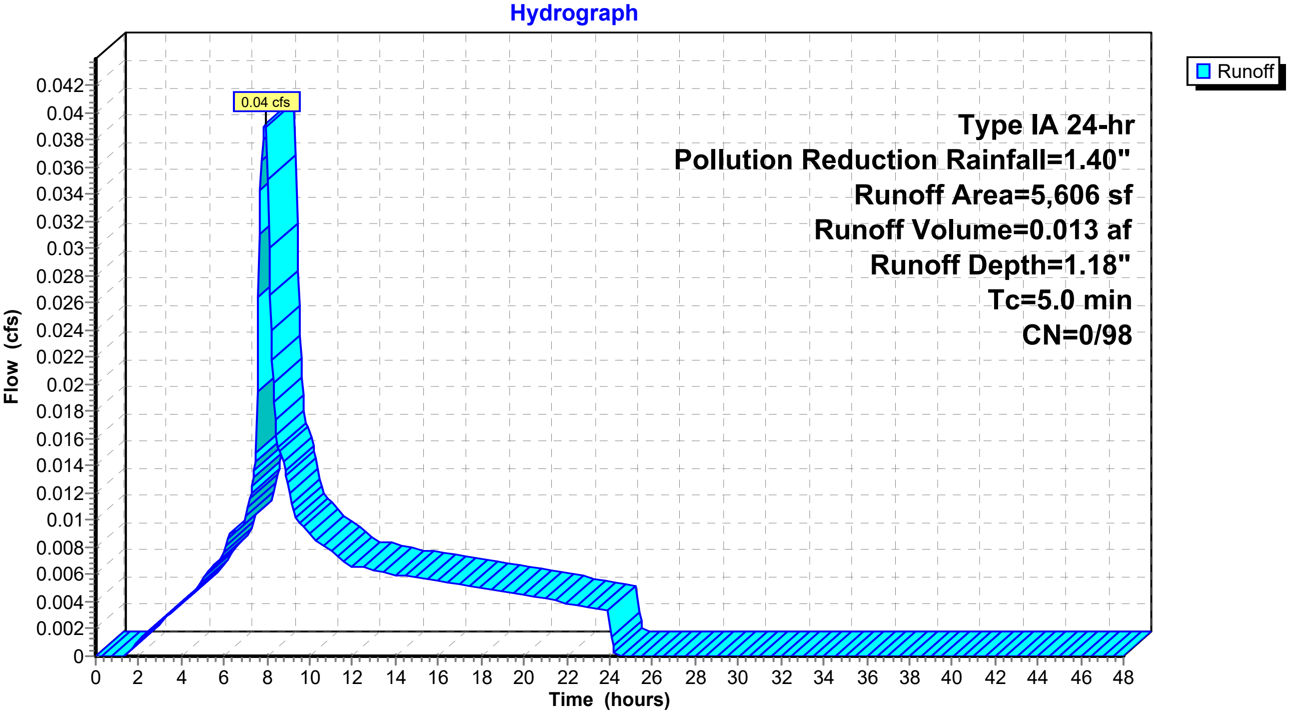
Runoff = 0.04 cfs @ 7.91 hrs, Volume= 0.013 af, Depth= 1.18"
Routed to Pond 46P : Pond #1

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Pollution Reduction Rainfall=1.40"

Area (sf)	CN	Description
5,606	98	Unconnected roofs, HSG B
5,606	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 17S: Apt Building 10



Summary for Subcatchment 18S: Apt Building 11

[49] Hint: Tc<2dt may require smaller dt

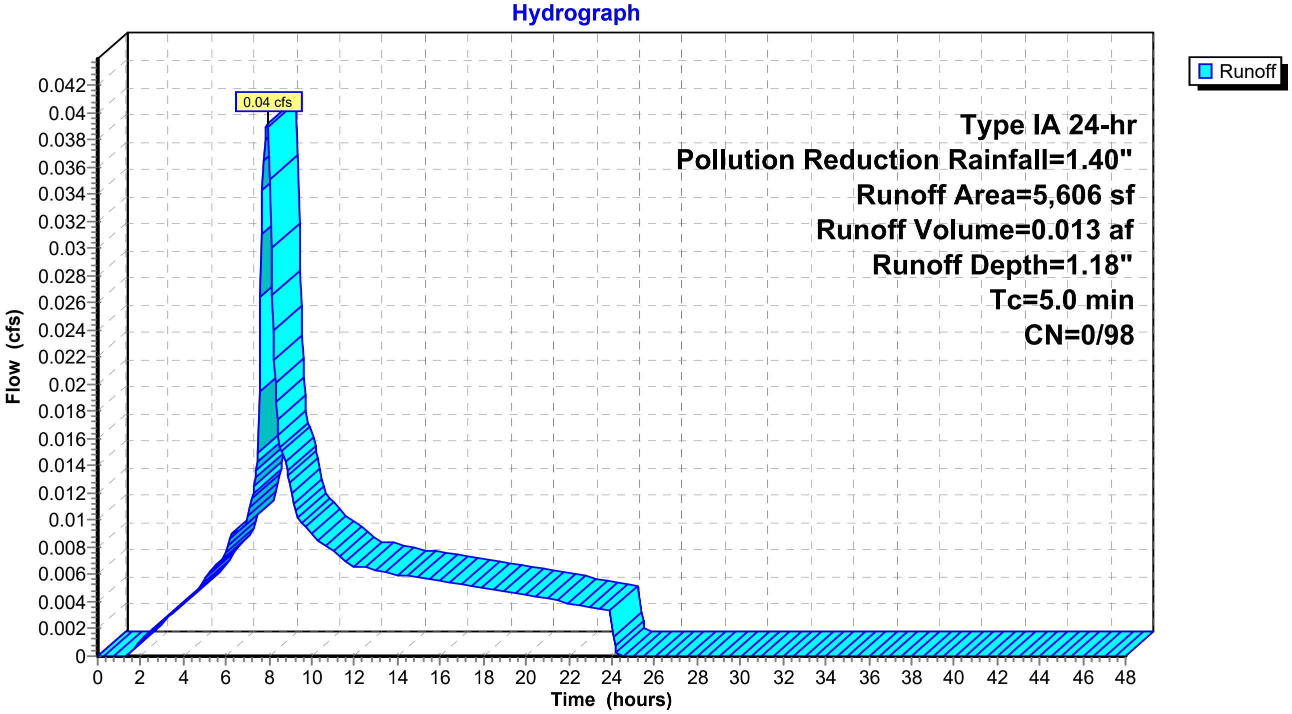
Runoff = 0.04 cfs @ 7.91 hrs, Volume= 0.013 af, Depth= 1.18"
Routed to Pond 46P : Pond #1

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Pollution Reduction Rainfall=1.40"

Area (sf)	CN	Description
5,606	98	Unconnected roofs, HSG B
5,606	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 18S: Apt Building 11



Summary for Subcatchment 19S: Apt Building 12

[49] Hint: Tc<2dt may require smaller dt

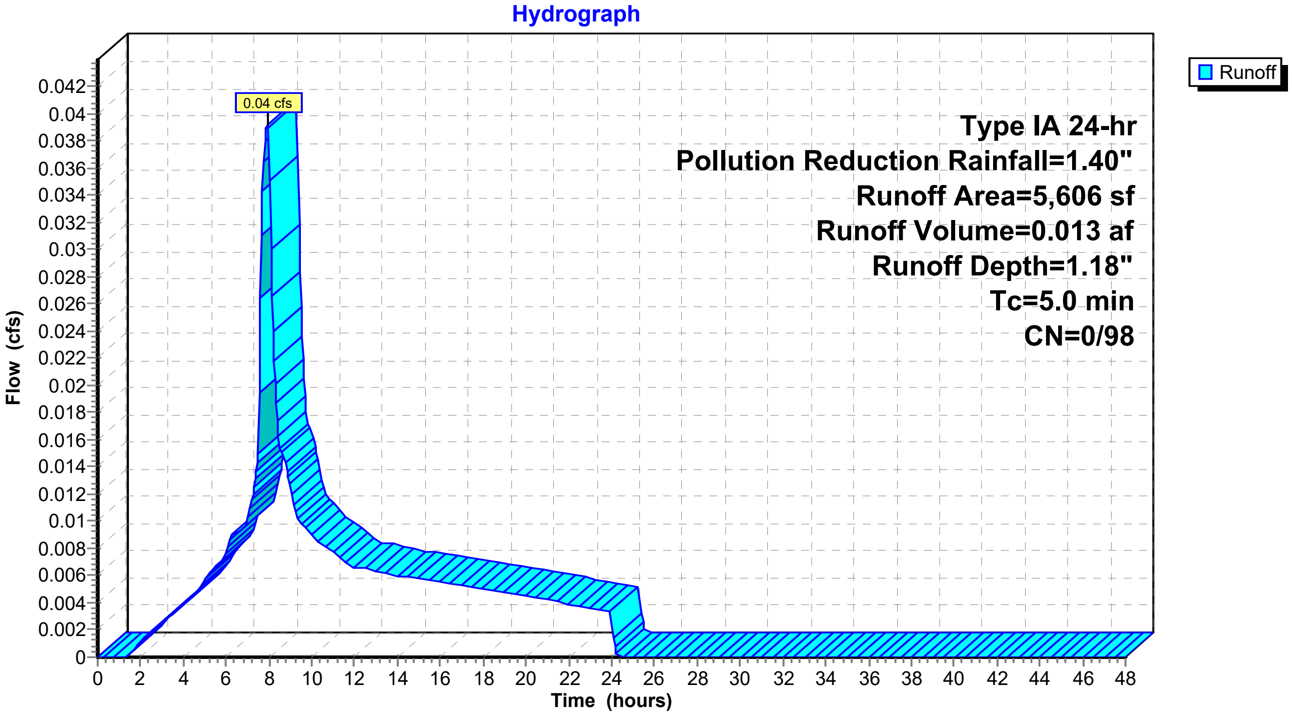
Runoff = 0.04 cfs @ 7.91 hrs, Volume= 0.013 af, Depth= 1.18"
Routed to Pond 46P : Pond #1

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Pollution Reduction Rainfall=1.40"

Area (sf)	CN	Description
5,606	98	Unconnected roofs, HSG B
5,606	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 19S: Apt Building 12



Summary for Subcatchment 20S: Apt Building 13

[49] Hint: Tc<2dt may require smaller dt

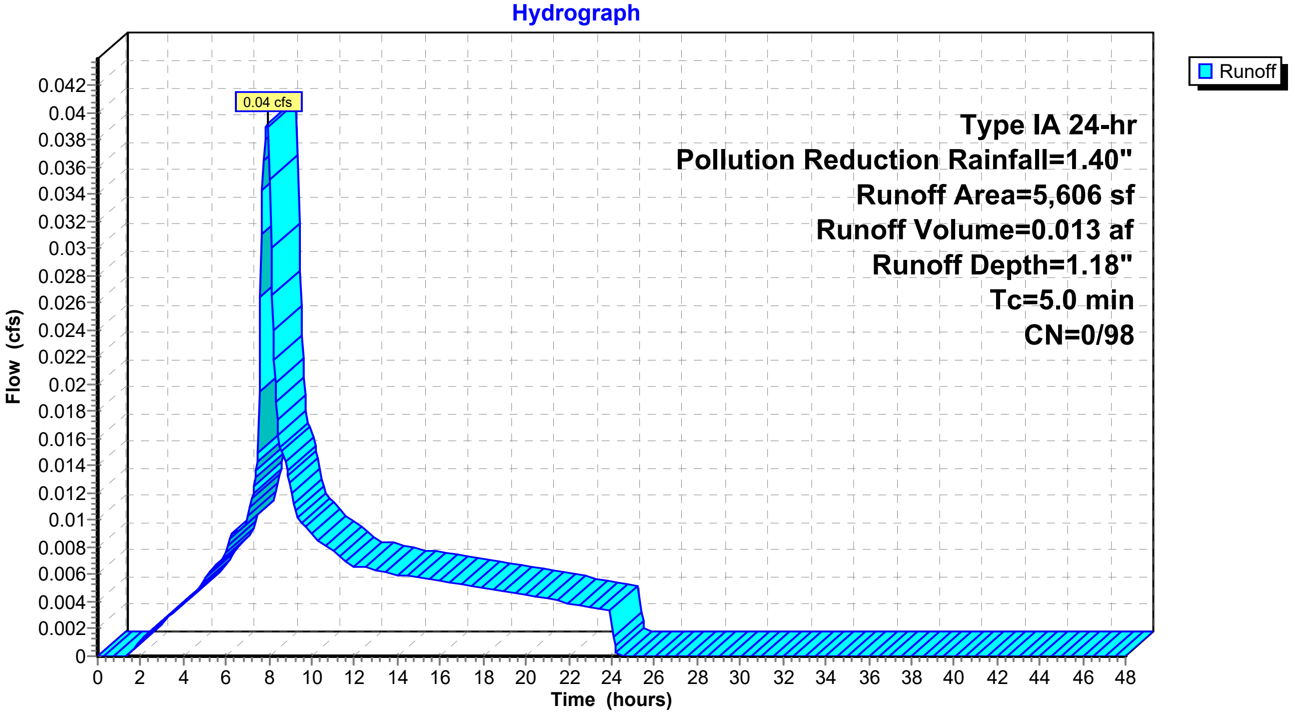
Runoff = 0.04 cfs @ 7.91 hrs, Volume= 0.013 af, Depth= 1.18"
Routed to Pond 46P : Pond #1

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Pollution Reduction Rainfall=1.40"

Area (sf)	CN	Description
5,606	98	Unconnected roofs, HSG B
5,606	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 20S: Apt Building 13



Summary for Subcatchment 21S: Apt Building 14

[49] Hint: Tc<2dt may require smaller dt

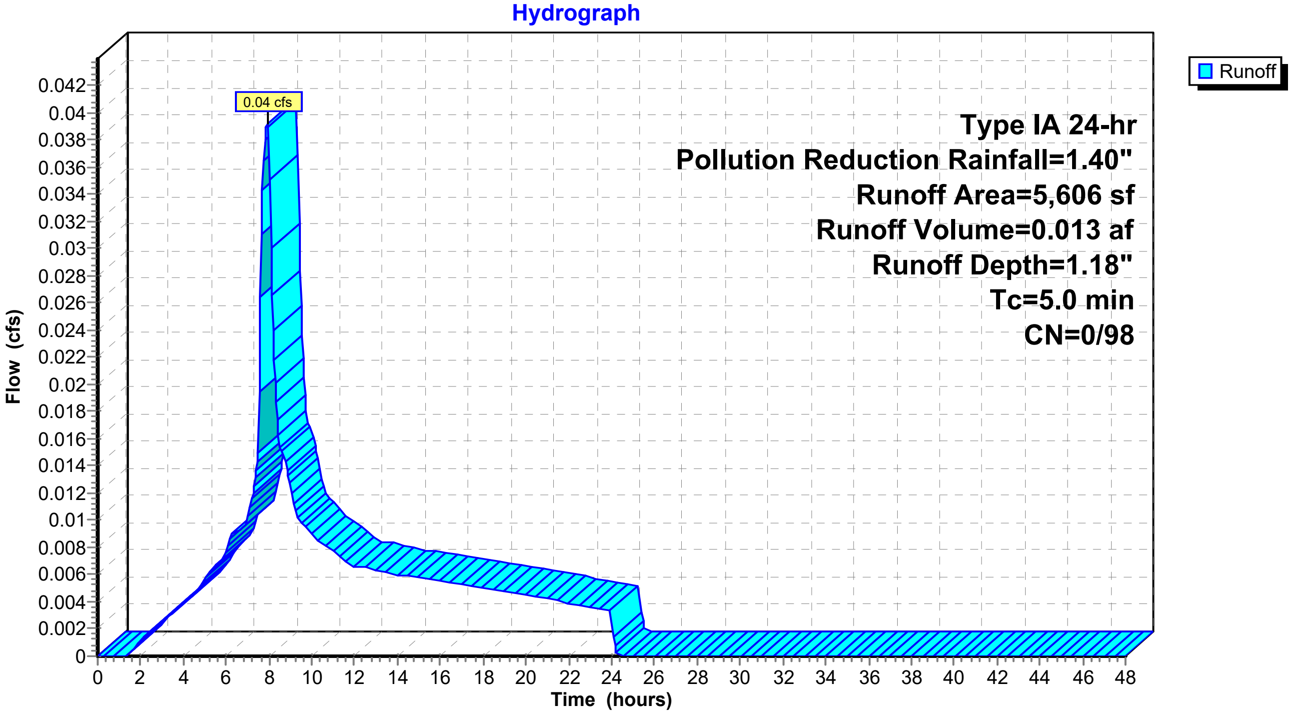
Runoff = 0.04 cfs @ 7.91 hrs, Volume= 0.013 af, Depth= 1.18"
Routed to Pond 48P : Pond #2

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Pollution Reduction Rainfall=1.40"

Area (sf)	CN	Description
5,606	98	Unconnected roofs, HSG B
5,606	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 21S: Apt Building 14



Summary for Subcatchment 22S: Apt Building 15

[49] Hint: Tc<2dt may require smaller dt

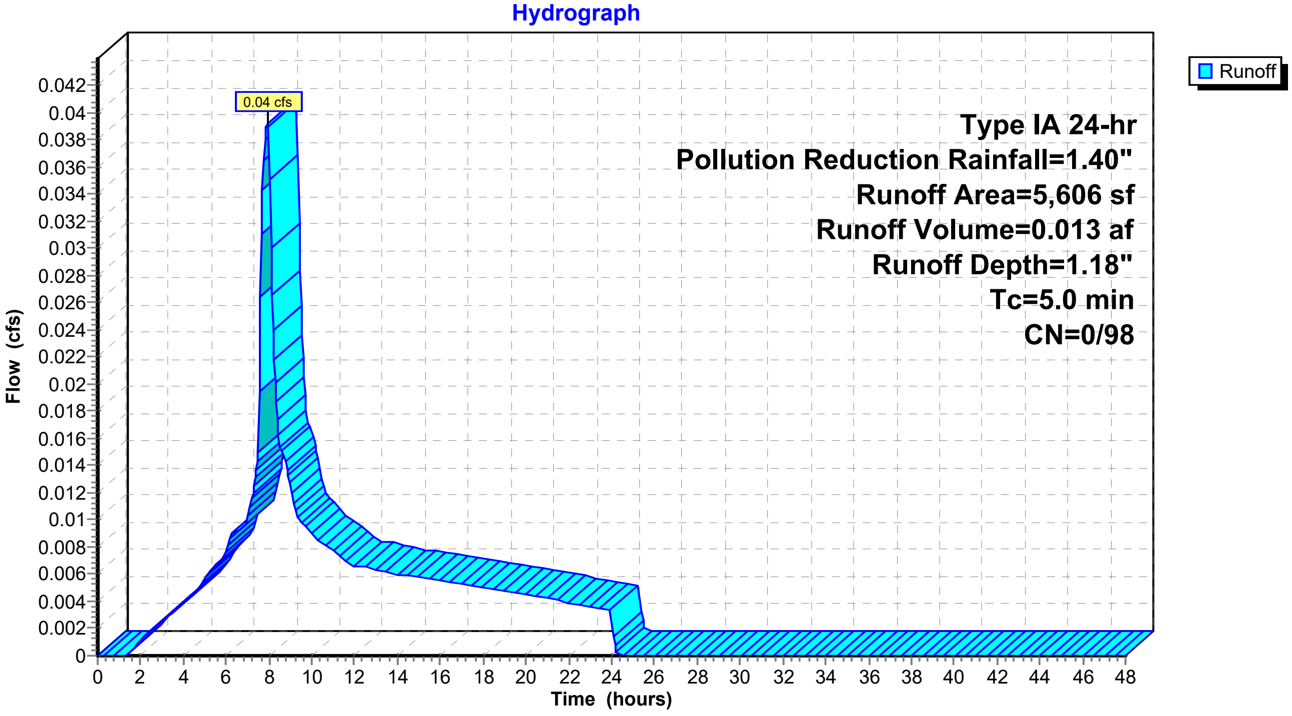
Runoff = 0.04 cfs @ 7.91 hrs, Volume= 0.013 af, Depth= 1.18"
Routed to Pond 48P : Pond #2

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Pollution Reduction Rainfall=1.40"

Area (sf)	CN	Description
5,606	98	Unconnected roofs, HSG B
5,606	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 22S: Apt Building 15



Summary for Subcatchment 23S: Apt Building 16

[49] Hint: Tc<2dt may require smaller dt

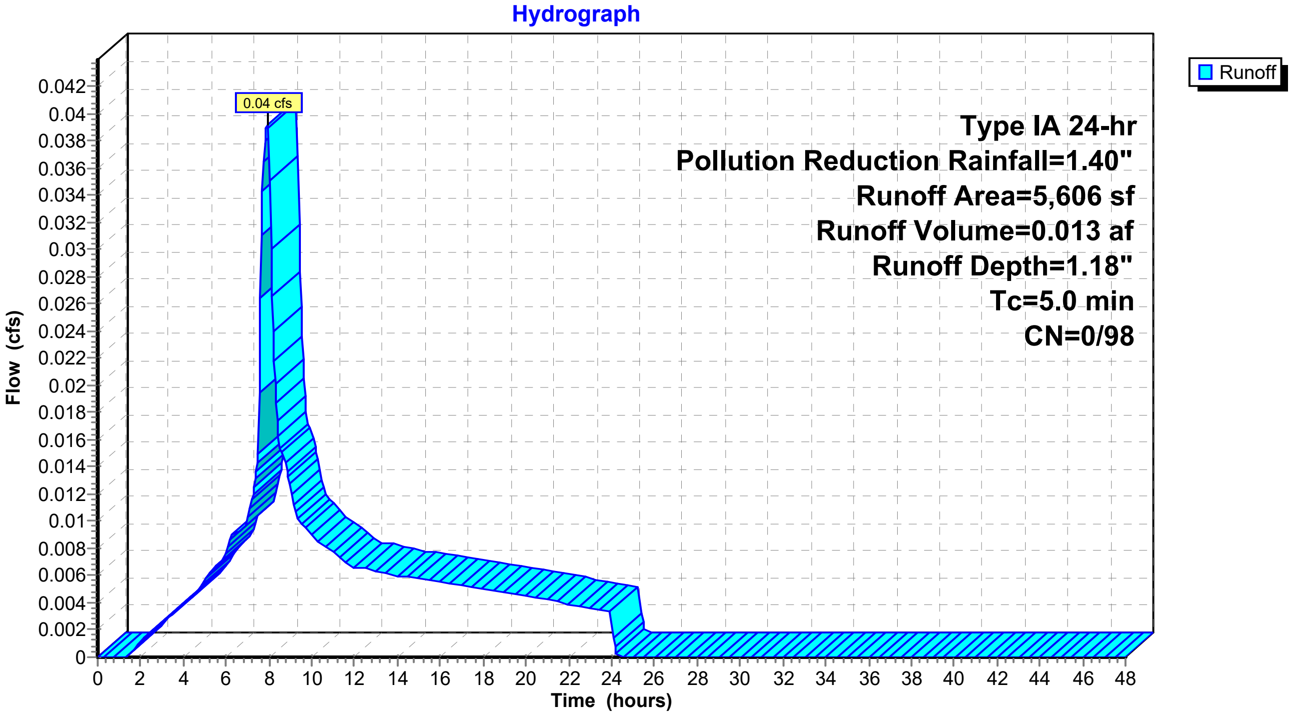
Runoff = 0.04 cfs @ 7.91 hrs, Volume= 0.013 af, Depth= 1.18"
Routed to Pond 48P : Pond #2

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Pollution Reduction Rainfall=1.40"

Area (sf)	CN	Description
5,606	98	Unconnected roofs, HSG B
5,606	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 23S: Apt Building 16



Summary for Subcatchment 26S: P1

Includes area from common drive aisle that serves Village Green Hotel.

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[49] Hint: Tc<2dt may require smaller dt

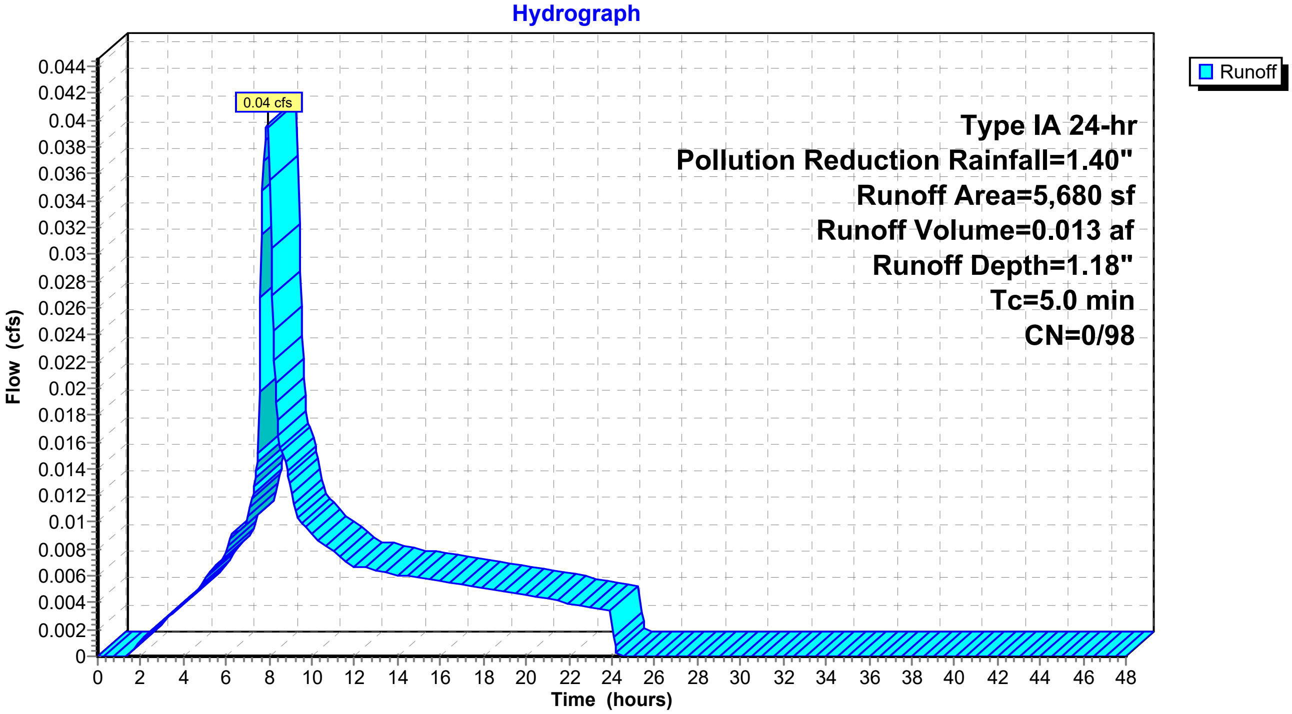
Runoff = 0.04 cfs @ 7.91 hrs, Volume= 0.013 af, Depth= 1.18"
Routed to Reach 50R : Discharge

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Pollution Reduction Rainfall=1.40"

	Area (sf)	CN	Description
*	5,680	98	Impervious Surface
	5,680	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 26S: P1



Summary for Subcatchment 27S: P2

Includes drive aisle that serves Village Green Hotel.

[49] Hint: Tc<2dt may require smaller dt

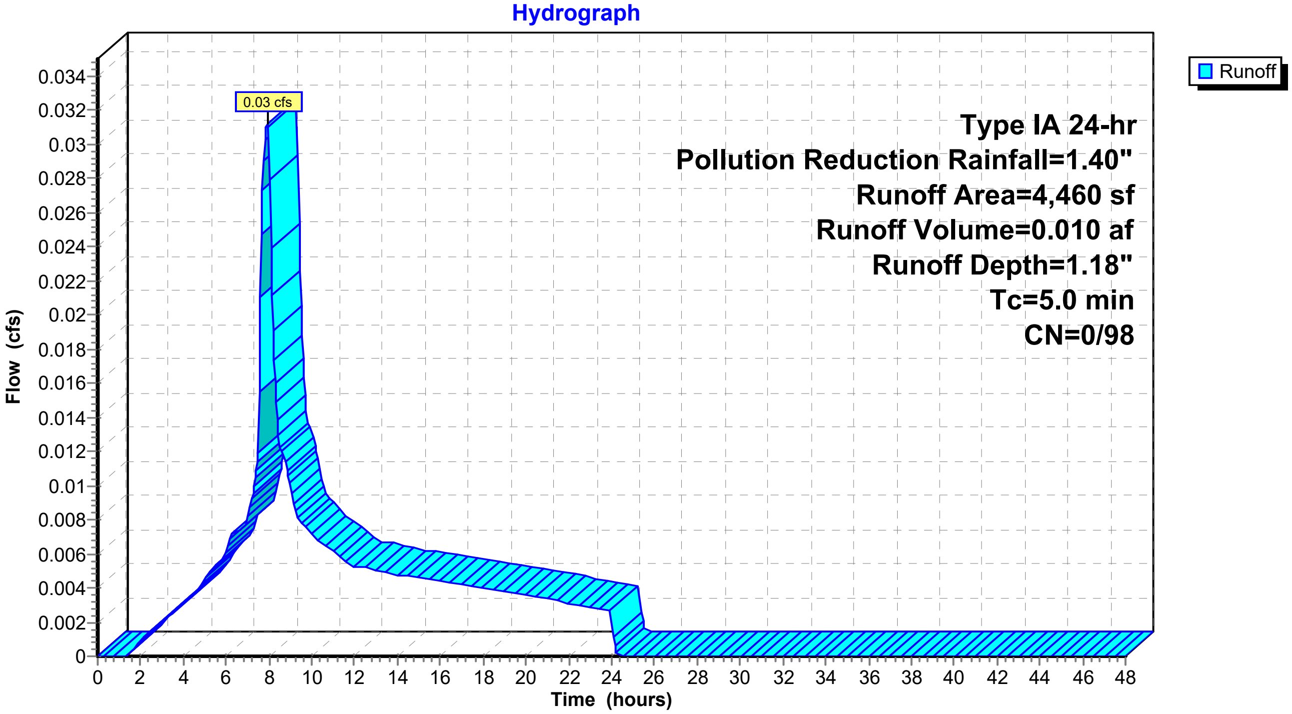
Runoff = 0.03 cfs @ 7.91 hrs, Volume= 0.010 af, Depth= 1.18"
Routed to Reach 50R : Discharge

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Pollution Reduction Rainfall=1.40"

	Area (sf)	CN	Description
*	4,460	98	Impervious Surface
	4,460	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 27S: P2



Summary for Subcatchment 28S: P3

[49] Hint: Tc<2dt may require smaller dt

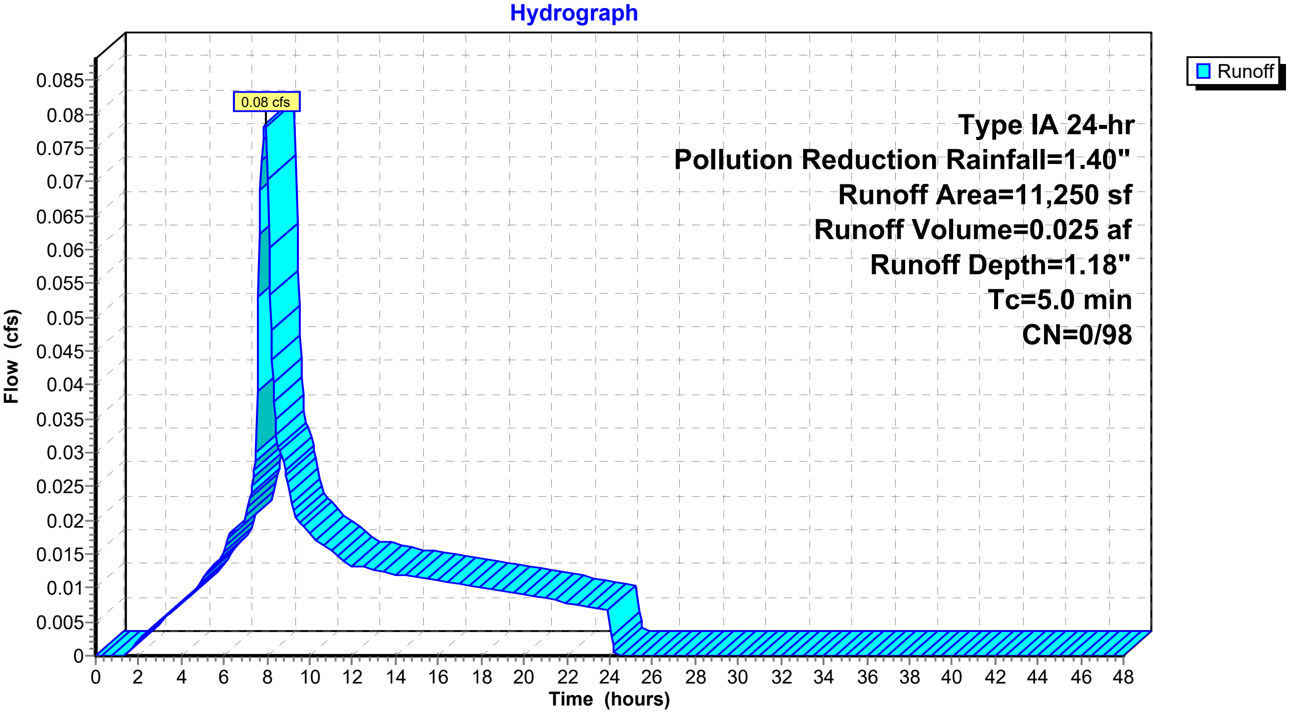
Runoff = 0.08 cfs @ 7.91 hrs, Volume= 0.025 af, Depth= 1.18"
Routed to Pond 48P : Pond #2

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Pollution Reduction Rainfall=1.40"

	Area (sf)	CN	Description
*	11,250	98	Impervious Surface
	11,250	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 28S: P3



Summary for Subcatchment 29S: P4

[49] Hint: Tc<2dt may require smaller dt

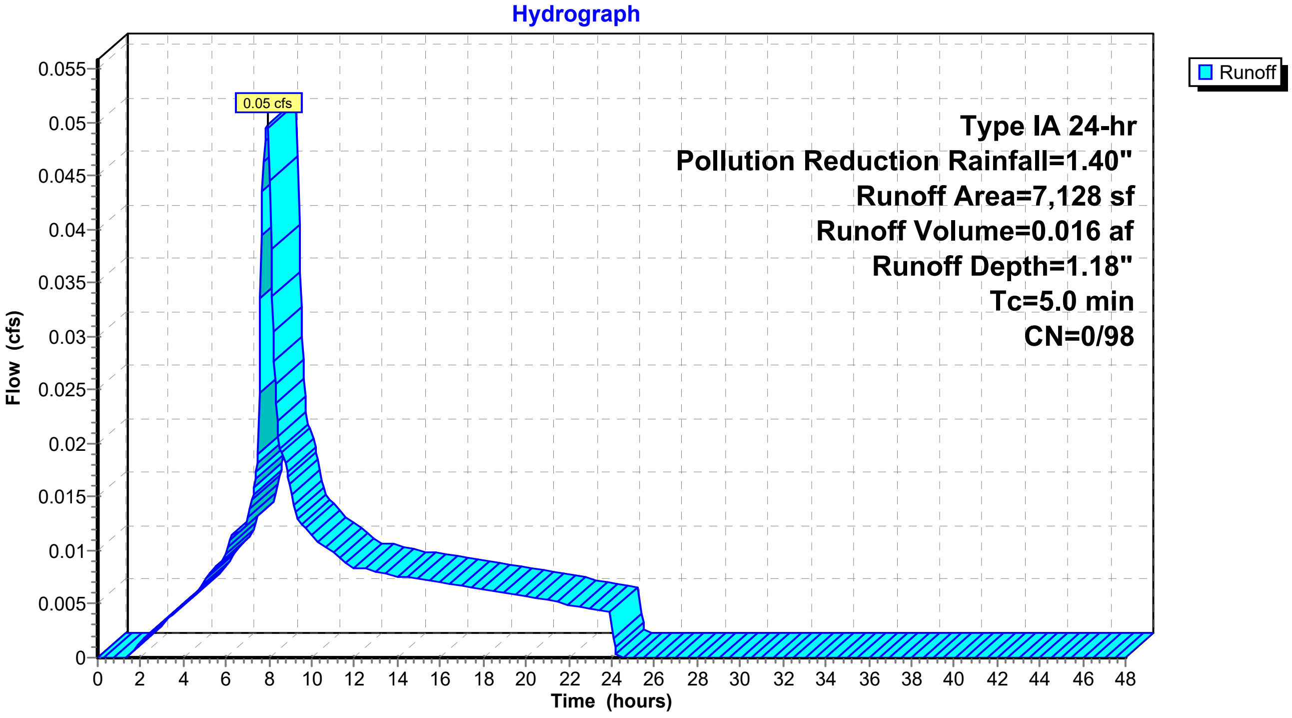
Runoff = 0.05 cfs @ 7.91 hrs, Volume= 0.016 af, Depth= 1.18"
Routed to Pond 48P : Pond #2

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Pollution Reduction Rainfall=1.40"

	Area (sf)	CN	Description
*	7,128	98	Impervious Surface
	7,128	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 29S: P4



Summary for Subcatchment 30S: P5

[49] Hint: Tc<2dt may require smaller dt

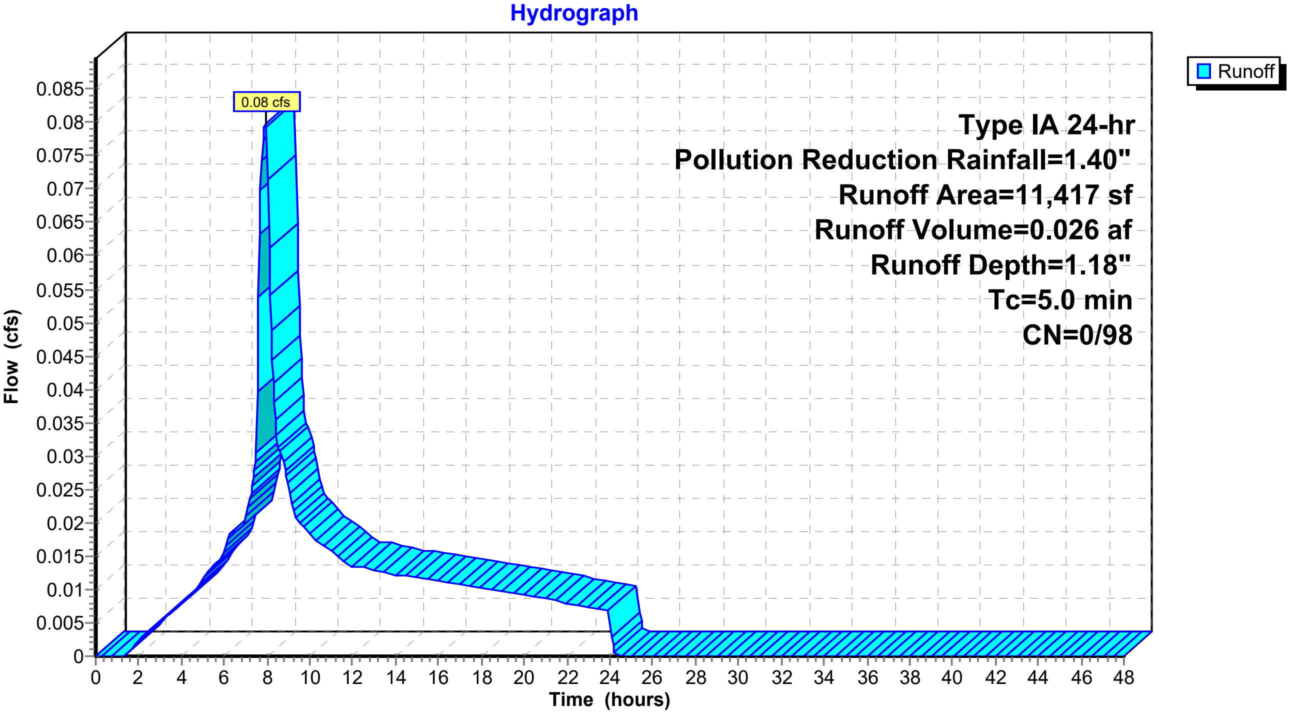
Runoff = 0.08 cfs @ 7.91 hrs, Volume= 0.026 af, Depth= 1.18"
Routed to Pond 48P : Pond #2

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Pollution Reduction Rainfall=1.40"

	Area (sf)	CN	Description
*	11,417	98	Impervious Surface
	11,417	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 30S: P5



Summary for Subcatchment 31S: P6

[49] Hint: Tc<2dt may require smaller dt

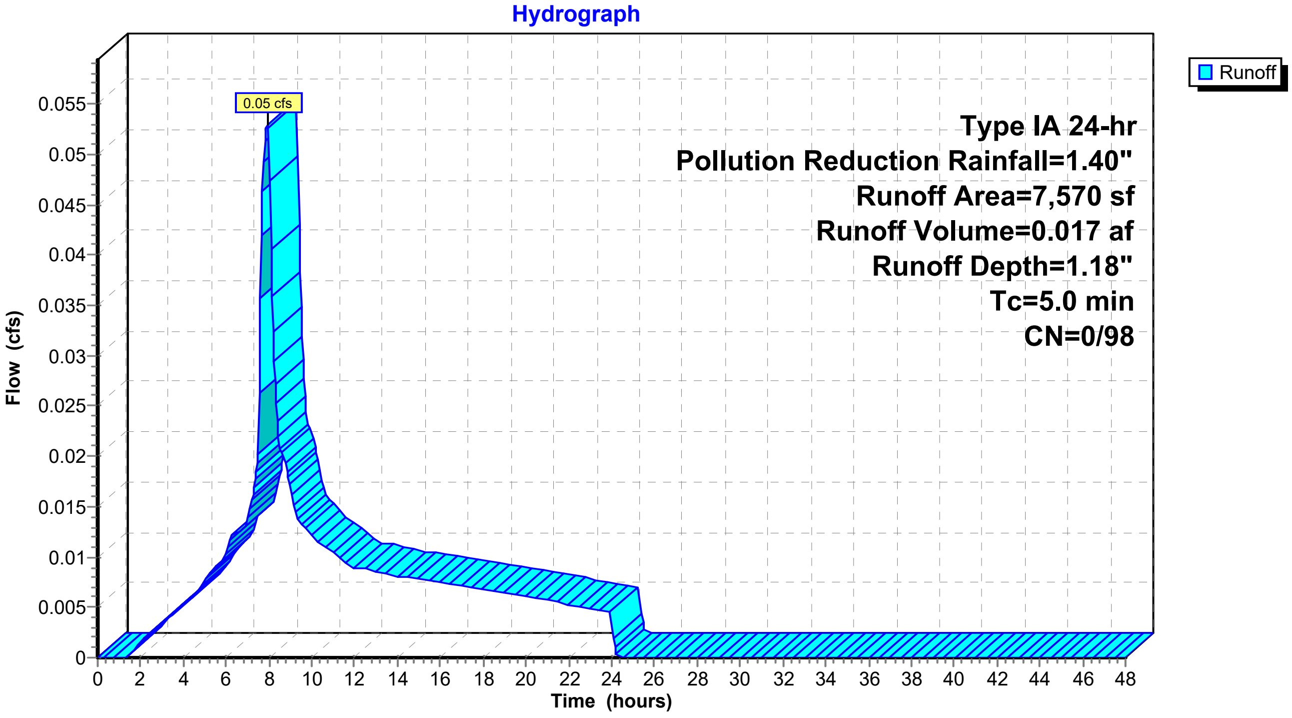
Runoff = 0.05 cfs @ 7.91 hrs, Volume= 0.017 af, Depth= 1.18"
Routed to Pond 46P : Pond #1

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Pollution Reduction Rainfall=1.40"

	Area (sf)	CN	Description
*	7,570	98	Impervious Surface
	7,570	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 31S: P6



Summary for Subcatchment 32S: P7

[49] Hint: Tc<2dt may require smaller dt

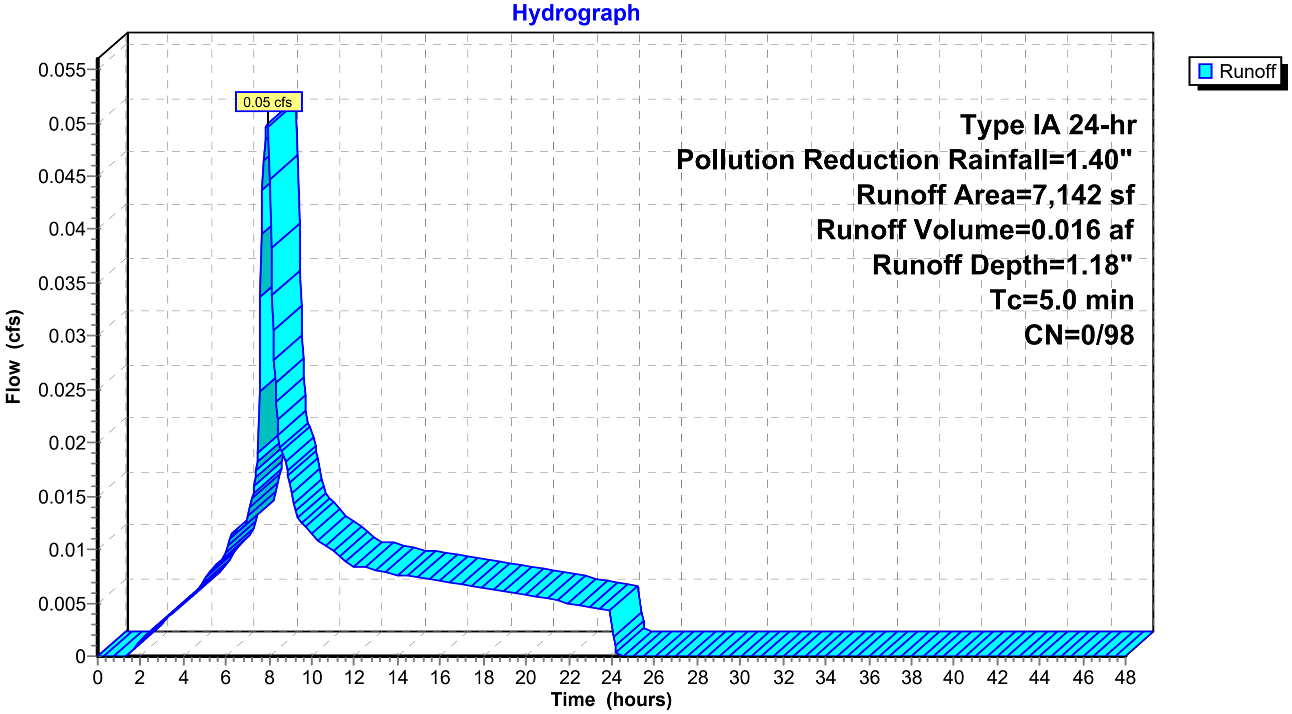
Runoff = 0.05 cfs @ 7.91 hrs, Volume= 0.016 af, Depth= 1.18"
Routed to Pond 46P : Pond #1

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Pollution Reduction Rainfall=1.40"

	Area (sf)	CN	Description
*	7,142	98	Impervious Surface
	7,142	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 32S: P7



Summary for Subcatchment 33S: P8

[49] Hint: Tc<2dt may require smaller dt

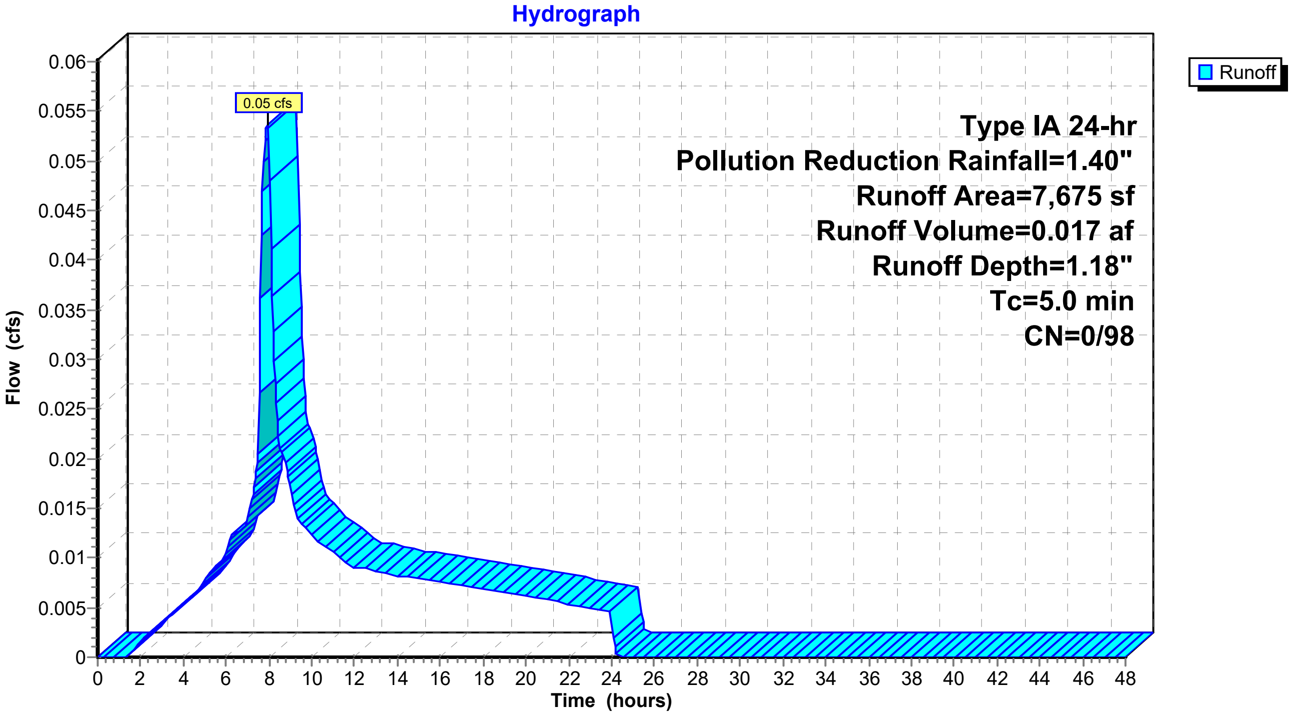
Runoff = 0.05 cfs @ 7.91 hrs, Volume= 0.017 af, Depth= 1.18"
Routed to Pond 46P : Pond #1

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Pollution Reduction Rainfall=1.40"

	Area (sf)	CN	Description
*	7,675	98	Impervious Surface
	7,675	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 33S: P8



Summary for Subcatchment 34S: P9

[49] Hint: Tc<2dt may require smaller dt

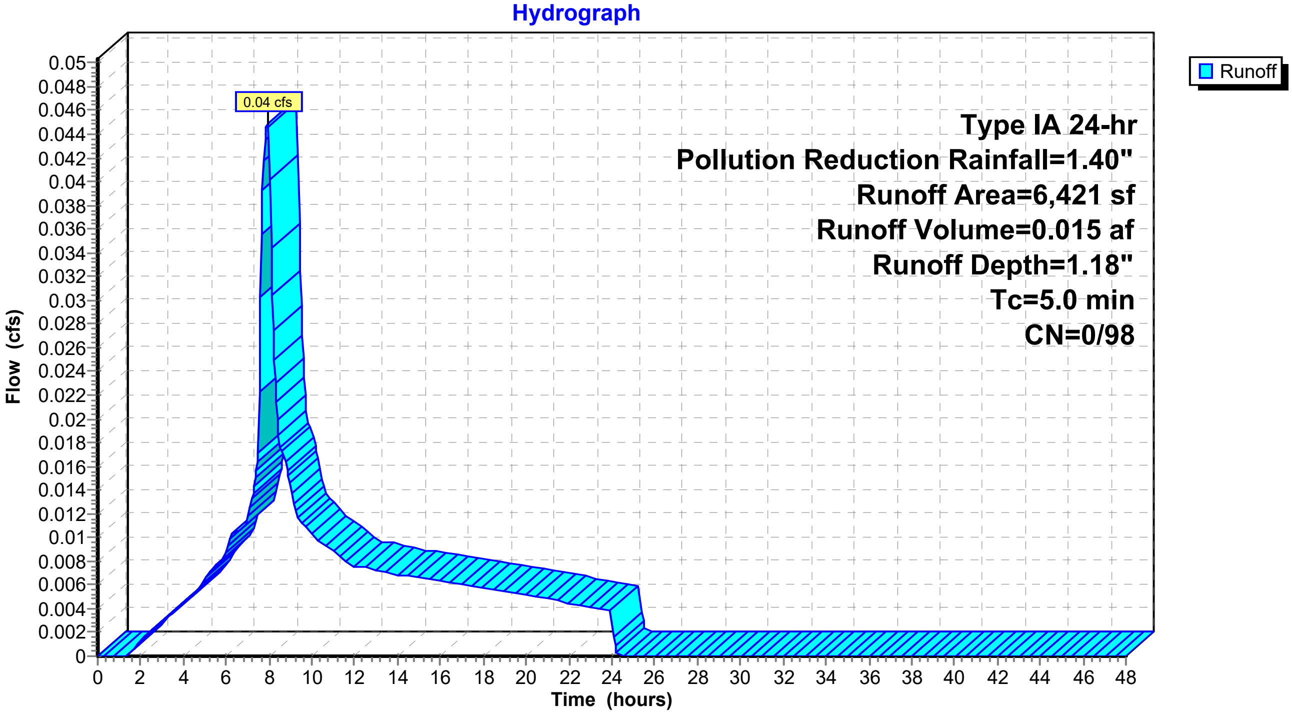
Runoff = 0.04 cfs @ 7.91 hrs, Volume= 0.015 af, Depth= 1.18"
Routed to Pond 46P : Pond #1

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Pollution Reduction Rainfall=1.40"

	Area (sf)	CN	Description
*	6,421	98	Impervious Surface
	6,421	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 34S: P9



Summary for Subcatchment 35S: P10

[49] Hint: Tc<2dt may require smaller dt

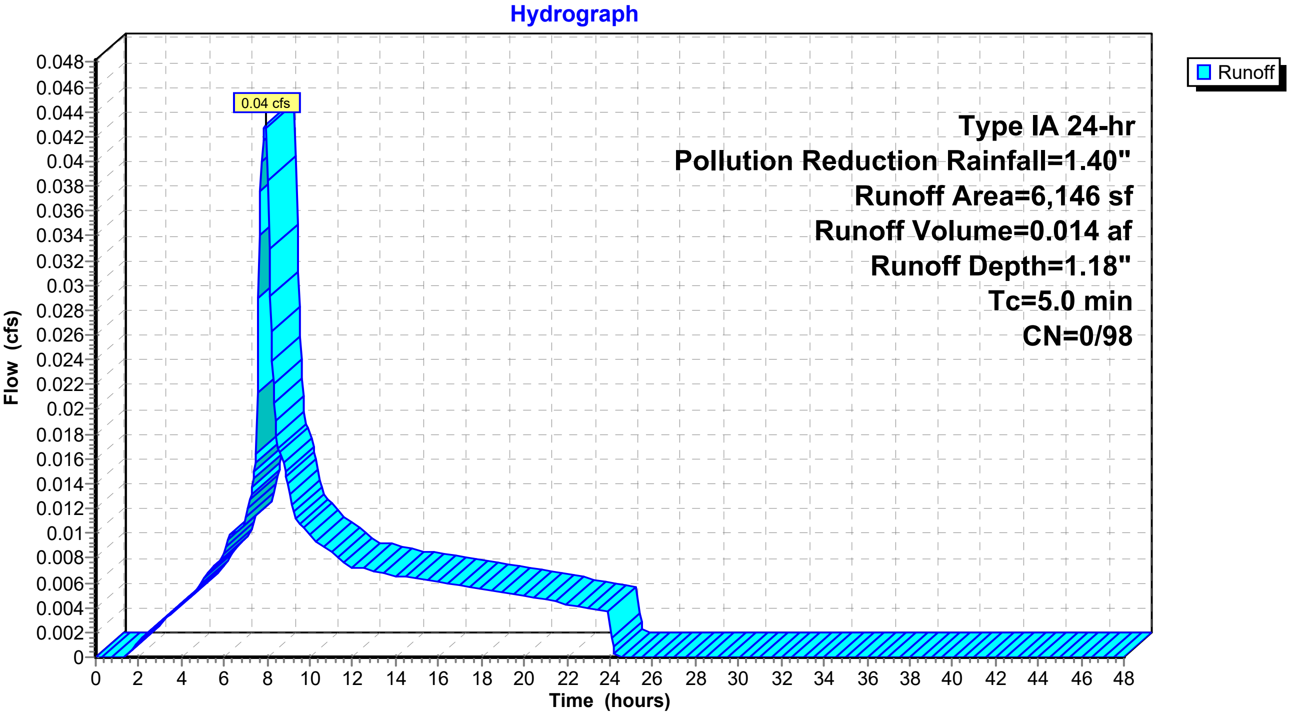
Runoff = 0.04 cfs @ 7.91 hrs, Volume= 0.014 af, Depth= 1.18"
Routed to Pond 46P : Pond #1

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Pollution Reduction Rainfall=1.40"

	Area (sf)	CN	Description
*	6,146	98	Impervious Surface
	6,146	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 35S: P10



Summary for Subcatchment 36S: P11

[49] Hint: Tc<2dt may require smaller dt

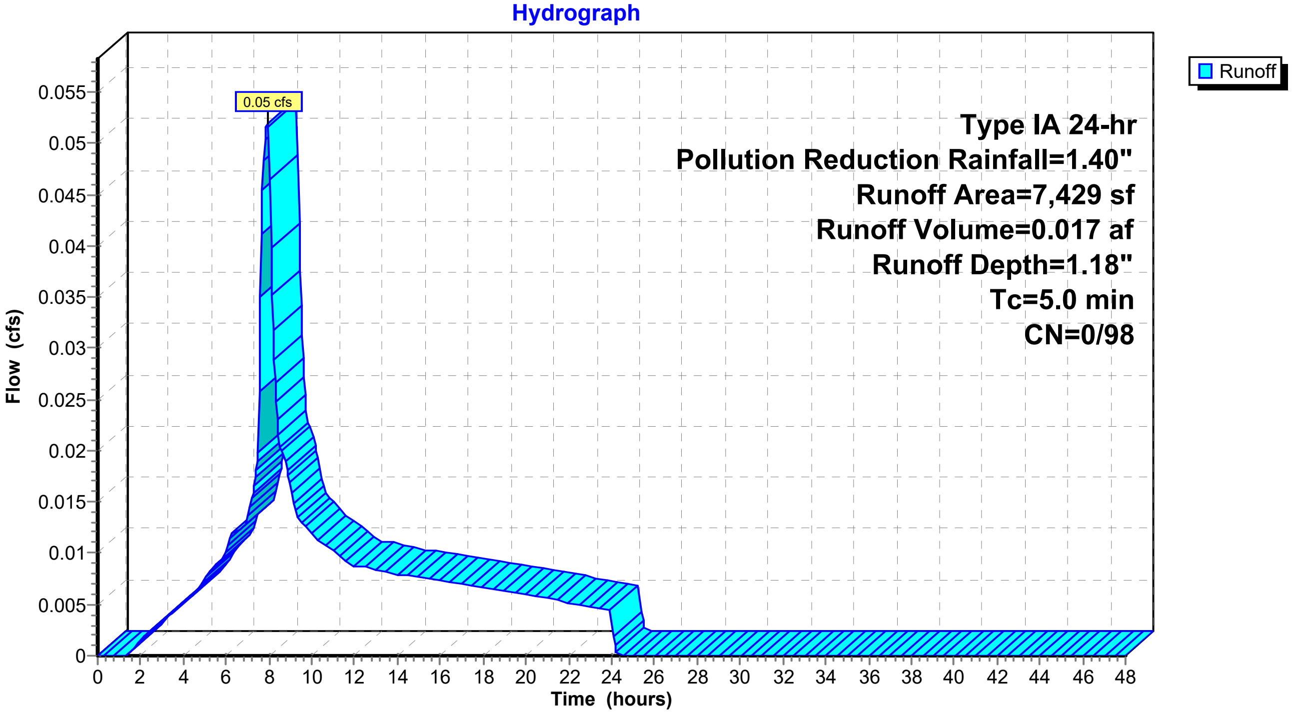
Runoff = 0.05 cfs @ 7.91 hrs, Volume= 0.017 af, Depth= 1.18"
Routed to Pond 46P : Pond #1

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Pollution Reduction Rainfall=1.40"

	Area (sf)	CN	Description
*	7,429	98	Impervious Surface
	7,429	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 36S: P11



Summary for Subcatchment 37S: P12

[49] Hint: Tc<2dt may require smaller dt

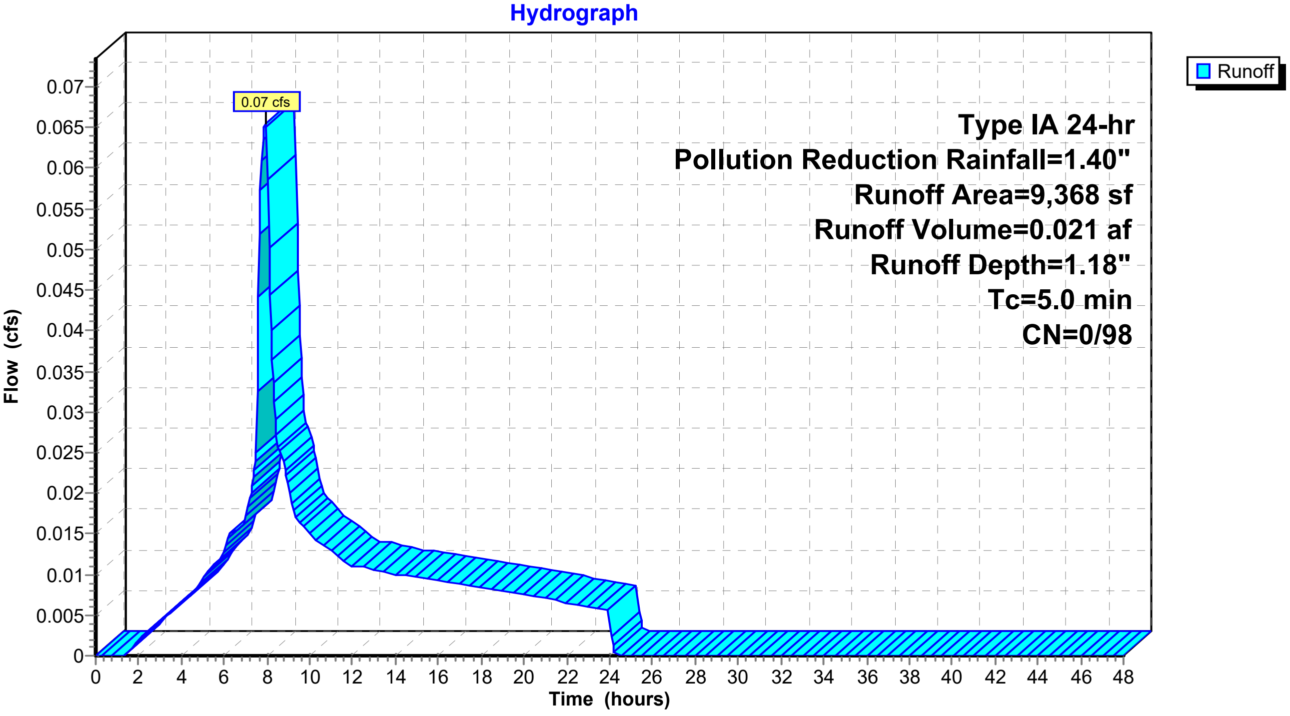
Runoff = 0.07 cfs @ 7.91 hrs, Volume= 0.021 af, Depth= 1.18"
Routed to Pond 47P : Pond #3

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Pollution Reduction Rainfall=1.40"

	Area (sf)	CN	Description
*	9,368	98	Impervious Surface
	9,368	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 37S: P12



Summary for Subcatchment 38S: P13

[49] Hint: Tc<2dt may require smaller dt

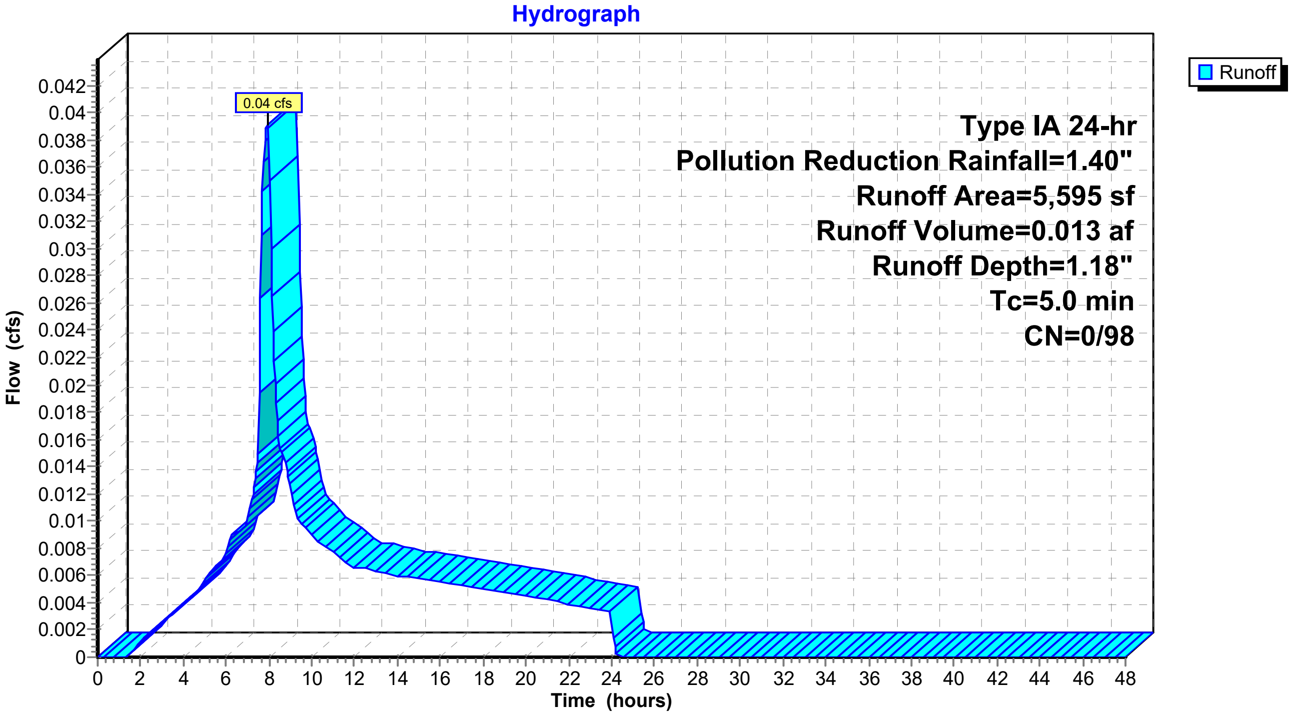
Runoff = 0.04 cfs @ 7.91 hrs, Volume= 0.013 af, Depth= 1.18"
Routed to Pond 47P : Pond #3

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Pollution Reduction Rainfall=1.40"

	Area (sf)	CN	Description
*	5,595	98	Impervious Surface
	5,595	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 38S: P13



Summary for Subcatchment 39S: P14

[49] Hint: Tc<2dt may require smaller dt

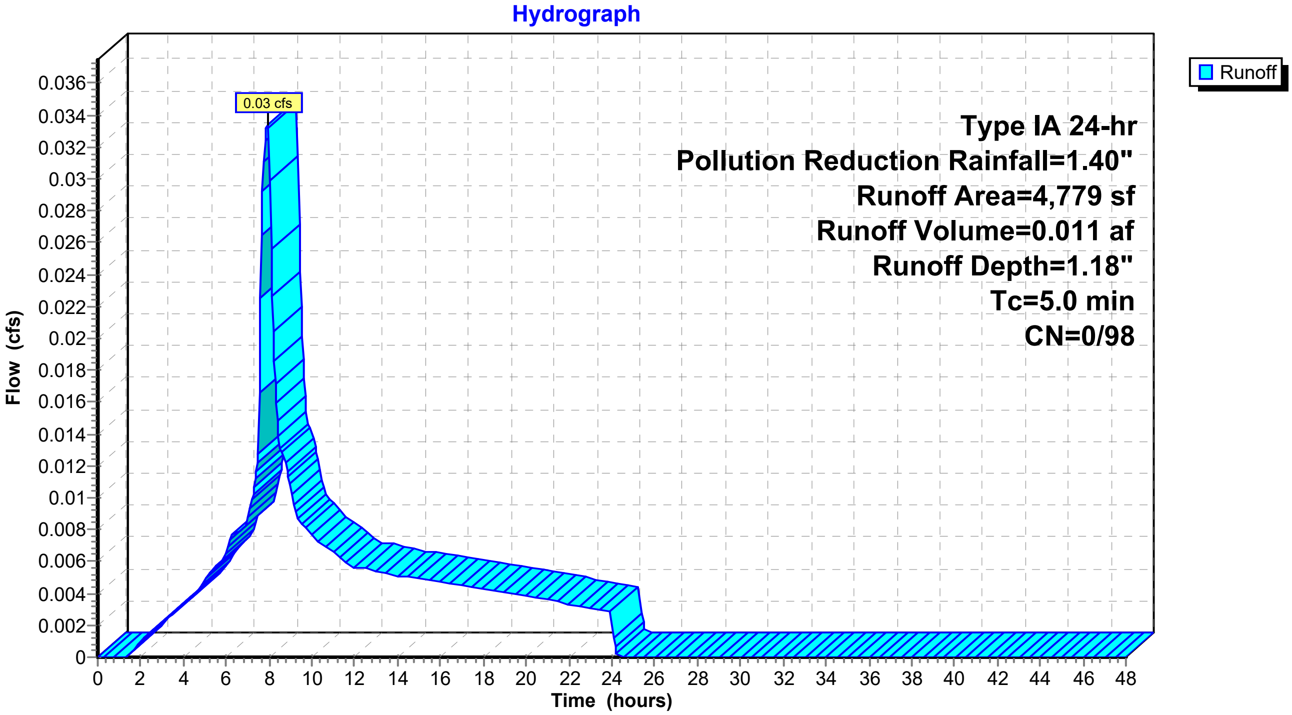
Runoff = 0.03 cfs @ 7.91 hrs, Volume= 0.011 af, Depth= 1.18"
Routed to Pond 47P : Pond #3

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Pollution Reduction Rainfall=1.40"

	Area (sf)	CN	Description
*	4,779	98	Impervious Surface
	4,779	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 39S: P14



Summary for Subcatchment 40S: P15

[49] Hint: Tc<2dt may require smaller dt

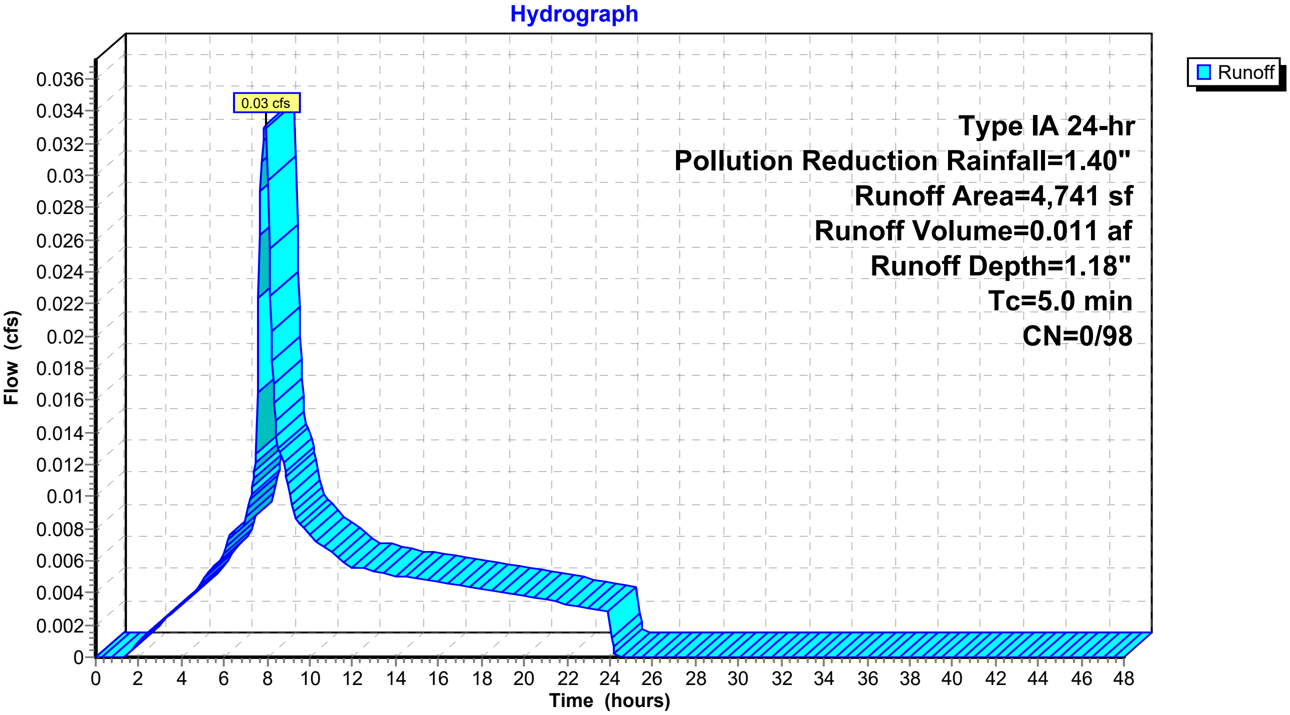
Runoff = 0.03 cfs @ 7.91 hrs, Volume= 0.011 af, Depth= 1.18"
Routed to Pond 47P : Pond #3

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Pollution Reduction Rainfall=1.40"

	Area (sf)	CN	Description
*	4,741	98	Impervious Surface
	4,741	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 40S: P15



Summary for Subcatchment 41S: P16

[49] Hint: Tc<2dt may require smaller dt

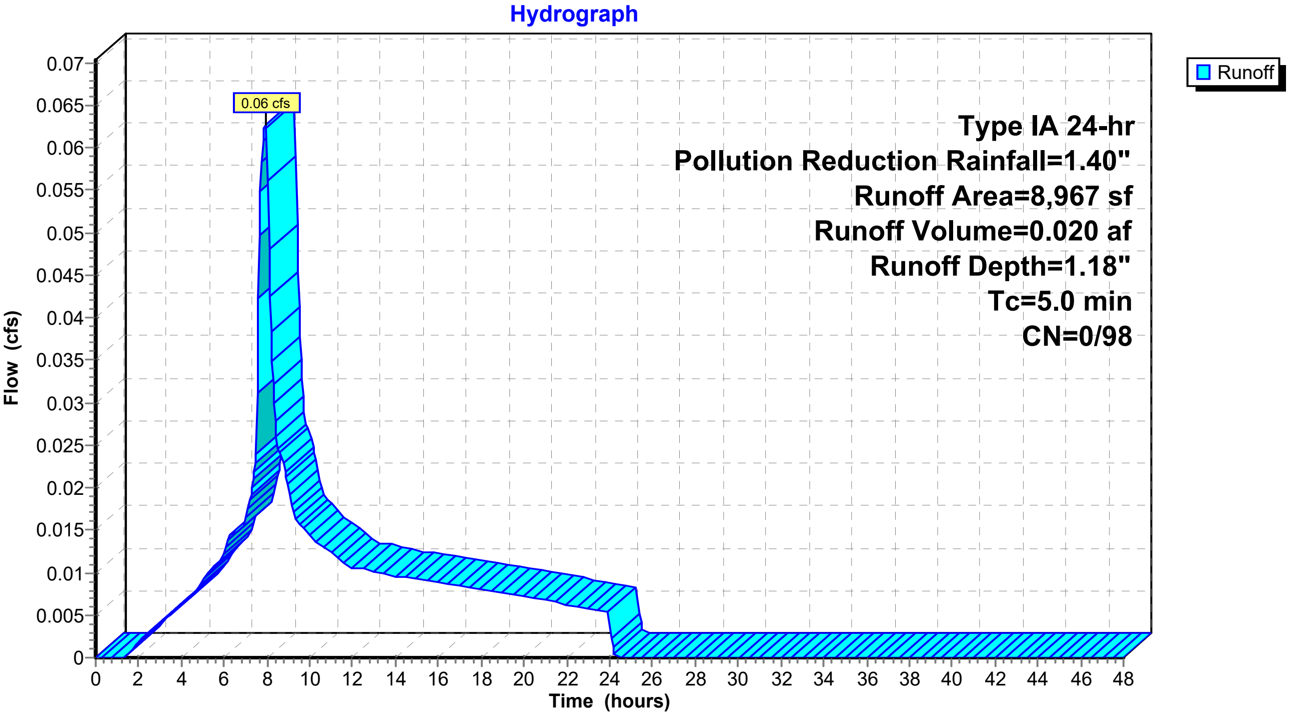
Runoff = 0.06 cfs @ 7.91 hrs, Volume= 0.020 af, Depth= 1.18"
Routed to Pond 47P : Pond #3

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Pollution Reduction Rainfall=1.40"

	Area (sf)	CN	Description
*	8,967	98	Impervious Surface
	8,967	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 41S: P16



Summary for Subcatchment 50S: Existing Buildings

Includes the roofs from existing buildings 1-8 and some adjacent sidewalks for areas within master plan (apartments). See existing drainage basin map for corresponding areas.

---

[49] Hint: Tc<2dt may require smaller dt

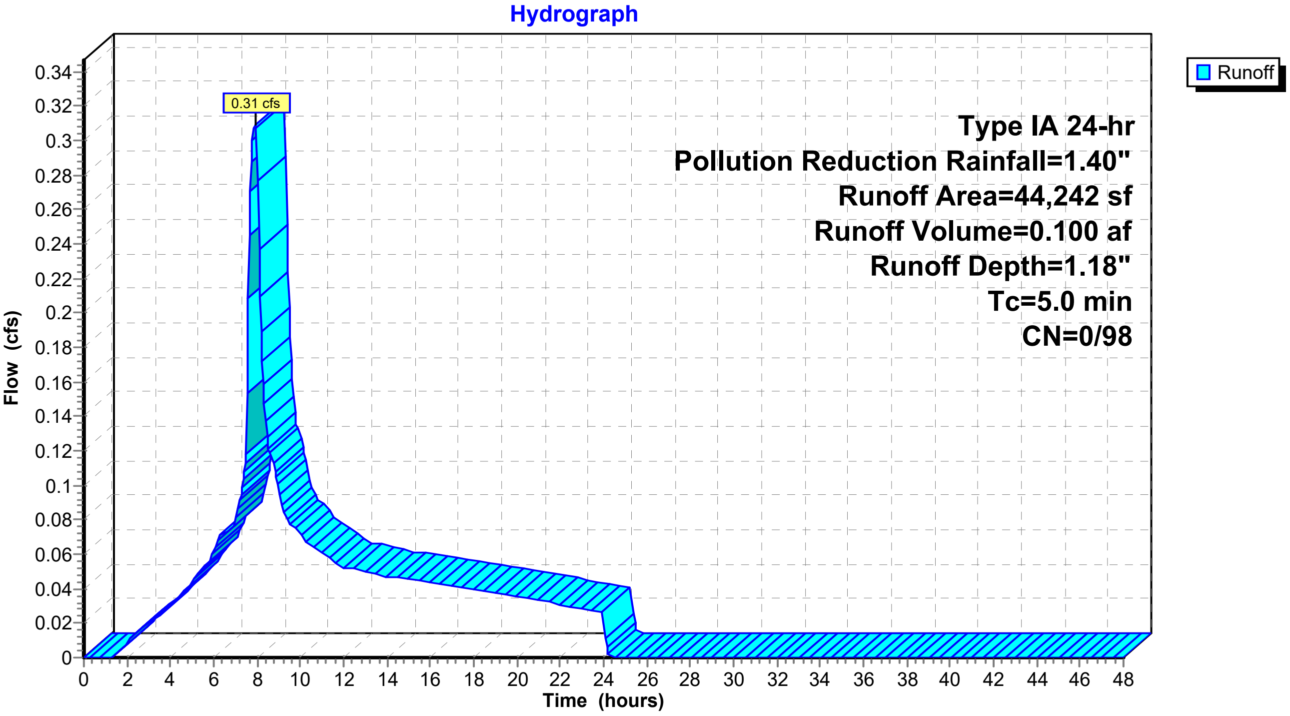
Runoff = 0.31 cfs @ 7.91 hrs, Volume= 0.100 af, Depth= 1.18"
Routed to Reach 53R : Existing Discharge

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Pollution Reduction Rainfall=1.40"

	Area (sf)	CN	Description
*	44,242	98	Impervious Roof & Adjacent Sidewalk
	44,242	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 50S: Existing Buildings



Summary for Subcatchment 51S: Existing Impervious Areas

Includes existing impervious pavement within the new master plan development area (apartments). See existing drainage basin map for corresponding areas.

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[49] Hint: Tc<2dt may require smaller dt

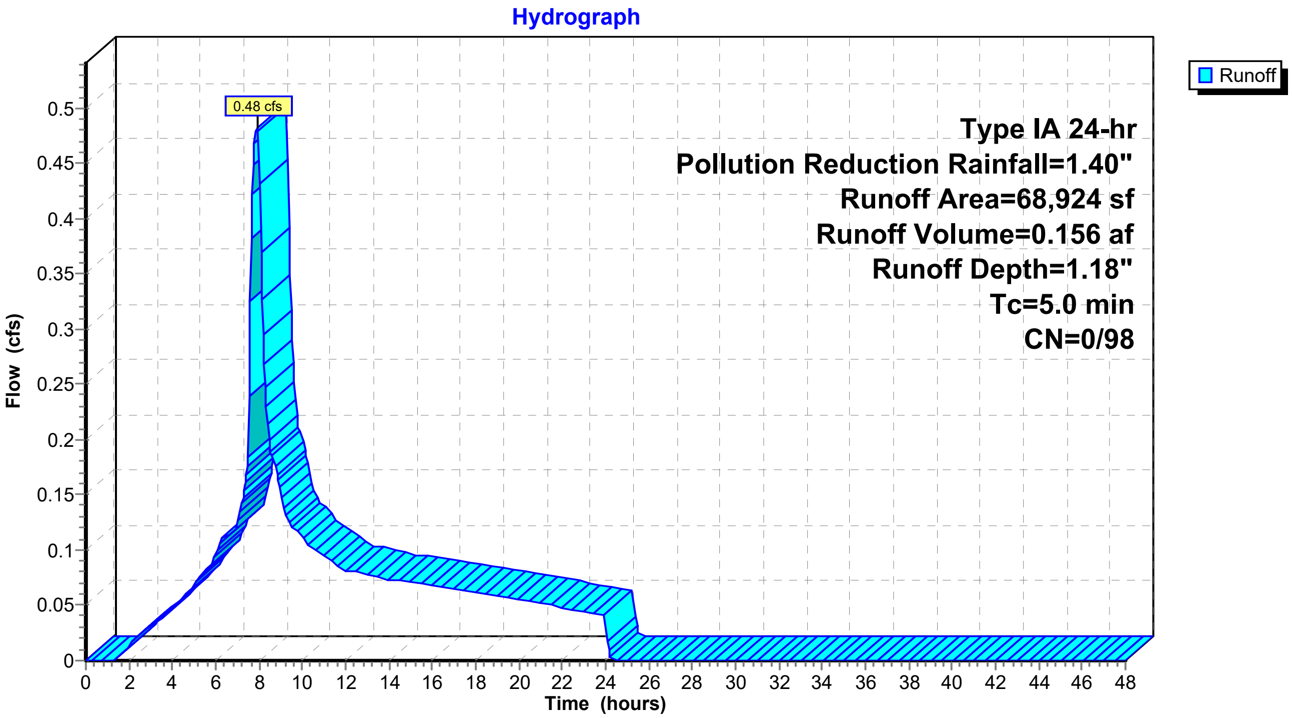
Runoff = 0.48 cfs @ 7.91 hrs, Volume= 0.156 af, Depth= 1.18"
Routed to Reach 53R : Existing Discharge

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Pollution Reduction Rainfall=1.40"

	Area (sf)	CN	Description
*	68,924	98	Impervious pavement and sidewalk
	68,924	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 51S: Existing Impervious Areas



Summary for Subcatchment 52S: Existing Landscape Area

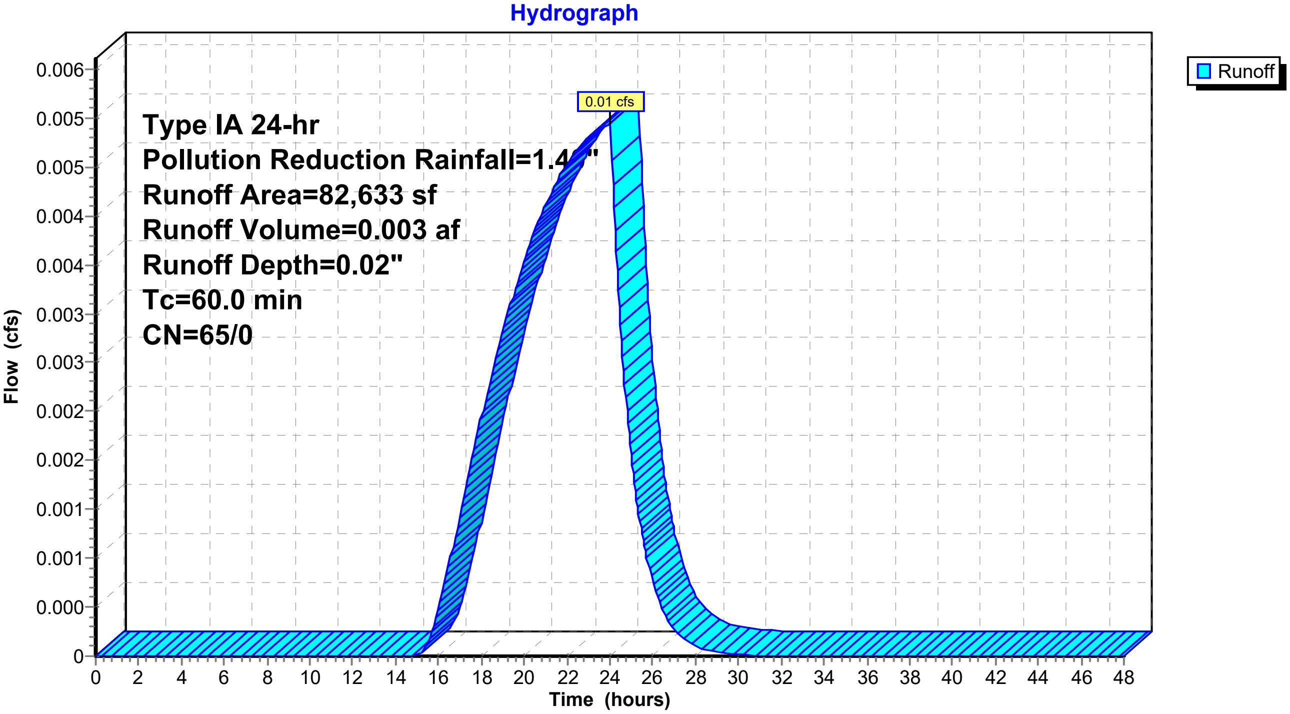
Runoff = 0.01 cfs @ 24.00 hrs, Volume= 0.003 af, Depth= 0.02"
Routed to Reach 53R : Existing Discharge

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Pollution Reduction Rainfall=1.40"

Area (sf)	CN	Description
82,633	65	Woods/grass comb., Fair, HSG B
82,633	65	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
60.0					**Direct Entry,**

Subcatchment 52S: Existing Landscape Area



Summary for Subcatchment 94S: Pond #3

[49] Hint: Tc<2dt may require smaller dt

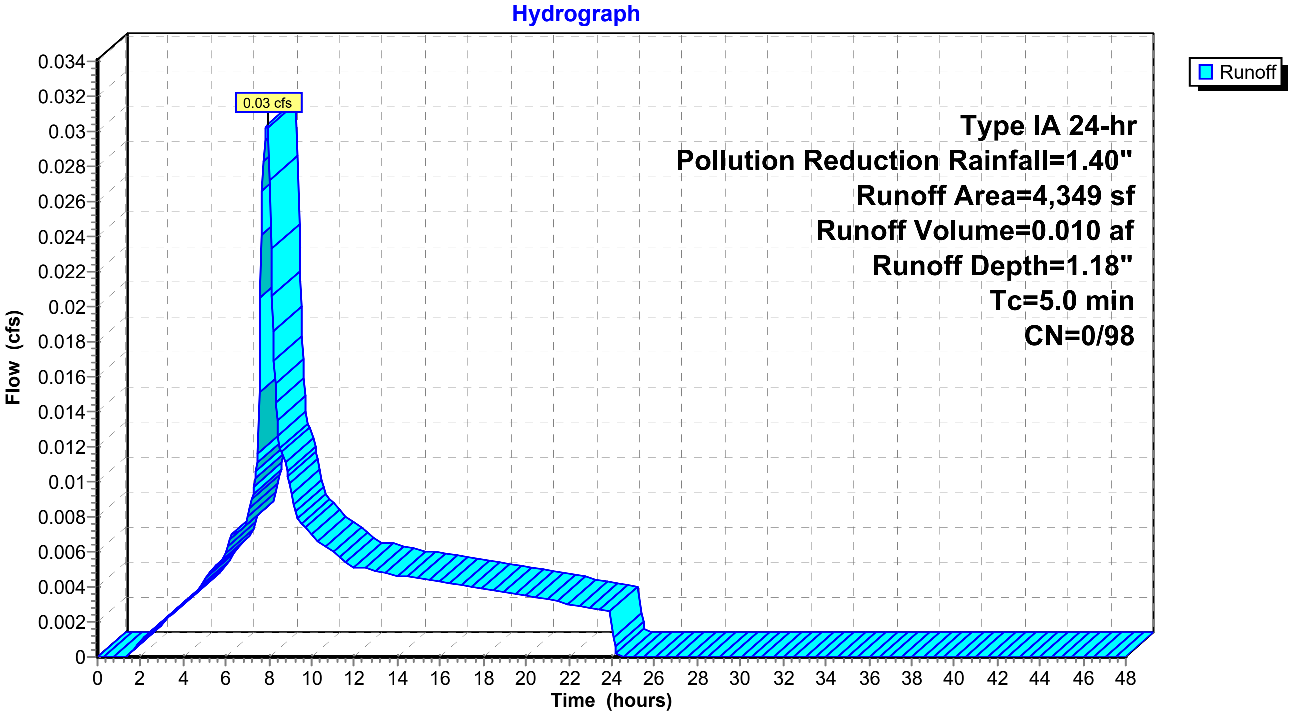
Runoff = 0.03 cfs @ 7.91 hrs, Volume= 0.010 af, Depth= 1.18"
Routed to Pond 47P : Pond #3

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Pollution Reduction Rainfall=1.40"

Area (sf)	CN	Description
4,349	98	Water Surface, HSG B
4,349	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 94S: Pond #3



Summary for Subcatchment 95S: Pond #1

[49] Hint: Tc<2dt may require smaller dt

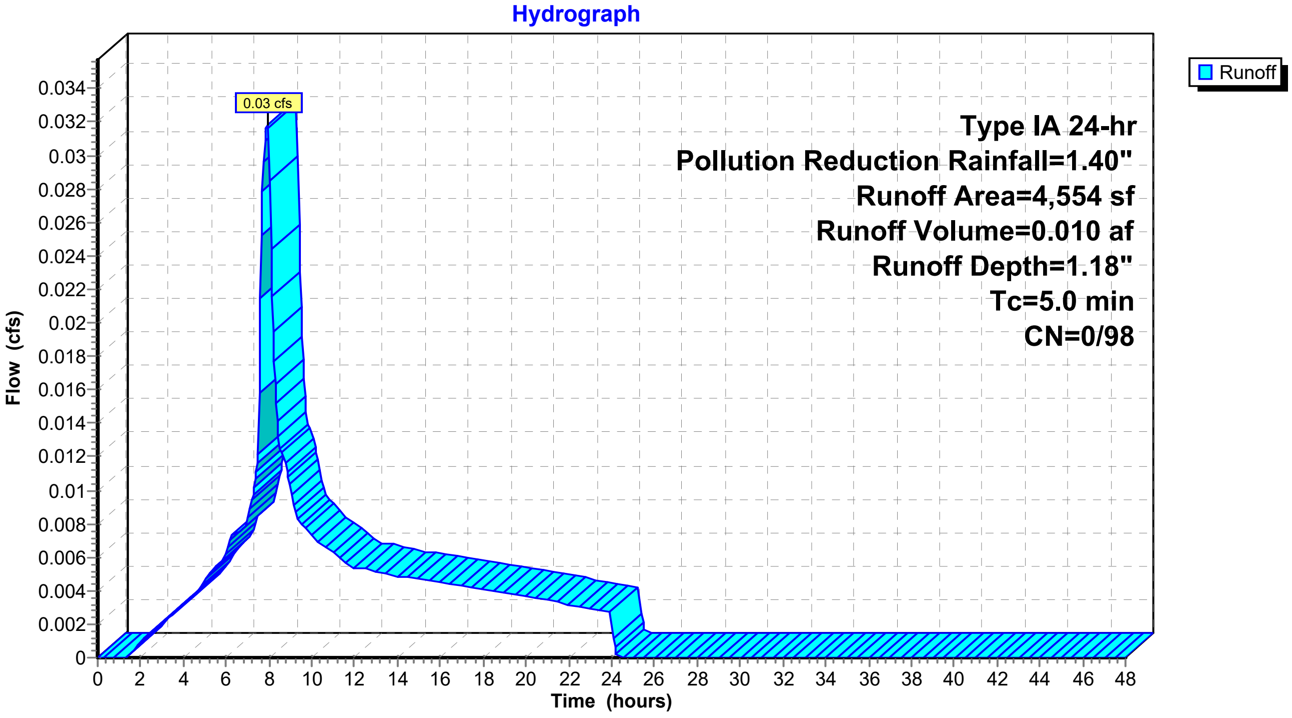
Runoff = 0.03 cfs @ 7.91 hrs, Volume= 0.010 af, Depth= 1.18"
Routed to Pond 46P : Pond #1

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Pollution Reduction Rainfall=1.40"

Area (sf)	CN	Description
4,554	98	Water Surface, HSG B
4,554	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 95S: Pond #1



Summary for Subcatchment 96S: Pond #2

[49] Hint: Tc<2dt may require smaller dt

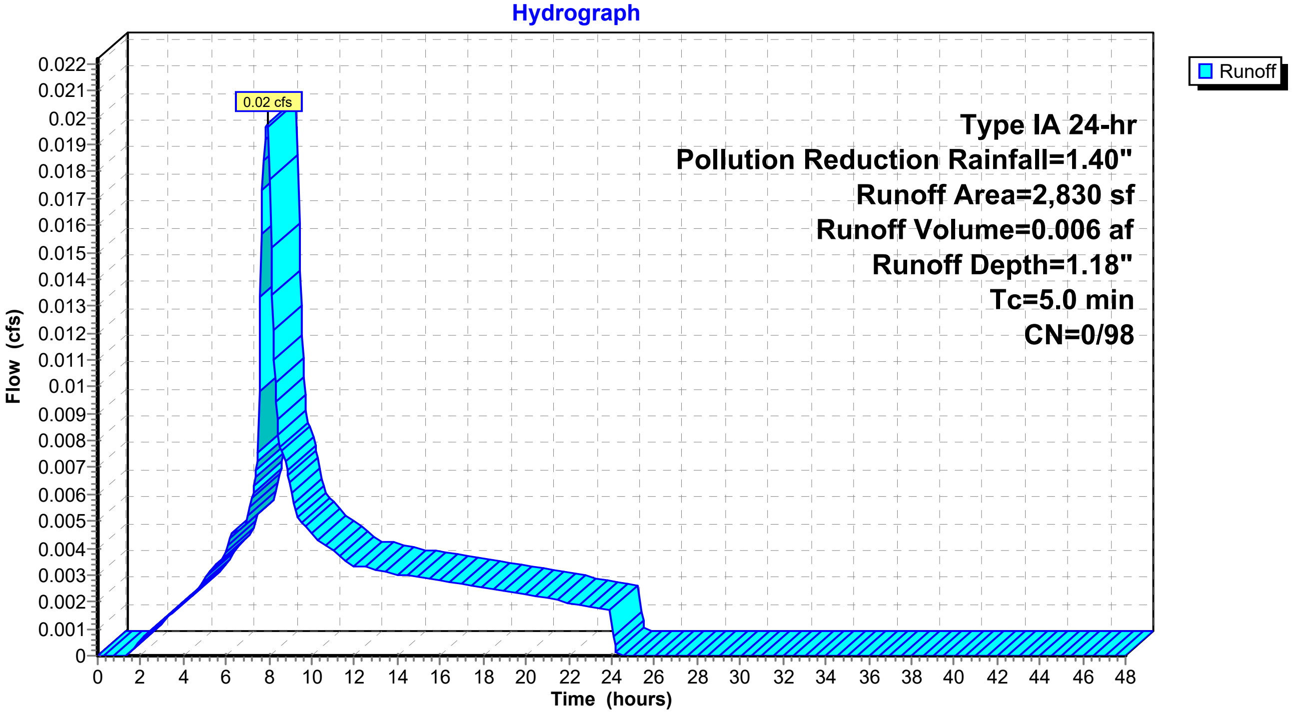
Runoff = 0.02 cfs @ 7.91 hrs, Volume= 0.006 af, Depth= 1.18"
Routed to Pond 48P : Pond #2

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Pollution Reduction Rainfall=1.40"

Area (sf)	CN	Description
2,830	98	Water Surface, HSG B
2,830	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 96S: Pond #2



Summary for Subcatchment 97S: Pond #4

[49] Hint: Tc<2dt may require smaller dt

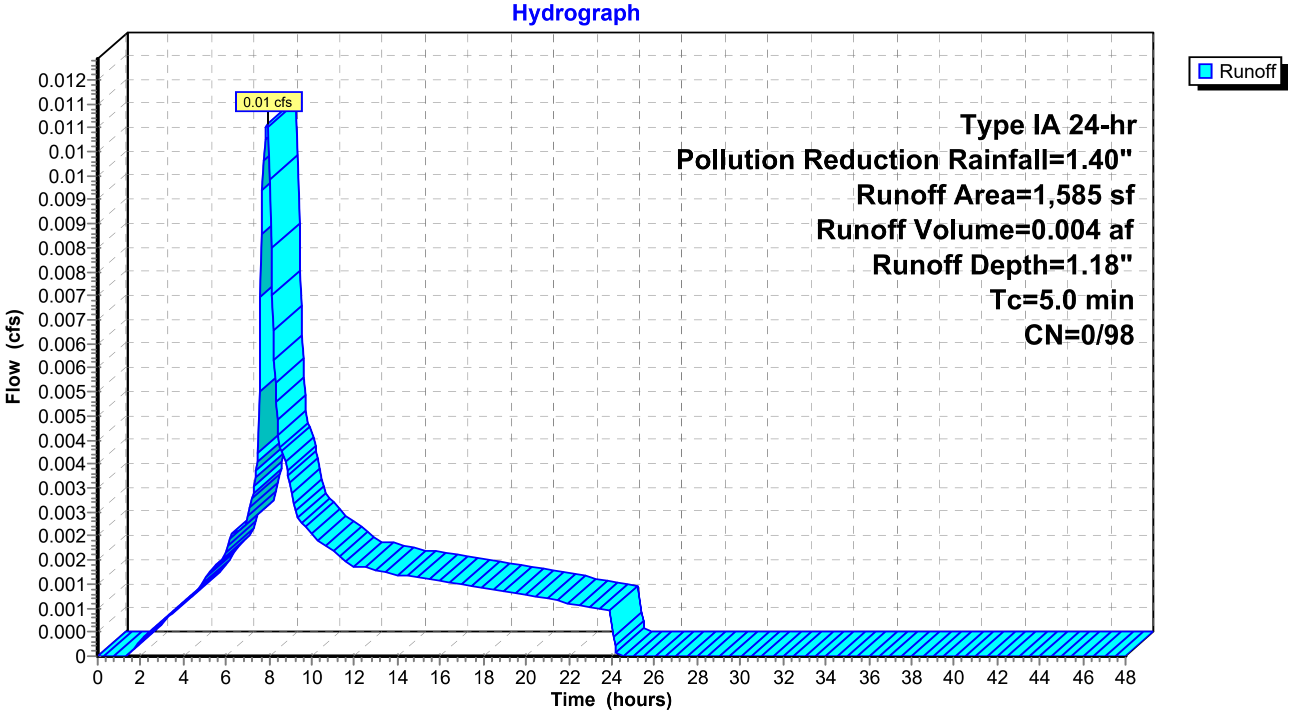
Runoff = 0.01 cfs @ 7.91 hrs, Volume= 0.004 af, Depth= 1.18"
Routed to Pond 49P : Pond #4

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr Pollution Reduction Rainfall=1.40"

Area (sf)	CN	Description
1,585	98	Water Surface, HSG B
1,585	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 97S: Pond #4



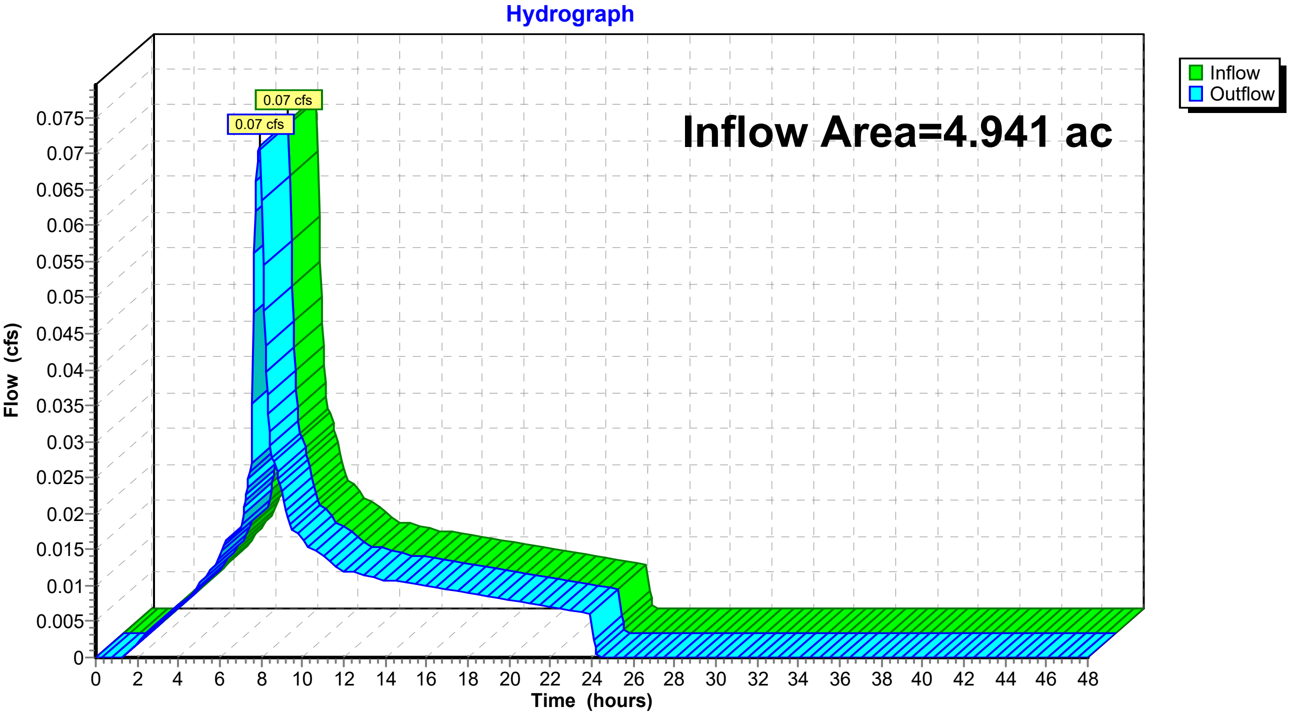
Summary for Reach 50R: Discharge

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4.941 ac,100.00% Impervious, Inflow Depth = 0.06" for Pollution Reduction event
Inflow = 0.07 cfs @ 7.91 hrs, Volume= 0.023 af
Outflow = 0.07 cfs @ 7.91 hrs, Volume= 0.023 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Reach 50R: Discharge



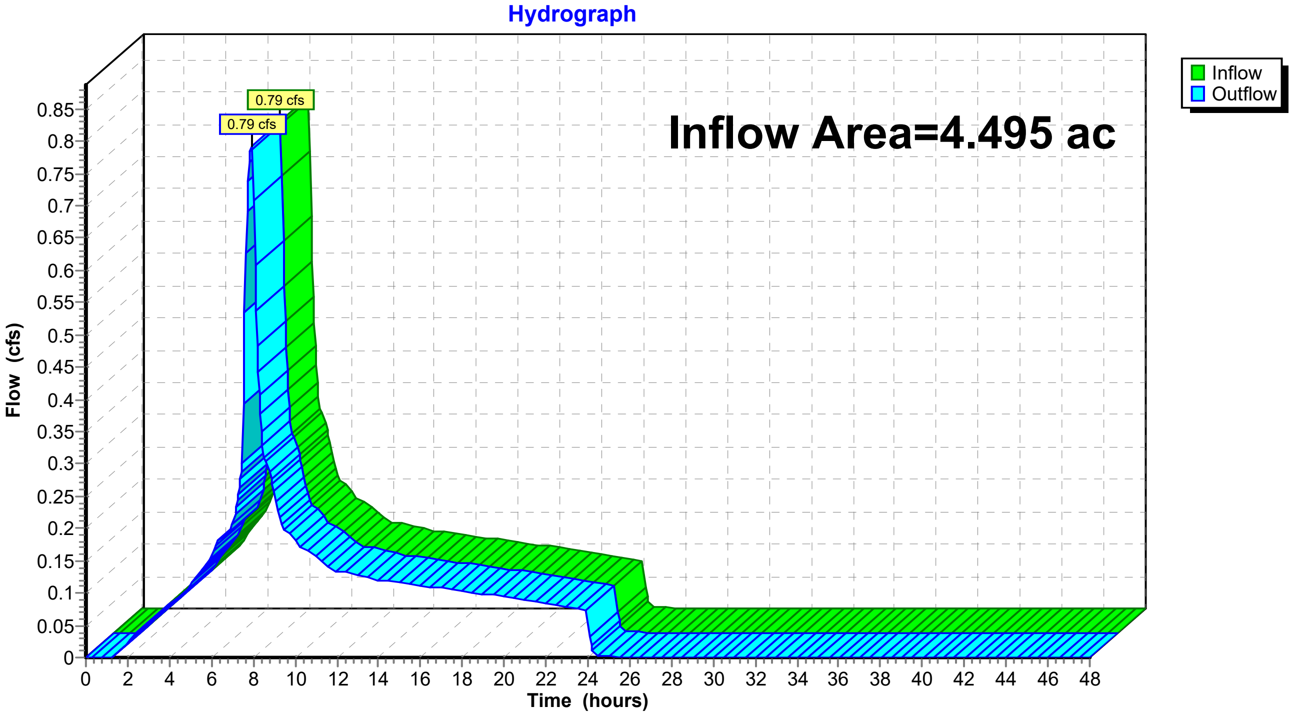
Summary for Reach 53R: Existing Discharge

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4.495 ac, 57.80% Impervious, Inflow Depth = 0.69" for Pollution Reduction event
Inflow = 0.79 cfs @ 7.91 hrs, Volume= 0.259 af
Outflow = 0.79 cfs @ 7.91 hrs, Volume= 0.259 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Reach 53R: Existing Discharge



Summary for Pond 46P: Pond #1

Inflow Area = 3.584 ac,100.00% Impervious, Inflow Depth = 0.69" for Pollution Reduction event
Inflow = 0.64 cfs @ 7.91 hrs, Volume= 0.208 af
Outflow = 0.13 cfs @ 10.95 hrs, Volume= 0.208 af, Atten= 80%, Lag= 182.6 min
Discarded = 0.13 cfs @ 10.95 hrs, Volume= 0.208 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond 47P : Pond #3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 634.08' @ 10.95 hrs Surf.Area= 2,791 sf Storage= 2,463 cf
Flood Elev= 637.00' Surf.Area= 5,590 sf Storage= 11,426 cf

Plug-Flow detention time= 229.9 min calculated for 0.207 af (100% of inflow)
Center-of-Mass det. time= 230.1 min (926.7 - 696.6)

Volume	Invert	Avail.Storage	Storage Description
#1	632.00'	11,193 cf	**Open Storage (Irregular)**Listed below (Recalc)
#2	631.00'	52 cf	**Growing Medium (Irregular)**Listed below (Recalc) 518 cf Overall x 10.0% Voids
#3	630.00'	181 cf	**Rock Chamber (Irregular)**Listed below (Recalc) 518 cf Overall x 35.0% Voids
		11,426 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
632.00	518	104.0	0	0	518
633.00	1,018	147.0	754	754	1,386
634.00	1,697	191.0	1,343	2,097	2,581
635.00	2,527	224.0	2,098	4,195	3,691
636.00	3,482	253.0	2,992	7,187	4,817
637.00	4,554	282.0	4,006	11,193	6,081

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
631.00	518	104.0	0	0	518
632.00	518	104.0	518	518	622

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
630.00	518	104.0	0	0	518
631.00	518	104.0	518	518	622

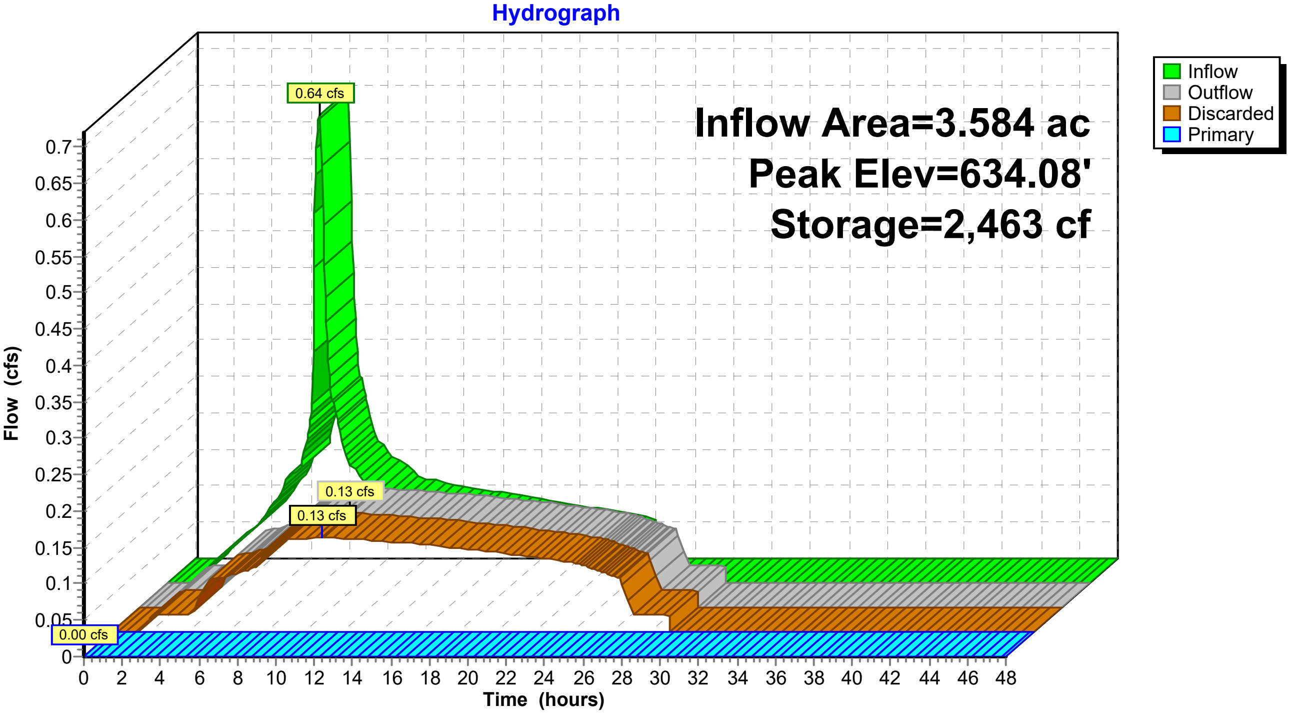
Device	Routing	Invert	Outlet Devices
#1	Discarded	630.00'	**2.000 in/hr Exfiltration over Surface area**
#2	Primary	633.60'	**12.0" Round 12" Pipe** L= 400.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 633.60' / 632.00' S= 0.0040 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf
#3	Device 2	634.10'	**6.0" Vert. 6" Orifice** C= 0.600 Limited to weir flow at low heads

#4	Device 2	636.50'	**24.0" W x 8.0" H 18° Overflow Grate** C= 0.600 Limited to weir flow at low heads

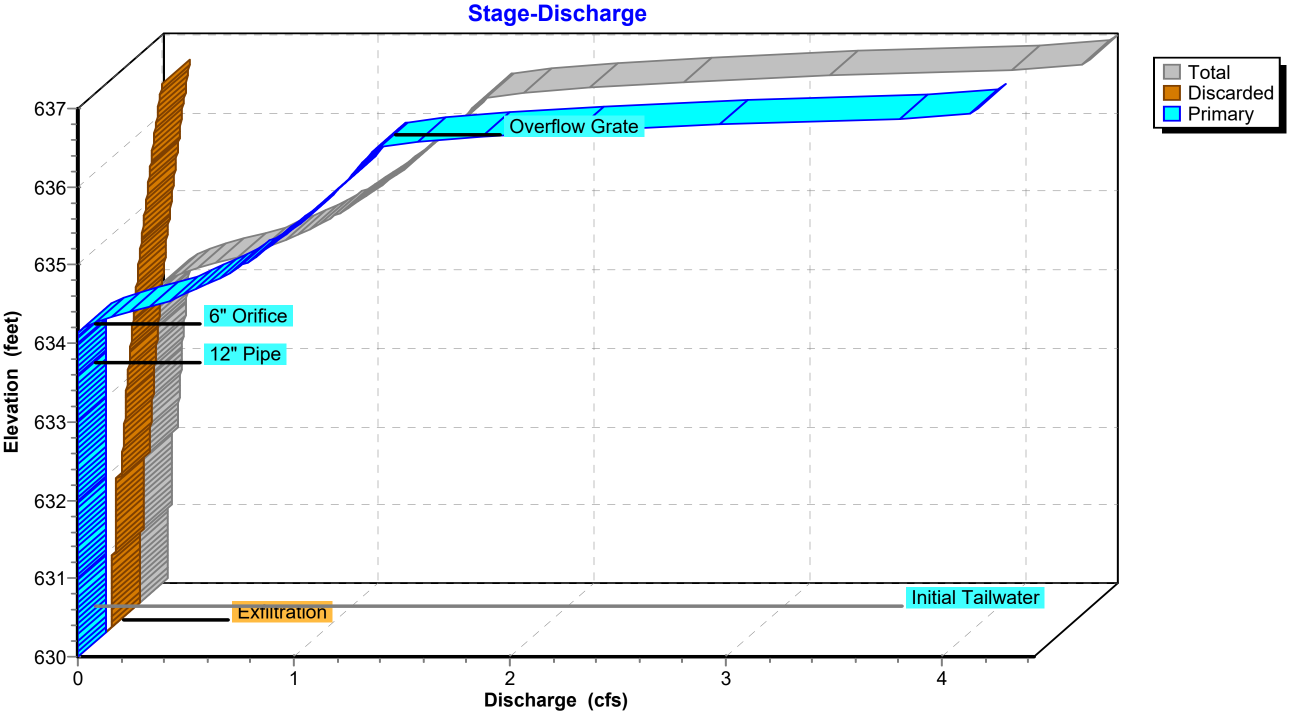
Discarded OutFlow Max=0.13 cfs @ 10.95 hrs HW=634.08' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.13 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=630.00' TW=630.50' (Dynamic Tailwater)
└─**2=12" Pipe** (Controls 0.00 cfs)
  ├─**3=6" Orifice** (Controls 0.00 cfs)
  └─**4=Overflow Grate** (Controls 0.00 cfs)

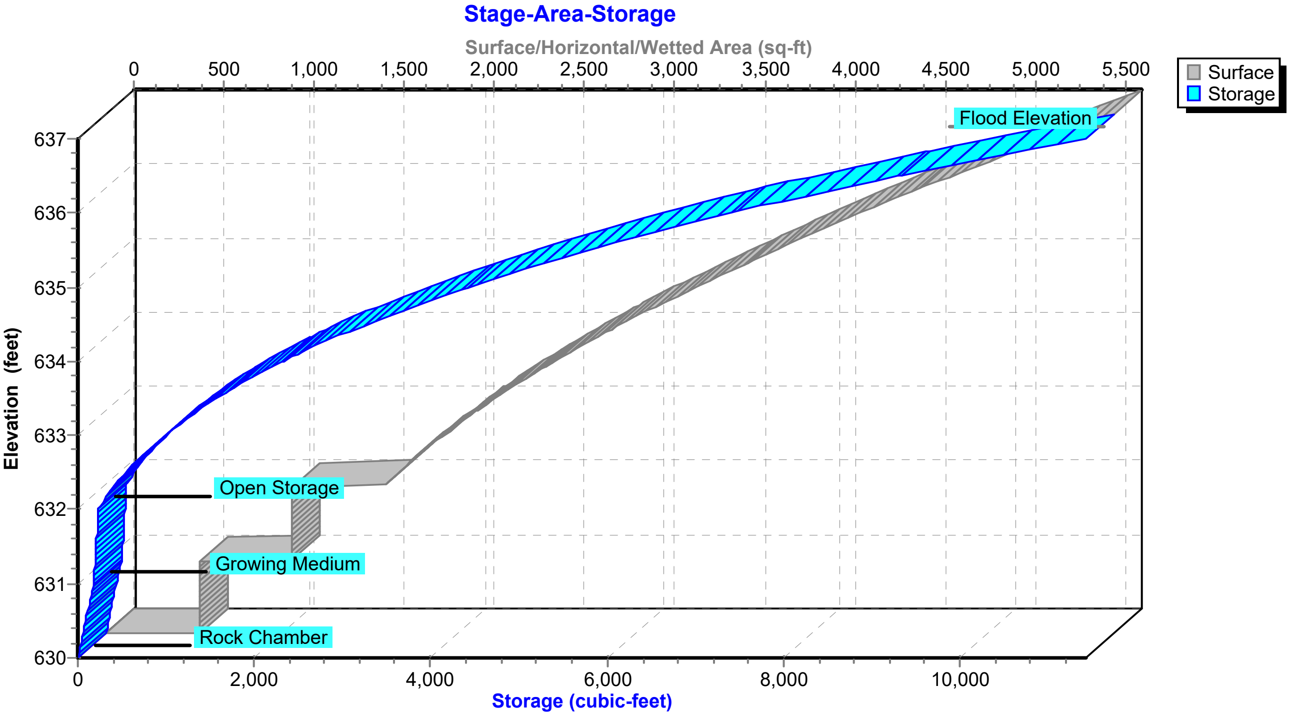
Pond 46P: Pond #1



Pond 46P: Pond #1



Pond 46P: Pond #1



Summary for Pond 47P: Pond #3

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=56)

```
Inflow Area =        4.709 ac,100.00% Impervious,  Inflow Depth =   0.28"    for  Pollution Reduction event
Inflow      =       0.34 cfs @    7.91 hrs,  Volume=          0.111 af
Outflow     =       0.10 cfs @    9.10 hrs,  Volume=          0.111 af,  Atten= 70%,  Lag= 71.2 min
Discarded  =        0.10 cfs @    9.10 hrs,  Volume=          0.111 af
Primary     =       0.00 cfs @    0.00 hrs,  Volume=          0.000 af
    Routed to Reach 50R : Discharge
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 633.29' @ 9.10 hrs Surf.Area= 2,230 sf Storage= 904 cf
Flood Elev= 636.50' Surf.Area= 5,485 sf Storage= 9,193 cf

Plug-Flow detention time= 92.8 min calculated for 0.111 af (100% of inflow)
Center-of-Mass det. time= 92.9 min (789.5 - 696.6)

Volume	Invert	Avail.Storage	Storage Description
#1	632.50'	8,937 cf	**Open Storage (Irregular)**Listed below (Recalc)
#2	631.50'	57 cf	**Growing Medium (Irregular)**Listed below (Recalc) 568 cf Overall x 10.0% Voids
#3	630.50'	199 cf	**Rock Chamber (Irregular)**Listed below (Recalc) 568 cf Overall x 35.0% Voids
		9,193 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
632.50	568	149.0	0	0	568
633.50	1,258	195.0	890	890	1,839
634.50	2,127	239.0	1,674	2,564	3,374
635.50	3,168	281.0	2,630	5,194	5,131
636.50	4,349	308.0	3,743	8,937	6,431

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
631.50	568	149.0	0	0	568
632.50	568	149.0	568	568	717

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
630.50	568	149.0	0	0	568
631.50	568	149.0	568	568	717

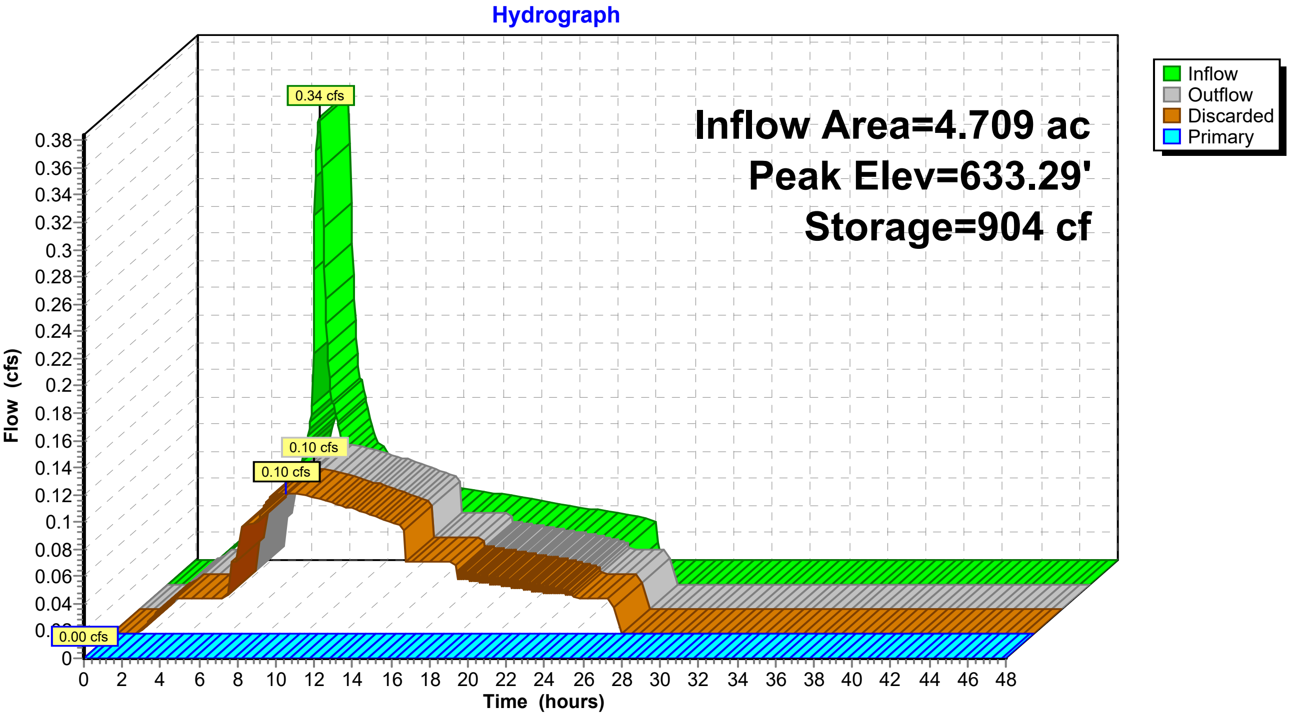
Device	Routing	Invert	Outlet Devices
#1	Discarded	630.50'	**2.000 in/hr Exfiltration over Surface area**
#2	Primary	633.92'	**10.0" Round 10" Pipe** L= 480.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 633.92' / 632.00' S= 0.0040 '/' Cc= 0.900 n= 0.010, Flow Area= 0.55 sf

#3	Device 2	635.50'	**24.0" W x 8.0" H 18° Overflow Grate** C= 0.600 Limited to weir flow at low heads

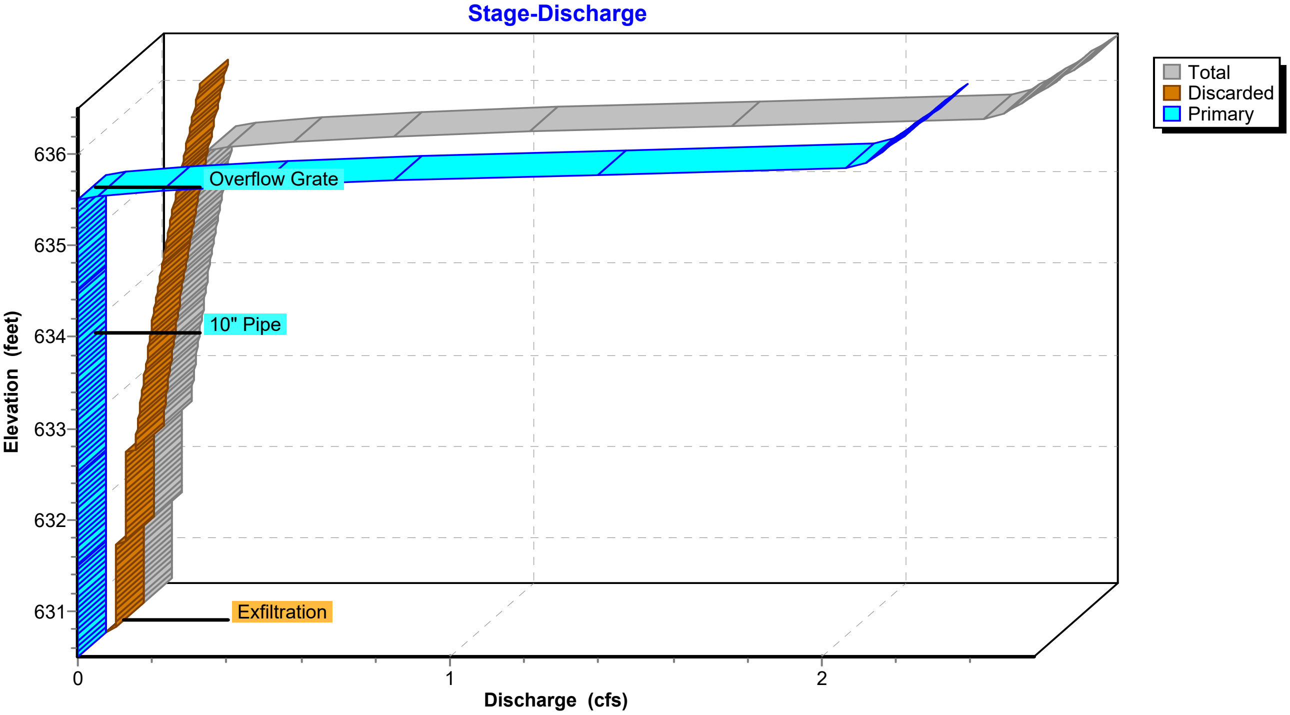
Discarded OutFlow Max=0.10 cfs @ 9.10 hrs HW=633.29' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.10 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=630.50' TW=0.00' (Dynamic Tailwater)
└─**2=10" Pipe** (Controls 0.00 cfs)
  └─**3=Overflow Grate** (Controls 0.00 cfs)

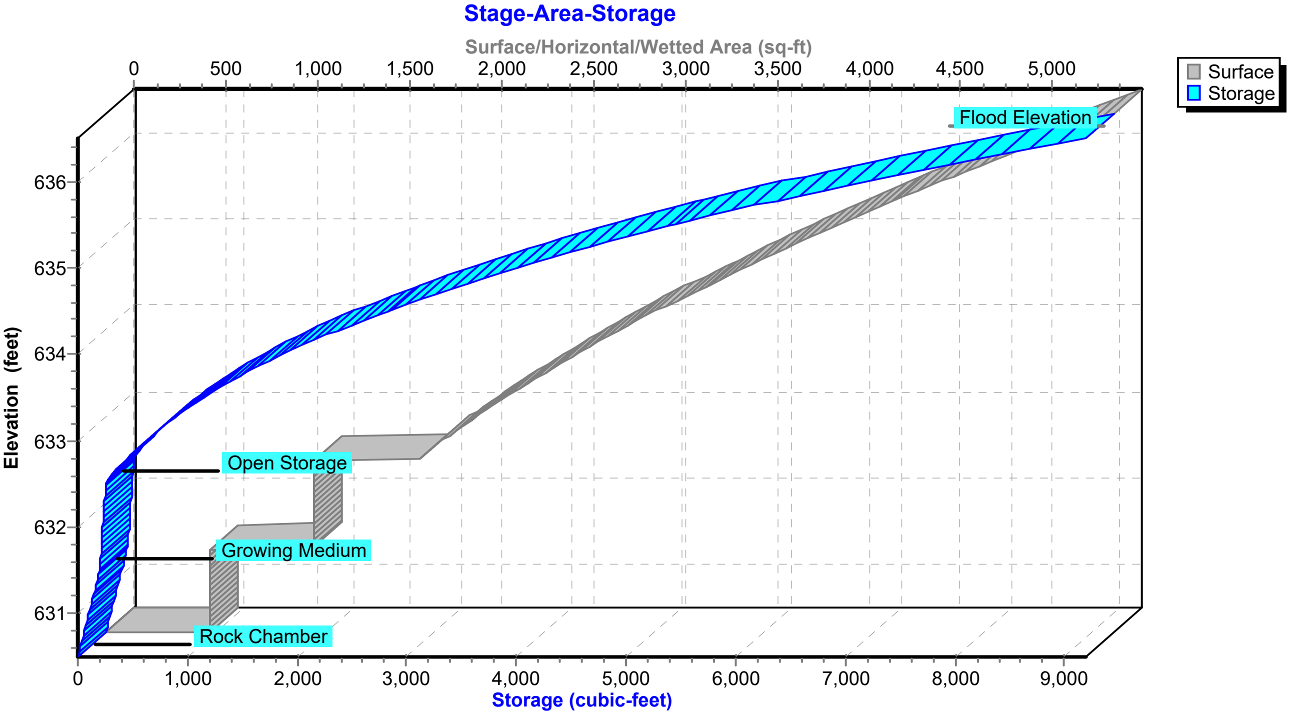
Pond 47P: Pond #3



Pond 47P: Pond #3



Pond 47P: Pond #3



Summary for Pond 48P: Pond #2

Inflow Area = 1.135 ac,100.00% Impervious, Inflow Depth = 1.18" for Pollution Reduction event
Inflow = 0.35 cfs @ 7.91 hrs, Volume= 0.112 af
Outflow = 0.07 cfs @ 10.35 hrs, Volume= 0.112 af, Atten= 79%, Lag= 146.6 min
Discarded = 0.07 cfs @ 10.35 hrs, Volume= 0.112 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond 46P : Pond #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 634.94' @ 10.35 hrs Surf.Area= 1,589 sf Storage= 1,329 cf
Flood Elev= 637.00' Surf.Area= 3,234 sf Storage= 5,376 cf

Plug-Flow detention time= 225.7 min calculated for 0.112 af (100% of inflow)
Center-of-Mass det. time= 225.8 min (922.4 - 696.6)

Volume	Invert	Avail.Storage	Storage Description
#1	633.00'	5,285 cf	**Open Storage (Irregular)**Listed below (Recalc)
#2	632.00'	20 cf	**Growing Medium (Irregular)**Listed below (Recalc) 202 cf Overall x 10.0% Voids
#3	631.00'	71 cf	**Rock Chamber (Irregular)**Listed below (Recalc) 202 cf Overall x 35.0% Voids
		5,376 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
633.00	202	86.0	0	0	202
634.00	636	129.0	399	399	946
635.00	1,228	167.0	916	1,315	1,853
636.00	1,969	202.0	1,584	2,899	2,897
637.00	2,830	228.0	2,387	5,285	3,812

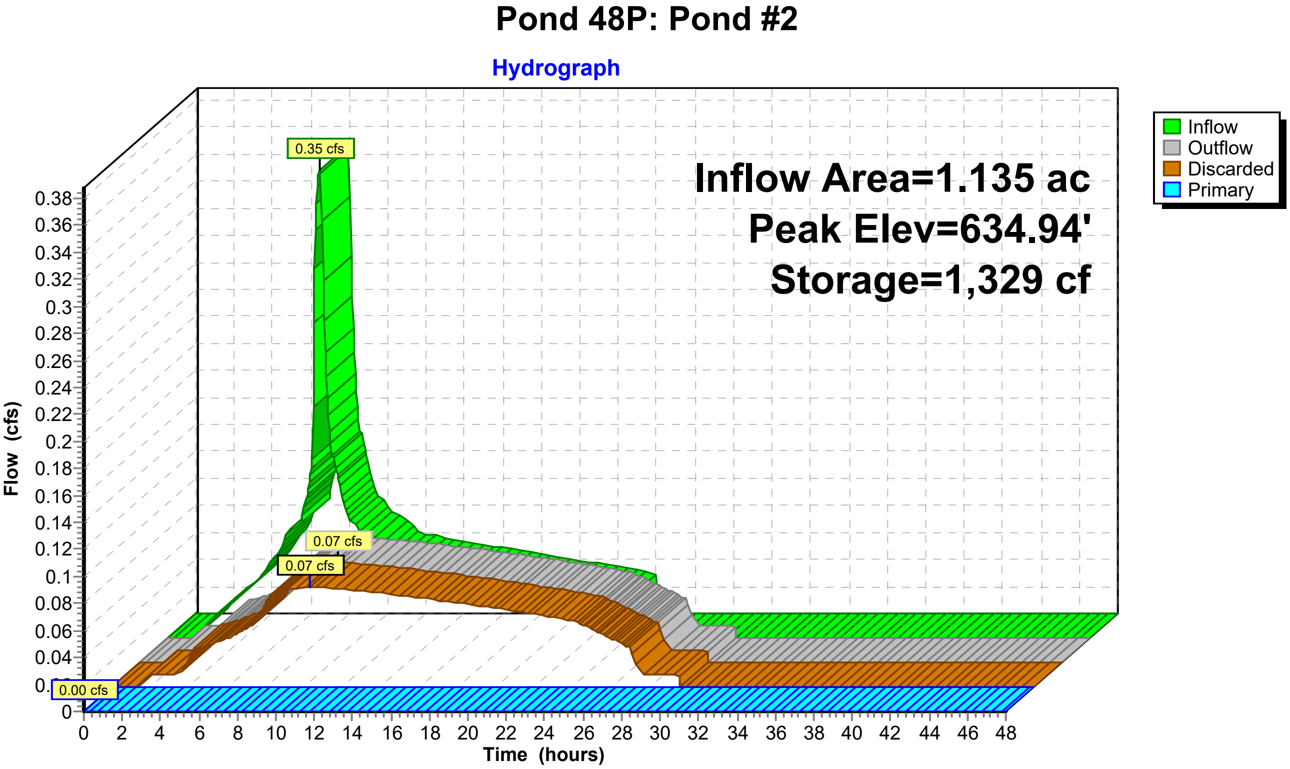
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
632.00	202	86.0	0	0	202
633.00	202	86.0	202	202	288

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
631.00	202	86.0	0	0	202
632.00	202	86.0	202	202	288

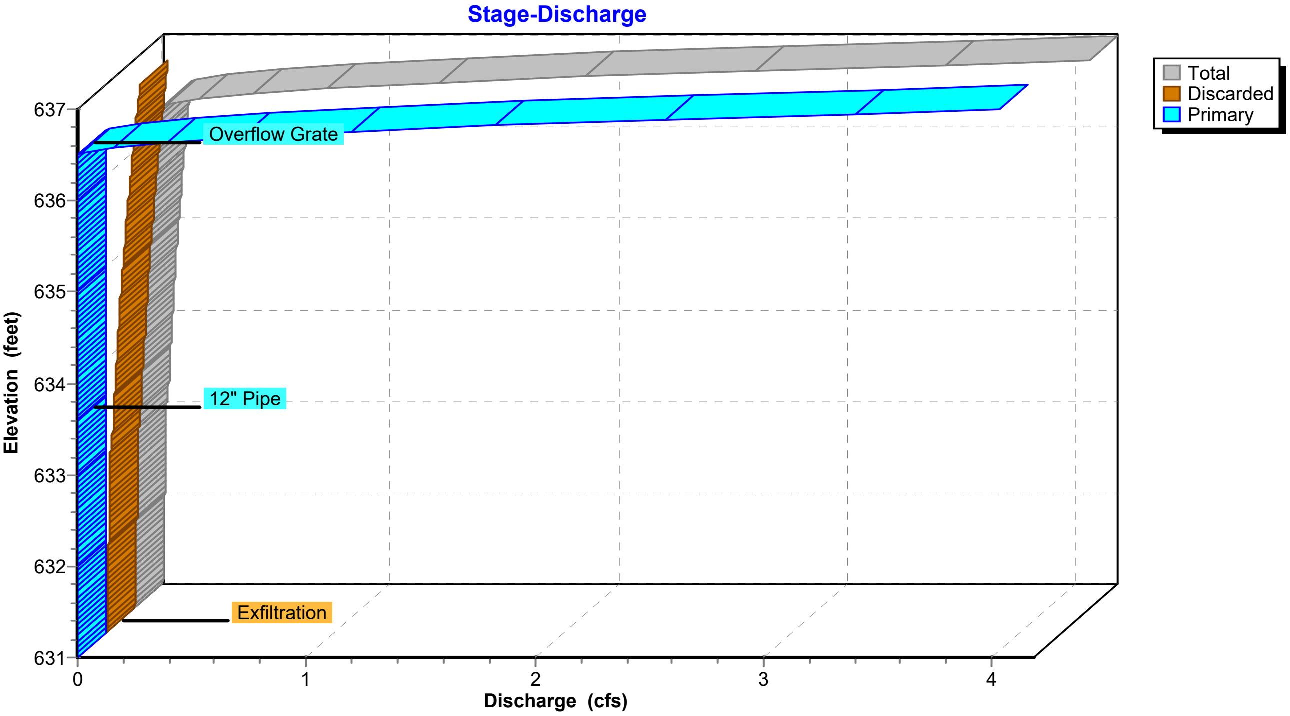
Device	Routing	Invert	Outlet Devices
#1	Discarded	631.00'	**2.000 in/hr Exfiltration over Surface area**
#2	Primary	633.60'	**12.0" Round 12" Pipe** L= 400.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 633.60' / 632.00' S= 0.0040 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf
#3	Device 2	636.50'	**24.0" W x 8.0" H 18° Overflow Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.07 cfs @ 10.35 hrs HW=634.94' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

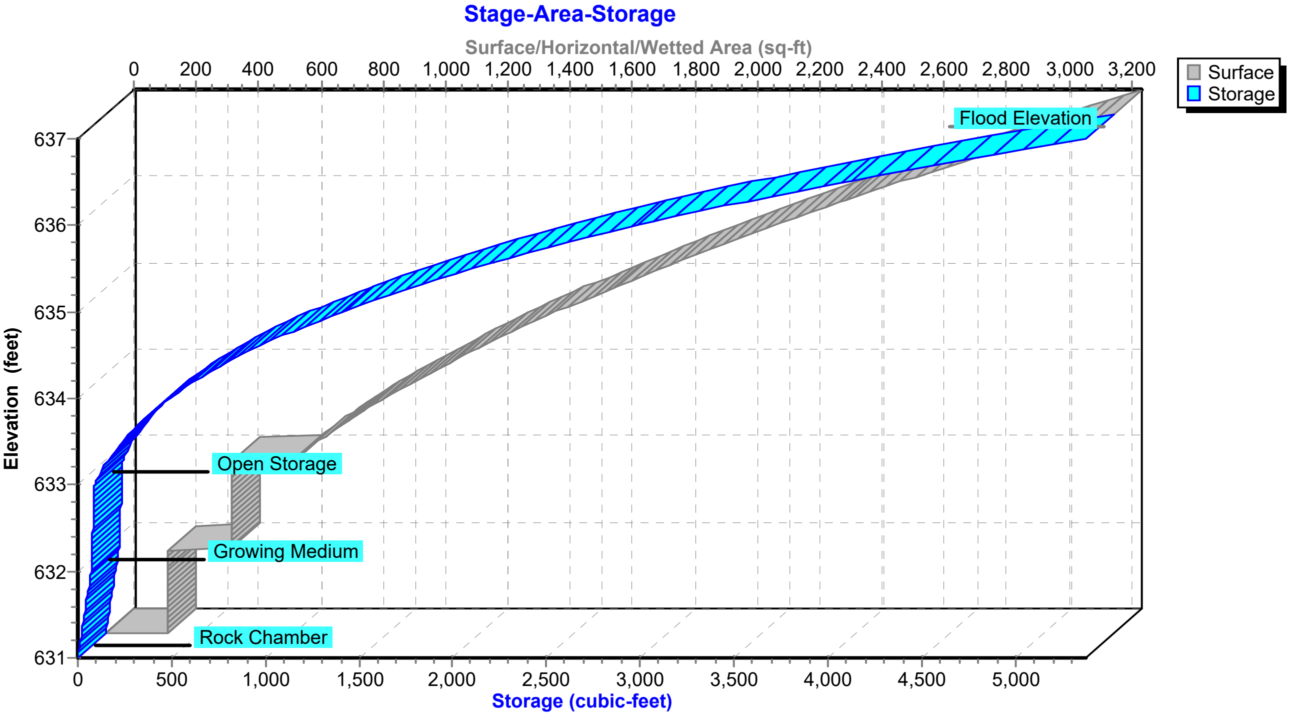
Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=631.00' TW=630.00' (Dynamic Tailwater)
↑—**2=12" Pipe** (Controls 0.00 cfs)
  ↑—**3=Overflow Grate** (Controls 0.00 cfs)



Pond 48P: Pond #2



Pond 48P: Pond #2



Summary for Pond 49P: Pond #4

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=82)

Inflow Area = 0.341 ac,100.00% Impervious, Inflow Depth = 1.18" for Pollution Reduction event
Inflow = 0.10 cfs @ 7.91 hrs, Volume= 0.034 af
Outflow = 0.05 cfs @ 8.46 hrs, Volume= 0.034 af, Atten= 52%, Lag= 33.0 min
Discarded = 0.05 cfs @ 8.46 hrs, Volume= 0.034 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond 46P : Pond #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 635.01' @ 8.45 hrs Surf.Area= 1,074 sf Storage= 189 cf
Flood Elev= 638.00' Surf.Area= 2,659 sf Storage= 2,283 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 47.3 min (743.9 - 696.6)

Volume	Invert	Avail.Storage	Storage Description
#1	636.00'	2,041 cf	**Open Storage (Irregular)**Listed below (Recalc)
#2	635.00'	54 cf	**Growing Medium (Irregular)**Listed below (Recalc) 537 cf Overall x 10.0% Voids
#3	634.00'	188 cf	**Rock Chamber (Irregular)**Listed below (Recalc) 537 cf Overall x 35.0% Voids
		2,283 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
636.00	537	102.0	0	0	537
637.00	1,003	131.0	758	758	1,087
638.00	1,585	159.0	1,283	2,041	1,749

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
635.00	537	102.0	0	0	537
636.00	537	102.0	537	537	639

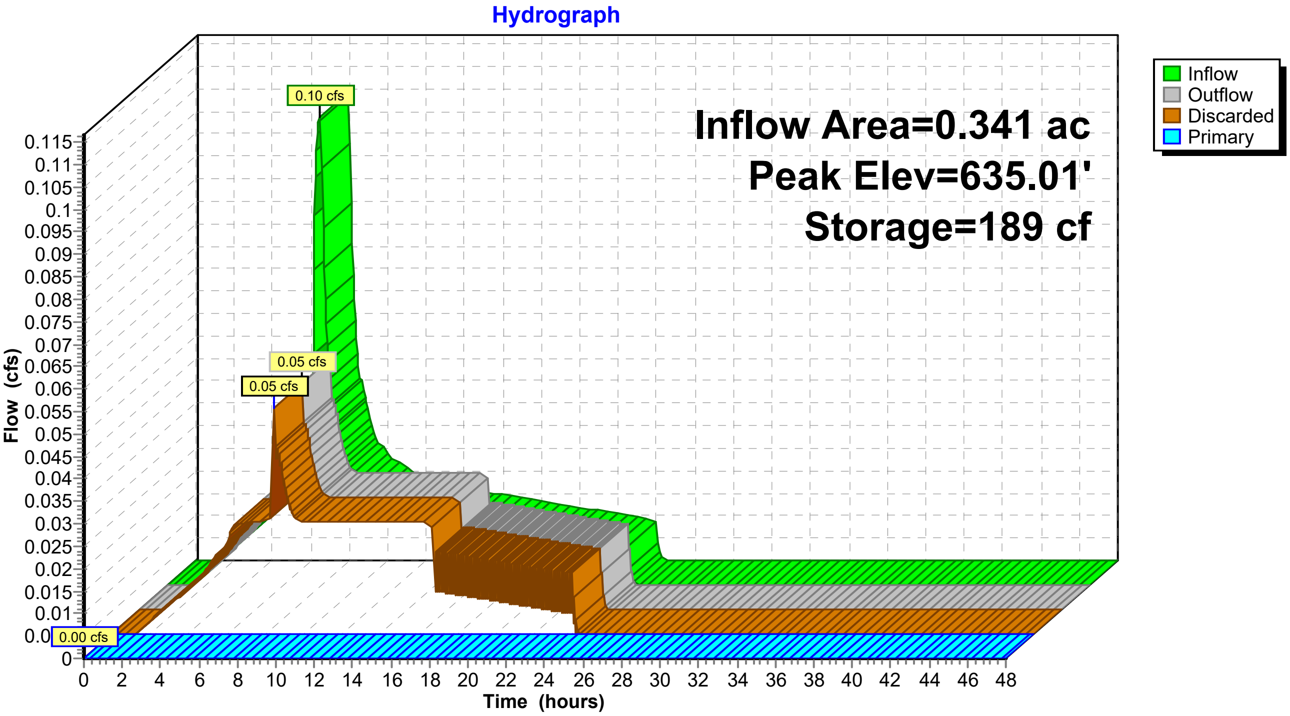
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
634.00	537	102.0	0	0	537
635.00	537	102.0	537	537	639

Device	Routing	Invert	Outlet Devices
#1	Discarded	634.00'	**2.000 in/hr Exfiltration over Surface area**
#2	Primary	636.00'	**8.0" Round 8" Pipe** L= 125.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 636.00' / 634.00' S= 0.0160 '/' Cc= 0.900 n= 0.010, Flow Area= 0.35 sf
#3	Device 2	637.00'	**24.0" W x 8.0" H 18° Overflow Grate** C= 0.600 Limited to weir flow at low heads

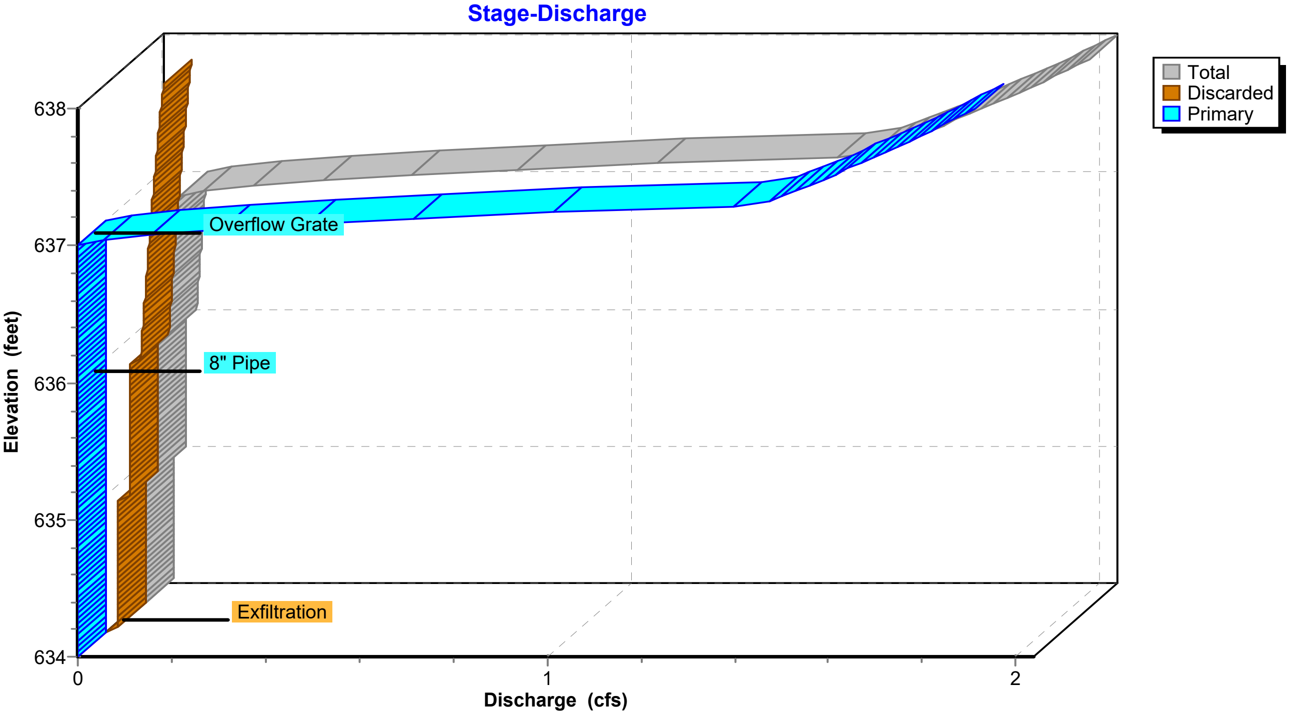
Discarded OutFlow Max=0.05 cfs @ 8.46 hrs HW=635.01' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=634.00' TW=630.00' (Dynamic Tailwater)
↑—**2=8" Pipe** (Controls 0.00 cfs)
  ↑—**3=Overflow Grate** (Controls 0.00 cfs)

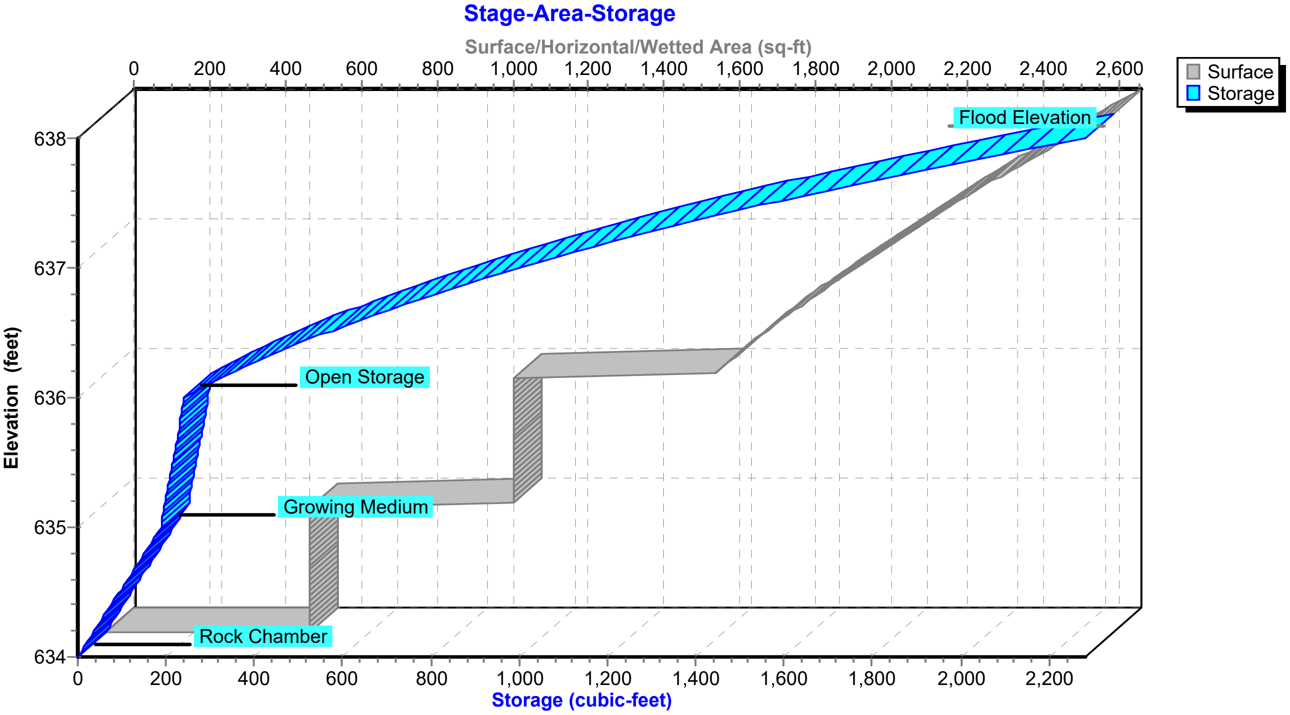
Pond 49P: Pond #4



Pond 49P: Pond #4



Pond 49P: Pond #4



MPD EXHIBIT G **EXHIBIT E**

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Eugene, OR 97405
541-514-1029
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VILLAGE GREEN SUBDIVISION
&
PINE SPRINGS MASTER PLAN

APPLICANT / NEIGHBORHOOD MEETING NOTES

February 1, 2023 - 5:30 p.m.

Applicant's Team:
Teresa Bishow, Bishow Consulting
Colin Kelley, Property Owner/Developer
Bailey Williams, A & E Engineering

Community Members:
During the virtual meeting, 7 community members participated. Most stated they lived either in the Village Green RV Park or within three blocks. Those providing names are listed below:

Stephen Lawn, Chamber of Commerce & Tourism, stephenlawn@msn.com
Buck Strode, buckstrode@gmail.com
Don Place, DonPlace@aol.com
Tracy Evans, tle2068@aol.com
Sharon
Gayle

Teresa Bishow facilitated the virtual meeting beginning with introductions. She presented an overview of the Village Green Subdivision including number of proposed lots and use of the existing driveways on Row River. She presented an overview of the Pine Springs Master Plan including key features such as the number of proposed apartments, access and circulation, arrangement of open space and parking.

Colin Kelley described the continued operation and potential expansion of the RV Park and the property owner's desire to find someone to purchase and operate the hotel and restaurant/bar. Colin also shared about the property owner's commitment to provide housing, especially in small to mid-size communities.

Below are key questions and brief responses by the applicant's team.

KEY QUESTIONS AND COMMENTS

1. How can people learn more about the project? What applications are required?

The project requires City approval of the Village Green Subdivision and Pine Springs Master Plan applications. Each application requires a public hearing before the Planning Commission. After considering public comments, the Planning Commission will forward a recommendation to the City Council. The City Council will also hold a public hearing before taking final action.

2. Will the Village Green Hotel and restaurant be re-opened? What are the plans for the hotel?

The property owners hope to find a local buyer interested in investing in the hotel/restaurant and re-opening with about 40 guest rooms. The purchase of the hotel can't occur until that portion of the site is on its own legal lot. The RV Park will be on a separate legal lot allowing it to be owned independently or by the same person that buys the hotel.

3. What are the plans for the RV Park? Can a mailbox, community restroom or laundry room be provided for residents?

The property owners plan to continue to operate the RV Park. The RV Park lot will allow a small expansion of the number of spaces or enhanced amenities. The current property owners are looking into providing a mailbox for residents and seeing how the existing building on the site might provide other amenities for residents.

4. Once the Pine Springs Apartments are complete, will the property owners look to sell the property?

The property owners are constructing the new apartments for a long-term hold. The family-owned business has built apartment complexes in several Oregon communities and have retained the properties following construction – they do not "flip" the property.

5. Will Pine Springs Apartments be income-controlled housing?

No. The apartments will be market based rental units.

6. What is the design of the apartments and what type of households do you foresee renting units?

The apartments each have 2-bedrooms and 2-baths and access to an outdoor patio or 2nd floor balcony. The apartment floor plans are attractive to a wide range of households including retirees, young adults and families with children. The property owners have developed garden style apartments in several other communities along I-5 such as Junction City, Roseburg, Springfield and Eugene.

7. **Has a traffic study been done?**

Yes. The developer retained Sandow Engineering to conduct a traffic study. The scope and methodology of the traffic study complied with City and ODOT requirements. The study concluded that a traffic signal was not warranted at the intersection of Row River Road and Jim Wright Way. The Sandow Engineering study also included looked at crash data and any known traffic problems in the vicinity.

8. **When will the apartments be constructed and when will the hotel/restaurant re-open?**

The goal is to obtain City approval of the Subdivision and Master Plan by fall. Once new lots are created, the hotel property can be sold to new owners and the hotel/restaurant re-opened. Before construction can being on the apartments, City needs to approve a more detailed set of plans reviewed during a Site Plan Review process. Ideally, restoration of the hotel/restaurant will occur while the apartments are being built so upon completion people can live, work, dine and stay.

9. **Are the new commercial lots being listed by a real estate broker? Has there been any interest in the new commercial uses on the property?**

The property owners have reached out to local hotel groups and a few parties have expressed interest. Until the subdivision is approved, the hotel can't be sold. The property owners have an agreement with a developer interested in the future commercial lots on Row River.

In closing, Teresa again provided her e-mail address and offered to respond to any further inquiries regarding the project.

Meeting notes prepared by Teresa Bishow.

BISHOW
CONSULTING

NEIGHBORHOOD MEETING

- **Village Green Subdivision**
- **Pine Springs Master Plan**

February 1, 2022 - 5:30 p.m.

Please join meeting from your computer, tablet or smartphone.
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The Village Green Subdivision will create 5 lots for commercial and residential use. The site is located at 725 Row River Road in Cottage Grove, Oregon. One lot will allow re-opening the hotel/restaurant, one lot will allow for continued operation of the RV Park, two lots are for future commercial use on Row River Road and one lot is for the Pine Springs Apartments.

The Pine Springs Master Plan consists of 120 new 2-bedroom / 2-bath apartment units and a leasing office / apartment unit for an on-site manager. It also includes parking and open space amenities for residents.

The Pine Springs Master Plan allows for the continued operation of the Village Green Hotel and RV Park and space for future new commercial uses on Row River Road.

Please see the enclosed Tentative Subdivision Plat and Pine Springs Master Plan Site Plan.

For more information contact:

Teresa Bishow at teresa@bishowconsulting.com or 541-514-1029.

NEIGHBORHOOD MEETING MAILING LIST - January 5, 2023

Autozone Development Corporation	123 S Front St	Memphis	TN	38103
Cave Income Properties LLC	PO Box 40051	Eugene	OR	97404
Kristen Woodard LLC	PO Box 10666	Eugene	OR	97440
McDonalds Cottage Grove	2855 Willamette St	Eugene	OR	97405
Oregon State of	3040 25th St SE	Salem	OR	97310
PB Row River LLC	10502 126th Ave NE	Kirkland	WA	98033-4723
Peacehealth	1115 SE 164th Ave	Vancouver	WA	98683
Pine Springs LLC	3025 W 7th Pl	Eugene	OR	97402
ST Vincent De Paul Society of Lane County Inc	PO Box 24608	Eugene	OR	97402
Sunlight Basin LLC	PO Box 948	Powell	WY	82435
Wal-Mart Real Estate Business Trust	PO Box 8050 Ms 0555	Bentonville	AR	72716-0555
Friends of Mt. David	PO Box 22	Cottage Grove	OR	97424

VILLAGE GREEN SUBDIVISION AND PINE SPRINGS MASTER PLAN NEIGHBORHOOD MEETING
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