



TUALATIN ARCHITECTURAL REVIEW BOARD MEETING

WEDNESDAY, JUNE 08, 2022

TUALATIN SERVICE CENTER
10699 SW HERMAN ROAD
TUALATIN, OR 97062

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CALL TO ORDER & ROLL CALL

ANNOUNCEMENTS & COMMUNICATION

APPROVAL OF MINUTES

COMMUNICATION FROM THE PUBLIC (NOT ON THE AGENDA)

ACTION ITEMS

1. Consideration of an Architectural Review application (AR 22-0001) for 116 unit multi-family development on a 4.68 acre site in the High-Density Residential (RH) zone at 23500 SW Boones Ferry Road (Tax Lot: 2S135D000303).

COMMUNICATION FROM CITY STAFF

FUTURE ACTION ITEMS

ADJOURNMENT



TO: Architectural Review Board

THROUGH: Steve Koper, AICP, Assistant Community Development Director

FROM: Erin Engman, Senior Planner

DATE: June 8, 2022

SUBJECT:

Consideration of an Architectural Review application (AR 22-0001) for a 116 unit multi-family development on a 4.68 acre site in the High-Density Residential (RH) zone at 23500 SW Boones Ferry Road (Tax Lot: 2S135D000303).

RECOMMENDATION:

Based on the analysis and findings, as well as the application materials demonstrating compliance with the applicable review criteria, staff respectfully recommends approval of the subject Architectural Review application (AR 22-0001), subject to the recommended conditions of approval in the attached Analysis and Findings.

EXECUTIVE SUMMARY:

- The subject proposal is a Type III land use case, subject to a quasi-judicial hearing before the Architectural Review Board.
- The subject site comprises 4.66 acres of land in the High-Density Residential zone, located east of Boones Ferry Road, south of Norwood Road, north of Greenhill Lane, and within the Basalt Creek Area. The land is currently occupied by two single-family homes and abuts the Horizon Community Church campus along the northern, eastern, and southern property lines. The recently approved Autumn Sunrise subdivision (SB21-0001) is also located south of the project site.
- The applicant requests approval to construct a 116-unit apartment development. The scope includes two, four-story residential buildings with units ranging in size from one-bedroom to four-bedrooms, as well as a community building, passive and active recreational amenities, and 170 parking stalls.
- The proposed development was granted a variance to height standards and minimum parking requirements through VAR 21-0003; this includes a maximum building height requirement of 54 feet and a minimum parking requirement of 170 stalls to maintain density allowances.
- As Boones Ferry Road is designated an access limited roadway, site access will be provided off the property's southern boundary by future roadway that is to be constructed as part of the Autumn Sunrise subdivision (SB21-0001). If the adjoining Autumn Sunrise access is not available when the Plambeck multi-family development is being constructed, the applicant must obtain a Design Exception through Washington County for interim site access off of Boones Ferry Road. Secondary, emergency access is proposed along the northern side of the site at SW Boones Ferry Road as required by TVF&R.

- City utilities have yet to be extended to properties south of Norwood Road, including the subject site. The applicant will be required to extend City water lines from the intersection of Boones Ferry Road and Norwood to southern property line of the subject site. The applicant will also be required to extend City sewer to the subject site.
- Public comments (Exhibit H) have been received from property owners, adjacent to the project site and west of Boones Ferry Road voicing concerns over potential stormwater and resultant downstream impacts. Staff recommends a condition of approval requiring the applicant to submit final plans that minimize impact from stormwater runoff to adjacent properties, allow adjacent properties to drain as they did before the new development, and provide gravity drainage from this development to an approved public system prior to issuance of permits for construction activities.

OUTCOMES OF DECISION:

Approval of AR 22-0001 will facilitate construction of the proposed development.

ALTERNATIVES TO RECOMMENDATION:

The Architectural Review Board may alternatively:

- Approve AR 22-0001 with amended conditions of approval and direct staff to provide updated Analysis and Findings;
 - Continue the hearing to a later date for further consideration; or
 - Deny AR 22-0001.
-

ATTACHMENTS:

- Analysis and Findings
- Presentation
- Exhibit A1 - Narrative
- Exhibit A2 – Plan Set and Elevations
- Exhibit A3 – Tree Assessment Report
- Exhibit A4 – Transportation Impact Analysis
- Exhibit A5 – Preliminary Stormwater Report
- Exhibit A6 – Supporting Documents
- Exhibit B – Public Noticing Requirements
- Exhibit C – Tualatin Valley Fire & Rescue Conditions
- Exhibit D – Clean Water Services Memorandum
- Exhibit E – Washington County Conditions
- Exhibit F – VAR21-0003 Final Order
- Exhibit G – Lot Coverage Email
- Exhibit H – Public Comment
- Exhibit I – Figure 73-1
- Exhibit J – Figure 73-2
- Exhibit K - Map 8-1 Tualatin Functional Classification Plan
- Exhibit L - Map 8-4 Tualatin Bicycle and Pedestrian Plan
- Exhibit M – City Engineering Memorandum
- Exhibit N – Water System Capacity Analysis
- Exhibit O – Letter of Intent for Easement Agreement

- Exhibit P – Items Added to the Record in Response to Public Comment



ANALYSIS AND FINDINGS PLAMBECK GARDEN APARTMENTS

ARB Hearing: June 8, 2022

Re-published on June 7, 2022

Additions in **bold underline** deletions in ~~strikethrough~~

Case #:	AR 22-0001
Project:	Plambeck Garden Apartments
Location:	23500 SW Boones Ferry Road; Tax Lot: 2S135D000303
Representative:	Kayla Zander, Carleton Hart Architecture
Owner:	Community Partners for Affordable Housing

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Arrangements can be made to provide these materials in alternative formats such as large type or audio recording. Please contact the Planning Division at 503.691.3026 and allow as much lead time as possible.

I. INTRODUCTION

A. Applicable Criteria

The following Chapters of the Tualatin Development Code (TDC) are applicable to the subject proposal:

- TDC 33.020: Architectural Review
- TDC 33.110: Tree Removal Permit/Review
- TDC 33.120: Variances
- TDC 43: High Density Residential (RH) Zone
- TDC 73A: Site Design Standards
- TDC 73B: Landscaping Standards
- TDC 73C: Parking Standards
- TDC 73D: Waste and Recyclables Management Standards
- TDC 74: Public Improvements
- TDC 75: Access

B. Site Description

The subject site is a 4.66 acre property located at 23500 SW Boones Ferry Road (Washington County Tax Lot: 2S135D000303), and is zoned High Density Residential (RH).

The site currently consists of two single family homes with several small structures scattered around the site. This property is located in the Basalt Creek planning area; east of SW Boones Ferry Road and abutting the Horizon Community Church campus to the north, east, and south. The land reaches a high point of 357 feet in elevation in the northeast corner and slopes down to a low point of 330 feet near the northwest corner of the property.

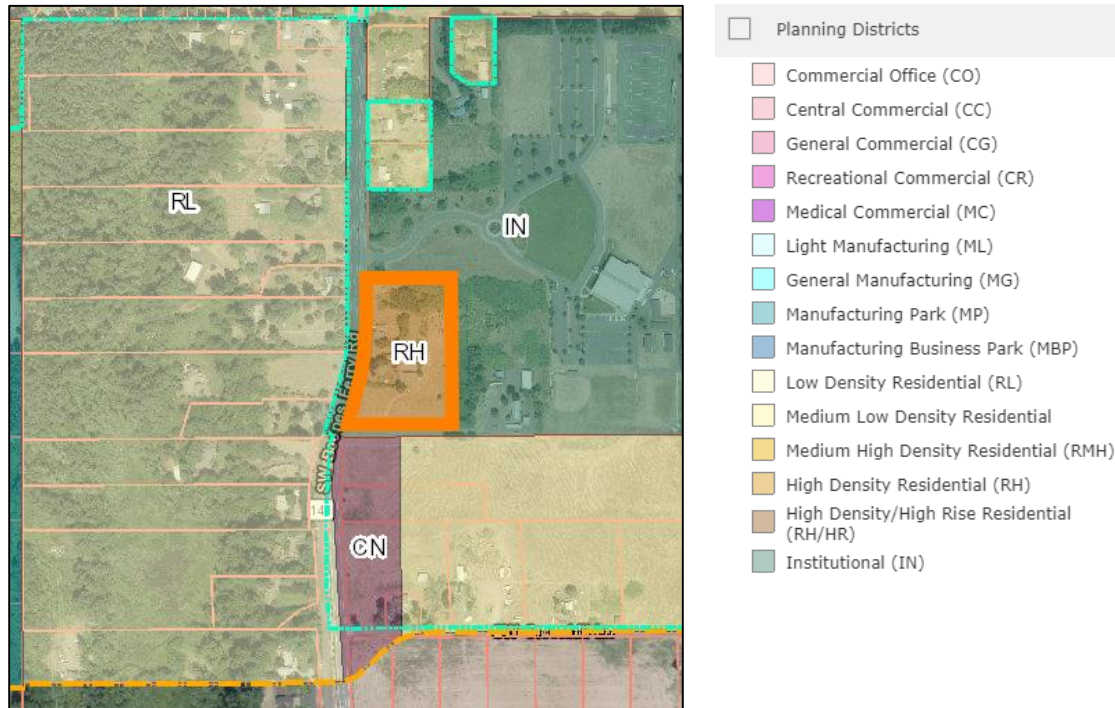


Figure 1: Aerial view of subject site (highlighted)

C. Proposed Project

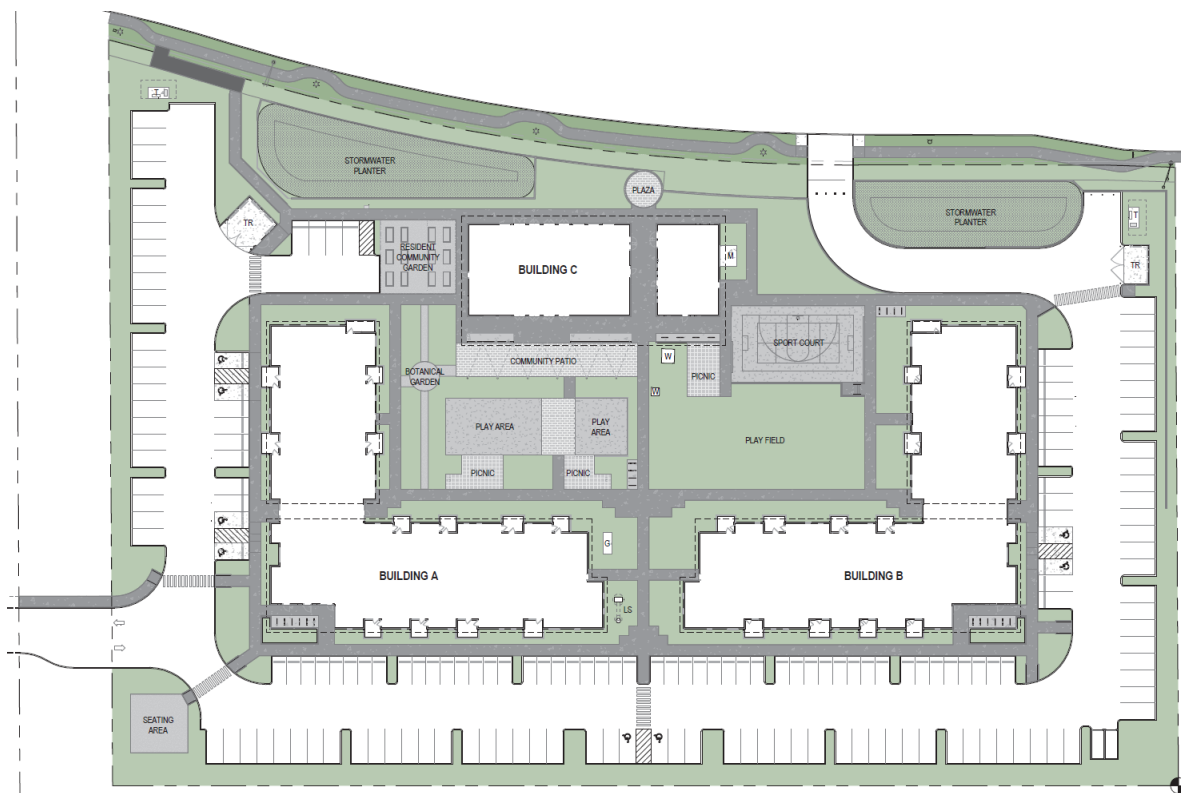
As described in the applicant’s narrative (Exhibit A1), Community Partners for Affordable Housing proposes to construct a 116-unit apartment development. The scope includes two, four-story residential buildings with units ranging in size from one-bedroom to four-bedrooms, as well as a community building that includes additional resident services, management offices, and classrooms.

The proposed development was granted a variance to height standards and minimum parking requirements through VAR 21-0003. As shown on the architectural elevations (Exhibit A2), the north side of Building B is the highest elevation proposed at approximately 53.6-feet in height. Design elements include fiber cement cladding in shades of grey and gold with decorative balcony railings. A variety of play and recreation areas are proposed between the residential buildings.

As Boones Ferry Road is an access limited roadway, access to the site will be provided by a future roadway created as part of the Autumn Sunrise subdivision to the south and through an access easement agreement with the Horizon Community Church campus. A secondary, emergency access is proposed along the northern side of the site at SW Boones Ferry Road. Two stormwater planters are proposed along the western property line abutting Boones Ferry Road, with parking proposed along the north, east, and south property lines.

The surrounding vicinity is within the Basalt Creek Planning area. Nearby development includes the Horizon Community Church campus, as well as the future 400 lot Autumn Sunrise subdivision (approved as CUP 21-0001 and SB 21-0001). Phase 1 of this project is currently under construction and is located south of Norwood Road and west of Interstate 5. Additionally, residential land developed with single family homes is located west of SW Boones Ferry Road.

Figure 2: Site Plan (overview)



D. Previous Land Use Actions

- ANN 20-0004 Property Annexed into Tualatin
- VAR 21-0003 Variance to Minimum Parking and Structure Height Standards

E. Surrounding Uses

Surrounding areas indicate a transitional area including institutional and residential use. Adjacent land uses include:

North: Institutional (IN)

- Horizon Community Church campus

Unincorporated Washington County (FD-20)

Tualatin Urban Planning Area; designated future Residential Medium-Low Density (RML) zone

- Residential property

East: Institutional (IN)

- Horizon Community Church campus

Residential Medium-Low Density (RML)

- Future Autumn Sunrise subdivision

South: Institutional (IN)

- Horizon Community Church campus

Neighborhood Commercial (CN)

- Vacant land

West: Unincorporated Washington County (FD-20)

Tualatin Urban Planning Area; designated future Residential Low Density (RL) zone

- Residential Property

F. Exhibit List

Exhibit A1 - Narrative

Exhibit A2 – Plan Set and Elevations

Exhibit A3 – Tree Assessment Report

Exhibit A4 – Transportation Impact Analysis

Exhibit A5 – Preliminary Stormwater Report

Exhibit A6 – Supporting Documents

Exhibit B – Public Noticing Requirements

Exhibit C – Tualatin Valley Fire & Rescue Conditions

Exhibit D – Clean Water Services Memorandum

Exhibit E – Washington County Conditions

Exhibit F – VAR21-0003 Final Order

Exhibit G – Lot Coverage Email

Exhibit H – Public Comment

Exhibit I – Figure 73-1

Exhibit J – Figure 73-2

Exhibit K - Map 8-1 Tualatin Functional Classification Plan

Exhibit L - Map 8-4 Tualatin Bicycle and Pedestrian Plan

Exhibit M – City Engineering Memorandum

Exhibit N- Water System Capacity Analysis

Exhibit O - Letter of Intent for Easement Agreement

Exhibit P - Items Added to the Record in Response to Public Comment

II. PLANNING FINDINGS

These findings reference the Tualatin Development Code (TDC), unless otherwise noted.

Chapter 32: Procedures

Section 32.010 – Purpose and Applicability.

[...]

(2) **Applicability of Review Procedures.** All land use and development permit applications and decisions, will be made by using the procedures contained in this Chapter. The procedure “type” assigned to each application governs the decision-making process for that permit or application. There are five types of permit/application procedures as described in subsections (a) through (e) below. Table 32-1 lists the City’s land use and development applications and corresponding review procedure(s).

[...]

(c) **Type III Procedure (Quasi-Judicial Review – Public Hearing).** Type III procedure is used when the standards and criteria require discretion, interpretation, or policy or legal judgment. Quasi-Judicial decisions involve discretion but implement established policy. Type III decisions are made by the Planning Commission or Architectural Review Board and require public notice and a public hearing, with an opportunity for appeal to the City Council.

[...]

(3) **Determination of Review Type.** Unless specified in Table 32-1, the City Manager will determine whether a permit or application is processed as Type I, II, III, IV-A or IV-B based on the descriptions above. Questions regarding the appropriate procedure will be resolved in favor of the review type providing the widest notice and opportunity to participate. An applicant may choose to elevate a Type I or II application to a higher numbered review type, provided the applicant pays the appropriate fee for the selected review type.

Table 32-1 – Applications Types and Review Procedures

Application / Action	Type	Decision Body*	Appeal Body*	Pre-Application Conference Required	Neighborhood /Developer Mtg Required	Applicable Code Chapter
Architectural Review						
Multifamily Housing Projects 100 units and above	III	ARB	CC	Yes	Yes	TDC 33.020
[...]						
* City Council (CC); Planning Commission (PC); Architectural Review Board (ARB); City Manager or designee (CM); Land Use Board of Appeals (LUBA).						

Finding:

The proposal is for a 116 unit multifamily housing project, and is therefore classified as a Type III Procedure Types according to Table 32-1. The application has been processed according to the applicable code for Type III procedures. This standard is met.

Section 32.030 – Time to Process Applications.

(1) **Time Limit - 120-day Rule.** The City must take final action on all Type II, Type III, and Type IV-A land use applications, as provided by ORS 227.178, including resolution of all local appeals, within 120 days after the application has been deemed complete under TDC 32.160, unless the applicant provides

written request or consent to an extension in compliance with ORS 227.178. (Note: The 120-day rule does not apply to Type IV-B (Legislative Land Use) decisions.)

[...]

Finding:

The application was deemed complete on April 12, 2022, while the hearing for AR 22-0001 is scheduled for June 8, 2022. Final action will take place by August 10, 2022 in compliance with ORS 227.178. This standard is met.

Section 32.110 – Pre-Application Conference.

(1) Purpose of Pre-Application Conferences. Pre-application conferences are intended to familiarize applicants with the requirements of the TDC; to provide applicants with an opportunity discuss proposed projects in detail with City staff; and to identify approval criteria, standards, and procedures prior to filing a land use application. The pre-application conference is intended to be a tool to assist applicants in navigating the land use process, but is not intended to be an exhaustive review that identifies or resolves all potential issues, and does not bind or preclude the City from enforcing any applicable regulations or from applying regulations in a manner differently than may have been indicated at the time of the pre-application conference.

(2) When Mandatory. Pre-application conferences are mandatory for all land use actions identified as requiring a pre-application conference in Table 32-1. An applicant may voluntarily request a pre-application conference for any land use action even if it is not required.

(3) Timing of Pre-Application Conference. A pre-application conference must be held with City staff before an applicant submits an application and before an applicant conducts a Neighborhood/Developer meeting.

(4) Application Requirements for Pre-Application Conference.

(a) Application Form. Pre-application conference requests must be made on forms provided by the City Manager.

(b) Submittal Requirements. Pre-application conference requests must include:

(i) A completed application form;

(ii) Payment of the application fee;

(iii) The information required, if any, for the specific pre-application conference sought; and

(iv) Any additional information the applicant deems necessary to demonstrate the nature and scope of the proposal in sufficient detail to allow City staff to review and comment.

(5) Scheduling of Pre-Application Conference. Upon receipt of a complete application, the City Manager will schedule the pre-application conference. The City Manager will coordinate the involvement of city departments, as appropriate, in the pre-application conference. Pre-application conferences are not open to the general public.

(6) Validity Period for Mandatory Pre-Application Conferences; Follow-Up Conferences. A follow-up conference is required for those mandatory pre-application conferences that have previously been held when:

(a) An application relating to the proposed development that was the subject of the pre-application conference has not been submitted within six (6) months of the pre-application conference;

(b) The proposed use, layout, and/or design of the proposal have significantly changed; or

(c) The owner and/or developer of a project changes after the pre-application conference and prior to application submittal.

Finding:

The subject land use action is identified as requiring a pre-application conference in Table 32-1. The applicant participated in a pre-application meeting on July 28, 2021, approximately seven months prior to submittal. Staff finds that the proposed layout has not significantly changed since the preapplication meeting, and that the applicant has, on several occasions had in-depth discussions regarding the project with staff by phone call and email to satisfy the follow-up conference requirement. These standards are met.

Section 32.120 – Neighborhood/Developer Meetings.

(1) Purpose. The purpose of this meeting is to provide a means for the applicant and surrounding property owners to meet to review a development proposal and identify issues regarding the proposal so they can be considered prior to the application submittal. The meeting is intended to allow the developer and neighbors to share information and concerns regarding the project. The applicant may consider whether to incorporate solutions to these issues prior to application submittal.

(2) When Mandatory. Neighborhood/developer meetings are mandatory for all land use actions identified in Table 32-1 as requiring a neighborhood/developer meeting. An applicant may voluntarily conduct a neighborhood/developer meeting even if it is not required and may conduct more than one neighborhood/developer meeting at their election.

(3) Timing. A neighborhood/developer meeting must be held after a pre-application meeting with City staff, but before submittal of an application.

(4) Time and Location. Required neighborhood/developer meetings must be held within the city limits of the City of Tualatin at the following times:

(a) If scheduled on a weekday, the meeting must begin no earlier than 6:00 p.m.

(b) If scheduled on a weekend, the meeting must begin between 10:00 a.m. and 6:00 p.m.

(5) Notice Requirements.

(a) The applicant must provide notice of the meeting at least 14 calendar days and no more than 28 calendar days before the meeting. The notice must be by first class mail providing the date, time, and location of the meeting, as well as a brief description of the proposal and its location. The applicant must keep a copy of the notice to be submitted with their land use application.

(b) The applicant must mail notice of a neighborhood/developer meeting to the following persons:

(i) All property owners within 1,000 feet measured from the boundaries of the subject property;

(ii) All property owners within a platted residential subdivision that is located within 1,000 feet of the boundaries of the subject property. The notice area includes the entire subdivision and not just those lots within 1,000 feet. If the residential subdivision is one of two or more individually platted phases sharing a single subdivision name, the notice area need not include the additional phases; and

(iii) All designated representatives of recognized Citizen Involvement Organizations as established in TMC Chapter 11-9.

(c) The City will provide the applicant with labels for mailing for a fee.

(d) Failure of a property owner to receive notice does not invalidate the neighborhood/developer meeting proceedings.

(6) Neighborhood/Developer Sign Posting Requirements. The applicant must provide and post on the subject property, at least 14 calendar days before the meeting. The sign must conform to the design and placement standards established by the City for signs notifying the public of land use actions in TDC 32.150.

(7) Neighborhood/Developer Meeting Requirements. The applicant must have a sign-in sheet for all attendees to provide their name, address, telephone number, and email address and keep a copy of the sign-in sheet to provide with their land use application. The applicant must prepare meeting notes identifying the persons attending, those commenting and the substance of the comments expressed, and the major points that were discussed. The applicant must keep a copy of the meeting notes for submittal with their land use application.

Finding:

The applicant has provided evidence within Exhibit A6 that they held a Neighborhood/Developer meeting on August 11, 2021, over six months prior to application submittal. The applicant has provided documentation of sign posting and notification in compliance with this section, as well as a sign-in sheet and notes from the meeting. These standards are met.

Section 32.130 – Initiation of Applications.

(1) Type I, Type II, Type III, and Type IV-A Applications. Type I, Type II, Type III, and Type IV-A applications may be submitted by one or more of the following persons:

- (a) The owner of the subject property;
- (b) The contract purchaser of the subject property, when the application is accompanied by proof of the purchaser's status as such and by the seller's written consent;
- (c) A lessee in possession of the property, when the application is accompanied by the owners' written consent; or
- (d) The agent of any of the foregoing, when the application is duly authorized in writing by a person authorized to submit an application by paragraphs (a), (b) or (c) of this subsection, and accompanied by proof of the agent's authority.

[...]

Finding:

The application has been signed by a representative of Community Partners for Affordable Housing, who is the owner of the subject property. This standard is met.

Section 32.140 – Application Submittal.

(1) Submittal Requirements. Land use applications must be submitted on forms provided by the City. A land use application may not be accepted in partial submittals. All information supplied on the application form and accompanying the application must be complete and correct as to the applicable facts. Unless otherwise specified, all of the following must be submitted to initiate completeness review under TDC 32.160:

- (a) A completed application form. The application form must contain, at a minimum, the following information:
 - (i) The names and addresses of the applicant(s), the owner(s) of the subject property, and any authorized representative(s) thereof;
 - (ii) The address or location of the subject property and its assessor's map and tax lot number;
 - (iii) The size of the subject property;
 - (iv) The comprehensive plan designation and zoning of the subject property;
 - (v) The type of application(s);
 - (vi) A brief description of the proposal; and
 - (vii) Signatures of the applicant(s), owner(s) of the subject property, and/or the duly authorized representative(s) thereof authorizing the filing of the application(s).
- (b) A written statement addressing each applicable approval criterion and standard;
- (c) Any additional information required under the TDC for the specific land use action sought;

(d) Payment of the applicable application fee(s) pursuant to the most recently adopted fee schedule;

(e) Recorded deed/land sales contract with legal description.

(f) A preliminary title report or other proof of ownership.

(g) For those applications requiring a neighborhood/developer meeting:

(i) The mailing list for the notice;

(ii) A copy of the notice;

(iii) An affidavit of the mailing and posting;

(iv) The original sign-in sheet of participants; and

(v) The meeting notes described in TDC 32.120(7).

(h) A statement as to whether any City-recognized Citizen Involvement Organizations (CIOs) whose boundaries include, or are adjacent to, the subject property were contacted in advance of filing the application and, if so, a summary of the contact. The summary must include the date when contact was made, the form of the contact and who it was with (e.g. phone conversation with neighborhood association chairperson, meeting with land use committee, presentation at neighborhood association meeting), and the result;

(i) Any additional information, as determined by the City Manager, that may be required by another provision, or for any other permit elsewhere, in the TDC, and any other information that may be required to adequately review and analyze the proposed development plan as to its conformance to the applicable criteria;

(2) Application Intake. Each application, when received, must be date-stamped with the date the application was received by the City, and designated with a receipt number and a notation of the staff person who received the application.

(3) Administrative Standards for Applications. The City Manager is authorized to establish administrative standards for application forms and submittals, including but not limited to plan details, information detail and specificity, number of copies, scale, and the form of submittal.

Finding:

The applicant submitted the subject application on March 4 2022. The applicant submitted additional information on March 30, 2022 and the application was deemed complete on April 12, 2022. The general land use submittal requirements were included with this application. These standards are met.

Section 32.150 - Sign Posting.

(1) When Signs Posted. Signs in conformance with these standards must be posted as follows:

(a) Signs providing notice of an upcoming neighborhood/developer meeting must be posted prior to a required neighborhood/developer meeting in accordance with Section 32.120(6); and

(b) Signs providing notice of a pending land use application must be posted after land use application has been submitted for Type II, III and IV-A applications.

(2) Sign Design Requirements. The applicant must provide and post a sign(s) that conforms to the following standards:

(a) Waterproof sign materials;

(b) Sign face must be no less than eighteen (18) inches by twenty-four (24) inches (18" x 24"); and

(c) Sign text must be at least two (2) inch font.

(3) On-site Placement. The applicant must place one sign on their property along each public street frontage of the subject property. (Example: If a property adjoins four public streets, the applicant must place a sign at each of those public street frontages for a total of four signs). The applicant cannot place the sign within public right of way.

(4) Removal. If a sign providing notice of a pending land use application disappears prior to the final decision date of the subject land use application, the applicant must replace the sign within forty-eight (48) hours of discovery of the disappearance or of receipt of notice from the City of its disappearance, whichever occurs first. The applicant must remove the sign no later than fourteen (14) days after:

- (a) The meeting date, in the case of signs providing notice of an upcoming neighborhood/developer meeting; or
- (b) The City makes a final decision on the subject land use application, in the case of signs providing notice of a pending land use application.

Finding:

The applicant provided certification within Exhibit A6 that signs in conformance with this section were placed on site in accordance with this section. This standard is met.

Section 32.160 – Completeness Review.

(1) Duration. Except as otherwise provided under ORS 227.178, the City Manager must review an application for completeness within 30 days of its receipt.

(2) Considerations. Determination of completeness will be based upon receipt of the information required under TDC 32.140 and will not be based on opinions as to quality or accuracy. Applications that do not respond to relevant code requirements or standards can be deemed incomplete. A determination that an application is complete indicates only that the application is ready for review on its merits, not that the City will make a favorable decision on the application.

(3) Complete Applications. If an application is determined to be complete, review of the application will commence.

(4) Incomplete Applications. If an application is determined to be incomplete, the City Manager must provide written notice to the applicant identifying the specific information that is missing and allowing the applicant the opportunity to submit the missing information. An application which has been determined to be incomplete must be deemed complete for purposes of this section upon receipt of:

- (a) All of the missing information;
- (b) Some of the missing information and written notice from the applicant that no other information will be provided; or
- (c) Written notice from the applicant that none of the missing information will be provided.

(5) Vesting. If an application was complete at the time it was first submitted, or if the applicant submits additional required information within 180 days of the date the application was first submitted, approval or denial of the application must be based upon the standards and criteria that were in effect at the time the application was first submitted.

(6) Void Applications. An application is void if the application has been on file with the City for more than 180 days and the applicant has not provided the missing information or otherwise responded, as provided in subsection (4) of this section.

[...]

Finding:

The subject application was submitted on March 4, 2022. The application was deemed complete on April 12, 2022. These standards are met.

Section 32.230 – Type III Procedure (Quasi-Judicial Review – Public Hearing).

Type III decisions involve the use of discretion and judgment and are made by the Planning Commission or Architectural Review Board after a public hearing with an opportunity for appeal to the City Council. The decision body for each application type is specified in Table 32-1. A hearing under these procedures provides a forum to apply standards to a specific set of facts to determine whether the facts conform to the applicable criteria and the resulting determination will directly affect only a small number of identifiable persons.

(1) Submittal Requirements. Type III applications must include the submittal information required by TDC 32.140(1).

(2) Determination of Completeness. After receiving an application for filing, the City Manager will review the application will for completeness in accordance with TDC 32.160.

(3) Written Notice of Public Hearing – Type III. Once the application has been deemed complete, the City must mail by regular first class mail Notice of a Public Hearing to the following individuals and agencies no fewer than 20 days before the hearing.

(a) Recipients:

(i) The applicant and, the owners of the subject property;

(ii) All property owners within 1,000 feet measured from the boundaries of the subject property;

(iii) All property owners within a platted residential subdivision that is located within 1,000 feet of the boundaries of the subject property. The notice area includes the entire subdivision and not just those lots within 1,000 feet. If the residential subdivision is one of two or more individually platted phases sharing a single subdivision name, the notice area need not include the additional phases;

(iv) All recognized neighborhood associations within 1,000 feet from the boundaries of the subject property;

(v) All designated representatives of recognized Citizen Involvement Organizations as established in TMC Chapter 11-9;

(vi) Any person who submits a written request to receive a notice;

(vii) Any governmental agency that is entitled to notice under an intergovernmental agreement entered into with the City and any other affected agencies, including but not limited to: school districts; fire district; where the project either adjoins or directly affects a state highway, the Oregon Department of Transportation; and where the project site would access a County road or otherwise be subject to review by the County, then the County; and Clean Water Services; Tri Met; and, ODOT Rail Division and the railroad company if a railroad-highway grade crossing provides or will provide the only access to the subject property. The failure of another agency to respond with written comments on a pending application does not invalidate an action or permit approval made by the City under this Code;

(viii) Utility companies (as applicable); and,

(ix) Members of the decision body identified in Table 32-1.

(b) The Notice of a Public Hearing, at a minimum, must contain all of the following information:

(i) The names of the applicant(s), any representative(s) thereof, and the owner(s) of the subject property;

(ii) The street address if assigned, if no street address has been assigned then Township, Range, Section, Tax Lot or Tax Lot ID;

(iii) The type of application and a concise description of the nature of the land use action;

(iv) A list of the approval criteria by TDC section for the decision and other ordinances or regulations that apply to the application at issue;

- (v) Brief summary of the local decision making process for the land use decision being made and a general explanation of the requirements for submission of testimony and the procedure for conduct of hearings;
 - (vi) The date, time and location of the hearing;
 - (vii) Disclosure statement indicating that if any person fails to address the relevant approval criteria with enough detail, he or she may not be able to appeal to the Land Use Board of Appeals on that issue, and that only comments on the relevant approval criteria are considered relevant evidence;
 - (viii) The name of a City representative to contact and the telephone number where additional information may be obtained; and
 - (ix) Statement that the application and all documents and evidence submitted to the City are in the public record and available for review, and that copies can be obtained at a reasonable cost from the City; and
 - (x) Statement that a copy of the staff report will be available for inspection at no cost at least seven days prior to the hearing and will be provided at reasonable cost.
- (c) Failure of a person or agency to receive a notice, does not invalidate any proceeding in connection with the application, provided the City can demonstrate by affidavit that required notice was given.

Finding:

After submittal and completeness review as required by this section, notice for the Type III hearing concerning AR 22-0001 was mailed by city staff on April 28, 2022 as Exhibit B, which contained the information required by this section. One public comment was received and has been included as Exhibit H. These standards are met.

(4) Conduct of the Hearing - Type III.

The person chairing the hearing must follow the order of proceedings set forth below. These procedures are intended to provide all interested persons a reasonable opportunity to participate in the hearing process and to provide for a full and impartial hearing on the application before the body. Questions concerning the propriety or the conduct of a hearing will be addressed to the chair with a request for a ruling. Rulings from the chair must, to the extent possible, carry out the stated intention of these procedures. A ruling given by the chair on such question may be modified or reversed by a majority of those members of the decision body present and eligible to vote on the application before the body. The procedures to be followed by the chair in the conduct of the hearing are as follows:

- (a) At the commencement of the hearing, the person chairing the hearing must state to those in attendance all of the following information and instructions:
 - (i) The applicable substantive criteria;
 - (ii) That testimony, arguments and evidence must be directed toward the criteria described in paragraph (i) of this subsection or other criteria in the plan or land use regulation which the person believes to apply to the decision;
 - (iii) That failure to raise an issue accompanied by statements or evidence sufficient to afford the decision maker and the parties an opportunity to respond to the issue precludes appeal to the State Land Use Board of Appeals based on that issue;
 - (iv) At the conclusion of the initial evidentiary hearing, the decision body must deliberate and make a decision based on the facts and arguments in the public record; and
 - (v) Any participant may ask the decision body for an opportunity to present additional relevant evidence or testimony that is within the scope of the hearing; if the decision body grants the request, it will schedule a date to continue the hearing as provided in TDC

32.230(4)(e), or leave the record open for additional written evidence or testimony as provided TDC 32.230(4)(f).

(b) The public is entitled to an impartial decision body as free from potential conflicts of interest and pre-hearing ex parte (outside the hearing) contacts as reasonably possible. Where questions related to ex parte contact are concerned, members of the decision body must follow the guidance for disclosure of ex parte contacts contained in ORS 227.180. Where a real conflict of interest arises, that member or members of the decision body must not participate in the hearing, except where state law provides otherwise. Where the appearance of a conflict of interest is likely, that member or members of the decision body must individually disclose their relationship to the applicant in the public hearing and state whether they are capable of rendering a fair and impartial decision. If they are unable to render a fair and impartial decision, they must be excused from the proceedings.

(c) Presenting and receiving evidence.

(i) The decision body may set reasonable time limits for oral presentations and may limit or exclude cumulative, repetitious, irrelevant, or personally derogatory testimony or evidence;

(ii) No oral testimony will be accepted after the close of the public hearing. Written testimony may be received after the close of the public hearing only as provided by this section; and

(iii) Members of the decision body may visit the property and the surrounding area, and may use information obtained during the site visit to support their decision, if the information relied upon is disclosed at the beginning of the hearing and an opportunity is provided to dispute the evidence.

(d) The decision body, in making its decision, must consider only facts and arguments in the public hearing record; except that it may take notice of facts not in the hearing record (e.g., local, state, or federal regulations; previous City decisions; case law; staff reports). Upon announcing its intention to take notice of such facts in its deliberations, it must allow persons who previously participated in the hearing to request the hearing record be reopened, as necessary, to present evidence concerning the newly presented facts.

(e) If the decision body decides to continue the hearing, the hearing must be continued to a date that is at least seven days after the date of the first evidentiary hearing (e.g., next regularly scheduled meeting). An opportunity must be provided at the continued hearing for persons to present and respond to new written evidence and oral testimony. If new written evidence is submitted at the continued hearing, any person may request, before the conclusion of the hearing, that the record be left open for at least seven days, so that he or she can submit additional written evidence or arguments in response to the new written evidence. In the interest of time, after the close of the hearing, the decision body may limit additional testimony to arguments and not accept additional evidence.

(f) If the decision body leaves the record open for additional written testimony, the record must be left open for at least seven days after the hearing. Any participant may ask the decision body in writing for an opportunity to respond to new evidence (i.e., information not disclosed during the public hearing) submitted when the record was left open. If such a request is filed, the decision body must reopen the record, as follows:

(i) When the record is reopened to admit new evidence or arguments (testimony), any person may raise new issues that relate to that new evidence or testimony;

(ii) An extension of the hearing or record granted pursuant to this section is subject to the limitations of TDC 32.030, unless the applicant waives his or her right to a final decision being made within the required timeframe; and

(iii) If requested by the applicant, the decision body must grant the applicant at least seven days after the record is closed to all other persons to submit final written arguments, but not evidence, provided the applicant may expressly waive this right.

Finding:

The Architectural Review Board will follow the hearing requirements set forth by this section. These standards will be met.

(5) Notice of Adoption of a Type III Decision.

Notice of Adoption must be provided to the property owner, applicant, and any person who provided testimony at the hearing or in writing. The Type III Notice of Adoption must contain all of the following information:

- (a) A description of the applicant’s proposal and the City’s decision on the proposal, which may be a summary, provided it references the specifics of the proposal and conditions of approval in the public record;
- (b) The address or other geographic description of the property proposed for development, including a map of the property in relation to the surrounding area;
- (c) A statement that a copy of the decision and complete case file, including findings, conclusions, and conditions of approval, if any, is available for review and how copies can be obtained;
- (d) The date the decision becomes final, unless a request for appeal is submitted; and
- (e) The notice must include an explanation of rights to appeal the decision to the City Council in accordance with TDC 32.310.

(6) Appeal of a Type III Decision. Appeal of an Architectural Review Board or Planning Commission Type III Decision to the City Council may be made in accordance with TDC 32.310.

(7) Effective Date of a Type III Decision.

- (a) The written order is the final decision on the application.
- (b) The mailing date is the date of the order certifying its approval by the decision body.
- (c) A decision of the Architectural Review Board or Planning Commission is final unless:
 - (i) a written appeal is received at the City offices within 14 calendar days of the date notice of the final decision is mailed; or
 - (ii) The City Manager or a member of the City Council requests a review of the decision within 14 calendar days of the date notice of the final decision is mailed.

Finding:

A final decision and any appeal will follow the requirements of this section. These standards will be met.

Chapter 33: Applications and Approval Criteria

[...]

Section 33.020 Architectural Review

[...]

(5) Approval Criteria.

(c) Large Commercial, Industrial, and Multifamily Development. Applications for Large Commercial, Industrial, and Multifamily Development must comply with the applicable standards and objectives in TDC Chapter 73A through 73G.

Finding:

The subject application, which is for multi-family development, which must comply with the standards and objectives in TDC 73A through 73G. These standards are met by findings and conditions of approval for the subject application.

(9) Permit Expiration.

Architectural Review decisions (including Minor Architectural Review decisions) expire two (2) years from the effective date unless the applicant has received a building, or grading permit submitted in conjunction with a building permit application, substantial construction has occurred pursuant to the building permit, and an inspection has been performed by a member of the Building Division.

(10) Extension of Permit Expiration.

(a) An Architectural Review approval may be extended if the applicant, or successor interest, submits a written request for an extension of time within two (2) years of the effective date.

[...]

(c) Upon receipt of a request for an extension of time, the City will process the extension request as follows:

(i) If the City Manager approved the Architectural Review, then the City Manager will decide the extension request under the Type II procedures in TDC 32.220.

(ii) If the Architectural Review Board (ARB) approved the Architectural Review, then the ARB will decide the extension request under the Type III quasi-judicial procedures in TDC 32.230.

(d) The City must provide notice of the extension request to past recipients of the Architectural Review notice of decision and the applicant must post a sign pursuant to TDC 32.150.

(e) The City Manager or Architectural Review Board, as applicable, may grant the extension of time upon finding the following:

(i) The applicant submitted a written extension request prior to the expiration date;

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

(iii) If the previously approved application included a special study, the applicant provided a status report includes a letter from a recognized professional that states that conditions have not changed after the original approval and that no new study is warranted; and

(iv) If the site has been neglected so as to allow the site to become blighted, the deciding party must factor this into its decision.

(f) The City Manager or Architectural Review Board, as applicable, may grant or deny the extension request. The decision must be in writing and must be made within sixty (60) days of receipt of the request for extension. If the decision is to grant the extension, the extension can be no more than a single one-year extension.

(g) Upon making the decision, the City must provide notice of the extension decision as provided in TDC 32.220 for Type II decisions made by the City Manager and TDC 32.230 for Type III decisions made by the Architectural Review Board.

Finding:

The proposed application is approved subject the compliance with the above criteria. With recommended Condition of Approval A1, these standards are met.

Section 33.110 Tree Removal Permit/Review

(1) Purpose. To regulate the removal of trees within the City limits other than trees within the public right-of-way which are subject to TDC Chapter 74.

(2) Applicability. No person may remove a tree on private property within the City limits, unless the City grants a tree removal permit, consistent with the provisions of this Section.

[...]

(3) Procedure Type. Tree Removal Permit applications are subject to Type II Review in accordance with TDC Chapter 32. Tree Removal Permit applications submitted with an Architectural Review, Subdivision, or Partition application will be processed in conjunction with the Architectural Review, Subdivision, or Partition decision.

Finding:

The applicant has submitted for tree removal in conjunction with the Architectural Review application. The criteria in TDC 33.110, addressed below, are the basis for approval or denial for tree removal as part of this Architectural Review. These standards are met.

Section 33.110 Tree Removal Permit/Review Approval Criteria

(5) Approval Criteria.

(a) An applicant must satisfactorily demonstrate that at least one of the following criteria are met:

(i) The tree is diseased and:

(A) The disease threatens the structural integrity of the tree; or

(B) The disease permanently and severely diminishes the esthetic value of the tree; or

(C) The continued retention of the tree could result in other trees being infected with a disease that threatens either their structural integrity or esthetic value.

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

(A) The tree is in danger of falling; or

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

(iii) It is necessary to remove the tree to construct proposed improvements based on

Architectural Review approval, building permit, or approval of a Subdivision or Partition Review.

(b) If none of the conditions in TDC 33.110(5)(a) are met, the certified arborist must evaluate the condition of each tree.

(i) Evergreen Trees. An evergreen tree which meets any of the following criteria as determined by a certified arborist will not be required to be retained:

(A) Trunk Condition - extensive decay and hollow; or

(B) Crown Development - unbalanced and lacking a full crown;

(ii) Deciduous Trees. A deciduous tree which meets any of the following criteria as determined by a certified arborist will not be required to be retained:

(A) Trunk Condition - extensive decay and hollow;

(B) Crown Development - unbalanced and lacking a full crown; or

(C) Structure - Two or more dead limbs.

Finding:

The applicant's arborist surveyed a total of 104 trees on-site and adjacent to the site. The report recommends the preservation of one on-site tree and 15 adjacent to the site, as well as removal of 89 trees that are over 8" dbh. Of the on-site trees proposed for removal, the majority are to be removed to construct the proposed improvements in accordance with criterion 33.110(5)(a)(iii). There are also eight trees that are either dead or in poor condition, meeting the criterion of 33.110(5)(a)(i).

The tree survey also identified tree protection measures for Tree #29, as well as off-site trees to protect them from grading impacts. There is a discrepancy between the amount and location of trees shown on the Arborist Report submitted as Exhibit A3 and the demolition plan submitted with Exhibit A2. With recommended Condition of Approval A11.a. which requires the applicant to provide a tree preservation plan that corresponds to the submitted Tree Assessment Report, and recommended Condition of Approval A12 related to tree protection, these standards are met.

CHAPTER 43 - High Density Residential (RH) Zone

[...]

Section 43.200. - Use Categories.

(1) **Uses Categories.** Table 43-1 lists use categories Permitted Outright (P) or Conditionally Permitted (C) in the RH zone. Use categories may also be designated as Limited (L) and subject to the limitations listed in Table 43-1 and restrictions identified in TDC 43.210. Limitations may restrict the specific type of use, location, size, or other characteristics of the use category. Use categories which are not listed are prohibited within the zone, except for uses which are found by the City Manager to be of a similar character and to meet the purpose of this zone, as provided in TDC 31.070.

(2) **Overlay Zones.** Additional uses may be allowed in a particular overlay zone. See the overlay zone Chapters for additional uses.

**Table 43-1
 Use Categories in the RH Zone**

USE CATEGORY	STATUS	LIMITATIONS AND CODE REFERENCES
RESIDENTIAL USE CATEGORIES		
Household Living	P/C	Permitted housing types subject to TDC 43.220.
[...]		

[...]

Use Category from TDC 39.200:

(1) **Characteristics.** Household Living is the residential occupancy of an owner-occupied or rented dwelling unit by a family or household. Dwelling units must be self-contained, with cooking, sleeping and bathroom facilities. Occupancy is long-term, 30 days or more, and non-transient.

[...]

Finding:

The proposal is for a 116 unit multi-family development and includes self-contained units for rental. Refer to housing type discussion below. This standard is met.

Section 43.220. - Housing Types.

Table 43-2 lists Housing Types permitted in the RH zone. Housing types may be Permitted Outright (P), Conditionally Permitted (C), or Not Permitted (N) in the RH zone.

**Table 43-2
 Housing Types in the RH Zone**

HOUSING TYPE	STATUS	LIMITATIONS AND CODE REFERENCES
[...]		
Multi-Family Structure	P	See TDC definition in 31.060 .
[...]		

Definition from TDC 31.060:

Multi-Family Structure. A structure containing five or more dwelling units on one lot. The land underneath the structure is not divided into separate lots. Multi-Family Structure includes, but is not limited to structures commonly called apartments, condominiums, and garden apartments.

Finding:

The proposal is for a multi-family development which includes two multi-family structures with 58 dwelling units each, as well as an accessory community building which is permitted under TDC 39.100(3)(c). The use standard is met.

Section 43.300 – Development Standards.

Development standards in the RH zone are listed in Table 43-3. Additional standards may apply to some uses and situations, see TDC 43.310.

**Table 43-3
 Development Standards in the RH Zone**

	Requirement	Minimum Proposed
MAXIMUM DENSITY		
Household Living Uses	Maximum: 25 units per acre Minimum: 16 units per acre	25 units per acre
MINIMUM SETBACKS		
Front (SW Boones Ferry)	5 feet* 35 feet**	33 feet* 86 feet**
Side	12 feet**	85 feet**
Rear	12 feet**	84 feet**
Between Buildings	10 feet	42 feet between Buildings A-B
Parking and Circulation Areas	10 feet	10.5 feet
MAXIMUM STRUCTURE HEIGHT		
All uses	35 feet	53.6 feet***
MAXIMUM LOT COVERAGE		
All Other Permitted Uses	45%	18%
* For one story structure ** For 2.5+ story structure *** VAR21-0003 Granted variance to maximum structure height up to 54 feet		

[...]

Finding:

Density, setbacks, and building height are reflected in Exhibit A2. One-story side and rear setbacks were not logged on the above table since the community building is recessed toward the interior of the site and the multi-family structures are set closer to the side and rear property lines. VAR21-0003 (Final Order included as Exhibit F) found evidence of various hardships on-site to grant a variance to maximum structure height standards up to 54 feet to maintain maximum density allowances. The applicant also provided the following development footprints in an email included as Exhibit G:

*Residential Building A: 15,195 SF
Residential Building B: 15,195 SF
Community Building: 6,100 SF
Total Building Footprint: 36,490 SF
Total Site Area: 203,082 SF
Total Lot Coverage: 17.97%*

As shown in the table above, the development standards are met.

Section 43.310. - Projections into Required Yards.

The following architectural features may project into a required front or rear yard setback area not more than three feet, and into a required side yard not more than two feet: cornices, eaves, canopies, decks, sun-shades, gutters, chimneys, flues, belt courses, leaders, sills, pilasters, lintels, ornamental features, and other similar architectural features.

Finding:

No projections into required setbacks are proposed. This provision has not been utilized.

Section 43.320. - Density Bonus or Setback Reduction for Developments Adjacent to Greenways and Natural Areas.

[...]

Finding:

The proposal is not located adjacent to identified greenways or natural areas. This provision is not applicable.

Chapter 73A: Site Design

Section 73A.200 – Multi-Family Design Standards.

The following standards are the minimum standards for all other residential development in all zones that does not meet the definition of single-family dwelling, duplex, townhouse, triplex, quadplex, or cottage cluster or is 5 or more dwelling units. These standards do not apply to development in the Central Design District and Mixed Use Commercial (MUC) zone, which have separate standards and may be less than the minimums provided below.

- (1) Private Outdoor Areas. Multi-family uses must provide private outdoor area features as follows:**
- (a) A separate outdoor area of not less than 80 square feet must be attached to each ground level dwelling unit; and**
 - (b) The private outdoor area must be separated from common outdoor areas with walls, fences or shrubs.**

Finding:

Private outdoor areas are proposed for all ground floor units, as shown in Exhibit A2. Patios range in size from 84 to 115 square feet and are separated from outdoor areas by a combination of low concrete wall and metal fencing. With recommended Condition of Approval A11.c., these standards are met.

(2)Balconies, Terraces, and Loggias. Multi-family uses must provide balconies, terraces, and loggias features as follows:

- (a)A separate outdoor area of not less than 48 square feet in the form of balconies, terraces, or loggias must be provided for each unit located above the ground level.**

Finding:

Balconies are proposed for all upper units and range in size from 51 to 112 square feet, as shown in Exhibit A2. With recommended Condition of Approval A11.d., these standards are met.

(3)Entry Areas. Multi-family uses must provide entry area features as follows:

- (a)A private main entry area must be provided as a private extension of each dwelling unit;**
- (b)The entry area must be separated from on-site parking areas and public streets with landscaping, change of grade, low fences, or walls;**
- (c)The entry area must be a minimum of 24 square feet in area for each dwelling unit; and**
- (d)The entry area may be combined to serve more than one unit as determined by the City.**

Finding:

The proposal includes two multi-family structures with 58 dwelling units each. While the minimum entry area requirement would equate to 1,392 square feet per multi-family building, the proposal includes 1,453 square feet in the form of recessed unit alcoves and shared lobby/lounge areas, as shown in Exhibit A2. With recommended Condition of Approval A11.e., these standards are met.

(4)Shared Outdoor Areas. Multi-family uses must provide shared outdoor area features as follows:

- (a)Must provide year round shared outdoor areas for both active and passive recreation;**
- (b)The shared outdoor area must be a minimum of:
 - (i)Three hundred square feet per dwelling unit; or**
 - (ii)[...]****
- (c)Gazebos and other covered spaces are encouraged to satisfy this requirement;**
- (d)The shared outdoor area must be separated from all entryway and parking areas with a landscaped transition area measuring a minimum of ten feet wide;**
- (e)The shared outdoor area must have controlled access from off-site as well as from on-site parking and entrance areas with a minimum 4-foot high fence, wall, or landscaping; and**
- (f)The shared outdoor area standard does not apply to any development with less than 12 dwelling units.**

Finding:

The project has a total of 116 units, which requires 34,800 square feet of Shared Outdoor Areas. The project is providing a total of 35,688 square feet of Shared Outdoor Areas. Shared Outdoor Areas include a series of active and passive uses, such as picnic areas, seating areas, community gardens, community patio area with both covered and uncovered sections, pet relief area and scenic paths by a botanical garden and stormwater basin, as shown in Exhibit A2. Shared Outdoor Areas are separated from vehicular circulation by either a landscape transition or by building structures. With recommended Condition of Approval A11.f., these standards are met.

(5) Children's Play Areas. Multi-family uses must provide children's play area features as follows:

- (a) The children's play area must be a minimum of 150 square feet per dwelling unit;**
 - (b) The children's play area must provide a separation from all entryway and parking areas with a landscaped transition area measuring a minimum of ten feet wide;**
 - (c) The children's play area must have controlled access to shared outdoor areas from off-site as well as from on-site parking and entrance areas with a minimum 4-foot high fence, wall, or landscaping; and**
 - (d) The children's play area must provide a usable floor surface (material such as lawn, decks, wood chips, sand and hard surface materials qualify); and**
- [...]

Finding:

The project has a total of 116 units, which requires 17,400 square feet of Children's Play Areas. The project is providing a total of 17,557 square feet of Children's Play Areas. Children's Play Area includes two play areas, designed for children of different age ranges in addition to a multi-sport court and play lawns, as shown in Exhibit A2. Children's Play Areas are located interior to the site and are separated from vehicular circulation areas by building structures. With recommended Condition of Approval A11.g., these standards are met.

(6) Storage. Multi-family uses must provide storage features as follows:

- (a) Enclosed storage areas are required for each unit.**
 - (i) Garages do not satisfy the storage requirements. An enclosed storage area may be located within the garage of the individual unit. Enclosed storage areas may also be located within commonly accessible shared garage.**
- (b) Each storage area must be a minimum of six feet in height and have a minimum floor area of:**
 - (i) 24 square feet for studio and one bedroom units;**
 - (ii) 36 square feet for two bedroom units; and**
 - (iii) 48 square feet for greater than two bedroom units.**

Finding:

As shown in Exhibit A2, storage areas for the one-bedroom and two-bedroom units are accessible from the unit's patio or balcony and range in size from 24 square feet to 37 square feet while being a minimum of 7.5 feet tall. Storage areas for the three-bedroom and four-bedroom units are accessible from the hallway and range in size from 48 square feet to 51 square feet while being a minimum of 7.5 feet tall. Additionally a community garden shed is provided at Building C for all residents. With recommended Condition of Approval A11.h., these standards are met.

(7) Walkways. Multi-family uses must provide walkways as follows:

[...]

- (b) All other multi-family development must have walkways of a minimum of six feet in width;**
- (c) Walkways must be constructed of asphalt, concrete, pervious concrete, pavers, or grasscrete. Gravel or bark chips are not acceptable; and**
- (d) The walkways must meet ADA standards applicable at time of construction or alteration.**

Finding:

As shown in Exhibit A2, walkways throughout the site are a minimum of 6-feet wide, concrete, and ADA compliant. With recommended Condition of Approval A11.i., these standards are met.

(8) Accessways.

(a) When Required. Accessways are required to be constructed when a multi-family development is adjacent to any of the following:

[...]

(iii) Areas intended for public use, such as schools and parks; and

(iv) Collector or arterial streets where transit stops or bike lanes are provided or designated.

(b) Design Standard. Accessways must meet the following design standards:

(i) Accessways must be a minimum of eight feet in width;

(ii) Public accessways must be constructed in accordance with the Public Works Construction Code;

(iii) Private accessways must be constructed of asphalt, concrete, pavers or grasscrete. Gravel or bark chips are not acceptable;

(iv) Accessways must meet ADA standards applicable at time of construction or alteration;

(v) Accessways must be provided as a connection between the development's walkway and bikeway circulation system;

(vi) Accessways must not be gated to prevent pedestrian or bike access;

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

(viii) Must be constructed, owned and maintained by the property owner.

(c) Exceptions. The Accessway standard does not apply to the following:

[...]

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

Finding:

The subject development abuts an institutional site that serves a church and school, as well as abuts a major arterial with bike lane; and therefore an accessway is required. As shown in Exhibit A2, an eight-foot wide accessway is proposed that connects the proposed public sidewalk along Boones Ferry Road to the project's internal walkways. The accessway is not be gated, but will have handrails on both sides due to sloping conditions. The slope and handrails will remain ADA compliant, with slopes less than 8.33%. Trimet bus stops are located near the subject site at Boones Ferry and Norwood/Greenhill Lane but no transit facilities have been identified on Comprehensive Plan Map 8-5. With recommended Condition of Approval A11.j., these standards are met.

(9) Carports and Garages. Multi-family uses must provide Carports and Garage features as follows:

(a) The form, materials, color, and construction must be compatible with the complex they serve.

Finding:

TDC 73C.100 includes requirements for private off-street parking but does not require a garage component for multi-family housing. The proposal does not include carport or garage structures, and therefore the carport and garage features standard does not apply.

(10) Safety and Security. Multi-family units must provide safety and security features as follows:

- (a) Private outdoor areas must be separated from shared outdoor areas and children's play areas with a minimum 4-foot high fence, wall, or landscaping;**
- (b) An outdoor lighting system that does not produce direct glare on adjacent properties and without shining into residential units, public rights-of-way, or fish and wildlife habitat areas; and**
- (c) Building identification must be provided consistent with the Oregon Fire Code.**

Finding:

Private outdoor areas on the ground floor include a wall that is approximately 2.75 feet tall combined with a concrete wall that varies in sized based on the slope, as shown in Exhibit A2. These private areas are further separated from shared areas by landscaping that grows 4-6 feet in height. Outdoor lighting is provided throughout all common outdoor areas, parking lot, and building entryways. All exterior lighting fixtures are compliant with The Dark Sky Society lighting standards and will not cast glare onto the public right of way or adjacent properties. Additionally, there are no habitat areas located near the subject site. Building identification is reviewed as part of the building permit process. With recommended Condition of Approval A13, these standards are met.

(11) Service, Delivery and Screening. Multi-family uses must provide service, delivery, and screening features as follows:

- (a) Provisions for postal delivery must be made consistent with US Postal Service regulations conveniently located and efficiently designed for residents;**
- (b) Pedestrian access from unit entries to postal delivery areas, shared activity areas, and parking areas must be provided via accessways; and**
- (c) Above grade and on-grade electrical and mechanical equipment such as transformers, heat pumps and air conditioners must be screened with sight obscuring fences, walls or landscaping.**

Finding:

As shown in Exhibit A2, resident mailboxes are located within the ground floor lobby of each residential building and are accessed internally by residents. The outdoor mechanical units for Buildings A & B are located on the flat roof portion of the building and are obscured by the pitched roof adjacent. The outdoor mechanical unit for Building C is surrounded by landscaping. The two proposed above-ground transformers and above-ground generator on-site are surrounded by landscaping. With recommended Condition of Approval A19, these standards are met.

Chapter 73B: Landscaping Standards

Section 73B.020 – Landscape Area Standards Minimum Areas by Use and Zone.

Zone	Minimum Area Requirement*	Minimum Area Requirement with dedication for a fish and wildlife habitat*
(1) RL, RML, RMH, RH and RH/HR zones—Permitted Uses	None	None
[...]		

Finding:

While there is no minimum landscape requirement by RH zone, there are minimum landscaping requirements for multifamily housing developments that are addressed below. As shown in Exhibit A2, 64,314 square feet (32%) of landscaping is included with this proposal. This standard is met.

Section 73B.030 – Additional Minimum Landscaping Requirements for Multi-Family Residential Uses.

(1)General. In addition to requirements in TDC 73B.020, Multi-Family Residential Uses must comply with the following additional standards.

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

(i)This standard does not apply to areas subject to the Hedges Creek Wetlands Mitigation Agreement.

Finding:

Landscaping is provided in all areas not otherwise occupied by buildings, vehicle areas, or pedestrian amenity areas. The site is not located adjacent to the Hedges Creek Wetland. With recommended Condition of Approval A14, this standard is met.

Section 73B.080 – Minimum Landscaping Standards for All Zones.

The following are minimum standards for landscaping for all zones.

<p>(1) Required Landscape Areas</p>	<ul style="list-style-type: none"> • Must be designed, constructed, installed, and maintained so that within three years the ground must be covered by living grass or other plant materials. • The foliage crown of trees cannot be used to meet this requirement. • A maximum of 10% of the landscaped area may be covered with un-vegetated areas of bark chips, rock or stone. • Must be installed in accordance with the provisions of the American National Standards Institute ANSI A300 (Part 1) (Latest Edition). • Must be controlled by pruning, trimming, or otherwise so that: • It will not interfere with designated pedestrian or vehicular access; and • It will not constitute a traffic hazard because of reduced visibility.
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Finding:

The density of plantings as shown on Landscape Plans (Exhibit A2) is sufficient to provide full coverage of landscaping within three years. These standards are met.

<p>(2) Fences</p>	<p>Landscape plans that include fences must integrate any fencing into the plan to guide wild animals toward animal crossings under, over, or around transportation corridors.</p>
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Finding:

A fence is proposed around the perimeter of the Stormwater basins, as shown in Exhibit A2. There are no established wildlife crossings in the vicinity. However there are Metro riparian and upland wildlife areas mapped west of Boones Ferry Road near the canyon. This standard is met.

<p>(3) Tree Preservation</p>	<ul style="list-style-type: none"> • Trees and other plant materials to be retained must be identified on the landscape plan and grading plan. <p>During construction:</p> <ul style="list-style-type: none"> ○ Must provide above and below ground protection for existing trees and plant materials identified to remain;
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	<ul style="list-style-type: none"> ○ Trees and plant materials identified for preservation must be protected by chain link or other sturdy fencing placed around the tree at the drip line; ○ If it is necessary to fence within the drip line, such fencing must be specified by a qualified arborist; ○ Top soil storage and construction material storage must not be located within the drip line of trees designated to be preserved; ○ Where site conditions make necessary a grading, building, paving, trenching, boring, digging, or other similar encroachment upon a preserved tree's drip-line area, such grading, paving, trenching, boring, digging, or similar encroachment must only be permitted under the direction of a qualified arborist. Such direction must assure that the health needs of trees within the preserved area can be met; and ○ Tree root ends must not remain exposed. ● Landscaping under preserved trees must be compatible with the retention and health of the preserved tree. ● When it is necessary for a preserved tree to be removed in accordance with TDC 33.110 (Tree Removal Permit) the landscaped area surrounding the tree or trees must be maintained and replanted with trees that relate to the present landscape plan, or if there is no landscape plan, then trees that are complementary with existing, landscape materials. Native trees are encouraged ● 100% of the area preserved under any tree or group of trees (Except for impervious surface areas) retained in the landscape plan must apply directly to the percentage of landscaping required for a development
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Finding:

The Arborist Report (Exhibit A3) calls for preserving one on-site tree and including protection measures for neighboring off-site trees. Protection for off-site trees been has not been identified on Grading Plan (Exhibit A2). With recommended Conditions of Approval A11.b. and A12, these standards are met.

(4) Grading	<ul style="list-style-type: none"> ● After completion of site grading, top-soil is to be restored to exposed cut and fill areas to provide a suitable base for seeding and planting. ● All planting areas must be graded to provide positive drainage. ● Soil, water, plant materials, mulch, or other materials must not be allowed to wash across roadways or walkways. ● Impervious surface drainage must be directed away from pedestrian walkways, dwelling units, buildings, outdoor private and shared areas and landscape areas except where the landscape area is a water quality facility.
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Finding:

The applicant is required to obtain an erosion control and grading permit with the City. With recommended Condition of Approval A6, this standard is met.

(5) Irrigation	<ul style="list-style-type: none"> ● Landscaped areas must be irrigated with an automatic underground or drip irrigation system ● Exceptions: Irrigation requirement does not apply to duplexes and townhouses.
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Finding:

Irrigation is proposed in new landscaping areas as detailed in the Planting Notes on the Landscape Plan (Exhibit A2). This standard is met.

<p>(6) Re-vegetation in Un-landscaped Areas</p>	<ul style="list-style-type: none"> • Vegetation must be replanted in all areas where vegetation has been removed or damaged in areas not affected by the landscaping requirements and that are not to be occupied by structures or other improvements,. • Plant materials must be watered at intervals sufficient to ensure survival and growth for a minimum of two growing seasons. • The use of native plant materials is encouraged to reduce irrigation and maintenance demands. • Disturbed soils should be amended to an original or higher level of porosity to regain infiltration and stormwater storage capacity.
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Finding:

The applicant proposes to landscape all areas not otherwise proposed for development. Drought tolerant plants, as well as some natives, have been selected to reduce irrigation and maintenance needs. With recommended Condition of Approval A14, this standard is met.

Section 73B.080 – Minimum Standards Trees and Plants.

The following minimum standards apply to the types of landscaping required to be installed for all zones.

<p>(1) Deciduous Shade Trees</p>	<ul style="list-style-type: none"> • One and on-half inch caliper measured six inches above ground; • Balled and burlapped; bare root trees will be acceptable to plant during their dormant season; • Reach a mature height of 30 feet or more; • Cast moderate to dense shade in summer; • Live over 60 years; • Do well in urban environments, tolerant of pollution and heat, and resistant to drought; • Require little maintenance and mechanically strong; • Insect- and disease-resistant; • Require little pruning; and • Barren of fruit production.
<p>(2) Deciduous Ornamental Trees</p>	<ul style="list-style-type: none"> • One and on-half inch caliper measured six inches above ground; • balled and burlapped; bare root trees will be acceptable to plant during their dormant season; and • Healthy, disease-free, damage-free, well-branched stock, characteristic of the species
<p>(3) Coniferous Trees</p>	<ul style="list-style-type: none"> • 5 feet in height above ground; • balled and burlapped; bare root trees will be acceptable to plant during their dormant season; and • Healthy, disease-free, damage-free, well-branched stock, characteristic of the species.
<p>(4) Evergreen and Deciduous Shrubs</p>	<ul style="list-style-type: none"> • One to five gallon size; • Healthy, disease-free, damage-free, well-branched stock, characteristic of the species; and • Side of shrub with best foliage must be oriented to public view.
<p>(5) Groundcovers</p>	<ul style="list-style-type: none"> • Fully rooted; • Well branched or leafed; • Healthy, disease-free, damage-free, well-branched stock, characteristic of the species; and

	<ul style="list-style-type: none"> English ivy (<i>Hedera helix</i>) is prohibited.
(6) Lawns	<ul style="list-style-type: none"> Consist of grasses, including sod, or seeds of acceptable mix within the local landscape industry; 100 percent coverage and weed free; and Healthy, disease-free, damage-free, characteristic of the species.

Finding:

Per the Plant Schedule provided on the Landscape Plan included in Exhibit A2, the standards for groundcover, shrubs, and trees to be planted are met.

Chapter 73C: Parking Standards

TDC 73C.010. - Off-Street Parking and Loading Applicability and General Requirements.

[...]

(2)General Requirements. Off-street parking spaces, off-street vanpool and carpool parking spaces, off-street bicycle parking, and off-street loading berths must be as provided as set forth in TDC 73C.100, unless greater requirements are otherwise established by the conditional use permit or the Architectural Review process.

(a)The following apply to property and/or use with respect to the provisions of TDC 73C.100:

(i)The requirements apply to both the existing structure and use, and enlarging a structure or use;

(ii)The floor area is measured by gross floor area of the building primary to the function of the particular use of the property other than space devoted to off-street parking or loading;

[...]

(iv)Calculations to determine the number of required parking spaces and loading berths must be rounded to the nearest whole number;

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

[...]

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

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

(x)Institution of on-street parking, where none is previously provided, must not be done solely for the purpose of relieving crowded parking lots in commercial or industrial zones; and

[...]

(xiii)If the applicant demonstrates that too many or too few parking spaces are required, applicant may seek a variance from the minimum or maximum by providing evidence that the particular use needs more or less than the amount specified in this Code.

Finding:

In accordance with (xiii) parking requirements were reviewed under VAR 21-0003 which found a minimum of 170 spaces should be provided for the 116- unit development as Condition of Approval VAR-3. The proposal includes a 170 stalls on the same lot as the multi-family housing. These standards are met.

Section 73C.020 – Parking Lot Design Standards.

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

- (1) Off-street parking lot design must comply with the dimensional standards set forth in Figure 73-1; [...]**
- (2) Parking lot drive aisles must be constructed of asphalt, concrete, or pervious concrete;**
- (3) Parking stalls must be constructed of asphalt, concrete, previous concrete, or a pervious surface such as pavers or grasscrete, but not gravel or woody material. Pervious surfaces, are encouraged for parking stalls in or abutting the Natural Resource Protection Overlay District, Other Natural Areas, or in a Clean Water Services Vegetated Corridor;**
- (4) Parking lots must be maintained adequately for all-weather use and drained to avoid water flow across sidewalks;**
- (5) Parking bumpers or wheel stops or curbing must be provided to prevent cars from encroaching on adjacent landscaped areas, or adjacent pedestrian walkways.**

Finding:

As shown on the Site Plan (Exhibit A2), most stalls are proposed at 9 feet wide and 18.5 feet long. There are also 48 compact stalls proposed at approximately 7.75 feet by 15 feet wide located east of the multifamily buildings. Drive aisles are proposed between 24 to 26 feet. Both aisles and stalls are proposed to be comprised of asphalt. Concrete curbs are also proposed. Wheel stops are proposed for parking stalls adjacent to pedestrian walkways to prevent encroachment. These standards are met.

- (6) Disability parking spaces and accessibility must meet ADA standards applicable at time of construction or alteration;**
- (7) Parking stalls for sub-compact vehicles must not exceed 35 percent of the total parking stalls required by TDC 73C.100. Stalls in excess of the number required by TDC 73C.100 can be sub-compact stalls;**

Finding:

The Site Plan (Exhibit A2) shows a total of eight ADA-compliant parking spaces planned near building entrances. There are 48 subcompact stalls of 170 proposed or 28% of required parking. ADA standards will be reviewed in greater detail during the building permit phase. With recommended Condition of Approval A11.I. which will show compliance with standards (7), these standards are met.

- (8) Groups of more than 4 parking spaces must be so located and served by driveways that their use will require no backing movements or other maneuvering within a street right-of-way other than an alley;**
- (9) Drives to off-street parking areas must be designed and constructed to facilitate the flow of traffic, provide maximum safety of traffic access and egress, and maximum safety of pedestrians and vehicular traffic on the site;**
- (10) On-site drive aisles without parking spaces, which provide access to parking areas with regular spaces or with a mix of regular and sub-compact spaces, must have a minimum width of 22 feet for two-way traffic and 12 feet for one-way traffic; When 90 degree stalls are located on both sides of a drive**

aisle, a minimum of 24 feet of aisle is required. On-site drive aisles without parking spaces, which provide access to parking areas with only sub-compact spaces, must have a minimum width of 20 feet for two-way traffic and 12 feet for one-way traffic;

Finding:

The design of the parking lot will not require movement on the public street. Drive aisles with parking are at between 24 to 26 feet wide as proposed. These standards are met.

(11) Artificial lighting, must be deflected to not shine or create glare in a residential zones, street right-of-way, a Natural Resource Protection Overlay District, Other Natural Areas, or a Clean Water Services Vegetated Corridor;

(12) Parking lot landscaping must be provided pursuant to the requirements of TDC 73C.200; and

(13) Except for parking to serve residential uses, parking areas adjacent to or within residential zones or adjacent to residential uses must be designed to minimize disturbance of residents.

Finding:

All exterior site lighting fixtures that have been selected are compliant with The Dark Sky Society lighting standards. As shown on the Site Lighting Plan (Exhibit A2), lighting will primarily be focused toward the building entrances, loading, and interior parking areas. These standards are met.

Section 73C.050 – Bicycle Parking Requirements and Standards.

(1) Requirements. Bicycle parking facilities must include:

(a) Long-term parking that consists of covered, secure stationary racks, lockable enclosures, or rooms in which the bicycle is stored;

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

(b) Short-term parking provided by secure stationary racks (covered or not covered), which accommodate a bicyclist's lock securing the frame and both wheels.

(2) Standards. Bicycle parking must comply with the following:

(a) Each bicycle parking space must be at least six feet long and two feet wide, with overhead clearance in covered areas must be at least seven feet;

(b) A five (5) foot-wide bicycle maneuvering area must be provided beside or between each row of bicycle parking. It must be constructed of concrete, asphalt, or a pervious hard surface such as pavers or grasscrete, and be maintained;

(c) Access to bicycle parking must be provided by an area at least three feet in width. It must be constructed of concrete, asphalt, or a pervious hard surface such as pavers or grasscrete, and be maintained;

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

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

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

[...]

(h) The City Manager or the Architectural Review Board may approve a form of bicycle parking not specified in these provisions but that meets the needs of long-term and/or short-term parking pursuant to Architectural Review.

Finding:

As described in the Narrative (Exhibit A1), the applicant proposes to provide a total of 206 indoor/ and covered outdoor bike parking areas. One and two-bedroom units will have wall mounted bike racks within the unit. Three and four-bedroom units will have access to outdoor covered bike racks located on the eastern corner of Buildings A and B. The project is proposing additional uncovered bike parking areas adjacent to the sport court and play field. Dimensioned details of the bike parking furnishings were not included in the application materials.

With recommended Conditions of Approval A11.k. and A15 which will show compliance with standards (a), (b), (c), and (d), these standards are met.

Section 73C.100 – Off-Street Parking Minimum/Maximum Requirements.

USE	MINIMUM MOTOR VEHICLE PARKING	MAXIMUM MOTOR VEHICLE PARKING	BICYCLE PARKING	PERCENTAGE OF BICYCLE PARKING TO BE COVERED
(a) Residential Uses				
(viii) Multi-family dwellings in complexes with private internal driveways	1.0 space/studio, 1.25 space/1 bedroom, 1.50 space/2 bedroom, 1.75 space/3= bedroom	none	Developments with five or more units; none required if a garage is provided as an integral element of a unit; otherwise 1.00 space per unit	100

Finding:

The proposed multi-family development includes 116 units. The applicant additionally secured a variance under VAR 21-0003 which found a minimum of 170 spaces should be provided as Condition of Approval VAR-3. With recommended Condition of Approval A11.l. which will ensure compliance with the minimum parking standards established under VAR 21-0003, these standards are met.

Table 1: Minimum and Proposed Parking by Use

Use	Units	Vehicle Parking Min.	Proposed	Bike Parking Min.	Proposed
<i>Multi-family</i>	<i>116</i>	<i>174</i>	<i>170</i>	<i>116</i>	<i>206</i>

The proposal includes 54 one-bedroom units, 40 two-bedroom units, 16 three-bedroom units, and 6 four-bedroom units which would require 174 parking stalls. However, the applicant did apply for a variance to parking standards, under VAR 21-0003 which found a minimum of 170 parking spaces would be required for the development. Additionally, 116 bike parking spaces are required by code based on the unit count, 116 of which must be covered. The narrative notes that bike parking is proposed within one and two-bedroom units and three and four-bedroom units will have access to outdoor covered bike racks located at the corner of their buildings. However clear details are not shown on the plan set included as Exhibit

A2. With recommended Condition of Approval A11.k. which will require additional bike parking details, these standards are met.

(2) In addition to the general parking requirements in subsection (1), the following are the minimum number of off-street vanpool and carpool parking for commercial, institutional, and industrial uses.
 [...]

Finding:

The proposal is for a residential development. This standard does not apply.

Section 73C.120 – Off-Street Loading Facilities Minimum Requirements.

(1) The minimum number of off-street loading berths for commercial, industrial, and institutional uses is as follows:
 [...]

Finding:

The proposal is for a residential development. This standard does not apply.

Section 73C.130 – Parking Lot Driveway and Walkway Minimum Requirements. Parking lot driveways and walkways must comply with the following requirements:

(1) Residential Use. Minimum requirements for residential uses:
 [...]

(c) Ingress and egress for multi-family residential uses must not be less than the following:

Dwelling Units	Minimum Number Required	Minimum Width	Walkways, Etc.
50-499	1 or 2	32 feet 24 feet	6-foot walkway, 1 side only; curbs required

[...]

Finding:

The site proposes a joint access at the south end of the property through Tract L of the Autumn Sunrise development (SB 21-0001). Additional findings are provided in Chapter 75.

(6) Maximum Driveway Widths and Other Requirements.

[...]

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

(e) Must comply with the distance requirements for access as provided in TDC 75.

(f) Must comply with vision clearance requirements in TDC 75.

Finding:

Proposed driveway and emergency vehicle access are located a width greater than 40 feet. With recommended Condition of Approval A2 standard (e) is met and Condition of Approval A23 standard (f) is met.

Section 73C.210. - Multi-Family Parking Lot Landscaping Requirements. Multi-family residential uses (as defined in TDC 31.060) must comply with the following landscaping requirements for parking lots in all zones:

(1)General. Locate landscaping or approved substitute materials in all areas not necessary for vehicular parking and maneuvering.

Finding:

The parking lot contains landscaping in areas not used for vehicle and pedestrian movement. This standard is met.

(2)Clear Zone. Clear zone must be provided for the driver at ends of on-site drive aisles and at driveway entrances, vertically between a maximum of 30 inches and a minimum of eight feet as measured from the ground level.

[...]

Finding:

As shown in the Landscape Plans (Exhibit A2), the proposed plantings will provide for visual clearance at the end of drive aisles and drive entrances. With recommended Condition of Approval A23 related to maintenance, this standard is met.

(3)Setback. Minimum 10-foot landscape setback must be provided between the property lines and parking areas and must comply with the following:

- (a)Must be planted with deciduous trees an average of not more than 30 feet on center and shrubs at least 30 inches in height which provide screening of vehicular headlights; and**
- (b)Native trees and shrubs are encouraged.**

Finding:

As shown in the Landscape Plans (Exhibit A2), 10 feet of landscape buffer is proposed along the north, east, and south property lines, adjacent to parking and vehicle drive areas. European hornbeam and Sawleaf Zelkova are not native, however they are proposed 30 feet on center within these areas. With recommended Condition of Approval A11.m. to provide deciduous as specified in standard (a) or as recommended by the Architectural Review Board, these standards are met.

(4)Perimeter. Minimum five feet in width in all off-street parking and vehicular circulation areas, including loading areas and must comply with the following:

- (a)Deciduous trees located not more than 30 feet apart on average as measured on center;**
- (b)Shrubs or ground cover, planted so as to achieve 90 percent coverage within three years;**
- (c)Plantings which reach a mature height of 30 inches in three years which provide screening of vehicular headlights year round;**
- (d)Native trees and shrubs are encouraged; and**
- (e)Exceptions: [...]**

Finding:

As shown in the Landscape Plans (Exhibit A2), perimeter landscaping is proposed adjacent to parking lot walkways. With recommended Condition of Approval A11.m, this standard is met.

(5)Transition. Minimum 10-foot landscaped transition area between parking and vehicle circulation areas and buildings and shared outdoor areas and must comply with the following:

- (a) Deciduous shade trees located at not less than 30 feet on center must be located in this transition area;
- (b) Groundcover plants mixed with low shrubs must completely cover the remainder of this area within three years;
- (c) Native trees and shrubs are encouraged; and
- (d) Exceptions: [...]

Finding:

In lieu of providing a 10- foot transition area between the parking areas and buildings, the applicant has elected to provide a six foot walkway and seven foot landscape area as shown in the Landscape Plans (Exhibit A2). The planter strips include Quaking Aspen and a variety of ground cover. With recommended Condition of Approval A11.m., this standard is met.

(6) Landscape Island. Minimum 25 square feet per parking stall must be improved with landscape island areas and must comply with the following:

- (a) May be lower than the surrounding parking surface to allow them to receive stormwater runoff and function as water quality facilities as well as parking lot landscaping;
- (b) Must be protected from vehicles by curbs, but the curbs may have spaces to allow drainage into the islands;
- (c) Landscape separation required for every eight continuous spaces in a row;
- (d) Must be planted with one deciduous shade trees for every four parking spaces. Required trees must be evenly dispersed throughout the parking lot;
- (e) Must be planted with groundcover or shrubs;
- (f) Native plant materials are encouraged;
- (g) Landscape island areas with trees must be a minimum of five feet in width (from inside of curb to curb);
- (h) Required plant material in landscape islands must achieve 90 percent coverage within three years; and
- (i) Exceptions: [...]

Finding:

Given that a minimum of 170 parking spaces are required for the proposed use, 4,250 square feet of parking lot landscape island area and 43 trees are required. As described in the narrative submitted as Exhibit A1, The proposed project includes 5,441 square feet of total landscape island areas, as well as 43 trees. Landscape islands area also included for eight continuous spaces. With recommended Condition of Approval A11.n., these standards are met.

Chapter 73D: Waste and Recyclables Management Standards

Section 73D.010 – Applicability and Objectives.

(1) Applicability. The requirements of this Chapter apply to all new or expanded:

- (a) Common wall residential developments containing five or more units;
- [...]

Section 73D.020 - Design Methods.

An applicant required to provide mixed solid waste and source separated recyclables storage areas must comply with one of following methods:

- (1) The minimum standards method in TDC 73D.030;
- (2) The waste assessment method in TDC 73D.040;

- (3) The comprehensive recycling plan method in TDC 73D.050; or**
- (4) The franchised hauler review method in TDC 73D.060.**

Finding:

The applicant proposes to use the Minimum Standards Method (TDC 73D.030) and has verified that the location and configuration of the proposed waste facility and access will satisfy Republic Services in Exhibit A6. As discussed below, these standards are met.

Section 73D.030 – Minimum Standards Method.

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

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

(2) The storage area requirement is based on uses. If a building has more than one use and that use occupies 20 percent or less of the gross leasable area (GLA) of the building, the GLA occupied by that use must be counted toward the floor area of the predominant use(s). If a building has more than one use and that use occupies more than 20 percent of the GLA of the building, then the storage area requirement for the whole building must be the sum of the area of each use. Minimum storage area requirements by use is as follows:

[...]

(b) Common wall residential greater than ten units must provide 50 square feet plus an additional five square feet per unit above ten.

[...]

Finding:

The proposal includes 116 residential units, which requires 580 square feet. The narrative submitted as Exhibit A1 states that 608 square feet of trash enclosure is provided. As shown on the site plan included in Exhibit A2, two trash enclosures are proposed and include an approximately 260-square-foot enclosure located at the northwest corner and an approximately 348-square-foot enclosure at the southwest corner. With recommended Condition of Approval A11.o., these standards are met.

Section 73D.070 – Location, Design and Access Standards.

The following location, design, and access standards are applicable to all storage areas:

(1) Location Standards.

(a) The storage area for source separated recyclables may be collocated with the storage area for mixed solid waste.

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

(c) Exterior storage areas must:

(i) Be located in central and visible locations on the site to enhance security for users;

(ii) Be located in a parking area; and

(iii) Not be located within a required front yard setback or in a yard adjacent to a public or private street.

(2) Design Standards.

(a) The dimensions of the storage area must accommodate containers consistent with current methods of local collection at time of construction or alteration.

(b) Indoor and outdoor storage areas must comply with Oregon Building and Fire Code requirements.

(c) Exterior storage areas must be enclosed by a sight obscuring fence or wall at least 6 feet in height.

(d) Evergreen plants must be placed around the enclosure walls, excluding the gate or entrance openings for common wall, commercial, and institutional developments.

(e) Gate openings for haulers must be a minimum of 10 feet wide and must be capable of being secured in a closed and open position.

(f) Horizontal clearance must be a minimum of 10 feet and a vertical clearance of 8 feet is required if the storage area is covered.

(g) A separate pedestrian access must also be provided in common wall, commercial, and institutional developments.

(h) Exterior storage areas must have either a concrete or asphalt floor surface.

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

Finding:

The applicant has proposed two waste areas that are in visible areas convenient to tenant entries, parking and loading areas, and are outside of the applicable setbacks, as shown Exhibit A2. Both are located outside of the front yard setback and will be screened from the public right-of-way by Texas Japanese Privet. Further compliance with Building and Fire Code standards will be reviewed at the time of building permit. Plans show the gate openings at approximately 20 feet wide and that a separate pedestrian access will be provided. The narrative submitted as Exhibit A1 states that the enclosures will be comprised of concrete masonry units and will be a minimum of 6-feet in height and will not have a cover. However elevations have not been submitted to demonstrate compliance with fence or wall standards, as well as vertical clearance. With recommended Condition of Approval A11.o., these standards are met.

(3) Access Standards.

(a) Storage areas must be accessible to users at convenient times of the day, and to hauler personnel on the day and approximate time they are scheduled to provide hauler service.

(b) Storage areas must be designed to be easily accessible to hauler trucks and equipment, considering paving, grade, gate clearance and vehicle access.

(c) Storage areas must be accessible to hauler trucks without requiring backing out of a driveway onto a public street. If only a single access point is available to the storage area, adequate turning radius must be provided to allow hauler trucks to safely exit the site in a forward motion.

(d) Storage areas must located so that pedestrian and vehicular traffic movement are not obstructed on site or on public streets adjacent to the site.

(e) The following is an exception to the access standard:

(i) Access may be limited for security reasons.

Finding:

As shown in the applicant's submittal, Republic Services, the applicable waste hauler, has indicated that the dimensions and accessibility of the enclosures meet their service needs (Exhibit A6). These standards are met.

Chapter 74: Public Improvement Requirements

[...]

TDC 74.120 Public Improvements.

(1) Except as specially provided, all public improvements must be installed at the expense of the applicant. All public improvements installed by the applicant must be constructed and guaranteed as to workmanship and material as required by the Public Works Construction Code prior to acceptance by the City. Work must not be undertaken on any public improvement until after the construction plans have been approved by the City Manager and a Public Works Permit issued and the required fees paid.

Finding:

All public improvements will be installed by the applicant at their expense and will require prior approval of plans and a Public Works Permit to be issued. With recommended Conditions of Approval A17 and A18, this standard is met.

TDC 74.130 Private Improvements.

All private improvements must be installed at the expense of the applicant. The property owner must retain maintenance responsibilities over all private improvements.

Finding:

All private improvements will be installed by the applicant at their expense and will require prior approval of plans and building permits. With recommended Conditions of Approval A17 and A18, this standard is met.

TDC 74.140 Construction Timing.

- (1) All the public improvements required under this chapter must be completed and accepted by the City prior to the issuance of a Certificate of Occupancy.**
- (2) All private improvements required under this Chapter must be approved by the City prior to the issuance of a Certificate of Occupancy.**

Finding:

All public and private improvements proposed and modified by conditions of approval must be completed prior to receiving a Certificate of Occupancy. With recommended Condition of Approval A17, this standard is met.

[...]

TDC 74.210 Minimum Street Right-of-Way Widths.

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

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

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

Finding:

The proposal is adjacent to SW Boones Ferry Road which is within Washington County's jurisdiction. Washington County has provided comments on the proposal as Exhibit E. Final plans must include frontage improvement along the site's SW Boones Ferry Road frontage meeting the requirements of Washington County and the City of Tualatin. The preferred cross-section of a Tualatin Major Arterial may be modified as directed by the City Engineer.

With recommended Conditions of Approval A2 and A8, these standards are met.

TDC 74.320. - Slope Easements.

(1) The applicant must obtain and convey to the City any slope easements determined by the City Manager to be necessary adjacent to the proposed development site to support the street improvements in the public right-of-way or accessway or utility improvements required to be constructed by the applicant.

[...]

(3) For all other development applications, a slope easement dedication must be submitted to the City Manager; building permits must not be issued for the development prior to acceptance of the easement by the City.

Finding:

Any required slope easements will be provided and completed prior to Building Permit issuance. With recommended Conditions of Approval A2 and A9, this standard is met.

TDC 74.330. - Utility Easements.

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

[...]

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

(5) The width of the public utility easement must meet the requirements of the Public Works Construction Code. All subdivisions and partitions must have a 6-foot public utility easement adjacent

to the street and a 5-foot public utility easement adjacent to all side and rear lot lines. Other easements may be required as determined by the City Manager.

Finding:

Any required utility easements will be granted to the City, with required widths to meet the Public Works Construction Code. With recommended Conditions of Approval A2 and A9, these standards are met.

TDC 74.350. - Maintenance Easement or Lots.

A dedicated lot or easement will be required when access to public improvements for operation and maintenance is required, as determined by the City Manager. Access for maintenance vehicles must be constructed of an all-weather driving surface capable of carrying a 50,000-pound vehicle. The width of the lot or easement must be at least 15-feet in order to accommodate City maintenance vehicles. In subdivisions and partitions, the easement or lot must be dedicated to the City on the final plat. In any other development, the easement or lot must be granted to the City and recorded prior to issuance of a building permit.

Finding:

Utility easements are included in the proposal. With recommended Conditions of Approval A2 and A9, this standard is met.

TDC 74.420 Street Improvements.

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

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

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

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

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

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

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

[...]

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

[...]

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

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

[...]

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

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

[...]

(16) The City Manager may determine that, although concurrent construction and placement of the improvements in (14) and (15) of this section, either individually or collectively, are impractical at the time of development, the improvements will be necessary at some future date. In such a case, the applicant must sign a written agreement guaranteeing future performance by the applicant and any successors in interest of the property being developed. The agreement must be subject to the City's approval.

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

(18) Pursuant to requirements for off-site improvements as conditions of development approval, proposed multi-family residential, commercial, or institutional uses that are adjacent to a major transit stop will be required to comply with the City's Mid-Block Crossing Policy.

Finding:

A Traffic Study conducted by Charbonneau Engineering was submitted as Exhibit A4. Plans show removal of existing driveway, addition of an emergency vehicle access to SW Boones Ferry Road restricted by bollards, and construction of a public access within a public access easement south then west to SW Boones Ferry road across adjacent and nearby lots. Washington County has also reviewed the proposed development, and have recommended applicable conditions of approval within Exhibit E. Additionally the City Engineer has reviewed the proposal against the above requirements, and with recommended Conditions of Approval A2 and A17, these standards are met.

TDC 74.425 Street Design Standards.

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

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

[...]

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

(a) Arterials:

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

[...]

Finding:

The proposal is adjacent to SW Boones Ferry Road which is designated a Major Arterial on Tualatin Comprehensive Plan Map 8-1 (Exhibit K). A Traffic Study conducted by Charbonneau Engineering was submitted as Exhibit A4. With recommended Conditions of Approval A2 and A17, these standards are met.

TDC 74.430. - Streets, Modifications of Requirements in Cases of Unusual Conditions.

Finding:

The City Engineer has found that no modifications are required. This section does not apply.

TDC 74.440 Streets, Traffic Study Required.

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

- (a) Assure that the existing or proposed transportation facilities in the vicinity of the proposed development are capable of accommodating the amount of traffic that is expected to be generated by the proposed development, and/or**
- (b) Assure that the internal traffic circulation of the proposed development will not result in conflicts between on-site parking movements and/or on-site loading movements and/or on-site traffic movements, or impact traffic on the adjacent streets.**

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

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

- (a) an analysis of the existing situation, including the level of service on adjacent and impacted facilities.**
- (b) an analysis of any existing safety deficiencies.**
- (c) proposed trip generation and distribution for the proposed development.**
- (d) projected levels of service on adjacent and impacted facilities.**

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

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

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

(4) The applicant must implement all or a portion of the improvements called for in the traffic study as determined by the City Manager.

Finding:

A Traffic Study conducted by Charbonneau Engineering was submitted as Exhibit A4. City staff has reviewed the subject analysis and has determined that it meets the above requirements. With recommended Conditions of Approval A2 and A17, these standards are met.

TDC 74.450. - Bikeways and Pedestrian Paths.

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

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

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

(b) The applicant must install the striping and signing of the bike lanes and shared roadway facilities, where designated.

Finding:

The proposal is adjacent to SW Boones Ferry Road. Both roadways require a sidewalk and bike lane on Tualatin Comprehensive Plan Map 8-4 (Exhibit L). The City Engineer has reviewed the proposal against the above requirements and has required a 12-foot wide multi-use path along the applicant's Boones Ferry frontage. *With recommended Conditions of Approval A2 and A17, these standards are met.*

[...]

TDC 74.470 Street Lights.

(1) Street light poles and luminaries must be installed in accordance with the Public Works Construction Code.

(2) The applicant must submit a street lighting plan for all interior and exterior streets on the proposed development site prior to issuance of a Public Works Permit.

Finding:

The proposal abuts SW Boones Ferry Road which requires street lights. *With recommended Conditions of Approval A2 and A17, these standards are met.*

[...]

TDC 74.485. - Street Trees.

[...]

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

(3) The Street Tree Ordinance specifies the species of tree which is to be planted and the spacing between trees.

Finding:

The Landscape Plan submitted as Exhibit A2, illustrates street trees along SW Boones Ferry Road. With recommended Condition of Approval A2, these standards are met.

TDC 74.610 Water Service.

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

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

(3) As set forth in TDC Chapter 12, Water Service, the City has three water service levels. All development applicants must be required to connect the proposed development site to the service level in which the development site is located. If the development site is located on a boundary line between two service levels the applicant must be required to connect to the service level with the higher reservoir elevation. The applicant may also be required to install or provide pressure reducing valves to supply appropriate water pressure to the properties in the proposed development site.

Finding:

Utility Plans, submitted as Exhibit A2, illustrate a 4-inch water meter and backflow device for a domestic service connecting to the public water main within SW Boones Ferry Road. A separate 8-inch fire service line also connects to the public system.

A gate valve must be located near the main for each water lateral. Public utility easements must surround fire vaults by five feet. Public water easements must extend from the existing public water easement 10-feet wide centered on the lateral and surrounding the vaults by 5 feet.

Additionally, an analysis of water system capacity was conducted by MurraySmith and included as Exhibit N. The conclusions indicate a need for extension of the public C-Level water system from the intersection of SW Boones Ferry Road and SW Norwood Road south to serve this development. The public system must extend to the south property line.

With recommended Condition of Approval A3, these standards are met.

TDC 74.620 Sanitary Sewer Service.

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

(2) If there are undeveloped properties adjacent to the proposed development site which can be served by the gravity sewer system on the proposed development site, the applicant must extend public sanitary sewer lines to the common boundary line with these properties. The lines must be sized to convey flows to include all future development from all up stream areas that can be expected

to drain through the lines on the site, in accordance with the City's Sanitary Sewer System Master Plan, TDC Chapter 13.

Finding:

Utility Plans, submitted as Exhibit A2, illustrate a 6-inch connection by a private gravity lateral to future public sanitary sewer system approved within the Autumn Sunrise Subdivision then to a future Clean Water Services' sanitary sewer pump station approved within AR21-0014, Norwood Road Pump Station. The extension of public sanitary sewer lines and Clean Water Services' pump station could provide access to the public sanitary sewer main for all lots surrounding this development.

*If any portion of the public system or pump station required to serve this development is not permitted at the time applicant requests issuance of ~~construction permits~~ **certificate of occupancy**, the applicant must include construction of those portions within their public works permit. Associated public sanitary sewer easements and access must be recorded. If any portion of the public system or pump station required to serve this development is permitted but not constructed and approved at the time applicant requests issuance of construction permits, the applicant must submit approval from the permittee(s) to connect to their unapproved sanitary sewer system.*

Final sanitary sewer permit plans must be submitted that show cleanouts at the edge of public easements.

With recommended Conditions of Approval A4 and A17, these standards are met.

TDC 74.630 Storm Drainage System.

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

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

(3) If there are undeveloped properties adjacent to the proposed development site which can be served by the storm drainage system on the proposed development site, the applicant must extend storm drainage lines to the common boundary line with these properties. The lines must be sized to convey expected flows to include all future development from all up stream areas that will drain through the lines on the site, in accordance with the adopted Stormwater Master Plan.

Finding:

A Stormwater Report has been submitted as Exhibit A5 and proposes two private extended dry detention basins located adjacent to SW Boones Ferry Road. The proposed facility must be sized to meet the current City of Tualatin and Clean Water Service requirements for stormwater quality and quantity. Final plans and stormwater calculations must demonstrate that the development has direct access by gravity to public storm and sanitary sewer from within 5 feet of the building the public main in accordance with Clean Water Service standards.

Utility Plans, submitted as Exhibit A2, illustrate stormwater laterals at right-of-way. With recommended Condition of Approval A5, these standards are met.

TDC 74.640 Grading.

- (1) Development sites must be graded to minimize the impact of storm water runoff onto adjacent properties and to allow adjacent properties to drain as they did before the new development.**
- (2) A development applicant must submit a grading plan showing that all lots in all portions of the development will be served by gravity drainage from the building crawl spaces; and that this development will not affect the drainage on adjacent properties. The City Manager may require the applicant to remove all excess material from the development site.**

Finding:

The plans indicate disturbance of approximately 4.66 acres. Final plans may include over 5 acres of disturbance based on conditions of approval. Erosion and sediment control plans and permit applications conforming to the requirements of the City of Tualatin, CWS, and Oregon Department of Environmental Quality must be provided with the construction permit submittal documents. The applicant must obtain an erosion control permit from the City of Tualatin for disturbance greater than 500 square feet and a National Pollution Discharge Elimination System (NPDES) 1200-C Construction Erosion Control permit from Oregon DEQ for over 5 acres.

With recommended Condition of Approval A6, these standards are met.

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

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

[...]

- (2) On all other development applications, prior to issuance of any building permit, the applicant must arrange to construct a permanent on-site water quality facility and storm water detention facility and submit a design and calculations indicating that the requirements of the Surface Water Management Ordinance will be met and obtain a Stormwater Connection Permit from Clean Water Services.**
- (3) For on-site private and regional non-residential public facilities, the applicant must submit a stormwater facility agreement, which will include an operation and maintenance plan provided by the City, for the water quality facility for the City's review and approval. The applicant must submit an erosion control plan prior to issuance of a Public Works Permit. No construction or disturbing of the site must occur until the erosion control plan is approved by the City and the required measures are in place and approved by the City.**

Finding:

As shown on the Utility Plans, submitted as Exhibit A2, two private extended dry detention basins are proposed adjacent to SW Boones Ferry Road. A Preliminary Drainage Report prepared by Vega Civil Engineering was also submitted as Exhibit A5.

A Clean Water Services Service Memorandum was received and included as Exhibit D. After land use decision issuance, the applicant must submit final plans complying with the Service Provider Letter conditions and CWS Memorandum that are sufficient to obtain a Stormwater Connection Permit Authorization Letter from Clean Water Services in accordance with TDC 74.650(2) and CWS D&CS 3.01.2(d).

Public comments (Exhibit H) have been received from adjacent property owners voicing their concerns over stormwater and potential downstream impacts. Stormwater from all impervious areas will be conveyed to private treatment and detention facilities then released to the public stormwater system

which discharges into Basalt Creek. Prior to issuance of permits for construction activities, the applicant must submit final plans that minimize impact from stormwater runoff to adjacent properties, allow adjacent properties to drain as they did before the new development, and provide gravity drainage from this development to an approved public system.

With recommended Conditions of Approval A5, A6, and A10, this standard is met.

TDC 74.660 Underground.

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

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

Findings:

There are existing overhead utility lines along the frontage of SW Boones Ferry Road. With recommended Condition of Approval A2, this standard is met.

TDC 74.765. - Street Tree Species and Planting Locations.

All trees, plants or shrubs planted in the right-of-way of the City must conform in species and location and in accordance with the street tree plan and City standards, including Table 74-1. If the City Manager determines that none of the species in City standards, including Table 74-1 is appropriate or finds appropriate a species not listed, the City Manager may substitute an unlisted species.

Table 74-1 Street Tree Species					
Species Common Names	Planting Strip Width (feet)			Power line compatible	Spacing on center (feet)
	4	5	6+		
Amur Maackia	•	•	•	•	30
Amur Maple	•	•	•	•	30
Armstrong Maple	•	•	•		30
Autumn Applause Ash		•	•		30
Black Tupelo	•	•	•		30
Capital Flowering Pear	•	•	•		30
Cascara	•	•	•	•	30
Crimson King Maple		•	•		30
Crimson Sentry Maple	•	•	•	•	30
Eastern Redbud	•	•	•		30

European Hornbeam	•	•	•	•	30
Frontier Elm			•		60
Ginko		•	•		30
Globe Sugar Maple			•		60
Golden Desert Ash	•	•	•	•	30
Goldenrain	•	•	•		30
Greenspire Linden		•	•		30
Ivory Japanese Lilac	•	•	•	•	30
Leprechaun Ash	•	•	•		30
Persain Parrotia	•	•	•		30
Purple Beech	•	•	•		30
Raywood Ash		•	•	•	30
Katsura	•	•	•		30
Red Oak			•		60
Red Sunset Maple			•		60
Scanlon/Bowhall Maple	•	•	•		30
Scarlet Oak			•		60
Shademaster Honey Locust		•	•		30
Skyrocket English Oak	•	•	•		30
Japanese snowbell	•	•	•	•	30
Sourwood	•	•	•	•	30
Tall Stewartia	•	•	•	•	30
Chinese Fringetree	•	•	•	•	30
Tri-Color Beech			•		60
Trident Maple	•	•	•	•	30
Urbanite Ash		•	•		30
Yellowwood	•	•	•		30
Zelkova Musashino	•	•	•		30

Finding:

The Landscape Plan submitted as Exhibit A2, illustrates street trees along SW Boones Ferry Road. With recommended Condition of Approval A2, this standard is met.

Chapter 75 Access Management

[...]

TDC 75.020. - Permit for New Driveway Approach

- (1) **Applicability.** A driveway approach permit must be obtained prior to constructing, relocating, reconstructing, enlarging, or altering any driveway approach.
- (3) **Procedure Type.** A Driveway Approach Permit is processed as a Type II procedure under TDC 32.220 (Type II).
- (4) **Submittal Requirements.** In addition to the application materials required by TDC 32.140, the following application materials are also required:
 - (a) A site plan, of a size and form and in the number of copies meeting the standards established by the City Manager, containing the following information:
 - (i) The location and dimensions of the proposed driveway approach;
 - (ii) The relationship to nearest street intersection and adjacent driveway approaches;

- (iii) Topographic conditions;
 - (iv) The location of all utilities;
 - (v) The location of any existing or proposed buildings, structures, or vehicular use areas;
 - (vi) The location of any trees and vegetation adjacent to the location of the proposed driveway approach that are required to be protected pursuant to TDC Chapter 73B or 73C; and
 - (vii) The location of any street trees adjacent to the location of the proposed driveway approach.
- (b) Identification of the uses or activities served, or proposed to be served, by the driveway approach; and
- (c) Any other information, as determined by the City Manager, which may be required to adequately review and analyze the proposed driveway approach for conformance with the applicable criteria.
- (5) Criteria. A Driveway Approach Permit must be granted if:
- (a) The proposed driveway approach meets the standards of this Chapter and the Public Works Construction Code;
 - (b) No site conditions prevent placing the driveway approach in the required location;
 - (c) The number of driveway approaches onto an arterial are minimized;
 - (d) The proposed driveway approach, where possible:
 - (i) Is shared with an adjacent property; or
 - (ii) Takes access from the lowest classification of street abutting the property;
 - (e) The proposed driveway approach meets vision clearance standards;
 - (f) The proposed driveway approach does not create traffic hazards and provides for safe turning movements and access;
 - (g) The proposed driveway approach does not result in significant adverse impacts to the vicinity;
 - (g) The proposed driveway approach minimizes impact to the functionality of adjacent streets and intersections; and
 - (i) The proposed driveway approach balances the adverse impacts to residentially zoned property and the functionality of adjacent streets.
- [...]

Finding:

Plans submitted under Exhibit A2 show removal of existing driveway, addition of an emergency vehicle access to SW Boones Ferry Road restricted by bollards, and construction of a public access within a public access easement south then west to SW Boones Ferry road across adjacent and nearby lots. As Boones Ferry Road is an arterial, driveway approaches are being minimized by encouraging joint approved through SB21-0001, Autumn Sunrise Subdivision. If joint access is not available at time of construction, the applicant may obtain a Design Exception through Washington County for interim site access off of Boones Ferry Road.

With recommended Conditions of Approval A2 and A17, this standard is met.

TDC 75.040. - Driveway Approach Requirements

(1) The provision and maintenance of driveway approaches from private property to the public streets as stipulated in this Code are continuing requirements for the use of any structure or parcel of real property in the City of Tualatin. No building or other permit may be issued until scale plans are presented that show how the driveway approach requirement is to be fulfilled. If the owner or occupant of a lot or building changes the use to which the lot or building is put, thereby increasing

driveway approach requirements, it is unlawful and a violation of this code to begin or maintain such altered use until the required increase in driveway approach is authorized by the City.

(2) Owners of two or more uses, structures, or parcels of land may agree to utilize jointly the same driveway approach when the combined driveway approach of both uses, structures, or parcels of land satisfies their combined requirements as designated in this code; provided that satisfactory legal evidence is presented to the City Attorney in the form of deeds, easements, leases or contracts to establish joint use. Copies of said deeds, easements, leases or contracts must be placed on permanent file with the City Recorder.

(3) Joint and Cross Access.

[...]

(b) A system of joint use driveways and cross access easements may be required and may incorporate the following:

(i) A continuous service drive or cross access corridor extending the entire length of each block served to provide for driveway separation consistent with the access management classification system and standards;

(ii) A design speed of ten mph and a maximum width of 24 feet to accommodate two-way travel aisles designated to accommodate automobiles, service vehicles, and loading vehicles;

(iii) Stub-outs and other design features to make it visually obvious that the abutting properties may be tied in to provide cross access via a service drive; and

(iv) An unified access and circulation system plan for coordinated or shared parking areas.

(c) Pursuant to this section, property owners may be required to:

(i) Record an easement with the deed allowing cross access to and from other properties served by the joint use driveways and cross access or service drive;

(ii) Record an agreement with the deed that remaining access rights along the roadway will be dedicated to the city and pre-existing driveways will be closed and eliminated after construction of the joint-use driveway;

(iii) Record a joint maintenance agreement with the deed defining maintenance responsibilities of property owners; and (iv) If subsection (i) through (iii) above involve access to the state highway system or county road system, ODOT or the county must be contacted and must approve changes to subsection (i) through (iii) above prior to any changes.

[...]

(6) Except as provided in TDC 53.100, all driveway approach must connect directly with public streets.

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

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

(9) Minimum driveway approach width for uses are as provided in Table 75-1 (Driveway Approach Width):

TABLE 75-1 Driveway Approach Width		
Use	Minimum Driveway Approach Width	Maximum Driveway Approach Width
Multi-family	50-499 = 32 feet	May provide two 24-foot one-way driveways instead of one 32-foot driveway

[...]

Finding:

Plans (Exhibit A2) show removal of an existing driveway, addition of an emergency vehicle access to SW Boones Ferry Road restricted by bollards, and construction of a public access obtained south of the property through development approved under SB21-0001, Autumn Sunrise Subdivision. The joint access must include 24 feet wide two-way travel, with curbs and gutters, and a 5-foot wide sidewalk on the west side. Additionally, SW “H” (Mahogany) Street as approved within SB21-0001, Autumn Sunrise Subdivision must be dedicated, constructed, and signalized as needed prior to occupancy. If joint access is not available at time of construction, the applicant may obtain a Design Exception through Washington County for interim site access off of Boones Ferry Road.

With recommended Condition of Approval A2, this standard is met.

TDC 75.050. - Access Limited Roadways

(1) This section applies to all developments, permit approvals, land use approvals, partitions, subdivisions, or any other actions taken by the City pertaining to property abutting any road or street listed in TDC 75.050(2). In addition, any property not abutted by a road or street listed in subsection (2), but having access to an arterial by any easement or prescriptive right, must be treated as if the property did abut the arterial and this Chapter applies.

(2) The following Freeways and Arterials are access limited roadways:

[...]

(h)Boones Ferry Road at all points located within the City of Tualatin Planning Area;

[...]

Finding:

Plans (Exhibit A2) show removal of an existing driveway, addition of an emergency vehicle access to SW Boones Ferry Road restricted by bollards, and construction of a public access obtained south of the property through development approved under SB21-0001, Autumn Sunrise Subdivision. If joint access is not available at time of construction, the applicant may obtain a Design Exception through Washington County for interim site access off of Boones Ferry Road.

With recommended Condition of Approval A2, this standard is met.

III. RECOMMENDATION

Based on the application materials and analysis and findings presented above, staff finds that the applicable criteria have been met relative to AR 22-0001, and therefore recommend approval of this application with the following conditions of approval:

GENERAL:

- A1. This Architectural Review approval shall expire after two years unless a building, or grading permit submitted in conjunction with a building permit application, has been issued and substantial construction pursuant thereto has taken place and an inspection performed by a member of the Building Division, or an extension is granted under TDC 33.020(10).

PRIOR TO EROSION CONTROL, PUBLIC WORKS, AND WATER QUALITY PERMIT ISSUANCE:

Submit to [eTrakit](#) for review and approval:

- A2. The applicant must submit Final Street Improvement Plans in accordance with TDC 74.120, 74.130, 74.210, 74.320, 74.330, 74.350, 74.420, 74.450, 74.470, 74.485, 74.660, 74.765, 75.020, and 75.040 that show:
- a. Frontage improvements for the east side of SW Boones Ferry Road, as approved by the City Engineer, consisting of:
 - i. Dedication of adequate right-of-way required to permit the construction of the public improvements;
 - ii. Striping;
 - iii. Curbs and gutters;
 - iv. A 4-foot wide planter strip (the curb is not included in this width). **This width may be reduced in locations, as needed to accommodate existing improvements and/or constraints, subject to approval by the City Engineer;**
 - v. Street trees and planting locations with irrigation consistent with TDC 74.745;
 - vi. A 12-foot wide multi-use path; and,
 - vii. An 8-foot wide public utility easement adjacent to right-of-way with additional as required to support any Portland General Electric support poles, water meters, and vaults; this width may be reduced in locations, as needed to accommodate existing improvements and/or constraints, subject to approval by the City Engineer.
 - b. Access to SW Boones Ferry Road from this site:
 - i. Via a public access and utility easement over Tax Lot 106 (2S13 5D) and Tract L of the Autumn Sunrise Subdivision to SW Mahogany Road with public improvements consisting of:
 1. A 24-foot wide paved travel surface striped for two-way traffic;
 2. Curbs and gutters on both sides of the travel surface; and,
 3. A 5-foot wide sidewalk on the west side of the travel surface.
 4. Alternatively, the applicant may show interim access directly to SW Boones Ferry Road, subject to the approval of a Design Exception by Washington County and approval by the City Engineer, until such time as access to SW Mahogany Road can be constructed, at which time direct access to SW Boones Ferry Road

would be abandoned and closed subject to applicable closure requirements of Washington County and the City of Tualatin.

~~ii. If public street and stormwater improvements required by Conditions of Approval for Phase 3 of the Autumn Sunrise Subdivision (File No. SB21-0001) have not been constructed and accepted by the City prior to Erosion Control, Public Works, and Water Quality Permit Issuance for this project, then the applicant shall provide evidence of an agreement, approved by the City Engineer, allowing this project to design and construct the following:~~

~~1. For Private Tract L including:~~

~~a. A 24-foot wide paved travel surface, striped to accommodate two-way traffic;~~

~~b. A blanket public access and utility easement;~~

~~c. A 5-foot wide sidewalk on the west side of the travel surface;~~

~~d. Curbs and gutters on both sides of the travel surface; and,~~

~~e. A six-foot deep concrete approach where the access meets SW Mahogany Street, matching the travel surface width.~~

~~2. For SW Mahogany Street including:~~

~~a. A traffic signal at SW Boones Ferry Road based on applicable signal warrants, as determined by Washington County and the City of Tualatin;~~

~~b. Crosswalks and receiving ramp on the west side of SW Boones Ferry Road;~~

~~c. Street signs with local street name for SW Mahogany Street approved by the City Engineer; and,~~

~~d. Associated water quality and quantity facilities.~~

A3. The applicant must submit Final Water Plans in accordance with code section TDC 74.610, TMC 3-3, and the Public Works Construction Code that show:

a. Construction of the C-Level public water system from the intersection of SW Boones Ferry Road and SW Norwood Road to the south property line of this development with a 12-inch diameter main to meet public water system requirements of the MurraySmith Technical Memorandum dated November 2, 2021 and included as Exhibit N;

b. A gate valve at the main for domestic and fire service laterals; and,

c. Adjacent to the SW Boones Ferry Road right-of-way:

i. Reduced pressure backflow prevention and water meter for the domestic lateral;

ii. The water meter must be located within the planter strip. If inadequate width of strip is approved, then behind the sidewalk and within and surrounded by five feet of public utility easement;

iii. Irrigation after a domestic meter and reduced pressure backflow device; and,

iv. The fire vault surrounded by five feet of public utility easement.

A4. The applicant must submit Final Sanitary Sewer Plans in accordance with code section TDC 74.620, TMC 3-2, and the Public Works Construction Code that show:

a. The location of the lines, grade, materials, and other details;

- b. The gravity service lateral releasing to a public manhole at the north end of a public sanitary sewer easement to the south; and,
 - e. Construction of the public gravity sanitary sewer system as needed to serve this development within public sanitary sewer easements and right-of-way. ~~If the public sanitary sewer system necessary to serve this development is not constructed at the time of Erosion Control, Public Works, and Water Quality Permit Issuance for this project, the applicant must:~~
 - ~~i. Obtain approval to extend the public sanitary sewer system from the north end of the vicinity of future Tract L within Phase 3 of the Autumn Sunrise Subdivision (File No. SB21-00001) to connect to approved and constructed mains and the Clean Water Services' Norwood Road Pump Station; or~~
 - ~~ii. Obtain permits from the City to construct all necessary portions of public system yet to be constructed; and,~~
 - ~~iii. Means of compliance with the contractor insurance and bond requirements of the City of Tualatin.~~
- A5. The applicant must submit Final Stormwater Plans certified by an Oregon registered, professional engineer in accordance with TDC 74.630 and 74.650, TMC 3-5-200 through 3-5-430, Public Works Construction Code (PWCC), and Clean Water Services' (CWS) Design and Construction Standards (D&CS) Chapter 4 that show:
- a. A downstream analysis, including but not limited to erosion, and include solutions within final plans for ¼ mile downstream from the release from the private development through the public stormwater system, in accordance with TMC 3-5-210(1 through 4);
 - b. With gravity flow five feet from the outside of the established line of the building to the public stormwater system in accordance with CWS D&CS 1.03.39 and 5.09.3(a) (1) and (4), or as otherwise approved by the City Engineer;
 - c. Discharge to an approved public system; and,
 - d. Capture of runoff from all new and modified private and public impervious areas, including:
 - i. Runoff from new impervious area located within the public access easement on Tax Lot 106 and Tract L within Phase 3 of the Autumn Sunrise Subdivision (File No. SB21-0001);
 - ii. This runoff may be captured and treated within stormwater facilities of the subject development subject to compliance with CWS D&CS approved Proprietary Treatment Systems or City Engineer approved alternative; and,
 - iii. Treatment of new and modified impervious areas in accordance with CWS D&CS 4.08.1.d meeting phosphorous removal in accordance with TMC 3-5-350 per the design storm in accordance with TMC 3-5-360 and CWS D&CS 4.08.2, including:
 - 1. Stormwater from public impervious areas may be alternatively equivalently treated and detained within the subject development's private stormwater facilities;
 - 2. Public water quality facilities may be LIDA street swales or can connect to the public water quality facility constructed by Autumn Sunrise, subject to final approval by the City Engineer; and
 - 3. If additional public stormwater facilities are required, additional dedication of right-of-way may be needed; and,

4. Detention in accordance with TMC 3-5-220, TMC 3-5-230, and CWS D&CS 4.08;
 5. On-site facilities accommodating hydromodification, meeting release rates for ½ the 2-year or 5-year storm events for proposed new and modified impervious areas in accordance with CWS D&CS 4.03.5;
 6. Conveyance calculations demonstrating the proposed public facilities can accommodate up to a 25-year storm event in accordance with TDC 74.640 and CWS D&CS 5.05.2.d; and,
 7. Compliance with the following, in accordance with TDC 74.650(2) and CWS D&CS 3.01.2(d):
 - a. The submitted Clean Water Services’ Service Provider Letter CWS File Number 21-002248 dated September 7, 2021 and its requirement to obtain a Stormwater Connection Permit Authorization Letter (Exhibit A6);
 - b. And updated Service Provider Letter, if required due to plan modifications; and,
 - c. Requirements stated within the Clean Water Services’ Memorandum included as Exhibit D; and,
 - d. The applicant must submit financial assurance for construction performance in accordance with TMC 3-390(3), PWCC 102.14.00, and amount per CWS D&CS 2.07 Table 2-1; and,
 - e. The applicant must submit a copy of the recorded private stormwater maintenance agreement in accordance with TMD 3-5-390(4). The agreement must assure the owner as responsible for maintenance of the constructed portions of private stormwater systems within their lot. The identified system must include all conveyance, detention, hydromodification, and treatment.
- A6. The applicant must submit Final Erosion Control Plans in accordance with TDC 74.640 and 74.650, TMC 3-5-050 and 3-5-060, the Tualatin Public Works Construction Code, and Clean Water Services’ Design and Construction Standards Chapters 2 and 6 that show:
- a. Grading within the public right-of-way and public easements, as approved by the City Engineer; and,
 - b. For total disturbed area up to five acres, a copy of the National Pollution Discharge Elimination System (NPDES) 1200-CN Stormwater Discharge Permit from Clean Water Services as an agent of Oregon DEQ, or
 - c. For total disturbed area of five or more acres, a copy of the National Pollution Discharge Elimination System (NPDES) 1200-C Construction Erosion Control permit from Oregon DEQ.

PRIOR TO BUILDING OR ENGINEERING PERMIT ISSUANCE:

Submit to [eTrakit](#) for review and approval:

- A7. The applicant must obtain approved Erosion Control, Public Works, and Water Quality Permits from the City of Tualatin

- A8. The applicant must provide a copy of recorded dedication of sufficient right-of-way for SW Boones Ferry Road from the centerline plus any additional to accommodate final accepted public street and stormwater improvements in accordance with TDC 74.210, 74.420, 74.470, 74.485, and 74.765.
- A9. The applicant must provide a copy of the recorded easement for the following, in accordance with TDC 74.320, 74.330, 74.350:
- a. A public utility easement, as approved by City Engineer, adjacent to SW Boones Ferry Road including, five foot wide public water easement surrounding water meter, backflow protection, and/or fire vaults, and additional width as needed for PGE support poles and guy wires.
 - b. A 50-foot wide public access and utility easement dedicated to the City of Tualatin, or as otherwise approved by the city Engineer over Tax Lot 106 and Tract L of Phase 3 of the Autumn Sunrise Subdivision
- A10. The applicant must provide a copy of:
- a. A Design Exception, if needed for direct access to Boones Ferry Road;
 - b. Approved Facility Permits from Washington County; and,
 - c. A 1200-CN National Pollution Discharge Elimination System (NPDES) Stormwater Discharge Permit from Clean Water Services as an agent of Oregon DEQ if less than five acres are disturbed, or a National Pollution Discharge Elimination System (NPDES) 1200-C Construction Erosion Control permit from Oregon DEQ if more than five acres are disturbed.
- A11. The applicant must submit a Final Site Plan Set (in PDF format) to the Planning Division that is in substantial conformance to the submitted site plans and includes:
- a. Tree Preservation Plan that corresponds to the Tree Assessment Report (submitted as Exhibit A3) that is drawn to scale that includes the location of all trees proposed for removal and preservation that are eight inches or more in diameter, all existing and proposed structures, all existing and proposed public and private improvements, and all existing public and private easements in accordance with TDC 33.110(4)(a).
 - b. Trees identified for retention in Tree Assessment Report (Exhibit A3) must be identified on the grading plan, consistent with TDC 73B.080(3). This includes on-site Tree 29 and fifteen off-site trees. Tree protection fencing and other preservation measures recommended by the Arborist should also be specified on the grading plan.
 - c. Private outdoor areas of 80 square feet or greater attached to each ground level unit, consistent with TDC 73A.200(1).
 - d. Balcony areas of 48 square feet or greater provided for each above-ground unit, consistent with TDC 73A.200(2).
 - e. Entry areas of 24 square feet or greater provided for each unit, or a minimum combined area of 1,392 square feet or greater for each multi-family building, consistent with TDC 73A.200(3).
 - f. Shared outdoor area of 34,800 square feet or greater with features consistent with TDC 73A.200(4).
 - g. Children’s play area of 17,400 square feet or greater with features consistent with TDC 73A.200(5).

- h. Storage areas for each unit that are a minimum of: 24 square feet for one-bedroom units, 36 square feet for two-bedroom units, and 48 square feet for three-bedroom or greater units, consistent with TDC 73A.200(6).
- i. Walkways that are a minimum of 6 feet in width; constructed of asphalt, concrete, pervious concrete, pavers, or grasscrete; and meet ADA standards at time of construction, consistent with TDC 73A.200(7).
- j. An accessway that is a minimum 8 feet in width; constructed of asphalt, concrete, pervious concrete, pavers, or grasscrete; meets ADA standards at time of construction; and connects the private on-site walkways to the public sidewalk or multiuse path on Boones Ferry Road, consistent with TDC 73A.200(7). **The width may be reduced, as needed to accommodate right-of-way improvements and/or constraints, subject to approval by the City Engineer.**
- k. Details to demonstrate that proposed bicycle parking meets the standards of TDC 73C.050(2)(a)-(c), and that a minimum of 116 covered bicycle parking spaces are provided, in conformance with TDC 73C.100(1).
- l. A minimum of 170 parking spaces are provided as approved under VAR 21-0003 (Exhibit F) that meet the dimensional standards set forth in Figure 73-1 (Exhibit I). Sub-compact parking spaces must not exceed 35% of the total required parking, or 60 spaces, consistent with TDC 73C.020(7).
- m. Trees, as approved by the Architectural Review Board, must be planted no more than 30 feet apart on the perimeter of vehicle circulation areas consistent with TDC 73C.210(3)-(5).
- n. A minimum of 4,250 square feet or 25 square feet per parking stall improved with parking lot landscape island area with one deciduous shade trees for every four parking spaces, consistent with TDC 73C.210(6).
- o. A minimum of 580 square feet of trash enclosure area must be shown on the plans. These facilities must comply with the location, design, and access standards in TDC 73D.070.

DURING CONSTRUCTION ACTIVITY:

- A12. The applicant must install the tree protection fencing consistent with the Tree Assessment Report submitted as Exhibit A3 and Section 73B.080(3). Please contact the Planning Division to schedule an inspection with a minimum of 48 hours' notice. Where site conditions make grading or other similar encroachment upon a preserved tree's drip-line area, such grading or similar encroachment must only be permitted under the direction of a qualified arborist.

PRIOR TO ISSUANCE OF CERTIFICATE OF OCCUPANCY:

- A13. Provide an identification system which clearly locates buildings and their entries for patrons and emergency services, pursuant to TDC 73A.200(10)(c). Building identification approved by TVF&R must be placed in a position that is plainly legible and visible from the street fronting the property. Numbers must contrast with their background, be a minimum of 4 inches high, and have a minimum stroke width of 1/2 inch.
- A14. Areas impacted by grading and all areas not occupied by buildings, parking spaces, driveways, drive aisles, pedestrian areas, or undisturbed natural areas must be landscaped, pursuant to TDC 73B.030(1).

- A15. The applicant must install bicycle parking signage per MUTCD standards, pursuant to TDC 73C.050(2)(d).
- A16. The applicant must construct proposed buildings and all site improvements as illustrated on the approved Final Site Plan and Final Color Architectural Elevations. The applicant must contact the Planning Division for a site inspection at least 72 hours prior to requesting a certificate of occupancy. This inspection is separate from inspection(s) done by the Building Division.
- A17. The applicant must complete all the private stormwater and public improvements as shown on the approved permit plans. All improvements must also be accepted by the City in accordance with TDC 74.120, 74.130, and 74.170.
- a. **If the public sanitary sewer system necessary to serve this development is not constructed to the extent of property/available easements at the time of request for a Certificate of Occupancy the applicant must:**
- i. **Obtain approval to extend the public sanitary sewer system from the north end of the vicinity of future Tract L within Phase 3 of the Autumn Sunrise Subdivision (File No. SB21-00001) to connect to approved and constructed mains and the Clean Water Services' Norwood Road Pump Station; or**
 - ii. **Obtain approval for revised Erosion Control, Public Works, and Water Quality permits from the City to construct all necessary portions of the public system yet to be constructed; and,**
 - iii. **Provide a means of compliance with the contractor insurance and bond requirements of the City of Tualatin.**
- b. **If public street and stormwater improvements required by Conditions of Approval for Phase 3 of the Autumn Sunrise Subdivision (File No. SB21-0001) have not been constructed and accepted by the City at the time of a request for a Certificate of Occupancy for this project, then the applicant shall provide evidence of an agreement or obtain approval for revised Erosion Control, Public Works, and Water Quality permits from the City, as approved by the City Engineer, allowing this project to design and construct the following:**
- i. **For Private Tract L including:**
 1. **A 24-foot wide paved travel surface, striped to accommodate two-way traffic;**
 2. **A blanket public access and utility easement;**
 3. **A 5-foot wide sidewalk on the west side of the travel surface;**
 4. **Curbs and gutters on both sides of the travel surface; and,**
 5. **A six-foot deep concrete approach where the access meets SW Mahogany Street, matching the travel surface width.**
 - ii. **For SW Mahogany Street including:**
 1. **A traffic signal at SW Boones Ferry Road based on applicable signal warrants, as determined by Washington County and the City of Tualatin;**
 2. **Crosswalks and receiving ramp on the west side of SW Boones Ferry Road;**
 3. **Street signs with local street name for SW Mahogany Street approved by the City Engineer; and,**
 4. **Associated water quality and quantity facilities.**
- A18. The applicant must submit paper and electronic as-builts of the Engineering permits along with maintenance bonds and any final fees for public and water quality improvements City in accordance with TDC 74.120, 74.130, and 74.170.

THE FOLLOWING ITEMS APPLY TO THE SITE IN AN ON-GOING MANNER:

- A19. All mechanical equipment must be screened in accordance with TDC 73A.200(11)(c). Prior to approval of a mechanical permit, the applicant or property owner must submit scaled elevations illustrating that above-grade or on-grade equipment will be screened by parapet, sight-obscuring fence, landscaping, or other method.
- A20. All sign permits require separate sign permit approval per TDC Chapter 38. This approval does not constitute sign permit approval.
- A21. All site, building exterior, and landscaping improvements approved through the AR process must be continually maintained, so as to remain substantially similar to original approval through the AR process, except as permitted under TDC 33.020(7) (Modifications to Previously Approved Final Architectural Review Decisions).
- A22. All parking spaces shall be continuously maintained in compliance with the dimensional standards specified in TDC Figure 73-1 (Exhibit I).
- A23. No vehicular parking, hedge, planting, fence, wall structure, or temporary/permanent physical obstruction is permitted between 30 inches and eight feet above the established height of the curb in the vision clearance area specified in TDC Figure 73-2 (Exhibit J).



ARCHITECTURAL REVIEW BOARD DECISION

June 8, 2022

Case #:	AR 21-0001
Project:	Plambeck Garden Apartments
Location:	23500 SW Boones Ferry Road; Tax Lot: 2S135D000303
Representative	Kayla Zander, Carleton Hart Architecture
Owner:	Community Partners for Affordable Housing

I. FINDINGS

- A. An application for Architectural Review (AR 22-0001) was filed by Carleton Hart Architecture requesting approval of a 116 unit multi-family development known as Plambeck Garden Apartments.
- B. The Architectural Review Board (ARB) conducted a noticed quasi-judicial public hearing on June 8, 2022 in conformance with the laws of the State of Oregon and the City of Tualatin.
- C. At the June 8, 2022 public hearing, the ARB found that with conditions of approval to further the implementation of the requirements of the Tualatin Development Code, and in order to meet purpose and objectives of community design standards to achieve pleasant environments for living and ensure all public facilities are adequate to serve the development, as described in TDC 33.020.

II. ACTION

The Architectural Review Board Decision approves AR 22-0001 and adopted the staff analysis and findings, dated June 8, 2022, with the following Conditions of Approval (**bold underline** conditions were added by the Architectural Review Board at the hearing and are supported by the staff findings and discussion on the record):

GENERAL:

- A1. This Architectural Review approval shall expire after two years unless a building, or grading permit submitted in conjunction with a building permit application, has been issued and substantial construction pursuant thereto has taken place and an inspection performed by a member of the Building Division, or an extension is granted under TDC 33.020(10).

PRIOR TO EROSION CONTROL, PUBLIC WORKS, AND WATER QUALITY PERMIT ISSUANCE:

Submit to [eTrakit](#) for review and approval:

- A2. The applicant must submit Final Street Improvement Plans in accordance with TDC 74.120, 74.130, 74.210, 74.320, 74.330, 74.350, 74.420, 74.450, 74.470, 74.485, 74.660, 74.765, 75.020, and 75.040 that show:

- a. Frontage improvements for the east side of SW Boones Ferry Road, as approved by the City Engineer, consisting of:
 - i. Dedication of adequate right-of-way required to permit the construction of the public improvements;
 - ii. Striping;
 - iii. Curbs and gutters;
 - iv. A 4-foot wide planter strip (the curb is not included in this width). This width may be reduced in locations, as needed to accommodate existing improvements and/or constraints, subject to approval by the City Engineer;
 - v. Street trees and planting locations with irrigation consistent with TDC 74.745
 - vi. A 12-foot wide multi-use path; and,
 - vii. An 8-foot wide public utility easement adjacent to right-of-way with additional as required to support any Portland General Electric support poles, water meters, and vaults; this width may be reduced in locations, as needed to accommodate existing improvements and/or constraints, subject to approval by the City Engineer.
 - b. Access to SW Boones Ferry Road from this site:
 - i. Via a public access and utility easement over Tax Lot 106 (2S13 5D) and Tract L of the Autumn Sunrise Subdivision to SW Mahogany Road with public improvements consisting of:
 1. A 24-foot wide paved travel surface striped for two-way traffic;
 2. Curbs and gutters on both sides of the travel surface; and,
 3. A 5-foot wide sidewalk on the west side of the travel surface.
 4. Alternatively, the applicant may show interim access directly to SW Boones Ferry Road, subject to the approval of a Design Exception by Washington County and approval by the City Engineer, until such time as access to SW Mahogany Road can be constructed, at which time direct access to SW Boones Ferry Road would be abandoned and closed subject to applicable closure requirements of Washington County and the City of Tualatin.
- A3. The applicant must submit Final Water Plans in accordance with code section TDC 74.610, TMC 3-3, and the Public Works Construction Code that show:
- a. Construction of the C-Level public water system from the intersection of SW Boones Ferry Road and SW Norwood Road to the south property line of this development with a 12-inch diameter main to meet public water system requirements of the MurraySmith Technical Memorandum dated November 2, 2021 and included as Exhibit N;
 - b. A gate valve at the main for domestic and fire service laterals; and,
 - c. Adjacent to the SW Boones Ferry Road right-of-way:
 - i. Reduced pressure backflow prevention and water meter for the domestic lateral;
 - ii. The water meter must be located within the planter strip. If inadequate width of strip is approved, then behind the sidewalk and within and surrounded by five feet of public utility easement;
 - iii. Irrigation after a domestic meter and reduced pressure backflow device; and,
 - iv. The fire vault surrounded by five feet of public utility easement.

- A4. The applicant must submit Final Sanitary Sewer Plans in accordance with code section TDC 74.620, TMC 3-2, and the Public Works Construction Code that show:
- a. The location of the lines, grade, materials, and other details;
 - b. The gravity service lateral releasing to a public manhole at the north end of a public sanitary sewer easement to the south; and,
 - c. Construction of the public gravity sanitary sewer system as needed to serve this development within public sanitary sewer easements and right-of-way.
- A5. The applicant must submit Final Stormwater Plans certified by an Oregon registered, professional engineer in accordance with TDC 74.630 and 74.650, TMC 3-5-200 through 3-5-430, Public Works Construction Code (PWCC), and Clean Water Services' (CWS) Design and Construction Standards (D&CS) Chapter 4 that show:
- a. A downstream analysis, including but not limited to erosion, and include solutions within final plans for $\frac{1}{4}$ mile downstream from the release from the private development through the public stormwater system, in accordance with TMC 3-5-210(1 through 4);
 - b. With gravity flow five feet from the outside of the established line of the building to the public stormwater system in accordance with CWS D&CS 1.03.39 and 5.09.3(a) (1) and (4), or as otherwise approved by the City Engineer;
 - c. Discharge to an approved public system; and,
 - d. Capture of runoff from all new and modified private and public impervious areas, including:
 - i. Runoff from new impervious area located within the public access easement on Tax Lot 106 and Tract L within Phase 3 of the Autumn Sunrise Subdivision (File No. SB21-0001);
 - ii. This runoff may be captured and treated within stormwater facilities of the subject development subject to compliance with CWS D&CS approved Proprietary Treatment Systems or City Engineer approved alternative; and,
 - iii. Treatment of new and modified impervious areas in accordance with CWS D&CS 4.08.1.d meeting phosphorous removal in accordance with TMC 3-5-350 per the design storm in accordance with TMC 3-5-360 and CWS D&CS 4.08.2, including:
 1. Stormwater from public impervious areas may be alternatively equivalently treated and detained within the subject development's private stormwater facilities;
 2. Public water quality facilities may be LIDA street swales or can connect to the public water quality facility constructed by Autumn Sunrise, subject to final approval by the City Engineer; and
 3. If additional public stormwater facilities are required, additional dedication of right-of-way may be needed; and,
 4. Detention in accordance with TMC 3-5-220, TMC 3-5-230, and CWS D&CS 4.08;
 5. On-site facilities accommodating hydromodification, meeting release rates for $\frac{1}{2}$ the 2-year or 5-year storm events for proposed new and modified impervious areas in accordance with CWS D&CS 4.03.5;
 6. Conveyance calculations demonstrating the proposed public facilities can accommodate up to a 25-year storm event in accordance with TDC 74.640 and CWS D&CS 5.05.2.d; and,
 7. Compliance with the following, in accordance with TDC 74.650(2) and CWS D&CS 3.01.2(d):

- a. The submitted Clean Water Services' Service Provider Letter CWS File Number 21-002248 dated September 7, 2021 and its requirement to obtain a Stormwater Connection Permit Authorization Letter (Exhibit A6);
 - b. And updated Service Provider Letter, if required due to plan modifications; and,
 - c. Requirements stated within the Clean Water Services' Memorandum included as Exhibit D; and,
 - d. The applicant must submit financial assurance for construction performance in accordance with TMC 3-390(3), PWCC 102.14.00, and amount per CWS D&CS 2.07 Table 2-1; and,
 - e. The applicant must submit a copy of the recorded private stormwater maintenance agreement in accordance with TMD 3-5-390(4). The agreement must assure the owner as responsible for maintenance of the constructed portions of private stormwater systems within their lot. The identified system must include all conveyance, detention, hydromodification, and treatment.
- A6. The applicant must submit Final Erosion Control Plans in accordance with TDC 74.640 and 74.650, TMC 3-5-050 and 3-5-060, the Tualatin Public Works Construction Code, and Clean Water Services' Design and Construction Standards Chapters 2 and 6 that show:
- a. Grading within the public right-of-way and public easements, as approved by the City Engineer; and,
 - b. For total disturbed area up to five acres, a copy of the National Pollution Discharge Elimination System (NPDES) 1200-CN Stormwater Discharge Permit from Clean Water Services as an agent of Oregon DEQ, or
 - c. For total disturbed area of five or more acres, a copy of the National Pollution Discharge Elimination System (NPDES) 1200-C Construction Erosion Control permit from Oregon DEQ.

PRIOR TO BUILDING OR ENGINEERING PERMIT ISSUANCE:

Submit to [eTrakit](#) for review and approval:

- A7. The applicant must obtain approved Erosion Control, Public Works, and Water Quality Permits from the City of Tualatin
- A8. The applicant must provide a copy of recorded dedication of sufficient right-of-way for SW Boones Ferry Road from the centerline plus any additional to accommodate final accepted public street and stormwater improvements in accordance with TDC 74.210, 74.420, 74.470, 74.485, and 74.765.
- A9. The applicant must provide a copy of the recorded easement for the following, in accordance with TDC 74.320, 74.330, 74.350:
- a. A public utility easement, as approved by City Engineer, adjacent to SW Boones Ferry Road including, five foot wide public water easement surrounding water meter, backflow protection, and/or fire vaults, and additional width as needed for PGE support poles and guy wires.

- b. A 50-foot wide public access and utility easement dedicated to the City of Tualatin, or as otherwise approved by the city Engineer over Tax Lot 106 and Tract L of Phase 3 of the Autumn Sunrise Subdivision
- A10. The applicant must provide a copy of:
 - a. A Design Exception, if needed for direct access to Boones Ferry Road;
 - b. Approved Facility Permits from Washington County; and,
 - c. A 1200-CN National Pollution Discharge Elimination System (NPDES) Stormwater Discharge Permit from Clean Water Services as an agent of Oregon DEQ if less than five acres are disturbed, or a National Pollution Discharge Elimination System (NPDES) 1200-C Construction Erosion Control permit from Oregon DEQ if more than five acres are disturbed.
- A11. The applicant must submit a Final Site Plan Set (in PDF format) to the Planning Division that is in substantial conformance to the submitted site plans and includes:
 - a. Tree Preservation Plan that corresponds to the Tree Assessment Report (submitted as Exhibit A3) that is drawn to scale that includes the location of all trees proposed for removal and preservation that are eight inches or more in diameter, all existing and proposed structures, all existing and proposed public and private improvements, and all existing public and private easements in accordance with TDC 33.110(4)(a).
 - b. Trees identified for retention in Tree Assessment Report (Exhibit A3) must be identified on the grading plan, consistent with TDC 73B.080(3). This includes on-site Tree 29 and fifteen off-site trees. Tree protection fencing and other preservation measures recommended by the Arborist should also be specified on the grading plan.
 - c. Private outdoor areas of 80 square feet or greater attached to each ground level unit, consistent with TDC 73A.200(1).
 - d. Balcony areas of 48 square feet or greater provided for each above-ground unit, consistent with TDC 73A.200(2).
 - e. Entry areas of 24 square feet or greater provided for each unit, or a minimum combined area of 1,392 square feet or greater for each multi-family building, consistent with TDC 73A.200(3).
 - f. Shared outdoor area of 34,800 square feet or greater with features consistent with TDC 73A.200(4).
 - g. Children’s play area of 17,400 square feet or greater with features consistent with TDC 73A.200(5).
 - h. Storage areas for each unit that are a minimum of: 24 square feet for one-bedroom units, 36 square feet for two-bedroom units, and 48 square feet for three-bedroom or greater units, consistent with TDC 73A.200(6).
 - i. Walkways that are a minimum of 6 feet in width; constructed of asphalt, concrete, pervious concrete, pavers, or grasscrete; and meet ADA standards at time of construction, consistent with TDC 73A.200(7).
 - j. An accessway that is a minimum 8 feet in width; constructed of asphalt, concrete, pervious concrete, pavers, or grasscrete; meets ADA standards at time of construction; and connects the private on-site walkways to the public sidewalk or multiuse path on Boones Ferry Road, consistent with TDC 73A.200(7). The width may be reduced, as needed to accommodate right-of-way improvements and/or constraints, subject to approval by the City Engineer.
 - k. Details to demonstrate that proposed bicycle parking meets the standards of TDC 73C.050(2)(a)-(c), and that a minimum of 116 covered bicycle parking spaces are provided, in conformance with TDC 73C.100(1).

- l. A minimum of 170 parking spaces are provided as approved under VAR 21-0003 (Exhibit F) that meet the dimensional standards set forth in Figure 73-1 (Exhibit I). Sub-compact parking spaces must not exceed 35% of the total required parking, or 60 spaces, consistent with TDC 73C.020(7).
- m. Trees, as approved by the Architectural Review Board, must be planted no more than 30 feet apart on the perimeter of vehicle circulation areas consistent with TDC 73C.210(3)-(5).
- n. A minimum of 4,250 square feet or 25 square feet per parking stall improved with parking lot landscape island area with one deciduous shade trees for every four parking spaces, consistent with TDC 73C.210(6).
- o. A minimum of 580 square feet of trash enclosure area must be shown on the plans. These facilities must comply with the location, design, and access standards in TDC 73D.070.

DURING CONSTRUCTION ACTIVITY:

- A12. The applicant must install the tree protection fencing consistent with the Tree Assessment Report submitted as Exhibit A3 and Section 73B.080(3). Please contact the Planning Division to schedule an inspection with a minimum of 48 hours' notice. Where site conditions make grading or other similar encroachment upon a preserved tree's drip-line area, such grading or similar encroachment must only be permitted under the direction of a qualified arborist.

PRIOR TO ISSUANCE OF CERTIFICATE OF OCCUPANCY:

- A13. Provide an identification system which clearly locates buildings and their entries for patrons and emergency services, pursuant to TDC 73A.200(10)(c). Building identification approved by TVF&R must be placed in a position that is plainly legible and visible from the street fronting the property. Numbers must contrast with their background, be a minimum of 4 inches high, and have a minimum stroke width of 1/2 inch.
- A14. Areas impacted by grading and all areas not occupied by buildings, parking spaces, driveways, drive aisles, pedestrian areas, or undisturbed natural areas must be landscaped, pursuant to TDC 73B.030(1).
- A15. The applicant must install bicycle parking signage per MUTCD standards, pursuant to TDC 73C.050(2)(d).
- A16. The applicant must construct proposed buildings and all site improvements as illustrated on the approved Final Site Plan and Final Color Architectural Elevations. The applicant must contact the Planning Division for a site inspection at least 72 hours prior to requesting a certificate of occupancy. This inspection is separate from inspection(s) done by the Building Division.
- A17. The applicant must complete all the private stormwater and public improvements as shown on the approved permit plans. All improvements must also be accepted by the City in accordance with TDC 74.120, 74.130, and 74.170.
- a. If the public sanitary sewer system necessary to serve this development is not constructed to the extent of property/available easements at the time of request for a Certificate of Occupancy the applicant must:
 - i. Obtain approval to extend the public sanitary sewer system from the north end of the vicinity of future Tract L within Phase 3 of the Autumn Sunrise Subdivision (File No. SB21-

- 00001) to connect to approved and constructed mains and the Clean Water Services' Norwood Road Pump Station; or
- ii. Obtain approval for revised Erosion Control, Public Works, and Water Quality permits from the City to construct all necessary portions of the public system yet to be constructed; and,
 - iii. Provide a means of compliance with the contractor insurance and bond requirements of the City of Tualatin.
- b. If public street and stormwater improvements required by Conditions of Approval for Phase 3 of the Autumn Sunrise Subdivision (File No. SB21-0001) have not been constructed and accepted by the City at the time of a request for a Certificate of Occupancy for this project, then the applicant shall provide evidence of an agreement or obtain approval for revised Erosion Control, Public Works, and Water Quality permits from the City, as approved by the City Engineer, allowing this project to design and construct the following:
- i. For Private Tract L including:
 1. A 24-foot wide paved travel surface, striped to accommodate two-way traffic;
 2. A blanket public access and utility easement;
 3. A 5-foot wide sidewalk on the west side of the travel surface;
 4. Curbs and gutters on both sides of the travel surface; and,
 5. A six-foot deep concrete approach where the access meets SW Mahogany Street, matching the travel surface width.
 - ii. For SW Mahogany Street including:
 1. A traffic signal at SW Boones Ferry Road based on applicable signal warrants, as determined by Washington County and the City of Tualatin;
 2. Crosswalks and receiving ramp on the west side of SW Boones Ferry Road;
 3. Street signs with local street name for SW Mahogany Street approved by the City Engineer; and,
 4. Associated water quality and quantity facilities.
- A18. The applicant must submit paper and electronic as-builts of the Engineering permits along with maintenance bonds and any final fees for public and water quality improvements City in accordance with TDC 74.120, 74.130, and 74.170.

THE FOLLOWING ITEMS APPLY TO THE SITE IN AN ON-GOING MANNER:

- A19. All mechanical equipment must be screened in accordance with TDC 73A.200(11)(c). Prior to approval of a mechanical permit, the applicant or property owner must submit scaled elevations illustrating that above-grade or on-grade equipment will be screened by parapet, sight-obscuring fence, landscaping, or other method.
- A20. All sign permits require separate sign permit approval per TDC Chapter 38. This approval does not constitute sign permit approval.
- A21. All site, building exterior, and landscaping improvements approved through the AR process must be continually maintained, so as to remain substantially similar to original approval through the

AR process, except as permitted under TDC 33.020(7) (Modifications to Previously Approved Final Architectural Review Decisions).

- A22. All parking spaces shall be continuously maintained in compliance with the dimensional standards specified in TDC Figure 73-1 (Exhibit I).
- A23. No vehicular parking, hedge, planting, fence, wall structure, or temporary/permanent physical obstruction is permitted between 30 inches and eight feet above the established height of the curb in the vision clearance area specified in TDC Figure 73-2 (Exhibit J).

III. APPEAL

The applicant or any person who submitted written comments or testified orally or in writing at the Tualatin Architectural Review Board hearing and who may be adversely affected by the Board's decision may file a request for review of the final decision of the Tualatin Architectural Review Board to the City Council.

The Tualatin Architectural Review Board's decision will be final after 14 calendar days from the mailing of this order, unless a written appeal is received by the **Tualatin Planning Division at 10699 SW SW Herman Road, Tualatin, Oregon, before 5:00 p.m., June __, 2022. The appeal must be submitted on the City appeal form with all the information requested provided thereon, signed by the appellant, and include the applicable appeal fee.** The plans and appeal forms are available at the Planning Division offices. The appeal forms must include reasons, current appeal fee, and meet the requirements of Section 32.310 of the Tualatin Development Code. The City Council will review and make a decision. The parties will be notified of the Council meeting date.

ADOPTED THIS ____ DAY OF JUNE.

ARCHITECTURAL REVIEW BOARD
CITY OF TUALATIN

BY:

Nancy Grimes, Acting Chair
Architectural Review Board



AR 22-0001
Plambeck Gardens
23500 SW Boones Ferry Road

AR 22-0001
Plambeck Gardens

ARCHITECTURAL REVIEW BOARD
June 8, 2022



Tonight's Presentation

1. Site Background
2. Past Decision: VAR 21-0003
3. Project Overview
4. Applicable Criteria
5. Conclusion



Site Background



AR 22-0001
Plambeck Gardens

ARCHITECTURAL REVIEW BOARD
June 8, 2022



Past Decision

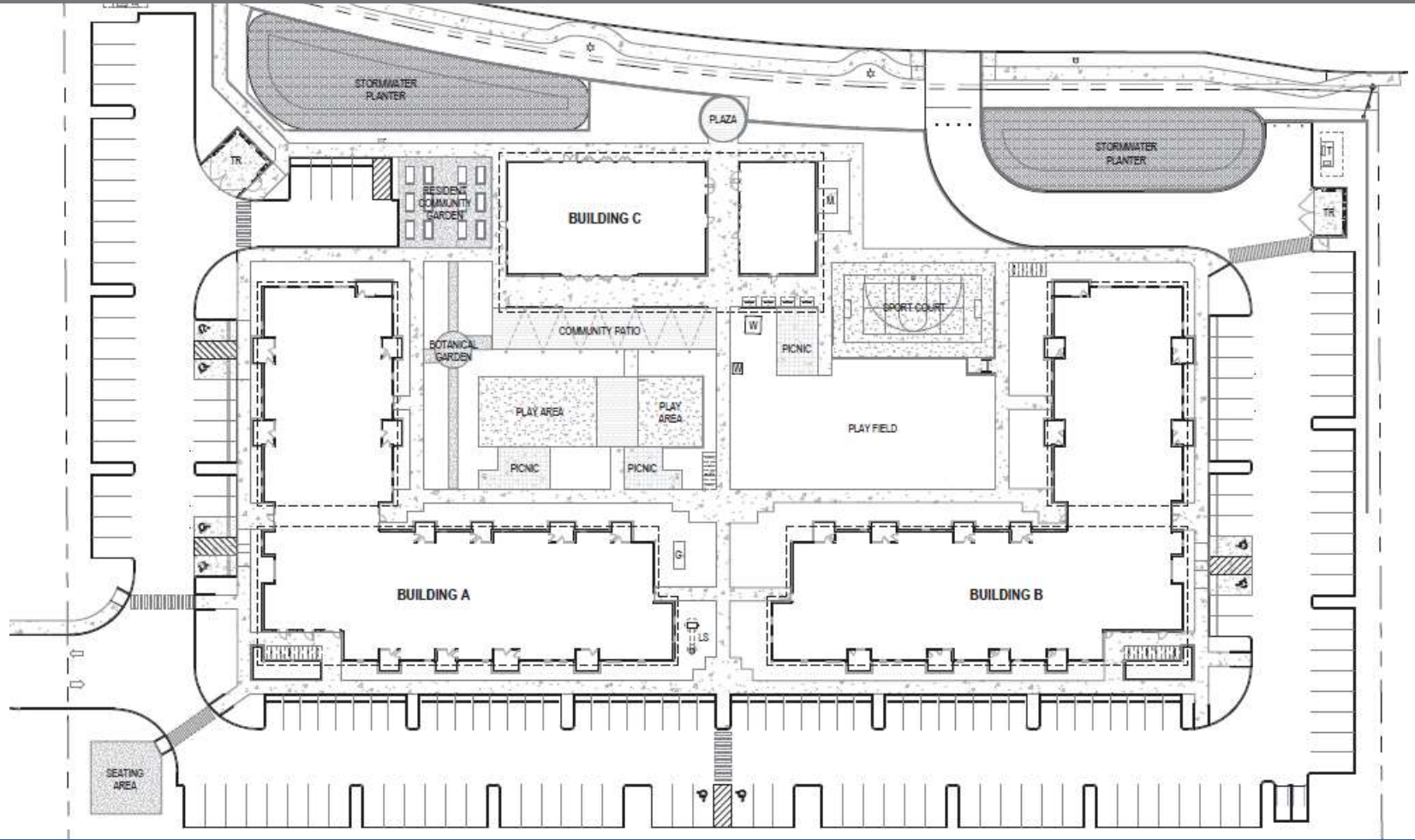
VAR 21-0003 Approved:

- Maximum structure height of 54 ft
- Minimum parking requirement of 170 spaces

Maintains density allowances despite hardships on site



Project Overview



AR 22-0001
Plambeck Gardens

ARCHITECTURAL REVIEW BOARD
June 8, 2022



Procedures (TDC 32.230)

Type III Architectural Review:

- Application submitted - March 4, 2022
- Deemed complete – April 12, 2022
- Notice of Hearing sent – April 28, 2022
- Public hearing – June 8, 2022
- Final decision required – August 24, 2022*

**Applicant granted 14-day extension to 120-day rule*



Architectural Review (TDC 33.020)

Architectural Review for Large Multi-family

Developments: Approval criteria listed in Chapter 73A through 73G, including:

- Site Design Standards
- Landscaping Standards
- Parking Standards
- Waste & Recyclable Management Standards

Conditions of Approval: may implement identified public facilities and services needed to serve the proposed development through Chapters 74 and 75.

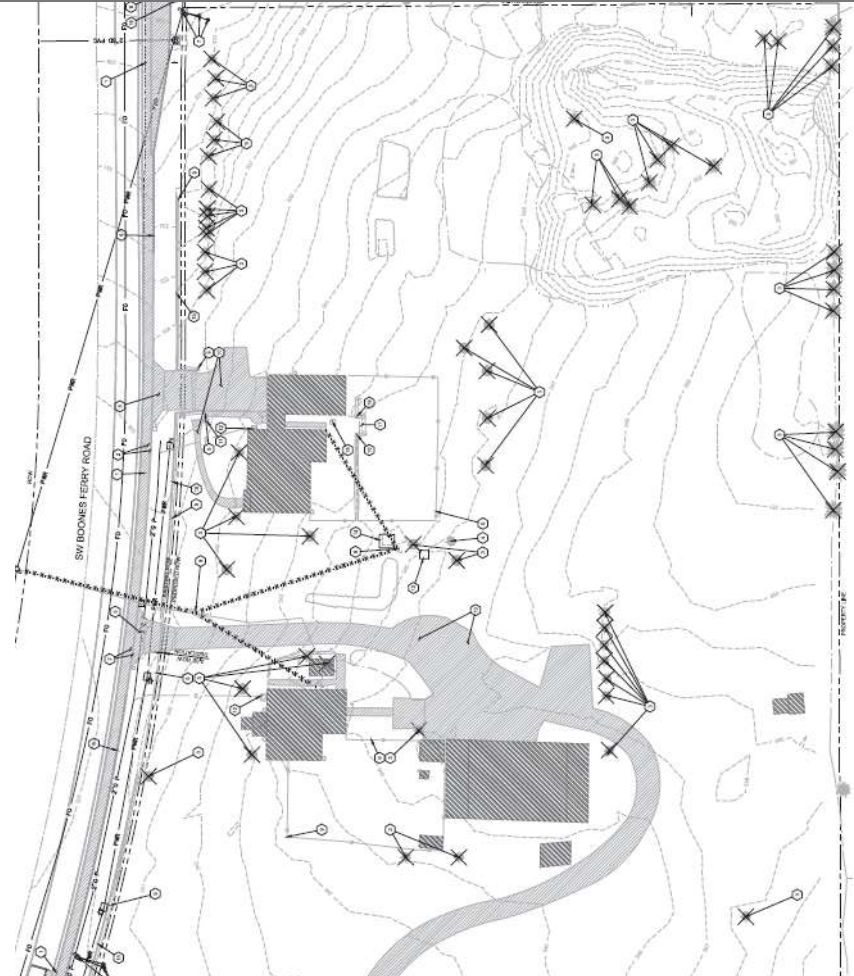


Tree Removal (TDC 33.110)

The application includes tree removal:

Approval Criteria

- The tree is diseased;
- The tree is a hazard;
- Necessary to remove tree to construct proposed improvements



AR 22-0001
Plambeck Gardens

ARCHITECTURAL REVIEW BOARD
June 8, 2022



RH Zone (TDC 43)

The proposal complies with zoning:

- Setbacks
- Building height
- Permitted uses

* VAR 21-0003

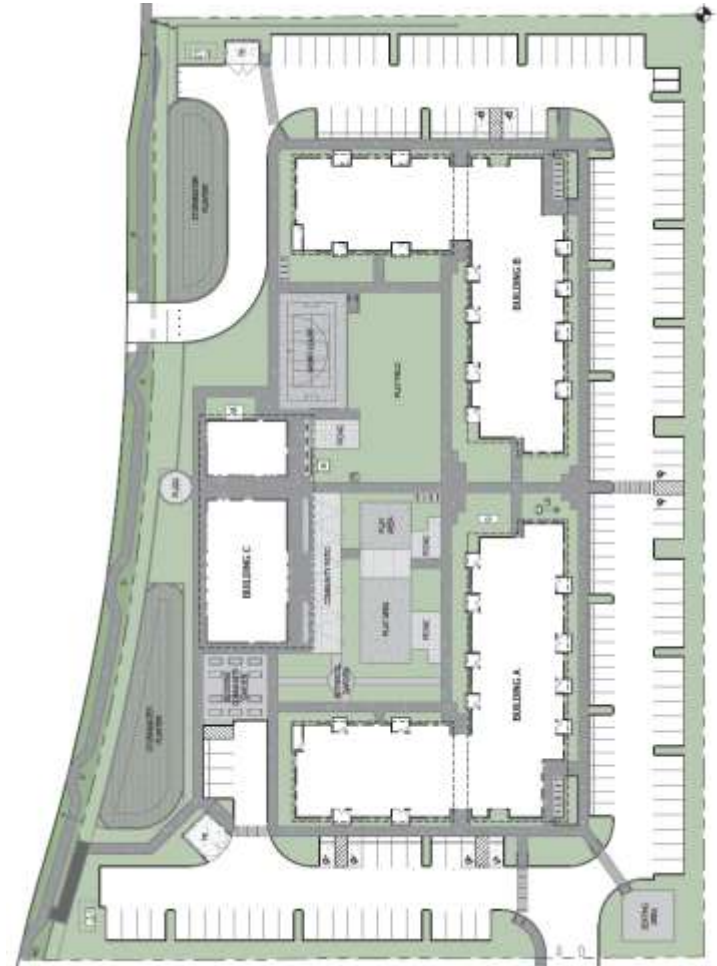
USE CATEGORY	STATUS	
Household Living: Multi-family structure	Permitted	
STANDARD	REQUIREMENT	MIN. PROPOSAL
Setbacks:		
<i>Front (Boones Ferry Rd)</i>	35 ft	86 ft
<i>Side/Rear</i>	12 ft	84 ft
<i>Between Buildings</i>	10 ft	45 ft
<i>Parking Area</i>	10 ft	10.5 ft
Building Height:	54 ft*	53.6 ft



Site Design (TDC 73A)

The proposal complies with requirements for:

- Private Outdoor Areas
- Entry Areas
- Shared Outdoor Areas
- Children's Play Areas
- Storage
- Walkways/Accessways
- Lighting
- Safety & Security
- Service, Delivery & Screening



AR 22-0001
Plambeck Gardens

ARCHITECTURAL REVIEW BOARD
June 8, 2022



Building Design (TDC 73A)



AR 22-0001
Plambeck Gardens

ARCHITECTURAL REVIEW BOARD
June 8, 2022



Building Design (TDC 73A)



VICTORIA WOODS SUBDIVISION



VICTORIA GARDENS SUBDIVISION

AR 22-0001
Plambeck Gardens

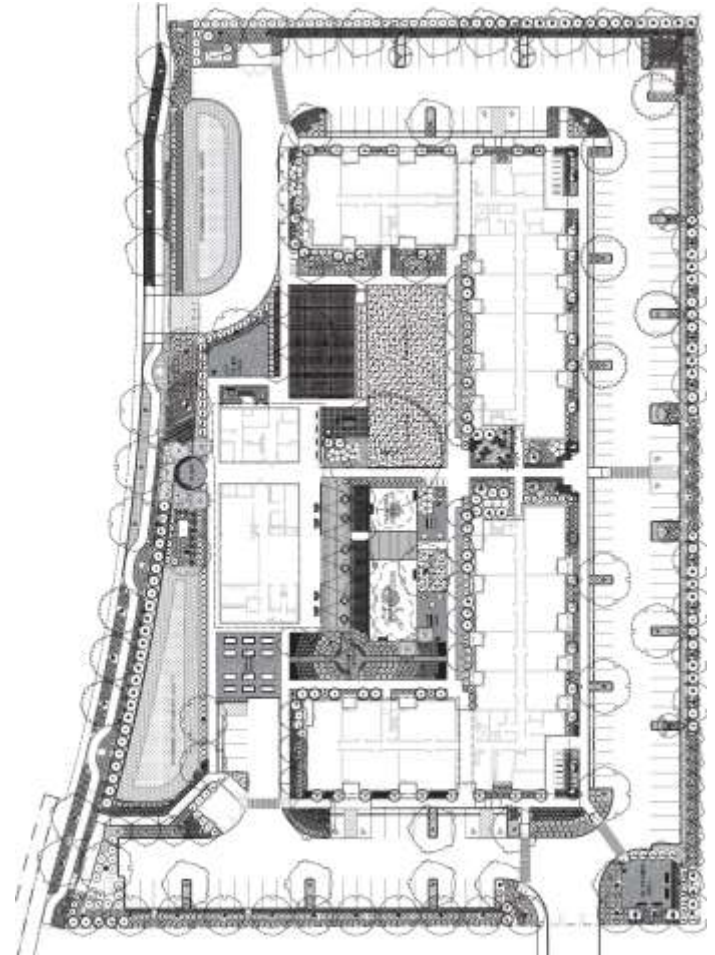
ARCHITECTURAL REVIEW BOARD
June 8, 2022



Landscaping Standards (TDC 73B)

The application demonstrates the proposal complies with requirements for:

- Tree preservation
- Irrigation
- Revegetation of disturbed areas
- Minimum standards for plantings



AR 22-0001
Plambeck Gardens

ARCHITECTURAL REVIEW BOARD
June 8, 2022

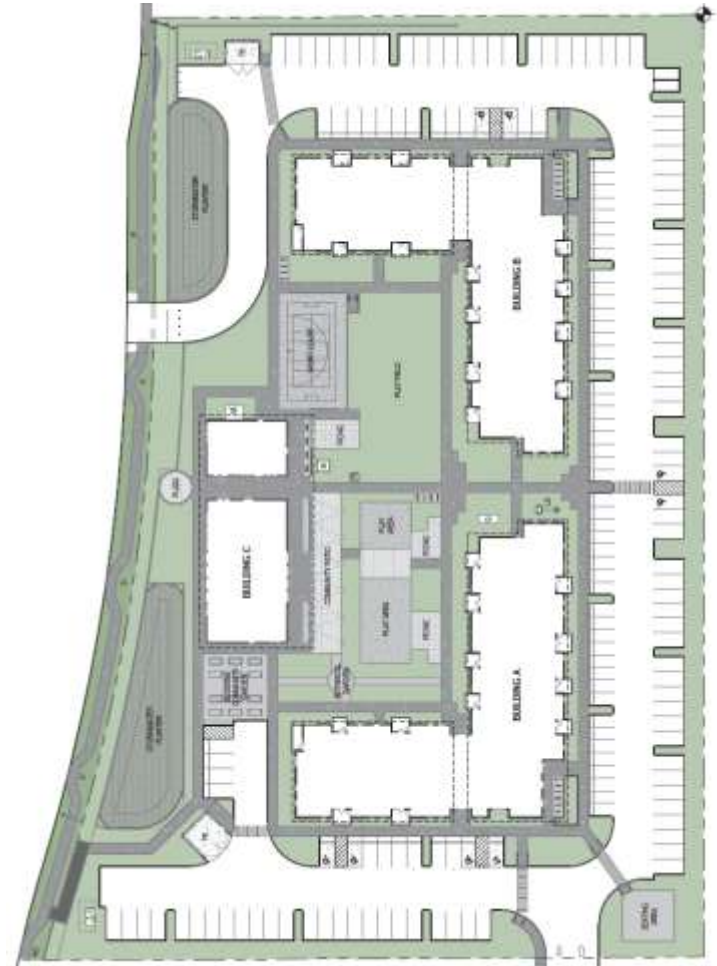


Parking Standards (TDC 73C)

The application demonstrates the proposal complies with requirements for:

- Minimum parking requirements (170 required* & provided)
- Bike parking (116 required & 206 provided)
- Parking / drive aisle standards
- Parking lot landscaping

*VAR 21-0003



AR 22-0001
Plambeck Gardens

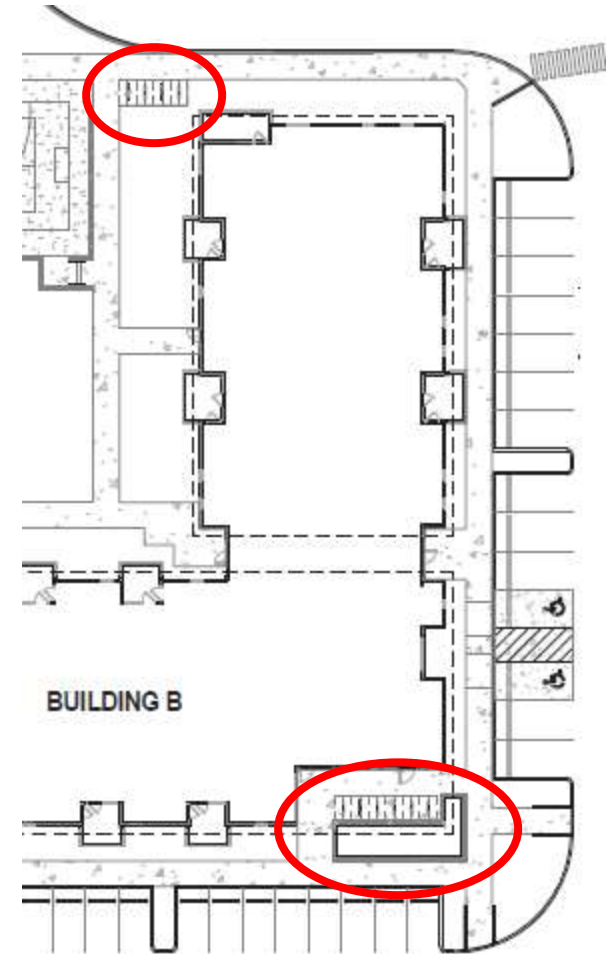
ARCHITECTURAL REVIEW BOARD
June 8, 2022



Parking Standards (TDC 73C)

With conditions, the proposal complies with TDC 73C.250(2):

- Each bicycle parking space must be at least six feet long and two feet wide, with overhead clearance in covered areas must be at least seven feet; [...]

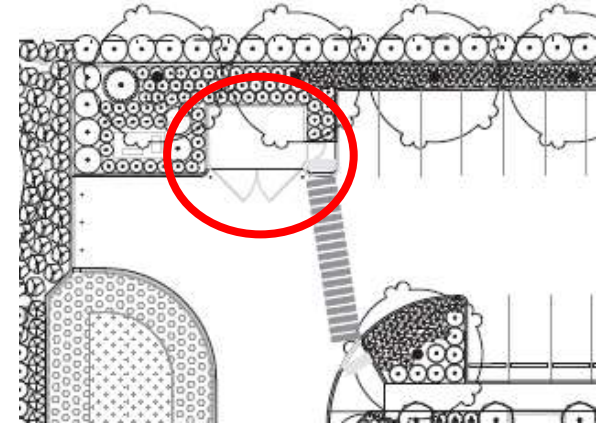




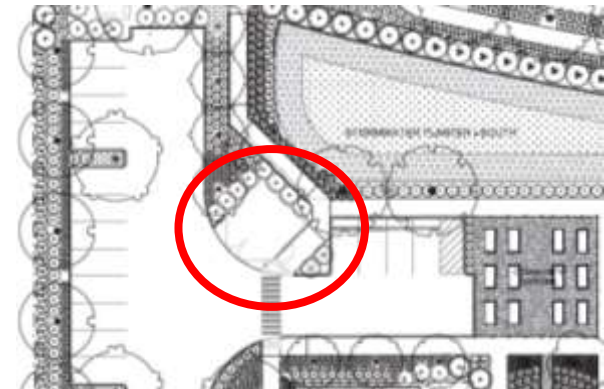
Waste and Recyclables (TDC 73D)

The application demonstrates the proposal complies with requirements for:

- Minimum Storage Area
- Location
- Screening
- Access



NW TRASH ENCLOSURE



SW TRASH ENCLOSURE



Waste and Recyclables (TDC 73D)

With conditions, the proposal complies with TDC 73D.070(2):

- Exterior storage areas must be enclosed by a sight obscuring fence or wall at least 6 feet in height.
- Vertical clearance of 8 feet is required if the storage area is covered.



Public Improvements (TDC 74)

With conditions, the proposal complies with public improvement standards.

- Right-of-Way and Easement Dedication
- Street Improvements
- Utilities: Water, Sanitary Sewer, Storm Sewer
- Stormwater: Water Quality Detention Facility
- Grading and Erosion Control



Access Management (TDC 75)

With conditions, the proposal is subject to joint access through the Autumn Sunrise subdivision or by obtaining a Design Exception from Washington County for interim access off of Boones Ferry.

- **TDC 75.050. - Access Limited Roadways. (2)(h)**
Boones Ferry Road at all points located within the City of Tualatin Planning Area
- **TDC 75.110. Joint Access Standards.**
When joint accesses are required by properties undergoing development, an overall access plan shall be prescribed by the City Manager. Interim accesses may be allowed in accordance with TDC 75.060 of this chapter to provide for the eventual implementation of the overall access plan.





Conclusion

- The findings demonstrate that the proposal meets the applicable criteria of the Tualatin Development Code with the recommended Conditions of Approval.
- Therefore, staff respectfully recommends approval of the subject Architectural Review application (AR 22-0001), as conditioned.
- Questions?



PLAMBECK GARDENS

23500 & 23550 SW BOONES FERRY ROAD

03.04.22

R1 – 04.21.22

R2 – 05.02.22

NARRATIVE & SUPPORTING DOCUMENTS

LAND USE – ARCHITECTURAL REVIEW APPLICATION (TYPE III)

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PROJECT INFORMATION

Project Name: Plambeck Gardens **Project no:** 19031
Representative: Kayla Zander
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Applicant: Jilian Saurage Felton
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Property Address: 23500 & 23550 SW Boones Ferry Road
Tualatin, Oregon 97062
Zoning Designation: RH – High Density Residential
Uses: Household Living (Multi-Family Structure), Residential Accessory Uses

PROJECT DESCRIPTION

The proposed Plambeck Gardens project is a new 116-unit affordable housing development at 23500 & 23550 SW Boones Ferry Road. The site currently consists of two single family homes with several small structures scattered around a site. The site has significant slopes throughout, with the steepest portions located on the northern side.

The developer for this project, Community Partners for Affordable Housing (CPAH) has a 27-year history of creating and maintaining safe, healthy, and sustainable housing with supportive services for diverse resident populations including families, seniors, and people with disabilities in Washington County and Multnomah County. CPAH believes in this work and looks for innovative ways to meet the growing needs for affordable housing. They currently have 466 units of regulated affordable housing units in their portfolio, with 182 more in development.

Understanding the lack of affordable housing in the area and the City of Tualatin's plan to develop the Basalt Creek Concept Plan in conjunction with Washington County, CPAH engaged the City about this SW Boones Ferry site in early 2019. Identified for high density residential development, the site offered an excellent location to bring needed affordable housing to Tualatin. In May of 2020, CPAH submitted the Basalt Creek project to the Washington County Metro Affordable Housing Bond Program Notice of Funding Availability, which is a competitive funding cycle, and the project was awarded funding in August of 2020. Both Washington County and the City of Tualatin were supportive of the project. Subsequently, the site was annexed into the City of Tualatin in April of 2021.

The Plambeck Gardens project proposes two 4-story wood-framed residential buildings with fiber cement cladding, patios or balconies for each unit, and a pitched roof. The residential buildings consist of units ranging in size from 1-bedroom to 4-bedrooms and several support spaces for residents including laundry rooms, resident lounges, unit storage and a meeting room. In addition to the support spaces within the residential buildings, there is a separate community building centrally located on the site that includes additional resident services, management offices, and classrooms intended for resident use only.

The existing site does not have a sidewalk, landscape strip or street trees. New public right-of-way improvements are proposed for the length of the Plambeck Gardens development frontage along SW Boones Ferry Road. In addition to the right-of-way improvements, the project is providing a public utility easement along the entire development frontage along SW Boones Ferry Road. Boones Ferry Road is

an Access Limited Roadway. Therefore, the Plambeck Gardens primary site entrance will be from the Autumn Sunrise development with an easement across the Horizon Church property. A second emergency access only is proposed along the northern side of the site at SW Boones Ferry Road, as required by Tualatin Valley Fire and Rescue.

The Plambeck Gardens development will connect the project's sanitary sewer service to a proposed public sanitary sewer line within the Autumn Sunrise development with an easement across the Horizon Church property. The Plambeck Gardens development team has been working with the Autumn Sunrise development on the connection point for the sewer design. Both residential buildings will have a gravity-fed sanitary sewer design. The community building will require a private lift station, which is located between buildings A & B on the Plambeck Gardens site. The sanitary line to and from the lift station will all be a gravity fed system. Utility drawings have been included in this submittal showing this condition.

Municipal water is not currently available at the Plambeck Gardens site. The development will construct a new 12-inch water line within SW Boones Ferry Road that will connect from the existing municipal water line at the intersection of SW Boones Ferry Road and SW Norwood Road to the proposed H-Street at the Autumn Sunrise development. Utility drawings have been included in this submittal showing this condition.

Stormwater management for the Plambeck Gardens development will be managed via two stormwater basins with both above ground and below ground detention on site. The northern stormwater basin will connect to the existing stormwater facility near the northwest corner of the site. The southern stormwater basin will connect to a proposed public stormwater manhole and new proposed storm main line within SW Boones Ferry Road before tying into the existing system along the Autumn Sunrise development frontage. The stormwater basins have been sized and designed to meet the requirements of the City of Tualatin, Clean Water Services (CWS) and U.S. Department of Housing and Urban Development (HUD). Stormwater drawings and a Stormwater Report have been included in this submittal showing this condition.

Please note that this application includes the updates to the Tualatin Development Code per Ordinance No. 1463-21, which at the time of this application had not been updated online via Municode. Additionally, city code text has been omitted in certain circumstances for brevity within the application, and is noted accordingly.

TDC 32.140 (1)(A) – LAND USE APPLICATION.

Refer to Supplemental Information section below.

TDC 32.140(1)(B) – WRITTEN STATEMENT

TDC: CHAPTER 31 – GENERAL PROVISIONS

GENERAL

TDC 31.020 – Classification of Planning District (Zones)

In order to carry out the objectives of the Tualatin Comprehensive Plan, land within the City is divided into planning districts or zones. The established planning districts are designated on the Plan Map. The planning district (zone) designations are as follows:

High Density Residential – RH

Applicant Response:

As shown by the Planning District Map, the subject property is located within the RH (High Density Residential) zoning district.

TDC 31.040 – Planning District (Zone) Map

Each planning district (zone) is designated on the Plan Map of the Tualatin Comprehensive Plan. To carry out the purposes of the planning district standards, the Plan Map of the Tualatin Comprehensive Plan is known as the "Planning District Map." The primary function of the Planning District Map is to describe the boundaries of the planning districts so that people using this Code may determine which planning district standards regulate the use and development of their land.

Applicant Response:

Refer to Supplemental Information section for Zoning Map.

TDC: CHAPTER 32 – PROCEDURES

TDC 32.010 – Purpose and Applicability

[City code text omitted for brevity]

Applicant Response:

The Plambeck Gardens project is a multi-family housing development, which is subject to a Type III Architectural Review Procedure.

TDC 32.020 – Procedures for Review of Multiple Applications

[City code text omitted for brevity]

Applicant Response:

The Plambeck Gardens project submitted a Type III Land Use Variance (VAR21-003) application for a parking reduction and height increase, which was approved by the City of Tualatin Planning Commission on November 18th, 2021. The notice of adoption is included in the Supplemental Information section of this application.

TDC 32.030 – Time to Process Applications

[City code text omitted for brevity]

Applicant Response:

Procedure will be followed.

TDC 32.110 – Pre-Application Conference

[City code text omitted for brevity]

Applicant Response:

The applicant attended a Pre-Application Conference on July 28th, 2021. Meeting Minutes from that Pre-Application Conference are included in the Supplemental Information Section. Since the Pre-Application Conference the applicant has attended additional follow up meetings with City Planning and Engineering Staff on August 4th, 2021 October 26th, 2021 and January 18th, 2022.

TDC 32.120 – Neighborhood/Developer Meetings

[City code text omitted for brevity]

Applicant Response:

A Neighborhood/ Developer Meeting was held on August 11th, 2021.

TDC 32.130 – Initiation of Applications

[City code text omitted for brevity]

Applicant Response:

The application is being submitted by Carleton Hart Architecture on behalf of Community Partners for Affordable Housing.

TDC 32.140 – Application Submittal

[City code text omitted for brevity]

Applicant Response:

This application includes a completed application form, a written statement addressing the applicable approval criterion and standards, additional information as required by the TDC, payment of application fees, recorded deed/land sales contract with legal description, the preliminary title report, the neighborhood/developer meeting content, and the statement of CIO contact prior to submitting the application.

TDC 32.150 – Sign Posting

[City code text omitted for brevity]

Applicant Response:

The Sign for the Architectural Review Submittal shall be posted after the application is submitted and an Architectural Review number has been assigned by the jurisdiction. The applicant will then provide the Certificate of Sign Posting per the City of Tualatin standards.

TDC 32.160 – Completeness Review

[City code text omitted for brevity]

Applicant Response:

Procedure will be followed.

TDC 32.170 – Revised Applications

[City code text omitted for brevity]

Applicant Response:

The project will comply with the outlined procedures if applicable.

TDC 32.180 – Not Applicable to Project

TDC 32.210 – Not Applicable to Project

TDC 32.220 – Not Applicable to Project

TDC 32.230 – Type III Procedure (Quasi-Judicial Review – Public Hearing)

[City code text omitted for brevity]

Applicant Response:

The Architectural Review application has been submitted per the requirements of TDC 32.140. The jurisdiction shall determine completeness per TDC 32.160 and the jurisdiction shall mail the notice of public hearing and conduct the hearing per the TDC requirements. After the hearing, the jurisdiction must issue a notice of adoption and include an effective date.

TDC 32.240 – Not Applicable to Project

TDC 32.250 – Not Applicable to Project

TDC 32.260 – Not Applicable to Project

TDC 32.310 – Appeals (Request for Review)

[City code text omitted for brevity]

Applicant Response:

The project will comply with the outlined procedures if applicable.

TDC: CHAPTER 33 – APPLICATIONS AND APPROVAL CRITERIA

TDC 33.020 – Architectural Review

(1) *Purpose. [City code text omitted for brevity]*

Applicant Response:

The Plambeck Garden project design introduces a modern design that draws inspiration from the natural qualities and characteristics of basalt stone. The façade design is oriented in a vertical direction, much like the formation of basalt stone columns. Additionally, a natural earth toned color palette has been selected to tie the buildings into their natural context with an emphasis on sustainable design measures, including durable, low maintenance, and healthy materials. Right-of-way improvements and utility connections are also shown in this application.

(2) *Applicability. [City code text omitted for brevity]*

Applicant Response:

The Plambeck Gardens project is a new Multi-Family Housing Development, and is thus subject to the Architectural Review.

(3) *Types of Architectural Review Applications. [City code text omitted for brevity]*

Applicant Response:

The Plambeck Gardens project consists of 116 units of Multi-Family Development and is thus subject to a Type III Review.

(4) *Application Materials. [City code text omitted for brevity]*

Applicant Response:

The project name, as well as contact information for the architect, landscape architect and engineer on the project have been included below in this application. Existing conditions, site plans, grading plans, utility plans, lighting plans and a landscape plan all drawn to scale have been included. Additionally, a materials board, title report and a service provider letter from Clean Water Services has been included in the application in the Supplemental Information section of the application.

(5) *Approval Criteria. [City code text omitted for brevity]*

Applicant Response:

The project is a Multi-Family Development, and will thus comply with TDC Chapters 73A through 73G.

(6) *Conditions of Approval. [City code text omitted for brevity]*

Applicant Response:

The project will comply with any applicable conditions of approval.

(7) *Not Applicable to Project.*

(8) *Effective Date. [City code text omitted for brevity]*

Applicant Response:

Procedure will be followed.

(9) *Permit Expiration. [City code text omitted for brevity]*

Applicant Response:

Procedure will be followed.

(10) *Extension of Permit Expiration. [City code text omitted for brevity]*

Applicant Response:

Procedure will be followed if applicable.

TDC 33.030 – Permit for New Driveway Approach and Closure Decisions

All requests for driveway approaches and closures are as provided in TDC 75.020 and TDC 75.030.

Applicant Response:

The Plambeck Gardens Project is proposing to close both existing driveways that connection to Boones Ferry Road. The new single access point for the site will be through the Autumn Sunrise Development to the south via H-Street and Tract L. Per Tualatin Valley Fire and Rescue (TVFR) requirements, the project will be required to provide an emergency only access point along Boones Ferry Road. This access point will have removable bollards per the TVFR requirements. Please refer to the TDC 75 section below for additional information.

TDC 33.110 – Tree Removal Permit/ Review

- (1) *Purpose.* To regulate the removal of trees within the City limits other than trees within the public right-of-way which are subject to TDC Chapter 74.
- (2) *Applicability.* No person may remove a tree on private property within the City limits, unless the City grants a tree removal permit, consistent with the provisions of this Section.
- (3) *Not Applicable to Project.*
- (4) *Procedure Type.* Tree Removal Permit applications are subject to Type II Review in accordance with TDC Chapter 32. Tree Removal Permit applications submitted with an Architectural Review, Subdivision, or Partition application will be processed in conjunction with the Architectural Review, Subdivision, or Partition decision.
- (5) *Specific Submittal Requirements.* In addition to the general submittal requirements in TDC 32.140 (Application Submittal), an applicant must submit the following:
 - (a) *Tree Preservation Plan.* [City code text omitted for brevity]
 - (b) *Tree Assessment Report.* [City code text omitted for brevity]
 - (c) *Tree Tags.* [City code text omitted for brevity]
- (6) *Approval Criteria*
 - (a) *An applicant must satisfactorily demonstrate that at least one of the following criteria are met:*
 - (i) *The tree is diseased and:* [City code text omitted for brevity]
 - (ii) *The tree represents a hazard which may include but not be limited to:* [City code text omitted for brevity]
 - (iii) *It is necessary to remove the tree to construct proposed improvements based on Architectural Review approval, building permit, or approval of a Subdivision or Partition Review.* [City code text omitted for brevity]
 - (b) *If none of the conditions in TDC 33.110(5)(a) are met, the certified arborist must evaluate the condition of each tree.*
 - (i) *Evergreen Trees.* An evergreen tree which meets any of the following criteria as determined by a certified arborist will not be required to be retained: [City code text omitted for brevity]
 - (ii) *Deciduous Trees.* A deciduous tree which meets any of the following criteria as determined by a certified arborist will not be required to be retained: [City code text omitted for brevity]
- (7) *Emergencies.* [City code text omitted for brevity]
- (8) *Permit Expiration.* [City code text omitted for brevity]
- (9) *Tree removal in violation of Zone Standards.* [City code text omitted for brevity]

Applicant Response:

The Plambeck Gardens project is proposing tree removal on site to construct the proposed improvements as described in this Architectural Review application. The Arborist Report has been included in the Supplemental Information section of application, which includes the tree preservation plan, tree assessment report and tree tags. The development is proposing to preserve an existing 66-foot tall coniferous tree on the site (Tree Tag 29), as indicated on the proposed drawings. The remaining trees on site are necessary to remove in order to construct the proposed improvements shown in the application, including building structures, parking, and new grading requirements. As indicated in the Arborist Report, the trees on adjacent properties that are close to the property line will remain. Refer to the Landscape Plan for location of Tree 29 and proposed new trees within the development.

TDC: CHAPTER 39 – USE CATEGORIES

RESIDENTIAL USE CATEGORIES

TDC 39.200 – Household Living

- (1) *Characteristics. Household Living is the residential occupancy of an owner-occupied or rented dwelling unit by a family or household. Dwelling units must be self-contained, with cooking, sleeping and bathroom facilities. Occupancy is long-term, 30 days or more, and non-transient.*
- (2) *Housing Types. Household Living uses can be accommodated in the following housing types. Housing types are subject to the regulations specific to each planning district or overlay district.*
 - *Multi-Family Structure (as defined in the TDC 31.060).*

Applicant Response:

The Plambeck Gardens development is a multi-family project that includes 116 dwelling units of affordable housing complying with the Household Living code requirements above.

TDC: CHAPTER 43 – HIGH DENSITY RESIDENTIAL ZONE (RH)

TDC 43.100 – Purposes

The purpose of this zone is to provide areas of the City suitable for townhouses, high density garden apartment and condominium developments.

Applicant Response:

The Plambeck Gardens development includes apartments within the High Density zone, therefore the standards of this section apply.

TDC 43.200 – Use Categories

- (1) *Uses Categories. Table 43-1 lists use categories Permitted Outright (P) or Conditionally Permitted (C) in the RH zone. Use categories may also be designated as Limited (L) and subject to the limitations listed in Table 43-1 and restrictions identified in TDC 43.210. Limitations may restrict the specific type of use, location, size, or other characteristics of the use category. Use categories which are not listed are prohibited within the zone, except for uses which are found by the City Manager to be of a similar character and to meet the purpose of this zone, as provided in TDC 31.070.*
- (2) *Not Applicable to Project.*

Residential Use Categories

Household Living – Permitted/ Conditional – Permitted housing types subject to TDC 43.220

Applicant Response:

This application is for a Multi-Family Structure, which is permitted per Table 43-2.

TDC 43.210 – Not Applicable to Project

TDC 43.220 – Housing Types

Table 43-2 lists Housing Types permitted in the RH zone. Housing types may be Permitted Outright (P), Conditionally Permitted (C), or Not Permitted (N) in the RH zone.

Multi-Family Structure – Permitted

Applicant Response:
Multi-Family Structures are a permitted use.

TDC 43.300 – Development Standards

Table 43-3

Maximum Density
Household Living Uses - Maximum: 25 units per acre/ Minimum: 16 units per acre

Applicant Response:
Density is consistent with the approved VAR21-0003 application for this project.

Minimum Lot Size
Multi-Family Structure – Development on More than One Acre: 1,742 square feet per unit

Applicant Response:
Minimum Lot Size is consistent with the approved VAR21-0003 application for this project.

Minimum Average Lot Width
Multi-Family Structure – 75 feet

Applicant Response:
Minimum Average Lot Width is consistent with the approved VAR21-0003 application for this project.

Minimum Setbacks
Front Setback – 1 story = 20 feet

Applicant Response:
Minimum Setbacks are consistent with the approved VAR21-0003 application for this project.

Front Setback – 2.5 story = 35 feet

Applicant Response:
Front Setbacks are consistent with the approved VAR21-0003 application for this project.

Side and Rear Setback – 1 story = 5 feet

Applicant Response:
Side and Rear Setbacks are consistent with the approved VAR21-0003 application for this project.

Side and Rear Setback – 2.5 story = 12 feet

Applicant Response:
Side and Rear Setbacks are consistent with the approved VAR21-0003 application for this project.

Maximum Structure Height
All Uses – 35 feet

Applicant Response:
Maximum Structure Height is consistent with the approved VAR21-0003 application for this project.

Maximum Lot Coverage
All Other Permitted Uses – 45%

Applicant Response:

Maximum Lot Coverage is consistent with the approved VAR21-0003 application for this project.

TDC 43.310 – Not Applicable to Project

TDC 43.320 – Not Applicable to Project

TDC: CHAPTER 73A – SITE DESIGN STANDARDS

GENERAL

TDC 73A.010 – Site and Building Design Standards Purpose and Objectives

- (1) *Purpose. The purpose of the site and building design objectives and standards found in TDC 73A through TDC 73G is to promote functional, safe, innovative, and attractive sites and buildings that are compatible with the surrounding environment, including, but not limited to:*
- (c) *The building form, articulation of walls, roof design, materials, and placement of elements such as windows, doors, and identification features; and*
 - (d) *The placement, design, and relationship of proposed site elements such as buildings, vehicular parking, circulation areas, bikeways and bike parking, accessways, walkways, buffer areas, and landscaping.*

Applicant Response:

The project includes articulation at each unit via a primary façade and a recessed area, where the patios and balconies are nested. The roof design responds to the building form by connecting the wall articulation of each unit under an undulating form that connects each of the units into a cohesive design. The two residential buildings are L-shaped in form to create a larger outdoor area in the center of the site, which is adjacent to the community building for resident use. The form, windows, and façade articulation wrap the buildings, creating an active façade at all building elevations.

Circulation throughout the outdoor areas, including walkways and accessways connect to the parking, which is located around the perimeter of the site. SW Boones Ferry Road has an existing bike lane that will remain. The accessway will connect the right-of-way path to the site paths, giving access for bicyclists and pedestrians. A variety of bike parking locations are available throughout the site plan, as shown on the drawings. The landscaping design has been coordinated to provide year-round seasonal interest, focuses on drought tolerant and native species while promoting safety for all vehicular traffic, pedestrian use and bicyclist use through the design.

- (2) *Objectives. The objectives of site and building design standards in TDC 73A through TDC 73G are to:*
- (a) *Enhance Tualatin through the creation of attractively designed development and streetscapes;*
 - (b) *Encourage originality, flexibility, and innovation in building design;*
 - (c) *Create opportunities for, or areas of, visual and aesthetic interest for occupants and visitors to the site;*
 - (d) *Provide a composition of building elements which responds to function, land form, identity and image, accessibility, orientation and climatic factors;*

- (e) *Conserve, protect, and restore fish and wildlife habitat areas, and maintain or create visual and physical corridors to adjacent fish and wildlife habitat areas;*
- (f) *Enhance energy efficiency through the use of landscape and architectural elements; and*
- (g) *Minimize disruption of natural site features such as topography, trees, and water features.*

Applicant Response:

The Plambeck Gardens design was created with a wholistic approach in mind, considerations for how the residents of Plambeck Gardens will experience the site, in addition to the neighbors, greater community and future developments. The site design was created concurrently to the landscape design and building design to create an overall unified design.

Walkways, paths, plazas, and landscaped areas are coordinated with entrances to the buildings and site in addition to their proximity to outdoor play areas. The project includes over 50% of its units as 2-bedroom, 3-bedroom and 4-bedroom units for families. Therefore, a large variety of outdoor uses for residents of all ages and abilities are found across the site design. These spaces include a community garden, botanical garden, outdoor sport court, play field, two separate playgrounds as well as both covered and uncovered seating areas. The majority of these spaces are located within the site area that is the flattest and located between the three buildings on site. The site layout, native landscaping design along with the buildings design concept that is inspired by natural elements as noted previously in this application ensure that this development is an attractive and functional addition to the community.

The two L-shaped buildings (Building A & Building B) create a central outdoor area on the site for residents. The southern Building B will provide shade in the summer months to portions of the outdoor areas. The two residential buildings have wings running east/west that are spaced far enough apart to allow for daylight to reach Building B in the winter to increase passive heat gains and reduce heating load requirements. Deciduous shade trees are planted on the south side of the wing to reduce unwanted heat gains in the summer months, while allowing heat gains in the winter months. In addition, deciduous shade trees have been planted on the south and west sides of all buildings on site to control seasonal heat gains. The layout of the site also places the single-story community building closest to the public way to create a gradual transition in height from the public sidewalk to the residential buildings in the center of the site.

COMMON WALL DESIGN STANDARDS

TDC 73A.200 – Multi-Family Design Standards

The following standards are minimum standards for all other residential development in all zones that does not meet the definition of single-family dwelling, duplex, townhouse, triplex, quadplex, or cottage cluster or is 5 or more dwelling units. These standards do not apply to development in the Central Design District and Mixed Use Commercial (MUC) zone, which have separate standards and may be less than the minimums provided below.

- (1) *Private Outdoor Areas. Multi-family uses must provide private outdoor area features as follows:*
 - (a) *A separate outdoor area of not less than 80 square feet must be attached to each ground level dwelling unit; and*
 - (b) *The private outdoor area must be separated from common outdoor areas with walls, fences or shrubs*

Applicant Response:

All level 1 patios are a minimum of 80 square feet and are separated from outdoor areas with a combination of a low concrete wall and metal guardrail. Refer to drawing sheets A2.01 and A2.04 for patio sizes per unit type.

- (2) *Balconies, Terraces, and Loggias. Multi-family uses must provide balconies, terraces, and loggias features as follows:*
- (a) *A separate outdoor area of not less than 48 square feet in the form of balconies, terraces, or loggias must be provided for each unit located above the ground level.*

Applicant Response:

All level 2, 3 and 4 balconies are a minimum of 48 square feet. Refer to drawing sheets A2.02, A2.03, A2.05 and A2.06 for balcony sizes per unit type.

- (3) *Entry Areas. Multi-family uses must provide entry area features as follows:*
- (a) *A private main entry area must be provided as a private extension of each dwelling unit;*
 - (b) *The entry area must be separated from on-site parking areas and public streets with landscaping, change of grade, low fences or walls.*
 - (c) *The entry area must be a minimum of 24 square feet in area for each dwelling unit; and*
 - (d) *The entry area may be combined to serve more than one unit as determined by the City.*

Applicant Response:

Each residential building has a total of 58 units. 58 Units x 24 square feet = 1,392 square feet of Entry Areas required. The project is providing a total of 1,453 square feet of Entry Areas in each residential building. The project is providing private recessed alcoves at each unit entry and combined lobby/ lounge areas at each building. Refer to drawing sheets A2.01 through A2.06 for locations within each structure.

- (4) *Shared Outdoor Areas. Multi-family uses must provide shared outdoor area features as follows:*
- (a) *Must provide year round shared outdoor areas for both active and passive recreation;*
 - (b) *The shared outdoor area must be a minimum of:*
 - (i) *Three hundred square feet per dwelling unit; or*
 - (ii) *Four hundred fifty square feet per dwelling unit for 55 and older communities.*
 - (c) *Gazebos and other covered spaces are encouraged to satisfy this requirement;*
 - (d) *The shared outdoor area must be separated from all entryway and parking areas with a landscaped transition area measuring a minimum of ten feet wide;*
 - (e) *The shared outdoor area must have controlled access from off-site as well as from on-site parking and entrance areas with a minimum 4-foot high fence, wall, or landscaping; and*
 - (f) *The shared outdoor area must standard does not apply to:*
 - (i) *Any development with less than 12 dwelling units.*

Applicant Response:

The project has a total of 116 units, which requires 34,800 square feet of Shared Outdoor Areas, based on the 300 square feet requirement per unit. The project is providing a total of 35,688 square feet of Shared Outdoor Areas. Shared Outdoor Areas include a series of active and passive uses, such as picnic areas, bench rest areas, plaza, community gardens, community patio area with both covered and uncovered sections, pet relief area and scenic paths by a botanical garden and stormwater basin. Refer to drawing sheet A1.02 for the outdoor space diagram.

- (5) *Children's Play Areas. Multi-family uses must provide children's play area features as follows:*
- (a) *The children's play area must be a minimum of 150 square feet per dwelling unit;*
 - (b) *The children's play area must provide a separation from all entryway and parking areas with a landscaped transition area measuring a minimum of ten feet wide;*

- (c) *The children's play area must have controlled access to shared outdoor areas from off-site as well as from on-site parking and entrance areas with a minimum 4-foot high fence, wall, or landscaping; and*
- (d) *The children's play area must provide a usable floor surface (material such as lawn, decks, wood chips, sand and hard surface materials qualify); and*
- (e) *The children's play area standard does not apply to:*
 - (i) *Duplexes and townhouses;*
 - (ii) *Fifty-five and older communities; and*
 - (iii) *Any development with less than 12 dwelling units.*

Applicant Response:

The project has a total of 116 units, which requires 17,400 square feet of Children's Play Areas, based on the 150 square feet requirement per unit. The project is providing a total of 17,557 square feet of Children's Play Areas. Children's Play Area includes two play areas, designed for children of different age ranges in addition to a multi-sport court and play lawns. Refer to drawing sheet A1.02 for the outdoor space diagram.

- (6) *Storage. Multi-family uses must provide storage features as follows:*
 - (a) *Enclosed storage areas are required.*
 - (i) *Garages do not satisfy the storage requirements. An enclosed storage area may be located within the garage of the individual unit. Enclosed storage areas may also be located within commonly accessible shared garage.*
 - (b) *Each storage area must be a minimum of six feet in height and have a minimum floor area of:*
 - (i) *24 square feet for studio and one bedroom units;*
 - (ii) *36 square feet for two bedroom units; and*
 - (iii) *48 square feet for greater than two bedroom units.*

Applicant Response:

The project includes storage areas at the 1-bedroom and 2-bedroom units that are accessed directly from the unit patios/ balconies that are a minimum of 7'-6" tall, and meet the minimum floor area requirements. The project includes storage areas internal to the building for the 3-bedroom and 4-bedroom units that are accessed directly from the corridor on the level of the unit. These storage rooms are a minimum of 7'-6" tall, and meet the minimum floor area requirements. Refer to the drawing sheets A2.01 through A2.06 for storage sizes per unit type. All the storage areas provided are large enough to accommodate storage for patio furniture, bicycles, etc. A community garden shed is provided at Building C for all residents, and 2 of the 3 picnic areas include an outdoor barbecue.

- (7) *Walkways. Multi-family uses must provide walkways as follows:*
 - (a) *Walkways for duplexes and townhouses must be a minimum of three feet in width;*
 - (b) *All other multi-family development must have walkways of a minimum of six feet in width;*
 - (c) *Walkways must be constructed of asphalt, concrete, pervious concrete, or grasscrete. Gravel or bark chips are not acceptable; and*
 - (d) *The walkways must meet ADA standards applicable at time of construction or alteration.*

Applicant Response:

All Walkways throughout the site are a minimum of 6-feet wide, concrete and ADA compliant. Refer to drawing A1.03 for extents of Walkways around project site.

- (8) *Accessways.*
 - (a) *When Required. Accessways are required to be constructed when a multi-family development is adjacent to any of the following:*
 - (i) *Residential property;*
 - (ii) *Commercial property;*
 - (iii) *Areas intended for public use, such as schools and parks; and*

- (iv) *Collector or arterial streets where transit stops or bike lanes are provided or designated.*
- (b) *Design Standard. Accessways must meet the following design standards:*
 - (i) *Accessways must be a minimum of eight feet in width;*
 - (ii) *Public accessways must be constructed in accordance with the Public Works Construction Code;*
 - (iii) *Private accessways must be constructed of asphalt, concrete, pavers or grasscrete. Gravel or bark chips are not acceptable;*
 - (iv) *Accessways must meet ADA standards applicable at time of construction or alteration;*
 - (v) *Accessways must be provided as a connection between the development's walkway and bikeway circulation system;*
 - (vi) *Accessways must not be gated to prevent pedestrian or bike access;*
 - (vii) *Outdoor Recreation Access Routes must be provided between the development's walkway and bikeway circulation system and parks, bikeways, and greenways where a bike or pedestrian path is designated; and*
 - (viii) *Must be constructed, owned and maintained by the property owner.*

Applicant Response:

The Accessway for the project is a minimum of 8-foot wide, concrete. It connects the new proposed public sidewalk along Boones Ferry Road to the project's internal walkways. The accessway will not be gated, but will have handrails on both sides due to site sloping conditions. The slope and handrails will remain ADA compliant, with slopes less than 8.33%. Refer to drawing A1.03 for extents of Accessway and TDC 74.460 response for additional information.

- (9) *Carports and Garages. Multi-family uses must provide Carports and Garage features as follows:*
 - (a) *The form, materials, color, and construction must be compatible with the complex they serve.*

Applicant Response:

Per Ordinance No. 1463-21, garages are no longer a requirement for multi-family dwellings in complexes with private internal driveways. Therefore, no garages are proposed for the Plambeck Gardens development.

- (10) *Safety and Security. Multi-family units must provide safety and security features as follows:*
 - (a) *Private outdoor areas must be separated from shared outdoor areas and children's play areas with a minimum 4-foot high fence, wall, or landscaping;*
 - (b) *An outdoor lighting system that does not produce direct glare on adjacent properties and without shining into residential units, public rights-of-way, or fish and wildlife habitat areas; and*
 - (c) *Building identification must be provided consistent with the Oregon Fire Code.*

Applicant Response:

Private outdoor areas are separated from other areas as described in 73A.200 (1) response. The two residential buildings on site are L-shaped and create a centralized outdoor common area. Windows are located on all sides of the buildings, to encourage watching over the shared outdoor areas, parking areas and walkways on site. Outdoor lighting is provided throughout all common outdoor areas, parking lot and building entry's. All exterior lighting fixtures selected are compliant with The Dark Sky Society lighting standards. Fixtures have been placed around the site to comply with the required lighting levels. Refer to drawings for the photometric lighting plan. The buildings on the site will be labeled with signage per City of Tualatin, TVFR standards and Oregon Fire Code.

- (11) *Service, Delivery and Screening. Multi-family uses must provide service, delivery, and screening features as follows:*
- (a) *Provisions for postal delivery must be made consistent with US Postal Service regulations;*
 - (b) *Pedestrian access from unit entries to postal delivery areas, shared activity areas, and parking areas must be provided via accessways; and*
 - (c) *Above grade and on-grade electrical and mechanical equipment such as transformers, heat pumps and air conditioners must be screened with sight obscuring fences, walls or landscaping.*

Applicant Response:

Resident mailboxes are located within each residential building directly adjacent to the lobby/lounge on level 1. The resident services and property management mailbox is a stand-alone box located near Building C by the loading zone with a walkway connecting the loading zone and mailbox area to the building. The outdoor mechanical units for Buildings A & B are located on the flat roof portion of the building, and are obscured by the pitched roof adjacent. The outdoor mechanical unit for Building C is surrounded by landscaping. The two proposed above ground transformers and above ground generator on site are surrounded by landscaping. Refer to landscape plan for additional information at these areas.

TDC: CHAPTER 73B – LANDSCAPING STANDARDS

TDC 73B.010 – Landscaping Standards Purpose and Objectives

- (1) *Purpose. The purpose of this Chapter is to establish standards for landscaping within Tualatin in order to enhance the environmental and aesthetic quality of the City.*

Applicant Response:

The Plambeck Gardens project includes new plantings that are coordinated with the building design to create an aesthetically pleasing landscape and enhance the new structures.

- (2) *Objectives. The objectives of this Chapter are to:*
- (a) *Encourage the retention and protection of existing trees and requiring the planting of trees in new developments;*
 - (b) *Use trees and other landscaping materials to temper the effects of the sun, wind, noise, and air pollution.*
 - (c) *Use trees and other landscaping materials to define spaces and the uses of specific areas; and*
 - (d) *Use trees and other landscaping materials as a unifying element within the urban environment.*

Applicant Response:

The project has placed an emphasis on providing quality landscaped areas that are low maintenance and drought tolerant to reduce water consumption on site. The landscape design provides a variety of outdoor spaces for diverse activities. Retaining the largest tree on the property and specifying several new trees around the site will provide shaded parking stalls and shaded outdoor areas in the summer for residents.

TDC 73B.020 – Landscaped Area Standards Minimum Areas by Use and Zone

The following are the minimum areas required to be landscaped for each use and zone:

- (1) *Zone: RH (Permitted Use) – Minimum Area Requirement: None & Minimum Area requirement with dedication for a fish and wildlife habitat: None.*

Applicant Response:

There is no minimum requirement for Landscaped Areas in the RH zone with a permitted use.

TDC 73B.030 – Additional Minimum Landscaping Requirements for Multi-Family Residential Uses

- (1) *General. In addition to requirements in TDC 73B.020, Multi-Family Uses must comply with the following additional standards:*
- (a) *All areas not occupied by buildings, parking spaces, driveways, drive aisles, pedestrian areas, or undisturbed natural areas must be landscaped.*
 - (i) *This standard does not apply to areas subject to the Hedges Creek Wetlands Mitigation Agreement.*

Applicant Response:

All areas on the site that are not occupied by buildings, parking spaces, driveways, drive aisles or pedestrian areas are landscaped. Refer to drawing sheets A1.02 and A1.03 for site paths and landscaping.

TDC 73B.040 – Not Applicable to Project

TDC 73B.050 – Not Applicable to Project

TDC 73B.060 – Not Applicable to Project

TDC 73B.070 – Not Applicable to Project

TDC 73B.080 – Minimum Landscaping Standards for All Zones

The following are minimum standards for landscaping for all zones.

- (1) *Required Landscaped Areas [City code text omitted for brevity]*

Applicant Response:

Proposed landscaped areas are designed such that within three years the ground will be covered by living grass or other plant materials. Design is compliant with ANSI A300 (Part 1) (Latest Edition), and the owner will be responsible for all pruning, trimming or other requirements to ensure that the vegetation does not interfere with pedestrian or vehicular access and will not constitute a traffic hazard due to reduced visibility.

- (2) *Fences [City code text omitted for brevity]*

Applicant Response:

The fencing proposed on site is only around the stormwater basins, as required by Clean Water Services and a few locations where a guardrail is required due to grading conditions.

- (3) *Tree Preservation [City code text omitted for brevity]*

Applicant Response:

Tree preservation is indicated on grading and landscape plans. The tree protection plan is based on the arborist report recommendations for the project. All trees on site to be removed shall be done through the tree removal permit. The project is proposing to preserve the largest existing tree on the site, which is possible due to the limited grading updates needed around that tree. All other trees on site are in areas that will require extensive excavation for structures, parking and grading, and will have to be removed.

(4) *Grading [City code text omitted for brevity]*

Applicant Response:

All final grading areas that are landscaped will be provided with a suitable base for plantings. All final grading areas with impervious drainage will be directed away from pedestrian walkways, buildings, outdoor private and shared areas and landscaped areas via catch basins and area drains that will direct water to stormwater basins.

(5) *Irrigation [City code text omitted for brevity]*

Applicant Response:

All landscaped areas on site will be watered via an automatic irrigation system, accomplished through drip irrigation and pop-up sprinkler heads.

(6) *Re-vegetation in Un-landscaped Areas [City code text omitted for brevity]*

Applicant Response:

Native and drought tolerant plants have been selected to reduce irrigation and maintenance needs. All disturbed areas on site will be replanted and vegetated according to the landscape planting plans.

TDC 73B.090 – Minimum Standards Trees and Plants

The following minimum standards apply to the types of landscaping required to be installed for all zones.

(1) *Deciduous Shade Trees [City code text omitted for brevity]*

Applicant Response:

All required deciduous shade trees will be 1-1/2" caliper measured 6 inches above ground level. The species selected for the project are drought tolerant, have a mature height of 30-feet or more, live for a minimum of 60 years and cast shade in the summer.

(2) *Deciduous Ornamental Trees [City code text omitted for brevity]*

Applicant Response:

All required deciduous ornamental trees will be 1-1/2" caliper measured 6 inches above ground level. Species selection was based on low maintenance, disease-free, damage-free and drought tolerant when possible.

(3) *Coniferous Trees [City code text omitted for brevity]*

Applicant Response:

All proposed coniferous trees will be a minimum of 5-feet above ground level. Species selection was based on low maintenance, disease-free, damage-free and drought tolerant when possible.

(4) *Evergreen and Deciduous Shrubs [City code text omitted for brevity]*

Applicant Response:

All shrubs in project will range from one to five gallon size. Species selection was based on low maintenance, disease-free and drought tolerant when possible.

(5) *Groundcovers [City code text omitted for brevity]*

Applicant Response:

All groundcover proposed for the project will be fully rooted and drought tolerant. English Ivy is not included within the design.

(6) *Lawns [City code text omitted for brevity]*

Applicant Response:

All lawn areas are proposed to be a seeded grass mix with 100 percent coverage. Portions of the lawn under the existing 66-foot tall pine tree that will be retained may be replaced with mulch or similar materials due to the nature of the year round shading from that tree.

TDC: CHAPTER 73C – PARKING STANDARDS

GENERAL

TDC 73C.010 – Off-Street Parking and Loading Applicability and General Requirements

(1) *Applicability. Off-street parking and loading is required to be provided by the owner and/or developer, in all zones, whenever the following occurs:*

(a) *Establishment of a new structure or use;*

Applicant Response:

The Plambeck Gardens project is a new multi-family development, and therefore this section is applicable to the development.

(2) *General Requirements. Off-street parking spaces, off-street vanpool and carpool parking spaces, off-street bicycle parking, and off-street loading berths must be as provided as set forth in TDC 73C.100, unless greater requirements are otherwise established by the conditional use permit or the Architectural Review process.*

(a) *The following apply to property and/or use with respect to the provisions of TDC 73C.100:*

(i) *Not Applicable to Project.*

(ii) *Not Applicable to Project.*

(iii) *Not Applicable to Project.*

(iv) *Calculations to determine the number of required parking spaces and loading berths must be rounded to the nearest whole number;*

Applicant Response:

All calculations have been rounded to the nearest whole number. The number of parking spaces provided was approved in VAR21-0003.

(v) *Not Applicable to Project.*

(vi) *Parking and loading requirements for structures not specifically listed herein must be determined by the City Manager, based upon requirements of comparable uses listed;*

Applicant Response:

The number of parking spaces provided was approved in VAR21-0003.

(vii) *Not Applicable to Project.*

(viii) *Off-street parking spaces for dwellings must be located on the same lot with the dwelling. Other required parking spaces may be located on a separate parcel, provided the parcel is not greater than five hundred (500) feet from the entrance to the building to be served, measured along the shortest pedestrian route to the*

building. The applicant must prove that the parking located on another parcel is functionally located and that there is safe vehicular and pedestrian access to and from the site. The parcel upon which parking facilities are located must be in the same ownership as the structure;

Applicant Response:

All off-street parking spaces for the dwelling units are located on the same lot as the dwelling units, as noted in VAR21-0003.

- (ix) *Required parking spaces must be available for the parking of operable passenger automobiles of residents, customers, patrons, and employees and must not be used for storage of vehicles or materials or for the parking of trucks used in conducting the business;*

Applicant Response:

All parking spaces are intended to be used for the parking of operable passenger automobiles, as noted in VAR21-0003.

- (x) *Not Applicable to Project.*
(xi) *Not Applicable to Project.*
(xii) *Not Applicable to Project.*
(xiii) *Not Applicable to Project.*

TDC 73C.020 – Parking Lot Design Standards

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

- (1) *Off-street parking lot design must comply with the dimensional standards set forth in Figure 73-1;*

Applicant Response:

The project includes all parking at a 90-degree angle. The standard stalls are 9'-0" wide and 18'-6" in length. The compact parking stalls are 7'-8-1/2" wide and 15'-0" in length, as noted in VAR21-0003. See item (10) below for additional compliance with drive aisle widths.

- (2) *Parking lots and parking areas must be constructed of asphalt, concrete, pervious concrete, pavers, or grass*

Applicant Response:

All drive aisles will be asphalt and compliant with Tualatin Valley Fire and Rescue vehicle weight loading requirements.

- (3) *Parking stalls must be constructed of asphalt, concrete, pervious concrete, pavers, or grasscrete. Gravel or woody material are not an acceptable material. Pavers, pervious concrete or grasscrete are encouraged for parking stalls in or abutting the Natural Resource Protection Overlay District, Other Natural Areas, or in a Clean Water Services Vegetated Corridor;*

Applicant Response:

All parking stalls will be asphalt construction with the exception of the ADA stalls and ADA access aisle, which will be concrete construction.

- (4) *Parking lots must be maintained adequately for all-weather use and drained to avoid water flow across sidewalks;*

Applicant Response:

The parking lot will be maintained for all-weather use. The proposed grading and use of curbs throughout the parking lot design ensure that all sidewalks are at a higher elevation than the adjacent parking lot, except for curb cuts for ADA access, which are sloped to drain away from the sidewalks.

- (5) *Parking bumpers or wheel stops or curbing must be provided to prevent cars from encroaching on adjacent landscaped areas, or adjacent pedestrian walkways.*

Applicant Response:

The project is proposing the use of wheel stops at all parking stalls adjacent to pedestrian walkways to prevent encroachment and the use of curbs at all parking stalls adjacent to landscaping to prevent encroachment.

- (6) *Disability parking spaces and accessibility must meet ADA standards applicable at time of construction or alteration;*

Applicant Response:

All accessible parking stalls will be designed to comply with 2010 ADA standards, Chapter 11 of the 2019 OSSC, 2009 ICC A117.1 and Oregon Transportation Commission Standards for Accessible Parking Places August 2018, as noted in VAR21-0003.

- (7) *Parking stalls for sub-compact vehicles must not exceed 35 percent of the total parking stalls required by TDC 73C.100. Stalls in excess of the number required by TDC 73C.100 can be sub-compact stalls;*

Applicant Response:

The project includes a total of 170 parking stalls, 48 of which are sub-compact. This results in sub-compact parking making up 28% of total parking stalls provided on site, as noted in VAR21-0003.

- (8) *Groups of more than four parking spaces must be so located and served by driveways that their use will require no backing movements or other maneuvering within a street right-of-way other than an alley;*

Applicant Response:

All parking spaces are located off internal private drive aisles. No movement within a street right-of-way or alley will occur.

- (9) *Drives to off-street parking areas must be designed and constructed to facilitate the flow of traffic, provide maximum safety of traffic access and egress, and maximum safety of pedestrians and vehicular traffic on the site;*

Applicant Response:

The drives within the Plambeck Gardens development have been designed to facilitate two-way traffic flow and provide maximum safety for both vehicular traffic and pedestrians. Detectable warning strips have been included at all internal walkways that meet a drive surface. Additionally, crosswalk striping has been added to walkways that connect across drive aisles to promote safety.

- (10) *On-site drive aisles without parking spaces, which provide access to parking areas with regular spaces or with a mix of regular and sub-compact spaces, must have a minimum width of 22 feet for two-way traffic and 12 feet for one-way traffic; When 90 degree stalls are located on both sides of a drive aisle, a minimum of 24 feet of aisle is required. On-site drive aisles without parking spaces, which provide access to parking areas with only sub-compact*

spaces, must have a minimum width of 20 feet for two-way traffic and 12 feet for one-way traffic;

Applicant Response:

The north and south drive aisles that are double loaded with parking are 26'-0" wide to comply with both the City of Tualatin standards as well as the Tualatin Valley Fire and Rescue width requirements when adjacent to a fire hydrant. The east drive aisle, which is also double loaded with parking is 24'-0" wide to comply with City of Tualatin Standards as well as Tualatin Valley Fire and Rescue drive aisle width when not adjacent to a fire hydrant. The four parking spaces located on the southwest corner of the site near the Community Building are a single loaded drive aisle that is 20'-0" wide to comply with City of Tualatin Standards and Tualatin Valley Fire and Rescue aerial apparatus requirements, as noted in VAR21-0003.

(11) Artificial lighting, must be deflected to not shine or create direct glare on adjacent properties, street right-of-way, a Natural Resource Protection Overlay District, Other Natural Areas, or a Clean Water Services Vegetated Corridor;

Applicant Response:

All exterior site lighting fixtures that have been selected are compliant with The Dark Sky Society lighting standards. A photometric site plan has been included in this application to show that lighting is adequate for the needs of the site and does not deflect, shine, or create glare.

(12) Parking lot landscaping must be provided pursuant to the requirements of TDC 73C.200; and

Applicant Response:

Project will comply with parking lot landscaping requirements. Refer to TDC 73C.200 for responses.

(13) Except for parking to serve residential uses, parking areas adjacent to or within residential zones or adjacent to residential uses must be designed to minimize disturbance of residents.

Applicant Response:

All parking has been designed to minimize disturbance of residents.

TDC 73C.030 – Not Applicable to Project

TDC 73C.040 – Not Applicable to Project

TDC 73C.050 – Bicycle Parking Requirements and Standards

(1) Requirements. Bicycle parking facilities must include:

- (a) Long-term parking that consists of covered, secure stationary racks, lockable enclosures, or rooms in which the bicycle is stored;*
- (i) Long-term bicycle parking facilities may be provided inside a building in suitable secure and accessible locations.*

(2)

Applicant Response:

Long-term bike parking will be covered with secure station rack attachment. All outdoor covered racks will accommodate a bicyclist's lock securing the bicycle frame and both wheels to the rack. All indoor covered racks within units will not include a locking mechanism.

- (b) Short-term parking provided by secure stationary racks (covered or not covered), which accommodate a bicyclist's lock securing the frame and both wheels.*

Applicant Response:

All outdoor racks will accommodate a bicyclist's lock securing the bicycle frame and both wheels to the rack.

- (3) *Standards. Bicycle parking must comply with the following:*
- (a) *Each bicycle parking space must be at least six feet long and two feet wide, with overhead clearance in covered areas must be at least seven feet;*
 - (b) *A five-foot-wide bicycle maneuvering area must be provided beside or between each row of bicycle parking. It must be constructed of concrete, asphalt, or a pervious hard surface such as pavers or grasscrete, and be maintained;*
 - (c) *Access to bicycle parking must be provided by an area at least three feet in width. It must be constructed of concrete, asphalt, or a pervious hard surface such as pavers or grasscrete, and be maintained;*
 - (d) *Bicycle parking areas and facilities must be identified with appropriate signing as specified in the Manual on Uniform Traffic Control Devices (MUTCD) (latest edition). At a minimum, bicycle parking signs must be located at the main entrance and at the location of the bicycle parking facilities;*
 - (e) *Bicycle parking must be located in convenient, secure, and well-lighted locations approved through the Architectural Review process. Lighting, which may be provided, must be deflected to not shine or create glare into street rights-of-way or fish and wildlife habitat areas;*
 - (f) *Required bicycle parking spaces must be provided at no cost to the bicyclist, or with only a nominal charge for key deposits, etc. This does not preclude the operation of private for-profit bicycle parking businesses;*
 - (g) *Bicycle parking may be provided within the public right-of-way in the Core Area Parking District subject to approval of the City Engineer and provided it meets the other requirements for bicycle parking; and*
 - (h) *The City Manager or the Architectural Review Board may approve a form of bicycle parking not specified in these provisions but that meets the needs of long-term and/or short-term parking pursuant to Architectural Review.*

Applicant Response:

The Plambeck Gardens project includes a large variety of bicycle parking opportunities for residents. There will be a total of 206 spaces for bicycle parking throughout the development, all at no cost to the bicyclist.

1-bedroom and 2-bedroom units will have wall mounted bike racks within the unit that will accommodate a 2-foot wide and six-foot tall area for bike parking with a 5-foot wide maneuvering area in front of the rack. 3-bedroom and 4-bedroom units will have access to outdoor covered bike racks in addition to their designated storage area. Each outdoor bike rack can accommodate (2) two bicycle parking spaces. There are covered bike racks provided at all three buildings. In addition to the covered requirements, the project is proposing additional uncovered bike parking areas adjacent to the sport court and play field. All outdoor bike racks will comply with the standards above.

TDC 73C.060 – Not Applicable to Project

TDC 73C.100 – Off-Street Parking Minimum/ Maximum Requirements

- (1) *The following are the minimum and maximum requirements for off-street motor vehicle parking in the City, except these standards do not apply in the Core Area Parking District. The Core Area Parking District standards are in TDC 73C.110.*
- (a) *Residential Uses - Multi-family dwellings in complexes with private internal driveways:*
Minimum Motor Vehicle Parking:
1.0 space per Studio
1.25 space per 1-Bedroom

1.5 space per 2-Bedroom
1.75 space per 3-Bedroom

*Minimum Bicycle Parking & Percentage of Bicycle Parking to be Covered:
1.00 space per unit, 100% covered*

Applicant Response:

As approved in VAR21-003, the project is permitted to have 170 motor vehicle parking spaces. The project consists of 116 total units comprised of 1-bedroom, 2-bedroom, 3-bedroom and 4-bedroom as indicated below. While the code does not state a specific standard for 4-bedroom units, the design team confirmed with Planning staff that the same 3-bedroom standard applies to the 4-bedrooms, as described above in section 73C.010(2)(vi).

Minimum Motor Vehicle Parking Calculation:

1-Bedroom: 54 units x 1.25 = 67.5 stalls
2-Bedroom: 40 units x 1.50 = 60 stalls
3-Bedroom: 16 units x 1.75 = 28 stalls
4-Bedroom: 6 units x 1.75 = 10.5 stalls

Total Required Parking: 166 stalls
Total Provided Parking: 170 stalls

Minimum Bicycle Parking & Percentage of Bicycle Parking to be Covered:

Total Required Covered Parking: 116 Covered Spaces
Total Provided Covered Parking: 166 Covered Spaces

- (b) *Not Applicable to Project.*
- (c) *Not Applicable to Project.*
- (d) *Not Applicable to Project.*
- (e) *Not Applicable to Project.*
- (f) *Not Applicable to Project.*
- (g) *Not Applicable to Project.*
- (2) *Not Applicable to Project.*

TDC 73C.110 – Not Applicable to Project

TDC 73C.120 – Not Applicable to Project

TDC 73C.130 – Parking Lot Driveway and Walkway Minimum Requirements

Parking lot driveways and walkways must comply with the following requirements:

- (1) *Residential Use. Minimum requirements for residential uses:*
 - (a) *Not Applicable to Project.*
 - (b) *Not Applicable to Project.*
 - (c) *Ingress and egress for multi-family residential uses must not be less than the following:*
 - 50-499 Dwelling Units:*
 - 1 driveway at 32-feet wide with a 6-foot walkway, 1 side only; curbs required*
 - 2 driveways at 24-feet wide with a 6-foot walkway, 1 side only; curbs required*

Applicant Response:

The Plambeck Gardens project, with a total of 116 dwelling units includes one driveway at 32-feet wide with a 6-foot walkway on one side only with curbs.

- (2) *Not Applicable to Project.*
- (3) *Not Applicable to Project.*
- (4) *Not Applicable to Project.*
- (5) *Not Applicable to Project.*

(6) *Not Applicable to Project.*

PARKING LOT LANDSCAPING

TDC 73C.200 – Parking Lot Landscaping Standards Purpose and Applicability

- (1) *Purpose. The goals of the off-street parking lot standards are to create shaded areas in parking lots, to reduce glare and heat buildup, provide visual relief within paved parking areas, emphasize circulation patterns, reduce the total number of spaces, reduce the impervious surface area and stormwater runoff, and enhance the visual environment. The design of the off-street parking area must be the responsibility of the developer and should consider visibility of signage, traffic circulation, comfortable pedestrian access, and aesthetics.*
- (2) *Applicability. Off-street parking lot landscaping standards apply to any surface vehicle parking or circulation area. The following standards do not apply to the following residential development: single family detached or attached; duplexes; townhouses; triplexes; quadplexes; or cottage clusters.*

Applicant Response:

The parking lot landscaping is focused on creating shaded areas in parking lots to reduce glare and heat buildup, as well as to provide visual relief within paved parking area. A variety of trees, shrubs and groundcovers are shown on the planting plan to provide seasonal interest, screen parking areas from residential units, insure pedestrian safety and reinforce pedestrian and vehicular circulation. Due to the high water table located on the project site, pervious pavement and/or pavers within the parking area is not permitted by Clean Water Services, and thus the parking lot is comprised of asphalt and concrete surfaces, the surfaces will be treated through the stormwater basins on site.

TDC 73C.210 – Multi-Family Parking Lot Landscaping Requirements

Multi-family residential uses (as defined in TDC 31.060) must comply with the following landscaping requirements for parking lots in all zones:

- (1) *General. Locate landscaping or approved substitute materials in all areas not necessary for vehicular parking and maneuvering.*

Applicant Response:

All areas adjacent to parking stalls and drive aisles that are not designated site walkways have landscaping.

- (2) *Clear Zone. Clear zone must be provided for the driver at ends of on-site drive aisles and at driveway entrances, vertically between a maximum of 30 inches and a minimum of eight feet as measured from the ground level.*

Applicant Response:

Clear zones have been provided throughout the drive aisles and driveway entrances.

- (3) *Setback. Minimum 10-foot landscape setback must be provided between the property lines and parking areas and must comply with the following:*
 - (a) *Must be planted with deciduous trees an average of not more than 30 feet on center and shrubs at least 30 inches in height which provide screening of vehicular headlights;*
 - (b) *Native trees and shrubs are encouraged;*

Applicant Response:

The parking lot wraps the north, east and south sides of the site. All three sides provide a minimum of a 10-foot landscaping setback with a minimum deciduous tree spacing of 30-feet maximum and shrubs at least 30 inches in height. Refer to drawings for notes on plant selection for notes on drought tolerant and native species.

- (4) *Perimeter. Minimum five feet in width in all off-street parking and vehicular circulation areas, including loading areas and must comply with the following:*
- (a) *Deciduous trees located not more than 30 feet apart on average as measured on center;*
 - (b) *Shrubs or ground cover, planted so as to achieve 90 percent coverage within three years;*
 - (c) *Plantings which reach a mature height of 30 inches in three years which provide screening of vehicular headlights year round;*
 - (d) *Native trees and shrubs are encouraged;*
 - (e) *Not Applicable to Project.*

Applicant Response:

All off-street parking and vehicular circulation areas will comply with the requirements above. Refer to drawings for notes on plant selection for notes on drought tolerant and native species.

- (5) *Transition. Minimum 10-foot landscaped transition area between parking and vehicle circulation areas and buildings and shared outdoor areas and must comply with the following:*
- (a) *Deciduous shade trees located at not less than 30 feet on center must be located in this transition area;*
 - (b) *Groundcover plants mixed with low shrubs must completely cover the remainder of this area within three years;*
 - (c) *Native trees and shrubs are encouraged;*
 - (d) *Not Applicable to Project.*

Applicant Response:

All transition areas between parking and vehicle circulation areas and buildings will be landscaped with a sidewalk and planted area, including deciduous trees located not less than 30-feet on center and groundcover plants mixed with low shrubs. Refer to drawings for notes on plant selection including drought tolerant and native species.

The project will also comply with the 30-foot maximum distance between drive aisle and face of building per Tualatin Valley Fire and Rescue requirements for aerial access route.

- (6) *Landscape Island. Minimum 25 square feet per parking stall must be improved with landscape island areas and must comply with the following:*
- (a) *May be lower than the surrounding parking surface to allow them to receive stormwater run-off and function as water quality facilities as well as parking lot landscaping;*
 - (b) *Must be protected from vehicles by curbs, but the curbs may have spaces to allow drainage into the islands;*
 - (c) *Landscape separation required for every eight continuous spaces in a row;*
 - (d) *Must be planted with one deciduous shade trees for every four parking spaces. Required trees must be evenly dispersed throughout the parking lot;*
 - (e) *Must be planted with groundcover or shrubs;*
 - (f) *Native plant materials are encouraged;*
 - (g) *Landscape island areas with trees must be a minimum of five feet in width (from inside of curb to curb);*
 - (h) *Required plant material in landscape islands must achieve 90 percent coverage within three years; and*

Applicant Response:

There is a landscaped island between all continuous parking stalls that is protected by curbs. The project provides a landscape island for every eight continuous stalls at a minimum. The islands are distributed throughout the parking lot and include a deciduous tree for every four parking spaces. The 170 parking stalls on site requires a total of 43 trees (1 tree for every 4 stalls). The project is providing the 43 trees. Remaining landscape islands are planted with

groundcover and shrubs complying with the requirements above. Refer to drawings for notes on plant selection for notes on drought tolerant and native species.

With a total of 170 parking stalls, the project is required to provide a total of 4,250 square feet of landscape island areas (170 parking stalls x 25sf). The proposed project includes 5,441 square feet of total landscape island areas. The project has one parking island that will function as an accessible sidewalk/ path to connect parking stalls on the east side of the property. In place of planting at the pathway island, two nearby landscape islands have been widened to provide additional landscape area. Refer to drawing sheet A1.02 for landscaping island diagram.

TDC 73C.220 – Not Applicable to Project

TDC 73C.230 – Not Applicable to Project

TDC 73C.240 – Not Applicable to Project

TDC 73C.250 – Not Applicable to Project

TDC: CHAPTER 73D – WASTE AND RECYCLABLES MANAGEMENT STANDARDS

TDC 73D.010 – Applicability and Objectives

- (1) *Applicability. The requirements of this Chapter apply to all new or expanded:*
- (a) *Common wall residential developments containing five or more units;*

Applicant Response:

This project consists of 116 units of multi-family and is thus subject to this chapter.

- (2) *Objectives. Mixed solid waste and source separated recyclable storage areas should be designed to the maximum extent practicable to:*
- (a) *Screen elements such as garbage and recycling containers from view;*
 - (b) *Ensure storage areas are centrally located and easy to use;*
 - (c) *Meet dimensional and access requirements for haulers;*
 - (d) *Designed to mitigate the visual impacts of storage areas;*
 - (e) *Provide adequate storage for mixed solid waste and source separated recyclables; and*
 - (f) *Improve the efficiency of collection of mixed solid waste and source separated recyclables.*

Applicant Response:

This project consists of two waste and recyclable management areas on site that meet the objectives outlined in this code.

TDC 73D.020 – Design Methods

An applicant required to provide mixed solid waste and source separated recyclables storage areas must comply with one of following methods: [City code text omitted for brevity]

Applicant Response:

The project is following the Minimum Standards Method.

TDC 73D.030 – Minimum Standards Method

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

- (1) *The size and location of the storage area(s) must be indicated on the site plan. Requirements are based on an assumed storage area height of four feet for mixed solid waste and source separated recyclables. Vertical storage higher than four feet, but no higher than seven feet may be used to accommodate the same volume of storage in a reduced floor space (potential reduction of 43 percent of specific requirements). Where vertical or stacked storage is proposed, submitted plans must include drawings to illustrate the layout of the storage area and dimensions for containers.*
- (2) *The storage area requirement is based on uses. If a building has more than one use and that use occupies 20 percent or less of the gross leasable area (GLA) of the building, the GLA occupied by that use must be counted toward the floor area of the predominant use(s). If a building has more than one use and that use occupies more than 20 percent of the GLA of the building, then the storage area requirement for the whole building must be the sum of the area of each use. Minimum storage area requirements by use is as follows:*
 - (b) *Common wall residential greater than ten units must provide 50 square feet plus an additional five square feet per unit above ten.*
- (3) *Mixed solid waste and source separated recyclables storage areas for multiple tenants on a single site may be combined and shared.*

Applicant Response:

The project consists of 116 total units.

Total Trash Enclosure Area Required

= 50 square feet + (5 square feet x (116 units – 10 units))

Total Trash Enclosure Area Required = 580 square feet.

Total Trash Enclosure Area Provided = 608 square feet.

TDC 73D.040 – Not Applicable to Project

TDC 73D.050 – Not Applicable to Project

TDC 73D.060 – Not Applicable to Project

TDC 73D.070 – Location, Design and Access Standards

- (1) *Location Standards*
 - (a) *The storage area for source separated recyclables may be collocated with the storage area for mixed solid waste.*
 - (b) *Storage area space requirements can be satisfied with a single location or multiple locations, and can combine both interior and exterior locations.*
 - (c) *Exterior storage areas must:*
 - (i) *Be located in central and visible locations on the site to enhance security for users;*
 - (ii) *Be located in a parking area; and*
 - (iii) *Not be located within a required front yard setback or in a yard adjacent to a public or private street.*

Applicant Response:

The project includes two trash enclosures. One on the north side of the site and the other on the south side of the site, which are both located in visible areas within the parking lot and not within the front yard setback or in a yard adjacent to a public or private street.

- (2) *Design Standards*
 - (a) *The dimensions of the storage area must accommodate containers consistent with current methods of local collection at time of construction or alteration.*
 - (b) *Indoor and outdoor storage areas must comply with Oregon Building and Fire Code requirements.*
 - (c) *Exterior storage areas must be enclosed by a sight obscuring fence or wall at least six feet in height.*

- (d) *Evergreen plants must be placed around the enclosure walls, excluding the gate or entrance openings for common wall, commercial, and institutional developments.*
- (e) *Gate openings for haulers must be a minimum of ten feet wide and must be capable of being secured in a closed and open position.*
- (f) *Horizontal clearance must be a minimum of ten feet and a vertical clearance of eight feet is required if the storage area is covered.*
- (g) *A separate pedestrian access must also be provided in common wall, commercial, and institutional developments.*
- (h) *Exterior storage areas must have either a concrete or asphalt floor surface.*
- (i) *Storage areas and containers must be clearly labeled to indicate the type of material accepted.*

Applicant Response:

The Plambeck Gardens project team has been in correspondence with Republic Services, who will be the trash hauler for the project. The gate approach and turn-arounds provided on the plans have been designed to accommodate Republic Service's front-loading trucks. Additionally, Republic Services requires a 20-foot width opening to accommodate different trash container sizes, which has been accounted for in the design. The trash enclosures will be comprised of concrete masonry units and will be a minimum of 6-feet in height and will not have a cover. In addition to the 20-foot wide trash hauler gate, the design includes a separate pedestrian access point. The ground material will be concrete and containers will be labeled. Evergreen shrubs are planted around the enclosure walls.

(3) Access Standards

- (a) *Storage areas must be accessible to users at convenient times of the day, and to hauler personnel on the day and approximate time they are scheduled to provide hauler service.*
- (b) *Storage areas must be designed to be easily accessible to hauler trucks and equipment, considering paving, grade, gate clearance and vehicle access.*
- (c) *Storage areas must be accessible to hauler trucks without requiring backing out of a driveway onto a public street. If only a single access point is available to the storage area, adequate turning radius must be provided to allow hauler trucks to safely exit the site in a forward motion.*
- (d) *Storage areas must located so that pedestrian and vehicular traffic movement are not obstructed on site or on public streets adjacent to the site.*
- (e) *The following is an exception to the access standard:*
 - (i) *Access may be limited for security reasons.*

Applicant Response:

The trash enclosures on site will comply with all the access standards.

TDC: CHAPTER 74 – PUBLIC IMPROVEMENT REQUIREMENTS

GENERAL

TDC 74.010 – Purpose

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

Applicant Response:

The Plambeck Gardens project is proposing a new right-of-way design that will improve the existing conditions to meet the requirements of both the City of Tualatin and Washington County.

IMPROVEMENTS

TDC 74.110 – Not Applicable to Project

TDC 74.120 – Public Improvements

- (1) *Except as specially provided, all public improvements must be installed at the expense of the applicant. All public improvements installed by the applicant must be constructed and guaranteed as to workmanship and material as required by the Public Works Construction Code prior to acceptance by the City. Work must not be undertaken on any public improvement until after the construction plans have been approved by the City Manager and a Public Works Permit issued and the required fees paid.*
- (2) *In accordance with the Tualatin Basin Program for fish and wildlife habitat the City intends to minimize or eliminate the negative impacts of public streets by modifying right-of-way widths and street improvements when appropriate. The City Manager is authorized to modify right-of-way widths and street improvements to address the negative impacts on fish and wildlife habitat.*

Applicant Response:

The right-of-way will be constructed at the expense of the Plambeck Gardens development. All right-of-way work will be in conformance with both the City of Tualatin and Washington County standards and will be submitted to both jurisdictions for approval prior to construction.

TDC 74.130 – Private Improvements

All private improvements must be installed at the expense of the applicant. The property owner must retain maintenance responsibilities over all private improvements.

Applicant Response:

All private improvements will comply.

TDC 74.140 – Construction Timing

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

Applicant Response:

All public and private improvements will be inspected and approved by City of Tualatin and Washington County Inspectors.

RIGHT-OF-WAY

TDC 74.210 – Minimum Street Right-or-Way Widths

The width of streets in feet must not be less than the width required to accommodate a street improvement needed to mitigate the impact of a proposed development. In cases where a street is required to be improved according to the standards of the TDC, the width of the right-of-way must not be less than the minimums indicated in TDC Chapter 74, Public Improvement Requirements, Figures 74-2A through 74-2G.

- (1) *Not Applicable to Project.*
- (2) *For development applications other than subdivisions and partitions, wherever existing or future streets adjacent to property proposed for development are of inadequate right-of-way width, the additional right-of-way necessary to comply with TDC Chapter 74, Public Improvement Requirements, Figures 74-2A through 74-2G must be dedicated to the City for*

use by the public prior to issuance of any building permit for the proposed development. This right-of-way dedication must be for the full width of the property abutting the roadway and, if required by the City Manager, additional dedications must be provided for slope and utility easements if deemed necessary.

- (3) Not Applicable to Project.*
- (4) Not Applicable to Project.*
- (5) Not Applicable to Project.*
- (6) Not Applicable to Project.*

Applicant Response:

Boones Ferry Road is a Washington County Major Arterial road. Therefore Figure 74-2A from the TDC is the applicable figure for the right-of-way design. The project will dedicate 2.00 feet of right -of-way (ROW) per Washington County requirements to provide 45-feet of dedicated ROW from the centerline of a major arterial. The Plambeck Gardens project is proposing a 6-foot wide planter strip and a 6-foot wide concrete sidewalk. Where Washington County streetlights exist in the pedestrian throughway, the sidewalk will meander to be curb tight for a short sections in order to protect lighting locations. Refer to application drawings for proposed meandering sidewalk and planter strip.

TDC 74.220 – Not Applicable to Project

EASEMENTS & TRACTS

TDC 74.310 – Not Applicable to Project

TDC 74.320 – Not Applicable to Project

TDC 74.330 – Utility Easements

- (1) Utility easements for water, sanitary sewer and storm drainage facilities, telephone, television cable, gas, electric lines and other public utilities must be granted to the City.*
- (2) Not Applicable to Project.*
- (3) Not Applicable to Project.*
- (4) For development applications other than subdivisions and partitions, and for both on-site and off-site easement areas, a utility easement must be granted to the City; building permits must not be issued for the development prior to acceptance of the easement by the City. The City may elect to exercise eminent domain and condemn necessary off-site public utility easements at the applicant's request and expense. The City Council must determine when condemnation proceedings are to be used.*
- (5) The width of the public utility easement must meet the requirements of the Public Works Construction Code. All subdivisions and partitions must have a 6-foot public utility easement adjacent to the street and a 5-foot public utility easement adjacent to all side and rear lot lines. Other easements may be required as determined by the City Manager.*

Applicant Response:

The project is proposing an 8-foot wide Public Utility Easement along Boones Ferry Road. This Public Utility Easement increases to a width of 18-feet at the location where the project's water and fire vaults are located.

TDC 74.340 – Not Applicable to Project

TDC 74.350 – Not Applicable to Project

TDC 74.410 – Not Applicable to Project

TDC 74.420 – Street Improvements

[City code text omitted for brevity]

Applicant Response:

Boones Ferry Road is a Washington County Road that is currently constructed to Washington County Standards. The existing street and curb will remain in place, with the exception of a new rolled curb at the emergency access location. Boones Ferry Road will be repaired per Washington County standards to the nearest lane line after the water main extension is completed from Norwood Road to the Plambeck Gardens and Autumn Sunrise development.

TDC 74.425 – Street Design Standards

[City code text omitted for brevity]

Applicant Response:

Boones Ferry Road is a Washington County Road that is currently constructed to Washington County Standards. The existing street and curb will remain in place, with the exception of a new rolled curb at the emergency access location. Boones Ferry Road will be repaired per Washington County standards to the nearest lane line after the water main extension is completed from Norwood Road to the Plambeck Gardens and Autumn Sunrise development.

TDC 74.730 – Not Applicable to Project

TDC 74.440 – Streets, Traffic Study Required

[City code text omitted for brevity]

Applicant Response:

The Plambeck Gardens project team has completed a Traffic Analysis Report that is attached in the supplemental information section of this application. The Traffic Analysis Report includes the requirements of this section, and includes the information from the Autumn Sunrise Traffic Analysis Report as well.

TDC 74.450 – Bikeways and Pedestrian Paths

- (1) *Where proposed development abuts or contains an existing or proposed bikeway, pedestrian path, or multi-use path, as set forth in TDC Chapter 11, Transportation Figure 11-4, the City may require that a bikeway, pedestrian path, or multi-use path be constructed, and an easement or dedication provided to the City.*
- (2) *Where required, bikeways and pedestrian paths must be provided as follows:*
 - (a) *Bike and pedestrian paths must be constructed and surfaced in accordance with the Public Works Construction Code.*
 - (b) *The applicant must install the striping and signing of the bike lanes and shared roadway facilities, where designated.*

Applicant Response:

Boones Ferry Road has an existing bikeway located on both sides of the street, which will be maintained. The Plambeck Gardens project will be replacing the surfacing and striping of the bike lane after the watermain extension is completed from Norwood Road to the Plambeck Gardens and Autumn Sunrise developments. The surfacing and striping will be completed to Washington County standards, as Boones Ferry Road is a Washington County Road.

TDC 74.460 – Accessways in Residential, Commercial and Industrial Subdivision and Partitions

- (1) *Accessways must be constructed by the applicant, dedicated to the City on the final residential, commercial or industrial subdivision or partition plat, and accepted by the City.*
- (2) *Not Applicable to Project.*
- (3) *Not Applicable to Project.*
- (4) *Accessways must be as short as possible, but in no case more than 600 feet in length.*
- (5) *Accessways must be as straight as possible to provide visibility from one end to the other.*

- (6) *Accessways must be located and improved within a right-of-way or tract of no less than eight feet.*
- (7) *Where possible, accessways must be combined with utility easements.*
- (8) *Accessways must be constructed in accordance with the Public Works Construction Code.*
- (9) *Curb ramps must be provided wherever the accessway crosses a curb and must be constructed in accordance with the Public Works Construction Code.*
- (10) *The Federal Americans With Disabilities Act (ADA) applies to development in the City of Tualatin. Accessways must comply with the Oregon Structural Specialty Code's (OSSC) accessibility standards.*
- (11) *Fences and gates which prevent pedestrian and bike access must not be allowed at the entrance to or exit from any accessway.*
- (12) *Final design and location of accessways must be approved by the City.*
- (13) *Not Applicable to Project.*

Applicant Response:

The Plambeck Gardens project is providing an Accessway for the project that is a minimum of 8-feet wide and approximately 53-feet in length. It will be constructed of concrete and located in the public utility easement. It connects the new proposed public sidewalk along Boones Ferry Road to the project's internal walkways. The accessway will not be gated. It will have handrails on both sides due to site sloping conditions and will be ADA compliant, with slopes less than 8.33%.

TDC 74.470 – Street Lights

- (1) *Street light poles and luminaries must be installed in accordance with the Public Works Construction Code.*
- (2) *The applicant must submit a street lighting plan for all interior and exterior streets on the proposed development site prior to issuance of a Public Works Permit.*

Applicant Response:

The Plambeck Gardens development is proposing to leave the existing new Washington County street lights in place in the right-of-way. The lighting analysis of the existing street lights is included in the drawings below on sheet L1.01.

TDC 74.475 – Not Applicable to Project

TDC 74.480 – Street Signs

- (1) *Not Applicable to Project.*
- (2) *Stop signs and other traffic control signs (speed limit, dead-end, etc.) may be required by the City.*

Applicant Response:

There will be a stop sign and stop bar marking at the Tract L to H-Street connection at the Autumn Sunrise property.

There is an existing "Right Lane Must Turn Right" sign located on the Horizon Property frontage along SW Boones Ferry Road where the new Plambeck Gardens right-of-way sidewalk will need to connect to the existing sidewalk. The Plambeck Gardens project team is proposing moving this sign further south within the landscaping strip on Plambeck Gardens frontage to allow the sidewalks to connect.

- (3) *Not Applicable to Project.*

TDC 74.845 – Street Trees

- (1) *Not Applicable to Project.*
- (2) *In nonresidential subdivisions and partitions street trees must be planted by the owners of the individual lots as development occurs.*
- (3) *The Street Tree Ordinance specifies the species of tree which is to be planted and the spacing between trees.*

Applicant Response:

There are no existing street trees on the project site. The street trees proposed along Boones Ferry Road will be planted as part the Plambeck Gardens development by the owner and will be compliant with both the City of Tualatin and Washington County standards for species and spacing.

UTILITIES

TDC 74.610 – Water Service

- (1) *Water lines must be installed to serve each property in accordance with the Public Works Construction Code. Water line construction plans must be submitted to the City Manager for review and approval prior to construction.*
- (2) *If there are undeveloped properties adjacent to the subject site, public water lines must be extended by the applicant to the common boundary line of these properties. The lines must be sized to provide service to future development, in accordance with the City's Water System Master Plan, TDC Chapter 12.*
- (3) *As set forth is TDC Chapter 12, Water Service, the City has three water service levels. All development applicants must be required to connect the proposed development site to the service level in which the development site is located. If the development site is located on a boundary line between two service levels the applicant must be required to connect to the service level with the higher reservoir elevation. The applicant may also be required to install or provide pressure reducing valves to supply appropriate water pressure to the properties in the proposed development site.*

Applicant Response:

The project will connect to the existing water service at Norwood Road and bring a new 12" water main down Boones Ferry Road to serve the Plambeck Gardens Site and Autumn Sunrise Development. Water utility plans will be submitted to both the City of Tualatin and Washington County for approval prior to construction. Refer to drawings provided in this application for additional information.

TDC 74.620 – Sanitary Sewer Service

- (1) *Sanitary sewer lines must be installed to serve each property in accordance with the Public Works Construction Code. Sanitary sewer construction plans and calculations must be submitted to the City Manager for review and approval prior to construction.*
- (2) *If there are undeveloped properties adjacent to the proposed development site which can be served by the gravity sewer system on the proposed development site, the applicant must extend public sanitary sewer lines to the common boundary line with these properties. The lines must be sized to convey flows to include all future development from all up stream areas that can be expected to drain through the lines on the site, in accordance with the City's Sanitary Sewer System Master Plan, TDC Chapter 13.*

Applicant Response:

The project will consist of a gravity fed sanitary sewer system for Buildings A & B that will connect to the new sanitary sewer line in the Autumn Sunrise development to the south of the project site. The connection will occur where the Plambeck Gardens driveway meets the Autumn Sunrise Tract L. Building C will flow by gravity to a sanitary lift station, located on the

east side of the site between Building A & Building B. From the lift station, the line will again flow by gravity to the connection point at the Plambeck Gardens driveway and Tract L connection. Sanitary sewer drawings and calculations will be submitted to the City of Tualatin and Clean Water Services for approval prior to construction. Refer to drawings provided in this application for additional information.

Community Partners for Affordable Housing and Horizon Community Church are preparing an easement for the Plambeck Gardens' sanitary sewer to cross the Horizon Community Church property. At the time this application is submitted, a signed Letter of Intent has been completed and is attached in the Supplemental Information section of this application.

TDC 74.630 – Storm Drainage System

- (1) *Storm drainage lines must be installed to serve each property in accordance with City standards and Clean Water Services standards. Storm drainage construction plans and calculations must be submitted to the City Manager for review and approval prior to construction.*
- (2) *The storm drainage calculations must confirm that adequate capacity exists to serve the site. The discharge from the development must be analyzed in accordance with the City's Storm and Surface Water Regulations and Clean Water Services standards.*
- (3) *If there are undeveloped properties adjacent to the proposed development site which can be served by the storm drainage system on the proposed development site, the applicant must extend storm drainage lines to the common boundary line with these properties. The lines must be sized to convey expected flows to include all future development from all up stream areas that will drain through the lines on the site, in accordance with the adopted Stormwater Master Plan.*

Applicant Response:

The project consists of two stormwater basins on site sized to accommodate impervious area on the Plambeck Gardens site, as well as Tract L on the Autumn Sunrise development. The Stormwater Report is included in this application in the supplemental information section. The project stormwater plans and calculations will be submitted to the City of Tualatin and Clean Water Services for approval prior to construction. Refer to drawings and Stormwater Report provided in this application for additional information.

TDC 74.640 – Grading

- (1) *Development sites must be graded to minimize the impact of storm water runoff onto adjacent properties and to allow adjacent properties to drain as they did before the new development.*
- (2) *A development applicant must submit a grading plan showing that all lots in all portions of the development will be served by gravity drainage from the building crawl spaces; and that this development will not affect the drainage on adjacent properties. The City Manager may require the applicant to remove all excess material from the development site.*

Applicant Response:

The project has been graded to minimize the impact of stormwater runoff onto adjacent properties and to allow adjacent properties to drain as they did before the new development. The grading plan has been included as part of this application.

TDC 74.650 – Water Quality, Storm Water Detention and Erosion Control

- (1) *All Applications. The applicant must comply with the water quality, stormwater detention, and erosion control requirements in Tualatin Municipal Code Chapter 3-5 (Soil Erosion, Surface Water Management, Water Quality Facilities, and Building and Sewers) and Clean Water Services standards.*
- (2) *Not Applicable to Project.*

- (3) *All Development, Except Subdivisions and Partitions. Prior to issuance of any building permit, an applicant for any development, except Subdivisions and Partitions, must:*
 - (a) *Submit a stormwater facilities design with calculations to satisfy the requirements of the Tualatin Municipal Code Chapter 3-5 (Soil Erosion, Surface Water Management, Water Quality Facilities, and Building And Sewers);*
 - (b) *Obtain a Stormwater Connection Permit from Clean Water Services; and*
 - (c) *Either construct a permanent on-site water quality facility and stormwater detention facility; or enter into an agreement with the City, as provided in TMC 35-390, recorded against the property, to guarantee construction of a permanent on-site water quality facility and stormwater detention facility.*
- (4) *On-Site Private and Regional Non-Residential Facilities. For on-site private and regional non-residential public facilities, the applicant must:*
 - (a) *Enter into a stormwater facility agreement, as provided in TMC 3-5-390, recorded against the property. The stormwater facility agreement will include an operation and maintenance plan, provided by the City and consistent with Clean Water Services requirements, for the water quality facility.*
 - (b) *Submit an erosion control plan prior to issuance of a Public Works Permit consistent with TMC 3-5 and Clean Water Services standards. No construction or disturbing of the site must occur until the erosion control plan is approved by the City and the required measures are in place and approved by the City.*

Applicant Response

The Plambeck Gardens site will comply with the water quality, stormwater detention and erosion control requirements in the Tualatin Municipal Code Chapters 3-5 in addition to the Clean Water Services Standards and the U.S. Department of Housing and Urban Development (HUD) standards. The project will submit stormwater drawings and calculations in addition to erosion control plans to the City of Tualatin and Clean Water Services for approval prior to construction. The project has received a service provider letter from Clean Water Services, which is included in this application in the supplemental information section. The project will construct two on-site water quality/ stormwater detention facilities. The owner will enter into a stormwater facility agreement that includes an operation and maintenance plan, provided by the City and consistent with Clean Water Services requirements.

TDC 74.660 – Underground

- (1) *All utility lines including, but not limited to, those required for gas, electric, communication, lighting and cable television services and related facilities must be placed underground. Surface-mounted transformers, surface-mounted connection boxes and meter cabinets may be placed above ground. Temporary utility service facilities, high capacity electric and communication feeder lines, and utility transmission lines operating at 50,000 volts or above may be placed above ground. The applicant must make all necessary arrangements with all utility companies to provide the underground services. The City reserves the right to approve the location of all surface-mounted transformers.*
- (2) *Any existing overhead utilities may not be upgraded to serve any proposed development. If existing overhead utilities are not adequate to serve the proposed development, the applicant must, at their own expense, provide an underground system. The applicant must be responsible for obtaining any off-site deeds and/or easements necessary to provide utility service to this site; the deeds and/or easements must be submitted to the City Manager for acceptance by the City prior to issuance of the Public Works Permit.*

Applicant Response:

There are three existing utility poles located on the property frontage along SW Boones Ferry Road. Per conversations with PGE, the pole on the south end of the site is a structural pole for the power lines on the west side of SW Boones Ferry Road to the south of the project site, and will need to remain in place to support those lines or if required to be removed will still require a two new poles to be placed to support the existing lines. This change would result

in more power poles along Boones Ferry Road and would require acquiring or obtaining an easement with the properties on the west side of Boones Ferry Road.

The pole in the middle of the site currently provides power to the two single family homes on site. This pole and the overhead lines will be removed as part of the Plambeck Gardens development. After further inspection of this pole, PGE determined that this pole is also structural. If removed, a new pole will still be required to support the power lines on the west side of Boones Ferry Road. This pole will need to be relocated due to it's current location within the Plambeck Gardens site as it conflicts with the proposed design.

The pole located on the north end of the property is also structural for the power lines on the east side of SW Boones Ferry Road to the north and will need to remain in place to support those lines. If required to underground or relocate this pole, this change would result in a greater number of poles along Boones Ferry Road and would require acquiring or obtaining an easement with property to the north of the site.

Based on PGE's assessment, removing the 3 structural power poles along the proposed project frontage would require a need for 5 new poles, resulting in a higher number of power poles along Boones Ferry Road. Therefore, the project team proposes to leave the north and south poles in their current location and work with PGE to relocate the middle pole to a location that works with the proposed site plan and the support requirements from PGE, as the addition of 2 more power poles along Boones Ferry Road is not in keeping with the intent of undergrounding power.

The Plambeck Gardens project will either attain power underground from the south if the Autumn Sunrise development provides underground power in their public utility easement as part of their Phase 3 construction or will connect to the structural poles on the north and south ends of the site via an underground feeder line from the pole to the transformers. The project includes two surface-mounted transformers.

TDC 74.670 – Existing Structures

- (1) *Any existing structures requested to be retained by the applicant on a proposed development site must be connected to all available City utilities at the expense of the applicant.*
- (2) *The applicant must convert any existing overhead utilities serving existing structures to underground utilities, at the expense of the applicant.*
- (3) *The applicant must be responsible for continuing all required street improvements adjacent to the existing structure, within the boundaries of the proposed development site.*

Applicant Response:

All existing structures on site will be demolished as part of the Plambeck Gardens development. There is an existing well house and pump house on site that will be removed unless it is determined to be feasible for irrigation.

TDC 74.700 – Removal, Destruction or Injury of Trees

It is unlawful for a person, without a written permit from the City Manager, to remove, destroy, break or injure a tree, plant or shrub, that is planted or growing in or upon a public right-of-way within the City, or cause, authorize, or procure a person to do so, authorize or procure a person to injure, misuse or remove a device set for the protection of any tree, in or upon a public right-of-way.

Applicant Response:

There are currently no trees within the public right-of-way along the Plambeck Gardens property.

TDC 74.705 – Not Applicable to Project

TDC 74.706 – Not Applicable to Project

TDC 74.707 – Not Applicable to Project

TDC 74.708 – Not Applicable to Project

TDC 74.710 – Open Ground

When impervious material or substance is laid down or placed in or upon a public right-of-way near a tree, at least nine square feet of open ground for a tree up to three inches in diameter must be provided about the base of the trunk of each tree.

Applicant Response:

All proposed new street trees adjacent to the sidewalk in the public right-of-way will have at least nine square feet of open ground around the tree. Refer to the drawings for caliper size proposed for the new trees.

TDC 74.715 – Attachments to Trees

It is unlawful for a person to attach or keep attached a rope, wire, chain, sign or other device to a tree, plant or shrub in or upon a public right-of-way or to the guard or stake intended for the protection of such tree, except as a support for a tree, plant or shrub.

Applicant Response:

The only items that will be attached to the new public right-of-way trees will be for tree staking during the initial plant establishment period.

TDC 74.720 – Not Applicable to Project

TDC 74.725 – Maintenance Responsibilities

Trees, shrubs or plants standing in or upon a public right-of-way, on public or private grounds that have branches projecting into the public street or sidewalk must be kept trimmed by the owner of the property adjacent to or in front of where such trees, shrubs or plants are growing so that:

- (1) The lowest branches are not less than 12 feet above the surface of the street, and are not be less than 14 feet above the surface of streets designated as state highways.*
- (2) The lowest branches are not less than eight feet above the surface of a sidewalk or footpath.*
- (3) A plant, tree, bush or shrub must not be more than 24 inches in height in the triangular area at the street or highway corner of a corner lot, or the alley-street intersection of a lot, such an area defined by a line across the corner between the points on the street right-of-way line measured ten feet back from the corner, and extending the line to the street curbs or, if there are no curbs, then to that portion of the street or alley used for vehicular traffic.*
- (4) Newly planted trees may remain untrimmed if they do not interfere with street traffic or persons using the sidewalk or obstruct the light of a street electric lamp.*
- (5) Maintenance responsibilities of the property owner include repair and upkeep of the sidewalk in accordance with the City Sidewalk Maintenance Ordinance.*

Applicant Response:

The owner will maintain all plantings and sidewalks within the site property lines as well as the right-of-way in front of the property site.

TDC 74.730 – Not Applicable to Project

TDC 74.735 – Not Applicable to Project

TDC 74.740 – Prohibited Trees

It is unlawful for a person to plant a tree within the right-of-way of the City of Tualatin that is not in conformance with City standards, including Table 74-1. Any tree planted subsequent to adoption of this Chapter not in compliance with City standards, including Table 74-1, must be removed at the expense of the property owner.

Applicant Response:

The proposed right-of-way design will conform to City standards for street trees and will be submitted to both the City of Tualatin and Washington County for approval prior to construction.

TDC 74.745 – Cutting and Planting Specifications

The following regulations are established for the planting, trimming and care of trees in or upon the public right-of-way of the City.

- (1) When trees are cut down, the stump must be removed to a depth of six inches below the surface of the ground or finish grade of the street, whichever is of greater depth.*
- (2) Trees must be planted in accordance with City standards, Table 74-1, except when a greater density is allowed under a special permit from the City Manager.*

Applicant Response:

There are no existing street trees along the property frontage in the right-of-way. All new proposed street trees will be planted in conformance with City of Tualatin and Washington County standards.

TDC 74.750 – Not Applicable to Project

TDC 74.755 – Not Applicable to Project

TDC 74.760 – Not Applicable to Project

TDC 74.765 – Street Tree Species and Planting Locations

All trees, plants or shrubs planted in the right-of-way of the City must conform in species and location and in accordance with the street tree plan and City standards, including Table 74-1. If the City Manager determines that none of the species in City standards, including Table 74-1 is appropriate or finds appropriate a species not listed, the City Manager may substitute an unlisted species.

Applicant Response:

All new proposed street trees will be planted in conformance with City of Tualatin and Washington County standards. Refer to drawings for proposed species and spacing.

TDC: CHAPTER 75 - ACCESS MANAGEMENT

TDC 75.010 – Purpose

The purpose of this chapter is to promote the development of safe, convenient and economic transportation systems and to preserve the safety and capacity of the street system by limiting

conflicts resulting from uncontrolled driveway access, street intersections, and turning movements while providing for appropriate access for all properties.

Applicant Response:

The Plambeck Gardens project will comply with the requirements of this chapter.

TDC 75.020 – Permit for New Driveway Approach

- (1) *Applicability. A driveway approach permit must be obtained prior to constructing, relocating, reconstructing, enlarging, or altering any driveway approach.*

Applicant Response:

The project will obtain a permit prior to construction.

- (2) *Not Applicable to Project.*
(3) *Procedure Type. A Driveway Approach Permit is processed as a Type II procedure under TDC 32.220 (Type II).*

Applicant Response:

The project is seeking approval on the driveway approach as part of this Type III application.

- (4) *Submittal Requirements. In addition to the application materials required by TDC 32.140 (Application Submittal), the following application materials are also required:*
(a) *A site plan, of a size and form and in the number of copies meeting the standards established by the City Manager, containing the following information: [City code text omitted for brevity]*
(b) *Identification of the uses or activities served, or proposed to be served, by the driveway approach; and*
(c) *Any other information, as determined by the City Manager, which may be required to adequately review and analyze the proposed driveway approach for conformance with the applicable criteria.*

Applicant Response:

This application includes the applicable submittal requirements, including a site plan and Traffic Analysis Report.

- (5) *Criteria. A Driveway Approach Permit must be granted if:*
(a) *The proposed driveway approach meets the standards of this Chapter and the Public Works Construction Code;*
(b) *No site conditions prevent placing the driveway approach in the required location;*
(c) *The number of driveway approaches onto an arterial are minimized;*
(d) *The proposed driveway approach, where possible:*
(i) *Is shared with an adjacent property; or*
(ii) *Takes access from the lowest classification of street abutting the property;*
(e) *The proposed driveway approach meets vision clearance standards;*
(f) *The proposed driveway approach does not create traffic hazards and provides for safe turning movements and access;*
(g) *The proposed driveway approach does not result in significant adverse impacts to the vicinity;*
(h) *The proposed driveway approach minimizes impact to the functionality of adjacent streets and intersections; and*
(i) *The proposed driveway approach balances the adverse impacts to residentially zoned property and the functionality of adjacent streets.*

Applicant Response:

The proposed driveway will meet the standards of this chapter and the Public Works Construction Code. The driveway design will be submitted to the City of Tualatin for approval prior to any construction.

- (6) *Effective Date. The effective date of a Driveway Approach Permit approval is the date the notice of decision is mailed.*

Applicant Response:

Procedure will be followed.

- (7) *Permit Expiration. A Driveway Approach Permit approval expires one year from the effective date, unless the driveway approach is constructed within the one-year period in accordance with the approval decision and City standards.*

Applicant Response:

Procedure will be followed.

TDC 75.030 – Driveway Approach Closure

- (1) *The City Manager may require the closure of a driveway approach where: [City code text omitted for brevity]*

Applicant Response

Public street improvements are being constructed on Boones Ferry Road, which is an Access Limited Roadway, so the project is proposing to close the two existing driveways that currently serve the existing single family homes on site to be demolished.

- (2) *Notice. Notice of driveway approach closure must be given in writing to the property owner and any affected tenants stating the grounds for closure, the date upon which the closure becomes effective, and the right to appeal.*

Applicant Response:

Procedure will be followed.

- (3) *Appeals. Any person entitled to notice under subsection (2) of this section may appeal the decision to the City Council.*

Applicant Response:

Procedure will be followed.

- (4) *Effect. Closure is effective immediately upon the mailing of notice of the decision. Unless otherwise provided in the notice, closure terminates all rights to continue the use the driveway approach for which the notice of closure has been issued.*

Applicant Response:

The project would like to request that the City postpone the effective date until the permit issuance for construction documents, as there are currently residents living in the two single family homes on the site that will need access until they relocate for construction.

- (5) *Failure to Close Driveway. If the owner fails to close the driveway approach to conform to the notice within 90 days, the City Manager may cause the closure to be completed and all expenses assessed against the property owner.*

Applicant Response:

Procedure will be followed.

TDC 75.040 – Driveway Approach Requirements

- (1) *The provision and maintenance of driveway approaches from private property to the public streets as stipulated in this Code are continuing requirements for the use of any structure or parcel of real property in the City of Tualatin. No building or other permit may be issued until scale plans are presented that show how the driveway approach requirement is to be fulfilled. If the owner or occupant of a lot or building changes the use to which the lot or building is put, thereby increasing driveway approach requirements, it is unlawful and a violation of this code to begin or maintain such altered use until the required increase in driveway approach is authorized by the City.*

Applicant Response:

Procedure will be followed.

- (2) *Not Applicable to Project.*
- (3) *Joint and Cross Access.*
 - (a) *Not Applicable to Project.*
 - (b) *A system of joint use driveways and cross access easements may be required and may incorporate the following:*
 - (i) *A continuous service drive or cross access corridor extending the entire length of each block served to provide for driveway separation consistent with the access management classification system and standards;*
 - (ii) *A design speed of ten mph and a maximum width of 24 feet to accommodate two-way travel aisles designated to accommodate automobiles, service vehicles, and loading vehicles;*
 - (iii) *Stub-outs and other design features to make it visually obvious that the abutting properties may be tied in to provide cross access via a service drive; and*
 - (iv) *Not Applicable to Project.*
 - (c) *Pursuant to this section, property owners may be required to:*
 - (i) *Record an easement with the deed allowing cross access to and from other properties served by the joint use driveways and cross access or service drive;*
 - (ii) *Record an agreement with the deed that remaining access rights along the roadway will be dedicated to the city and pre-existing driveways will be closed and eliminated after construction of the joint-use driveway;*
 - (iii) *Record a joint maintenance agreement with the deed defining maintenance responsibilities of property owners; and*
 - (iv) *Not Applicable to Project.*

Applicant Response:

Community Partners for Affordable Housing and Horizon Community Church are preparing an easement for the Plambeck Gardens' driveway approach to cross the Horizon Community Church property. At the time this application is submitted, a signed Letter of Intent has been completed and is attached in the Supplemental Information section of this application.

The project is required to provide a second emergency access only access point per Tualatin Valley Fire and Rescue requirements. This access point will be blocked off with the use of removable bollards per the requirements of Tualatin Valley Fire and Rescue, and will only be used by emergency vehicles.

- (4) *Not Applicable to Project.*
- (5) *Not Applicable to Project.*
- (6) *Except as provided in TDC 53.100, all driveway approach must connect directly with public streets.*

Applicant Response:

The Plambeck Gardens driveway will connect to a private tract "Tract L" on the Autumn Sunrise development, which will connect to the public "H-Street" in Autumn Sunrise's development.

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

Applicant Response:

A 6-foot wide sidewalk is proposed along the driveway. The sidewalk along the private "Tract L" will be constructed by the Autumn Sunrise development.

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

Applicant Response:

Procedure will be followed.

- (9) *Minimum driveway approach width for uses are as provided in Table 75-1 (Driveway Approach Width):*
Multi-family with 50-499 dwelling units requires a 32-foot wide minimum driveway approach

Applicant Response:

The Plambeck Gardens project includes a single 32-foot wide driveway.

- (10) *Driveway Approach Separation. There must be a minimum distance of 40 feet between any two adjacent driveways on a single property unless a lesser distance is approved by the City Manager.*

Applicant Response:

The Plambeck Gardens driveway is connecting to the private Tract L on the Autumn Sunrise property. No other driveways are proposed on the Plambeck Gardens property.

- (11) *Distance between Driveways and Intersections. Except for single-family dwellings, duplexes, townhouses, triplexes, quadplexes, and cottage clusters, the minimum distance between driveways and intersections must be as provided below. Distances listed must be measured from the stop bar at the intersection.*
- (a) *At the intersection of collector or arterial streets, driveways must be located a minimum of 150 feet from the intersection.*
 - (b) *At the intersection of two local streets, driveways must be located a minimum of 30 feet from the intersection.*
 - (c) *If the subject property is not of sufficient width to allow for the separation between driveway and intersection as provided, the driveway must be constructed as far from the*

intersection as possible, while still maintaining the 5-foot setback between the driveway and property line.

- (d) *When considering a driveway approach permit, the City Manager may approve the location of a driveway closer than 150 feet from the intersection of collector or arterial streets, based on written findings of fact in support of the decision.*

Applicant Response:

The Plambeck Gardens driveway is connecting to the private Tract L on the Autumn Sunrise property. The driveway connection to Tract L is not adjacent to an intersection.

(12) Vision Clearance Area.

- (a) *Local Streets. A vision clearance area for all local street intersections, local street and driveway intersections, and local street or driveway and railroad intersections must be that triangular area formed by the right-of-way lines along such lots and a straight line joining the right-of-way lines at points which are ten feet from the intersection point of the right-of-way lines, as measured along such lines (see Figure 73-2 for illustration).*
- (b) *Collector Streets. A vision clearance area for all collector/arterial street intersections, collector/arterial street and local street intersections, and collector/arterial street and railroad intersections must be that triangular area formed by the right-of-way lines along such lots and a straight line joining the right-of-way lines at points which are 25 feet from the intersection point of the right-of-way lines, as measured along such lines. Where a driveway intersects with a collector/arterial street, the distance measured along the driveway line for the triangular area must be ten feet (see Figure 73-2 for illustration).*
- (c) *Vertical Height Restriction. Except for items associated with utilities or publicly owned structures such as poles and signs and existing street trees, no vehicular parking, hedge, planting, fence, wall structure, or temporary or permanent physical obstruction must be permitted between 30 inches and eight feet above the established height of the curb in the clear vision area (see Figure 73-2 for illustration).*

Applicant Response:

The Plambeck Gardens driveway directly connects parallel to the private Tract L on the Autumn Sunrise property and does not form an intersection.

TDC 75.050 – Access Limited Roadways

- (1) *This section applies to all developments, permit approvals, land use approvals, partitions, subdivisions, or any other actions taken by the City pertaining to property abutting any road or street listed in TDC 75.050(2). In addition, any property not abutted by a road or street listed in subsection (2), but having access to an arterial by any easement or prescriptive right, must be treated as if the property did abut the arterial and this Chapter applies.*

Applicant Response:

The project is located on Boones Ferry Road.

- (2) *The following Freeways and Arterials are access limited roadways: [City code text omitted for brevity]*
(h) *Boones Ferry Road at all points located within the City of Tualatin Planning Area*

Applicant Response:

The project is located on Boones Ferry Road.

- (3) *This Chapter takes precedence over any other TDC chapter and over any other ordinance of the City when considering any development, land use approval or other proposal for property abutting an arterial or any property having an access right to an arterial.*

Applicant Response:

Procedure will be followed. The project is required to provide a second emergency access only access point per Tualatin Valley Fire and Rescue requirements. This access point will be blocked off with the use of removable bollards per the requirements of Tualatin Valley Fire and Rescue, and will only be used by emergency vehicles, with removable bollards restricting access.

- (4) *The City may act on its own initiative to protect the public safety and control access on arterials or any street to be included by TDC 75.030, consistent with its authority as the City Road Authority.*

Applicant Response:

Procedure will be followed.

TDC 75.060 – Not Applicable to Project

TDC 75.070 – Existing Driveways and Street Intersections

- (1) *Existing driveways with access onto arterials on the date this chapter was originally adopted are allowed to remain. If additional development occurs on properties with existing driveways with access onto arterials then this Chapter applies and the entire site must be made to conform with the requirements of this chapter.*
- (2) *Not Applicable to Project.*

Applicant Response:

The Plambeck Gardens project is proposing the removal of the two existing driveways on Boones Ferry Road, with the new access drive located from private Tract L on the Autumn Sunrise development. The Plambeck Gardens development will require a second emergency access only to the site per Tualatin Valley Fire and Rescue, which is proposed along Boones Ferry Road.

TDC 75.100 – Not Applicable to Project

TDC 75.110 – Not Applicable to Project

TDC 75.120 – Not Applicable to Project

TDC 75.130 – Not Applicable to Project

TDC 75.140 – Not Applicable to Project

TMC: TITLE 3 – UTILITIES AND WATER QUALITY

CHAPTER 3-02 – SEWER REGULATIONS; RATES

TMC 3-2-020 – Application, Permit and Inspection Procedure

[City code text omitted for brevity]

TMC 3-2-030 – Materials and Manner of Construction

[City code text omitted for brevity]

TMC 3-2-060 – Use of Public Sewers Required

[City code text omitted for brevity]

TMC 3-2-160 – Construction Standards

[City code text omitted for brevity]

Applicant Response:

Compliance with the applicable City of Tualatin and Clean Water Services standards for sanitary sewer will be demonstrated at the time of building and construction permit applications. The applicable standards will be met. Refer to the TDC 74.620 response and utility drawings in the application for additional information.

CHAPTER 3-03 – WATER SERVICE

TMC 3-3-040 – Separate Services Required

[City code text omitted for brevity]

TMC 3-3-050 – Regular Service

[City code text omitted for brevity]

TMC 3-3-080 – Fire Protection Service

[City code text omitted for brevity]

TMC 3-3-100 – Meters

[City code text omitted for brevity]

TMC 3-3-110 – Construction Standards

[City code text omitted for brevity]

TMC 3-3-120 – Backflow Prevention Devices and Cross Connections

[City code text omitted for brevity]

TMC 3-3-130 – Control Valves

[City code text omitted for brevity]

TMC 3-3-240 – Construction

[City code text omitted for brevity]

Applicant Response:

Compliance with the applicable City of Tualatin standards for water service will be demonstrated at the time of building and construction permit applications. The applicable standards will be met. Refer to the TDC 74.610 response and utility drawings in the application for additional information.

CHAPTER 3-05 – SOIL EROSION, SURFACE WATER MANAGEMENT, WATER QUALITY FACILITIES, AND BUILDING AND SEWERS

EROSION CONTROL

TMC 3-5-010 – Policy

[City code text omitted for brevity]

TMC 3-5-050 – Erosion Control Permits

[City code text omitted for brevity]

TMC 3-5-060 – Permit Process

[City code text omitted for brevity]

TMC 3-5-120 – Maintaining Water Quality

[City code text omitted for brevity]

TMC 3-5-190 – Soil Erosion Control Matrix and Methods

[City code text omitted for brevity]

Applicant Response:

Compliance with the applicable City of Tualatin standards for erosion control will be demonstrated at the time of building and construction permit applications. The applicable standards will be met.

ADDITIONAL SURFACE WATER MANAGEMENT SOLUTIONS

TMC 3-5-200 – Downstream Protection Requirement

[City code text omitted for brevity]

Applicant Response:

The project includes two new stormwater management facilities to treat and detain stormwater to meet the City of Tualatin, Clean Water Services and HUD standards. Refer to attached Stormwater Report and drawings for additional information. The applicable standards are met.

TMC 3-5-210 – Review of Downstream System

[City code text omitted for brevity]

Applicant Response:

The Stormwater Report included in the Supplemental Information section includes a downstream analysis with the applicable standards. As demonstrated by the downstream analysis provided in the Stormwater Report, applicable standards will be met. Refer to the Stormwater Report updated on May 2 for details.

TMC 3-5-230 – On-Site Detention Design Criteria

[City code text omitted for brevity]

Applicant Response:

The stormwater management facilities will meet the City of Tualatin, Clean Water Services and HUD standards and will limit post-developed runoff rates to the pre-developed rates of all applicable design storms. Refer to attached Stormwater Report and drawings for additional information. The applicable standards are met.

TMC 3-5-240 – On-Site Detention Design Method

[City code text omitted for brevity]

Applicant Response:

The stormwater management facilities will meet the City of Tualatin, Clean Water Services and HUD standards and will be sized to manage the runoff from all onsite impervious areas. Refer to attached Stormwater Report and drawings for additional information. The applicable standards are met.

PERMANENT ON-SITE WATER QUALITY FACILITIES

TMC 3-5-290 – Purpose of Title

[City code text omitted for brevity]

Applicant Response:

The project includes new impervious surfaces, and therefore this section is applicable.

TMC 3-5-300 – Application of Title

[City code text omitted for brevity]

Applicant Response:

The project includes new impervious surfaces, and therefore this section is applicable.

TMC 3-5-320 – Definitions

[City code text omitted for brevity]

Applicant Response:

The project will utilize appropriate facilities as defined in this section.

TMC 3-5-330 – Permit Required

[City code text omitted for brevity]

Applicant Response:

The project will obtain permits from the City of Tualatin and Clean Water Services prior to any construction.

TMC 3-5-340 – Facilities Required

[City code text omitted for brevity]

Applicant Response:

The project includes two stormwater management facilities that will be in accordance with City of Tualatin, Clean Water Services and HUD standards.

TMC 3-5-345 – Inspection Reports

[City code text omitted for brevity]

Applicant Response:

The property owner will submit inspection reports annually to the City to ensure maintenance activities occur according to the operation and maintenance plan, which will be submitted with the permit application.

TMC 3-5-350 – Phosphorus Removal Standard

[City code text omitted for brevity]

Applicant Response:

The water quality facilities are designed for phosphorous removal as required by the code standard.

TMC 3-5-360 – Design Storm

[City code text omitted for brevity]

Applicant Response:

The stormwater basins will meet the requirements of the water quality design storms for City of Tualatin, Clean Water Services and HUD.

TMC 3-5-370 – Design Requirements

[City code text omitted for brevity]

Applicant Response:

The stormwater facilities will meet performance requirements in addition to the design requirements specified.

TMC 3-5-390 – Facility Permit Approval

[City code text omitted for brevity]

Applicant Response:

The project will submit all required documentation for permit approval at the time of building and construction permit applications.

TMC: TITLE 4 – BUILDING

CHAPTER 4-01 – BUILDING CODES

TMC 4-1-010 – Standards Applicable to Building

[City code text omitted for brevity]

Applicant Response:

Compliance with the applicable codes will be demonstrated at the time of building and construction permit applications. The applicable standards will be met.

CHAPTER 4-02 – FIRE HYDRANT LOCATIONS AND RATES OF FLOW

TMC 4-2-010 – Hydrants and Water Supply for Fire Protection

[City code text omitted for brevity]

Applicant Response:

The project is proposing four new private fire hydrants within the site and one new public fire hydrant located in the right-of-way along Boones Ferry Road. Tualatin Valley Fire and Rescue have provided a Service Provider Permit, which is included in the Supplemental Information Section of this application.

TMC 4-2-020 – Access to Hydrants Located on Private Property

[City code text omitted for brevity]

Applicant Response:

The project is proposing four new private fire hydrants within the site and one new public fire hydrant located in the right-of-way along Boones Ferry Road. Tualatin Valley Fire and Rescue have provided a Service Provider Permit, which is included in the Supplemental Information Section of this application.

TDC 32.140 (1)(C) – ADDITIONAL INFORMATION REQUIRED UNDER TDC PER SPECIFIC LAND USE ACTION SOUGHT.

TDC 33.120 (4)(a) – Contact Information

Architect:

Carleton Hart Architecture, PC
830 SW 10th Avenue, #200
Portland, Oregon 97205
Contact: Kayla Zander
Phone: (503) 206-3038

Civil Engineer:

Vega Civil Engineering, LLC
1300 SE Stark Street, #201
Portland, Oregon 97214
Contact: Martha Williamson
Phone: (503) 349-1381

Landscape Architect:

Marianne Zarkin Landscape Architects
1326 NE 63rd Avenue
Portland, Oregon 97213
Contact: Marianne Zarkin
Phone: (503) 802-0031

TDC 33.120 (4)(b) – Survey

Refer to Supplemental Information section below.

TDC 32.140 (1)(D) – PAYMENT OF APPLICATION FEE.

Payment was made to the City of Tualatin at the time this application was submitted.

TDC 32.140 (1)(E) – RECORDED DEED/ LAND SALES CONTRACT WITH LEGAL DESCRIPTION.

Refer to Supplemental Information section below.

TDC 32.140 (1)(F) – PRELIMINARY TITLE REPORT OR OTHER PROOF OF OWNERSHIP.

Refer to Supplemental Information section below.

TDC 32.140(1)(G) – FOR THOSE APPLICATIONS REQUIRING A NIEGHBORHOOD/ DEVELOPER MEETING.

TDC 32.140(g)(i) – The mailing list for the notice

Refer to Supplemental Information section below.

TDC 32.140(g)(ii) – A copy of the notice

Refer to Supplemental Information section below.

TDC 32.140(g)(iii) – An affidavit of the mailing and posting

Refer to Supplemental Information section below.

TDC 32.140(g)(iv) – The original sign-in sheet of participants; and

Refer to Supplemental Information section below.

TDC 32.140(g)(v) – The meeting notes as described in TDC 32.120(7)

Refer to Supplemental Information section below.

TDC 32.140 (1)(H) – STATEMENT AS TO WHETHER ANY CITY-RECOGNIZED CITIZEN INVOLVEMENT ORGANIZATIONS (CIOS) WHOSE BOUNDARIES INCLUDE, OR ARE ADJACENT TO, THE SUBJECT PROPERTY WERE CONTACTED IN ADVANCE OF FILING THE APPLICATION AND, IF SO, A SUMMARY OF THE CONTACT.

TDC 32.120(5)(b)(iii) – The applicant must mail notice of a neighborhood/developer meeting to the following persons. All designated representatives of recognized Citizen Involvement Organizations as established in TMC Chapter 11-8.

Community Partners for Affordable Housing sent an email on Tuesday 07/27/21 to the CIO officers inviting them to attend the neighborhood meeting on 08/11/21 at 6:30pm based on the CIO contact sheet provided by City Planning staff. Additionally, it was confirmed by City Planning staff that email is an acceptable notification method. The Byrom CIO President, Alex Thurber, attended the neighborhood meeting in addition to CIO Lead, Ed Casey.

TDC 32.140 (1)(I) – ANY ADDITIONAL INFORMATION, AS DETERMINED BY CITY MANAGER.

The applicant team confirmed with City Planning staff that this project requires no additional information from the City Manager.

SUPPLEMENTAL INFORMATION

LAND USE ARCHITECTURAL REVIEW APPLICATION

HYDRAULIC MODELING ANALYSIS

SITE SURVEY

DRAWINGS

ZONING MAP

PRELIMINARY TITLE REPORT

TUALATIN VALLEY FIRE AND RESCUE SERVICE PROVIDER LETTER

CWS SERVICE PROVIDER LETTER

PRELIMINARY STORMWATER REPORT

RECORDED DEED/ LAND SALES CONTACT WITH LEGAL DESCRIPTION

NEIGHBORHOOD/ DEVELOPER MEETING ITEMS

PRE-APPLICATION CONFERENCE MEETING MINUTES

TRAFFIC ANALYSIS REPORT

ACCESS & SEWER ACCESS EASEMENT – LETTER OF INTENT

ARBORIST REPORT

LAND USE VARIANCE NOTICE OF ADOPTION – VAR21-0003

SUPPLEMENTAL INFORMATION



LAND USE DRAWING INDEX

G0.01 COVER SHEET
G0.02 DRAWING SHEET INDEX/ MATERIALS BOARD

A1.01 SITE PLAN - ARCHITECTURAL
A1.02 SITE PLAN - OUTDOOR SPACE DIAGRAM
A1.03 SITE PLAN - SITE PATHS & LANDSCAPING
A2.01 FLOOR PLAN - BUILDING A - LEVEL 1
A2.02 FLOOR PLAN - BUILDING A - LEVELS 2 & 3
A2.03 FLOOR PLAN - BUILDING A - LEVEL 4
A2.04 FLOOR PLAN - BUILDING B - LEVEL 1
A2.05 FLOOR PLAN - BUILDING B - LEVELS 2 & 3
A2.06 FLOOR PLAN - BUILDING B - LEVEL 4
A2.07 FLOOR PLAN - BUILDING C
A3.01 BUILDING ELEVATIONS - BUILDING A
A3.02 BUILDING ELEVATIONS - BUILDING A
A3.03 BUILDING ELEVATIONS - BUILDING B
A3.04 BUILDING ELEVATIONS - BUILDING B
A3.05 BUILDING ELEVATIONS - BUILDING C

L2.00 LANDSCAPE PLAN
L3.00 LANDSCAPE LEGEND

C0.00 COVER SHEET
C0.50 DEMOLITION PLAN
C1.00 GRADING PLAN - OVERALL
C1.01 GRADING PLAN - SOUTHWEST
C1.02 GRADING PLAN - SOUTHEAST
C1.03 GRADING PLAN - NORTHWEST
C1.04 GRADING PLAN - NORTHEAST
C3.00 STORMWATER PLAN - OVERALL
C3.01 STORMWATER PLAN - SOUTHWEST
C3.02 STORMWATER PLAN - SOUTHEAST
C3.03 STORMWATER PLAN - NORTHWEST
C3.04 STORMWATER PLAN - NORTHEAST
C4.00 UTILITY PLAN - ENTIRE SITE
C4.01 UTILITY PLAN - SOUTHWEST
C4.02 UTILITY PLAN - SOUTHEAST
C4.03 UTILITY PLAN - NORTHWEST
C4.04 UTILITY PLAN - NORTHEAST
C8.00 PUBLIC COVER SHEET
C8.01 PUBLIC GENERAL NOTES
C8.02 EXISTING SITE PLAN
C8.03 PROPOSED SITE PLAN
C8.04 TYPICAL SECTIONS
C8.05 SW BOONES FERRY ROAD PLAN AND PROFILE - SOUTH
C8.06 SW BOONES FERRY ROAD PLAN AND PROFILE - NORTH
C8.07 STORMWATER PLAN AND PROFILE
C8.08 ENLARGED PLANS
C9.00 SW BOONES FERRY RD WATER MAIN PLAN AND PROFILE - SOUTH
C9.01 SW BOONES FERRY RD WATER MAIN PLAN AND PROFILE - MID
C9.02 SW BOONES FERRY RD WATER MAIN PLAN AND PROFILE - MID
C9.03 SW BOONES FERRY RD WATER MAIN PLAN AND PROFILE - NORTH

E1.02 SITE LIGHTING PHOTOMETRICS

L1.01 STREET LIGHTING PHOTOMETRICS



FC-1
FIBER CEMENT - BOARD & BATTEN
8" BATTEN SPACING
COLOR: MEDIUM GREEN/GREY



FC-2
FIBER CEMENT - VERTICAL REVEAL
7" REVEAL PATTERN
COLOR: WARM GOLDEN/ YELLOW



FC-3
FIBER CEMENT - LAP SIDING
4" REVEAL
COLOR: SOFT/ LIGHT GREY



WD-1
WOOD CLADDING
1x4 CEDAR V-GROOVE
COLOR: CLEAR FINISH



WD-2
EXPOSED STRUCTURAL MEMBERS
COLOR: NATURAL FINISH



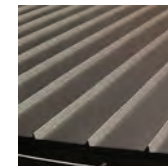
WD-3
EXPOSED STRUCTURAL MEMBERS
COLOR: DARK BRONZE



M-1
CANOPY
SMOOTH METAL PLATE
COLOR: DARK BRONZE



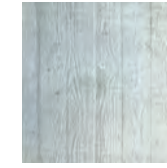
R-1
ROOFING - ASPHALT SHINGLE
COLOR: DARK BROWN



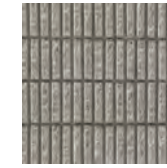
R-3
ROOFING - METAL STANDING SEAM
COLOR: DARK BRONZE



C-1
EXPOSED CONCRETE
SMOOTH FACE
COLOR: LIGHT GREY



C-2
EXPOSED CONCRETE
VERTICAL BOARD FORM
COLOR: LIGHT GREY



C-3
CONCRETE MASONRY UNIT
7-SCORE SPLIT FACE
COLOR: LIGHT GREY
*USED AT TRASH ENCLOSURE ONLY



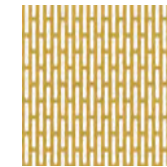
TR-1
COMPOSITE/ FIBER CEMENT TRIM
1" & 2" THICK PROFILE
COLOR: DARK BRONZE



TR-2
SHEET METAL TRIM
COLOR: DARK BRONZE



TR-3
COMPOSITE/ FIBER CEMENT TRIM
1" & 2" THICK PROFILE
COLOR: WARM GOLDEN/ YELLOW



M-2
METAL PATIO/ BALCONY RAILING
PERFORATED OBLONG SLOT PATTERN
COLOR: WARM GOLDEN/ YELLOW



R-2
ROOFING - SINGLE PLY MEMBRANE
COLOR: LIGHT GREY



W-1
VINYL WINDOWS
FIXED, CASEMENT, COMBINATION
EXTERIOR COLOR: DARK BRONZE

*NOTE ALL ALUMINUM STOREFRONT
WILL BE DARK BRONZE AS WELL

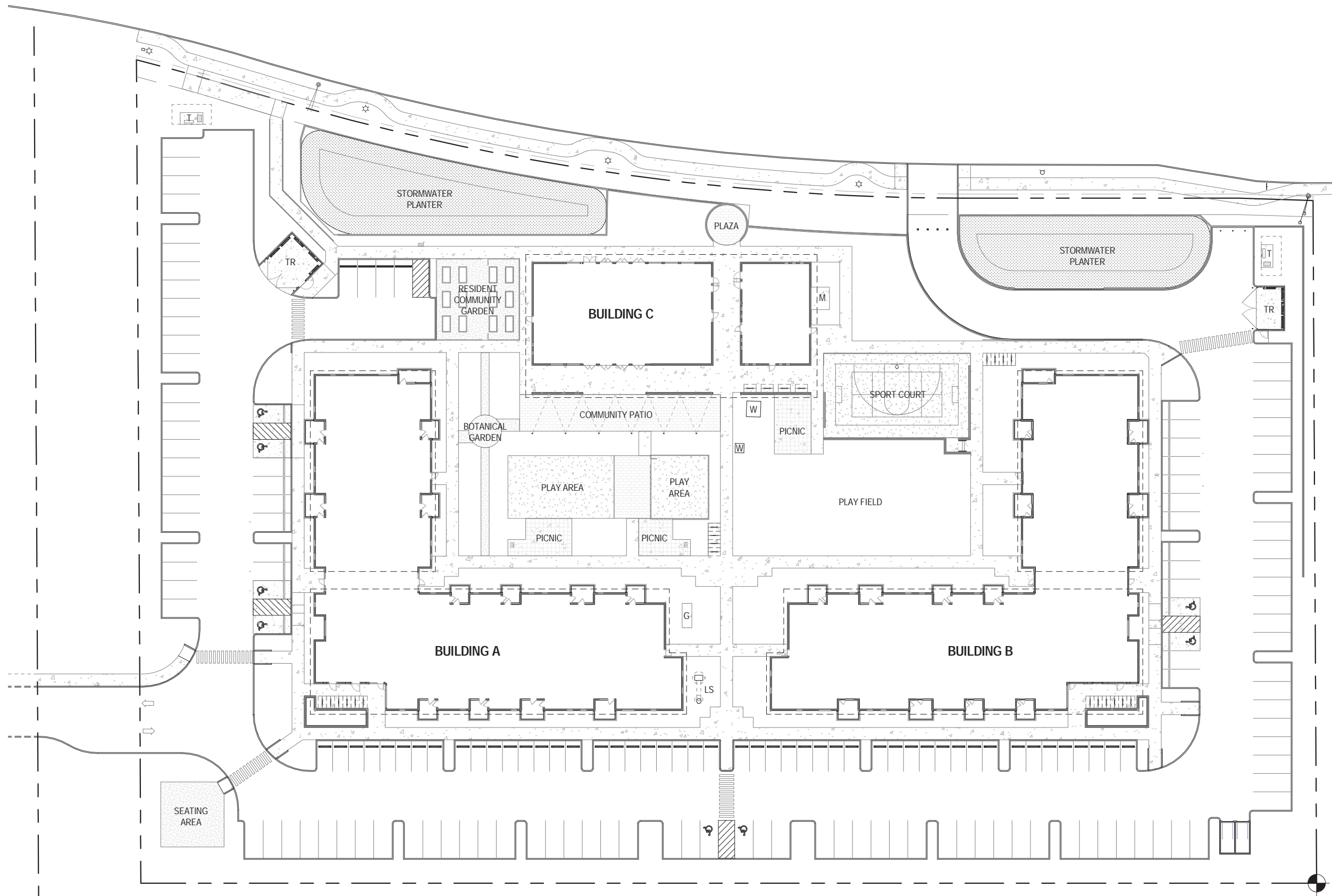
DRAWING SHEET INDEX/ MATERIALS BOARD

SITE PLAN ABBREVIATIONS:

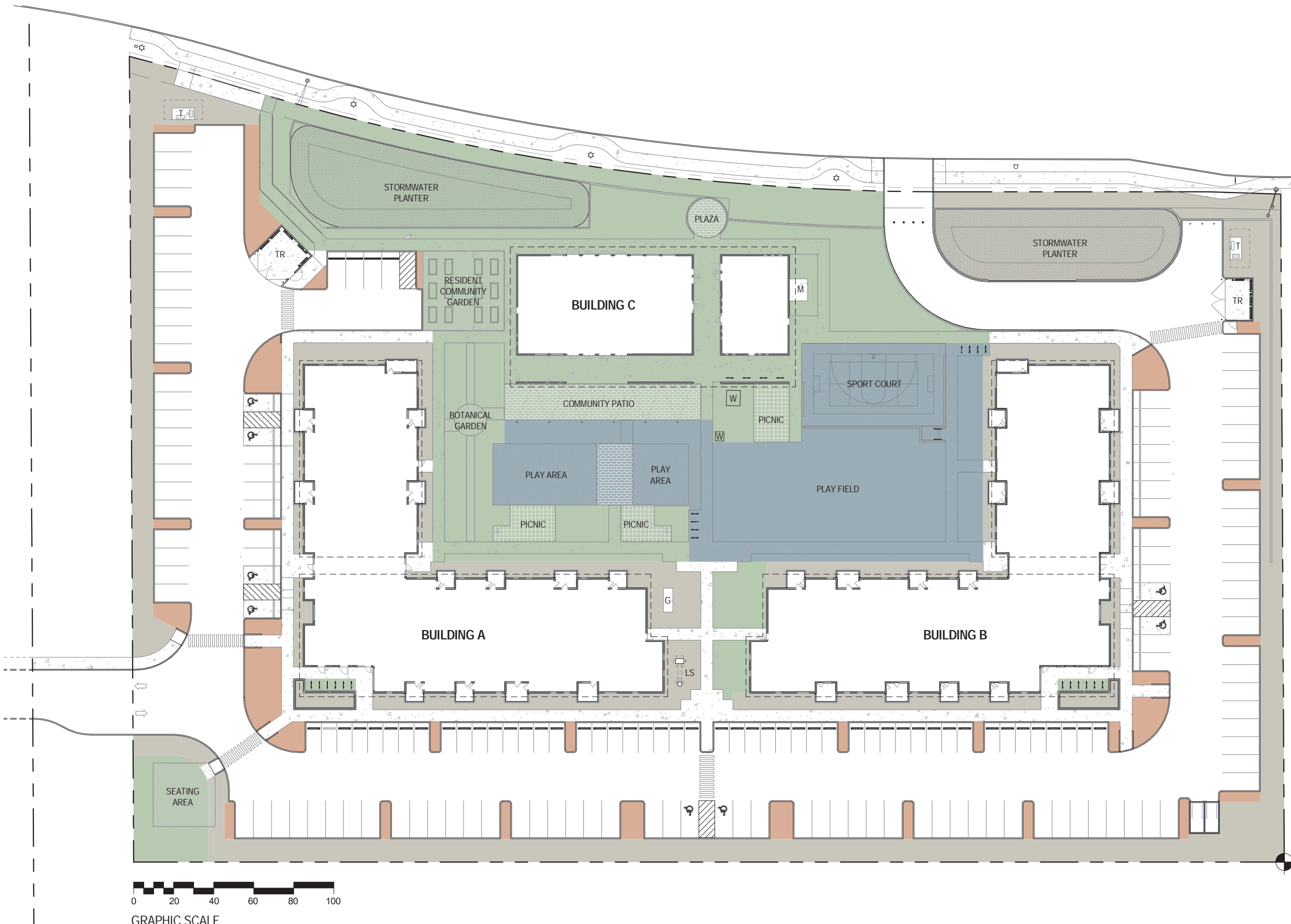
- T - TRANSFORMER
- TR - TRASH ENCLOSURE
- M - MECHANICAL UNIT
- G - GENERATOR
- LS - LIFT STATION
- W - EXISTING WELL HOUSE & TANK HOUSE

SITE PLAN LEGEND:

- — — — — PROPERTY LINE
- — — — — RIGHT-OF-WAY DEDICATION
- — — — — PUBLIC UTILITY EASEMENT
- - - - - ROOF EDGE ABOVE
- ||||| OUTDOOR BIKE RACKS
- ||| WHEEL STOPS
- ♿ ADA COMPLIANT PARKING
- ||||| CROSSWALK STRIPING



SITE PLAN - ARCHITECTURAL



SITE PLAN ABBREVIATIONS:

- T - TRANSFORMER
- TR - TRASH ENCLOSURE
- M - MECHANICAL UNIT
- G - GENERATOR
- LS - LIFT STATION
- W - EXISTING WELL HOUSE & TANK HOUSE

SITE PLAN LEGEND:

- — — — — PROPERTY LINE
- - - - - RIGHT-OF-WAY DEDICATION
- - - - - PUBLIC UTILITY EASEMENT
- - - - - ROOF EDGE ABOVE
- ||||| OUTDOOR BIKE RACKS
- | | WHEEL STOPS
- ♿ ADA COMPLIANT PARKING
- ||||| CROSSWALK STRIPING

TDC 73A.200 - COMMON WALL DESIGN STANDARDS:

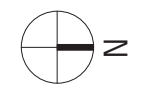
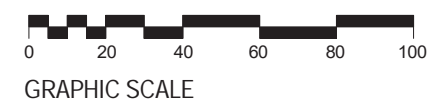
- SHARED OUTDOOR AREAS**
REQUIRED: 300 SF X 116 UNITS = 34,800 SF
PROVIDED: 35,688 SF
- CHILDREN'S PLAY AREA**
REQUIRED: 150 SF X 116 UNITS = 17,400 SF
PROVIDED: 17,557 SF

TDC 73B.030 - LANDSCAPING AREA STANDARDS:

- ADDITIONAL LANDSCAPING**
REQUIRED: REFER TO A1.03
PROVIDED: 30,268 SF

TDC 73C.210 - COMMON WALL PARKING LOT LANDSCAPING REQUIREMENTS:

- LANDSCAPING ISLAND**
REQUIRED: 25 SF X 170 STALLS = 4,250 SF
PROVIDED: 5,441 SF



SITE PLAN - OUTDOOR SPACE DIAGRAM

SITE PLAN ABBREVIATIONS:

- T - TRANSFORMER
- TR - TRASH ENCLOSURE
- M - MECHANICAL UNIT
- G - GENERATOR
- LS - LIFT STATION
- W - EXISTING WELL HOUSE & TANK HOUSE

SITE PLAN LEGEND:

- — — — — PROPERTY LINE
- — — — — RIGHT-OF-WAY DEDICATION
- — — — — PUBLIC UTILITY EASEMENT
- - - - - ROOF EDGE ABOVE
- ▤ OUTDOOR BIKE RACKS
- || WHEEL STOPS
- ♿ ADA COMPLIANT PARKING
- ▤▤▤▤▤▤ CROSSWALK STRIPING

TDC 73A.200 (7) - WALKWAYS:

- ▤ REQUIRED: 6-FEET WIDE, ADA COMPLIANT
- ▤ PROVIDED: 6-FEET WIDE, ADA COMPLIANT

TDC 73C.200 (8) - ACCESSWAYS:

- ▤ REQUIRED: 8-FEET WIDE, ADA COMPLIANT
- ▤ PROVIDED: 8-FEET WIDE, ADA COMPLIANT

TDC 73B.020 - LANDSCAPING AREA STANDARDS MINIMUM:

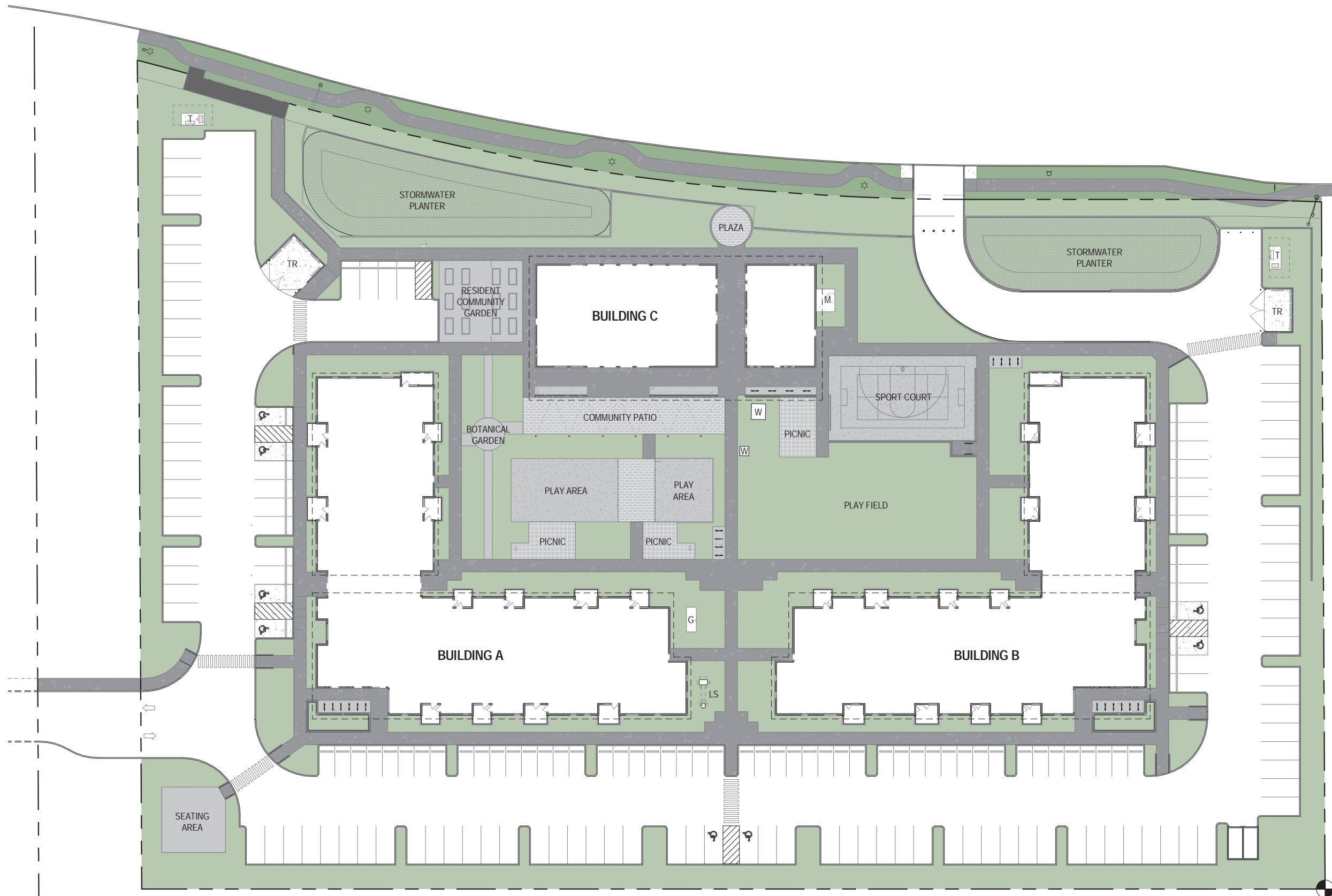
- ▤ REQUIRED: NONE (RH W/ PERMITTED USE)
- ▤ PROVIDED: 64,314 SF (NOT INCLUDING ROW)

TDC 73B.030 - ADDITIONAL MINIMUM LANDSCAPING REQUIREMENTS FOR MULTI-FAMILY RESIDENTIAL USES:

REQUIRED & PROVIDED: ALL AREAS NOT OCCUPIED BY BUILDINGS, PARKING SPACES, DRIVEWAYS, DRIVE ASILES, PEDESTRIAN AREAS, OR UNDISTURBED NATURAL AREAS MUST BE LANDSCAPED.

HARDSCAPED / PATHWAY AREAS:

- ▤ REQUIRED: ADA COMPLIANT
- ▤ PROVIDED: ADA COMPLIANT



SITE PLAN - SITE PATHS & LANDSCAPING



TDC 73A.200 (1) - UNIT PATIO SIZES: LEVEL 1

REQUIRED: 80 SF EACH

PROVIDED:

- UNIT 1.1 - 93 SF
- UNIT 1.2 (COURTYARD SIDE) - 84 SF
- UNIT 1.2 (PARKING LOT SIDE) - 93 SF
- UNIT 2.1 - 103 SF
- UNIT 2.2 (COURTYARD SIDE) - 103 SF
- UNIT 2.2 (PARKING LOT SIDE) - 115 SF
- UNIT 3.1 - 105 SF
- UNIT 3.2 - N/A
- UNIT 3.3 - 114 SF
- UNIT 4.1 - N/A

TDC 73A.200 (3) - ENTRY AREAS: ENTIRE BUILDING

REQUIRED: 58 UNITS x 24 SF = 1,392 SF

PROVIDED: 1,453 SF

- L1 COMBINED LOBBY/LOUNGE: 505 SF
- L2-L4 COMBINED LOBBY/ LOUNGE: 600 SF(200 SF PER LEVEL)
- INDIVIDUAL ENTRY: 348 SF (6 SF x 58 UNITS)

TDC 73A.200 (6) - UNIT STORAGE: LEVEL 1

REQUIRED: 1-BEDROOM: 24 SF/ 2-BEDROOM: 36 SF/ 3-BEDROOM: 48 SF

PROVIDED:

- UNIT 1.1 - 24 SF
- UNIT 1.2 - 24 SF
- UNIT 2.1 - 36 SF
- UNIT 2.2 - 36 SF
- UNIT 3.1 - 51 SF
- UNIT 3.2 - N/A
- UNIT 3.3 - 48 SF
- UNIT 4.1 - N/A

TDC 73A.200 (11) - SERVICE, DELIVERY AND SCREENING

REQUIRED: POSTAL DELIVERY MUST BE CONVENIENTLY LOCATED & EFFICIENTLY DESIGNED FOR RESIDENTS AND MAIL DELIVERY STAFF

PROVIDED: MAIL ROOM IS LOCATED DIRECTLY ADJAENT TO MAIN ENTRY

FLOOR PLAN - BUILDING A - LEVEL 1



TDC 73A.200 (2) - UNIT BALCONY SIZES: LEVELS 2-4

REQUIRED: 48 SF EACH

PROVIDED:

- UNIT 1.1 - N/A
- UNIT 1.2 - 51 SF (58 SF - END UNIT)
- UNIT 2.1 - N/A
- UNIT 2.2 - 65 SF
- UNIT 3.1 - N/A
- UNIT 3.2 - 59 SF
- UNIT 3.3 - 112 SF
- UNIT 4.1 - 72 SF

TDC 73A.200 (3) - ENTRY AREAS: ENTIRE BUILDING

REQUIRED: 58 UNITS x 24 SF = 1,392 SF

PROVIDED: 1,453 SF

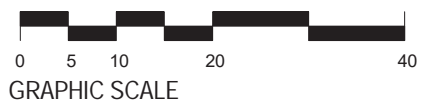
- L1 COMBINED LOBBY/LOUNGE: 505 SF
- L2-L4 COMBINED LOBBY/ LOUNGE: 600 SF (200 SF PER LEVEL)
- INDIVIDUAL ENTRY: 348 SF (6 SF x 58 UNITS)

TDC 73A.200 (6) - UNIT STORAGE: LEVELS 2-4

REQUIRED: 1-BEDROOM: 24 SF/ 2-BEDROOM: 36 SF/ 3-BEDROOM: 48 SF

PROVIDED:

- UNIT 1.1 - N/A
- UNIT 1.2 - 26 SF
- UNIT 2.1 - N/A
- UNIT 2.2 - 37 SF
- UNIT 3.1 - N/A
- UNIT 3.2 - 51 SF
- UNIT 3.3 - 48 SF
- UNIT 4.1 - 48 SF



FLOOR PLAN - BUILDING A - LEVELS 2 & 3



TDC 73A.200 (2) - UNIT BALCONY SIZES: LEVELS 2-4

REQUIRED: 48 SF EACH

PROVIDED:

- UNIT 1.1 - N/A
- UNIT 1.2 - 51 SF (58 SF - END UNIT)
- UNIT 2.1 - N/A
- UNIT 2.2 - 65 SF
- UNIT 3.1 - N/A
- UNIT 3.2 - 59 SF
- UNIT 3.3 - 112 SF
- UNIT 4.1 - 72 SF

TDC 73A.200 (3) - ENTRY AREAS: ENTIRE BUILDING

REQUIRED: 58 UNITS x 24 SF = 1,392 SF

PROVIDED: 1,453 SF

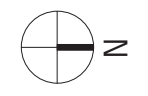
- L1 COMBINED LOBBY/LOUNGE: 505 SF
- L2-L4 COMBINED LOBBY/ LOUNGE: 600 SF(200 SF PER LEVEL)
- INDIVIDUAL ENTRY: 348 SF (6 SF x 58 UNITS)

TDC 73A.200 (6) - UNIT STORAGE: LEVELS 2-4

REQUIRED: 1-BEDROOM: 24 SF/ 2-BEDROOM: 36 SF/ 3-BEDROOM: 48 SF

PROVIDED:

- UNIT 1.1 - N/A
- UNIT 1.2 - 26 SF
- UNIT 2.1 - N/A
- UNIT 2.2 - 37 SF
- UNIT 3.1 - N/A
- UNIT 3.2 - 51 SF
- UNIT 3.3 - 48 SF
- UNIT 4.1 - 48 SF



FLOOR PLAN - BUILDING A - LEVEL 4



TDC 73A.200 (1) - UNIT PATIO SIZES: LEVEL 1

REQUIRED: 80 SF EACH

PROVIDED:

- UNIT 1.1 - 93 SF
- UNIT 1.2 (COURTYARD SIDE) - 84 SF
- UNIT 1.2 (PARKING LOT SIDE) - 93 SF
- UNIT 2.1 - 103 SF
- UNIT 2.2 (COURTYARD SIDE) - 103 SF
- UNIT 2.2 (PARKING LOT SIDE) - 115 SF
- UNIT 3.1 - 105 SF
- UNIT 3.2 - N/A
- UNIT 3.3 - 114 SF
- UNIT 4.1 - N/A

TDC 73A.200 (3) - ENTRY AREAS: ENTIRE BUILDING

REQUIRED: 58 UNITS x 24 SF = 1,392 SF

PROVIDED: 1,453 SF

- L1 COMBINED LOBBY/LOUNGE: 505 SF
- L2-L4 COMBINED LOBBY/ LOUNGE: 600 SF(200 SF PER LEVEL)
- INDIVIDUAL ENTRY: 348 SF (6 SF x 58 UNITS)

TDC 73A.200 (6) - UNIT STORAGE: LEVEL 1

REQUIRED: 1-BEDROOM: 24 SF/ 2-BEDROOM: 36 SF/ 3-BEDROOM: 48 SF

PROVIDED:

- UNIT 1.1 - 24 SF
- UNIT 1.2 - 24 SF
- UNIT 2.1 - 36 SF
- UNIT 2.2 - 36 SF
- UNIT 3.1 - 51 SF
- UNIT 3.2 - N/A
- UNIT 3.3 - 48 SF
- UNIT 4.1 - N/A

TDC 73A.200 (11) - SERVICE, DELIVERY AND SCREENING

REQUIRED: POSTAL DELIVERY MUST BE CONVENIENTLY LOCATED & EFFICIENTLY DESIGNED FOR RESIDENTS AND MAIL DELIVERY STAFF

PROVIDED: MAIL ROOM IS LOCATED DIRECTLY ADJAENT TO MAIN ENTRY

FLOOR PLAN - BUILDING B - LEVEL 1



TDC 73A.200 (2) - UNIT BALCONY SIZES: LEVELS 2-4

REQUIRED: 48 SF EACH

PROVIDED:

- UNIT 1.1 - N/A
- UNIT 1.2 - 51 SF (58 SF - END UNIT)
- UNIT 2.1 - N/A
- UNIT 2.2 - 65 SF
- UNIT 3.1 - N/A
- UNIT 3.2 - 59 SF
- UNIT 3.3 - 112 SF
- UNIT 4.1 - 72 SF

TDC 73A.200 (3) - ENTRY AREAS: ENTIRE BUILDING

REQUIRED: 58 UNITS x 24 SF = 1,392 SF

PROVIDED: 1,453 SF

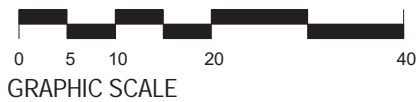
- L1 COMBINED LOBBY/LOUNGE: 505 SF
- L2-L4 COMBINED LOBBY/ LOUNGE: 600 SF (200 SF PER LEVEL)
- INDIVIDUAL ENTRY: 348 SF (6 SF x 58 UNITS)

TDC 73A.200 (6) - UNIT STORAGE: LEVELS 2-4

REQUIRED: 1-BEDROOM: 24 SF/ 2-BEDROOM: 36 SF/ 3-BEDROOM: 48 SF

PROVIDED:

- UNIT 1.1 - N/A
- UNIT 1.2 - 26 SF
- UNIT 2.1 - N/A
- UNIT 2.2 - 37 SF
- UNIT 3.1 - N/A
- UNIT 3.2 - 51 SF
- UNIT 3.3 - 48 SF
- UNIT 4.1 - 48 SF



FLOOR PLAN - BUILDING B - LEVELS 2 & 3



TDC 73A.200 (2) - UNIT BALCONY SIZES: LEVELS 2-4

REQUIRED: 48 SF EACH

PROVIDED:

- UNIT 1.1 - N/A
- UNIT 1.2 - 51 SF (58 SF - END UNIT)
- UNIT 2.1 - N/A
- UNIT 2.2 - 65 SF
- UNIT 3.1 - N/A
- UNIT 3.2 - 59 SF
- UNIT 3.3 - 112 SF
- UNIT 4.1 - 72 SF

TDC 73A.200 (3) - ENTRY AREAS: ENTIRE BUILDING

REQUIRED: 58 UNITS x 24 SF = 1,392 SF

PROVIDED: 1,453 SF

- L1 COMBINED LOBBY/LOUNGE: 505 SF
- L2-L4 COMBINED LOBBY/ LOUNGE: 600 SF (200 SF PER LEVEL)
- INDIVIDUAL ENTRY: 348 SF (6 SF x 58 UNITS)

TDC 73A.200 (6) - UNIT STORAGE: LEVELS 2-4

REQUIRED: 1-BEDROOM: 24 SF/ 2-BEDROOM: 36 SF/ 3-BEDROOM: 48 SF

PROVIDED:

- UNIT 1.1 - N/A
- UNIT 1.2 - 26 SF
- UNIT 2.1 - N/A
- UNIT 2.2 - 37 SF
- UNIT 3.1 - N/A
- UNIT 3.2 - 51 SF
- UNIT 3.3 - 48 SF
- UNIT 4.1 - 48 SF



FLOOR PLAN - BUILDING B - LEVEL 4

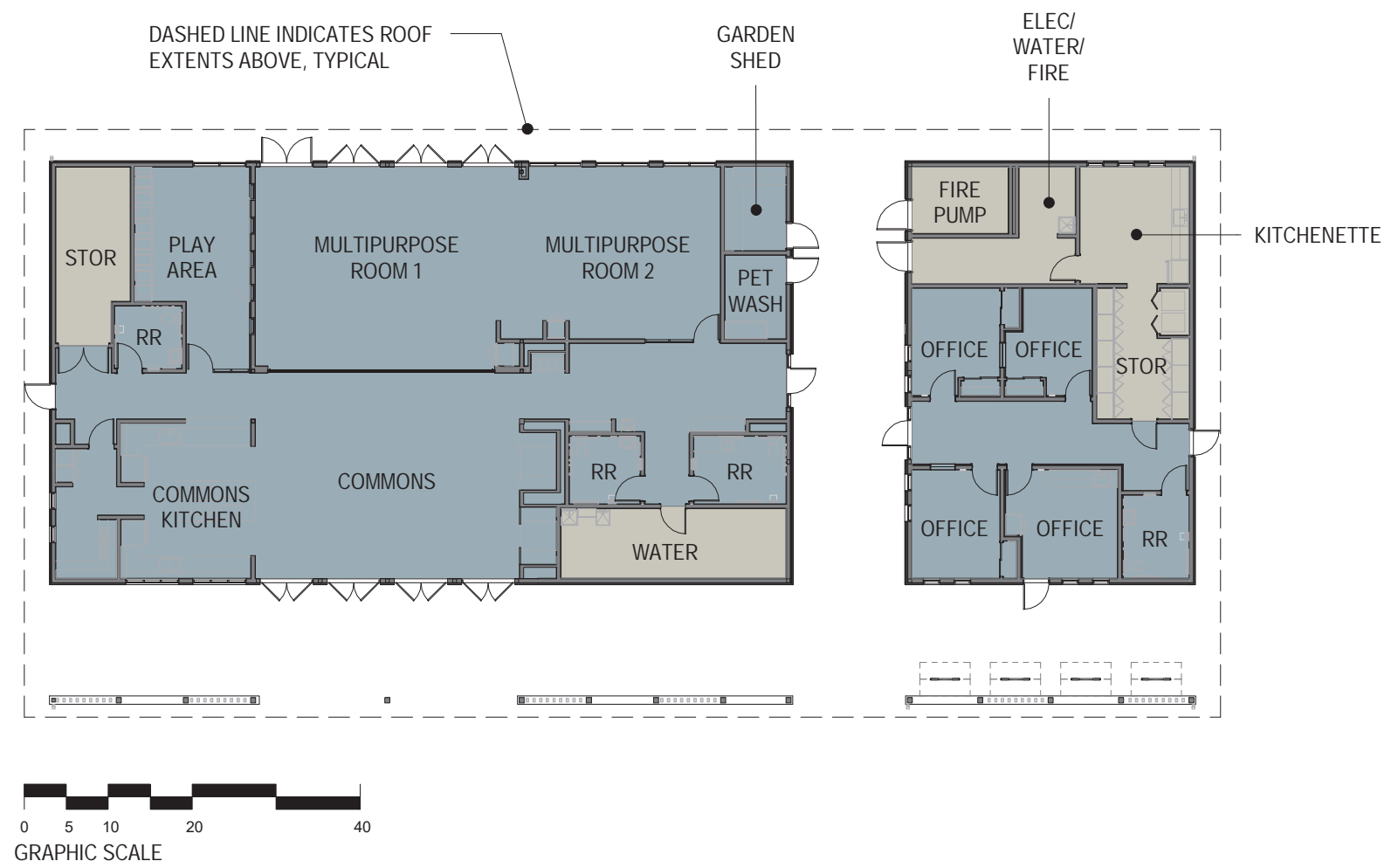
LEGEND

RESIDENT AMMENITY SPACES

SERVICE/ BACK OF HOUSE SPACES

ABBREVIATIONS:




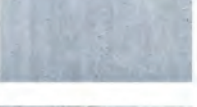

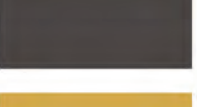



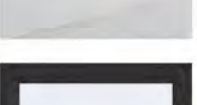
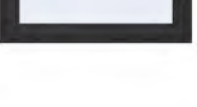
ELEC - ELECTRICAL
RES - RESIDENT
RR - RESTROOM
STOR - STORAGE



FLOOR PLAN - BUILDING C

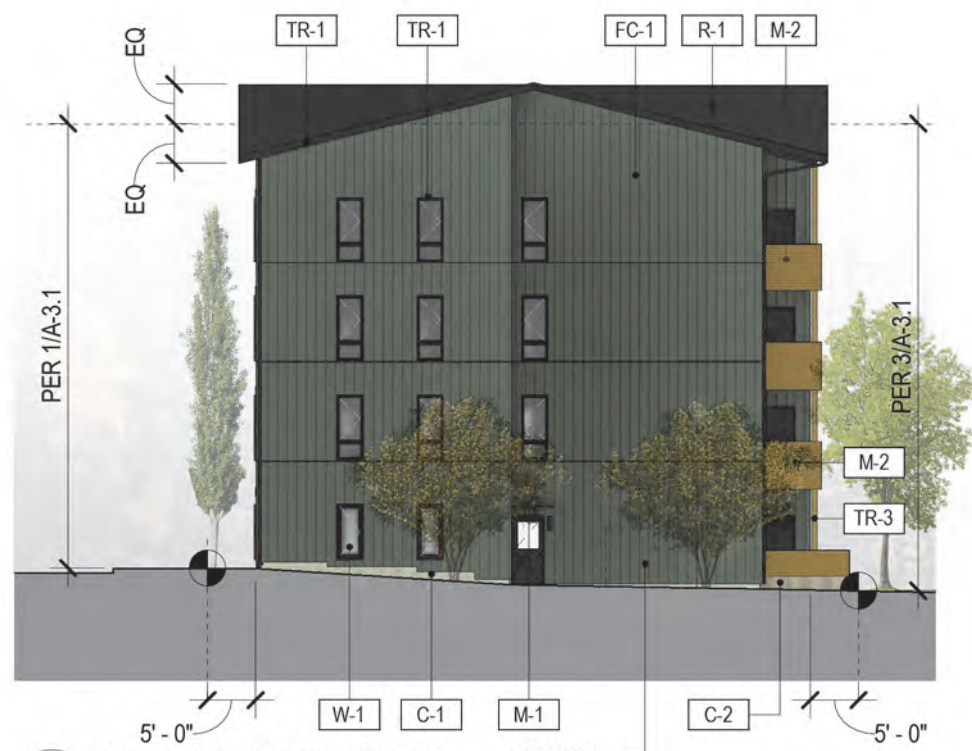
MATERIALS KEY:

REFER TO SHEET G0.02 FOR ADDITIONAL INFORMATION. ALL TAGS ARE TYPICAL CALLOUTS.

-  FC-1
-  FC-2
-  FC-3
-  WD-3
-  C-1
-  C-2
-  TR-1 & TR-2
-  TR-3
-  M-1
-  M-2
-  R-1
-  R-2
-  W-1



1 BUILDING A - EAST SIDE
SCALE: 1" = 20'-0"







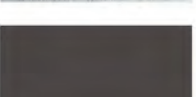




2 BUILDING A - NORTH END
SCALE: 1" = 20'-0"



3 BUILDING A - WEST SIDE
SCALE: 1" = 20'-0"

MATERIALS KEY:

REFER TO SHEET G0.02 FOR ADDITIONAL INFORMATION. ALL TAGS ARE TYPICAL CALLOUTS.

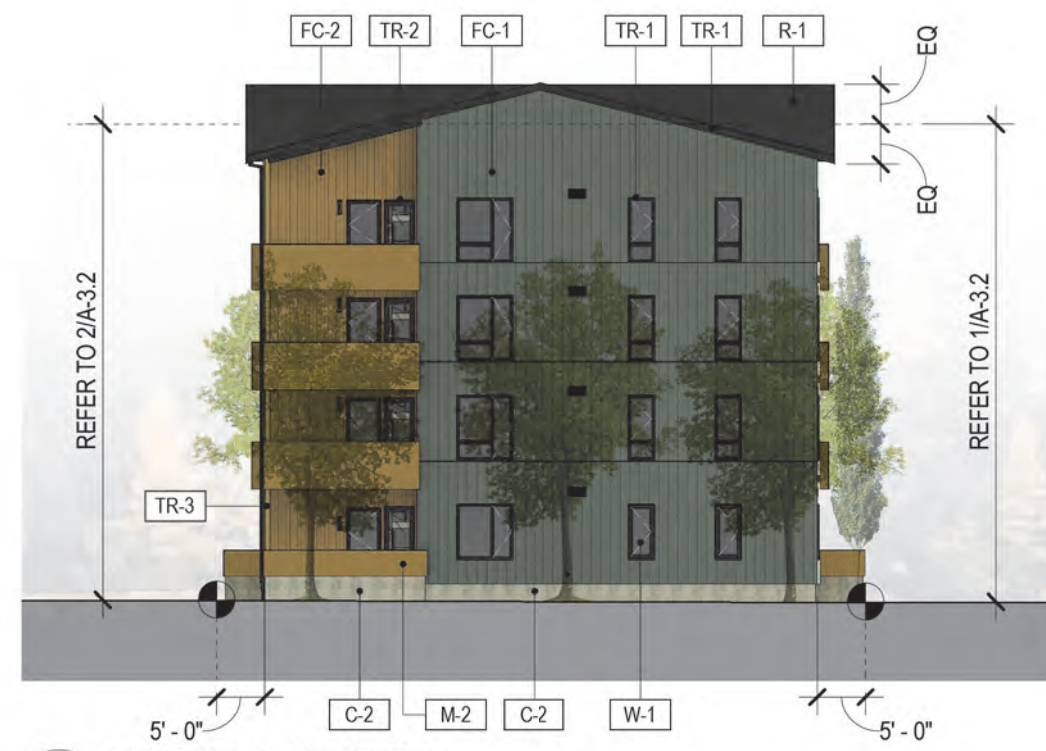
-  FC-1
-  FC-2
-  FC-3
-  WD-3
-  C-1
-  C-2
-  TR-1 & TR-2
-  TR-3
-  M-1
-  M-2
-  R-1
-  R-2
-  W-1



1 BUILDING A - SOUTH SIDE
SCALE: 1" = 20'-0"




2 BUILDING A - NORTH SIDE
SCALE: 1" = 20'-0"



3 BUILDING A - WEST END
SCALE: 1" = 20'-0"

MATERIALS KEY:

REFER TO SHEET G0.02 FOR ADDITIONAL INFORMATION. ALL TAGS ARE TYPICAL CALLOUTS.

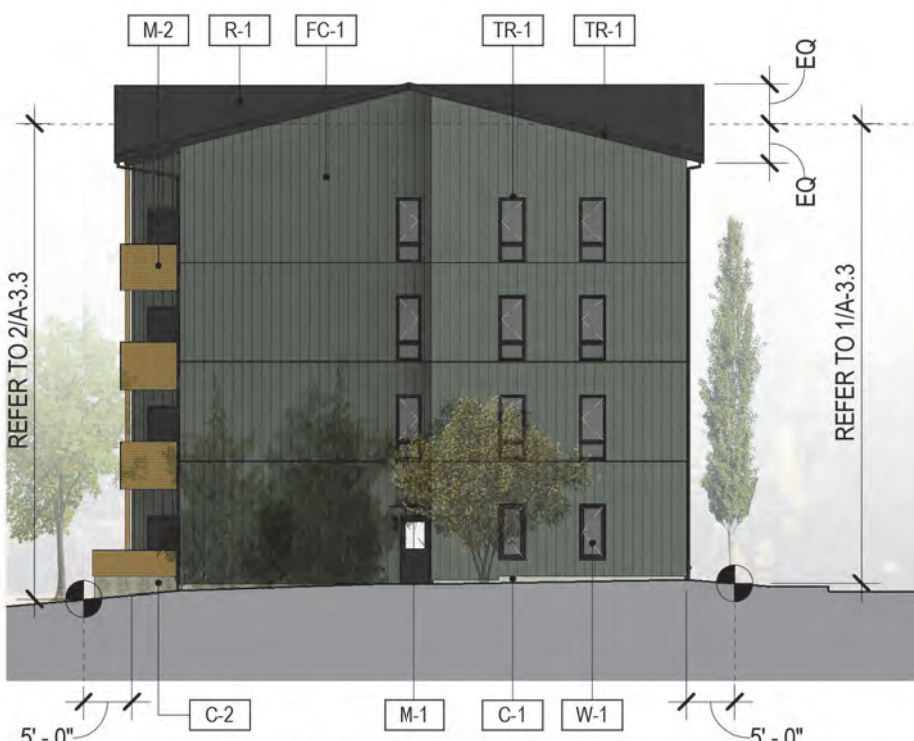
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-  FC-2
-  FC-3
-  WD-3
-  C-1
-  C-2
-  TR-1 & TR-2
-  TR-3
-  M-1
-  M-2
-  R-1
-  R-2
-  W-1



1 BUILDING B - EAST SIDE
SCALE: 1" = 20'-0"



2 BUILDING B - WEST SIDE
SCALE: 1" = 20'-0"





3 BUILDING B - SOUTH END
SCALE: 1" = 20'-0"

BUILDING ELEVATIONS - BUILDING B

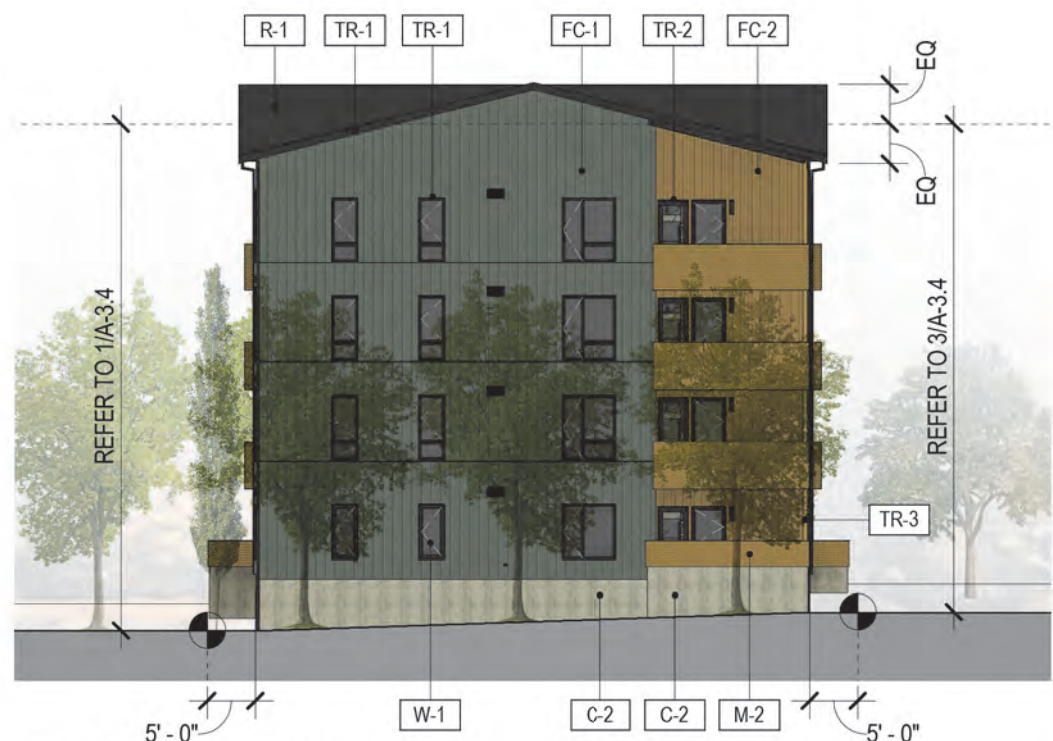
MATERIALS KEY:

REFER TO SHEET G0.02 FOR ADDITIONAL INFORMATION. ALL TAGS ARE TYPICAL CALLOUTS.

-  FC-1
-  FC-2
-  FC-3
-  WD-3
-  C-1
-  C-2
-  TR-1 & TR-2
-  TR-3
-  M-1
-  M-2
-  R-1
-  R-2
-  W-1



1 BUILDING B - NORTH SIDE
SCALE: 1" = 20'-0"





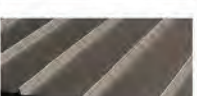
2 BUILDING B - WEST END
SCALE: 1" = 20'-0"

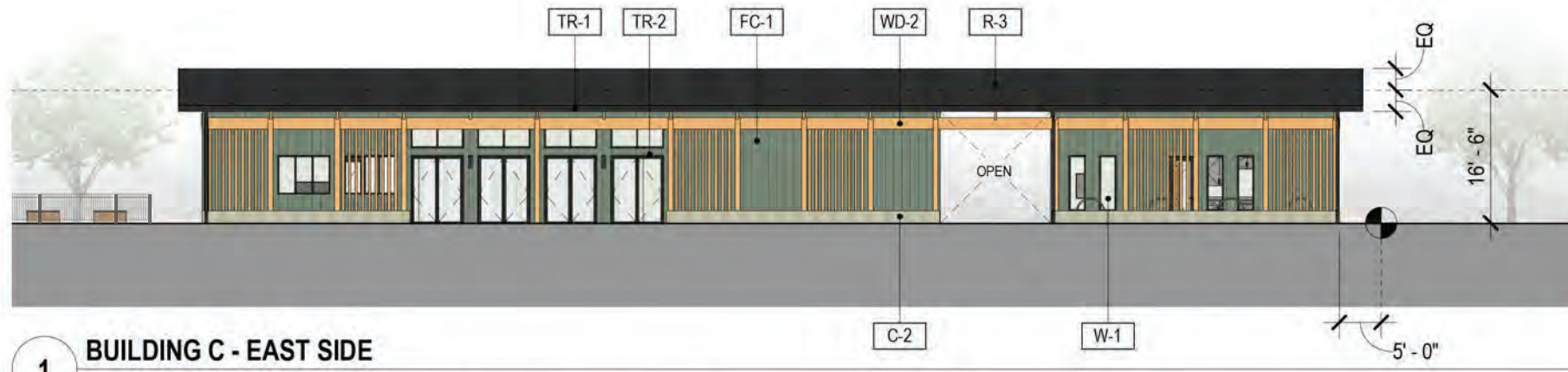


3 BUILDING B - SOUTH SIDE
SCALE: 1" = 20'-0"

MATERIALS KEY:

REFER TO SHEET G0.02 FOR ADDITIONAL INFORMATION. ALL TAGS ARE TYPICAL CALLOUTS.

-  FC-1
-  WD-1
-  WD-2
-  C-2
-  TR-1 & TR-2
-  R-3
-  W-1



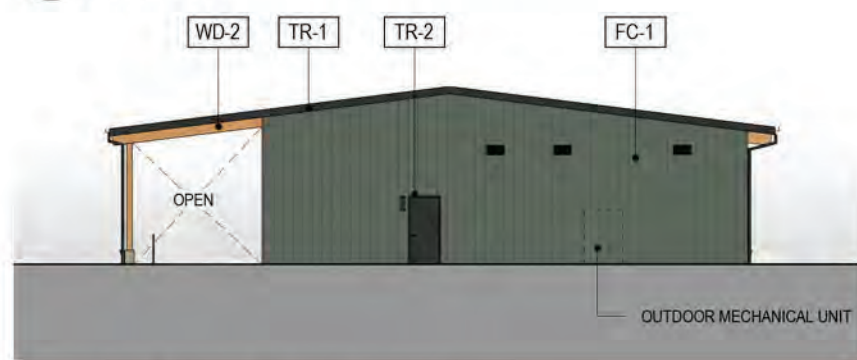
1 BUILDING C - EAST SIDE

SCALE: 1" = 20'-0"



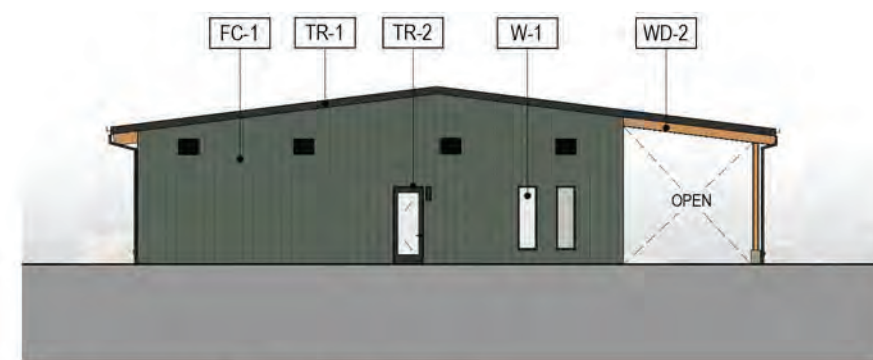
2 BUILDING C - WEST SIDE

SCALE: 1" = 20'-0"



3 BUILDING C - NORTH SIDE

SCALE: 1" = 20'-0"



4 BUILDING C - SOUTH SIDE

SCALE: 1" = 20'-0"



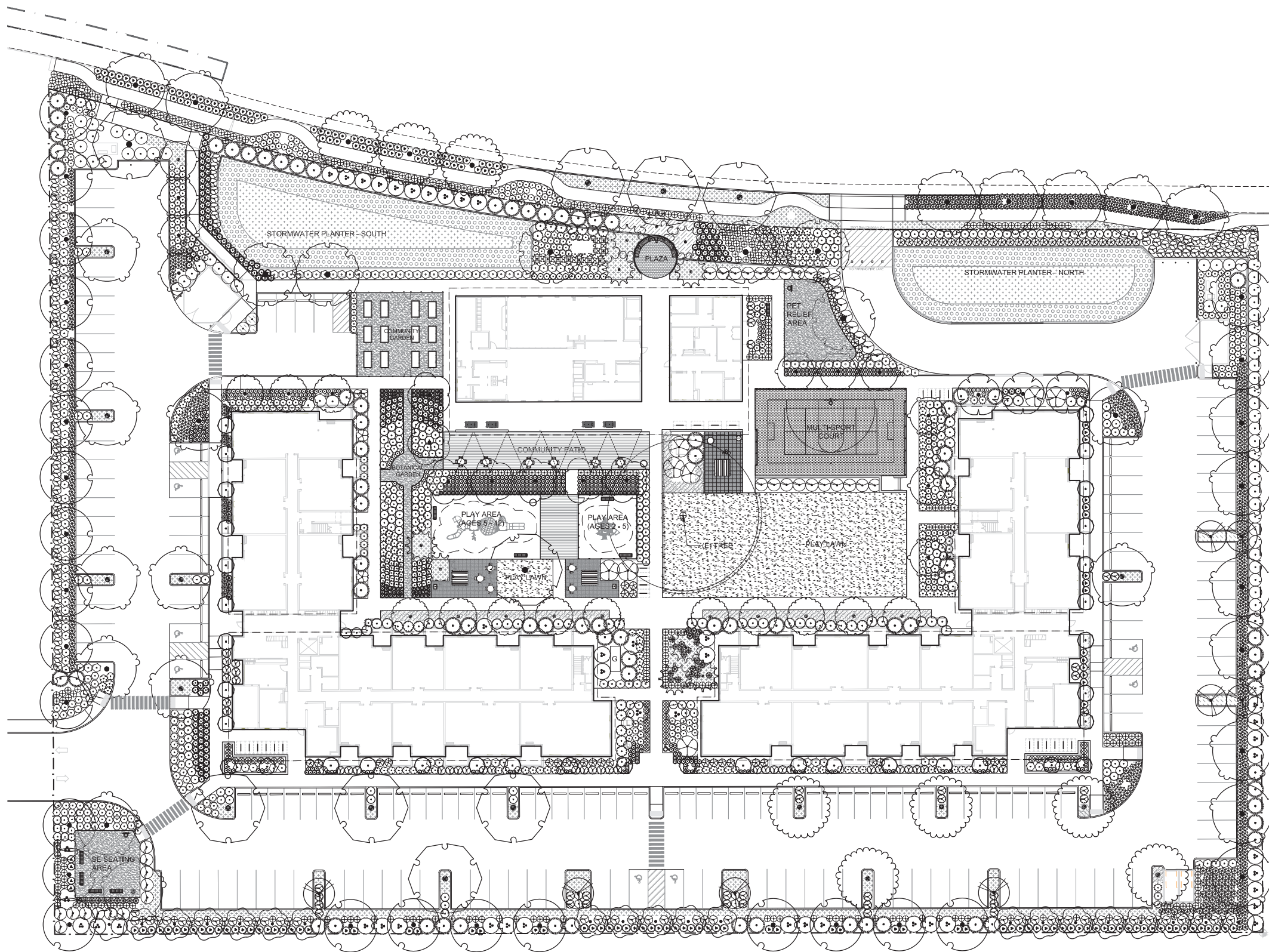
5 BUILDING C - BREEZEWAY SOUTH

SCALE: 1" = 20'-0"



6 BUILDING C - BREEZEWAY NORTH

SCALE: 1" = 20'-0"



1 LANDSCAPE PLANTING PLAN



PLANTING NOTES

1. FOR PLANT SCHEDULE, SEE SHEET L3.00.
2. ALL NEW PLANTING AREAS ARE TO BE IRRIGATED WITH A FULLY AUTOMATIC IRRIGATION SYSTEM EQUIPPED WITH A RAIN SENSOR.
3. VERIFY LOCATION OF EXISTING TREES TO REMAIN PRIOR TO SOIL PREPARATION. PROTECT ALL TREES AND SHRUBS INDICATED TO REMAIN.
4. VERIFY AND COORDINATE WORK AROUND ALL UNDERGROUND UTILITIES BEFORE EXCAVATION. NOTIFY ALL UTILITY PROVIDERS AT LEAST TWO (2) WORKING DAYS PRIOR TO BEGINNING WORK.
5. VERIFY THAT THE CONDITIONS ARE SUITABLE TO PROMOTE HEALTHY PLANT GROWTH. DO NOT PROCEED IF CONDITIONS DETRIMENTAL TO HEALTHY GROWING ENVIRONMENT ARE PRESENT, INCLUDING OVER-COMPACTED SOILS, ADVERSE DRAINAGE CONDITIONS, DEBRIS, OR OTHER HARMFUL CIRCUMSTANCES. PROCEEDING WITHOUT NOTIFICATION DENOTES ACCEPTANCE.
6. COORDINATE WITH OTHER SUBCONTRACTORS AND TRADES TO ENSURE PROTECTION OF GROWING CONDITIONS AND PLANT MATERIALS.
7. REFER TO SPECIFICATIONS FOR ADDITIONAL PLANTING REQUIREMENTS, METHODS, AND MATERIALS.
8. VERIFY PLANT QUANTITIES SHOWN ON THE PLANS BASED ON GRAPHIC REPRESENTATION. QUANTITIES SHOWN ARE FOR CONTRACTOR CONVENIENCE ONLY.
9. PROVIDE POSITIVE DRAINAGE FOR ALL PLANTING AREAS.
10. UNLESS OTHERWISE INDICATED, ALL PLANTINGS SHALL BE TRIANGULARLY SPACED.
11. LABELLING REFERS TO ALL ADJACENT IDENTICAL SYMBOLS WHERE PLANTS ARE MASSED. LABEL FOR MASS INDICATES TOTAL NUMBER OF PLANTS IN GROUP, EVEN IF THE GROUP IS SPREAD OVER MORE THAN ONE SHEET.

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23500 & 23550 SW BOONES FERRY ROAD
TUALATIN, OREGON 97062
LAND USE: ARCHITECTURAL REVIEW

PLANTING
PLAN
PROJECT NO.
#19031

REVISIONS:



L2.00

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PLANT SCHEDULE

TREES	CODE	BOTANICAL / COMMON NAME	SIZE	QTY	REMARKS		SPICE BUSH
	ACGI	ACER GINNALA AMUR MAPLE	1-1/2" CAL	3	DROUGHT TOLERANT		CASA CAMELLIA SASANQUA 'SETSUGEKKA' SETSUGEKKA CAMELLIA
	ACTA	ACER TATARICUM 'RUGGED CHARM' RUGGED CHARM TATARIAN MAPLE	1-1/2" CAL	13	DROUGHT TOLERANT		CHTE CHOISYA TERNATA MEXICAN ORANGE
	CABE	CARPINUS BETULUS 'FASTIGIATA' PYRAMIDAL EUROPEAN HORNBEAN	1-1/2" CAL	22			DEGR DEUTZIA GRACILIS 'NIKKO' SLENDER DEUTZIA
	CEJA	CERCIDIPHYLLUM JAPONICUM KATSURA TREE	1-1/2" CAL	1			GASH GAULTHERIA SHALLON SALAL
	CHNO	CHAMAECYPARIS NOOTKATENSIS 'PENDULA' WEeping NOOTKA CYPRESS	8' HT	10	DROUGHT TOLERANT		HAIN HAMAMELIS X INTERMEDIA 'JELENA' JELENA WITCH HAZEL
	COKC	CORNUS KOUSA CHINENSIS CHINESE DOGWOOD	1-1/2" CAL	7			HYQU HYDRANGEA QUERCIFOLIA 'PEE WEE' PEE WEE OAKLEAF HYDRANGEA
	FROX	FRAXINUS OXYCARPA 'RAYWOOD' RAYWOOD ASH	1-1/2" CAL	6			HYOA HYDRANGEA QUERCIFOLIA 'SNOW QUEEN' SNOW QUEEN OAKLEAF HYDRANGEA
	GIBI	GINKGO BILOBA 'AUTUMN GOLD' AUTUMN GOLD MAIDENHAIR TREE	1-1/2" CAL	8	DROUGHT TOLERANT		KEJA KERRIA JAPONICA 'PLENIFLORA' DOUBLE JAPANESE KERRIA
	GIPS	GINKGO BILOBA 'PRINCETON SENTRY' PRINCETON SENTRY MAIDENHAIR TREE	1-1/2" CAL	8	DROUGHT TOLERANT		LITE LIGUSTRUM JAPONICUM 'TEXANUM' TEXAS JAPANESE PRIVET
	POTR	POPULUS TREMULOIDES 'MOUNTAIN SENTINEL' MOUNTAIN SENTINEL QUAKING ASPEN	1-1/2" CAL	36			LIVU LIGUSTRUM VULGARE 'LODENSE' LODENSE PRIVET
	QUFR	QUERCUS FRAINETTO 'SCHMIDT' FOREST GREEN OAK	1-1/2" CAL	8	DROUGHT TOLERANT		LOPI LONICERA PILEATA PRIVET HONEYSUCKLE
	STJA	STYRAX JAPONICUS 'SNOWCONE' JAPANESE SNOWBELL	1-1/2" CAL	10			MAAQ MAHONIA AQUIFOLIUM 'COMPACTA' COMPACT OREGON GRAPE
	ZESE	ZELKOVA SERRATA 'GREEN VASE' GREEN VASE SAWLEAF ZELKOVA	1-1/2" CAL	27			MAXM MAHONIA X MEDIA 'WINTER SUN' WINTER SUN MAHONIA
	ZEMU	ZELKOVA SERRATA 'MUSASHINO' MUSASHINO SAWLEAF ZELKOVA	1-1/2" CAL	20			MYCA MYRICA CALIFORNICA PACIFIC WAX MYRTLE
	FRHI	FRAGARIA CHILOENSIS BEACH STRAWBERRY	1 GAL.	24" o.c.	68	NATIVE. DROUGHT TOLERANT	NAUL NANDINA DOMESTICA 'GULF STREAM' TM GULF STREAM HEAVENLY BAMBOO
	LION	LIRIOPE MUSCARI 'MONROE'S WHITE' MONROE'S WHITE LILYTURF	1 GAL.	12" o.c.	54	DROUGHT TOLERANT	PEAL PENNSETUM ALOPECUROIDES 'HAMELN' HAMELN FOUNTAIN GRASS
	MANE	MAHONIA NERVOSA OREGON GRAPE	1 GAL.	24" o.c.	333	NATIVE DROUGHT TOLERANT	POMU POLYSTICHUM MUNITUM WESTERN SWORD FERN
	MARE	MAHONIA REPENS CREEPING MAHONIA	1 GAL.	24" o.c.	1,264	NATIVE DROUGHT TOLERANT	PRAU PRUNUS LAUROCERASUS 'MOUNT VERNON' MOUNT VERNON ENGLISH LAUREL
	RODF	ROSA X 'MEIGALPIO' TM RED DRIFT GROUNDCOVER ROSE	1 GAL.	30" o.c.	68	DROUGHT TOLERANT	RISA RIBES SANGUINEUM 'WHITE ICICLE' WHITE ICICLE FLOWERING CURRRANT
							ROUT ROSA NUTKANA NOOTKA ROSE
							ROD2 ROSA X 'MEIGALPIO' TM RED DRIFT GROUNDCOVER ROSE
							RO43 ROSA X 'NOARE' TM FLOWER CARPET RED GROUNDCOVER ROSE
							ROTF ROSA X 'THE FAIRY' THE FAIRY SHRUB ROSE
							SAUS SARCOCOCCA RUSCIFOLIA FRAGRANT SWEETBOX
							SPJA SPIRAEA JAPONICA 'LITTLE PRINCESS' LITTLE PRINCESS JAPANESE SPIREA
							SPJW SPIRAEA JAPONICA 'WALBUMA' MAGIC CARPET JAPANESE SPIREA
							SYLB SYMPHORICARPUS ALBUS COMMON WHITE SNOWBERRY
							VAVA VACCINIUM OVATUM EVERGREEN HUCKLEBERRY
							VIPT VIBURNUM PPLICATUM TOMENTOSUM 'MARIESII' MARIE DOUBLEFILE VIBURNUM
							VIIN VIBURNUM TINUS 'SPRING BOUQUET' SPRING BOUQUET LAURUSTINUS
							WEFL WEIGELA FLORIDA 'BOKRASPIWT' SPILLED WINE WEIGELA

PLANT SCHEDULE - STORMWATER FACILITIES - SOUTH

	BOTANICAL NAME / COMMON NAME	SIZE	SPACING	QTY
ZONE A (BOTTOM)	TOTAL AREA: 2,232 SF			
	CAREX OBNUPTA / SLOUGH SEDGE JUNCUS PATENS / CALIFORNIA GRAY RUSH SCIRPUS MICROCARPUS / SMALL-FRUITED BULRUSH		PLUGS, 6" HT. MIN. 6 PLUGS / SF PLUGS, 6" HT. MIN. 6 PLUGS / SF	4,464 4,464
ZONE B (SIDE SLOPES)	TOTAL AREA: 2,960 SF			
	TREES: ACER MACROPHYLLUM / BIGLEAF MAPLE PSEUDOTSUGA MENZIESII / DOUGLAS FIR ACER CIRCINATUM / VINE MAPLE ABIES GRANDIS / GRAND FIR	2 GAL. / 3' HT. MIN. 2 GAL. / 3' HT. MIN. 2 GAL. / 3' HT. MIN. 2 GAL. / 3' HT. MIN.	10'-0" O.C. 10'-0" O.C. 10'-0" O.C. 10'-0" O.C.	8 7 8 7
	SHRUBS: CORNUS SERICEA / RED TWIG DOGWOOD MAHONIA AQUIFOLIUM / OREGON GRAPE OEMLERIA CERASIFORMIS / INDIAN PLUM SPIRAEA DOUGLASII / WESTERN SPIREA SYMPHORICARPUS ALBUS / SNOWBERRY	1 GAL. / 18" HT. MIN. 1 GAL. / 24" HT. MIN. 1 GAL. / 24" HT. MIN. 1 GAL. / 24" HT. MIN.	10'-0" O.C. 6'-0" O.C. 6'-0" O.C. 6'-0" O.C.	30 30 30 29
	SEEDING: FREEBOARD AREA SEED MIX: SEE SPECS			
STORMWATER BASIN - SOUTH: CWS PLANTING REQUIREMENTS				
TOTAL TREATMENT AREA ZONE A	= 2,232 SF			
TOTAL NUMBER OF PLUGS, ZONE A (TOTAL SF X 6)	= 13,392			
TOTAL TREATMENT AREA ZONE B	= 2,882 SF			
TOTAL NUMBER OF TREES, ZONE B (TOTAL SF X .01)	= 29			
TOTAL NUMBER OF SHRUBS, ZONE B (TOTAL SF X .05)	= 144			
TOTAL FREEBOARD AREA SEEDING	= 2,882 SF			

PLANT SCHEDULE - STORMWATER FACILITIES - NORTH

	BOTANICAL NAME / COMMON NAME	SIZE	SPACING	QTY
ZONE A (BOTTOM)	TOTAL AREA: 1,783 SF			
	CAREX OBNUPTA / SLOUGH SEDGE JUNCUS PATENS / CALIFORNIA GRAY RUSH SCIRPUS MICROCARPUS / SMALL-FRUITED BULRUSH		PLUGS, 6" HT. MIN. 6 PLUGS / SF PLUGS, 6" HT. MIN. 6 PLUGS / SF	3,566 3,566
ZONE B (SIDE SLOPES)	TOTAL AREA: 2,327 SF			
	TREES: ACER MACROPHYLLUM / BIGLEAF MAPLE PSEUDOTSUGA MENZIESII / DOUGLAS FIR ACER CIRCINATUM / VINE MAPLE ABIES GRANDIS / GRAND FIR	2 GAL. / 3' HT. MIN. 2 GAL. / 3' HT. MIN. 2 GAL. / 3' HT. MIN. 2 GAL. / 3' HT. MIN.	10'-0" O.C. 10'-0" O.C. 10'-0" O.C. 10'-0" O.C.	6 6 6 5
	SHRUBS: CORNUS SERICEA / RED TWIG DOGWOOD MAHONIA AQUIFOLIUM / OREGON GRAPE OEMLERIA CERASIFORMIS / INDIAN PLUM SPIRAEA DOUGLASII / WESTERN SPIREA SYMPHORICARPUS ALBUS / SNOWBERRY	1 GAL. / 18" HT. MIN. 1 GAL. / 24" HT. MIN. 1 GAL. / 24" HT. MIN. 1 GAL. / 24" HT. MIN.	10'-0" O.C. 6'-0" O.C. 6'-0" O.C. 6'-0" O.C.	23 23 23 24
	SEEDING: FREEBOARD AREA SEED MIX: SEE SPECS			
STORMWATER BASIN - NORTH: CWS PLANTING REQUIREMENTS				
TOTAL TREATMENT AREA ZONE A	= 1,783 SF			
TOTAL NUMBER OF PLUGS, ZONE A (TOTAL SF X 6)	= 10,698			
TOTAL TREATMENT AREA ZONE B	= 2,264 SF			
TOTAL NUMBER OF TREES, ZONE B (TOTAL SF X .01)	= 23			
TOTAL NUMBER OF SHRUBS, ZONE B (TOTAL SF X .05)	= 113			
TOTAL FREEBOARD AREA SEEDING	= 2,264 SF			

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LAND USE: ARCHITECTURAL REVIEW

PLANT
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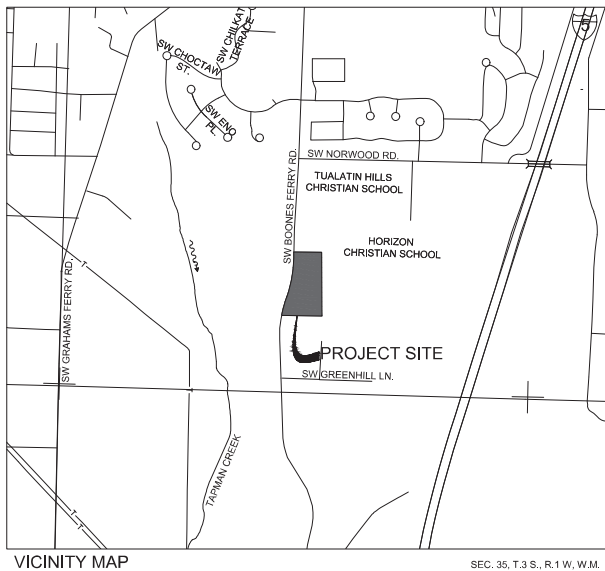


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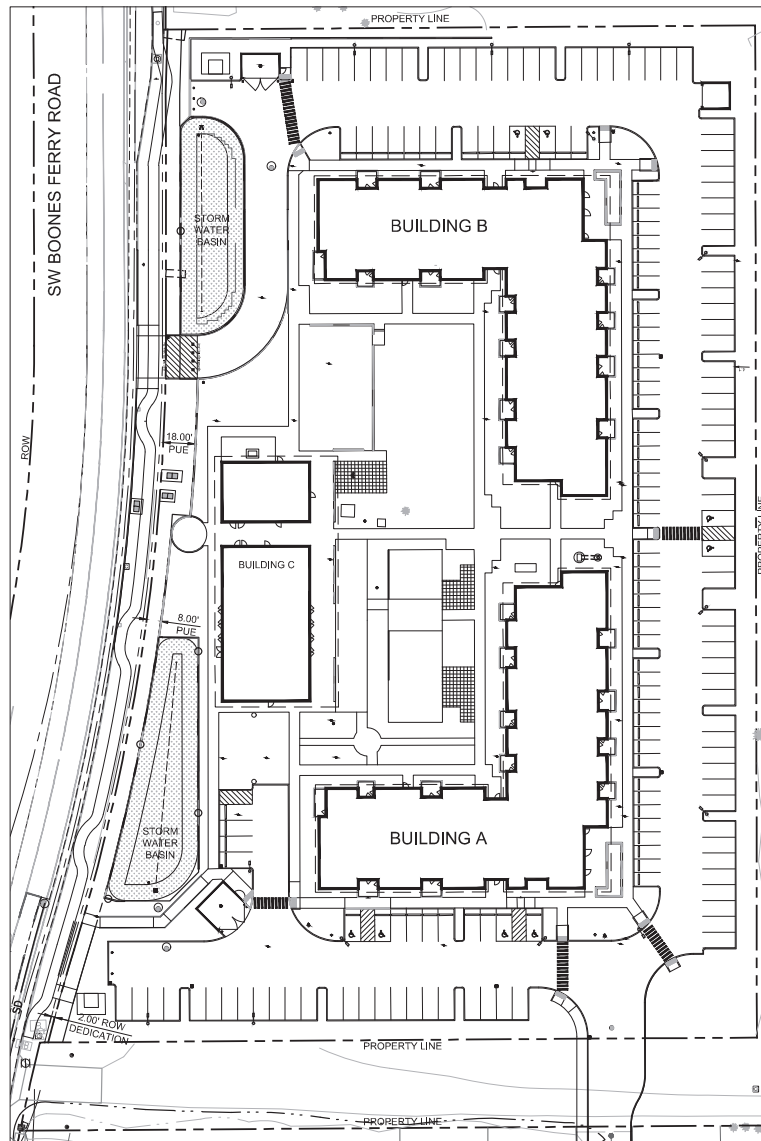
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PLAMBECK GARDENS

CIVIL PLANS



VICINITY MAP
NTS
SEC. 35, T.3 S., R.1 W., W.M.



SITE MAP

GENERAL NOTES

- ALL CONSTRUCTION, MATERIALS, AND WORKMANSHIP SHALL CONFORM TO THE LATEST STANDARDS AND PRACTICES OF THE CITY OF TUALATIN, WASHINGTON COUNTY, THE OREGON STRUCTURAL SPECIALTY CODE (BUILDING CODE), OREGON PLUMBING SPECIALTY CODE (PLUMBING CODE), AND THE OREGON FIRE CODE (FIRE CODE), LATEST EDITIONS.
- ALL PERMITS AND LICENSES NECESSARY FOR THE EXECUTION AND COMPLETION OF THE WORK SHALL BE SECURED BY THE CONTRACTOR PRIOR TO COMMENCING CONSTRUCTION.
- ALL EXCAVATORS MUST COMPLY WITH THE RULES ADOPTED BY THE OREGON UTILITY NOTIFICATION CENTER, INCLUDING NOTIFICATION OF ALL OWNERS OF UNDERGROUND UTILITIES AT LEAST 48 BUSINESS DAY HOURS, BUT NOT MORE THAN 10 BUSINESS DAYS, BEFORE COMMENCING AN EXCAVATION. THOSE RULES ARE SET FORTH IN OAR 852-001-0010 THROUGH OAR 852-001-0090 AND ORS 757.541 TO 757.57. THE TELEPHONE NUMBER FOR THE OREGON UTILITY NOTIFICATION CENTER IS 503-232-1987 AND THE LOCAL "CALL 48 HOURS BEFORE YOU DIG NUMBER" IS 503-246-6699.
- THE LOCATION OF EXISTING UNDERGROUND UTILITIES SHOWN ON THE PLANS IS FOR INFORMATION ONLY AND IS NOT GUARANTEED TO BE ACCURATE. CONTRACTOR SHALL VERIFY ELEVATIONS OF ALL UNDERGROUND UTILITY CONNECTION POINTS PRIOR TO COMMENCING WITH CONSTRUCTION AND SHALL BRING ANY DISCREPANCIES TO THE ATTENTION OF VEGA CIVIL ENGINEERING, LLC. POTHOLE ALL CROSSINGS AS NECESSARY BEFORE CONSTRUCTION TO PREVENT GRADE AND ALIGNMENT CONFLICTS.
- VEGA CIVIL ENGINEERING, LLC, ASSUMES NO RESPONSIBILITY FOR ANY DISCREPANCIES ENCOUNTERED BETWEEN THE CURRENT FIELD CONDITIONS AND THE INFORMATION SHOWN ON THE SURVEY MAP. THE CONTRACTOR IS RESPONSIBLE FOR REPORTING ANY DISCREPANCIES TO THE OWNER'S REPRESENTATIVE.

GRADING & PAVING NOTES

- ALL SURFACES SHALL HAVE A MINIMUM 1.5% SLOPE UNLESS OTHERWISE NOTED ON THE PLANS. ALL SURFACES SHALL MEET EXISTING GRADES SMOOTHLY AND EVENLY AND MAINTAIN CONSTANT SLOPES UNLESS OTHERWISE NOTED ON THE PLANS.
- THE CONTRACTOR SHALL NOTIFY VEGA CIVIL ENGINEERING, LLC IF THE GRADING PLAN DOES NOT PROVIDE POSITIVE DRAINAGE OR IF SLOPE CALLOUTS DO NOT MATCH SPOT GRADES.
- THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING EXISTING SITE AND DRAINAGE PATTERNS AND THE PROTECTION OF EXISTING ENGINEERED DRAINAGE FACILITIES.
- THE CONTRACTOR SHALL REPLACE AND RESTORE AREAS NOT SCHEDULED FOR CONSTRUCTION TO THEIR ORIGINAL CONDITION AND TO THE APPROVAL OF THE OWNER'S REPRESENTATIVE.
- THE CONTRACTOR SHALL EXERCISE EXTREME CAUTION WHEN WORKING IN AREAS ADJACENT TO EXISTING TREES IN ORDER TO MINIMIZE DISTURBANCES TO TREE ROOTS. THE CONTRACTOR SHALL INSTALL TREE PROTECTION FENCING, NO PARKING VEHICLES UNDER TREES.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR DEMOLITION AND DISPOSAL OF EXISTING AC, CURBS, SIDEWALKS AND OTHER SITE ELEMENTS WITHIN THE LIMITS OF DEMOLITION. DISPOSE OF DEMOLISHED ITEMS OFF-SITE IN A LEGAL MANNER.
- ACTUAL LINES AND GRADES OF EXCAVATION SHALL BE STAKED BY A QUALIFIED SURVEYOR, BASED ON INFORMATION SHOWN ON THE PLANS. THE CONTRACTOR SHALL RETAIN A SURVEYOR LICENSED IN OREGON.
- ADJUST ALL INCIDENTAL STRUCTURES, MANHOLE LIDS, VALVE BOXES, ETC. TO FINISH GRADE.
- PAVING WILL NOT BE ALLOWED DURING WET OR COLD WEATHER.
- ALL CONSTRUCTION WITHIN THE RIGHT-OF-WAY SHALL HAVE AN APPROVED TRAFFIC CONTROL PLAN.
- ALL CONSTRUCTION WITHIN THE RIGHT-OF-WAY SHALL BE PERMITTED UNDER A SEPARATE PERMIT AS SHOWN ON THE PLANS.

UTILITY NOTES

- MATERIALS SHALL BE NEW. THE USE OF MANUFACTURER'S NAMES, MODELS, AND NUMBERS IS INTENDED TO ESTABLISH STYLE, QUALITY, APPEARANCE, AND USEFULNESS. PROPOSED SUBSTITUTIONS WILL REQUIRE WRITTEN APPROVAL FROM CITY ENGINEER PRIOR TO INSTALLATION.
- ALL ON-SITE WATER, STORM AND SANITARY SEWER PIPE MATERIALS, AND FITTINGS SHALL CONFORM TO THE OREGON STATE PLUMBING SPECIALTY CODE, LATEST EDITION.
- ON-SITE WATER MAINS SHALL BE PVC PIPE, CONFORMING TO AWWA C900 OR APPROVED SPEC SUBSTITUTIONS. ON-SITE WATER MAINS SHALL BE MECHANICALLY RESTRAINED.
- ON-SITE STORM SEWER PIPE SHALL BE PVC PIPE CONFORMING TO ASTM D3034 SDR 35, OR HDPE PIPE (ADS "N-12" OR APPROVED EQUAL) CONFORMING TO AASHTO M252 WITH WATER-TIGHT JOINTS, OR APPROVED SUBSTITUTIONS.
- ON-SITE STORM SEWER PIPE WITH LESS THAN 2' OF COVER SHALL BE HDPE PIPE.
- ON-SITE AREA DRAINS SHALL BE MANUFACTURED BY GIBSON STEEL BASINS OR APPROVED EQUAL.
- ON-SITE SANITARY SEWER PIPE SHALL BE PVC PIPE CONFORMING TO ASTM D3034, SDR 35, OR APPROVED SUBSTITUTE.
- ALL WATER AND SANITARY SEWER FACILITIES AND THE INSTALLATION THEREOF, SHALL FOLLOW THE CURRENT OREGON STATE PLUMBING SPECIALTY CODE AND THE CURRENT EDITION OF APWA WITH CITY OF TUALATIN DURING CONSTRUCTION.
- ALL TRENCH BACKFILL SHALL BE AS SHOWN ON THE PIPE BEDDING AND BACKFILL DETAIL. FLOODING OR JETTING THE BACKFILLED TRENCHES WITH WATER IS NOT PERMITTED.
- CONNECTIONS TO EXISTING UTILITIES SHALL CONFORM WITH THE CITY OF TUALATIN ENGINEERING DESIGN MANUAL AND STANDARD DRAWINGS.
- ALL WATER AND FIRE PROTECTION PIPE SHALL HAVE A MINIMUM 36-INCH COVER TO FINISHED GRADE.
- ALL WATER LINES SHALL BE THOROUGHLY FLUSHED, CHLORINATED AND TESTED IN ACCORDANCE WITH THE OREGON STATE HEALTH DEPARTMENT PRIOR TO ANY METER HOOK-UP SERVICE.
- BEGIN LAYING STORM AND SANITARY SEWER PIPE AT THE LOW POINT OF THE SYSTEM TRUE TO GRADE AND ALIGNMENT INDICATED WITH UNBROKEN CONTINUITY OF INVERT. ESTABLISH LINE AND GRADE FOR THE STORM AND SANITARY SEWER PIPE BY THE USE OF A LASER.
- CONTRACTOR TO MAINTAIN A MINIMUM 5' HORIZONTAL AND 18" VERTICAL SEPARATION BETWEEN ALL EXISTING AND PROPOSED WATER AND SANITARY SEWER LINES.
- FOR CROSSINGS OF WATER LINES AND SANITARY SEWER LINES, THE OREGON STATE HEALTH DEPARTMENT CRITERIA SHALL APPLY.
- PG&E AND OTHER PRIVATE UTILITY COMPANIES SHALL OBTAIN PERMITTING FROM CITY OF TUALATIN TO INSTALL CONDUIT IN THE PUBLIC RIGHT-OF-WAY.
- THE CONTRACTOR SHALL VACUUM OUT ALL TRAPPED INLETS AND MANHOLES AT THE END OF CONSTRUCTION.
- CONTRACTOR TO ADJUST ALL EXISTING OR NEW FLEXIBLE UTILITIES (WATER, GAS, TV, TELEPHONE, ELEC., ETC.) TO CLEAR ANY EXISTING OR NEW GRAVITY DRAIN UTILITIES (STORM DRAIN, SANITARY SEWER, ETC.) IF CONFLICT OCCURS.
- CONTRACTOR SHALL EXERCISE CARE IN ALL OPERATIONS TO PROTECT EXISTING UNDERGROUND UTILITIES. ANY DAMAGE RESULTING FROM THIS WORK MUST BE RESTORED AT THE CONTRACTOR'S EXPENSE TO THE APPROVAL OF THE OWNER'S REPRESENTATIVE.

PROJECT CONTACTS

OWNER:
COMMUNITY PARTNERS FOR AFFORDABLE HOUSING
6380 SW GARTOOL HIGHWAY #151
PORTLAND, OR 97239
(503) 293-4038
CONTACT: JILIAN SAURAGE FELTON

ENGINEER:
VEGA CIVIL ENGINEERING, LLC
1300 SE STARK STREET #201
PORTLAND, OR 97214
(503) 662-1901
CONTACT: MARTHA WILLIAMSON, PE

SURVEYOR:
REPRETO & ASSOCIATES, INC.
12730 SE STARK ST
PORTLAND, OR 97233
(503) 405-1507
CONTACT: STEVEN P. BUCKLES

OTAK
806 SW 3RD AVE., STE. 800
PORTLAND, OR 97204
(503) 287-6825

LEGEND

EXISTING	DESCRIPTION	PROPOSED
	MANHOLE	
	CATCH BASIN	
	WATER METER	
	GUY WIRE ANCHOR	
	STREETLIGHT	
	UTILITY POLE	
	SIGN	
	TREE	
	PROPERTY LINE	
	CENTERLINE	
	SAWCUT LINE	
	EDGE OF PAVEMENT	
	CURB	
	STORM DRAIN	
	SANITARY SEWER	
	FIRE	
	WATER	
	OVERHEAD UTILITY	
	GAS	
	POWER	
	TELECOM	
	CONCRETE SIDEWALK	
	MINOR CONTOUR	
	MAJOR CONTOUR	
	LIMITS OF GRIND AND INLAY	

ABBREVIATIONS

AC	ASPHALTIC CONCRETE	LT	LEFT
BC	BOTTOM OF CURB	MAX	MAXIMUM
BGS	BELOW GROUND SURFACE	MIN	MINIMUM
BPZ	BACK OF PEDESTRIAN ZONE	NO	NUMBER
BZ	BUILDING ZONE	NTS	NOT TO SCALE
CL	CENTERLINE	ODOT	OREGON DEPARTMENT OF TRANSPORTATION
CONC	CONCRETE	PC	POINT OF CURVATURE
CONST	CITY OF TUALATIN	PROP	PROPOSED
COT	CITY OF TUALATIN	PT	POINT OF TANGENCY
d	DISTANCE	PVMT	PAVEMENT
DTL	DETAIL	R	RADIUS
EXIST(E)	EXISTING	ROW	RIGHT OF WAY
EG	EXISTING GROUND	RT	RIGHT
FF	FINISHED FLOOR	SD	STORM DRAIN
FS	FIRE SERVICE	STA	STATION
FPZ	FRONT OF PEDESTRIAN ZONE	STD	STANDARD
FZ	FURNISHING ZONE	TC	TOP OF CURB
GGUT	GUTTER	TP	TOP OF PAVEMENT
GB	GRADE BREAK	TYP	TYPICAL
H	HORIZONTAL	V	VERTICAL
HP	HIGH POINT		
IE	INVERT ELEVATION		
L	LENGTH		

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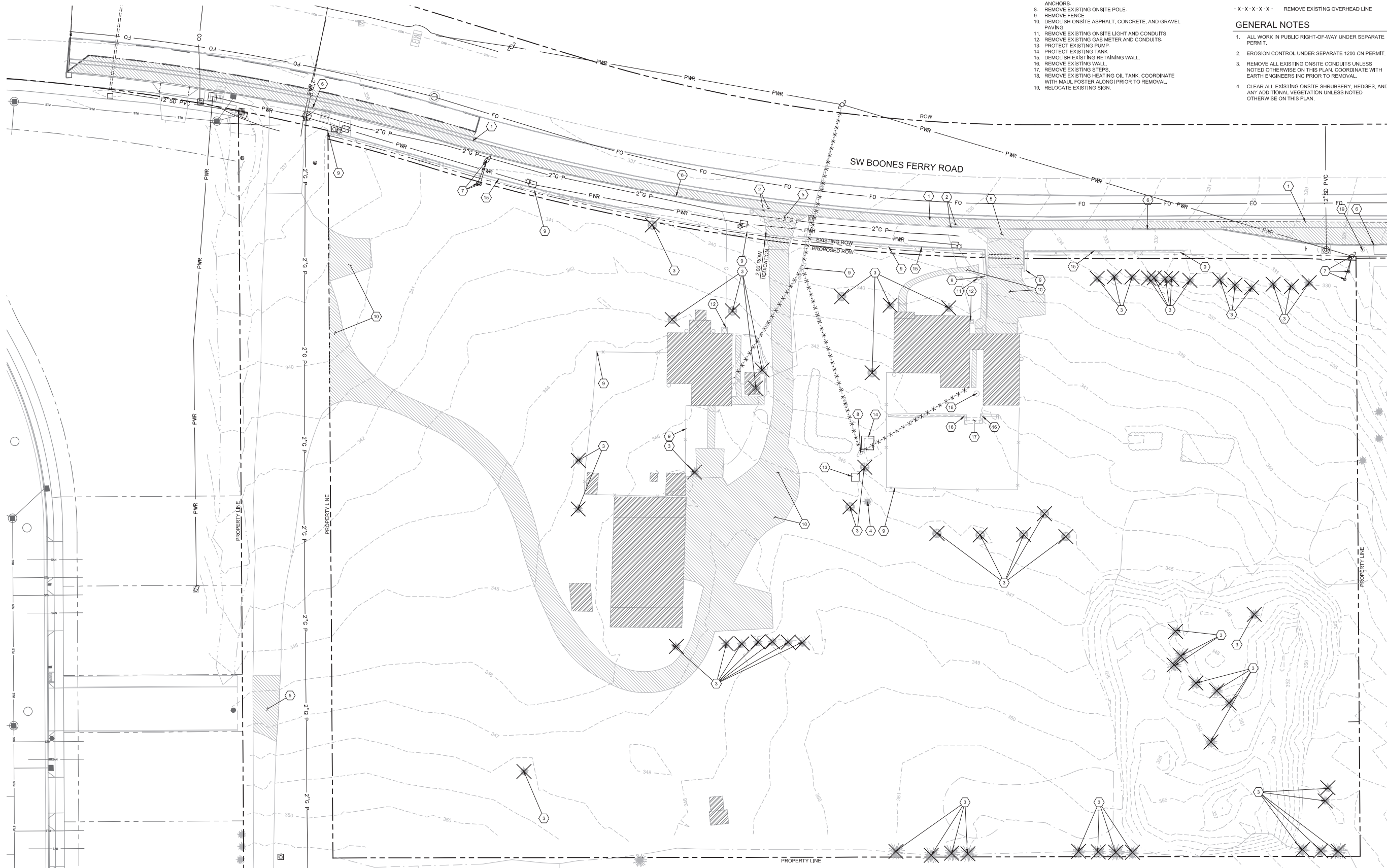
COVER SHEET

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#19031

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CONSTRUCTION NOTES

1. SAWCUT, TYPICAL.
2. REMOVE EXISTING CURB AND ASPHALT PAVING.
3. REMOVE EXISTING TREE.
4. PROTECT EXISTING TREE, SEE ARBORIST REPORT AND LANDSCAPE PLANS.
5. DEMOLISH EXISTING DRIVEWAY.
6. PROTECT EXISTING CURB.
7. PROTECT EXISTING UTILITY POLE AND GUY WIRE ANCHORS.
8. REMOVE EXISTING ONSITE POLE.
9. REMOVE FENCE.
10. DEMOLISH ONSITE ASPHALT, CONCRETE, AND GRAVEL PAVING.
11. REMOVE EXISTING ONSITE LIGHT AND CONDUITS.
12. REMOVE EXISTING GAS METER AND CONDUITS.
13. PROTECT EXISTING PUMP.
14. PROTECT EXISTING TANK.
15. DEMOLISH EXISTING RETAINING WALL.
16. REMOVE EXISTING WALL.
17. REMOVE EXISTING STEPS.
18. REMOVE EXISTING HEATING OIL TANK. COORDINATE WITH MAUL FOSTER ALONG PRIOR TO REMOVAL.
19. RELOCATE EXISTING SIGN.

SHEET LEGEND

- DEMOLISH EXISTING ASPHALT PAVING, CONCRETE, AND CURBS TO CUT LINE.
- DEMOLISH EXISTING BUILDINGS.
- REMOVE EXISTING TREE.
- REMOVE EXISTING OVERHEAD LINE.

GENERAL NOTES

1. ALL WORK IN PUBLIC RIGHT-OF-WAY UNDER SEPARATE PERMIT.
2. EROSION CONTROL UNDER SEPARATE 1200-CN PERMIT.
3. REMOVE ALL EXISTING ONSITE CONDUITS UNLESS NOTED OTHERWISE ON THIS PLAN. COORDINATE WITH EARTH ENGINEERS INC PRIOR TO REMOVAL.
4. CLEAR ALL EXISTING ONSITE SHRUBBERY, HEDGES, AND ANY ADDITIONAL VEGETATION UNLESS NOTED OTHERWISE ON THIS PLAN.

DEMOLITION PLAN

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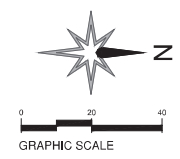
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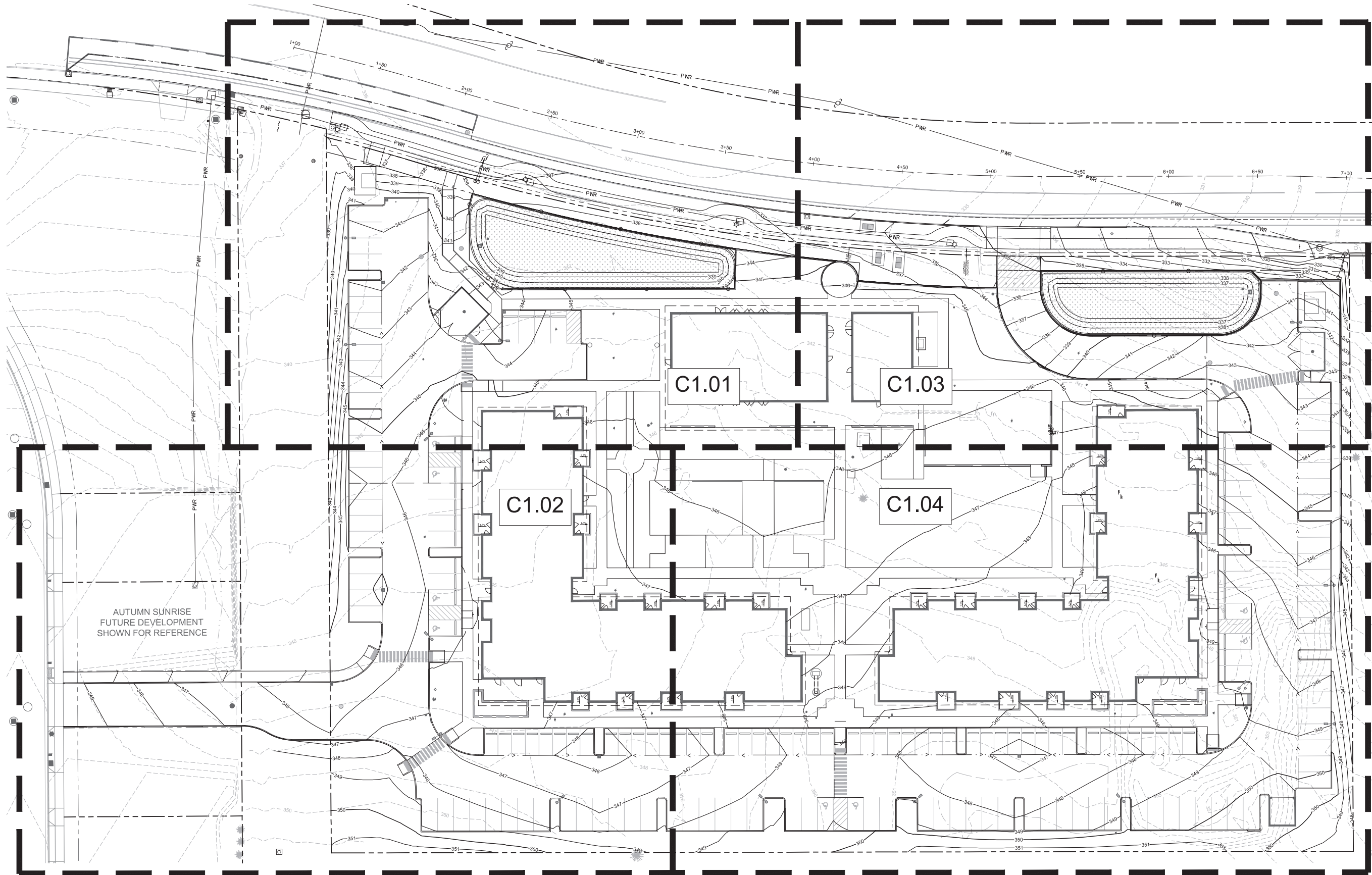
DEMOLITION PLAN

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GRADING PLAN -
OVERALL

PROJECT NO.
#19031

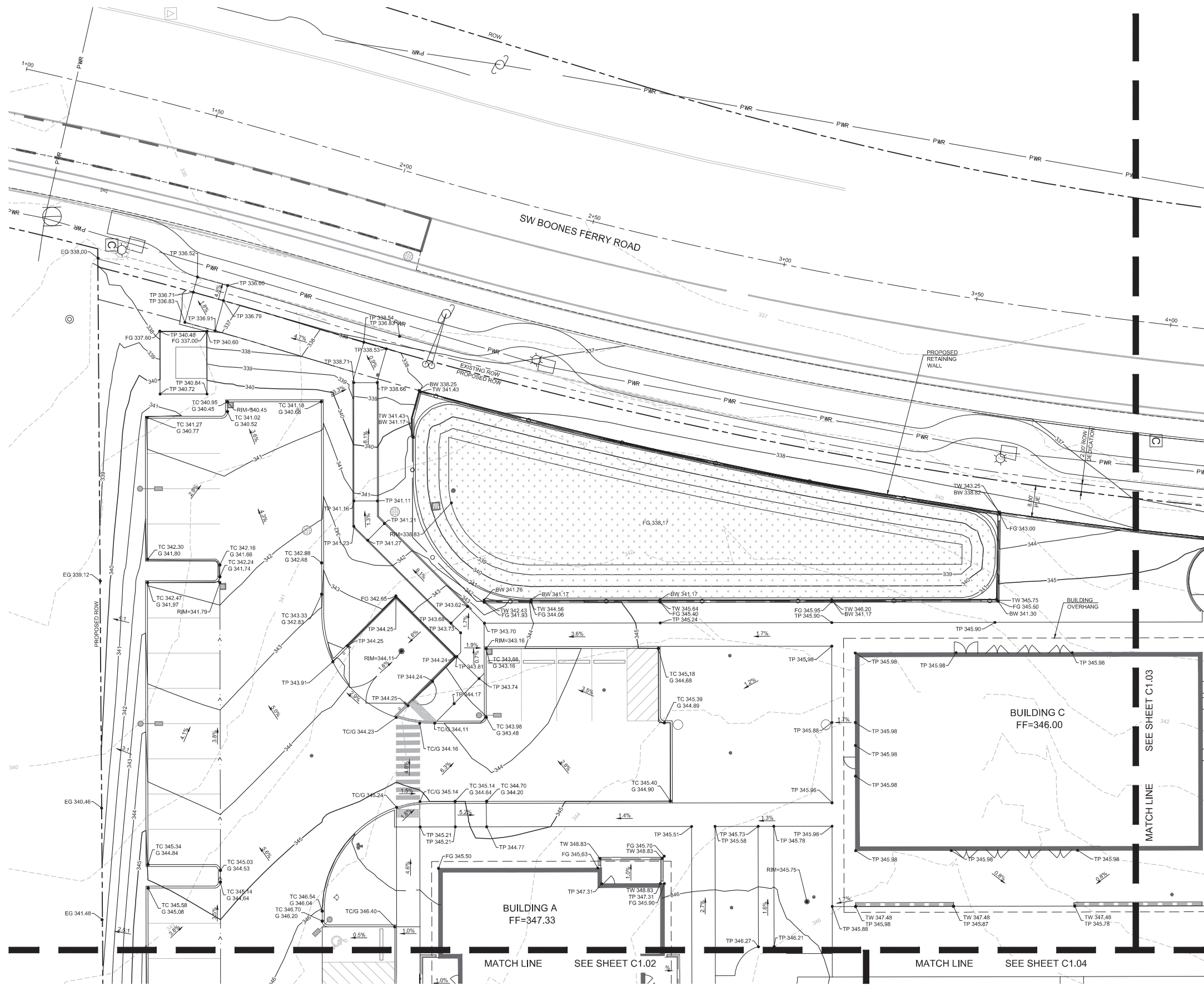
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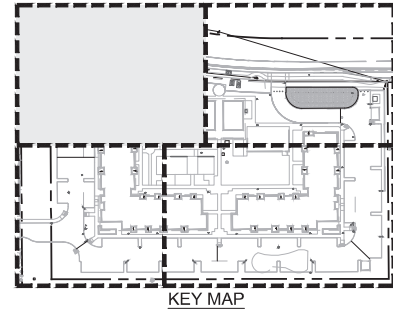
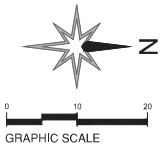
GRAPHIC SCALE

C1.00

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GRADING PLAN - SOUTHWEST



- GENERAL NOTES**
- SEE SHEET C2.01 FOR PAVING AND LAYOUT.
 - SEE PUBLIC SHEETS FOR IMPROVEMENTS IN PUBLIC RIGHT-OF-WAY.
- LEGEND**
- STORMWATER BASIN
 - SITE WALL, REFER TO ARCHITECTURAL AND STRUCTURAL PLANS
 - GRADE BREAK
 - HIGH POINT
 - FLOW LINE
 - FLUSH CURB PER DETAIL 15/C6.00
 - SANITARY/STORM CLEANOUT PER DETAIL 5/C6.01
 - EXISTING CONTOUR
 - PROPOSED CONTOUR
 - EXISTING GRADE
 - FINISHED GRADE
 - FINISHED FLOOR ELEVATION
 - GRADE AT GUTTER
 - GRADE AT TOP OF CURB
 - GRADE AT TOP OF PAVEMENT
 - GRADE AT TOP OF WALL
 - GRADE AT BOTTOM OF WALL
 - RIM ELEVATION
 - EXISTING SLOPE ARROW

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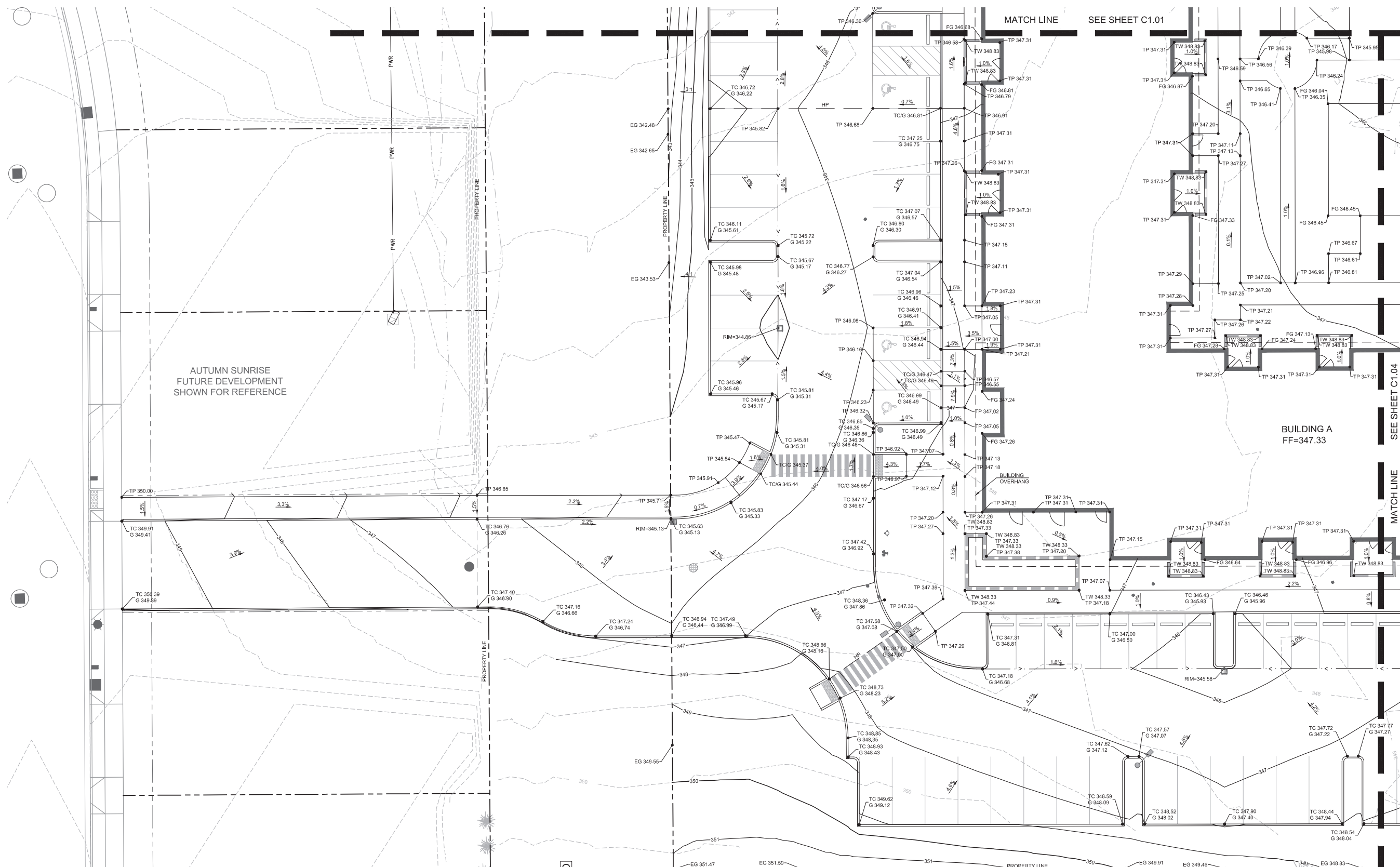
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GRADING PLAN - SOUTHWEST

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REVISIONS:

C1.01



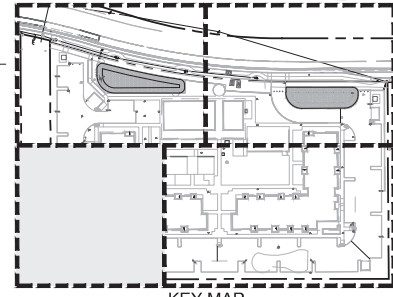
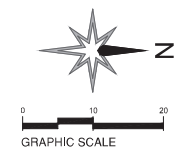
GRADING PLAN - SOUTHEAST

LEGEND

- SITE WALL, REFER TO ARCHITECTURAL AND STRUCTURAL PLANS
- GB GRADE BREAK
- HP HIGH POINT
- FLOW LINE
- FLUSH CURB PER DETAIL 15/C6.00
- SANITARY/STORM CLEANOUT PER DETAIL 5/C6.01
- 345 EXISTING CONTOUR
- 345 PROPOSED CONTOUR
- EG XXX.XX EXISTING GRADE
- FG XXX.XX FINISHED GRADE
- FF XXX.XX FINISHED FLOOR ELEVATION
- G XXX.XX GRADE AT GUTTER
- TC XXX.XX GRADE AT TOP OF CURB
- TP XXX.XX GRADE AT TOP OF PAVEMENT
- TW XXX.XX GRADE AT TOP OF WALL
- BW XXX.XX GRADE AT BOTTOM OF WALL
- (E) RIM ELEVATION
- (E) EXISTING
- XX% SLOPE ARROW

GENERAL NOTES

1. SEE SHEET C2.02 FOR PAVING AND LAYOUT.
2. SEE PUBLIC SHEETS FOR IMPROVEMENTS IN PUBLIC RIGHT-OF-WAY.



KEY MAP

SEE SHEET C1.04

MATCH LINE

MATCH LINE

MATCH LINE

MATCH LINE

MATCH LINE

MATCH LINE

AUTUMN SUNRISE
FUTURE DEVELOPMENT
SHOWN FOR REFERENCE

BUILDING A
FF=347.33

BUILDING
OVERHANG

MATCH LINE

SEE SHEET C1.01

SEE SHEET C1.04

MATCH LINE

MATCH LINE

MATCH LINE

MATCH LINE

MATCH LINE

MATCH LINE



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GRADING PLAN -
NORTHWEST
PROJECT NO.
#19031

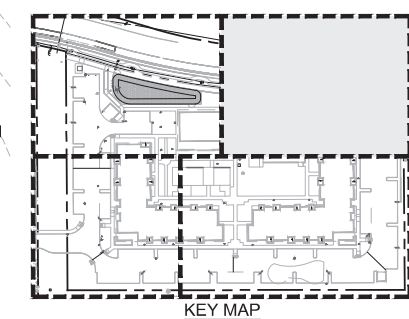
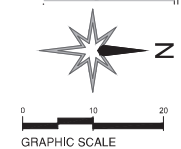
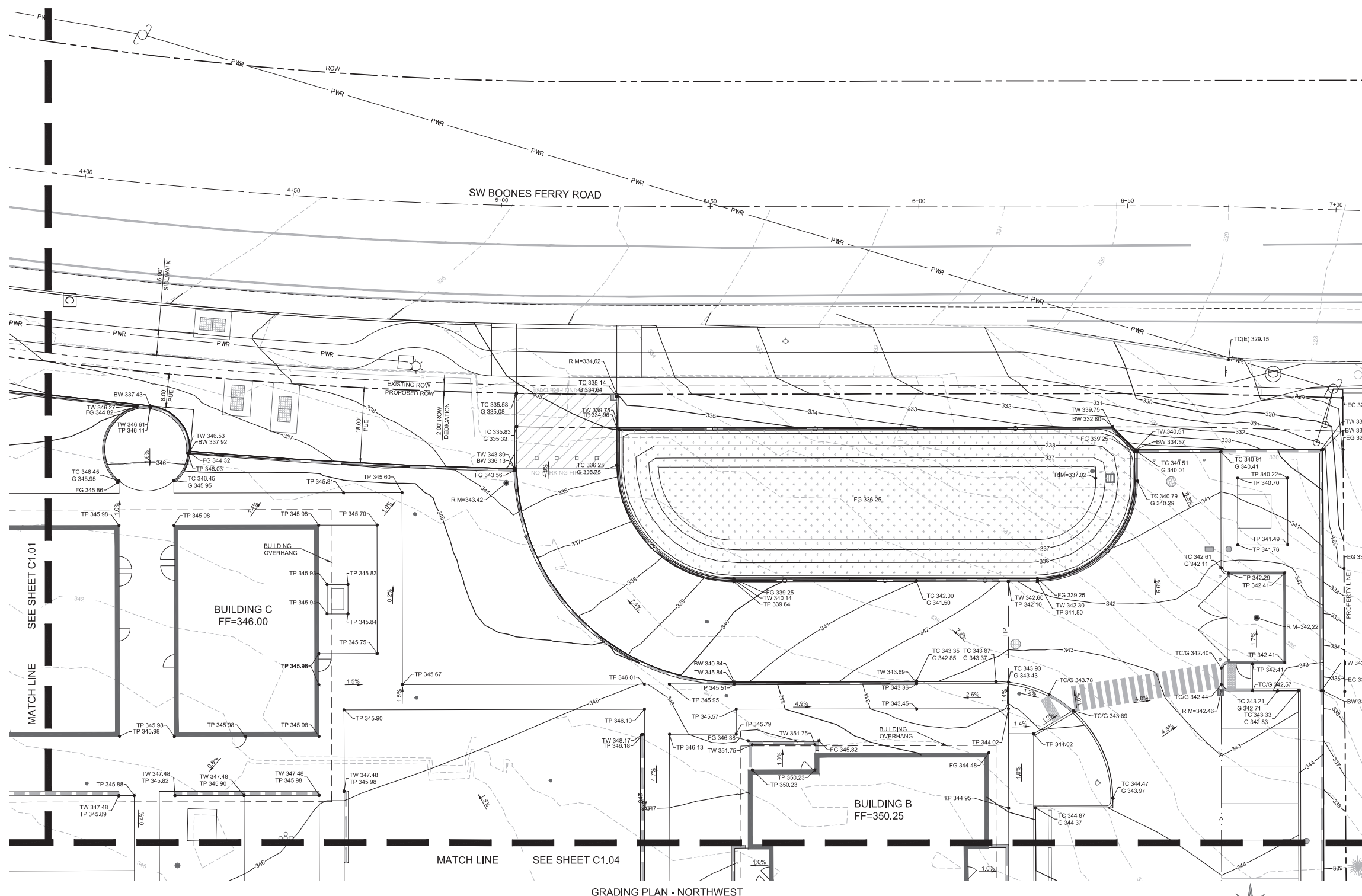
REVISIONS:

GENERAL NOTES

- SEE SHEET C2.03 FOR PAVING AND LAYOUT.
- SEE PUBLIC SHEETS FOR IMPROVEMENTS IN PUBLIC RIGHT-OF-WAY.

LEGEND

	STORMWATER BASIN
	SITE WALL, REFER TO ARCHITECTURAL AND STRUCTURAL PLANS
	GRADE BREAK
	HIGH POINT
	FLOW LINE
	FLUSH CURB PER DETAIL 15/C6.00
	SANITARY/STORM CLEANOUT PER DETAIL 5/C6.01
	EXISTING CONTOUR
	PROPOSED CONTOUR
	EXISTING GRADE
	FINISHED GRADE
	FINISHED FLOOR ELEVATION
	GRADE AT GUTTER
	GRADE AT TOP OF CURB
	GRADE AT TOP OF PAVEMENT
	GRADE AT TOP OF WALL
	GRADE AT BOTTOM OF WALL
	RIM ELEVATION
	EXISTING
	SLOPE ARROW



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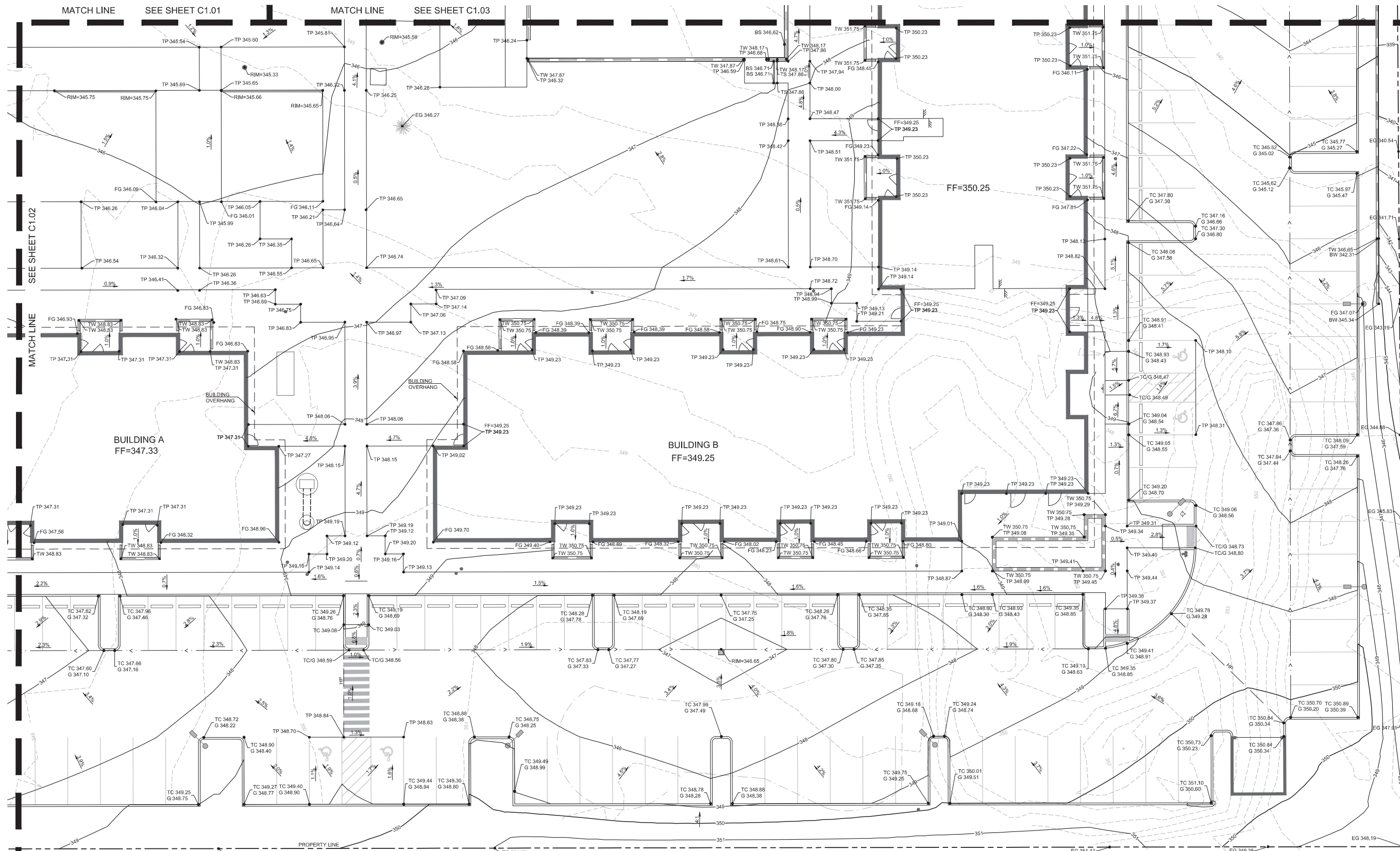
GRADING PLAN -
NORTHEAST

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C1.04

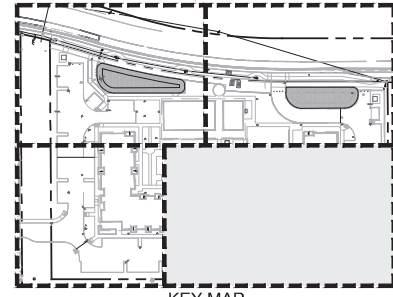
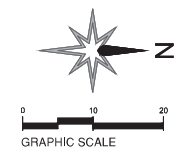


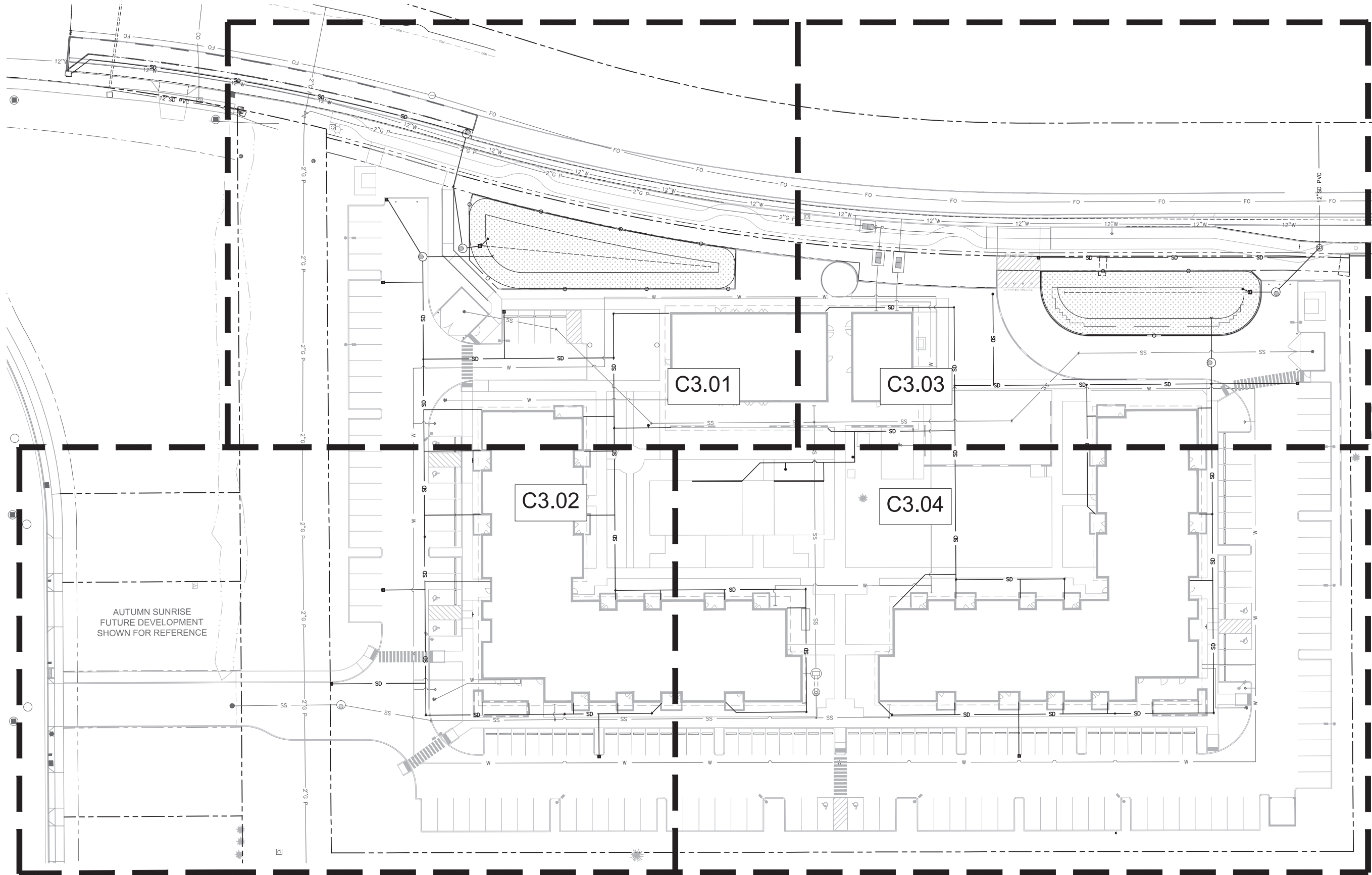
GRADING PLAN - NORTHEAST

LEGEND

	STORMWATER BASIN
	SITE WALL, REFER TO ARCHITECTURAL AND STRUCTURAL PLANS
	GRADE BREAK
	HIGH POINT
	FLOW LINE
	FLUSH CURB PER DETAIL 15/C6.00
	SANITARY/STORM CLEANOUT PER DETAIL 5/C6.01
	EXISTING CONTOUR
	PROPOSED CONTOUR
	STEPPED SLAB PER ARCHITECTURAL AND STRUCTURAL PLANS
	EXISTING GRADE
	FINISHED GRADE
	FINISHED FLOOR ELEVATION
	GRADE AT GUTTER
	GRADE AT TOP OF CURB
	GRADE AT TOP OF PAVEMENT
	GRADE AT TOP OF WALL
	GRADE AT BOTTOM OF WALL
	RIM ELEVATION
	EXISTING
	SLOPE ARROW

- GENERAL NOTES**
- SEE SHEET C2.04 FOR PAVING AND LAYOUT.
 - SEE PUBLIC SHEETS FOR IMPROVEMENTS IN PUBLIC RIGHT-OF-WAY.





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FUTURE DEVELOPMENT
SHOWN FOR REFERENCE

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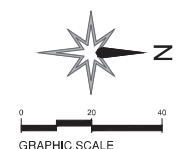
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STORMWATER PLAN -
OVERALL

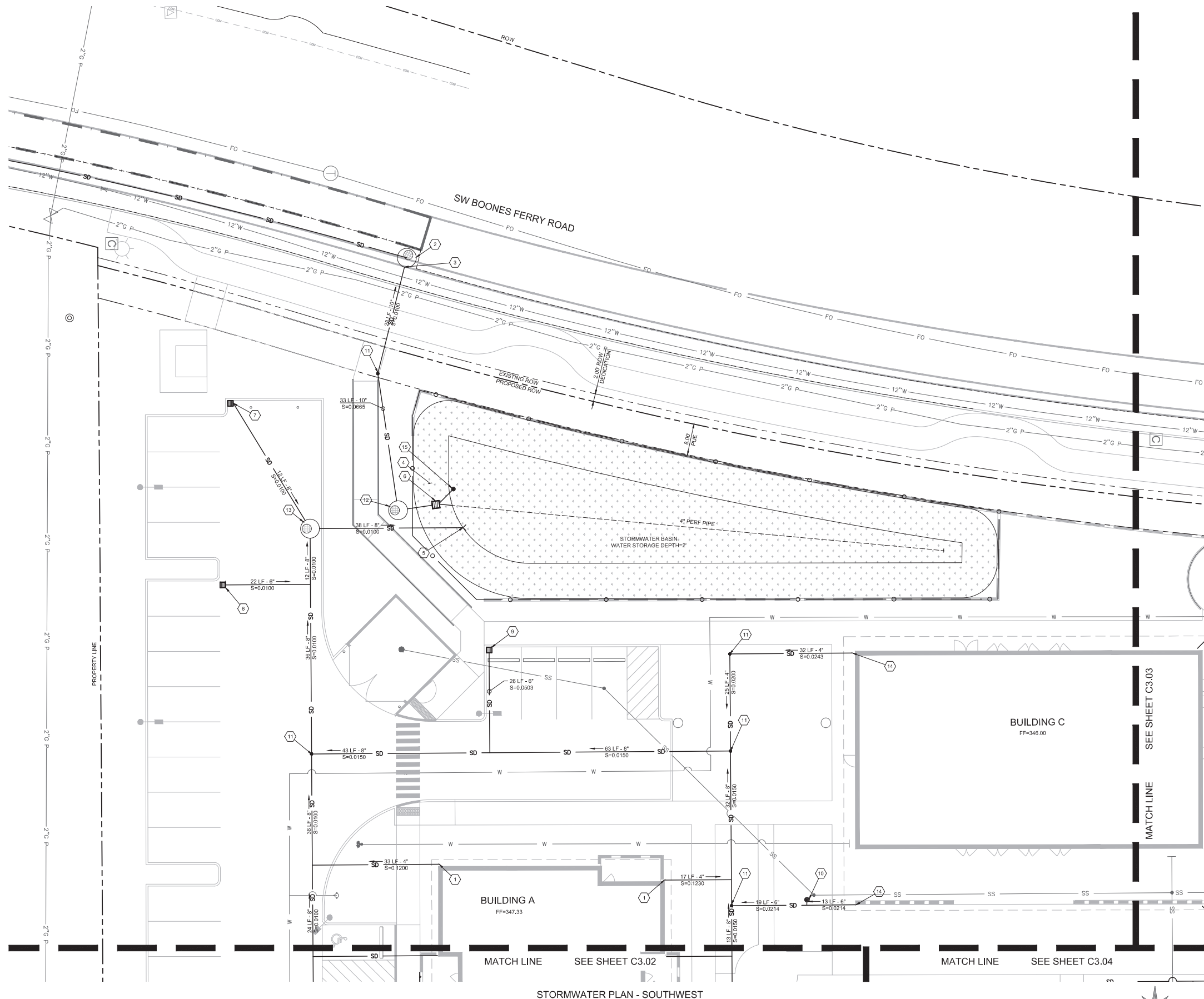
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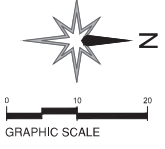


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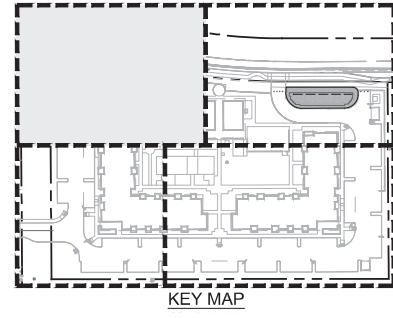
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STORMWATER PLAN - SOUTHWEST



- GENERAL NOTES**
- ALL WORK IN PUBLIC RIGHT-OF-WAY UNDER SEPARATE CITY OF TUALATIN PUBLIC WORKS PERMIT AND WASHINGTON COUNTY FACILITIES PERMIT. REFERENCE PUBLIC PLANS.
 - INSTALL "NO DUMPING / LEADS TO GROUNDWATER" MARKER AT ALL ONSITE CATCH BASIN PER DETAIL 11/C6.00.
 - FOR OTHER UTILITIES SEE SHEET C4.01.
 - COORDINATE ALL RETAINING WALL PENETRATIONS WITH STRUCTURAL.
- STORMWATER NOTES**
- ROOF DRAIN CONNECTION FROM BUILDING A.
IE=343.33
 - 48" STORMWATER MANHOLE AT CONNECTION TO NEW PUBLIC STORM MAIN. UNDER SEPARATE PUBLIC WORKS PERMIT. SEE C8.00 SHEETS.
 - STORMWATER CONNECTION TO PUBLIC MANHOLE.
IE=332.99
RIM=336.40
 - STORMWATER BASIN PER DETAIL 8/C6.01
AREA MANAGED=61,351 SF
BOTTOM AREA=2,016 SF
BOTTOM ELEVATION=338.17
WATER STORAGE DEPTH=2.0'
 - OUTFALL TO STORMWATER BASIN.
IE=338.17
 - DITCH INLET PER CWS STANDARD DRAWING NO. 390
FLOW INVERT=340.00
IE=335.83
IE=333.83
 - 18" SQUARE PARKING LOT CATCH BASIN PER DETAIL 4/C6.01
RIM=340.47
IE=338.95
 - 18" SQUARE PARKING LOT CATCH BASIN PER DETAIL 4/C6.01
RIM=340.44
IE=339.94
 - 18" SQUARE PARKING LOT CATCH BASIN PER DETAIL 4/C6.01
RIM=343.09
IE=341.09
 - 12' DOMED LANDSCAPE AREA DRAIN PER DETAIL 3/C6.01
RIM=345.75
IE=342.75
 - STORMWATER CLEANOUT TO GRADE PER DETAIL 5/C6.01.
 - FLOW CONTROL MANHOLE PER CWS STANDARD DRAWING NO. 270.
RIM=341.17
10" OVERFLOW=339.71
1" ORIFICE=333.47
IE=333.47
 - WATER QUALITY MANHOLE PER CWS STANDARD DRAWINGS NO. 290 AND 260.
RIM=340.42
IE=338.58
 - ROOF DRAIN CONNECTION FROM BUILDING C.
IE=342.03
 - 12" STEEL GIBSON CATCH BASIN WITH DOMED TOP AND 0.72" ORIFICE FLOW CONTROL PER DETAIL 13/C6.01.
RIM=338.17
IE=337.17



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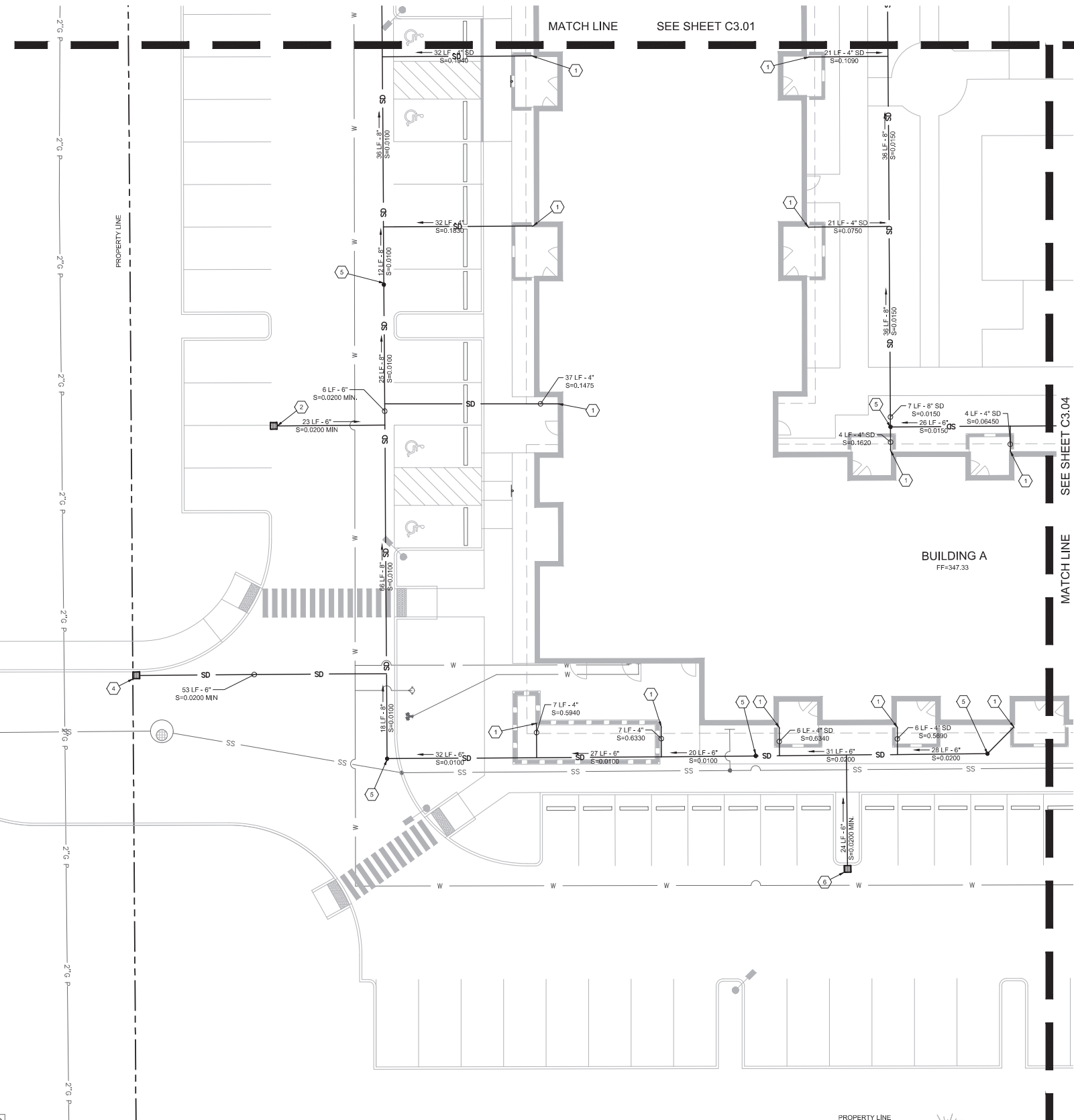
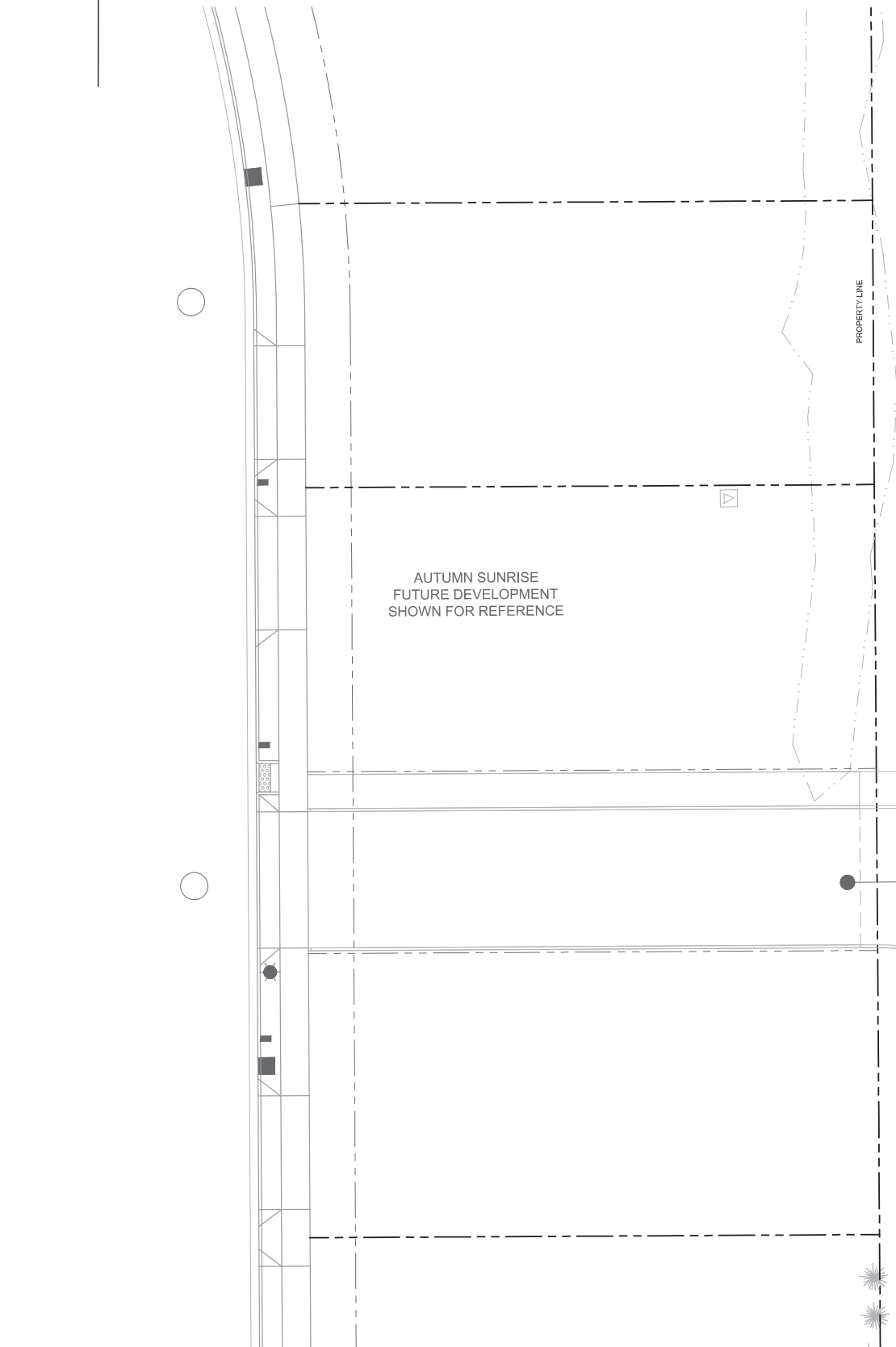
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STORMWATER PLAN - SOUTHWEST

PROJECT NO.
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REVISIONS:

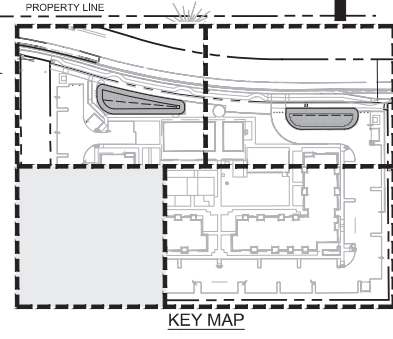
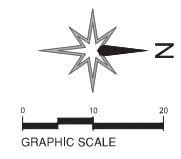
C3.01



STORMWATER PLAN - SOUTHEAST

- STORMWATER NOTES**
1. ROOF DRAIN CONNECTION FROM BUILDING A.
IE=343.33
 2. 18' SQUARE PARKING LOT CATCH BASIN PER DETAIL 4/C6.01
RIM=344.86
IE=342.86
 3. 18' SQUARE PARKING LOT CATCH BASIN PER DETAIL 4/C6.01
RIM=345.58
IE=343.58
 4. 18' SQUARE PARKING LOT CATCH BASIN PER DETAIL 4/C6.01
RIM=346.30
IE=341.30
 5. STORMWATER CLEANOUT TO GRADE PER DETAIL 5/C6.01
RIM=345.58
IE=343.58
 6. 18' SQUARE PARKING LOT CATCH BASIN PER DETAIL 4/C6.01
RIM=345.58
IE=343.58

- GENERAL NOTES**
1. INSTALL "NO DUMPING / LEADS TO GROUNDWATER" MARKER AT ALL ONSITE CATCH BASINS PER DETAIL 11/C6.00.
 2. FOR OTHER UTILITIES SEE SHEET C4.02.
 3. COORDINATE ALL RETAINING WALL PENETRATIONS WITH STRUCTURAL PLANS.



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STORMWATER PLAN - SOUTHEAST

PROJECT NO.
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STORMWATER PLAN - NORTHWEST

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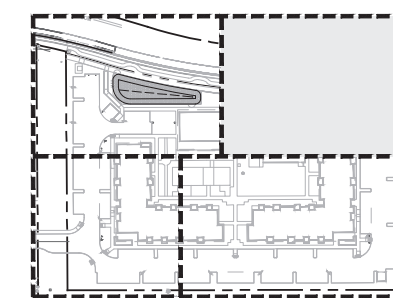
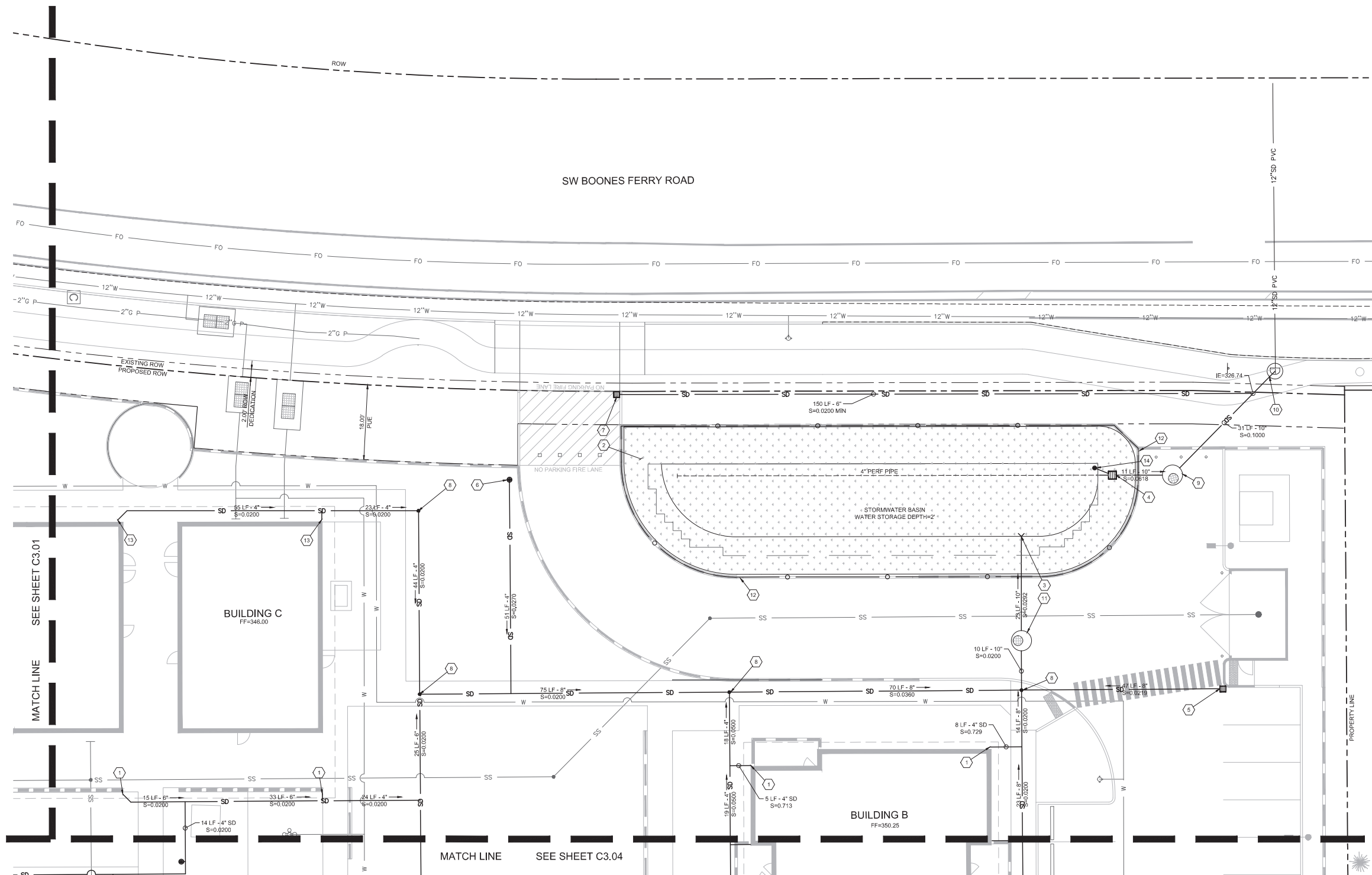
C3.03

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- INSTALL "NO DUMPING / LEADS TO GROUNDWATER" MARKER AT ALL ONSITE CATCH BASINS PER DETAIL 11/C6.00.
- FOR OTHER UTILITIES SEE SHEET C4.01.
- COORDINATE ALL RETAINING WALL PENETRATIONS WITH STRUCTURAL PLANS.

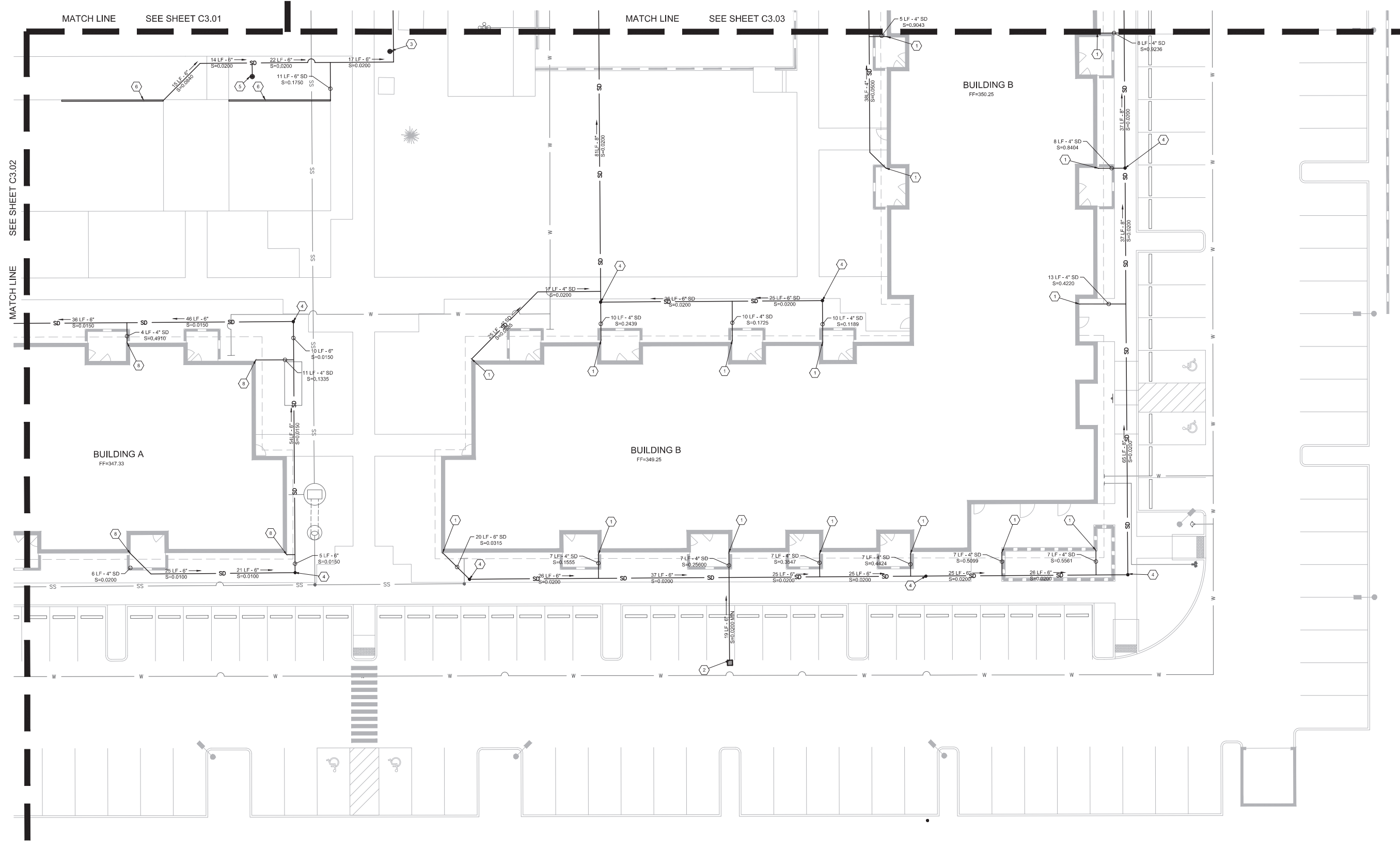
STORMWATER NOTES

- ROOF DRAIN CONNECTION FROM BUILDING B.
IE=343.00
- STORMWATER BASIN WITH 550 OLDCASTLE CUDO STORAGE CHAMBERS PER DETAIL 7/C6.01
AREA MANAGED=66,479 SF
BOTTOM AREA=2,200 SF
BOTTOM ELEVATION=336.25
WATER STORAGE DEPTH=2.0'
- OUTFALL TO STORMWATER BASIN.
IE=336.25
- DITCH INLET PER CWS STANDARD DRAWING NO. 380
FLOW INVERT=337.95
IE IN=329.83
IE OUT=329.83
- 18" SQUARE PARKING LOT CATCH BASIN PER DETAIL 4/C6.01
RIM=342.46
IE=340.46
- 12" DOMED AREA DRAIN PER DETAIL 3/C6.01
RIM=343.42
IE=340.92
- 18" SQUARE PARKING LOT CATCH BASIN PER DETAIL 4/C6.01
RIM=333.17
IE=332.17
- STORMWATER CLEANOUT TO GRADE PER DETAIL 5/C6.01
RIM=340.50
10" OVERFLOW=337.20
3.0" ORIFICE=336.88
0.5" ORIFICE=329.00
IE IN=329.00
- CONNECT TO EXISTING STORM FACILITY
RIM=328.89
IE(E)=323.05
NEW 12" IE=326.04
- WATER QUALITY MANHOLE PER CWS STANDARD DRAWING NO. 250 AND 260
RIM=342.91
IE=336.91
- CURB SCURPER PER DETAIL 10/C6.01
- ROOF DRAIN CONNECTION FROM BUILDING C.
IE=342.50
- 12" STEEL GIBSON CATCH BASIN WITH DOMED TOP AND 0.71" ORIFICE FLOW CONTROL PER DETAIL 13/C6.01
RIM=336.25
IE=335.25



KEY MAP

STORMWATER PLAN - NORTHWEST



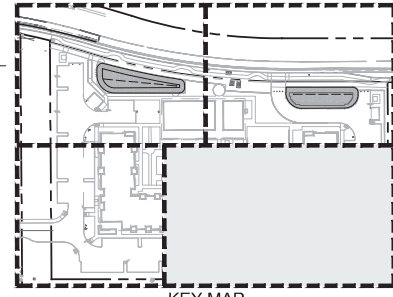
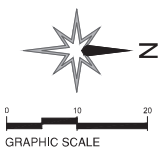
STORMWATER PLAN - NORTHEAST

STORMWATER NOTES

1. ROOF DRAIN CONNECTION FROM BUILDING B. IE=344.75
2. 18" SQUARE PARKING LOT CATCH BASIN PER DETAIL 4/C6.01 RIM=346.65 IE=344.65
3. 12" DOMED LANDSCAPE AREA DRAIN PER DETAIL 3/C6.01 RIM=345.85 IE=343.95
4. STORMWATER CLEANOUT TO GRADE PER DETAIL 5/C6.01
5. 12" DOMED LANDSCAPE AREA DRAIN PER DETAIL 3/C6.01 RIM=345.33 IE=343.33
6. TRENCH DRAIN. SEE ARCHITECTURAL PLANS RIM=345.65 IE=344.15
7. TRENCH DRAIN. SEE ARCHITECTURAL PLANS RIM=345.75 IE=344.25
8. ROOF DRAIN CONNECTION FROM BUILDING A. IE=345.83

GENERAL NOTES

1. INSTALL "NO DUMPING / LEADS TO GROUNDWATER" MARKER AT ALL ONSITE CATCH BASINS PER DETAIL 11/C6.00.
2. FOR OTHER UTILITIES SEE SHEET C4.02
3. COORDINATE ALL RETAINING WALL PENETRATIONS WITH STRUCTURAL PLANS.



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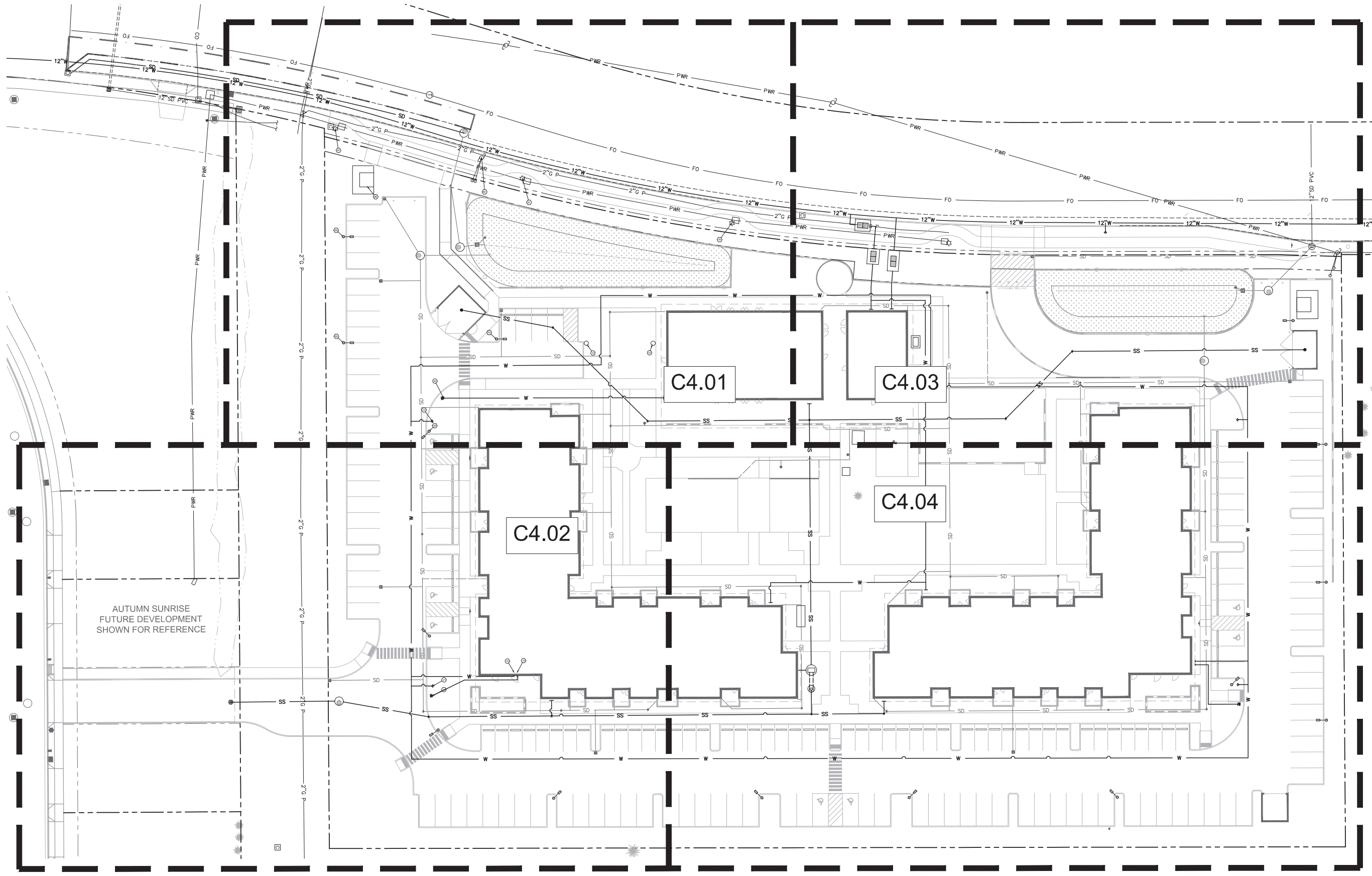
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STORMWATER PLAN -
NORTHEAST

PROJECT NO.
#19031

REVISIONS:

C3.04



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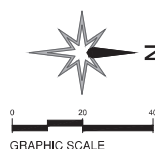
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UTILITY PLAN - ENTIRE
SITE

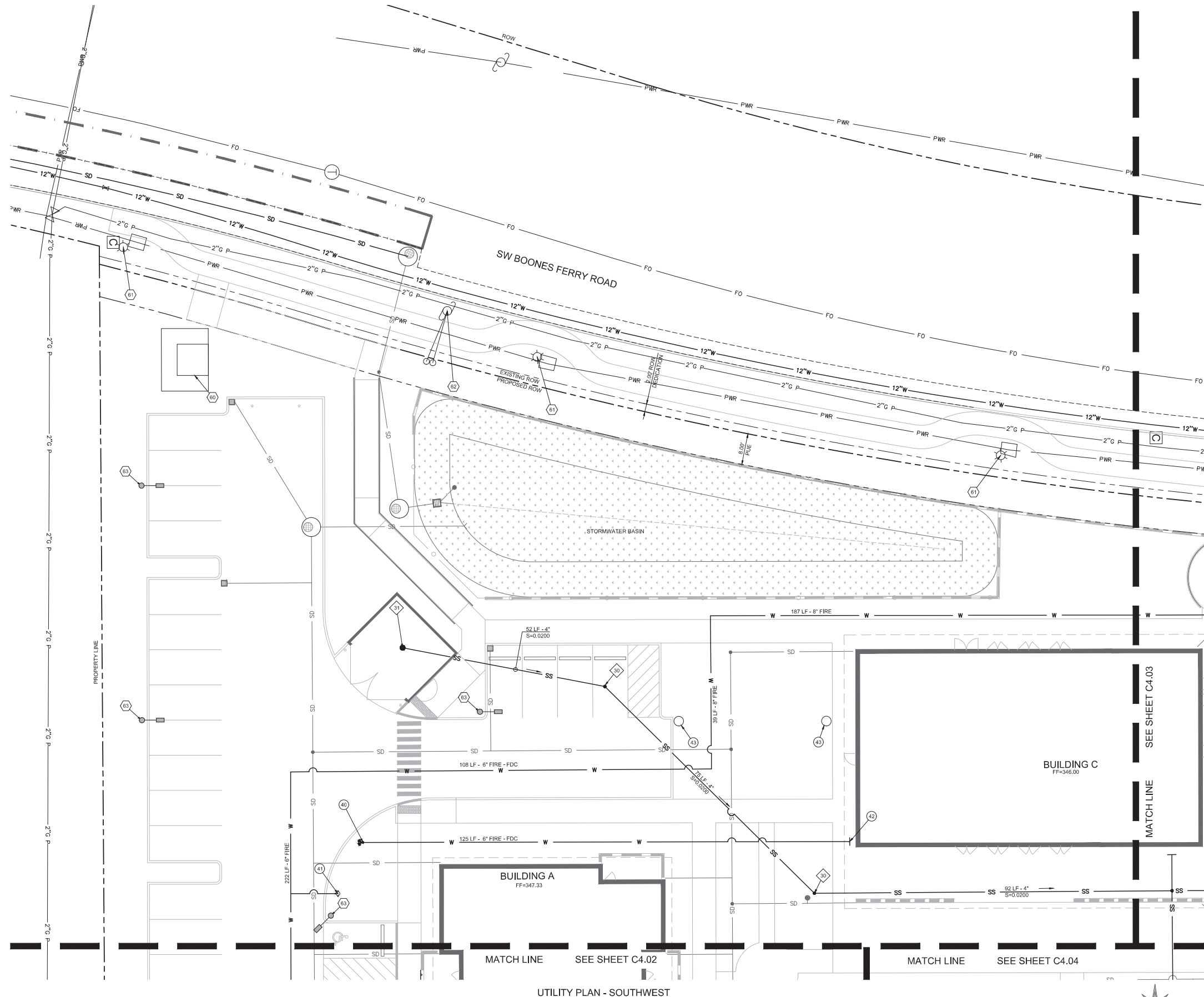
PROJECT NO.
#19031

REVISIONS:



C4.00

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GENERAL NOTES

1. ALL WORK IN PUBLIC RIGHT-OF-WAY UNDER SEPARATE CITY OF TUALATIN PUBLIC WORKS PERMIT. REFER TO PUBLIC DRAWINGS FOR EXTENT OF WORK.

SANITARY NOTES

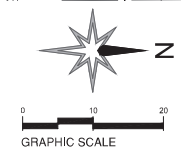
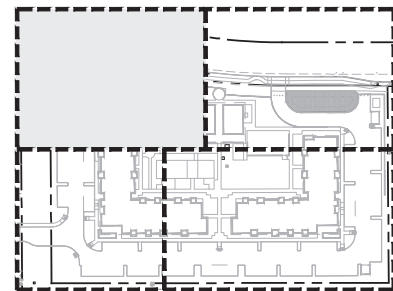
30. SANITARY CLEANOUT TO GRADE PER DETAIL 5/06.01.
 31. INSTALL TRAPPED TRASH DRAIN WITH AIRTIGHT CLEANOUT PER DETAIL 11/C6.01.
 RIM=343.95
 4" IS=340.17

WATER NOTES

40. FIRE DEPARTMENT CONNECTION. ATTACH SIGN "FDC - BUILDING C".
 41. NEW ONSITE FIRE HYDRANT. PER CITY OF TUALATIN STANDARD.
 42. FDC CONNECTION TO BUILDING. SEE PLUMBING PLANS FOR COORDINATION.
 43. FROST PROOF YARD HYDRANT. SEE LANDSCAPE PLANS.

OTHER UTILITY NOTES

60. TRANSFORMER. SEE ELECTRICAL PLANS.
 61. PROTECT EXISTING STREET LIGHT.
 62. PROTECT EXISTING UTILITY POLE AND GUY WIRE ANCHORS.
 63. SITE LIGHT. REFER TO ELECTRICAL DRAWINGS.



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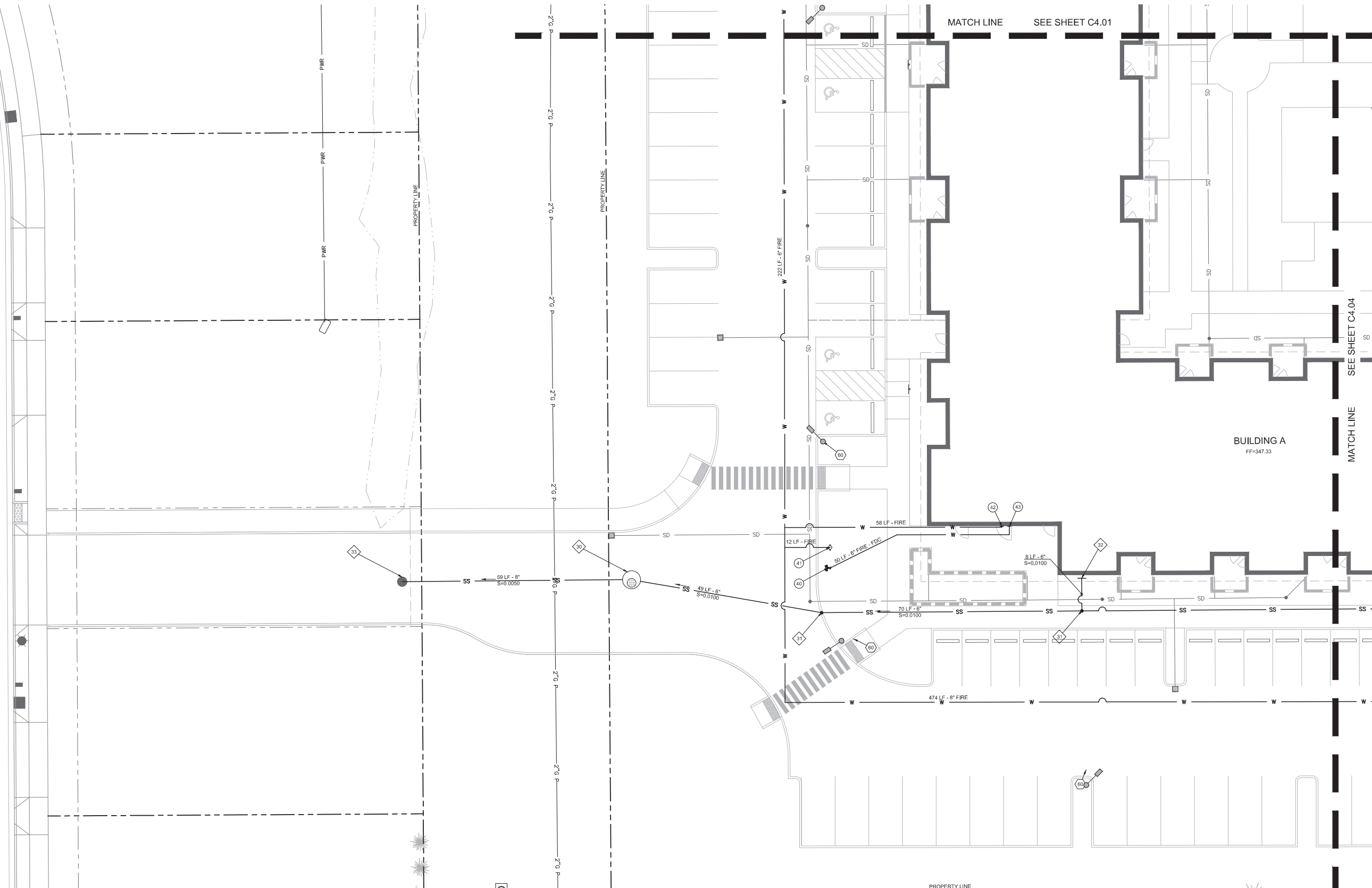


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UTILITY PLAN -
SOUTHWEST
 PROJECT NO.
#19031

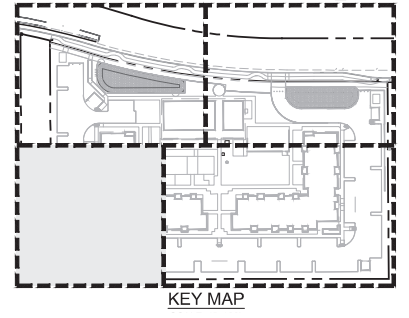
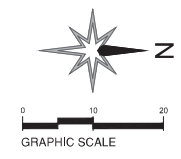
REVISIONS:

C4.01



UTILITY PLAN - SOUTHEAST

- ◆ SANITARY NOTES**
- 30. NEW SANITARY MANHOLE:
RIM=345.71
6" IE, IN(IN)=341.77
8" IE, OUT(S)=341.77
 - 31. SANITARY CLEANOUT TO GRADE PER DETAIL S/C6.01.
 - 32. SANITARY CONNECTION FROM BUILDING A.
6" IE=343.48
 - 33. CONNECT TO FUTURE MANHOLE INSTALLED WITH AUTUMN SUNRISE DEVELOPMENT. CONTRACTOR TO CONFIRM IE IN FIELD AND NOTIFY ENGINEER OF DISCREPANCIES.
IE=341.5
- Ⓢ WATER NOTES**
- 40. FIRE DEPARTMENT CONNECTION. ATTACH SIGN "FDC - BUILDING A".
 - 41. NEW ONSITE FIRE HYDRANT, PER DETAIL CITY OF TUALATIN STANDARD.
 - 42. NEW FIRE PROTECTION CONNECTION TO BUILDING. SEE PLUMBING FOR CONTINUATION.
 - 43. FDC CONNECTION TO BUILDING. SEE PLUMBING PLANS FOR COORDINATION.
- Ⓢ OTHER UTILITY NOTES**
- 60. SITE LIGHT, PER ELECTRICAL PLANS.



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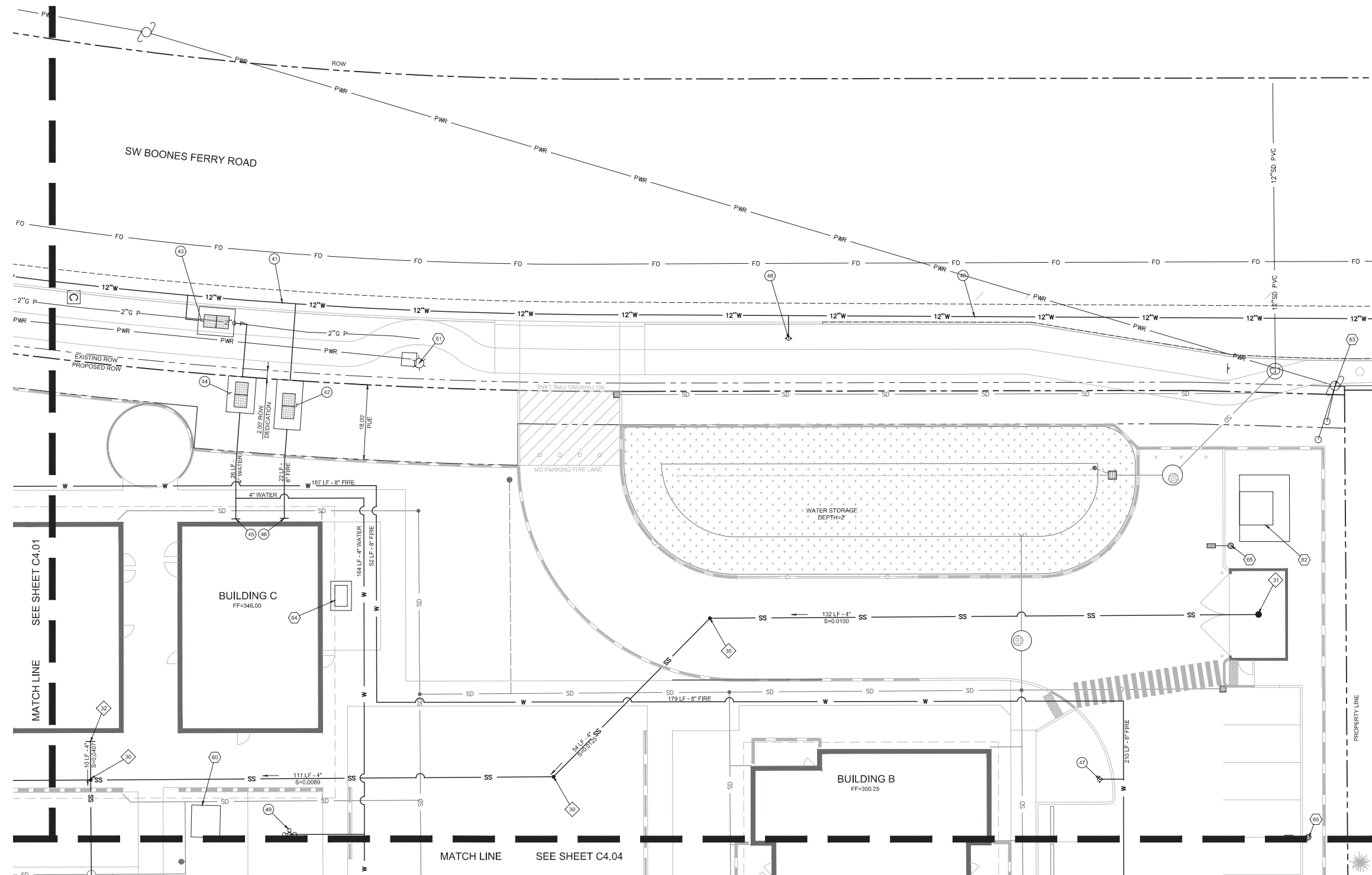
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UTILITY PLAN -
SOUTHEAST

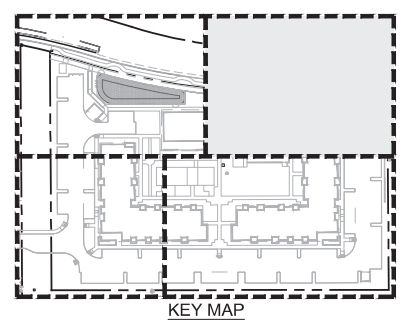
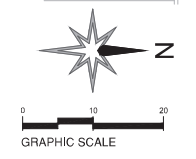
PROJECT NO.
#19031

REVISIONS:

C4.02



UTILITY PLAN - NORTHWEST



- GENERAL NOTES**
- ALL WORK IN PUBLIC RIGHT-OF-WAY UNDER SEPARATE CITY OF TUALATIN PUBLIC WORKS PERMIT. REFER TO PUBLIC IMPROVEMENT DRAWINGS FOR EXTENT OF WORK.
- SANITARY NOTES**
- SANITARY CLEANOUT TO GRADE PER DETAIL 5/C6.01.
 - TRAPPED TRASH DRAIN WITH AIRTIGHT CLEANOUT PER DETAIL 1/C6.01.
 - RIM=342.25
 - 4" IE=338.75
 - SANITARY CONNECTION FROM COMMUNITY BUILDING.
 - 6" IE=338.15
- WATER NOTES**
- NEW 12" PUBLIC WATER MAIN CONNECTING FROM SW NORWOOD ROAD, PER SEPARATE PUBLIC PERMIT.
 - FIRE PROTECTION CONNECTION TO PROPOSED WATER MAIN, PER SEPARATE PUBLIC PERMIT.
 - 8" DCVA (FIRE PROTECTION) IN 5106-WA BACKFLOW VAULT PER CITY OF TUALATIN STD. DWG. NO. 614, AND DETAIL 1/C6.01.
 - 4" PUBLIC WATER METER IN 687-WA BACKFLOW VAULT PER CITY OF TUALATIN STD. DWG. NO. 613, PER SEPARATE PUBLIC PERMIT.
 - 4" DCVA (DOMESTIC WATER) IN 687-WA BACKFLOW VAULT PER CITY OF TUALATIN STD. DWG. NO. 634 AND DETAIL 2/C6.01.
 - DOMESTIC WATER CONNECTION TO BUILDING, SEE PLUMBING PLAN FOR CONTINUATION.
 - FIRE PROTECTION CONNECTION TO BUILDING, SEE PLUMBING PLAN FOR CONTINUATION.
 - NEW ON-SITE FIRE HYDRANT, PER CITY OF TUALATIN STANDARD.
 - NEW PUBLIC FIRE HYDRANT.
 - HAND WASHING STATION, SEE ARCHITECTURAL PLANS FOR LOCATION.
- OTHER UTILITY NOTES**
- EXISTING TANK AND PUMP TO REMAIN, SEE ARCHITECTURAL PLANS FOR NEW PUMP HOUSE.
 - PROTECT EXISTING STREET LIGHT.
 - TRANSFORMER, PER ELECTRICAL PLANS.
 - PROTECT EXISTING UTILITY POLE AND GUY WIRE ANCHORS.
 - MECHANICAL UNIT FOR BUILDING C.
 - SITE LIGHT, PER ELECTRICAL PLANS.

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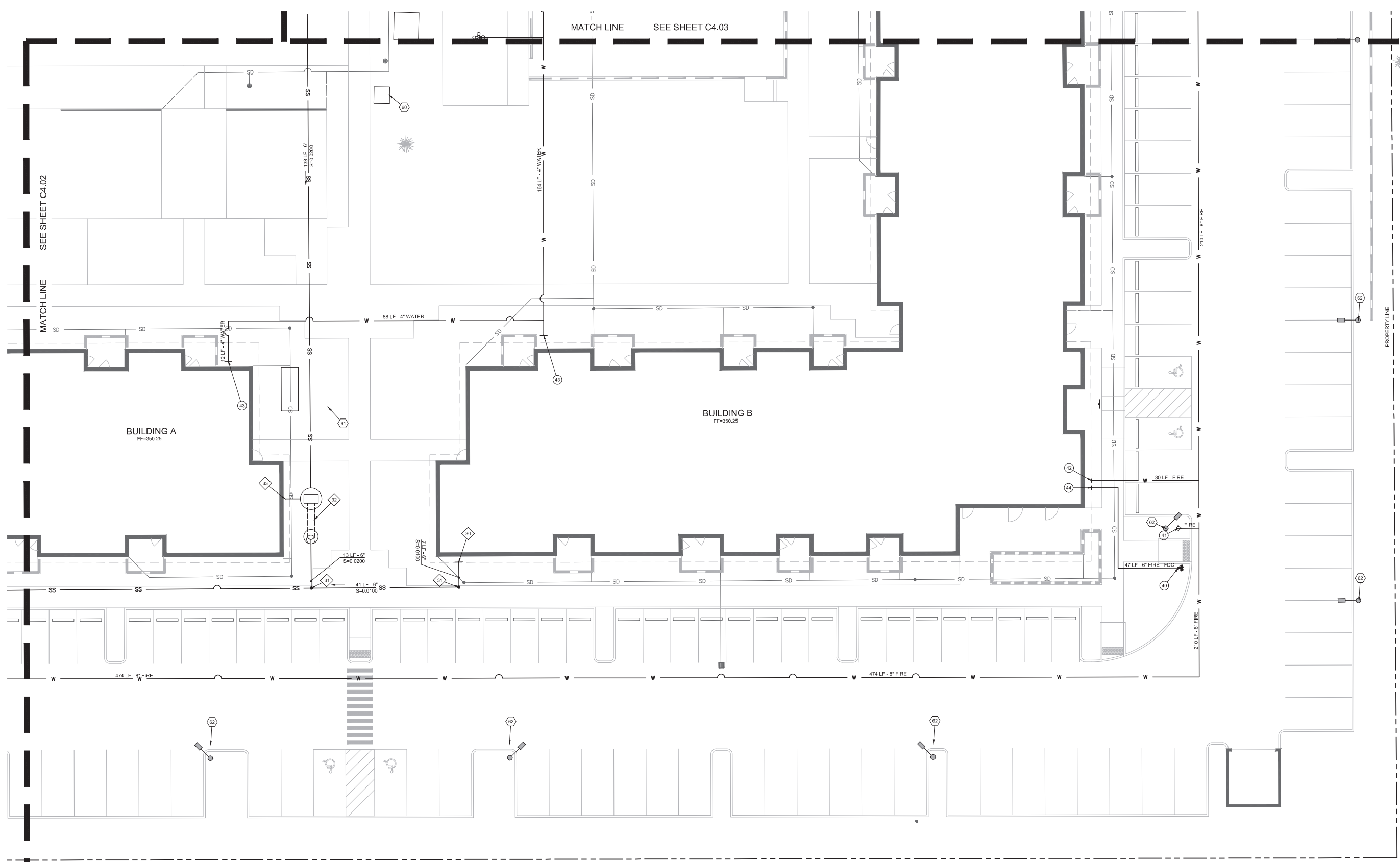
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UTILITY PLAN -
NORTHWEST
PROJECT NO.
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UTILITY PLAN - NORTHEAST

◆ SANITARY NOTES

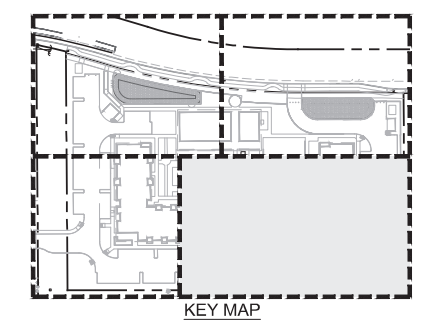
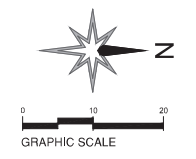
- 30. SANITARY CONNECTION FROM BUILDING B.
6" IE=345.26
- 31. SANITARY CLEANOUT TO GRADE PER DETAIL 5/06.01.
- 32. SANITARY LIFT STATION FOR COMMUNITY BUILDING. 10 FRAME DRIVER SUBMERSIBLE CHOPPER PUMP, MOTOR TYPE XP1FM, 3.0 HP, 15.5 FEET HEAD.
RBM=348.91
6" IE, IN(W)=333.01
6" IE, OUT(E)=344.67
- 33. SANITARY VENT CONNECTION TO BUILDING. SEE PLUMBING PLANS.

☉ WATER NOTES

- 40. FIRE DEPARTMENT CONNECTION. ATTACH SIGN "FDC - BUILDING B".
- 41. NEW ON-SITE FIRE HYDRANT. PER CITY OF TUALATIN STANDARD.
- 42. NEW FIRE PROTECTION CONNECTION TO BUILDING. SEE PLUMBING PLAN FOR CONTINUATION.
- 43. NEW DOMESTIC WATER CONNECTION TO BUILDING. SEE PLUMBING PLAN FOR CONTINUATION.
- 44. FDC CONNECTION TO BUILDING. SEE PLUMBING PLANS FOR COORDINATION.

⊕ OTHER UTILITY NOTES

- 60. EXISTING TANK AND PUMP TO REMAIN. SEE ARCHITECTURAL PLANS FOR NEW PUMP HOUSE.
- 61. GENERATOR FOR LIFT STATION. SEE ELECTRICAL PLANS.
- 62. SITE LIGHT. PER ELECTRICAL PLANS.



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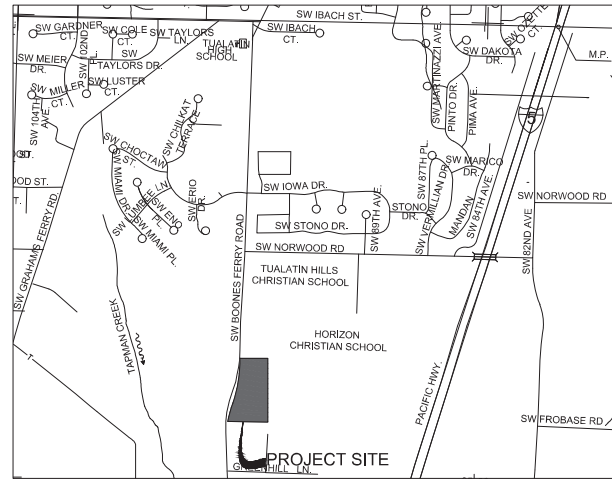


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PUBLIC IMPROVEMENTS FOR 23500 AND 23550 SW BOONES FERRY ROAD



VICINITY MAP
NTS
SEC. 35, T.3 S., R.1 W. W.M.



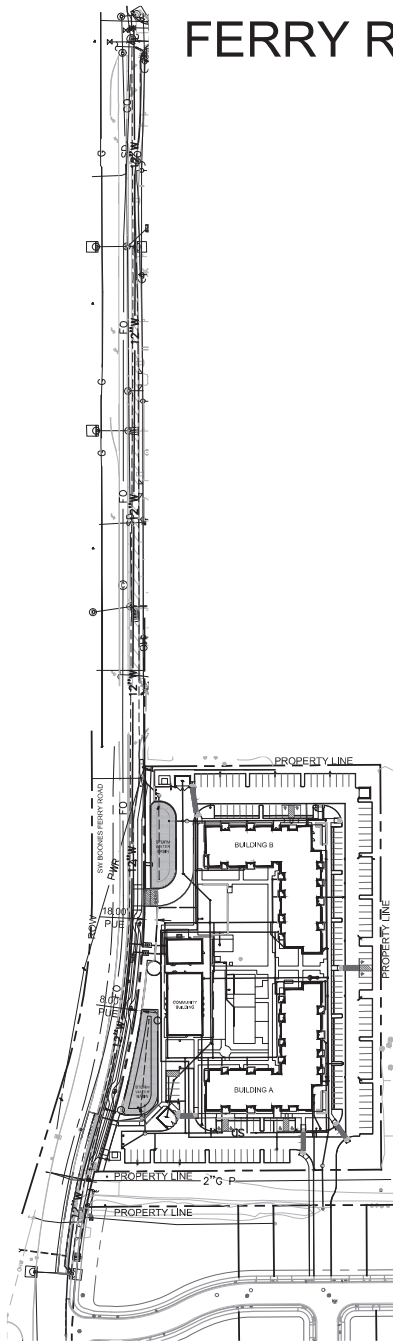
ATTENTION:
OREGON LAW REQUIRES YOU TO FOLLOW RULES ADOPTED BY THE OREGON UTILITY NOTIFICATION CENTER. THOSE RULES ARE SET FORTH IN OAR 952-001-0010 THROUGH 952-001-0090. YOU MAY OBTAIN COPIES OF THE RULES BY CALLING THE CENTER. (NOTE: THE TELEPHONE NUMBER FOR THE OREGON UTILITY NOTIFICATION CENTER IS 503-232-1987).

"THIS DESIGN COMPLIES WITH ORS 92.044 (7) IN THAT NO UTILITY INFRASTRUCTURE IS DESIGNED TO BE WITHIN ONE (1) FOOT OF A SURVEY MONUMENT LOCATION SHOWN ON A SUBDIVISION OR A PARTITION PLAT. NO DESIGN EXCEPTIONS OR FINAL FIELD LOCATION CHANGES SHALL BE PERMITTED IF THAT CHANGE WOULD CAUSE ANY UTILITY INFRASTRUCTURE TO BE PLACED WITHIN THE PROHIBITED AREA."

POTENTIAL UNDERGROUND FACILITY OWNERS

Dig Safely.
Call the Oregon One-Call Center
DIAL 811 or 1-800-332-2344

EMERGENCY TELEPHONE NUMBERS		NOTICE TO EXCAVATORS:	
NW NATURAL GAS	M-F 7am-6pm 503-226-4211 Ext.4313	ATTENTION: OREGON LAW REQUIRES YOU TO FOLLOW RULES ADOPTED BY THE OREGON UTILITY NOTIFICATION CENTER. THOSE RULES ARE SET FORTH IN OAR 952-001-0010 THROUGH OAR 952-001-0090. YOU MAY OBTAIN COPIES OF THE RULES BY CALLING THE CENTER. (NOTE: THE TELEPHONE NUMBER FOR THE OREGON UTILITY NOTIFICATION CENTER IS (503)-232-1987).	
AFTER HOURS	503-226-4211		
PGE	503-464-7777		
CENTURYLINK	1-800-573-1311		
CITY BUREAU OF MAINTENANCE	503-823-1700		
CITY WATER	503-823-4874		
VERIZON	1-800-483-1000		



SITE MAP



EXISTING	DESCRIPTION	PROPOSED
	MANHOLE	
	CATCH BASIN	
	WATER METER	
	GUY WIRE ANCHOR	
	STREETLIGHT	
	UTILITY POLE	
	SIGN	
	TREE	
	PROPERTY LINE	
	CENTERLINE	
	SAWCUT LINE	
	EDGE OF PAVEMENT	
	CURB	
	STORM DRAIN	
	SANITARY SEWER	
	FIRE	
	WATER	
	OVERHEAD UTILITY	
	GAS	
	POWER	
	TELECOM	
	CONCRETE SIDEWALK	
	MINOR CONTOUR	
	MAJOR CONTOUR	

ABBREVIATIONS			
AC	ASPHALTIC CONCRETE	LT	LEFT
BC	BOTTOM OF CURB	MAX	MAXIMUM
BGS	BELOW GROUND SURFACE	MIN	MINIMUM
BPZ	BACK OF PEDESTRIAN ZONE	NO	NUMBER
BFZ	BUILDING FRONTAGE ZONE	NTS	NOT TO SCALE
CL	CENTERLINE	ODOT	OREGON DEPARTMENT OF TRANSPORTATION
CONC	CONCRETE	PBOT	PORTLAND BUREAU OF TRANSPORTATION
CONST	CONSTRUCT	PC	POINT OF CURVATURE
COP	CITY OF PORTLAND	PROP	PROPOSED
D	DISTANCE	PT	POINT OF TANGENCY
DTL	DETAIL	PVMT	PAVEMENT
EXIST(E)	EXISTING GROUND	PZ	PEDESTRIAN ZONE
EG	EXISTING GROUND	R	RADIUS
FF	FINISHED FLOOR	ROW	RIGHT OF WAY
FS	FIRE SERVICE	RT	RIGHT
FPZ	FRONT OF PEDESTRIAN ZONE	SD	STORM DRAIN
FZ	FURNISHING ZONE	STA	STATION
GICUT	GUTTER	STD	STANDARD
GB	GRADE BREAK	TC	TOP OF CURB
H	HORIZONTAL	TP	TOP OF PAVEMENT
HP	HIGH POINT	TYP	TYPICAL
IE	INVERT ELEVATION	V	VERTICAL
L	LENGTH		

PROJECT CONTACTS

OWNER: COMMUNITY PARTNERS FOR AFFORDABLE HOUSING 6380 SW CAPITOL HIGHWAY #151 PORTLAND, OR 97239 (503) 293-4038 CONTACT: JULIAN SAURAGE FELTON	ENGINEER: VEGA CIVIL ENGINEERING, LLC 1300 SE STARK STREET #201 PORTLAND, OR 97214 (503) 662-1901 CONTACT: MARTHA WILLIAMSON, PE
SURVEYOR: OTAK 808 SW 3RD AVE., STE. 800 PORTLAND, OR 97204 (503) 287-8825	

PUBLIC COVER SHEET

PROJECT NO.
#19031

REVISIONS:

C8.00

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PUBLIC GENERAL
NOTES

PROJECT NO.
#19031

REVISIONS:

C8.01

GENERAL NOTES

GENERAL

- ELEVATIONS ARE BASED ON POINT #508, NGVD 29 DATUM, LOCATED AT THE WEST CURB OF SW BOONES FERRY. ELEVATION: 334.12'. EXISTING UTILITIES AND SITE FEATURES SHOWN ON THESE PLANS ARE BASED ON A SURVEY BY OTAK AT (503) 287-8825.

PAVING

- NOTE: MILL & FILL: AFTER 'T' CUT PATCH BACKS, MILL 2" DEPTH AND MACHINE LAY HOT MIX WITH THE ASSOCIATED ROAD WORK. FINAL DETERMINATION OF MILL & FILL AREA IS AT THE DISCRETION OF THE COUNTY INSPECTOR.
- PAVING GEOTEXTILE MAY BE REQUIRED BY INSPECTION STAFF ON THE BOTTOM OF THE FINAL LIFT AT ANY JOINTS BETWEEN THE EXISTING PAVEMENT AND NEW PAVEMENT SECTIONS BY THREE INCHES ON EACH SIDE OF THE JOINT, AS LONG AS THE JOINT IS LESS THAN 1/8" WIDE. PAVING GEOTEXTILE SHOULD ALSO BE PLACED OVER ANY CRACKS THAT ARE OBSERVED IN THE EXISTING PAVEMENT AFTER MILLING AND BEFORE PLACEMENT OF THE NEW OVERLAY. FOLLOW MANUFACTURERS RECOMMENDATIONS FOR JOINTS/CRACKS WIDER THAN 1/8".
- REPLACE STRIPING DAMAGED BY CONSTRUCTION PER ODOT STD. DWGS. TM500 SERIES, PAVEMENT MARKINGS.



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EXISTING SITE PLAN

PROJECT NO.
#19031

REVISIONS:

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STORM NOTES

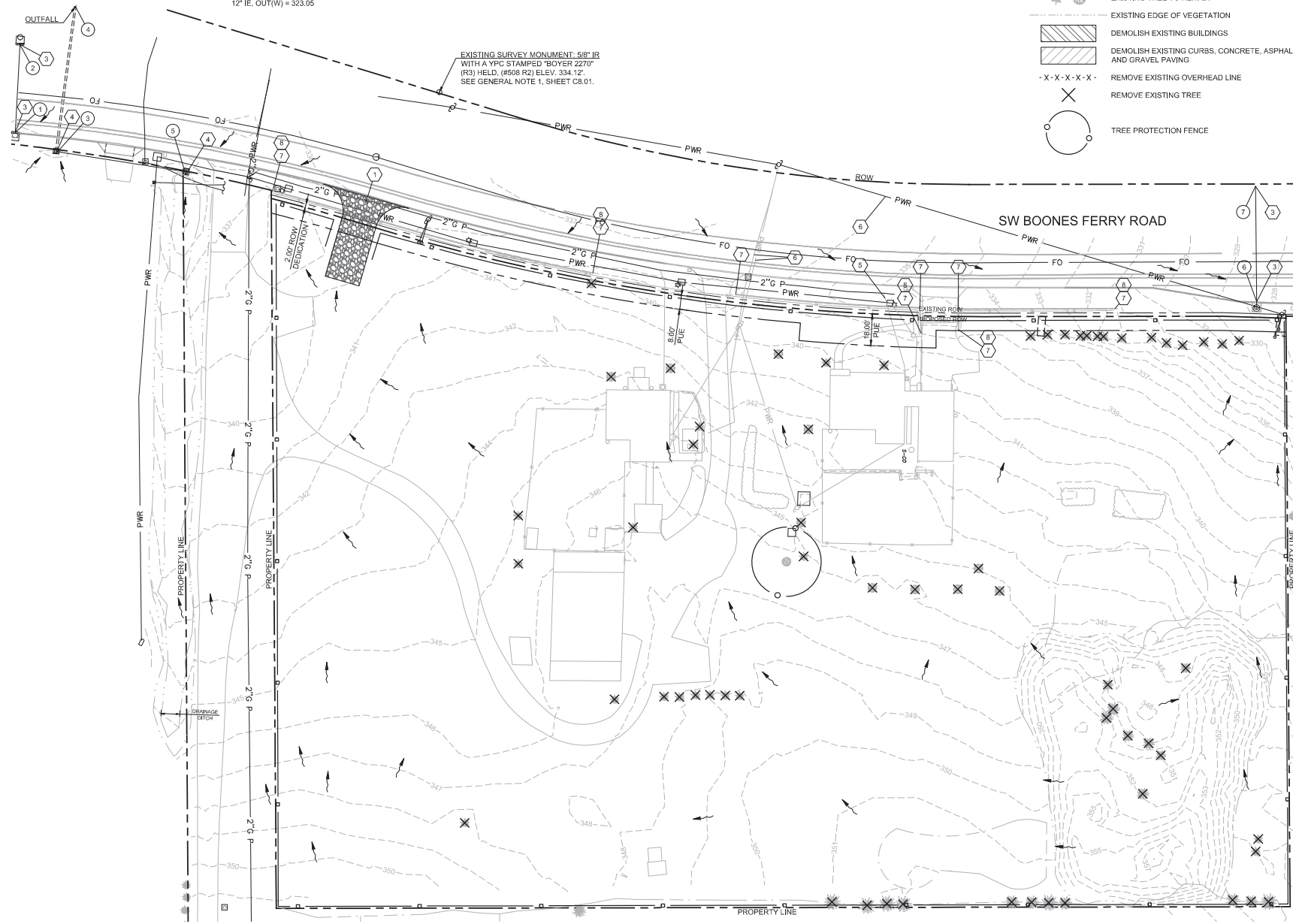
- CG-30 CATCH BASIN #451882
LID = 335.41
GUTTER = 334.71
PER AS-BUILT #100096:
10" PVC IE, OUT(W) = 329.37
CURB INLET #451883
LID = 334.99
GUTTER = 334.34
12" PVC IE, OUT(S) = 327.43
- 10" PVC IE, IN(E) = 328.43
DITCH INLET #451877
RIM = 335.67
GUTTER = 334.69
12" PVC IE, IN(N) = 331.08
12" CPPL IE, OUT(W) = 330.55
OUTFALL
12" CCPL
- IE = 329.42
DITCH INLET #451676
12" PVC
IE = 331.79
CG-48 STORM MAINTENANCE HOLE
AND CURB INLET #451739
GUTTER = 328.35
PER AS-BUILT #100096:
RIM = 328.89
12" IE, OUT(W) = 323.05
- 12" KNOCKOUT, IN(E) = 326.04
MODIFIED CG-48 STORM
MAINTENANCE HOLE AND CURB
INLET #451739
PER AS-BUILT #100096:
RIM = 328.57
12" IE, IN(E) = 322.78
12" IE, OUT(N) = 322.40

EROSION CONTROL AND DEMOLITION NOTES

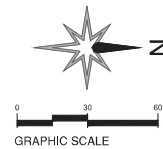
- INSTALL TEMPORARY CONSTRUCTION ENTRANCE PER CWS STD. DWG. NO. 855.
- INSTALL SEDIMENT FENCE PER CWS STD. DWG. NO. 875.
- INSTALL TEMPORARY WATTLE INLET PROTECTION AT EXISTING INLET PER CWS STD. DWG. NO. 905.
- INSTALL TEMPORARY BIO-FILTER BAG INLET PROTECTION AT EXISTING INLET PER CWS STD. DWG. NO. 915.
- REMOVE EXISTING GAS LINE TO SITE.
- REMOVE EXISTING OVERHEAD LINE.
- REMOVE EXISTING WALL.
- REMOVE EXISTING FENCE.

LEGEND

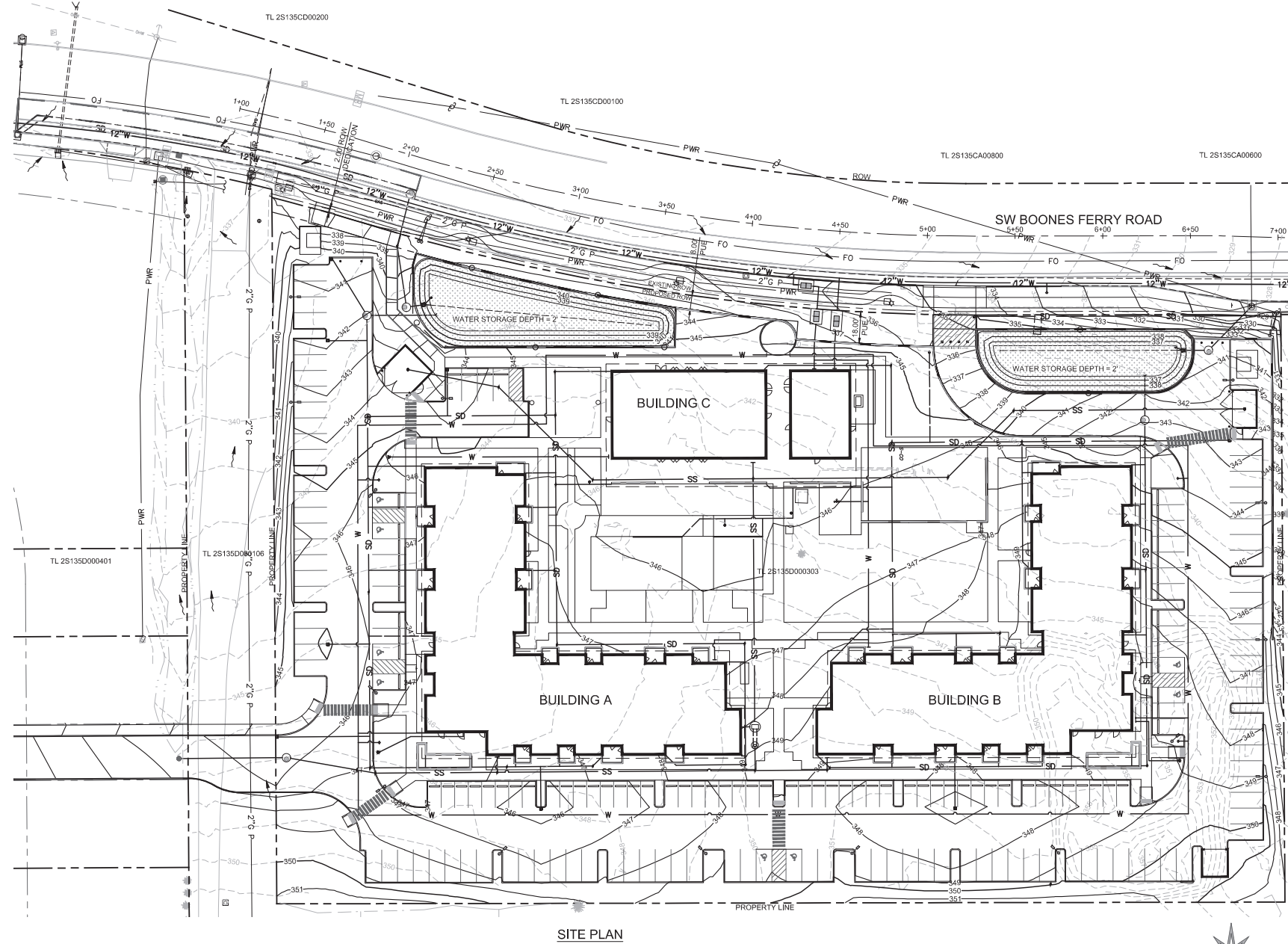
- EXISTING DRAINAGE FLOW DIRECTION
- EXISTING CONTOUR
- PROPERTY LINE
- SEDIMENT FENCE
- EXISTING TREE TO REMAIN
- EXISTING EDGE OF VEGETATION
- DEMOLISH EXISTING BUILDINGS
- DEMOLISH EXISTING CURBS, CONCRETE, ASPHALT,
AND GRAVEL PAVING
- REMOVE EXISTING OVERHEAD LINE
- REMOVE EXISTING TREE
- TREE PROTECTION FENCE



EXISTING CONDITIONS SITE PLAN



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LAND USE: ARCHITECTURAL REVIEW

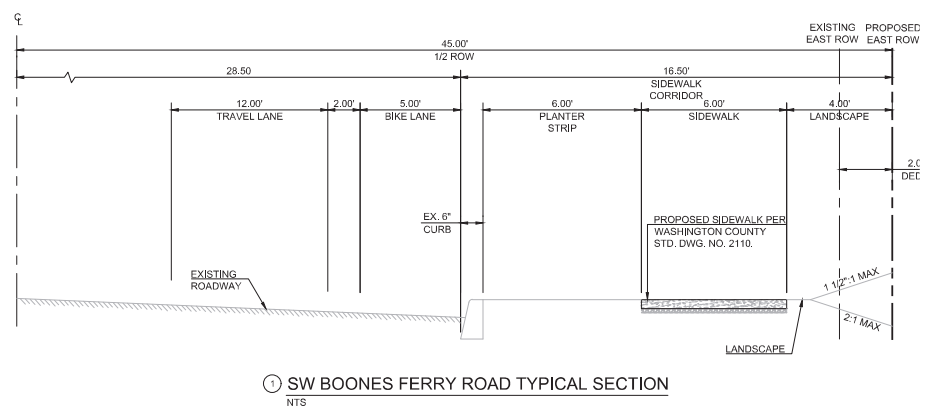
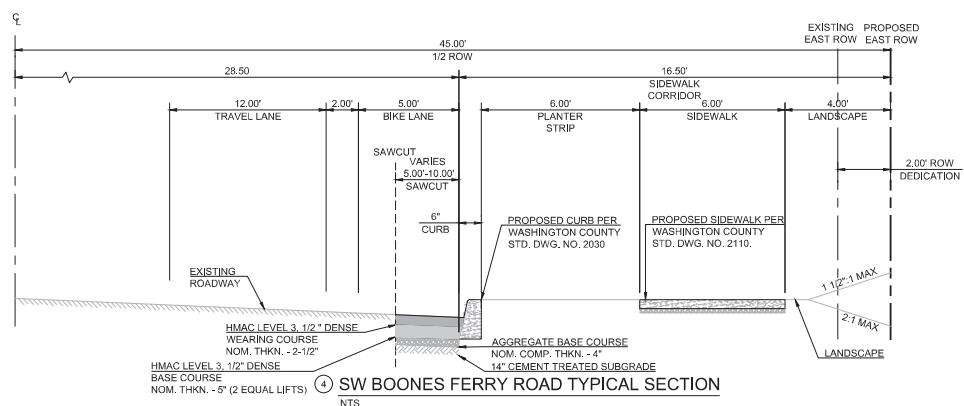
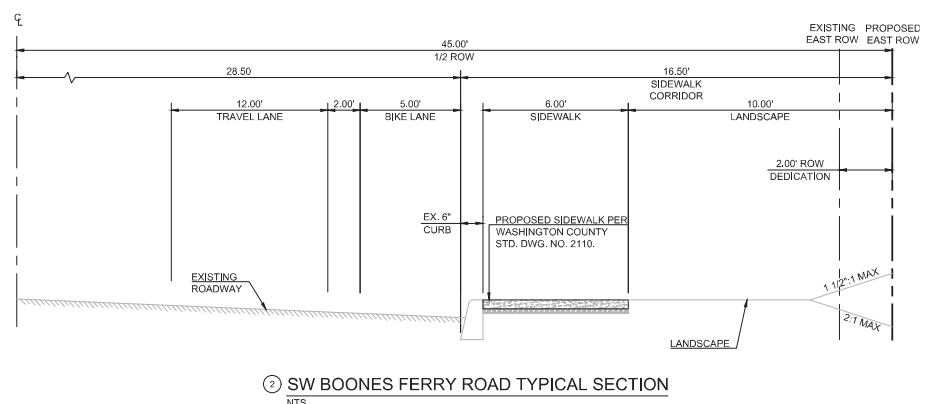
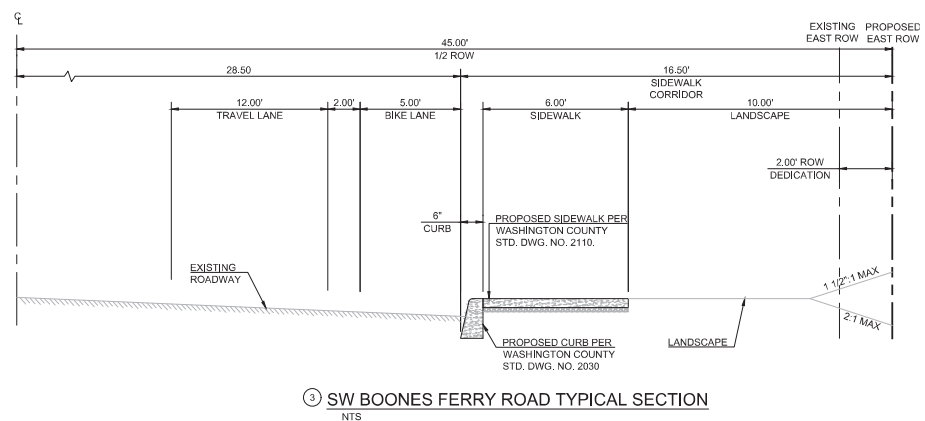
PROPOSED SITE PLAN

PROJECT NO.
#19031

REVISIONS:

C8.03

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TYPICAL SECTIONS

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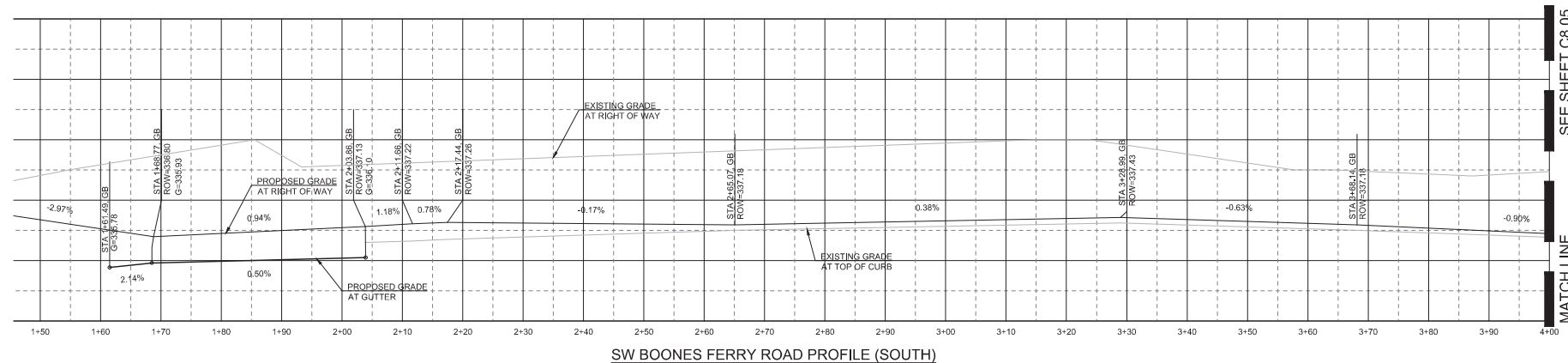
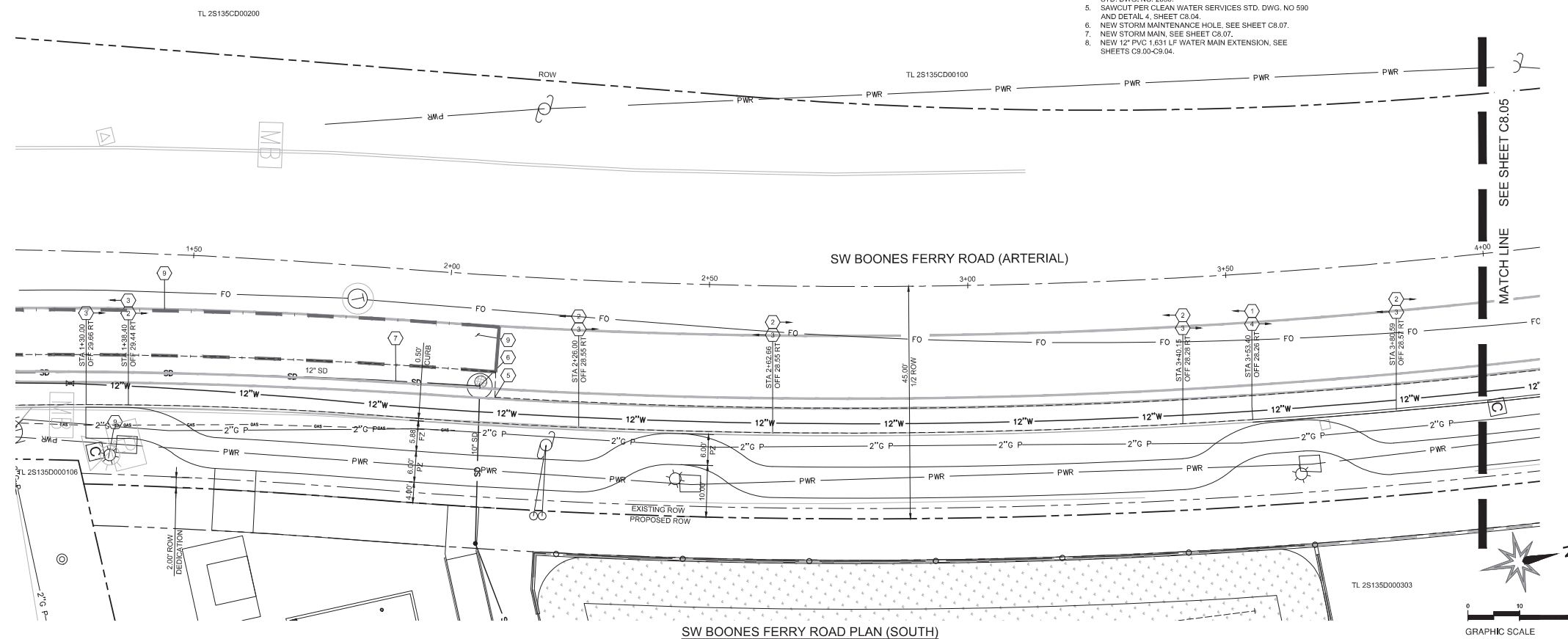
SW BOONES FERRY
ROAD PLAN AND
PROFILE - SOUTH
PROJECT NO.
#19031

REVISIONS:

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CONSTRUCTION NOTES

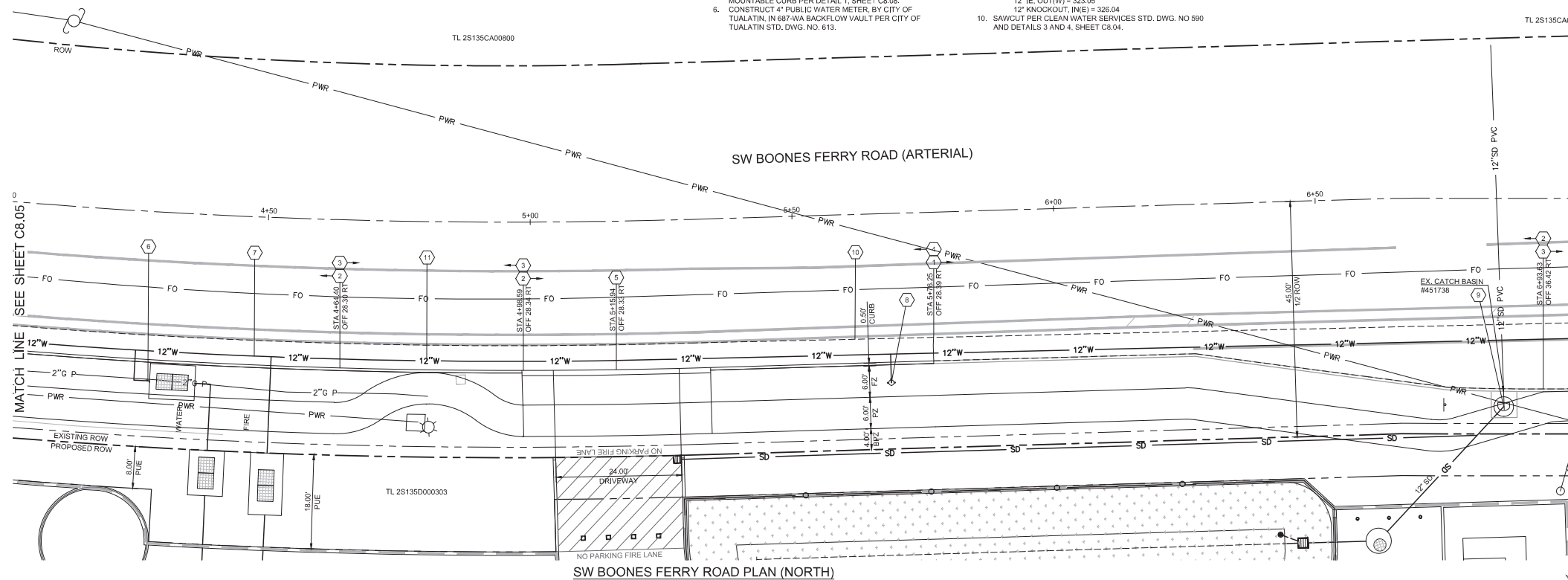
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2. CONSTRUCT SEPARATED SIDEWALK PER WASHINGTON COUNTY STD. DWG. 2110.
3. CONSTRUCT CURB TIGHT SIDEWALK PER WASHINGTON COUNTY STD. DWG. NO. 2110.
4. CONSTRUCT CONCRETE CURB PER WASHINGTON COUNTY STD. DWG. NO. 2030.
5. SAWCUT PER CLEAN WATER SERVICES STD. DWG. NO 590 AND DETAIL 4, SHEET C8.04.
6. NEW STORM MAINTENANCE HOLE, SEE SHEET C8.07.
7. NEW STORM MAIN, SEE SHEET C8.07.
8. NEW 12" PVC 1.631 LF WATER MAIN EXTENSION, SEE SHEETS C8.00-C8.04.
9. MILL & FILL: AFTER 1" CUT PATCH BACKS, MILL 2" AND MACHINE LAY HOT MIX WITH THE ASSOCIATE WORK. FINAL DETERMINATION OF MILL & FILL ARE THE DISCRETION OF THE COUNTY INSPECTOR.



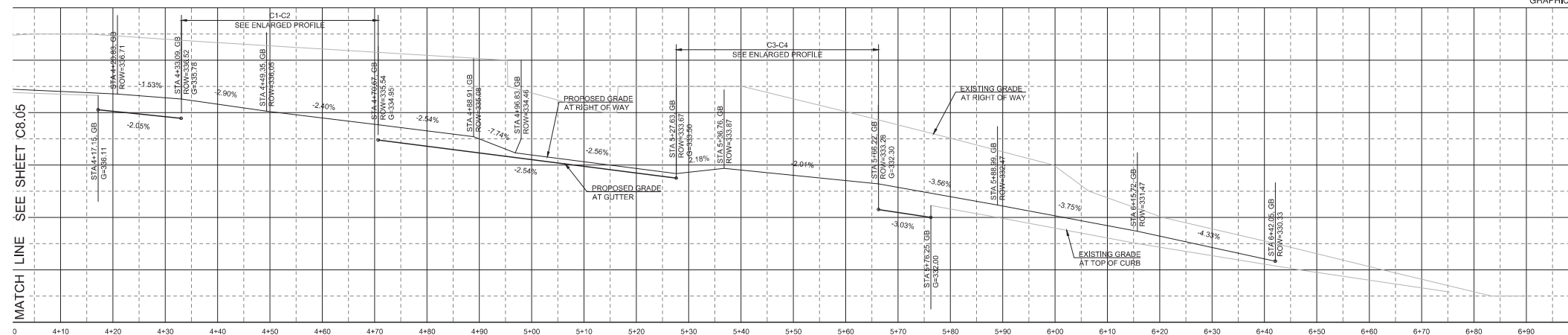
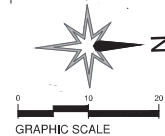


CONSTRUCTION NOTES

- PROTECT EXISTING CURB.
- CONSTRUCT SEPARATED SIDEWALK PER WASHINGTON COUNTY STD. DWG. 2110.
- CONSTRUCT CURB TIGHT SIDEWALK PER WASHINGTON COUNTY STD. DWG. NO. 2110.
- CONSTRUCT CONCRETE CURB PER WASHINGTON COUNTY STD. DWG. NO. 2030.
- CONSTRUCT 24.00' EMERGENCY FIRE ACCESS DRIVE WITH MOUNTABLE CURB PER DETAIL 1, SHEET C8.08.
- CONSTRUCT 4" PUBLIC WATER METER, BY CITY OF TUALATIN, IN 687-WA BACKFLOW VAULT PER CITY OF TUALATIN STD. DWG. NO. 613.
- CONSTRUCT 8" FIRE PROTECTION CONNECTION TO PROPOSED WATER MAIN.
- INSTALL FIRE HYDRANT, PER CITY OF TUALATIN STD. DWG. NO. 610.
- CONNECT TO EXISTING 12" KNOCKOUT AT EAST INVERT OF C8-48 STORM MAINTENANCE HOLE #451738, PER AS-BUILT #100096:
RIM=328.89
12" IE, CUT(W) = 323.05
12" KNOCKOUT, (IN)E) = 326.04
- SAWCUT PER CLEAN WATER SERVICES STD. DWG. NO 590 AND DETAILS 3 AND 4, SHEET C8.04.
- NEW 12" PVC 1.631 LF WATER MAIN EXTENSION, SEE SHEETS C9.00-C9.04
- RELOCATE EXISTING SIGN AND POST.



SW BOONES FERRY ROAD PLAN (NORTH)



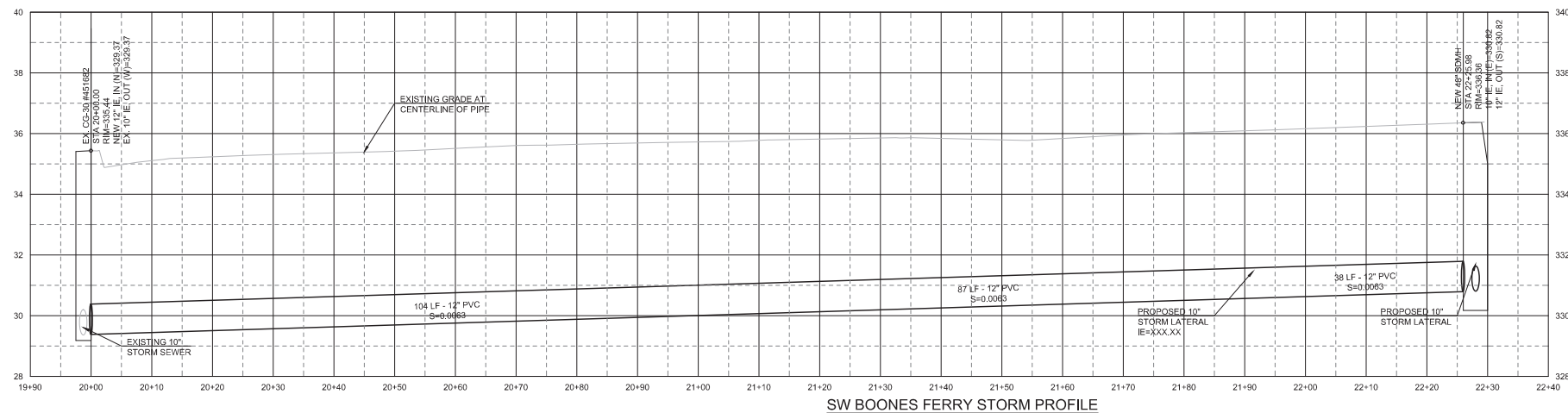
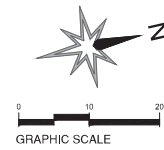
SW BOONES FERRY ROAD PROFILE (NORTH)

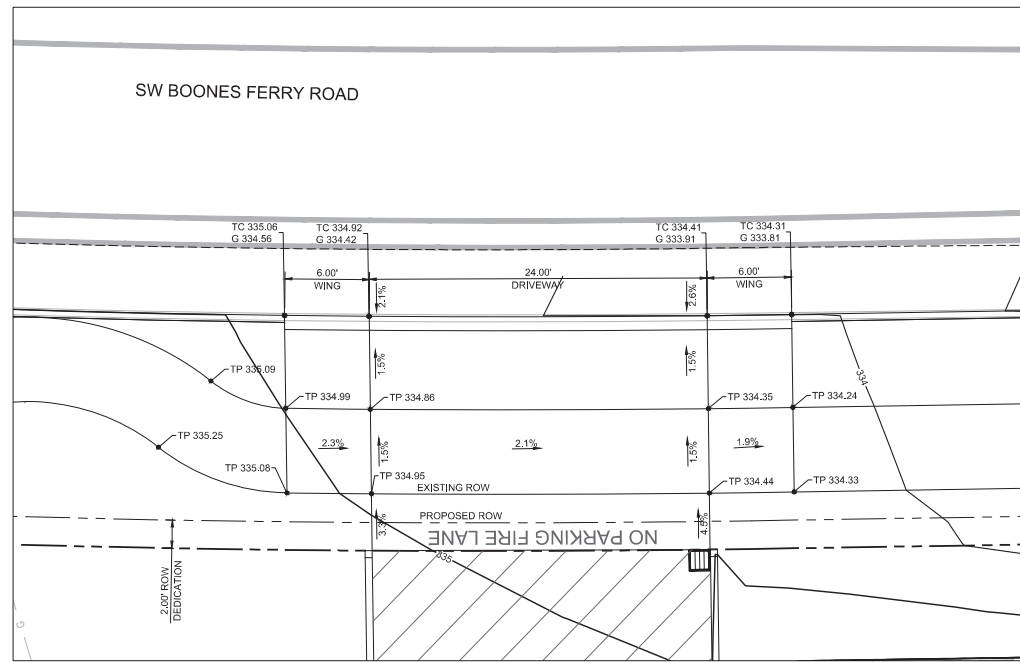
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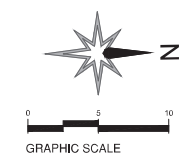
CONSTRUCTION NOTES

- CONSTRUCT NEW STORM MAINTENANCE HOLE PER CLEAN WATER SERVICES STD. DWG. NO. 010 AND 120.
STA 22+26.00
RIM=XXX.XX
NEW 10" IE, IN(IE)=XXX.XX
NEW 12" IE, OUT(IE)=XXX.XX
- CONSTRUCT NEW STORM MAIN FROM NEW STORM MAINTENANCE HOLE TO NEW PUBLIC CLEANOUT.
12" LF - 12" PVC
S=0.XXXX
- NOT USED
- NOT USED
- CONSTRUCT NEW 12" STORM LATERAL CONNECTION PER CLEAN WATER SERVICES STD. DWG. NO. 520. (SEE LATERAL TABLE).
STA 20+00.00
IE=XXX.XX
- CONSTRUCT NEW 10" STORM LATERAL CONNECTION PER CLEAN WATER SERVICES STD. DWG. NO. 520. (SEE LATERAL TABLE).
IE=XXX.XX
- SAWCUT, TYP., PER SHEETS C8.04 AND C8.05.
TL 2S135CD00200





1 ENLARGED DRIVEWAY PLAN - NORTH



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CONSTRUCTION



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CIVIL ENGINEERING LLC
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ENLARGED PLANS

PROJECT NO.
#19031

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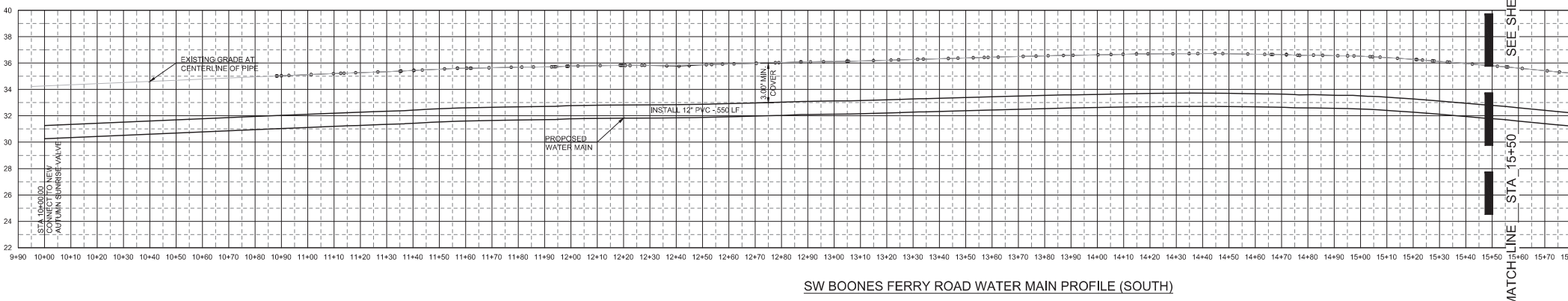
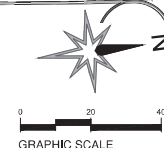


CONSTRUCTION NOTES

1. PROTECT EXISTING CURB.
2. SAWCUT, TYP., PER SHEETS C8.04, C8.05, AND C8.06.

WATER MAIN PIPE AND FITTING NOTES

1. AUTUMN SUNRISE FUTURE DEVELOPMENT WATER VALVE.
2. CONSTRUCT NEW 12" WATER MAIN EXTENSION FROM SW NORWOOD RD TO PROPOSED TEMPORARY BLOW-OFF VALVE. STA 10+00.00 TO STA 15+50.00 850 LF - 12" PVC
3. 6" WATER CONNECTION TO PROPOSED WATER MAIN, BY CITY OF TUALATIN, UNDER SEPARATE PERMIT.
4. 4" PUBLIC WATER METER, BY CITY OF TUALATIN, SEE SHEET C8.06.



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LAND USE: ARCHITECTURAL REVIEW

SW BOONES FERRY RD
WATER MAIN
PLAN AND PROFILE - MID
PROJECT NO.
#19031

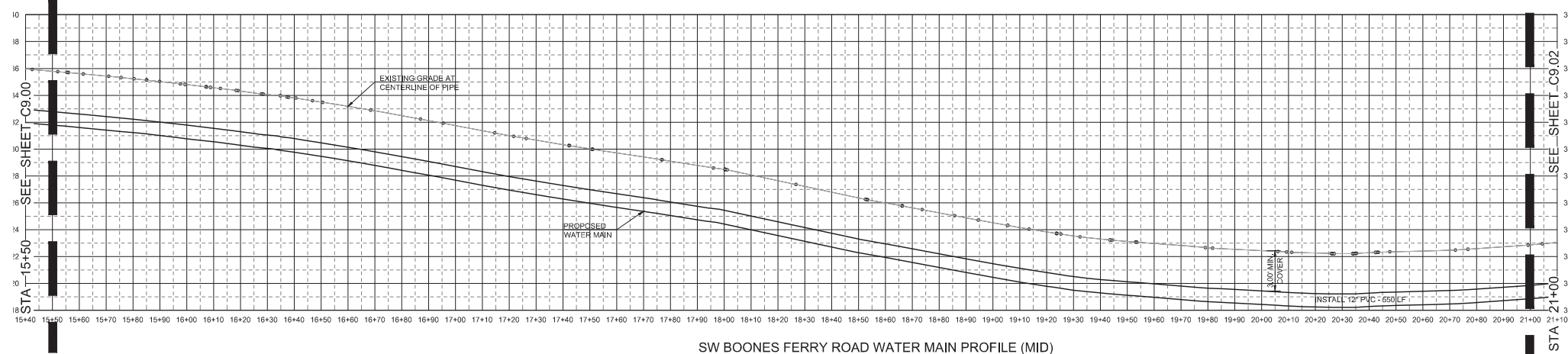
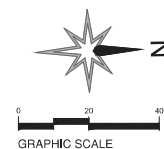
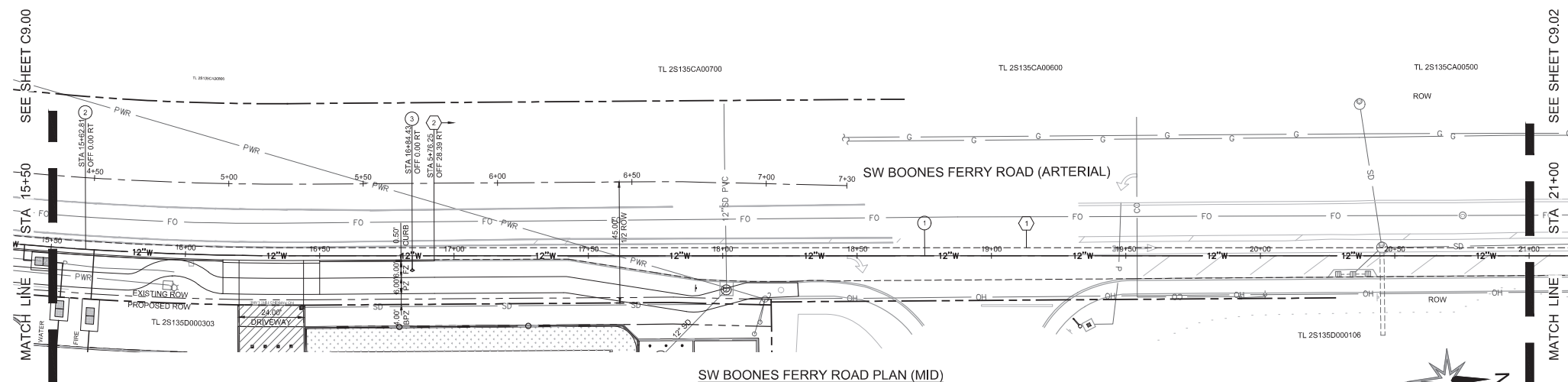
REVISIONS:

CONSTRUCTION NOTES

- SAWCUT, TYP., PER CLEAN WATER SERVICES STD. DWG. NO. 590.
- PROTECT EXISTING CURB.

WATER MAIN PIPE AND FITTING NOTES

- CONSTRUCT NEW 12" WATER MAIN EXTENSION FROM SW NORWOOD RD TO PROPOSED TEMPORARY BLOW-OFF VALVE. STA 15+50.00 TO STA 21+00.00
550 LF - 12" PVC
- 8" FIRE PROTECTION CONNECTION TO PROPOSED WATER MAIN, BY CITY OF TUALATIN, UNDER SEPARATE PERMIT.
- NEW FIRE HYDRANT CONNECTION, UNDER SEPARATE PERMIT.





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LAND USE: ARCHITECTURAL REVIEW

SW BOONES FERRY RD
WATER MAIN
PLAN AND PROFILE - MID
PROJECT NO.
#19031

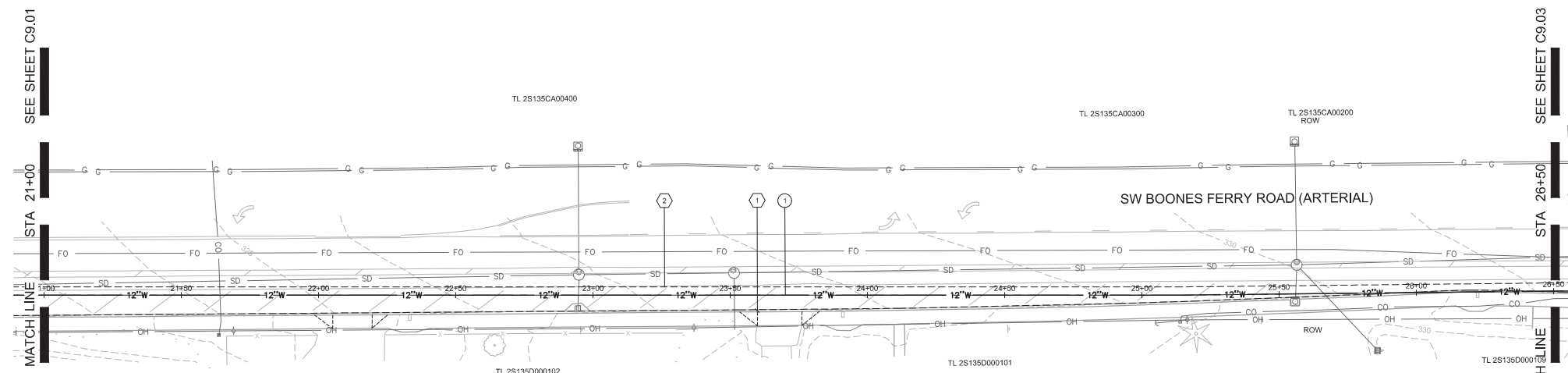
REVISIONS:

CONSTRUCTION NOTES

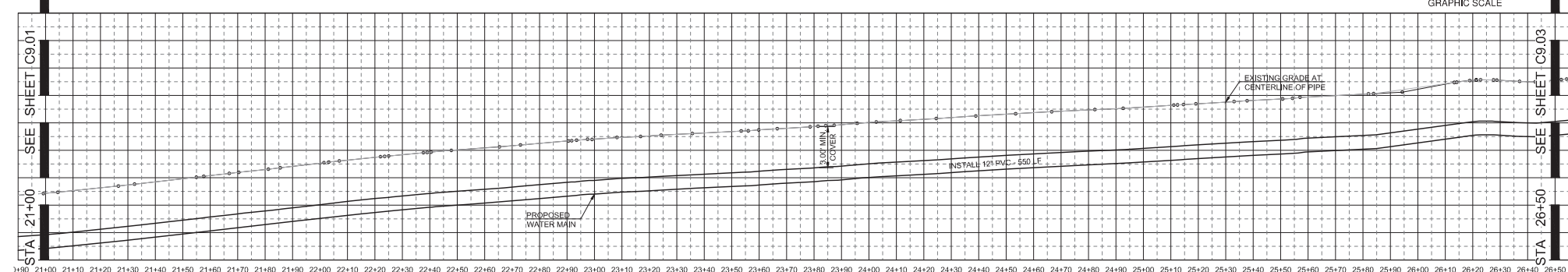
- PROTECT EXISTING CURBS.
- SAWCUT, TYP., PER CLEAN WATER SERVICES STD. DWG. NO. 590.

WATER MAIN PIPE AND FITTING NOTES

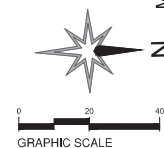
- CONSTRUCT NEW 12" WATER MAIN EXTENSION FROM SW NORWOOD RD TO PROPOSED TEMPORARY BLOW-OFF VALVE. STA 21+00.00 TO 26+50.00. 550 LF - 12" PVC



SW BOONES FERRY ROAD PLAN (MID)



SW BOONES FERRY ROAD WATER MAIN PROFILE (MID)



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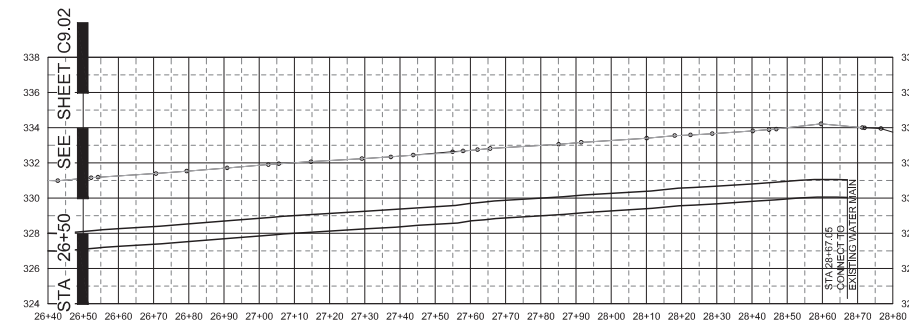
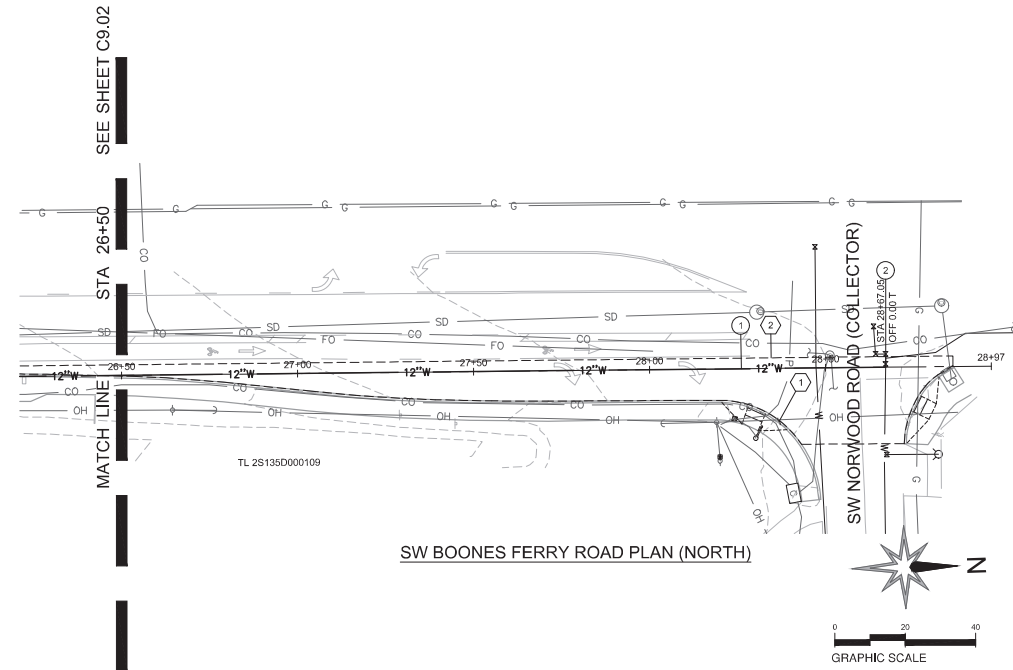


CONSTRUCTION NOTES

1. PROTECT EXISTING CURB.
2. SAWCUT, TYP., PER CLEAN WATER SERVICES STD. DWG. NO. 590.

WATER MAIN PIPE AND FITTING NOTES

1. CONSTRUCT NEW 12" WATER MAIN EXTENSION FROM SW NORWOOD RD TO PROPOSED TEMPORARY BLOW-OFF VALVE. STA 21+25.00 TO 28+50.00. 525 LF - 12" PVC
2. CONNECT TO EXISTING WATER MAIN.



GENERAL NOTES:

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KEYNOTES: ◆

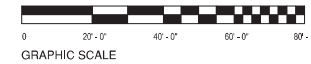
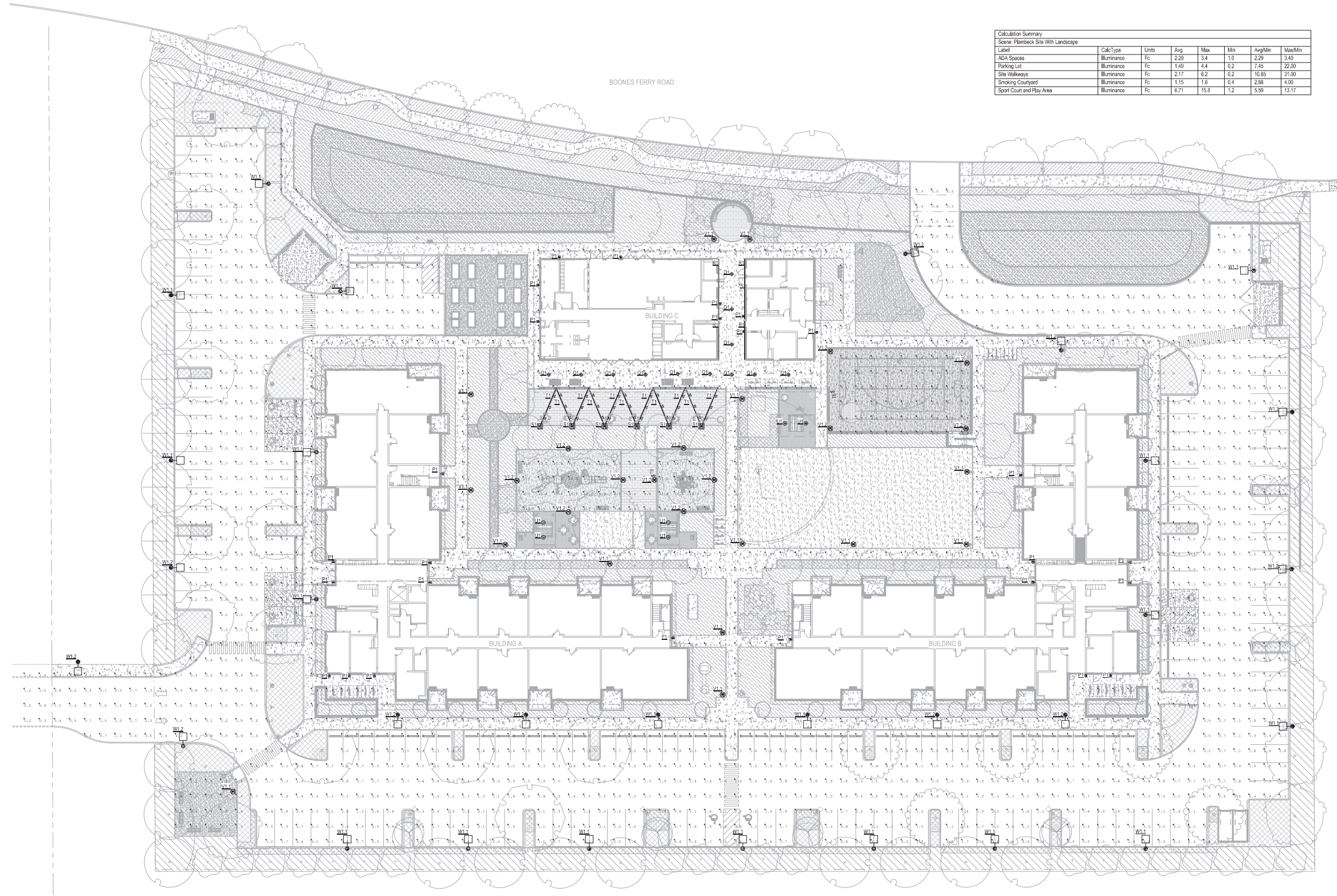
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TUALATIN, OREGON 97062
LAND USE: ARCHITECTURAL REVIEW

SITE PLAN -
PHOTOMETRICS
PROJECT NO.
#19031

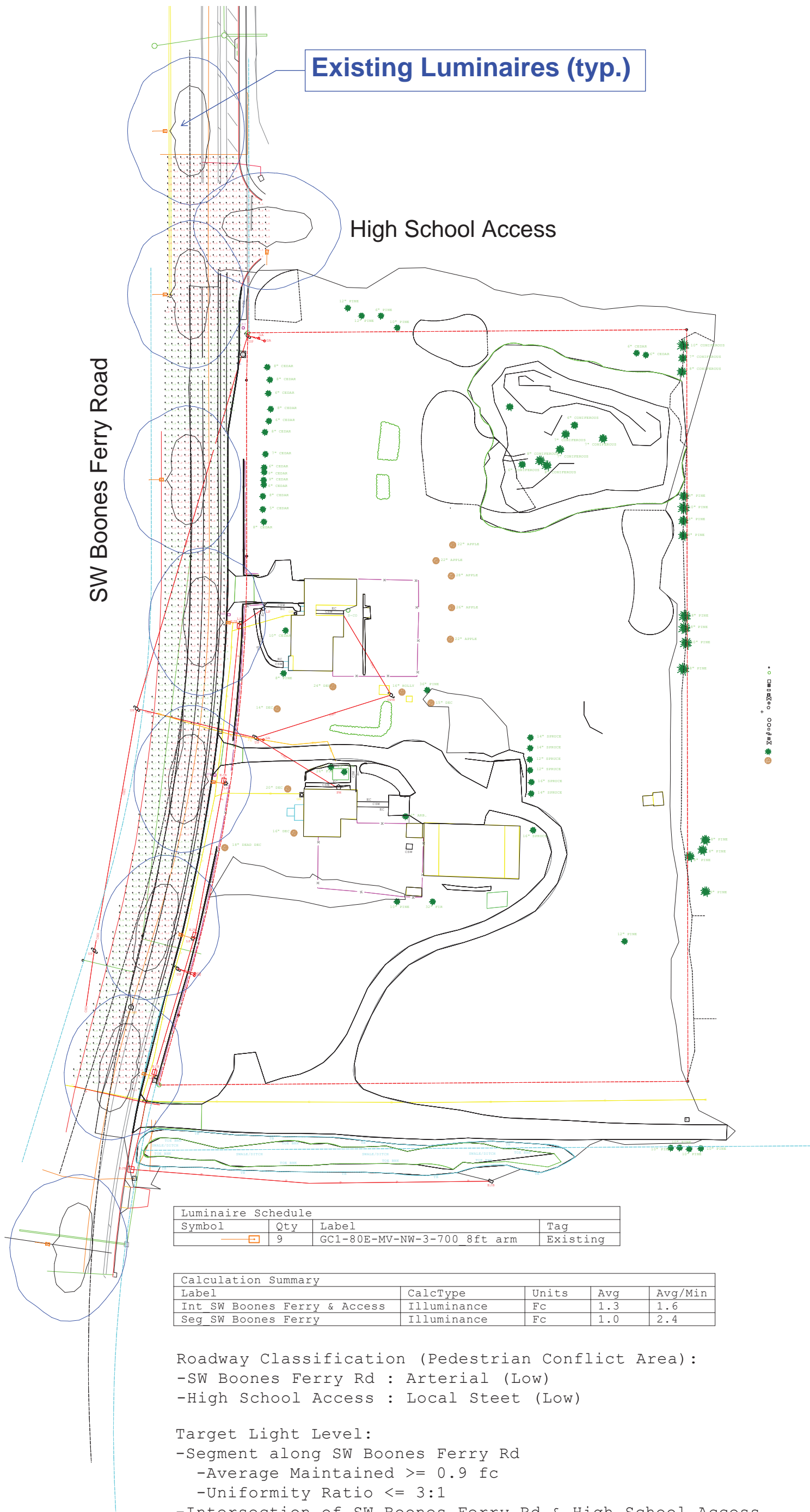
REVISIONS:

SITE LUMINAIRE SCHEDULE													
LUMINAIRE INFORMATION			OPTIONS				ELECTRICAL INFORMATION		BASIS OF DESIGN			NOTES	
MARK	DESCRIPTION	LAMP	DIMMING	CCT	LUMENS	FINISH	MOUNTING	VA	VOLTS	SIZE	MANUFACTURER		SERIES
P1	WALL SCONCE	LED	0-10V	4000 K	1500 lm	BY ARCHITECT	WALL	16 W	120 V	4" W	PORTFOLIO	LERWMB-15-D010	
Q1	EXTERIOR GLOBE PENDANT	LED	0-10V	4000 K	1320 lm	BY ARCHITECT	PENDANT	21 W	120 V	12" D	TECH LIGHTING	ROTON 12	7000PROT-940-12-X-UNV
RT	SURFACE MOUNT LINEAR WALL WASHER	LED	0-10V	4000 K	250 lm	BY ARCHITECT	SURFACE	10 W	120 V	PER DRAWINGS	FOCAL POINT	SEEM 1	FSM1S-AS-250LF-40K-1C-UNV-LD1-SM
S1	SITE LIGHT COLUMN	LED	0-10V	4000 K	710 lm	BY ARCHITECT	COLUMN	21 W	120 V	18" H	LIGMAN	WANCOVER 55	
T1	CATENARY LIGHTING	LED	0-10V	4000 K	50 lm	BY ARCHITECT	CATENARY	2 W	120 V	3" L x 1.75" D	TOKSTAR	EXHIBITOR	EXC-12-UBW-X-C
U1	PICNIC AREA DOWNLIGHT	LED	0-10V	4000 K	2284 lm	BY ARCHITECT	SURFACE	20 W	120 V	6.3" D	LIGMAN	JET CEILING	UJE-8052-20W-M-W40-X-120V27-DIM
V1.1	PATH POLE LIGHT	LED	0-10V	4000 K	4500 lm	BY ARCHITECT	POLE	48 W	120 V	15H	INVUE	LUXESCAPE SPIDER	LXS-VA-2-830-LJSYLS
V1.2	PATH POLE LIGHT	LED	0-10V	4000 K	9500 lm	BY ARCHITECT	POLE	90 W	120 V	15H	INVUE	LUXESCAPE SPIDER	LXS-VA-4-830-LJSYLS
W1.1	SITE POLE LIGHT	LED	0-10V	4000 K	6900 lm	BY ARCHITECT	POLE	54 W	120 V	20H	LIGMAN	LINEAR PT 4	LL2117-14-W30
W1.2	SITE POLE LIGHT	LED	0-10V	4000 K	6000 lm	BY ARCHITECT	POLE	54 W	120 V	20H	LIGMAN	LINEAR PT 4	LL2117-12-W30

Calculation Summary						
Scene: Plambeck Site With Landscape						
Label	CalcType	Units	Avg	Max	Min	Avg/Min
ADA Spaces	Illuminance	Fc	2.29	3.4	1.0	2.29
Parking Lot	Illuminance	Fc	1.49	4.4	0.2	7.45
Site Walkways	Illuminance	Fc	2.17	6.2	0.2	10.85
Smoking Courtyard	Illuminance	Fc	1.15	1.8	0.4	2.88
Sport Court and Play Area	Illuminance	Fc	6.71	15.8	1.2	5.99



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Existing Luminaires (typ.)

High School Access

SW Boones Ferry Road

Luminaire Schedule			
Symbol	Qty	Label	Tag
	9	GC1-80E-MV-NW-3-700 8ft arm	Existing

Calculation Summary				
Label	CalcType	Units	Avg	Avg/Min
Int SW Boones Ferry & Access	Illuminance	Fc	1.3	1.6
Seg SW Boones Ferry	Illuminance	Fc	1.0	2.4

Roadway Classification (Pedestrian Conflict Area):

- SW Boones Ferry Rd : Arterial (Low)
- High School Access : Local Steet (Low)

Target Light Level:

- Segment along SW Boones Ferry Rd
 - Average Maintained \geq 0.9 fc
 - Uniformity Ratio \leq 3:1
- Intersection of SW Boones Ferry Rd & High School Access
 - Average Maintained \geq 1.3 fc
 - Uniformity Ratio \leq 3:1

Plambeck Gardens Frontage Lighting Evaluation

Prepared by
Global Transportation Engineering
2/9/2022

Pre-Construction Tree Inventory & Tree Protection Plan

Inventoried July 2021

Plan Proposed March 2022



Prepared For:

Community Partners for Affordable Housing
Plambeck Gardens Multifamily Housing Project
Site Address: 23500 SW Boones Ferry Road
Tualatin, OR 97062

Billing Address:
6380 SW Capitol Hwy #151
Portland, OR 97239

Prepared By:

Treecology Consulting Group



Ruth Williams
BCMA #WE-7317-BM
13640 Garden Meadow Dr.
Oregon City, OR 97046
503-804-7868 office
503-880-3818 cell
503-662-6846 fax
www.treecology.com

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Summary

On July 9 & 13, 2021, Ruth Williams, an International Society of Arboriculture (ISA) Board Certified Master Arborist (#WE-7317-BM) completed an assessment and inventory of the trees at 23500 SW Boones Ferry Road Tualatin, Oregon. The assessment was contracted by Community Partners for Affordable Housing, in anticipation of upcoming development of the site. The arborist performed a visual assessment of all trees greater than 8" DBH on the property and along the property line which could be potentially impacted by development, and some smaller vegetation by client request. The arborist evaluated the current condition, health, and size of each tree and photo documented the site. The results were used to determine the Tree Protection Zone and Structural Root Zone of the trees (RPZ and SRZ). Prior to the assessment, land clearing mechanically with mulchers, mowers or similar light equipment had been conducted that created a path, facilitating site access.

Observations

- The site includes two residential properties and a lightly maintained area that historically was a plant nursery. Topography is variable. Irrigation was not apparent.
- One hundred and four (104) trees were assessed including 15 unique species. The most common species were Scotch pine, (*Pinus sylvestris*, 60 trees) and Leyland cypress (*Cupressus x leylandii*, 15 trees).
- The trees are primarily in good (40) to fair (56) condition. Six (6) are in poor condition and two (2) are dead. Tree #34 meets the conditions of TDC 33.110 (5)(a)(ii)(B); the tree is hazardous and parts are in danger of falling.
- Diameters at breast height (DBHs) ranged from 7-30", heights ranged from 8-66'.
- Arborist-assigned preservation priorities were rated high, moderate, low, and one tree is hazardous to preserve. Fifteen (15) trees on adjacent property are required to be preserved unless alternative agreements are made with adjacent property owners. Six (6) adjacent property trees (#13-17) are no longer adjacent to the proposed construction because the parcel is no longer in consideration for development or construction site access.

Recommendations

- Preserve tree #29 following the detailed recommendations for fencing and monitoring provided in this plan. Arborist monitoring of construction is required whenever work is within the Tree Protection Zones.
- Remove eighty nine (89) trees early in the construction process. These trees would be directly impacted by site grading within the structural root zones, and therefore meet approval criteria TDC 33.110 (5)(a)(iii).
- Provide tree protection fencing for 15 trees on adjacent property and schedule arborist supervision of any excavation within 12' of adjacent property trees.
- The trees should be monitored by a Certified Arborist at the end of construction, and if any foliar browning, seasonally unusual loss, or lean.

This report focuses on recommendations for tree preservation, and provides the TPZs and SRZs of these trees for permitting purposes. This Tree Protection Plan is based on the proposed grading and drainage plans submitted March 4, 2022 for Architectural Review. The trees should be monitored by a Certified Arborist at the end of construction, and if any foliar browning, seasonally unusual loss, or lean.

Introduction

Purpose

This Pre-construction Tree Inventory and Tree Protection Plan can be submitted for permitting. This report details the health, size, and location of the trees and discusses tree protection and retention measures based on the proposed design.

Limits of the Assignment

Many factors can limit specific and accurate data when performing evaluations of trees, their conditions, and values. The determinations and recommendations presented here are based on current data and conditions that existed at the time of the evaluation and cannot be a predictor of the ultimate outcomes for the trees. A visual inspection was used to develop the findings, conclusions, and recommendations found in this report. No physical inspection of any canopy, sounding, root crown excavation, and resistograph or other technologies were used in the evaluation of the trees. Where vines or brambles prohibited access, DBH was estimated. Nineteen trees were not assessed in the original scope of work, but were later added to the data set at client request. These trees are not tagged, and tree data was estimated remotely on July 14. If greater accuracy is required, an additional arborist site visit should be arranged.

Methods

Data was collected by an ISA Board Certified Master Arborist (Ruth Williams #WE-7317 BM). A visual inspection was used to develop the findings, conclusions, and recommendations found in this report. Using a digital tablet to record information, the arborist visually assessed the trees and recorded information July 13, 2021. Following data collection, the tree's protection zone and structural root zones (TPZs and SRZs) were calculated.

The following attributes were collected:

Tree Tag: Each tree over 8" DBH was tagged with a metal identifier, and the number was recorded except for trees that obviously fell outside the property boundaries.

Species: Tree genus and species were identified.

Diameter at Breast Height (DBH): Trunk diameter was recorded to the nearest inch at 4.5 feet (breast height) above grade except where noted. When limbs or deformities occurred at breast height, measurement was taken below 4.5 ft. For multi-stemmed trees, the diameter was determined by measuring the six largest stems, and calculating the root of the sum of stems squared, or by taking a basal measurement.

Height: Tree height was measured with a laser range finder with a variance not to exceed +/- 10'.

Crown Spread: Approximate crown diameter was visually estimated with a variance not to exceed +/- 10'.

Condition: The arborist evaluated the structure and health of the tree compared to other trees in urban landscapes. Excellent, good, fair, poor, or dead were used to describe condition.

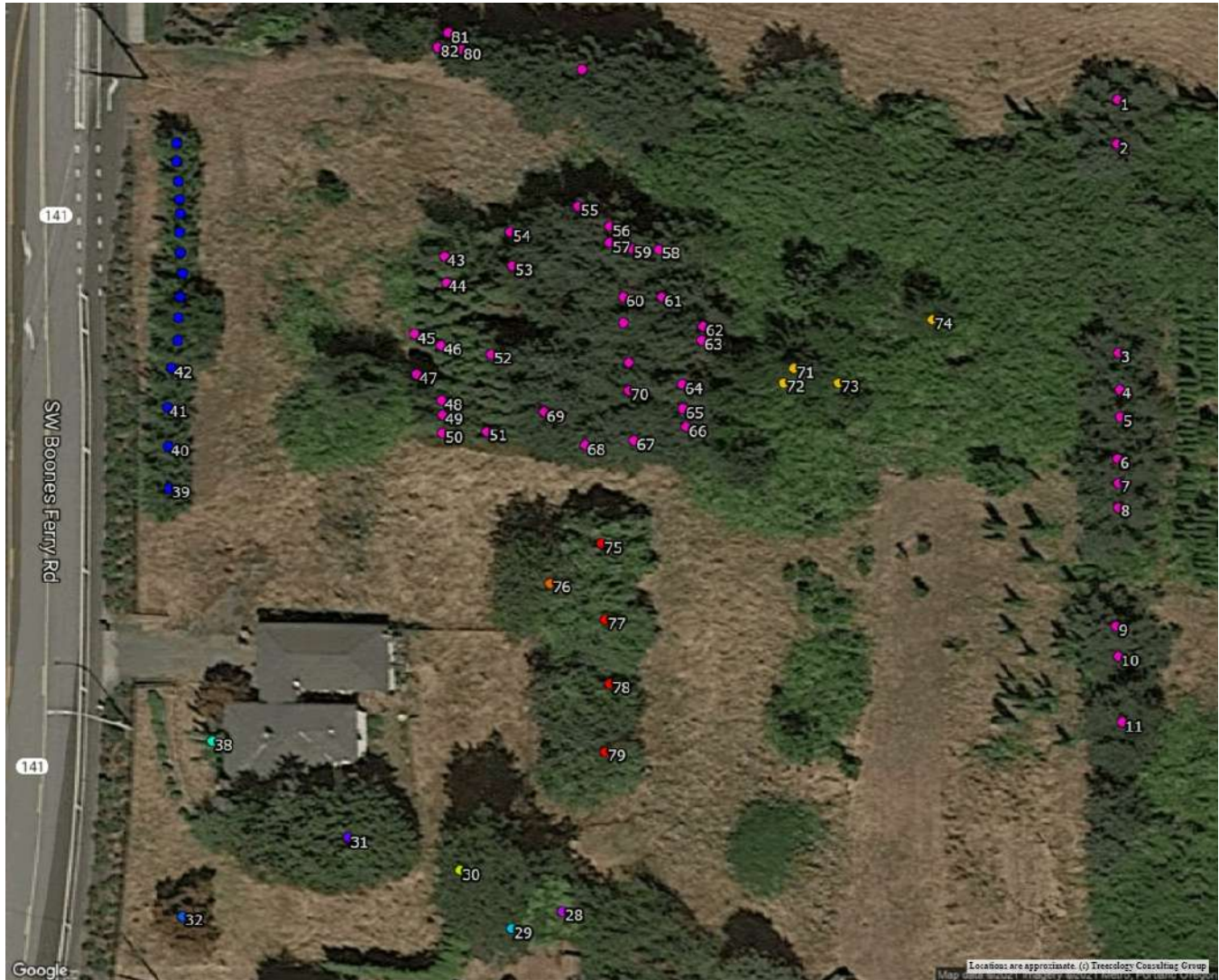
Geolocation: Approximate locations were determined by adding points to geolocated aerial tiles. Locations provided by the land surveyor are more accurate, and should be used for design purposes.

Notes: Additional observations, comments, or other points of consideration.

Observations

Site Observations

The site includes two residential properties and a lightly maintained area that was historically a plant nursery. Topography is variable. Irrigation was not apparent. Vegetation not inventoried included cryptomeria and arborvitae, as these perform as shrubs, not trees. Significant blackberry growth was present.



Map 1. North Site Overview



Map 2. South Site Overview

*Note: Trees 13-18 are not included in the project area as work and access are not anticipated within 30’.

Tree Observations

One hundred and four (104) trees were assessed including 15 unique species. The most common species were Scotch pine, (*Pinus sylvestris*, 60 trees) and Leyland cypress (*Cupressus x leylandii*, 15 trees). The trees are in good (40) to fair (56) condition. Six (6) are in poor condition and two (2) are dead. Diameters at breast height (DBHs) ranged from 7-30", heights ranged from 8-66'. Five (5) adjacent property trees (#13-17) are no longer adjacent to the proposed construction or access because the parcel is no longer in consideration for development.

Many of the Scotch pines had prior pruning resulting in co-dominant stems, and have been grown on 5' centers, creating uneven crowns, with low live crown ratios or self-pruning/dieback of most of the lower branches due to competition. Subsequently, many have had branches broken or ripped off, rather than pruned. They meet the conditions of TDC 33.110 (5)(b)(i)(B); evergreens which are unbalanced and lacking a full crown.

Analysis

Tree Benefits



Total Tree Value and Savings

Total Monetary Benefit: \$10,616

Benefits are only calculated for trees with defined species, DBH, and land use based on i-Tree research. Totals are annual amounts.



Stormwater Monetary Benefit
\$1,885 ?
Runoff Prevention (Gallons)
85,642 ?



Property Value Total
\$8,009 ?



Energy Savings
\$241 ?
Energy Saved (kWh)
4,247 ?
Natural Gas Savings
\$219 ?
Heat Prevention (Therms)
231 ?



Air Quality Monetary Benefit
\$160 ?
Pollutants removed (lb)
130 ?



Carbon Monetary Benefit
\$103 ?
Carbon Stored (lb)
21,380 ?
Carbon Sequestered (lb)
13,961 ?
Carbon Avoided (lb)
8,923 ?

Root Calculations

This analysis considers two types of roots.

1. Structural roots near the trunk that should not be damaged or cut - Removal of these large anchoring roots can lead to structural instability or failure.
2. Absorptive and feeder roots - These may be impacted with arborist supervision and monitoring. Removal (or compaction in the area) of the feeder roots can cause immediate water stress, limit a trees' ability to combat decay pathogens, and cause significant declines in condition. The ability of a tree to survive root loss is dependent on its tolerance of drought, tree health, and the ability to form new roots quickly. This area is called the Root Protection Zone.

The trunk diameter (DBH) of each assessed tree was used to determine the Root Protection Zone (RPZ). The RPZ is considered the ideal preservation area of a tree. It is equal to 1 foot of radius for every inch of trunk diameter measured at 4.5 feet from grade. The RPZ represents the typical rooting area required for tree health and survival. Construction activities should be limited near or in the RPZ of any tree to be retained. This includes but is not limited to the storage of materials, parking of vehicles, contaminating soil by washing out equipment, (concrete, paint, etc.), or changing soil grade.

Like the RPZ, the Structural Root Zone (SRZ) was also calculated using a commonly accepted method established by Dr. Kim Coder in *Conserving Trees During Site Development: A training manual*.¹ In this method, the root plate size (i.e. pedestal roots, zone of rapid taper area, and roots under compression) and limit of disruption based upon tree DBH is calculated. The SRZ is the trunk radius at breast height multiplied by 10.8. Significant risk of catastrophic tree failure exists if structural roots within the SRZ are cut, destroyed or severely damaged. The SRZ is the area where no disturbance should occur unless supervised by a Certified Arborist with Tree Risk Assessment training.

Design Constraints

Due to extensive site grading, shown in the Architectural Review submitted drawings March 4, 2022, eighty nine (89) trees have grading impacts in the structural root zone and cannot be preserved. Tree #29 is close to the proposed grade and a minor grade adjustment is possible, according to the civil engineer.

Recommendations

1. Fifteen (15) trees on adjacent property are required to be preserved unless alternative agreements are made with adjacent property owners. Provide tree protection fencing for any trees on adjacent property and schedule arborist supervision of any excavation within 12' of adjacent property trees.
2. Eighty nine (89) trees are identified for removal. These trees would be directly impacted by site grading within the structural root zones, and therefore meet approval criteria TDC 33.110 (5)(a)(iii).
3. Slightly modify grading plan to preserve tree #29 and provide tree protection fencing at the furthest possible extent to facilitate grading, but no closer than 12' from the tree trunk. The fence must be a

¹ Dr. Kim D. Coder. University of Georgia. 2018.

minimum of 6' cyclone fence attached to metal posts driven into the ground to a depth of 2' at intervals of 10' minimum. The fence may have one gate or bolted panel on fence stands to allow maintenance access, but the area may not be accessed without arborist supervision. The fence must be in place prior to any construction activity on site, and remain through the duration of the project. Signage must be affixed to the fence that states "Tree Protection Area. Do Not Enter without Arborist Supervision." in multiple languages, if applicable.

4. Prior to plan finalization, consider ivy removal and an aerial inspection of tree #29 to determine maintenance recommendations such as pruning or cabling. Hidden defects are possible in its current ivy-covered state.
5. Due to the sensitive nature of working within the RPZ of trees to be retained, any demolition, excavation or grading within the RPZ of the trees must be performed with hand or pneumatic excavation tools and supervised by a Certified Arborist to monitor and document any tree impacts. Any significant roots (roots 2 inches in diameter or larger) encountered should be cut cleanly and photo documented under the supervision of the project arborist. If severed roots increase failure risk beyond the property owner's tolerance, the Arborist may recommend tree removal.
6. The Landscape Architect should provide a detailed planting plan for any area in the RPZ to the arborist for review prior to beginning work. Landscaping within the RPZ must be supervised by the Arborist and field adjusted if significant roots are found. Plant spacing, sizing and count may require adjustment to preserve tree roots.
7. No material shall be stored, nor concrete basins, painting equipment washed, or any chemical materials stored within the RPZ of the tree, and no construction chemicals or paint should be released into landscaped areas, as these can be toxic to the tree and contaminate soil.
8. Efforts to reduce soil compaction and disturbance throughout the site should be considered. These may include mulch, fencing, and if needed, plywood or metal plates to distribute weight across a broader area. Soil that is preserved uncompacted provides an ideal substrate for tree planting and establishment.
9. A Certified Arborist should inspect the trees on construction completion, and immediately if any changes in tree health, condition or structural stability develop. If the trees decline, they should be monitored monthly or more frequently. Please call 503-804-7868 or 503-880-3818 to schedule monitoring site visits.
10. After construction is complete, the trees recommended by the designer should be planted November - February, and should receive mulch and irrigation for a minimum 3 year establishment period May - October.

Conclusion

This report is the first step in preserving the health, function, and value of the tree during and after construction. Trees and green spaces provide benefits and add value to residential properties. Tree preservation starts with a basic understanding of the health and structure of the tree, and the design intent of the project. With proper care and protection, this tree can continue to thrive. Tree protection guidelines and strategies should be shared with contractors and employers prior to any disturbance at the site. Successful tree preservation requires a team effort between the property owner, arborist, and project contractors. Using the findings of this report as a foundation, the design team and construction personnel are equipped to preserve one tree on site and 15 on adjacent property.

Appendix A. Tree Photos



Photo 1. Typical Scotch pine with low live crown ratio, poor pruning, meets the conditions of TDC 33.110 (5)(b)(i)(B); evergreens which are unbalanced and lacking a full crown.



Photo 2. Tree #34 is a mountain ash that is hazardous to preserve due to previous failure, crack, and weakly attached epicormic shoots. It meets the conditions of TDC 33.110 (5)(a)(ii)(B); substantial portions of the tree are in danger of falling.

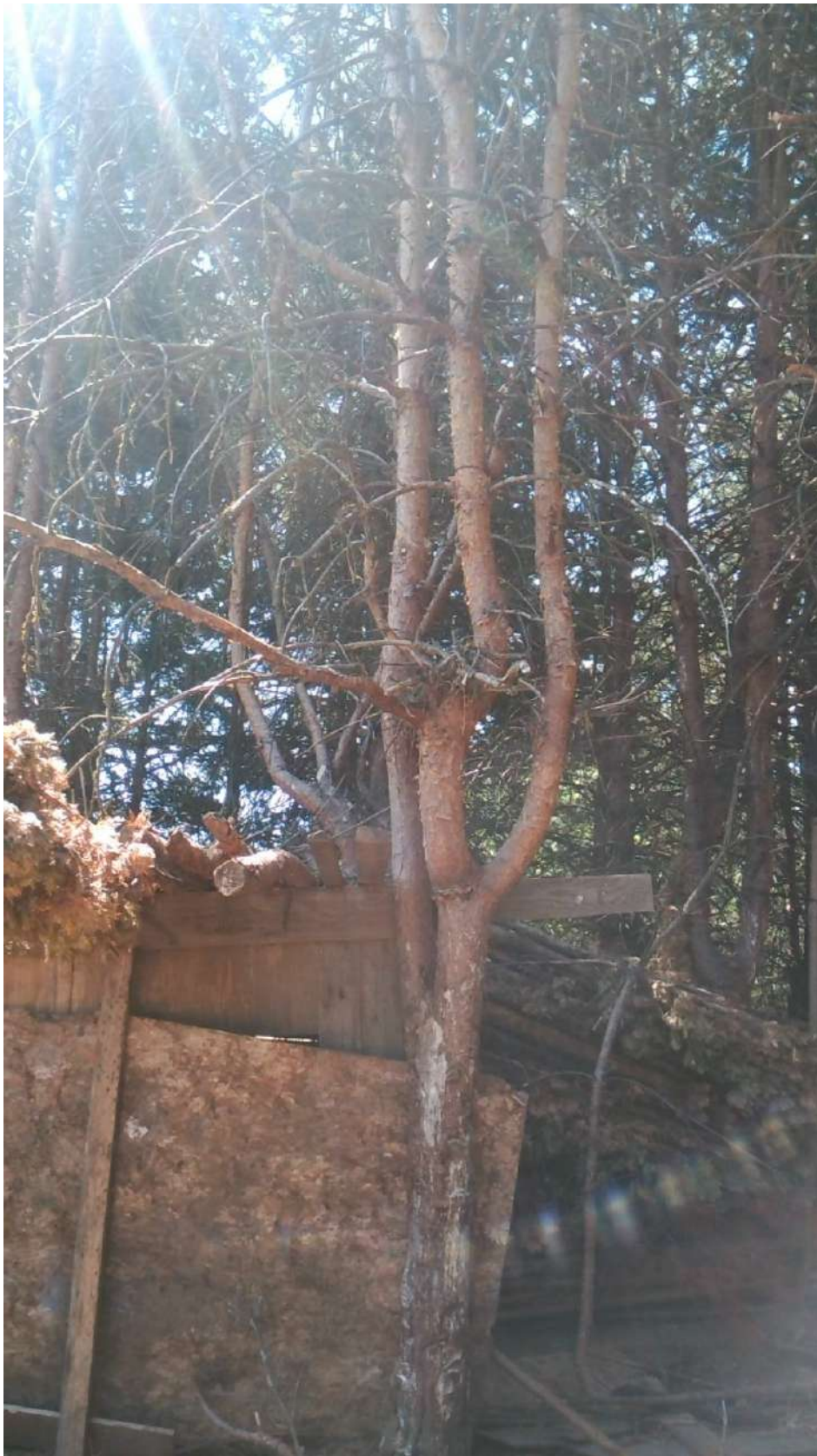


Photo 3. Tree #59 is a dead Scotch pine with multiple leaders. It meets the conditions of TDC 33.110 (5)(b)(i)(B); evergreens which are unbalanced and lacking a full crown.



Photo 4. Tree #79 is a fair condition apple tree with a broken limb.



Photo 5. Trees 39-42 and several untagged smaller DBH trees in a row are good condition Leyland cypress.



Photo 6. Nine untagged scotch pine on adjacent property near trees #80-82 should be fenced and protected in construction.



Photo 7. Tree #19 (left) and #20 (Right)



Photo 8. Tree #21 is an open-grown spruce



Photo 9. Tree #29 is a co-dominant pine in fair condition.



Photo 10. Tree #32 is a good condition Japanese maple



Photo 11. Tree #33 is a good condition Purple beech.



Photo 12. Tree #35 is a fastigiata beech.

Appendix B. Background Analysis

The following information was provided to the design team before grading plans were finalized. Diligent study of the preservation options within the context of the site’s soil, land use rules, and required site elements was performed by the design team. Ultimately, due to extensive site grading, it was determined preservation is possible for one onsite tree, (#29). Preservation is required for adjacent property trees unless arrangements are made with the adjacent property owner.

Arborist-Assigned Preservation Priorities

- Preservation priorities were rated high, moderate (Table 1) or low (46), and one tree, #34 meets the conditions of TDC 33.110 (5)(a)(ii)(B); the tree is hazardous and parts are in danger of falling.
- If preservation is desired for spruces #22-27, they are best preserved as a group for aesthetic reasons. Removal of end trees will likely result in unsightly gaps for at least a few years.
- Several of the trees near existing building footprints (30, 31, 33, 35, 36, 37, 38) would be challenging to preserve. Demolition would need to be conducted with great care and in some cases the prior foundation would need to be abandoned to avoid destabilizing the tree. Ultimately depending on foundation quality preservation may not be possible regardless of the nature of the proposed design.
- Many of the scotch pines and spruces meet the conditions of TDC 33.110 (5)(b)(i)(B); evergreens which are unbalanced and lacking a full crown.
- Fifteen (15) trees on adjacent property are required to be preserved unless alternative agreements are made with adjacent property owners. Due to design changes, Five (5) adjacent property trees (#13-17) are no longer adjacent to the proposed construction because the parcel is no longer being developed or identified for site access.

Table 1. Root Protection Zones for Required, High, and Moderate Preservation Priority Trees

Tree Tag	Scientific Name	Condition	DBH (In.)	Tree Height	RPZ (Ft.)	SRZ (Ft.)	Arborist Assigned Preservation Priority	Basis for Preservation Priority
8	Pinus sylvestris	Fair	9	22	9	4.1	required	Adjacent property
9	Pinus sylvestris	Fair	9	20	9	4.1	required	Adjacent property
10	Pinus sylvestris	Poor	10	15	10	4.5	required	Adjacent property
20	Pseudotsuga menziesii	Good	28	63	28	12.6	high	Open grown, native
21	Picea spp.	Fair	16	33	16	7.2	moderate	Meets TDC 33.110 (5)(b)(i)(B)
22	Picea spp.	Fair	13	39	13	5.9	moderate	Meets TDC 33.110 (5)(b)(i)(B)
23	Picea spp.	Fair	15	45	15	6.8	moderate	Meets TDC 33.110 (5)(b)(i)(B)
24	Picea spp.	Fair	10	45	10	4.5	moderate	Meets TDC 33.110 (5)(b)(i)(B)
25	Picea spp.	Fair	12	45	12	5.4	moderate	Meets TDC 33.110 (5)(b)(i)(B)
26	Picea spp.	Fair	14	45	14	6.3	moderate	Meets TDC 33.110 (5)(b)(i)(B)
27	Picea spp.	Fair	14	45	14	6.3	moderate	Meets TDC 33.110 (5)(b)(i)(B)
29	Pinus spp.	Fair	30	66	30	13.5	high	Open grown ornamental

Tree Tag	Scientific Name	Condition	DBH (In.)	Tree Height	RPZ (Ft.)	SRZ (Ft.)	Arborist Assigned Preservation Priority	Basis for Preservation Priority
32	Acer palmatum	Good	14	19	14	6.3	moderate	Small size
33	Fagus sylvatica	Good	23	61	23	10.4	moderate	Close to existing building footprint
35	Fagus sylvatica	Good	16	44	16	7.2	moderate	Close to existing building footprint
36	Picea spp.	Fair	27	48	27	12.2	moderate	Close to existing building footprint
37	Picea spp.	Fair	19	45	19	8.6	moderate	Close to existing building footprint
38	Sequoiadendron giganteum	Good	10	30	10	4.5	moderate	Close to existing building footprint
39	Cupressus x leylandii	Good	8	27	8	3.6	high	Nice ornamental tolerates construction impacts, young and vigorous.
40	Cupressus x leylandii	Good	9	27	9	4.3	high	Nice ornamental tolerates construction impacts, young and vigorous.
41	Cupressus x leylandii	Good	8	23	8	3.6	high	Nice ornamental tolerates construction impacts, young and vigorous.
42	Cupressus x leylandii	Good	9	23	9	4.0	high	Nice ornamental tolerates construction impacts, young and vigorous.
71	Pseudotsuga menziesii	Good	8	37	8	3.6	high	Native tolerates construction impacts, young and vigorous.
73	Pseudotsuga menziesii	Good	9	37	9	4.1	high	Native tolerates construction impacts, young and vigorous.
74	Pseudotsuga menziesii	Good	9	25	9	4.1	high	Native tolerates construction impacts, young and vigorous.
75	Malus domestica	Good	17	21	17	7.7	high	Historic food-producing tree
76	Prunus domestica	Fair	20	47	20	9.0	high	Historic food-producing tree
77	Malus domestica	Good	16	26	16	7.2	high	Historic food-producing tree
78	Malus domestica	Good	21	29	21	9.5	high	Historic food-producing tree
81	Pinus sylvestris	Good	12	34	12	5.4	required	Adjacent property
82	Pinus sylvestris	Good	9	34	9	4.1	required	Adjacent property
	Pinus sylvestris	Good	12	34	12	5.4	required	9 trees, Adjacent property

TRAFFIC ANALYSIS REPORT

FOR

PLAMBECK GARDENS

SW BOONES FERRY ROAD

TUALATIN

SUBMITTED BY



February 2022

Project 21-14

TRAFFIC ANALYSIS REPORT

FOR

PLAMBECK GARDENS

SW BOONES FERRY ROAD

TUALATIN

Prepared By

CHARBONNEAU Engineering LLC



February 2022

Project 21-14

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FL2203

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INTRODUCTION

This traffic study has been prepared to evaluate and document the operations and safety conditions for the Plambeck Gardens development being planned in Tualatin. The development will construct a total of 116 affordable apartment type units along the east side of SW Boones Ferry Road between SW Norwood Road and SW Greenhill Lane at addresses #23500 & #23550 SW Boones Ferry Road on tax lot #2S135D000303. Figure 'a' in the appendix is a vicinity map highlighting the project location.

In accordance with the City's requirements the traffic study area was defined as the section of SW Boones Ferry Road between SW Day Road and SW Iowa Drive and included several intersections and the site access point (referenced as Street 'H' in this report).

TRAFFIC ANALYSIS CONSIDERATIONS

In the project scope established with Washington County and Tualatin staff, a number of important elements were identified and considered in this study.

- Inventory and record pertinent information such as traffic control devices, circulation patterns, lane conditions, pedestrian & bicycle facilities, transit zones, parking, and street characteristics.
- Record data on typical weekdays during the AM and PM peak traffic hours.
- As confirmed by Washington County and the City of Tualatin the following study intersections were analyzed.
 - SW Boones Ferry Road at SW Day Road
 - SW Boones Ferry Road at site access
 - SW Boones Ferry Road at Horizon School access
 - SW Boones Ferry Road at SW Norwood Road
 - SW Boones Ferry Road at SW Iowa Drive
- Traffic count data was obtained for the study intersections from Lancaster-Mobley Engineering for their Autumn Sunrise study. The data consisted of intersection turning movement counts for the AM & PM peak hours that were recorded in the September 2020 and March 2021. The peak hour counts at SW Boones Ferry Road and the Horizon School intersection were recorded on September 14th when school was in session.
- Traffic growth at 2.0% per year was applied to establish the year 2026 background traffic scenarios.
- City staff confirmed that in-process traffic for the upcoming Autumn Sunrise subdivision project was applicable and was therefore incorporated into the study.
- Level of service (LOS) analysis of the study intersections to measure the approach delays for comparison to agency standards.
- Documentation of the access spacing conditions along SW Boones Ferry Road, a three-lane arterial with a minimum 600 feet of separation per County standard.
- Determination of vehicular queuing at the study intersections.

- Access to the site will occur at the Street `H` future Autumn Sunrise intersection with SW Boones Ferry Road as shown on the site plan. The two properties will be connected through Tract `L`.
- Review intersection sight distance at the future Street `H` intersection on SW Boones Ferry Road.
- Review traffic accident data furnished by ODOT. Determine the intersection crash rates at the study intersections.
- In the future Washington County will construct the Basalt Creek Parkway extension as an east-west arterial connecting Grahams Ferry Road to SW Boones Ferry Road. The intersection with SW Boones Ferry Road south of Greenhill Lane will be signalized. The exact timing to construct the road is not established at this time. Although not analyzed in the Plambeck Gardens traffic study the development's trip distribution and trip assignments with the road extension in place are included for reference purposes.

SITE DESCRIPTION, STREETS, ACCESS, AND CRITICAL INTERSECTIONS

Development of Plambeck Gardens is planned for 116 affordable apartment dwelling units in Tualatin along the east side of SW Boones Ferry Road. The apartment buildings will be constructed as four-story facilities and a total of 170 parking spaces will be provided on the site.

Vehicular access as shown on the site plan will occur at Street `H` and SW Boones Ferry Road. This street is planned in conjunction with the future Autumn Sunrise Subdivision development and is positioned approximately 730 feet south of the Horizon School driveway and 750 feet north of the Greenhill Lane intersection. An emergency vehicle access will be located on the Plambeck Gardens site at the property's north end. The access will not be available to the general public, residents, or staff. The driveway connecting Plambeck Gardens and Autumn Sunrise will occur at Tract `L`.

Currently there are two existing housing units on the Plambeck Gardens site. The buildings and associated driveways will be demolished.

The project site plan (Figure 'b') illustrates access location, building locations, internal driveways, and parking design.

The intersection of SW Boones Ferry Road and Day Road operates with signal control. The other study intersections are controlled by stop signing. The existing and proposed lane configurations and traffic control are presented in Figure `c` in the report's appendix.

SW Boones Ferry Road is classified as an arterial along the site's frontage in Washington County and is a fully-improved as a three-lane street consisting of two travel lanes and a center two-way left turn median lane. Bike lanes and curbs are present. Sidewalk occurs along the west side of the street and will be added on the east side at the development's frontage. The travel speed is posted at 45 MPH. Development in the area is primarily

residential with Horizon Christian High School located just to the north and Tualatin High School located north of Iowa Drive.

SW Boones Ferry Road at Day Road is a four-way signalized intersection with separate left turn lanes and protected left turn phasing on the north and south approaches. The northbound approach includes dual left turn lanes and the eastbound approach includes a separate right turn lane. All approaches have pedestrian crosswalks with pushbutton actuation.

SW Boones Ferry Road at the Horizon School driveway intersections consists of the school's private access on the road's east side, controlled by stop signing. The approach does not have lane markings although there is sufficient width for traffic turning right onto SW Boones Ferry Road to stack one to two cars. A private (residential) access occurs across from the school's approach. SW Boones Ferry Road includes a separate southbound left turn lane and separate right turn lane for traffic entering the school property.

SW Boones Ferry Road at Norwood Road is a tee-shaped design with stop sign control on the Norwood Road approach. Norwood Road contains a single lane approach. There is separate northbound right turn lane and separate southbound left turn lane on SW Boones Ferry Road. Crosswalks are not marked at the intersection.

SW Boones Ferry Road at Iowa Drive is a stop controlled four-way intersection with stop signing on the Iowa Drive approaches. There are no separate turn lanes on Iowa Drive. SW Boones Ferry Road is striped with separate left turn lanes. Only the north intersection leg is marked with a crosswalk and has pedestrian crossing symbol signing in both directions.

The proposed Street `H` intersection serving traffic for Plambeck Gardens and Autumn Sunrise will require stop signing and stop bar marking on the approach to Boones Ferry Road. The access will have one lane in each direction. Separate turn lanes on the approach to SW Boones Ferry Road are not required. SW Boones Ferry Road currently has a center turn lane which will serve as the southbound left turn lane for traffic turning into the site access. Consideration for a northbound right turn lane is addressed and documented later in the report.

The proposed Tract `L` intersection at `H` Street will be configured as a tee-shaped design and require stop signing and stop bar marking on the southbound approach to `H` Street. Tract `L` will have one lane in each direction. Separate turn lanes are not required at the intersection based on the low volume of projected traffic.

TRAFFIC OPERATIONAL ANALYSIS

The study intersections were analyzed for level of service (LOS) conditions, delay, and safety. Including the site access location a total of five intersections were evaluated. LOS and queuing analyses were completed in the AM and PM peak hour periods for the following scenarios:

- Year 2021 Existing Traffic
- Year 2026 Background Traffic
- Year 2026 Total Traffic

In order to perform the LOS analysis traffic counts from September 2020, March 2021, and September 2021 were obtained. Due to the traffic flow impacts associated with the COVID-19 pandemic adjustment factors were applied (by Lancaster-Mobley) to compensate. The count data is included in the appendix. Figure 1 illustrates the modeled year 2021 volume data.

Traffic growth at 2.0% per year has been added to the year 2021 volumes to account for the year 2026 background traffic volumes. The year 2026 background traffic volumes are illustrated in Figure 3.

Tualatin staff confirmed that it was necessary to account for the in-process traffic associated with the future Autumn Sunrise development which is projected to buildout a total of 321 single-family homes and 80 apartment units in four phases. Listed below is the anticipated phasing plan.

Phase #	Buildout Year	#Single-Family Homes	#Apartments
1	2023	86	24
2	2024	43	14
3	2025	91	42
4	2026	<u>101</u>	<u>0</u>
		321	80

The in-process traffic flow results for the Autumn Sunrise Subdivision are illustrated on Figure 2 for all phases 1-4 (401 units). The trips have been included in the background traffic figures.

The year 2026 total traffic (the summation of background traffic volumes and site generated traffic for Plambeck Gardens) is presented in Figure 6.

VEHICULAR TRIP GENERATION

Trip rates presented in the Institute of Transportation Engineers (ITE) Trip Generation manual, 10th edition (year 2017) were utilized to estimate the site's trip generation for 116 mid-rise type apartments. The trip generation is summarized in Table 1.

Table 1 Trip Generation Summary

ITE Land Use	Dwelling Units (#)	Weekday						
		ADT	AM Peak Hour			PM Peak Hour		
			Total	Enter	Exit	Total	Enter	Exit
Mid-Rise Housing (#221)	116							
Generation Rate ¹		5.44	0.36	26%	74%	0.44	61%	39%
Site Trips		631	42	11	31	51	31	20

¹ Source: *Trip Generation*, 10th Edition, ITE, 2017, average rates.

Two existing homes are located on the property site and will be demolished in conjunction with the proposed development. Trip credits totaling 19 daily trips, one AM trip, and two PM trips will result in a net trip generation of 612 daily trips, 41 AM peak hour trips, and 49 PM peak hour trips for Plambeck Gardens.

The Plambeck Gardens trip distribution was based on the existing count data and engineering judgment. This information is presented on Figure 4. The corresponding trip assignments are presented on Figure 5 for the AM & PM peak hours.

CAPACITY ANALYSIS

Capacity analyses were performed to determine the levels of service for the weekday peak hours. Synchro v11.1 software was used to determine the approach delays and level of service for the study intersections. The program is based on the Highway Capacity Manual (6th edition) methodology. Table 2 summarizes the analysis results for the year 2021 existing traffic and for the year 2026 background and total traffic scenarios. Copies of the capacity analysis summaries are included in the appendix.

Table 2 Capacity Analysis Summary

Intersection	Type of Control	Peak Hour	Traffic Scenario											
			Year 2021				2026 Background				2026 Total			
			Crit. Movt	LOS	Delay	v/c	Crit. Movt	LOS	Delay	v/c	Crit. Movt	LOS	Delay	v/c
Boones Ferry Road and Iowa Drive	Two-way Stop	AM	EB	F	52.3	0.63	EB	F	149.5	1.01	EB	F	158.7	1.04
		PM	EB	F	58.2	0.54	EB	F	159.0	0.92	EB	F	171.5	0.95
	<i>Mitigated¹</i>	AM	<i>EB</i>	<i>E</i>	38.5	0.20	<i>EB</i>	<i>F</i>	85.8	0.26	<i>EB</i>	<i>F</i>	90.5	0.26
		PM	<i>EB</i>	<i>E</i>	46.9	0.16	<i>EB</i>	<i>F</i>	106.4	0.23	<i>EB</i>	<i>F</i>	113.4	0.24
	<i>Mitigated²</i>	AM	-	A	7.9	0.40	-	A	9.3	0.46	-	A	9.5	0.46
		PM	-	A	6.1	0.40	-	A	8.0	0.46	-	A	8.1	0.47
Boones Ferry Road and Norwood Road	Two-way Stop	AM	WB	E	43.2	0.62	WB	F	157.0	1.13	WB	F	176.3	1.18
		PM	WB	D	25.9	0.41	WB	F	68.3	0.80	WB	F	86.6	0.88
	<i>Mitigated²</i>	AM	-	A	9.0	0.41	-	B	13.5	0.48	-	B	13.7	0.48
		PM	-	-	-	-	-	A	8.7	0.55	-	A	9.1	0.55
Boones Ferry Road and Horizon HS access	Two-way Stop	AM	WB	F	91.6	0.24	WB	F	201.8	0.30	WB	F	217.9	0.31
		PM	WB	C	20.9	0.07	WB	D	27.7	0.08	WB	D	28.9	0.08
Street 'H' and Boones Ferry Road	Two-way Stop	AM	-	-	-	-	WB	C	20.9	0.39	WB	C	23.7	0.48
		PM	-	-	-	-	WB	C	21.5	0.30	WB	C	24.1	0.38
Boones Ferry Road and Day Road	Signal	AM	-	C	25.2	0.49	-	C	27.4	0.57	-	C	27.3	0.57
		PM	-	C	26.6	0.55	-	C	27.5	0.63	-	C	27.4	0.64

Notes: 2016 Highway Capacity Manual methodology used in analysis, Synchro v11. EB - Eastbound, WB - Westbound, Crit. Movt - Critical movement or critical approach.

¹ Mitigation: Re-stripe west approach to provide a separate left turn lane and shared through-right lane.

² Mitigation: Install traffic signal.

The City of Tualatin's LOS standard is LOS 'E' or better. The intersections at Day Road and at the site access will experience acceptable LOS conditions through the year 2026 background and total traffic scenarios with stop control on the side street approaches.

The stop controlled intersection at SW Boones Ferry Road and Iowa Drive currently experiences LOS 'F' conditions in the AM & PM peak hours due to the vehicular delays occurring on the eastbound approach. The failing condition will continue through the year 2026 background and total traffic scenarios. To mitigate the situation will require the installation of a traffic signal which would improve the operations to acceptable LOS 'A'. However, the peak hour signal warrant is not met at this location through the year 2026 total traffic scenario and installing a signal without meeting warrants is typically not recommended according to the Manual on Uniform Traffic Control Devices (MUTCD) unless there are safety issues that could be improved. Research of the intersection's crash history confirmed that there were a total of six reported accidents within the latest available five-year study period resulting in a crash rate of 0.22 crashes per million entering vehicles

(MEV) per year. The rate is well below the crash rate of 1.0 MEV/year at which safety improvements need to be considered.

It is noted that the proposed development will not distribute any site trips on either of the Iowa Drive approaches to SW Boones Ferry Road. Additionally approximately 50% of the traffic using the failing east approach makes right turns onto SW Boones Ferry Road diminishing the need for signalized control. Based on the crash research results, signal warrant findings, and the lack of trip distribution to Iowa Drive by the proposed development installing a traffic signal is not recommended.

The Norwood Road stop controlled intersection will experience failing conditions (LOS 'F') in the year 2026 background and total traffic scenarios. To mitigate the situation will require the installation of a traffic signal which would improve the operations to acceptable LOS 'B'. The peak hour signal warrant is met in the year 2026 background and total traffic scenarios. Research of the intersection's crash history confirmed that there were a total of five reported accidents within the latest five-year study period resulting in a crash rate of 0.19 crashes per million entering vehicles (MEV) per year. The rate is well below the crash rate of 1.0 MEV/year at which safety improvements need to be considered. Installation of a signal is not recommended in conjunction with the proposed development as the signal warrant is met due to the background traffic conditions and Plambeck Gardens will distribute only two trips in the worst case AM peak hour on the westbound approach, representing only a 1.1% impact.

The Horizon School access at SW Boones Ferry Road operates at LOS 'F' currently during the AM peak hour. The delays on the school's approach drive experience long delays that could be mitigated with traffic signalization. The peak hour signal warrant is not met and no site trips are projected to occur on the school's private street approach. Effectively the westbound approach will not be impacted by the Plambeck Gardens development. No reported traffic crashes were reported at the location. Therefore, no improvements are proposed at the intersection in conjunction with the development project.

Street 'H' at SW Boones Ferry Road which provides traffic access to the site will operate at acceptable LOS 'C' through the year 2026 total traffic scenario with stop control on Street 'H'.

Day Road at SW Boones Ferry Road is signalized and will experience acceptable LOS 'C' through the year 2026 scenario.

Generally, LOS 'A', 'B', 'C', and 'D' are desirable service levels ranging from no vehicle delays to average or longer than average delays in the peak hours. Level 'E' represents long delays indicating signalization warrants need to be reviewed and signals considered only if warrants are met. Level 'F' indicates that intersection improvements, such as widening and signalization, may be required. According to the Highway Capacity Manual (HCM), the following delay times are associated with the LOS at stop controlled unsignalized and signalized intersections.

Level of Service criteria defined in Highway Capacity Manual

Level of Service (LOS)	Unsignalized Control Stopped Delay (sec/veh)	Signalized Control Stopped Delay (sec/veh)
A	≤ 10	≤ 10
B	> 10 and ≤ 15	> 10 and ≤ 20
C	> 15 and ≤ 25	> 20 and ≤ 35
D	> 25 and ≤ 35	> 35 and ≤ 55
E	> 35 and ≤ 50	> 55 and ≤ 80
F	> 50	> 80

QUEUING ANALYSIS

Queue lengths based on the 95th percentile demand values for the study intersections were established in the Synchro analysis. Copies of the reports are included in the appendix.

Queues at the signalized intersection of SW Boones Ferry Road and Day Road are projected to reach 625 feet on the eastbound approach in the year 2026 total traffic scenario. No public intersections will be blocked on Day Road due to the projected queues. There are dual northbound left turn lanes with stacking lengths of 250 feet each and queues will reach 300 feet in the year 2026 total traffic scenario. No public intersections will be blocked on SW Boones Ferry Road due to the projected queues.

At SW Boones Ferry Road and Street `H` the traffic queues were determined for the southbound left turn and westbound approach. The southbound demand queue will typically not exceed one vehicle in the existing turn lane. On the westbound approach to SW Boones Ferry Road the projected queue will total three to four vehicles, stacking for a distance of 75 feet to 100 feet from the stop bar.

The intersection of SW Boones Ferry Road and the Horizon School access will experience queues of five to six vehicles on the westbound stop approach in the worst case AM peak hour in the year 2026 total traffic scenario. No intersections on the private road approach will be blocked as a substantial vehicle stacking capacity exists on-site with over 500 feet available. The demand queue in year 2026 is projected at less than 200 feet.

The intersection of SW Boones Ferry Road and Norwood Road will experience queues of 11 to 12 vehicles on the westbound stop approach in the worst case AM peak hour in the year 2026 total traffic scenario. No public intersections on Norwood Road will be blocked due to the operating conditions.

The intersection of SW Boones Ferry Road at Iowa Drive will experience queues of eight vehicles on the west approach and four vehicles on the east approach during the worst case AM peak hour. No public intersections on Iowa Drive will be blocked due to the operating conditions.

SIGHT DISTANCE

Intersection sight distance along SW Boones Ferry Road at the proposed Street `H` location was reviewed in the field. The speed limit is posted at 45 MPH on SW Boones Ferry Road and according to Washington County standards an intersection sight distance of 450 feet is required. At the Street `H` location the intersection sight distance standard is met to the north and south as over 500 feet of sightline is available.

At the future Tract `L` intersection with Street `H` the intersection sight distance standard based on a 25 MPH travel speed along Street `H` shall be met. In this case a distance of 250 feet must be available and maintained in both directions along `H` Street from the vehicle's southbound stop position on Tract `L`.

LEFT TURN & RIGHT TURN LANE REQUIREMENTS

A center median left turn is currently available on SW Boones Ferry Road to provide stacking for southbound vehicles turning into the site. The continuous left turn lane will be sufficient to handle left turn demand.

The warrant for a northbound right turn (deceleration) lane on SW Boones Ferry Road at Street `H` was evaluated. A total of 35 vehicles are projected to make the right turn in the AM peak hour and 115 vehicles will make the turn in the PM peak hour. According to the analysis it will be necessary to provide a right turn lane and curb return radius for northbound traffic turning onto Street `H` for safety reasons. The considerations include the roadway approach volume, number of right turns, and vehicular travel speeds along SW Boones Ferry Road. These findings are consistent with the recommendations documented in the July 2021 TIA for the Autumn Sunrise Subdivision as the Plambeck Gardens' traffic was included as in-process traffic in the Autumn Sunrise analysis. Effectively the transportation system needs for the Plambeck Gardens development does not exceed the requirements beyond those established in the Autumn Sunrise TIA.

The warrant curve is included in the appendix.

TRAFFIC SIGNAL WARRANTS

The peak hour signal warrant was evaluated for the stop controlled intersections on SW Boones Ferry Road at Iowa Drive, Norwood Road, Horizon School access, and Street `H`. It was determined that the warrant is not met through the year 2026 total traffic scenario for the Iowa Drive, Horizon School, and Street `H` intersections.

The Norwood Road intersection met the warrant in the PM peak hour for the year 2026 background and total traffic scenarios. Effectively the warrant is met due to the traffic growth and in-process traffic conditions. Considering that there is a high percentage of right turns on the Norwood Road approach (over 50% of the approach volumes in the PM peak hour) the minor street volumes may be discounted and the warrant voided. Because the safety analysis has determined that there is a low crash history (five reported crashes, rate = 0.19 MEV/year), the warrant is met due to the background traffic, and the site distributes five or

fewer trips on the failing approach in the peak hours installation of a traffic signal is not recommended in conjunction with the Plambeck Gardens development.

ACCIDENT HISTORY

Crash data for the study intersections was obtained from ODOT staff and reviewed to help identify any traffic safety problems. The study period covered five years from January 2014 through December 2018.

The crash rates presented in Table 3 are based on the number of accidents per million entering vehicles (MEV) per year. Typically, an intersection is not considered unsafe unless its accident rate exceeds the threshold value of 1.0 accidents per MEV.

Table 3 Crash Rate Results

Intersection	Crash History (Years)	Number of Crashes	Crashes per year	Annual Traffic Entering (veh/yr)	Crash rate per M.E.V.*
Iowa Drive & Boones Ferry Road	5	6	1.2	5354418	0.22
Norwood Road & Boones Ferry Road	5	5	1.0	5193713	0.19
Horizon High School & Boones Ferry Road	5	0	0.0	4313484	0.00
Day Road & Boones Ferry Road	5	1	0.2	9353796	0.02

* M.E.V. - million entering vehicles.

None of the study intersections experienced a rate greater 0.22 MEV/year and therefore no safety improvements are recommended.

PEDESTRIANS, BICYCLES, & BUSES

Sidewalk is currently available along the west side of SW Boones Ferry Road. Sidewalk will be constructed on the east side along the development's property frontage. Sidewalk will also be constructed within the development site to provide connectivity to SW Boones Ferry Road.

Bicycle lanes are currently provided along SW Boones Ferry Road. No new bike lanes will be constructed with the development project.

Transit service is provided along on SW Boones Ferry Road with line #96 – Tualatin/I-5.

ACCESS STANDARDS & SPACING

As an arterial SW Boones Ferry Road requires an access spacing minimum of 600 feet. From the proposed Street 'H' location no streets will be present within 600 feet when the Autumn Sunrise Subdivision development is built.

Approximately 80 feet north of the proposed `H` Street intersection a minor private driveway exists on the east side of Boones Ferry Road that will remain in place. The access appears to serve a private residence and/or small business. No traffic safety or vehicle movement conflicts are anticipated when the new `H` Street intersection is constructed.

SUMMARY AND RECOMMENDATIONS

The traffic study for the Plambeck Gardens development containing 116 affordable housing apartment units has been prepared to determine the potential impacts at several study intersections along SW Boones Ferry Road. Development of the site is expected to generate a net of 612 daily trips, 41 AM peak hour trips, and 49 PM peak hour trips.

The traffic analysis has determined the following results.

- The intersection sight distance standard (450 feet) on SW Boones Ferry Road at the proposed Street `H` approach is met in both directions.
- The capacity analysis determined that the Iowa Drive intersection on SW Boones Ferry Road is failing. The stop controlled intersection currently operates LOS `F` in the peak hours and will continue to fail through the year 2026 total traffic scenario. The condition can be mitigated if a traffic signal is installed. As the signal warrant is not met, the crash history is very low (crash rate = 0.22 MEV/year), and traffic associated Plambeck Gardens will not be distributed on the Iowa Drive approaches installing a traffic signal is not recommend in conjunction with the proposed development.
- The Norwood Road stop controlled intersection will experience failing conditions (LOS `F`) in the year 2026 background and total traffic scenarios. To mitigate the situation will require the installation of a traffic signal. The peak hour signal warrant is met in the year 2026 background and total traffic scenarios. The crash rate of 0.19 crashes/MEV is well below the threshold rate of 1.0 MEV/year. Installation of a signal is not recommended in conjunction with the proposed development as the signal warrant is met due to the background traffic conditions and Plambeck Gardens will distribute only two trips in the worst case AM peak hour on the westbound approach.
- According to the analysis it will be necessary to provide a right turn lane and curb return radius for northbound traffic making a right turn from SW Boones Ferry Road onto Street `H`. The safety considerations include the roadway approach volume, number of right turns, and vehicular travel speeds along SW Boones Ferry Road. The turn lane will be built as part of the Autumn Sunrise Subdivision development.
- Review of the intersection crash data furnished by ODOT documented that none of the study intersections experienced a rate greater 0.22 MEV/year and therefore no safety improvements are recommended at the existing locations.
- The Street `H` approach at SW Boones Ferry Road will need to be controlled with a stop sign and stop bar pavement marking as part of the Autumn Sunrise Development.

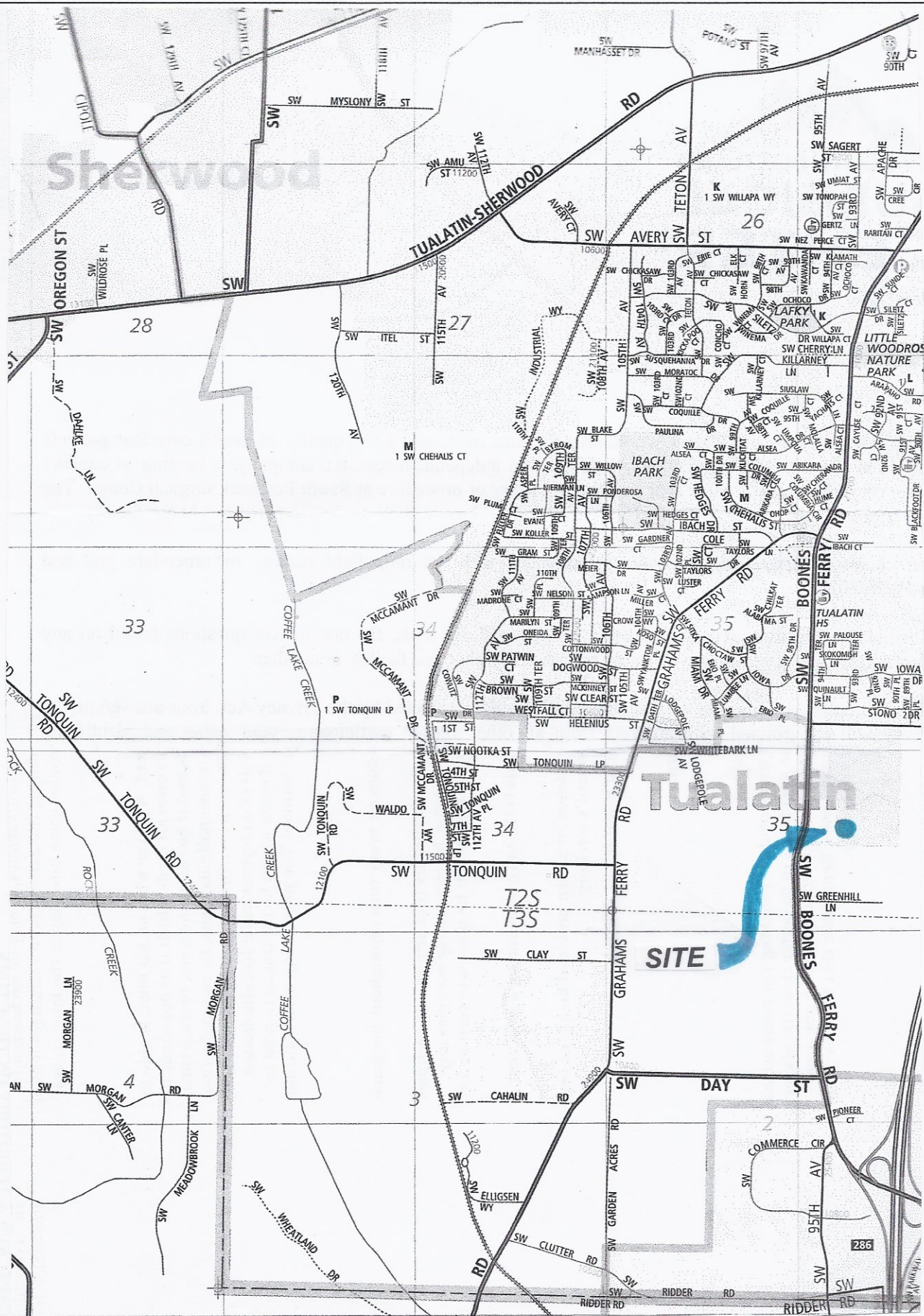
- The site's access occurring at Street `H` on SW Boones Ferry Road will be built in conjunction with the Autumn Sunrise Subdivision development project.
- No other intersection improvements are recommended on SW Boones Ferry Road in conjunction with the Plambeck Gardens development at the study intersections including Day Road, Norwood Road, and Iowa Drive.

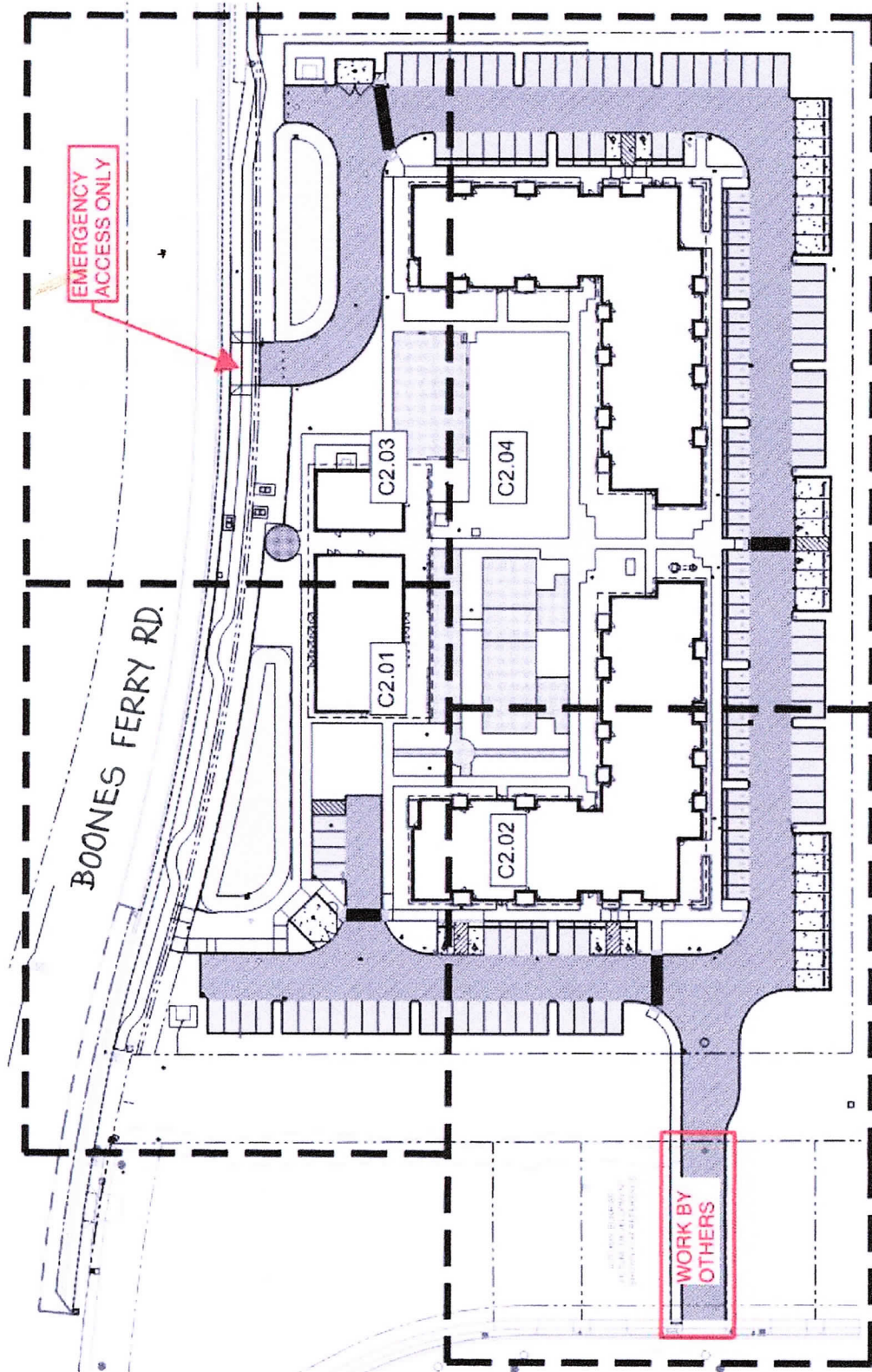
APPENDIX

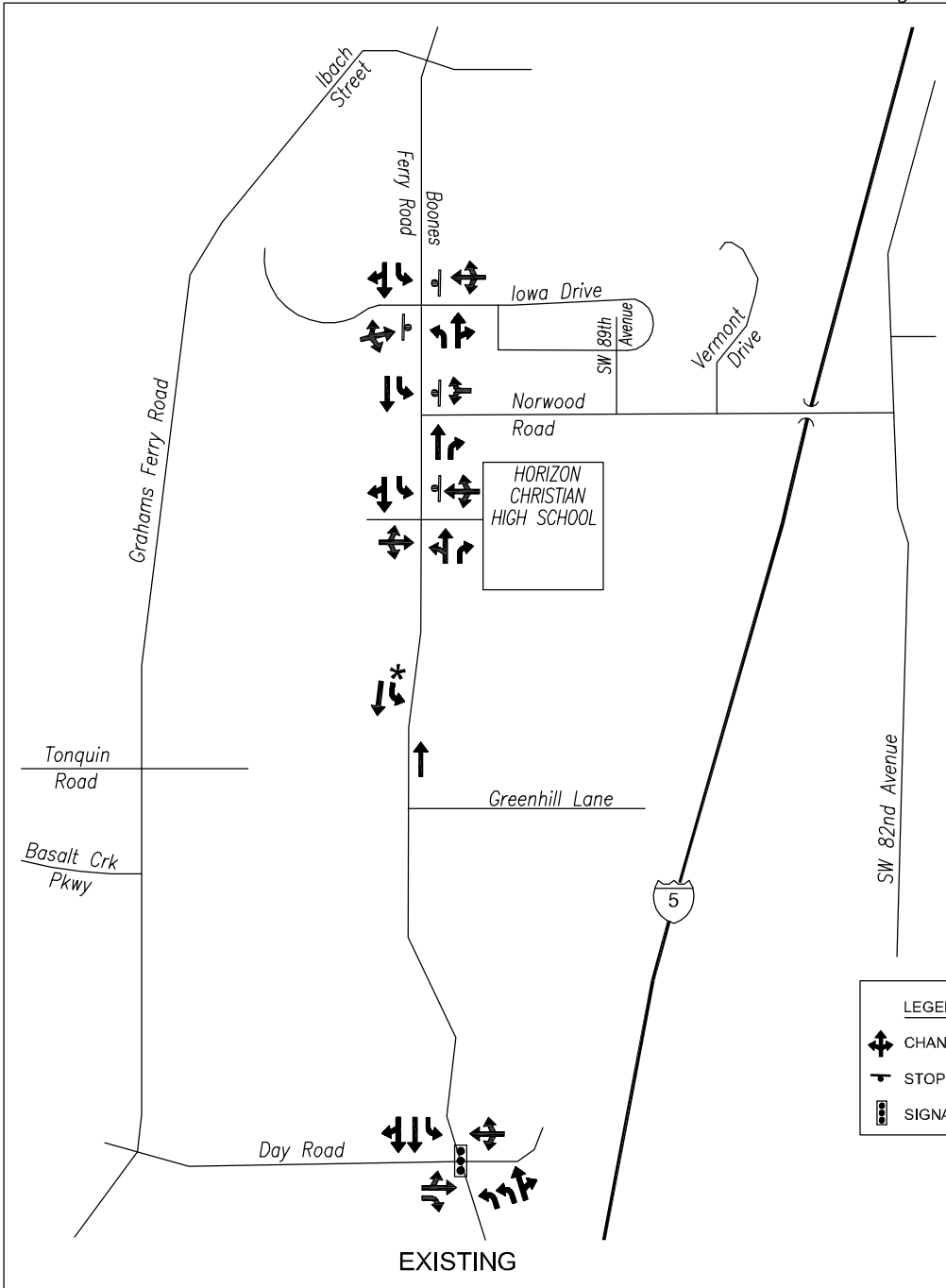
- Vicinity Map Figure `a`
- Site Plan Figure `b`
- Lane Configurations & Traffic Control Figure `c`
- Traffic Flow Diagrams
 - Figure 1 Year 2021 Existing Traffic, AM & PM Peak Hours
 - Figure 2 In-Process Traffic, Year 2023 (Autumn Sunrise, Phases 1-4)
 - Figure 3 Year 2026 Background Traffic, AM & PM Peak Hours
 - Figure 4 Trip Distribution
 - Figure 5 Trip Assignment, AM & PM Peak Hours
 - Figure 6 Year 2026 Total Traffic, AM & PM Peak Hours
- Autumn Sunrise Site Plan (In-Process Traffic Development Project)
- Traffic Count Data
- Right Turn Lane Warrant
- Peak Hour Signal Warrant
- Accident History Summary (furnished by ODOT)
- Synchro Capacity Analysis Reports

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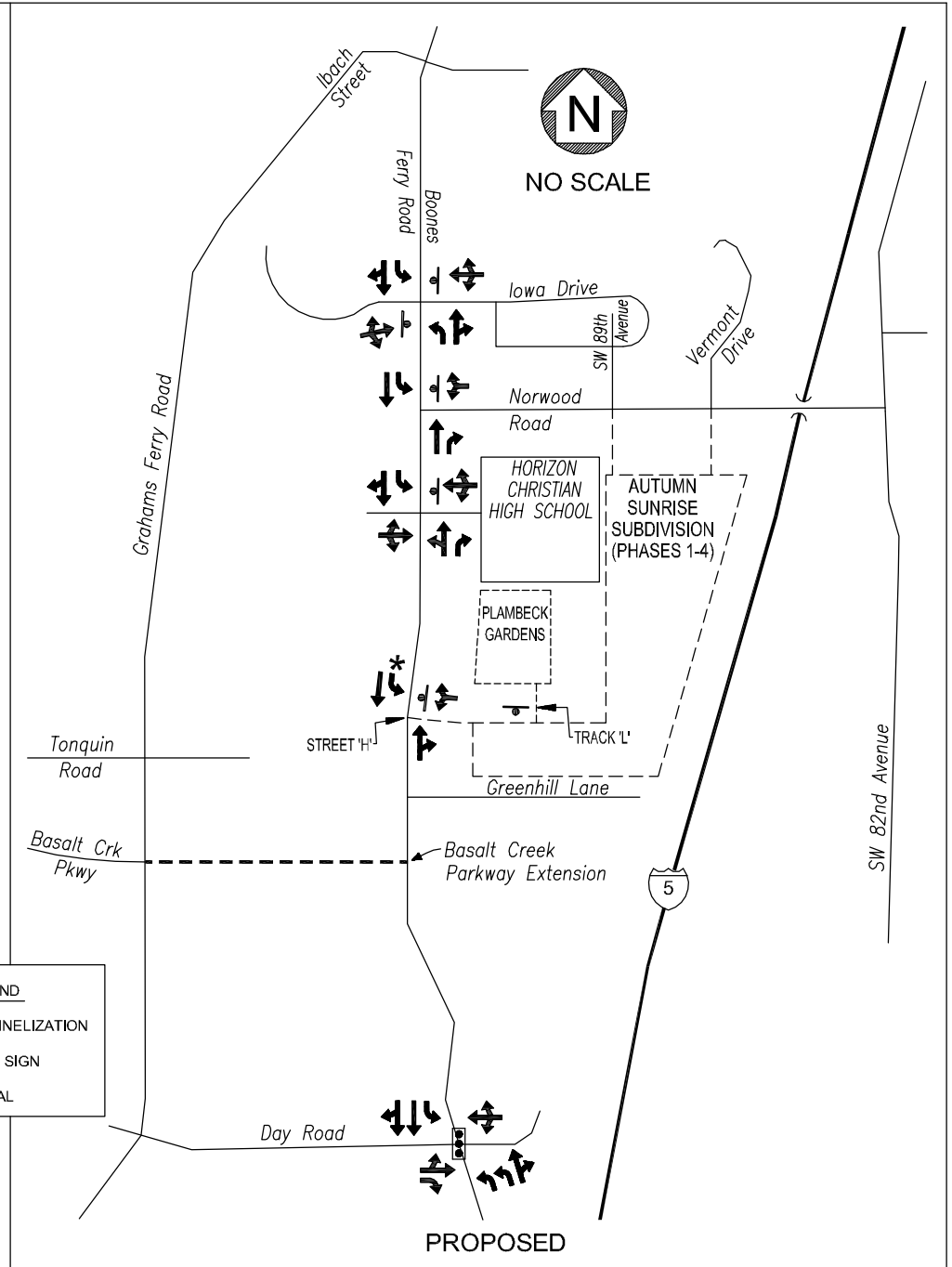
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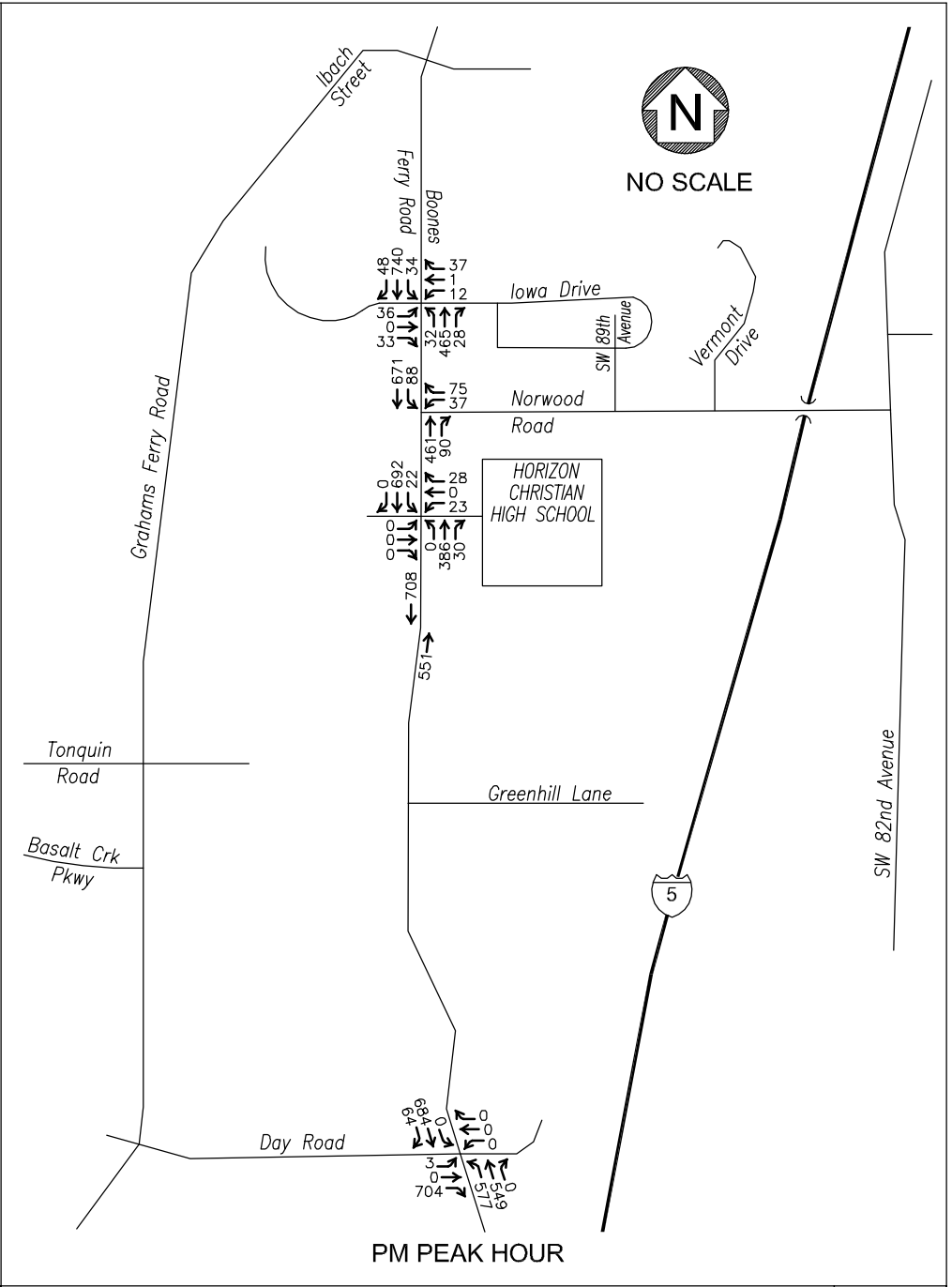
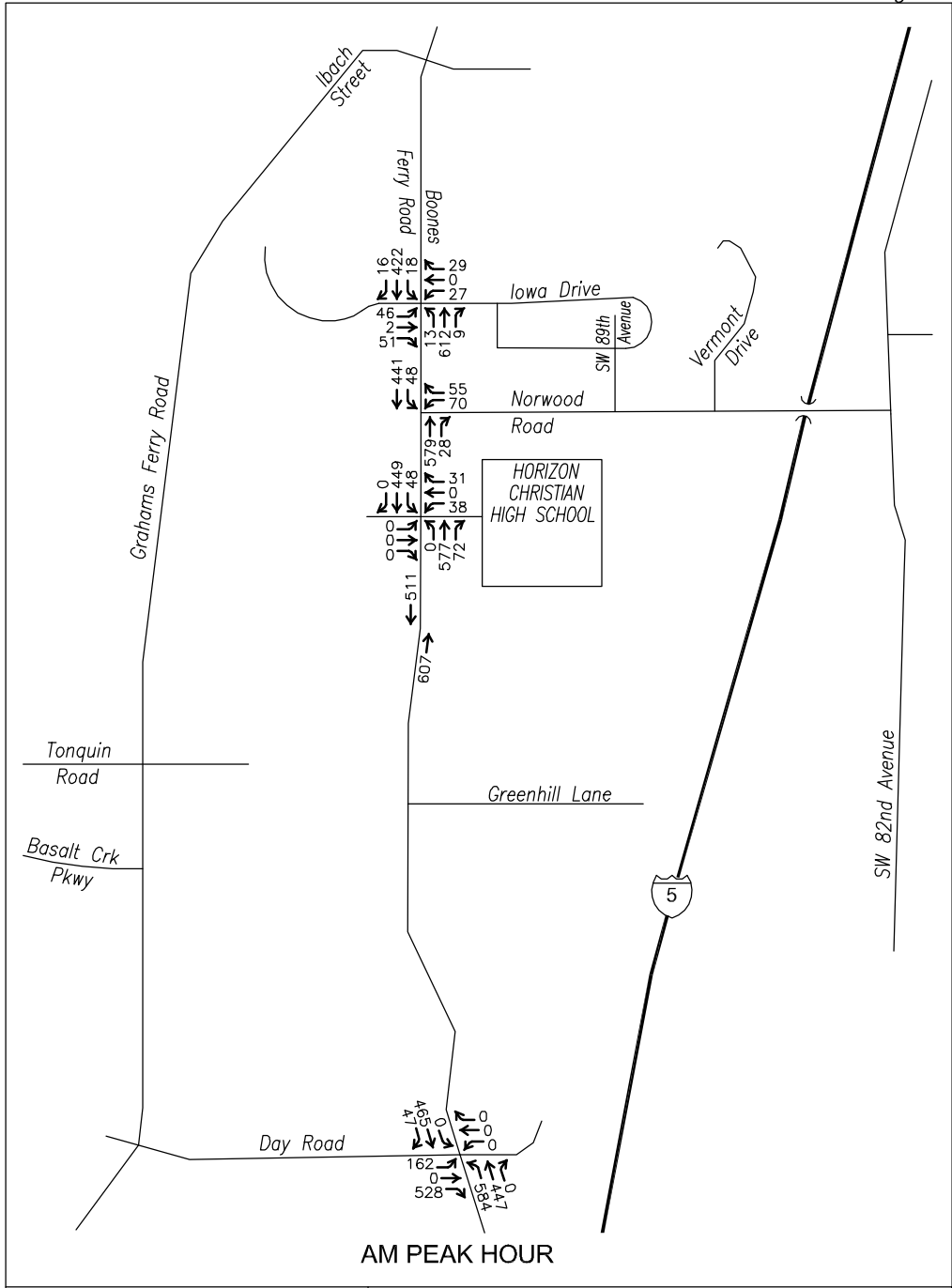
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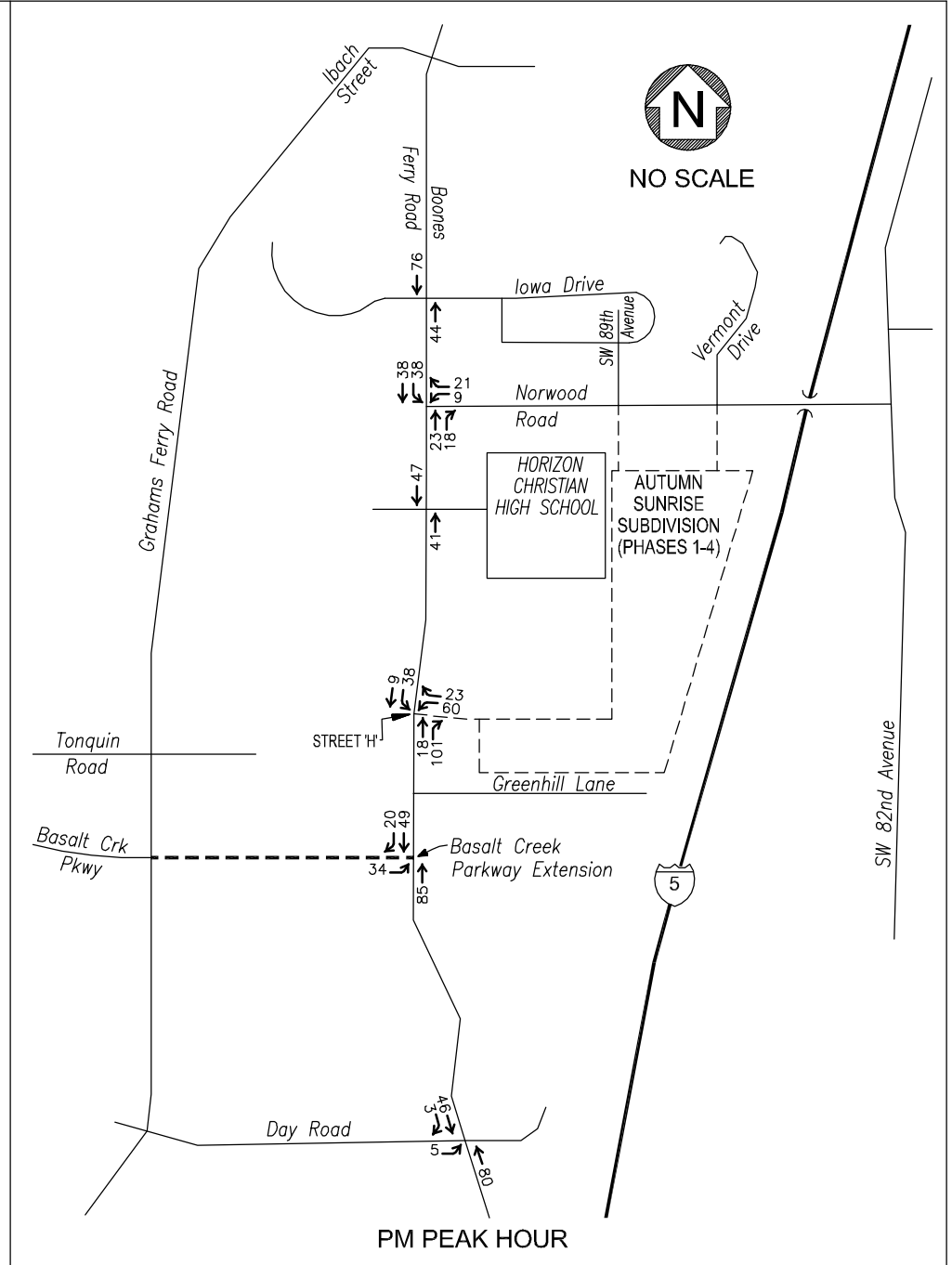
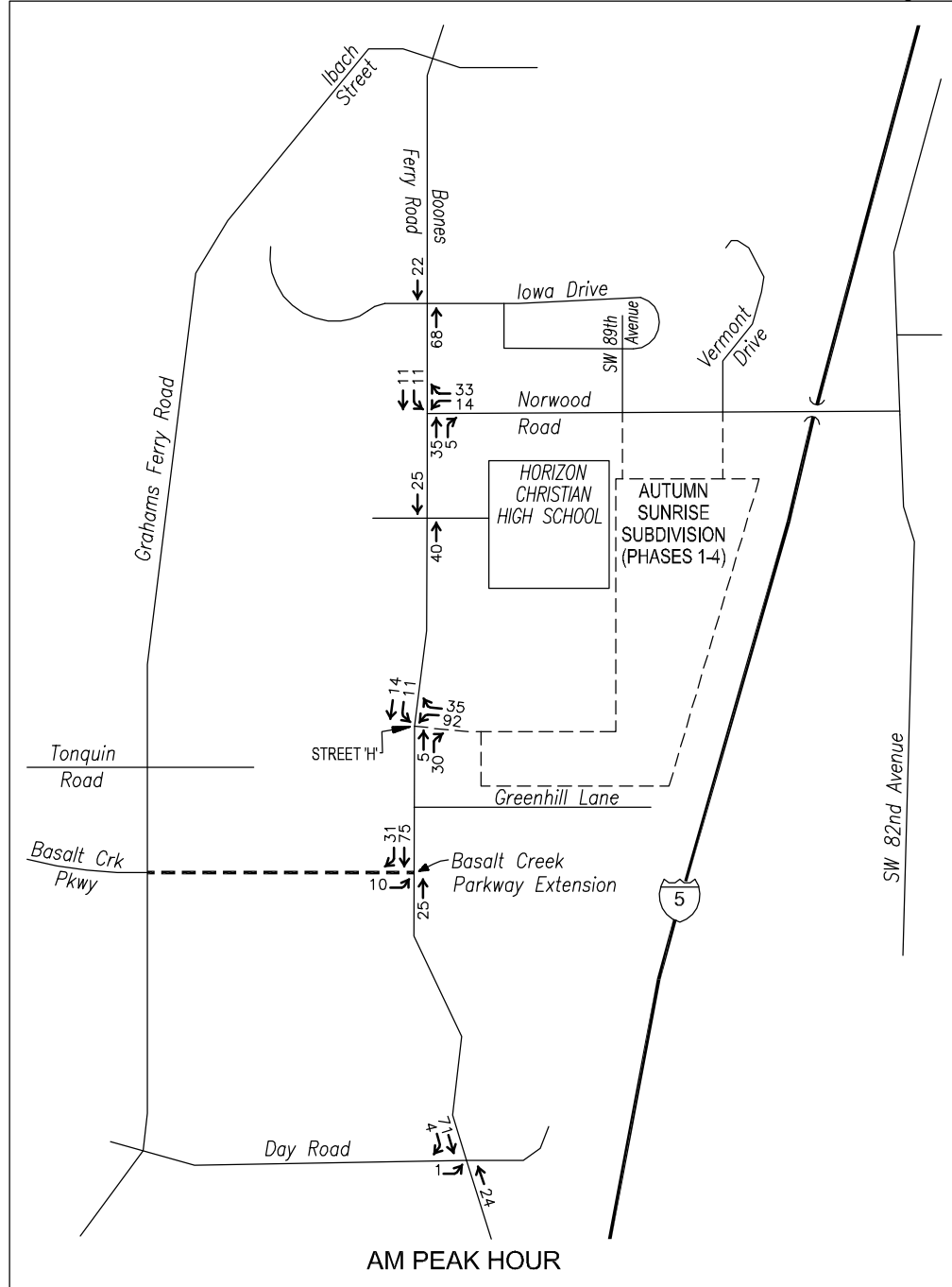


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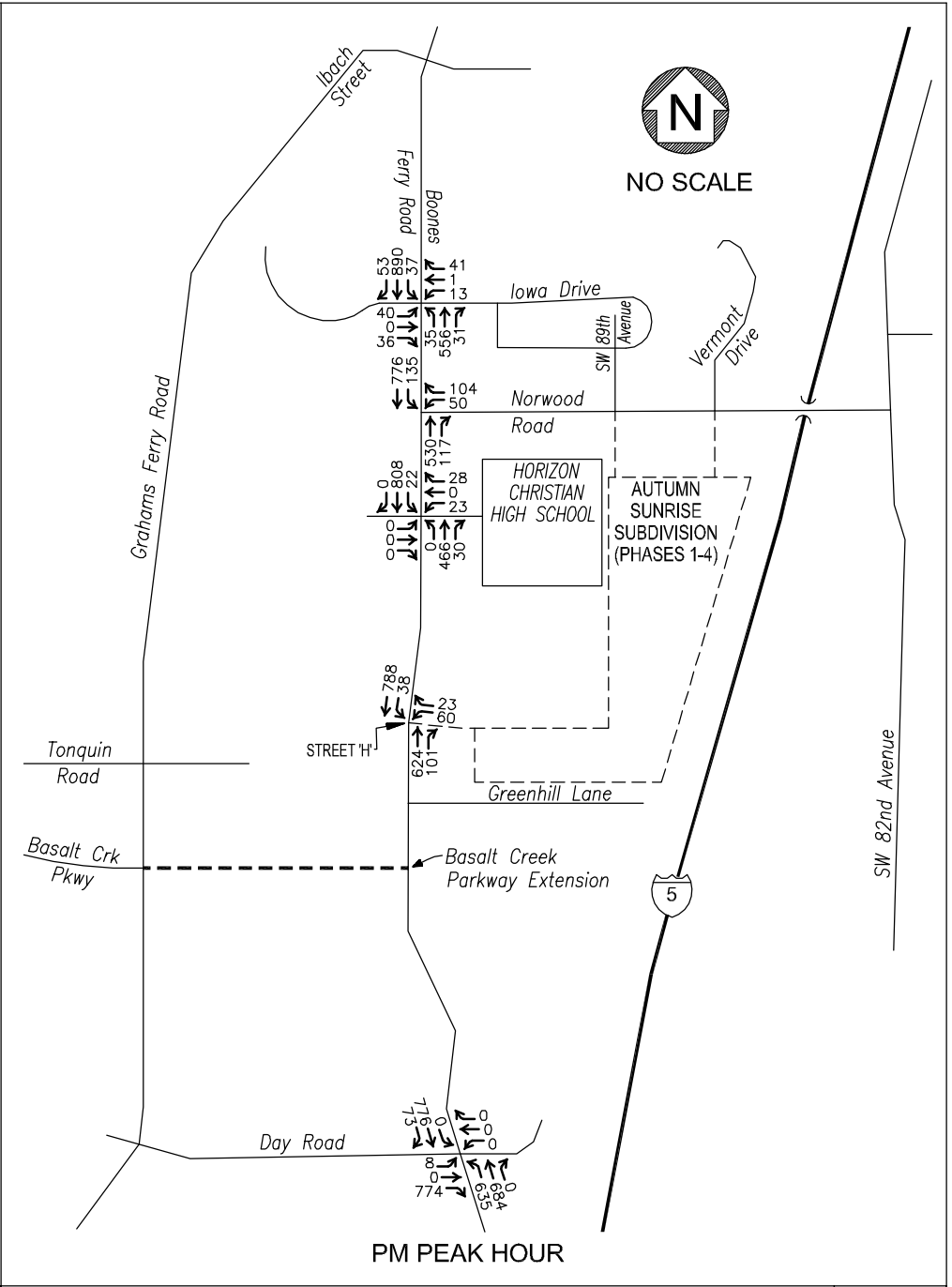
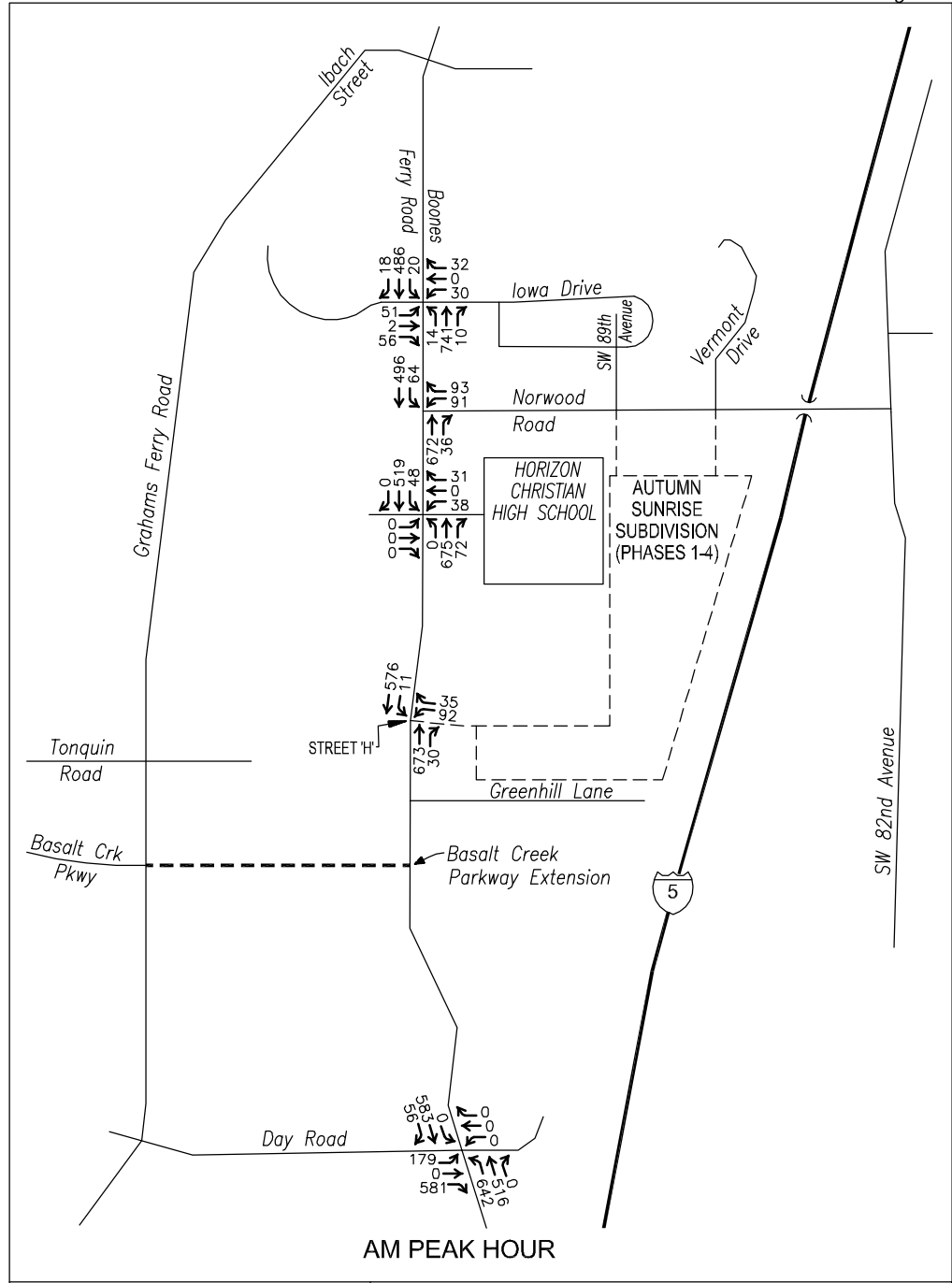
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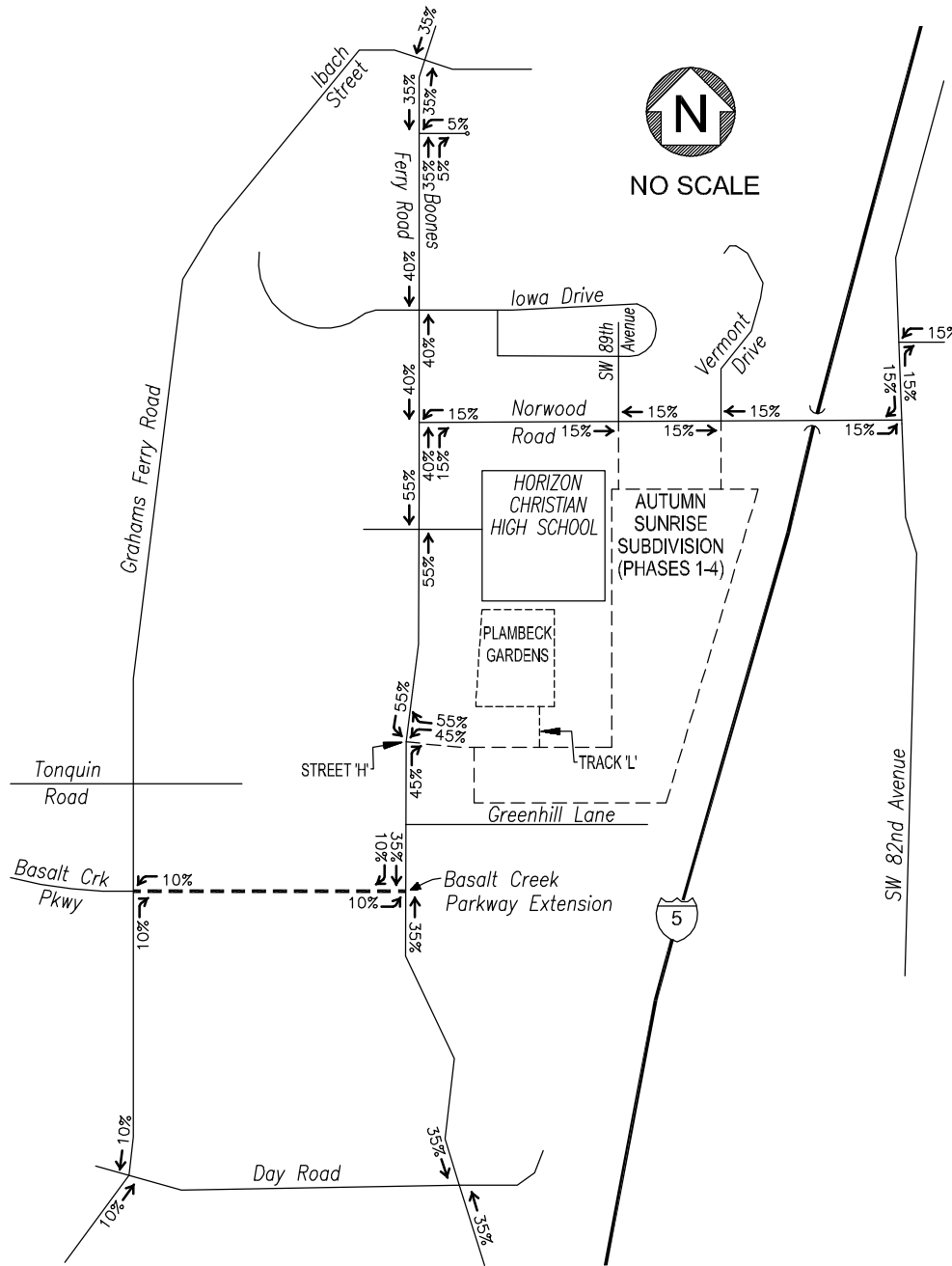
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- STOP SIGN
- SIGNAL

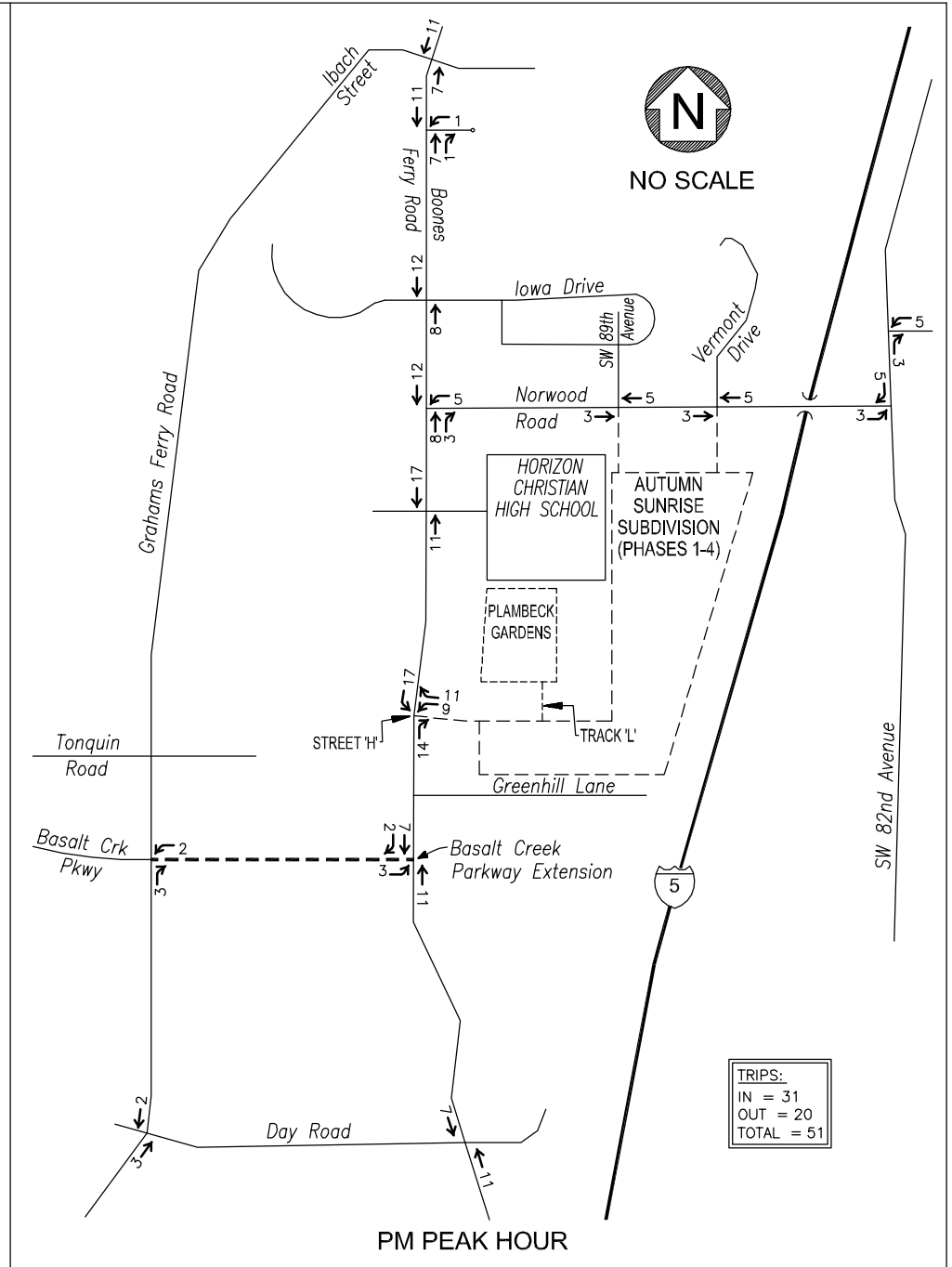
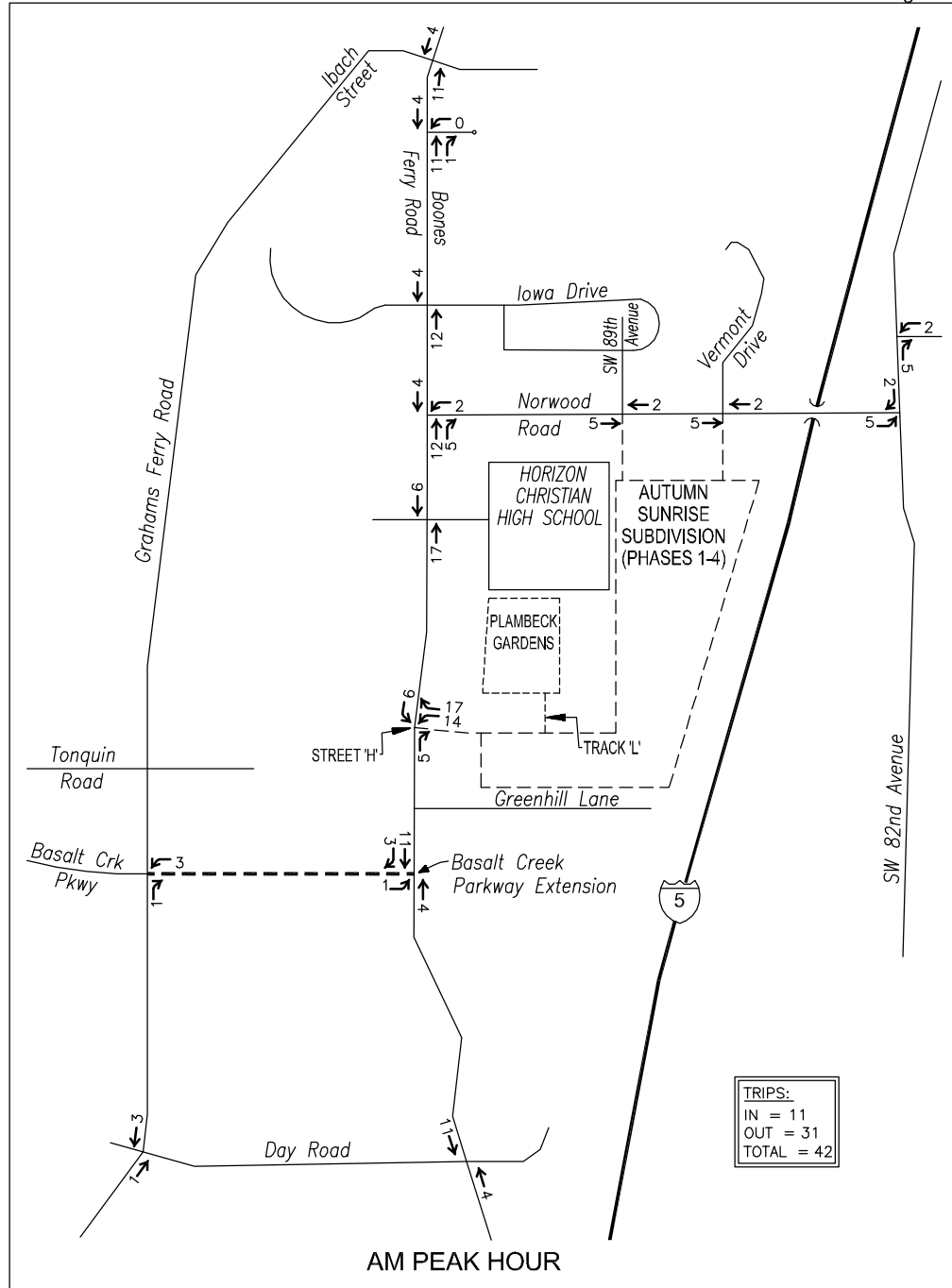


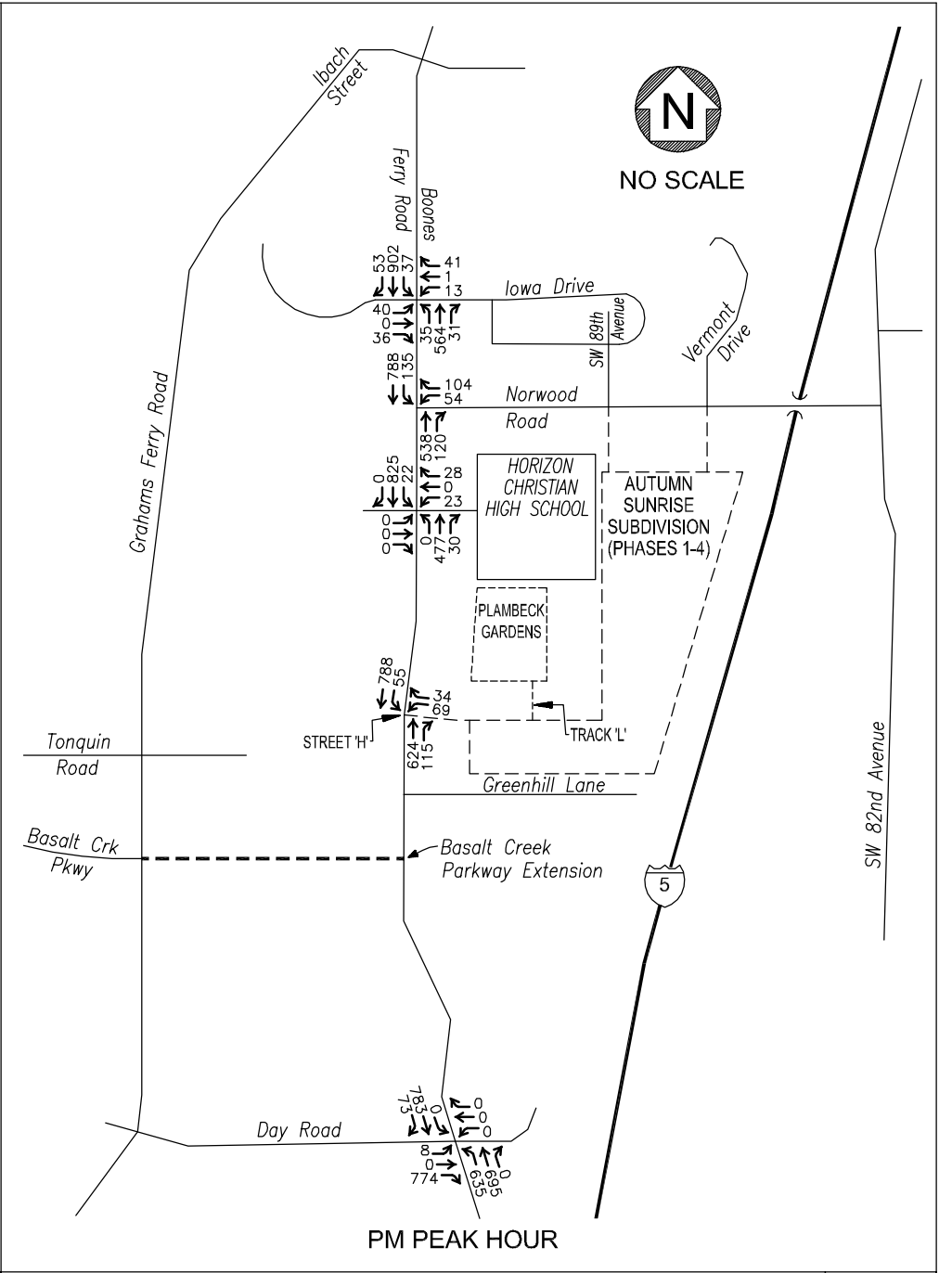
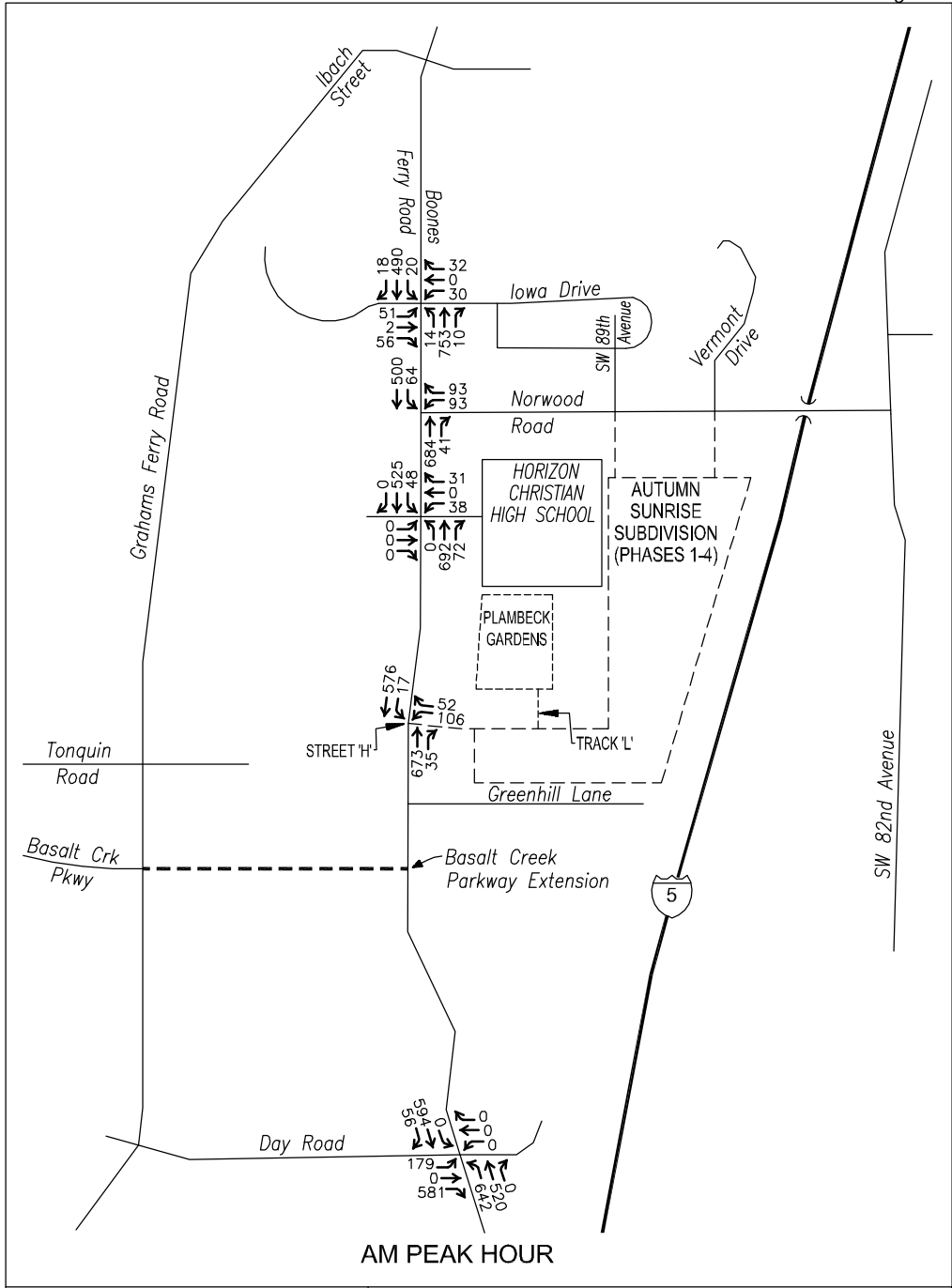


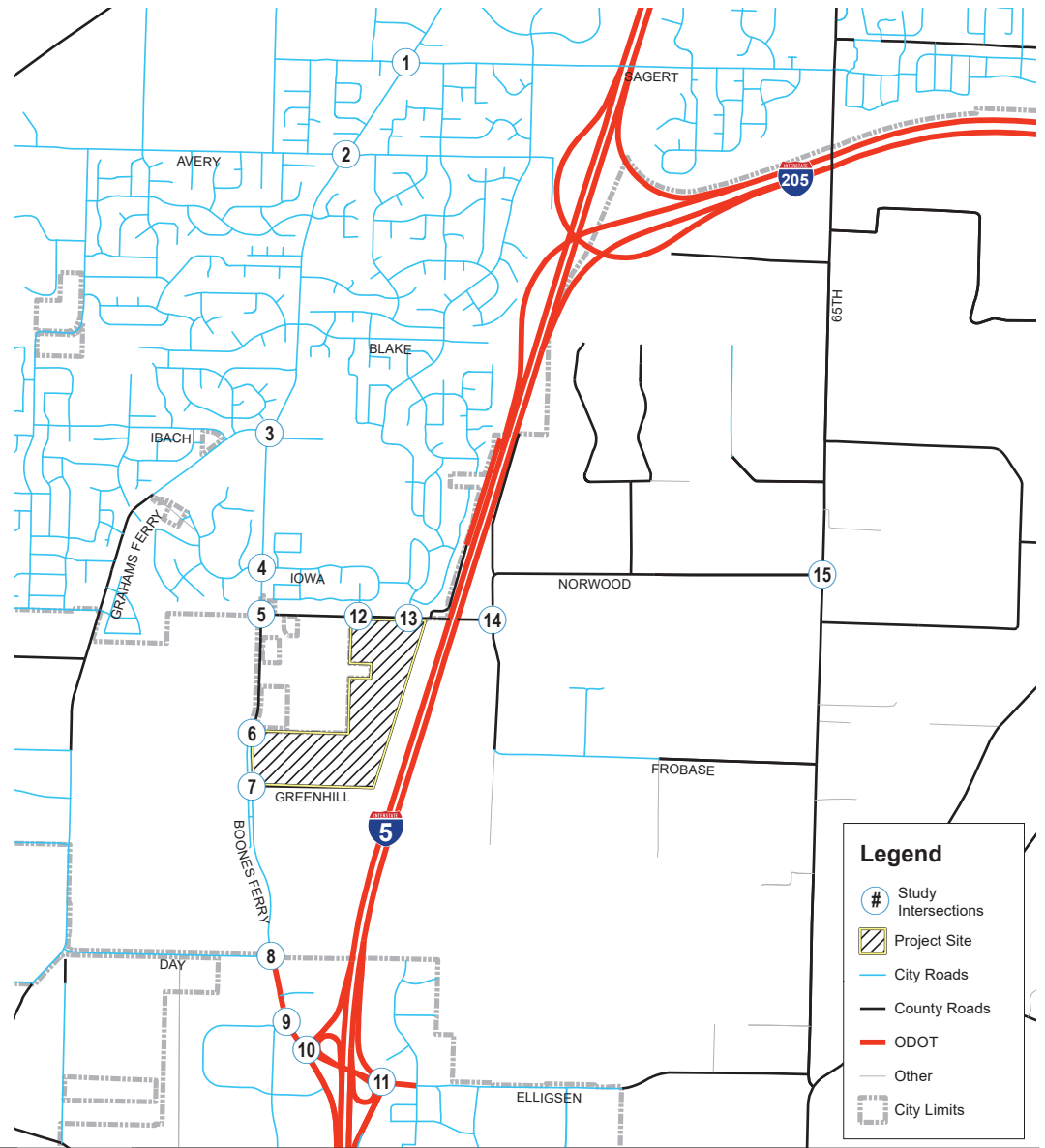
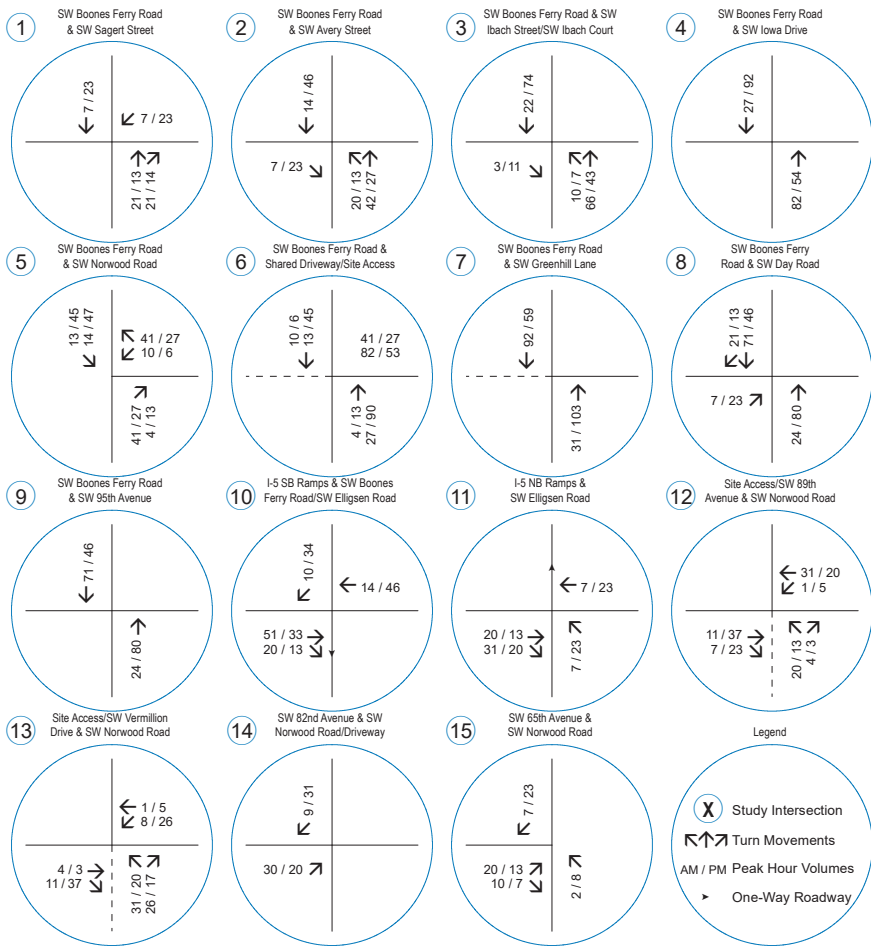
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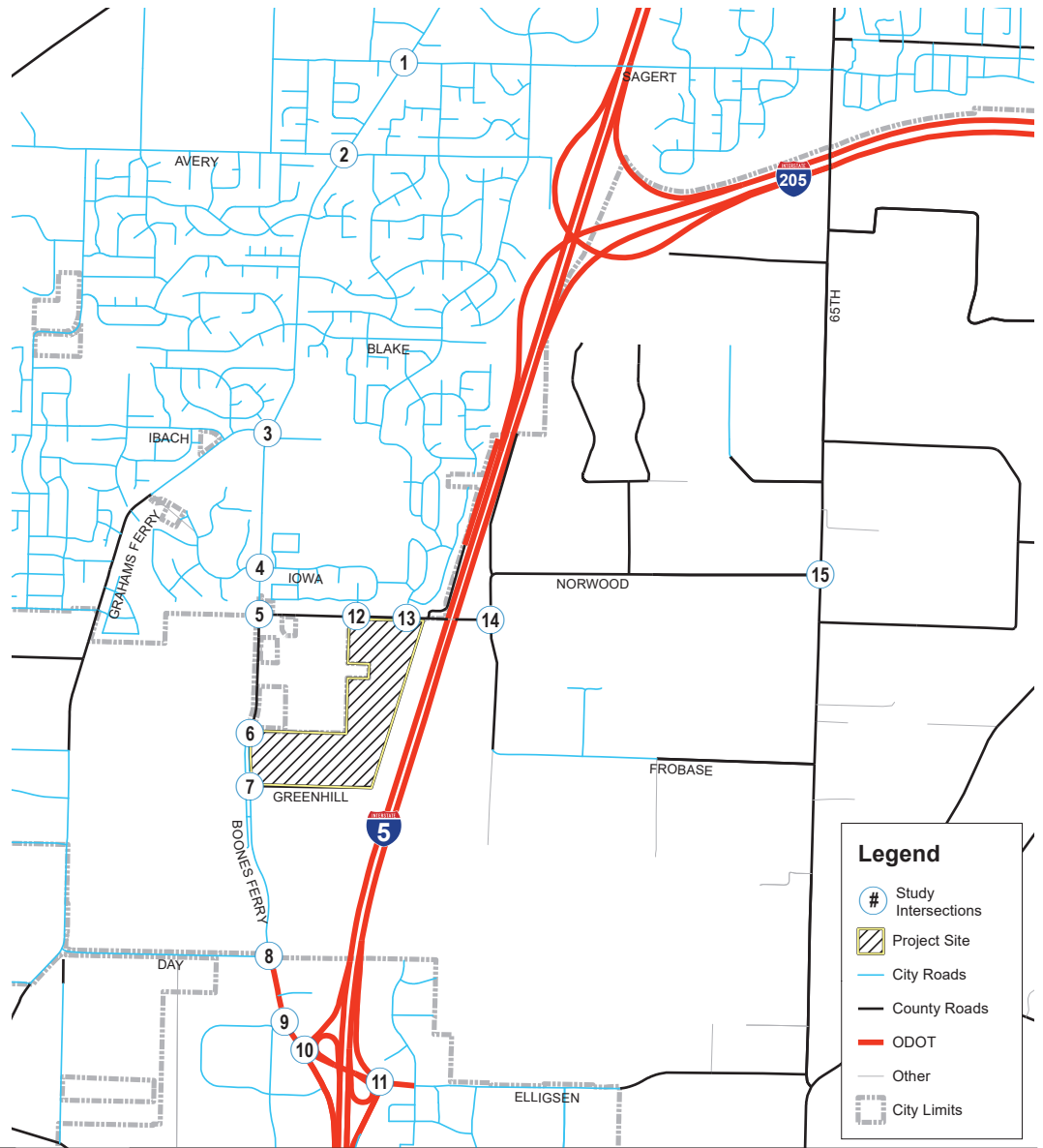
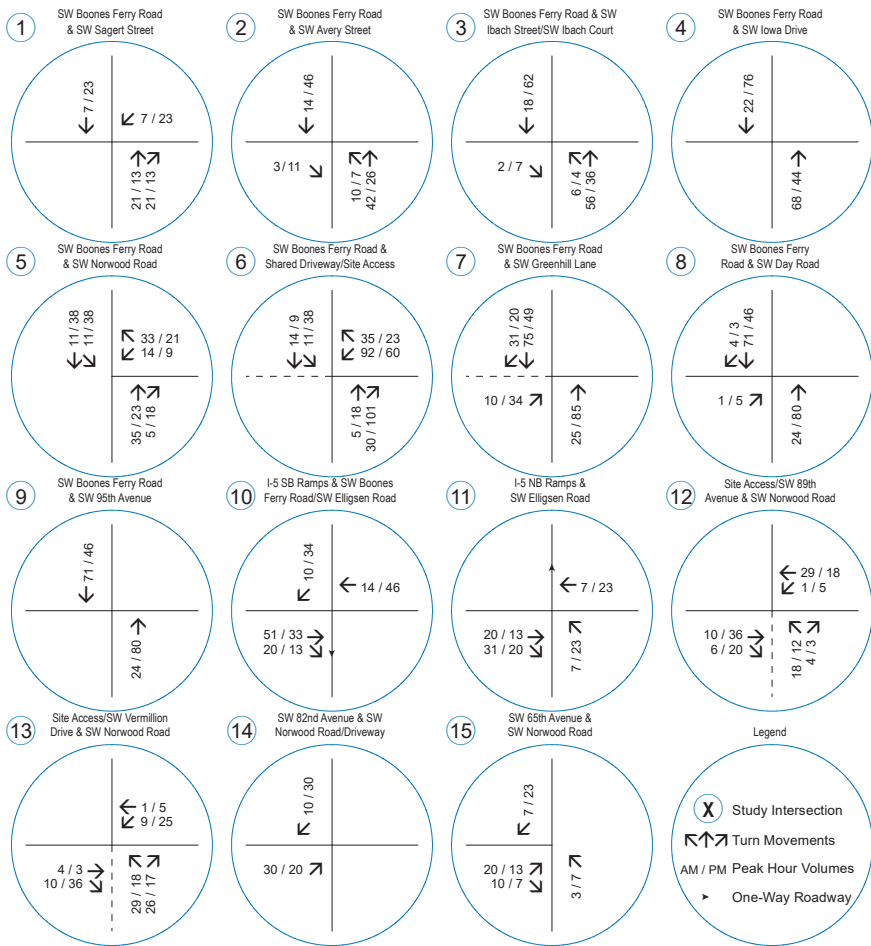














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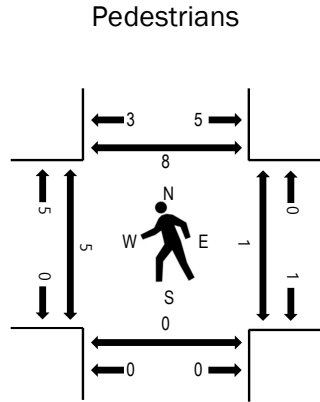
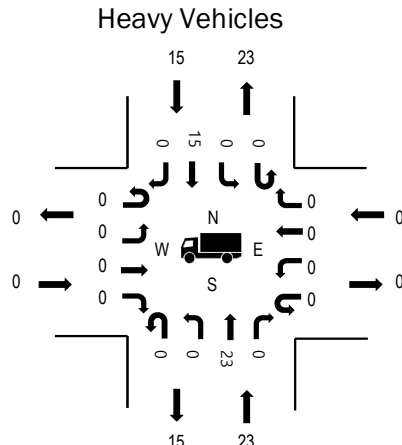
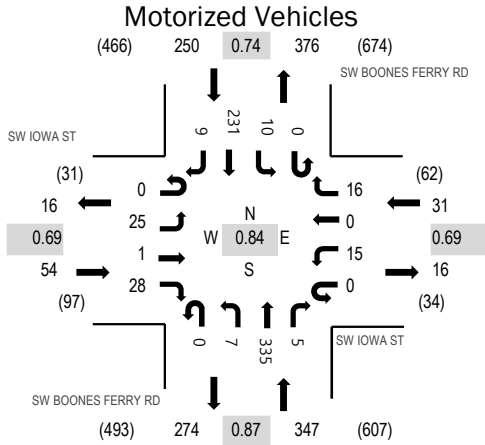
Location: 2 SW BOONES FERRY RD & SW IOWA ST AM

Date: Tuesday, September 29, 2020

Peak Hour: 07:15 AM - 08:15 AM

Peak 15-Minutes: 07:40 AM - 07:55 AM

Peak Hour



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	0.0%	0.69
WB	0.0%	0.69
NB	6.6%	0.87
SB	6.0%	0.74
All	5.6%	0.84

Traffic Counts - Motorized Vehicles

Interval Start Time	SW IOWA ST Eastbound				SW IOWA ST Westbound				SW BOONES FERRY RD Northbound				SW BOONES FERRY RD Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
7:00 AM	0	2	0	0	0	0	0	1	0	0	30	0	0	1	17	1	52	673
7:05 AM	0	3	0	1	0	0	0	2	0	0	27	2	0	0	19	0	54	675
7:10 AM	0	2	0	0	0	0	0	0	0	0	24	0	0	0	15	0	41	670
7:15 AM	0	1	0	3	0	1	0	1	0	1	30	1	0	1	15	0	54	682
7:20 AM	0	0	0	0	0	1	0	0	0	0	25	0	0	0	20	0	46	669
7:25 AM	0	0	0	3	0	1	0	2	0	0	37	0	0	0	19	1	63	662
7:30 AM	0	2	0	3	0	1	0	2	0	1	31	1	0	1	14	0	56	640
7:35 AM	0	4	0	3	0	1	0	2	0	0	30	0	0	1	15	0	56	623
7:40 AM	0	1	1	3	0	1	0	0	0	2	33	0	0	1	23	2	67	607
7:45 AM	0	5	0	4	0	3	0	0	0	0	30	0	0	1	28	0	71	591
7:50 AM	0	3	0	1	0	1	0	4	0	0	25	0	0	1	28	1	64	575
7:55 AM	0	3	0	2	0	2	0	2	0	1	15	0	0	2	19	3	49	551
8:00 AM	0	4	0	3	0	2	0	1	0	2	24	2	0	0	15	1	54	559
8:05 AM	0	0	0	1	0	1	0	0	0	0	29	1	0	1	16	0	49	
8:10 AM	0	2	0	2	0	0	0	2	0	0	26	0	0	1	19	1	53	
8:15 AM	0	2	0	1	0	1	0	3	0	1	16	0	0	4	13	0	41	
8:20 AM	0	2	0	1	0	0	0	1	0	0	18	0	0	0	17	0	39	
8:25 AM	0	2	0	3	0	2	0	2	0	1	19	0	0	0	12	0	41	
8:30 AM	0	2	0	2	0	1	0	1	0	0	19	1	0	1	12	0	39	
8:35 AM	0	0	0	2	0	1	0	1	0	1	19	1	0	1	14	0	40	
8:40 AM	0	2	0	2	0	1	0	1	0	1	25	0	0	0	15	4	51	
8:45 AM	0	5	0	2	0	1	0	5	0	0	21	0	0	1	17	3	55	
8:50 AM	0	2	0	1	0	0	0	4	0	1	13	1	0	1	16	1	40	
8:55 AM	0	3	0	1	0	0	0	3	0	1	16	2	0	2	29	0	57	
Count Total	0	52	1	44	0	22	0	40	0	13	582	12	0	21	427	18	1,232	
Peak Hour	0	25	1	28	0	15	0	16	0	7	335	5	0	10	231	9	682	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	0	3	0	0	3	7:00 AM						7:00 AM	0	0	1	0	1
7:05 AM	0	1	0	0	1	7:05 AM						7:05 AM	1	0	0	0	1
7:10 AM	0	1	0	2	3	7:10 AM						7:10 AM	0	0	1	0	1
7:15 AM	0	0	0	0	0	7:15 AM						7:15 AM	0	0	1	0	1
7:20 AM	0	3	0	0	3	7:20 AM						7:20 AM	0	0	0	2	2
7:25 AM	0	0	0	0	0	7:25 AM						7:25 AM	0	0	0	1	1
7:30 AM	0	2	0	3	5	7:30 AM						7:30 AM	1	0	0	0	1
7:35 AM	0	2	0	1	3	7:35 AM						7:35 AM	0	0	0	2	2
7:40 AM	0	3	0	2	5	7:40 AM						7:40 AM	0	0	0	1	1
7:45 AM	0	1	0	2	3	7:45 AM						7:45 AM	3	0	0	0	3
7:50 AM	0	2	0	1	3	7:50 AM						7:50 AM	0	0	0	0	0
7:55 AM	0	1	0	0	1	7:55 AM						7:55 AM	0	0	0	2	2
8:00 AM	0	2	0	2	4	8:00 AM						8:00 AM	0	0	0	0	0
8:05 AM	0	2	0	1	3	8:05 AM						8:05 AM	0	0	0	0	0
8:10 AM	0	5	0	3	8	8:10 AM						8:10 AM	1	0	0	0	1
8:15 AM	0	0	0	3	3	8:15 AM						8:15 AM	0	0	0	0	0
8:20 AM	0	1	0	0	1	8:20 AM						8:20 AM	0	0	0	0	0
8:25 AM	0	1	0	0	1	8:25 AM						8:25 AM	0	0	2	0	2
8:30 AM	0	1	0	1	2	8:30 AM						8:30 AM	0	0	0	0	0
8:35 AM	0	2	0	2	4	8:35 AM						8:35 AM	0	0	0	0	0
8:40 AM	0	2	0	1	3	8:40 AM						8:40 AM	0	0	0	0	0
8:45 AM	0	1	0	2	3	8:45 AM						8:45 AM	1	0	0	1	2
8:50 AM	0	1	0	3	4	8:50 AM						8:50 AM	0	0	0	1	1
8:55 AM	0	0	0	4	4	8:55 AM						8:55 AM	0	0	0	0	0
Count Total	0	37	0	33	70	Count Total						Count Total	7	0	5	10	22
Peak Hour	0	23	0	15	38	Peak Hour						Peak Hour	5	0	1	8	14



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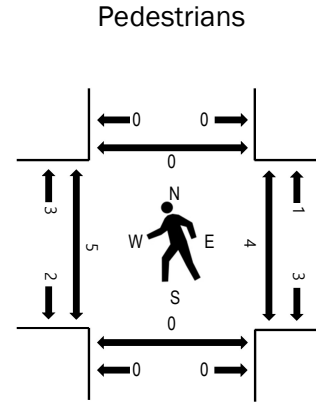
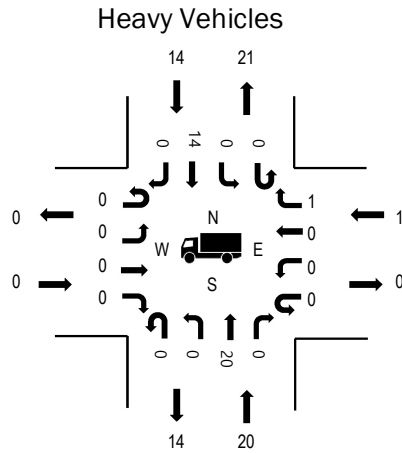
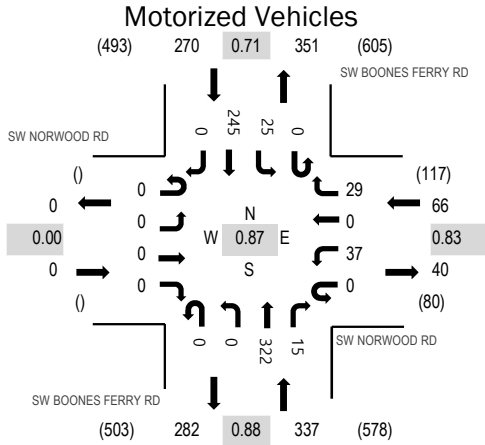
Location: 3 SW BOONES FERRY RD & SW NORWOOD RD AM

Date: Tuesday, September 29, 2020

Peak Hour: 07:10 AM - 08:10 AM

Peak 15-Minutes: 07:35 AM - 07:50 AM

Peak Hour



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	0.0%	0.00
WB	1.5%	0.83
NB	5.9%	0.88
SB	5.2%	0.71
All	5.2%	0.87

Traffic Counts - Motorized Vehicles

Interval Start Time	SW NORWOOD RD Eastbound				SW NORWOOD RD Westbound				SW BOONES FERRY RD Northbound				SW BOONES FERRY RD Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
7:00 AM	0	0	0	0	0	1	0	1	0	0	30	0	0	3	18	0	53	665
7:05 AM	0	0	0	0	0	1	0	2	0	0	24	1	0	1	14	0	43	657
7:10 AM	0	0	0	0	0	5	0	3	0	0	27	1	0	5	13	0	54	673
7:15 AM	0	0	0	0	0	1	0	3	0	0	25	0	0	3	21	0	53	665
7:20 AM	0	0	0	0	0	4	0	1	0	0	27	0	0	2	16	0	50	649
7:25 AM	0	0	0	0	0	3	0	3	0	0	34	0	0	1	20	0	61	637
7:30 AM	0	0	0	0	0	5	0	1	0	0	27	2	0	1	18	0	54	618
7:35 AM	0	0	0	0	0	1	0	4	0	0	32	1	0	2	17	0	57	603
7:40 AM	0	0	0	0	0	7	0	2	0	0	26	2	0	2	31	0	70	582
7:45 AM	0	0	0	0	0	1	0	2	0	0	29	3	0	1	31	0	67	568
7:50 AM	0	0	0	0	0	2	0	3	0	0	18	1	0	3	28	0	55	538
7:55 AM	0	0	0	0	0	2	0	2	0	0	24	0	0	3	17	0	48	521
8:00 AM	0	0	0	0	0	2	0	2	0	0	18	3	0	2	18	0	45	523
8:05 AM	0	0	0	0	0	4	0	3	0	0	35	2	0	0	15	0	59	
8:10 AM	0	0	0	0	0	2	0	4	0	0	16	2	0	2	20	0	46	
8:15 AM	0	0	0	0	0	3	0	2	0	0	11	3	0	1	17	0	37	
8:20 AM	0	0	0	0	0	3	0	2	0	0	19	0	0	4	10	0	38	
8:25 AM	0	0	0	0	0	3	0	4	0	0	19	1	0	1	14	0	42	
8:30 AM	0	0	0	0	0	2	0	3	0	0	14	2	0	2	16	0	39	
8:35 AM	0	0	0	0	0	1	0	3	0	0	14	1	0	3	14	0	36	
8:40 AM	0	0	0	0	0	2	0	3	0	0	29	2	0	1	19	0	56	
8:45 AM	0	0	0	0	0	1	0	0	0	0	18	2	0	1	15	0	37	
8:50 AM	0	0	0	0	0	2	0	3	0	0	14	2	0	2	15	0	38	
8:55 AM	0	0	0	0	0	1	0	2	0	0	17	0	0	3	27	0	50	
Count Total	0	0	0	0	0	59	0	58	0	0	547	31	0	49	444	0	1,188	
Peak Hour	0	0	0	0	0	37	0	29	0	0	322	15	0	25	245	0	673	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	0	2	1	0	3	7:00 AM						7:00 AM	1	0	0	0	1
7:05 AM	0	1	0	0	1	7:05 AM						7:05 AM	0	0	0	0	0
7:10 AM	0	1	0	2	3	7:10 AM						7:10 AM	0	0	0	0	0
7:15 AM	0	0	0	0	0	7:15 AM						7:15 AM	0	0	1	0	1
7:20 AM	0	1	1	0	2	7:20 AM						7:20 AM	0	0	0	0	0
7:25 AM	0	1	0	1	2	7:25 AM						7:25 AM	1	0	0	0	1
7:30 AM	0	1	0	2	3	7:30 AM						7:30 AM	1	0	0	0	1
7:35 AM	0	3	0	2	5	7:35 AM						7:35 AM	1	0	1	0	2
7:40 AM	0	2	0	2	4	7:40 AM						7:40 AM	1	0	1	0	2
7:45 AM	0	1	0	2	3	7:45 AM						7:45 AM	0	0	1	0	1
7:50 AM	0	2	0	0	2	7:50 AM						7:50 AM	0	0	0	0	0
7:55 AM	0	3	0	1	4	7:55 AM						7:55 AM	0	0	0	0	0
8:00 AM	0	2	0	1	3	8:00 AM						8:00 AM	0	0	0	0	0
8:05 AM	0	3	0	1	4	8:05 AM						8:05 AM	1	0	0	0	1
8:10 AM	0	3	0	3	6	8:10 AM						8:10 AM	0	0	0	0	0
8:15 AM	0	0	0	3	3	8:15 AM						8:15 AM	0	0	0	0	0
8:20 AM	0	2	0	0	2	8:20 AM						8:20 AM	0	0	0	0	0
8:25 AM	0	1	0	0	1	8:25 AM						8:25 AM	2	0	1	0	3
8:30 AM	0	1	0	2	3	8:30 AM						8:30 AM	0	0	0	0	0
8:35 AM	0	1	1	1	3	8:35 AM						8:35 AM	0	0	0	0	0
8:40 AM	0	1	0	1	2	8:40 AM						8:40 AM	0	0	0	0	0
8:45 AM	0	1	0	2	3	8:45 AM						8:45 AM	1	0	0	0	1
8:50 AM	0	1	0	3	4	8:50 AM						8:50 AM	0	0	0	0	0
8:55 AM	0	0	0	4	4	8:55 AM						8:55 AM	0	0	0	0	0
Count Total	0	34	3	33	70	Count Total						Count Total	9	0	5	0	14
Peak Hour	0	20	1	14	35	Peak Hour						Peak Hour	5	0	4	0	9



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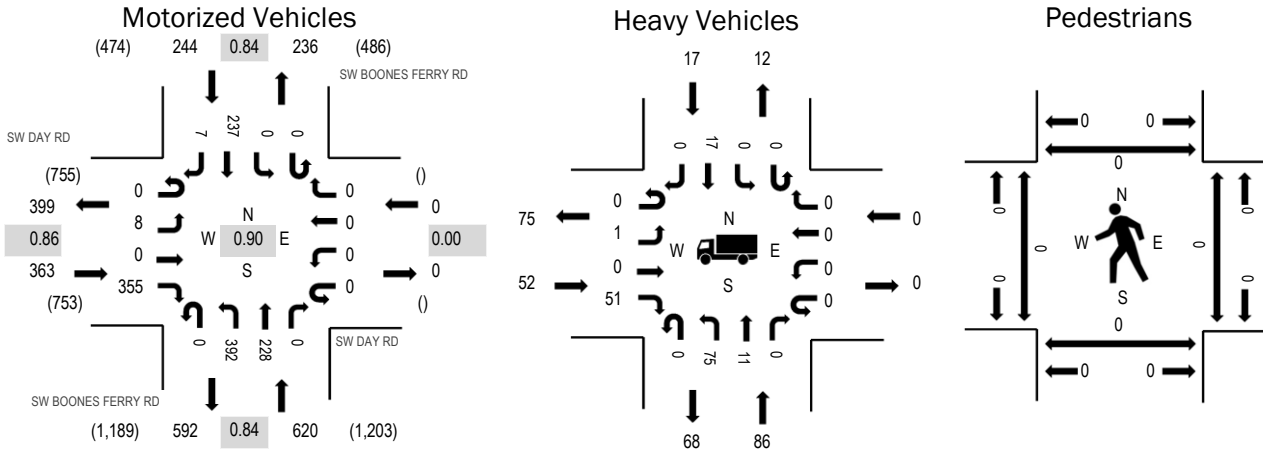
Location: 1 SW BOONES FERRY RD & SW DAY RD AM

Date: Tuesday, March 30, 2021

Peak Hour: 08:00 AM - 09:00 AM

Peak 15-Minutes: 08:20 AM - 08:35 AM

Peak Hour



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	14.3%	0.86
WB	0.0%	0.00
NB	13.9%	0.84
SB	7.0%	0.84
All	12.6%	0.90

Traffic Counts - Motorized Vehicles

Interval Start Time	SW DAY RD Eastbound				SW DAY RD Westbound				SW BOONES FERRY RD Northbound				SW BOONES FERRY RD Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
7:00 AM	0	2	0	34	0	0	0	0	0	33	22	0	0	0	21	1	113	1,203
7:05 AM	0	3	0	31	0	0	0	0	0	16	15	0	0	0	18	4	87	1,183
7:10 AM	0	2	0	29	0	0	0	0	0	42	23	0	0	0	22	1	119	1,179
7:15 AM	0	1	0	29	0	0	0	0	0	28	21	0	0	0	24	1	104	1,154
7:20 AM	0	0	0	24	0	0	0	0	0	21	23	0	0	0	20	4	92	1,135
7:25 AM	0	0	0	32	0	0	0	0	0	21	17	0	0	0	12	0	82	1,170
7:30 AM	0	0	0	33	0	0	0	0	0	34	34	0	0	0	25	1	127	1,197
7:35 AM	0	0	0	32	0	0	0	0	0	21	19	0	0	0	9	0	81	1,176
7:40 AM	0	1	0	36	0	0	0	0	0	35	23	0	0	0	16	1	112	1,210
7:45 AM	0	0	0	42	0	0	0	0	0	31	15	0	0	0	18	0	106	1,204
7:50 AM	0	0	0	34	0	0	0	0	0	24	18	0	0	0	21	0	97	1,212
7:55 AM	0	0	0	25	0	0	0	0	0	36	11	0	0	0	10	1	83	1,196
8:00 AM	0	0	0	30	0	0	0	0	0	27	20	0	0	0	16	0	93	1,227
8:05 AM	0	1	0	20	0	0	0	0	0	37	14	0	0	0	11	0	83	
8:10 AM	0	1	0	29	0	0	0	0	0	34	12	0	0	0	18	0	94	
8:15 AM	0	0	0	20	0	0	0	0	0	22	16	0	0	0	26	1	85	
8:20 AM	0	0	0	35	0	0	0	0	0	56	14	0	0	0	22	0	127	
8:25 AM	0	2	0	29	0	0	0	0	0	32	24	0	0	0	21	1	109	
8:30 AM	0	1	0	22	0	0	0	0	0	29	29	0	0	0	24	1	106	
8:35 AM	0	0	0	39	0	0	0	0	0	26	24	0	0	0	26	0	115	
8:40 AM	0	0	0	30	0	0	0	0	0	30	24	0	0	0	20	2	106	
8:45 AM	0	1	0	37	0	0	0	0	0	38	21	0	0	0	17	0	114	
8:50 AM	0	0	0	27	0	0	0	0	0	27	14	0	0	0	13	0	81	
8:55 AM	0	2	0	37	0	0	0	0	0	34	16	0	0	0	23	2	114	
Count Total	0	17	0	736	0	0	0	0	0	734	469	0	0	0	453	21	2,430	
Peak Hour	0	8	0	355	0	0	0	0	0	392	228	0	0	0	237	7	1,227	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	8	4	0	3	15	7:00 AM	0	0	0	0	0	7:00 AM	0	0	0	0	0
7:05 AM	7	2	0	1	10	7:05 AM	0	0	0	0	0	7:05 AM	0	0	0	0	0
7:10 AM	2	6	0	1	9	7:10 AM	0	0	0	0	0	7:10 AM	0	0	0	0	0
7:15 AM	5	2	0	0	7	7:15 AM	0	0	0	0	0	7:15 AM	0	0	0	0	0
7:20 AM	3	5	0	3	11	7:20 AM	0	0	0	0	0	7:20 AM	0	0	0	0	0
7:25 AM	6	4	0	0	10	7:25 AM	0	0	0	0	0	7:25 AM	0	0	0	0	0
7:30 AM	5	11	0	2	18	7:30 AM	0	0	0	0	0	7:30 AM	0	0	0	0	0
7:35 AM	6	7	0	0	13	7:35 AM	0	0	0	0	0	7:35 AM	0	0	0	0	0
7:40 AM	3	7	0	0	10	7:40 AM	0	0	0	0	0	7:40 AM	0	0	0	0	0
7:45 AM	10	8	0	0	18	7:45 AM	0	0	0	0	0	7:45 AM	0	0	0	0	0
7:50 AM	7	2	0	2	11	7:50 AM	0	0	0	0	0	7:50 AM	0	0	0	0	0
7:55 AM	2	3	0	1	6	7:55 AM	0	0	0	0	0	7:55 AM	0	0	0	0	0
8:00 AM	5	5	0	2	12	8:00 AM	0	0	0	0	0	8:00 AM	0	0	0	0	0
8:05 AM	2	2	0	3	7	8:05 AM	0	0	0	0	0	8:05 AM	0	0	0	0	0
8:10 AM	5	6	0	2	13	8:10 AM	0	0	0	0	0	8:10 AM	0	0	0	0	0
8:15 AM	2	7	0	2	11	8:15 AM	0	0	0	0	0	8:15 AM	0	0	0	0	0
8:20 AM	7	9	0	1	17	8:20 AM	0	0	0	0	0	8:20 AM	0	0	0	0	0
8:25 AM	6	15	0	1	22	8:25 AM	0	0	0	0	0	8:25 AM	0	0	0	0	0
8:30 AM	4	9	0	3	16	8:30 AM	0	0	0	0	0	8:30 AM	0	0	0	0	0
8:35 AM	1	6	0	1	8	8:35 AM	0	0	0	0	0	8:35 AM	0	0	0	0	0
8:40 AM	2	1	0	0	3	8:40 AM	0	0	0	0	0	8:40 AM	0	0	0	0	0
8:45 AM	6	7	0	2	15	8:45 AM	0	0	0	0	0	8:45 AM	0	0	0	0	0
8:50 AM	8	10	0	0	18	8:50 AM	0	0	0	0	0	8:50 AM	0	0	0	0	0
8:55 AM	4	9	0	0	13	8:55 AM	0	0	0	0	0	8:55 AM	0	0	0	0	0
Count Total	116	147	0	30	293	Count Total	0	0	0	0	0	Count Total	0	0	0	0	0
Peak Hour	52	86	0	17	155	Peak Hour	0	0	0	0	0	Peak Hour	0	0	0	0	0



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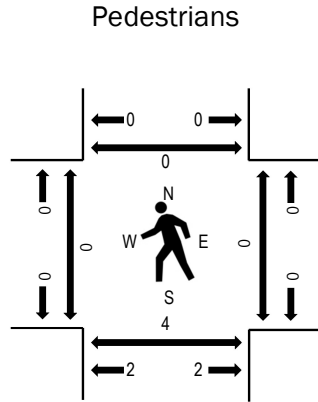
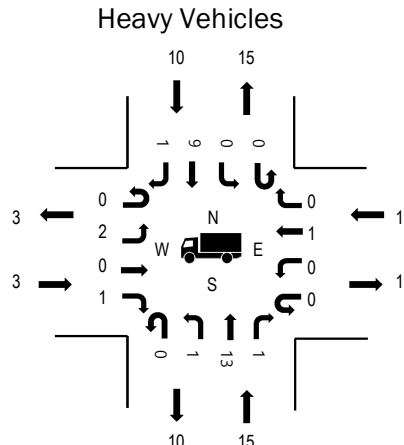
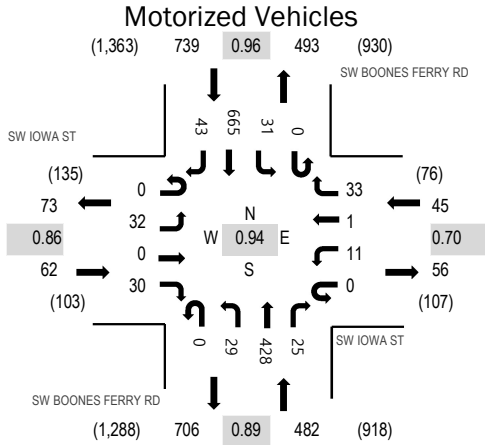
Location: 2 SW BOONES FERRY RD & SW IOWA ST PM

Date: Tuesday, September 29, 2020

Peak Hour: 04:35 PM - 05:35 PM

Peak 15-Minutes: 04:45 PM - 05:00 PM

Peak Hour



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	4.8%	0.86
WB	2.2%	0.70
NB	3.1%	0.89
SB	1.4%	0.96
All	2.2%	0.94

Traffic Counts - Motorized Vehicles

Interval Start Time	SW IOWA ST Eastbound				SW IOWA ST Westbound				SW BOONES FERRY RD Northbound				SW BOONES FERRY RD Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
4:00 PM	0	2	0	2	0	0	0	2	0	3	31	0	0	2	48	1	91	1,278
4:05 PM	0	0	0	1	0	2	0	4	0	4	30	0	0	2	41	4	88	1,292
4:10 PM	0	4	0	0	0	1	0	0	0	1	35	1	0	2	51	1	96	1,313
4:15 PM	0	3	0	3	0	1	0	0	0	4	38	2	0	2	63	6	122	1,325
4:20 PM	0	3	0	1	0	1	0	3	0	1	30	6	0	3	48	2	98	1,307
4:25 PM	0	2	0	0	0	1	0	2	0	2	37	1	0	6	50	3	104	1,319
4:30 PM	0	1	0	1	0	1	0	2	0	3	34	1	0	2	55	2	102	1,323
4:35 PM	0	5	0	3	0	2	0	5	0	3	39	1	0	1	55	2	116	1,328
4:40 PM	0	1	0	1	0	0	0	1	0	0	39	2	0	3	56	6	109	1,311
4:45 PM	0	4	0	2	0	1	0	2	0	2	38	3	0	1	56	2	111	1,306
4:50 PM	0	2	0	1	0	0	1	4	0	3	46	4	0	4	55	8	128	1,281
4:55 PM	0	2	0	1	0	4	0	4	0	3	28	3	0	2	61	5	113	1,230
5:00 PM	0	3	0	2	0	0	0	1	0	1	37	2	0	3	55	1	105	1,182
5:05 PM	0	2	0	4	0	0	0	3	0	4	30	2	0	4	58	2	109	
5:10 PM	0	4	0	3	0	0	0	0	0	1	36	2	0	3	53	6	108	
5:15 PM	0	2	0	2	0	1	0	3	0	3	31	0	0	2	57	3	104	
5:20 PM	0	3	0	3	0	1	0	3	0	4	37	3	0	3	50	3	110	
5:25 PM	0	2	0	6	0	0	0	3	0	2	30	2	0	3	58	2	108	
5:30 PM	0	2	0	2	0	2	0	4	0	3	37	1	0	2	51	3	107	
5:35 PM	0	2	0	2	0	0	0	1	0	4	29	2	0	5	50	4	99	
5:40 PM	0	0	0	3	0	0	0	5	0	1	43	2	0	3	43	4	104	
5:45 PM	0	2	0	3	0	0	0	0	0	1	28	1	0	3	46	2	86	
5:50 PM	0	1	0	1	0	0	0	2	0	2	36	1	0	3	30	1	77	
5:55 PM	0	3	0	1	0	0	0	3	0	3	19	0	0	1	32	3	65	
Count Total	0	55	0	48	0	18	1	57	0	58	818	42	0	65	1,222	76	2,460	
Peak Hour	0	32	0	30	0	11	1	33	0	29	428	25	0	31	665	43	1,328	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	0	4	0	2	6	4:00 PM						4:00 PM	0	0	0	0	0
4:05 PM	0	1	0	0	1	4:05 PM						4:05 PM	0	0	0	0	0
4:10 PM	0	0	0	1	1	4:10 PM						4:10 PM	0	0	0	0	0
4:15 PM	1	1	0	2	4	4:15 PM						4:15 PM	0	0	0	0	0
4:20 PM	0	3	0	1	4	4:20 PM						4:20 PM	0	0	0	0	0
4:25 PM	0	2	0	2	4	4:25 PM						4:25 PM	1	0	0	0	1
4:30 PM	0	0	0	1	1	4:30 PM						4:30 PM	0	0	0	0	0
4:35 PM	0	4	0	0	4	4:35 PM						4:35 PM	0	0	0	0	0
4:40 PM	0	1	0	1	2	4:40 PM						4:40 PM	0	2	0	0	2
4:45 PM	0	2	0	2	4	4:45 PM						4:45 PM	0	0	0	0	0
4:50 PM	0	2	1	2	5	4:50 PM						4:50 PM	0	0	0	0	0
4:55 PM	0	2	0	2	4	4:55 PM						4:55 PM	0	0	0	0	0
5:00 PM	1	1	0	0	2	5:00 PM						5:00 PM	0	0	0	0	0
5:05 PM	1	0	0	0	1	5:05 PM						5:05 PM	0	2	0	0	2
5:10 PM	1	1	0	0	2	5:10 PM						5:10 PM	0	0	0	0	0
5:15 PM	0	0	0	1	1	5:15 PM						5:15 PM	0	0	0	0	0
5:20 PM	0	0	0	0	0	5:20 PM						5:20 PM	0	0	0	0	0
5:25 PM	0	1	0	1	2	5:25 PM						5:25 PM	0	0	0	0	0
5:30 PM	0	1	0	1	2	5:30 PM						5:30 PM	0	0	0	0	0
5:35 PM	0	0	0	1	1	5:35 PM						5:35 PM	0	0	0	0	0
5:40 PM	0	2	0	2	4	5:40 PM						5:40 PM	1	0	0	0	1
5:45 PM	0	1	0	0	1	5:45 PM						5:45 PM	0	0	0	1	1
5:50 PM	0	2	0	0	2	5:50 PM						5:50 PM	0	0	0	0	0
5:55 PM	0	0	0	0	0	5:55 PM						5:55 PM	0	0	1	0	1
Count Total	4	31	1	22	58	Count Total						Count Total	2	4	1	1	8
Peak Hour	3	15	1	10	29	Peak Hour						Peak Hour	0	4	0	0	4



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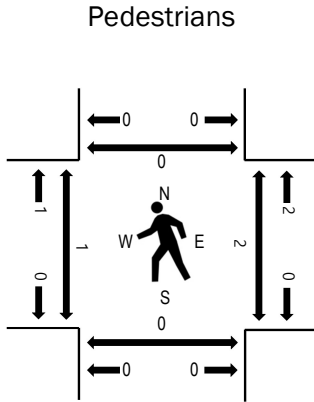
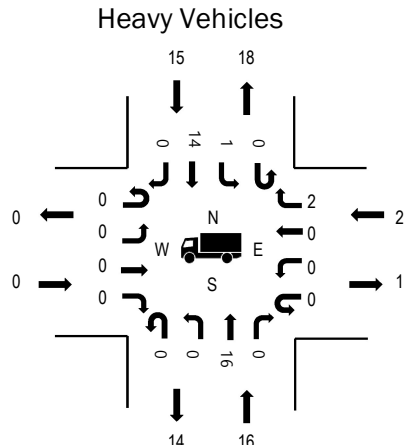
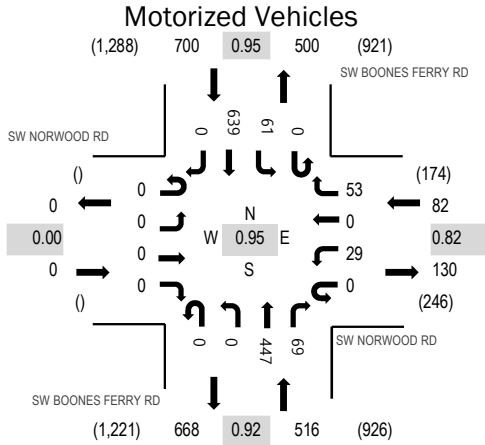
Location: 3 SW BOONES FERRY RD & SW NORWOOD RD PM

Date: Tuesday, September 29, 2020

Peak Hour: 04:10 PM - 05:10 PM

Peak 15-Minutes: 04:40 PM - 04:55 PM

Peak Hour



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	0.0%	0.00
WB	2.4%	0.82
NB	3.1%	0.92
SB	2.1%	0.95
All	2.5%	0.95

Traffic Counts - Motorized Vehicles

Interval Start Time	SW NORWOOD RD Eastbound				SW NORWOOD RD Westbound				SW BOONES FERRY RD Northbound				SW BOONES FERRY RD Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
4:00 PM	0	0	0	0	0	5	0	5	0	0	31	4	0	2	48	0	95	1,255
4:05 PM	0	0	0	0	0	4	0	4	0	0	26	4	0	7	34	0	79	1,272
4:10 PM	0	0	0	0	0	4	0	6	0	0	39	4	0	8	49	0	110	1,298
4:15 PM	0	0	0	0	0	3	0	3	0	0	41	7	0	9	63	0	126	1,282
4:20 PM	0	0	0	0	0	0	0	4	0	0	32	4	0	6	44	0	90	1,260
4:25 PM	0	0	0	0	0	2	0	3	0	0	40	3	0	5	44	0	97	1,286
4:30 PM	0	0	0	0	0	1	0	5	0	0	35	5	0	3	53	0	102	1,291
4:35 PM	0	0	0	0	0	2	0	5	0	0	36	5	0	4	55	0	107	1,291
4:40 PM	0	0	0	0	0	3	0	5	0	0	34	8	0	4	54	0	108	1,271
4:45 PM	0	0	0	0	0	3	0	5	0	0	49	6	0	2	59	0	124	1,261
4:50 PM	0	0	0	0	0	4	0	5	0	0	35	8	0	3	56	0	111	1,221
4:55 PM	0	0	0	0	0	1	0	5	0	0	30	3	0	5	62	0	106	1,183
5:00 PM	0	0	0	0	0	3	0	4	0	0	38	12	0	6	49	0	112	1,133
5:05 PM	0	0	0	0	0	3	0	3	0	0	38	4	0	6	51	0	105	
5:10 PM	0	0	0	0	0	2	0	5	0	0	26	4	0	5	52	0	94	
5:15 PM	0	0	0	0	0	4	0	6	0	0	29	6	0	4	55	0	104	
5:20 PM	0	0	0	0	0	4	0	6	0	0	39	5	0	6	56	0	116	
5:25 PM	0	0	0	0	0	0	0	2	0	0	35	6	0	7	52	0	102	
5:30 PM	0	0	0	0	0	2	0	6	0	0	34	4	0	8	48	0	102	
5:35 PM	0	0	0	0	0	1	0	5	0	0	36	2	0	4	39	0	87	
5:40 PM	0	0	0	0	0	2	0	7	0	0	29	7	0	11	42	0	98	
5:45 PM	0	0	0	0	0	3	0	6	0	0	24	7	0	3	41	0	84	
5:50 PM	0	0	0	0	0	2	0	6	0	0	34	1	0	1	29	0	73	
5:55 PM	0	0	0	0	0	1	0	4	0	0	16	1	0	7	27	0	56	
Count Total	0	0	0	0	0	59	0	115	0	0	806	120	0	126	1,162	0	2,388	
Peak Hour	0	0	0	0	0	29	0	53	0	0	447	69	0	61	639	0	1,298	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	0	4	0	2	6	4:00 PM						4:00 PM	0	0	0	0	0
4:05 PM	0	2	0	0	2	4:05 PM						4:05 PM	0	0	0	0	0
4:10 PM	0	0	0	2	2	4:10 PM						4:10 PM	0	0	0	0	0
4:15 PM	0	2	0	2	4	4:15 PM						4:15 PM	0	0	0	0	0
4:20 PM	0	2	0	1	3	4:20 PM						4:20 PM	1	0	0	0	1
4:25 PM	0	2	0	2	4	4:25 PM						4:25 PM	0	0	0	0	0
4:30 PM	0	0	0	1	1	4:30 PM						4:30 PM	0	0	0	0	0
4:35 PM	0	3	1	1	5	4:35 PM						4:35 PM	0	0	0	0	0
4:40 PM	0	1	1	1	3	4:40 PM						4:40 PM	0	0	2	0	2
4:45 PM	0	3	0	2	5	4:45 PM						4:45 PM	0	0	0	0	0
4:50 PM	0	0	0	2	2	4:50 PM						4:50 PM	0	0	0	0	0
4:55 PM	0	3	0	0	3	4:55 PM						4:55 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0	5:00 PM						5:00 PM	0	0	0	0	0
5:05 PM	0	0	0	1	1	5:05 PM						5:05 PM	0	0	0	0	0
5:10 PM	0	1	0	0	1	5:10 PM						5:10 PM	0	0	0	0	0
5:15 PM	0	0	0	1	1	5:15 PM						5:15 PM	0	0	0	0	0
5:20 PM	0	0	0	0	0	5:20 PM						5:20 PM	0	0	0	0	0
5:25 PM	0	1	0	2	3	5:25 PM						5:25 PM	0	0	0	0	0
5:30 PM	0	1	0	0	1	5:30 PM						5:30 PM	0	0	0	0	0
5:35 PM	0	1	0	0	1	5:35 PM						5:35 PM	0	0	0	0	0
5:40 PM	0	2	0	2	4	5:40 PM						5:40 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0	5:45 PM						5:45 PM	0	0	0	0	0
5:50 PM	0	2	0	0	2	5:50 PM						5:50 PM	0	0	0	0	0
5:55 PM	0	0	0	0	0	5:55 PM						5:55 PM	0	0	1	0	1
Count Total	0	30	2	22	54	Count Total						Count Total	1	0	3	0	4
Peak Hour	0	16	2	15	33	Peak Hour						Peak Hour	1	0	2	0	3



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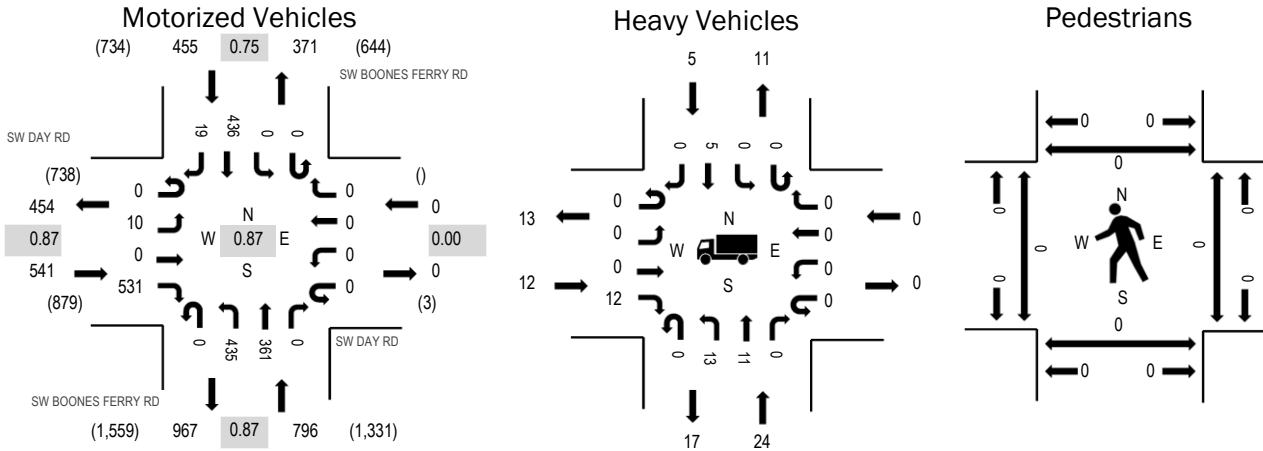
Location: 1 SW BOONES FERRY RD & SW DAY RD PM

Date: Tuesday, March 30, 2021

Peak Hour: 04:00 PM - 05:00 PM

Peak 15-Minutes: 04:10 PM - 04:25 PM

Peak Hour



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	2.2%	0.87
WB	0.0%	0.00
NB	3.0%	0.87
SB	1.1%	0.75
All	2.3%	0.87

Traffic Counts - Motorized Vehicles

Interval Start Time	SW DAY RD Eastbound				SW DAY RD Westbound				SW BOONES FERRY RD Northbound				SW BOONES FERRY RD Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
4:00 PM	0	2	0	56	0	0	0	0	0	53	29	0	0	0	44	2	186	1,792
4:05 PM	0	0	0	48	0	0	0	0	0	42	40	0	0	0	35	2	167	1,723
4:10 PM	0	1	0	49	0	0	0	0	0	31	32	0	0	0	41	2	156	1,678
4:15 PM	0	1	0	47	0	0	0	0	0	41	42	0	0	0	61	0	192	1,614
4:20 PM	0	2	0	50	0	0	0	0	0	33	37	0	0	0	46	1	169	1,541
4:25 PM	0	1	0	49	0	0	0	0	0	34	24	0	0	0	27	1	136	1,461
4:30 PM	0	0	0	37	0	0	0	0	0	27	24	0	0	0	24	0	112	1,411
4:35 PM	0	0	0	38	0	0	0	0	0	33	21	0	0	0	33	2	127	1,388
4:40 PM	0	0	0	43	0	0	0	0	0	34	25	0	0	0	32	3	137	1,342
4:45 PM	0	0	0	37	0	0	0	0	0	50	36	0	0	0	36	0	159	1,295
4:50 PM	0	2	0	41	0	0	0	0	0	33	27	0	0	0	26	2	131	1,213
4:55 PM	0	1	0	36	0	0	0	0	0	24	24	0	0	0	31	4	120	1,166
5:00 PM	0	0	0	38	0	0	0	0	0	28	28	0	0	0	20	3	117	1,152
5:05 PM	0	1	0	27	0	0	0	0	0	44	31	0	0	0	18	1	122	
5:10 PM	0	0	0	34	0	0	0	0	0	19	17	0	0	0	22	0	92	
5:15 PM	0	1	0	40	0	0	0	0	0	25	20	0	0	0	32	1	119	
5:20 PM	0	0	0	21	0	0	0	0	0	26	23	0	0	0	19	0	89	
5:25 PM	0	1	0	23	0	0	0	0	0	15	22	0	0	0	25	0	86	
5:30 PM	0	1	0	31	0	0	0	0	0	22	9	0	0	0	26	0	89	
5:35 PM	0	1	0	20	0	0	0	0	0	13	17	0	0	0	30	0	81	
5:40 PM	0	1	0	30	0	0	0	0	0	21	15	0	0	0	20	3	90	
5:45 PM	0	0	0	19	0	0	0	0	0	16	20	0	0	0	20	2	77	
5:50 PM	0	0	2	16	0	0	0	0	0	19	29	0	0	0	18	0	84	
5:55 PM	0	4	1	26	0	0	0	0	0	24	32	0	0	0	17	2	106	
Count Total	0	20	3	856	0	0	0	0	0	707	624	0	0	0	703	31	2,944	
Peak Hour	0	10	0	531	0	0	0	0	0	435	361	0	0	0	436	19	1,792	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	2	3	0	0	5	4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	0	0
4:05 PM	0	2	0	0	2	4:05 PM	0	0	0	0	0	4:05 PM	0	0	0	0	0
4:10 PM	3	2	0	0	5	4:10 PM	0	0	0	0	0	4:10 PM	0	0	0	0	0
4:15 PM	2	2	0	1	5	4:15 PM	0	0	0	0	0	4:15 PM	0	0	0	0	0
4:20 PM	0	3	0	0	3	4:20 PM	0	0	0	0	0	4:20 PM	0	0	0	0	0
4:25 PM	2	1	0	1	4	4:25 PM	0	0	0	0	0	4:25 PM	0	0	0	0	0
4:30 PM	1	0	0	0	1	4:30 PM	0	0	0	0	0	4:30 PM	0	0	0	0	0
4:35 PM	0	0	0	1	1	4:35 PM	0	0	0	0	0	4:35 PM	0	0	0	0	0
4:40 PM	1	7	0	0	8	4:40 PM	0	0	0	0	0	4:40 PM	0	0	0	0	0
4:45 PM	0	3	0	2	5	4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	0
4:50 PM	0	1	0	0	1	4:50 PM	0	0	0	0	0	4:50 PM	0	0	0	0	0
4:55 PM	1	0	0	0	1	4:55 PM	0	0	0	0	0	4:55 PM	0	0	0	0	0
5:00 PM	1	0	0	1	2	5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0
5:05 PM	2	1	0	1	4	5:05 PM	0	0	0	0	0	5:05 PM	0	0	0	0	0
5:10 PM	1	0	0	0	1	5:10 PM	0	0	0	0	0	5:10 PM	0	0	0	0	0
5:15 PM	0	1	0	2	3	5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0
5:20 PM	2	0	0	0	2	5:20 PM	0	0	0	0	0	5:20 PM	0	0	0	0	0
5:25 PM	3	0	0	0	3	5:25 PM	0	0	0	0	0	5:25 PM	0	0	0	0	0
5:30 PM	0	0	0	2	2	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0
5:35 PM	0	0	0	2	2	5:35 PM	0	0	0	0	0	5:35 PM	0	0	0	0	0
5:40 PM	0	2	0	0	2	5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0
5:45 PM	1	1	0	0	2	5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0
5:50 PM	2	1	0	0	3	5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0
5:55 PM	2	0	0	1	3	5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0
Count Total	26	30	0	14	70	Count Total	0	0	0	0	0	Count Total	0	0	0	0	0
Peak Hour	12	24	0	5	41	Peak Hour	0	0	0	0	0	Peak Hour	0	0	0	0	0

Type of report: Tube Count - Volume Data

LOCATION: Norwood Rd 0.1m E of Boones Ferry Rd - #443							QC JOB #: 14908836			
SPECIFIC LOCATION:							DIRECTION: EB			
CITY/STATE: Washington, OR							DATE: Apr 24 2019 - Apr 24 2019			
Start Time	Mon	Tue	Wed 24 Apr 19	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM			1			1			1	
01:00 AM			1			1			1	
02:00 AM			4			4			4	
03:00 AM			0			0			0	
04:00 AM			2			2			2	
05:00 AM			6			6			6	
06:00 AM			25			25			25	
07:00 AM			77			77			77	
08:00 AM			78			78			78	
09:00 AM			38			38			38	
10:00 AM			46			46			46	
11:00 AM			55			55			55	
12:00 PM			52			52			52	
01:00 PM			75			75			75	
02:00 PM			74			74			74	
03:00 PM			117			117			117	
04:00 PM			137			137			137	
05:00 PM			141			141			141	
06:00 PM			106			106			106	
07:00 PM			93			93			93	
08:00 PM			67			67			67	
09:00 PM			30			30			30	
10:00 PM			13			13			13	
11:00 PM			8			8			8	
Day Total			1246			1246			1246	
% Weekday Average			100%							
% Week Average			100%			100%				
AM Peak Volume			8:00 AM 78			8:00 AM 78			8:00 AM 78	
PM Peak Volume			5:00 PM 141			5:00 PM 141			5:00 PM 141	

Comments:

Type of report: Tube Count - Volume Data

LOCATION: Norwood Rd 0.1m E of Boones Ferry Rd - #443							QC JOB #: 14908836			
SPECIFIC LOCATION:							DIRECTION: WB			
CITY/STATE: Washington, OR							DATE: Apr 24 2019 - Apr 24 2019			
Start Time	Mon	Tue	Wed 24 Apr 19	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM			2			2			2	
01:00 AM			2			2			2	
02:00 AM			1			1			1	
03:00 AM			0			0			0	
04:00 AM			8			8			8	
05:00 AM			29			29			29	
06:00 AM			51			51			51	
07:00 AM			125			125			125	
08:00 AM			86			86			86	
09:00 AM			62			62			62	
10:00 AM			35			35			35	
11:00 AM			38			38			38	
12:00 PM			25			25			25	
01:00 PM			32			32			32	
02:00 PM			32			32			32	
03:00 PM			51			51			51	
04:00 PM			95			95			95	
05:00 PM			91			91			91	
06:00 PM			67			67			67	
07:00 PM			87			87			87	
08:00 PM			48			48			48	
09:00 PM			58			58			58	
10:00 PM			2			2			2	
11:00 PM			1			1			1	
Day Total			1028			1028			1028	
% Weekday Average			100%							
% Week Average			100%			100%				
AM Peak Volume			7:00 AM 125			7:00 AM 125			7:00 AM 125	
PM Peak Volume			4:00 PM 95			4:00 PM 95			4:00 PM 95	

Comments:

Type of report: Tube Count - Volume Data

LOCATION: Norwood Rd 0.1m E of Boones Ferry Rd - #443 SPECIFIC LOCATION: CITY/STATE: Washington, OR							QC JOB #: 14908836 DIRECTION: EB, WB DATE: Apr 24 2019 - Apr 24 2019			
Start Time	Mon	Tue	Wed 24 Apr 19	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM			3			3			3	
01:00 AM			3			3			3	
02:00 AM			5			5			5	
03:00 AM			0			0			0	
04:00 AM			10			10			10	
05:00 AM			35			35			35	
06:00 AM			76			76			76	
07:00 AM			202			202			202	
08:00 AM			164			164			164	
09:00 AM			100			100			100	
10:00 AM			81			81			81	
11:00 AM			93			93			93	
12:00 PM			77			77			77	
01:00 PM			107			107			107	
02:00 PM			106			106			106	
03:00 PM			168			168			168	
04:00 PM			232			232			232	
05:00 PM			232			232			232	
06:00 PM			173			173			173	
07:00 PM			180			180			180	
08:00 PM			115			115			115	
09:00 PM			88			88			88	
10:00 PM			15			15			15	
11:00 PM			9			9			9	
Day Total			2274			2274			2274	
% Weekday Average			100%							
% Week Average			100%			100%				
AM Peak Volume			7:00 AM 202			7:00 AM 202			7:00 AM 202	
PM Peak Volume			4:00 PM 232			4:00 PM 232			4:00 PM 232	

Comments:

Type of report: Tube Count - Volume Data

LOCATION: #464 SW Boones Ferry Rd S of SW Norwood Rd SPECIFIC LOCATION: CITY/STATE: Washington, OR							QC JOB #: 14908851 DIRECTION: NB DATE: Apr 24 2019 - Apr 24 2019			
Start Time	Mon	Tue	Wed 24 Apr 19	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM			20			20			20	
01:00 AM			11			11			11	
02:00 AM			10			10			10	
03:00 AM			45			45			45	
04:00 AM			180			180			180	
05:00 AM			235			235			235	
06:00 AM			386			386			386	
07:00 AM			493			493			493	
08:00 AM			350			350			350	
09:00 AM			238			238			238	
10:00 AM			221			221			221	
11:00 AM			271			271			271	
12:00 PM			265			265			265	
01:00 PM			306			306			306	
02:00 PM			317			317			317	
03:00 PM			403			403			403	
04:00 PM			448			448			448	
05:00 PM			428			428			428	
06:00 PM			376			376			376	
07:00 PM			252			252			252	
08:00 PM			201			201			201	
09:00 PM			104			104			104	
10:00 PM			59			59			59	
11:00 PM			32			32			32	
Day Total			5651			5651			5651	
% Weekday Average			100%							
% Week Average			100%			100%				
AM Peak Volume			7:00 AM 493			7:00 AM 493			7:00 AM 493	
PM Peak Volume			4:00 PM 448			4:00 PM 448			4:00 PM 448	

Comments:

Type of report: Tube Count - Volume Data

LOCATION: #464 SW Boones Ferry Rd S of SW Norwood Rd SPECIFIC LOCATION: CITY/STATE: Washington, OR							QC JOB #: 14908851 DIRECTION: SB DATE: Apr 24 2019 - Apr 24 2019			
Start Time	Mon	Tue	Wed 24 Apr 19	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM			52			52			52	
01:00 AM			8			8			8	
02:00 AM			13			13			13	
03:00 AM			17			17			17	
04:00 AM			28			28			28	
05:00 AM			102			102			102	
06:00 AM			186			186			186	
07:00 AM			325			325			325	
08:00 AM			287			287			287	
09:00 AM			270			270			270	
10:00 AM			231			231			231	
11:00 AM			263			263			263	
12:00 PM			269			269			269	
01:00 PM			279			279			279	
02:00 PM			287			287			287	
03:00 PM			431			431			431	
04:00 PM			384			384			384	
05:00 PM			444			444			444	
06:00 PM			349			349			349	
07:00 PM			281			281			281	
08:00 PM			199			199			199	
09:00 PM			121			121			121	
10:00 PM			53			53			53	
11:00 PM			36			36			36	
Day Total			4915			4915			4915	
% Weekday Average			100%							
% Week Average			100%			100%				
AM Peak Volume			7:00 AM 325			7:00 AM 325			7:00 AM 325	
PM Peak Volume			5:00 PM 444			5:00 PM 444			5:00 PM 444	

Comments:

Type of report: Tube Count - Volume Data

LOCATION: #464 SW Boones Ferry Rd S of SW Norwood Rd SPECIFIC LOCATION: CITY/STATE: Washington, OR							QC JOB #: 14908851 DIRECTION: NB, SB DATE: Apr 24 2019 - Apr 24 2019			
Start Time	Mon	Tue	Wed 24 Apr 19	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM			72			72			72	
01:00 AM			19			19			19	
02:00 AM			23			23			23	
03:00 AM			62			62			62	
04:00 AM			208			208			208	
05:00 AM			337			337			337	
06:00 AM			572			572			572	
07:00 AM			818			818			818	
08:00 AM			637			637			637	
09:00 AM			508			508			508	
10:00 AM			452			452			452	
11:00 AM			534			534			534	
12:00 PM			534			534			534	
01:00 PM			585			585			585	
02:00 PM			604			604			604	
03:00 PM			834			834			834	
04:00 PM			832			832			832	
05:00 PM			872			872			872	
06:00 PM			725			725			725	
07:00 PM			533			533			533	
08:00 PM			400			400			400	
09:00 PM			225			225			225	
10:00 PM			112			112			112	
11:00 PM			68			68			68	
Day Total			10566			10566			10566	
% Weekday Average			100%							
% Week Average			100%			100%				
AM Peak Volume			7:00 AM 818			7:00 AM 818			7:00 AM 818	
PM Peak Volume			5:00 PM 872			5:00 PM 872			5:00 PM 872	

Comments:



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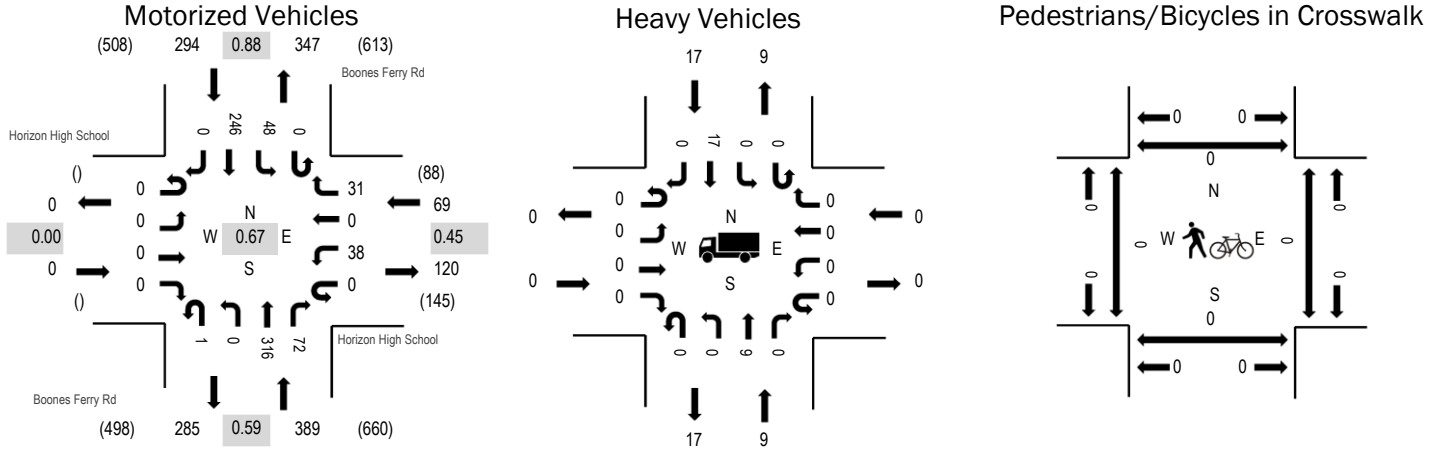
Location: 1 Boones Ferry Rd & Horizon High School AM

Date: Tuesday, September 14, 2021

Study Peak Hour: 07:30 AM - 08:30 AM

Peak 15-Minutes in Study Peak Hour: 07:45 AM - 08:00 AM

Study Peak Hour (for all study intersections)



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	0.0%	0.00
WB	0.0%	0.45
NB	2.3%	0.59
SB	5.8%	0.88
All	3.5%	0.67

Traffic Counts - Motorized Vehicles

Interval Start Time	Horizon High School Eastbound				Horizon High School Westbound				Boones Ferry Rd Northbound				Boones Ferry Rd Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
7:00 AM	0	0	0	0	0	0	0	1	0	0	15	2	0	1	21	0	40	705
7:05 AM	0	0	0	0	0	1	0	0	0	0	18	2	0	2	14	0	37	722
7:10 AM	0	0	0	0	0	3	0	1	0	0	19	1	0	1	19	0	44	739
7:15 AM	0	0	0	0	0	0	0	0	0	0	14	1	0	0	16	0	31	744
7:20 AM	0	0	0	0	0	3	0	0	0	0	25	2	0	4	18	0	52	750
7:25 AM	0	0	0	0	0	2	0	1	0	0	30	3	0	2	11	0	49	750
7:30 AM	0	0	0	0	0	1	0	2	0	0	16	3	0	5	19	0	46	752
7:35 AM	0	0	0	0	0	1	0	3	0	0	20	5	0	0	26	0	55	752
7:40 AM	0	0	0	0	0	4	0	3	0	0	30	11	0	9	14	0	71	741
7:45 AM	0	0	0	0	0	8	0	4	0	0	38	16	0	7	19	0	92	702
7:50 AM	0	0	0	0	0	4	0	4	0	0	46	23	0	11	24	0	112	657
7:55 AM	0	0	0	0	0	12	0	6	0	0	30	7	0	5	16	0	76	585
8:00 AM	0	0	0	0	0	4	0	4	1	0	24	4	0	4	16	0	57	551
8:05 AM	0	0	0	0	0	3	0	1	0	0	21	0	0	2	27	0	54	
8:10 AM	0	0	0	0	0	0	0	0	0	0	21	1	0	1	26	0	49	
8:15 AM	0	0	0	0	0	1	0	2	0	0	16	1	0	1	16	0	37	
8:20 AM	0	0	0	0	0	0	0	0	0	0	27	0	0	2	23	0	52	
8:25 AM	0	0	0	0	0	0	0	2	0	0	27	1	0	1	20	0	51	
8:30 AM	0	0	0	0	0	2	0	2	0	0	24	0	0	1	17	0	46	
8:35 AM	0	0	0	0	0	1	0	0	0	0	26	0	0	1	16	0	44	
8:40 AM	0	0	0	0	0	0	0	0	0	0	19	0	0	0	13	0	32	
8:45 AM	0	0	0	0	0	0	0	1	0	0	31	1	0	0	14	0	47	
8:50 AM	0	0	0	0	0	0	0	1	0	0	16	0	0	0	23	0	40	
8:55 AM	0	0	0	0	0	0	0	0	0	0	22	0	0	1	19	0	42	
Count Total	0	0	0	0	0	50	0	38	1	0	575	84	0	61	447	0	1,256	
Peak Hour	0	0	0	0	0	38	0	31	1	0	316	72	0	48	246	0	752	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	0	0	0	1	1	7:00 AM	0	0	0	0	0	7:00 AM	0	0	0	0	0
7:05 AM	0	0	0	1	1	7:05 AM	0	1	0	0	1	7:05 AM	0	0	0	0	0
7:10 AM	0	0	0	0	0	7:10 AM	0	0	0	0	0	7:10 AM	0	0	0	0	0
7:15 AM	0	1	0	1	2	7:15 AM	0	1	0	0	1	7:15 AM	0	0	0	0	0
7:20 AM	0	1	0	0	1	7:20 AM	0	0	0	0	0	7:20 AM	0	0	0	0	0
7:25 AM	0	0	0	0	0	7:25 AM	0	0	1	0	1	7:25 AM	0	1	1	0	2
7:30 AM	0	0	0	1	1	7:30 AM	0	0	0	0	0	7:30 AM	0	0	0	0	0
7:35 AM	0	0	0	0	0	7:35 AM	0	0	0	0	0	7:35 AM	0	0	0	0	0
7:40 AM	0	0	0	2	2	7:40 AM	0	0	0	0	0	7:40 AM	0	0	0	0	0
7:45 AM	0	2	0	1	3	7:45 AM	0	0	0	0	0	7:45 AM	0	0	0	0	0
7:50 AM	0	1	0	4	5	7:50 AM	0	0	0	0	0	7:50 AM	0	0	0	0	0
7:55 AM	0	1	0	0	1	7:55 AM	0	0	0	0	0	7:55 AM	0	0	0	0	0
8:00 AM	0	0	0	1	1	8:00 AM	0	0	0	0	0	8:00 AM	0	0	0	0	0
8:05 AM	0	1	0	3	4	8:05 AM	0	0	0	0	0	8:05 AM	0	0	0	0	0
8:10 AM	0	0	0	1	1	8:10 AM	0	0	0	0	0	8:10 AM	0	0	0	0	0
8:15 AM	0	1	0	1	2	8:15 AM	0	0	0	0	0	8:15 AM	0	0	0	0	0
8:20 AM	0	2	0	2	4	8:20 AM	0	0	0	0	0	8:20 AM	0	0	0	0	0
8:25 AM	0	1	0	1	2	8:25 AM	0	0	0	2	2	8:25 AM	0	0	0	0	0
8:30 AM	0	2	0	0	2	8:30 AM	0	0	0	0	0	8:30 AM	0	0	1	0	1
8:35 AM	0	1	0	1	2	8:35 AM	0	0	0	0	0	8:35 AM	0	0	0	0	0
8:40 AM	0	1	0	0	1	8:40 AM	0	1	0	0	1	8:40 AM	0	0	0	0	0
8:45 AM	0	1	0	1	2	8:45 AM	0	0	0	2	2	8:45 AM	0	0	0	0	0
8:50 AM	0	0	0	0	0	8:50 AM	0	0	0	0	0	8:50 AM	0	0	0	0	0
8:55 AM	0	1	0	2	3	8:55 AM	0	0	0	0	0	8:55 AM	0	0	0	0	0
Count Total	0	17	0	24	41	Count Total	0	3	1	4	8	Count Total	0	1	2	0	3
Peak Hour	0	9	0	17	26	Peak Hour	0	0	0	2	2	Peak Hour	0	0	0	0	0



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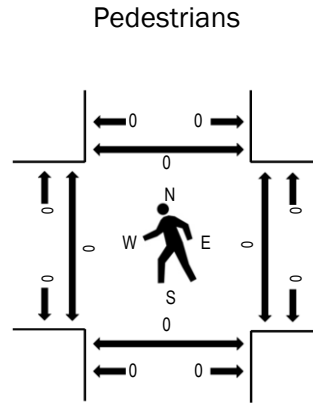
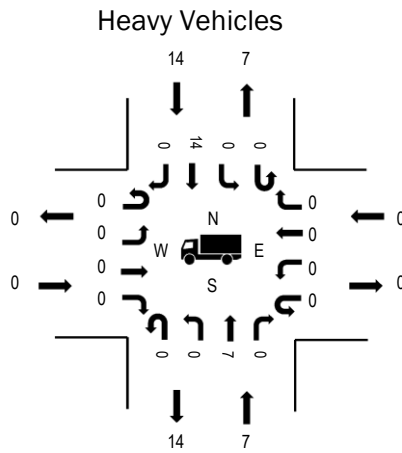
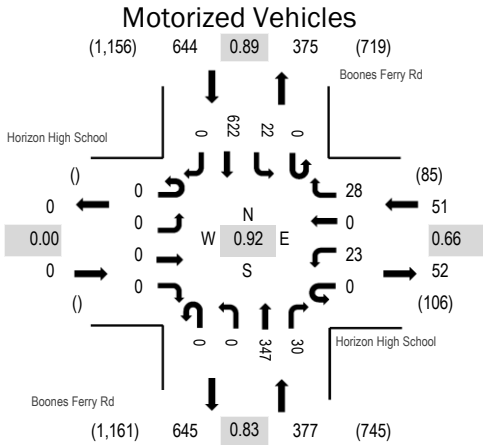
Location: 1 Boones Ferry Rd & Horizon High School PM

Date: Tuesday, September 14, 2021

Peak Hour: 04:20 PM - 05:20 PM

Peak 15-Minutes: 04:55 PM - 05:10 PM

Peak Hour



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	0.0%	0.00
WB	0.0%	0.66
NB	1.9%	0.83
SB	2.2%	0.89
All	2.0%	0.92

Traffic Counts - Motorized Vehicles

Interval Start Time	Horizon High School Eastbound				Horizon High School Westbound				Boones Ferry Rd Northbound				Boones Ferry Rd Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
4:00 PM	0	0	0	0	0	0	0	0	0	0	30	0	0	0	44	0	74	1,030
4:05 PM	0	0	0	0	0	0	0	1	0	0	18	0	0	2	60	0	81	1,043
4:10 PM	0	0	0	0	0	1	0	1	0	0	27	3	0	3	46	0	81	1,063
4:15 PM	0	0	0	0	0	4	0	0	0	0	19	1	0	1	47	0	72	1,067
4:20 PM	0	0	0	0	0	3	0	2	0	0	26	1	0	6	50	0	88	1,072
4:25 PM	0	0	0	0	0	0	0	3	0	0	33	0	0	1	48	0	85	1,064
4:30 PM	0	0	0	0	0	0	0	1	0	0	31	2	0	0	42	0	76	1,061
4:35 PM	0	0	0	0	0	3	0	3	0	0	24	0	0	1	58	0	89	1,050
4:40 PM	0	0	0	0	0	4	0	1	0	0	28	2	0	2	73	0	110	1,045
4:45 PM	0	0	0	0	0	0	0	2	0	0	25	3	0	0	47	0	77	1,008
4:50 PM	0	0	0	0	0	2	0	1	0	0	30	4	0	3	55	0	95	1,005
4:55 PM	0	0	0	0	0	3	0	1	0	0	40	7	0	2	49	0	102	987
5:00 PM	0	0	0	0	0	2	0	3	0	0	29	6	0	1	46	0	87	956
5:05 PM	0	0	0	0	0	4	0	7	0	0	35	2	0	3	50	0	101	
5:10 PM	0	0	0	0	0	2	0	1	0	0	30	0	0	2	50	0	85	
5:15 PM	0	0	0	0	0	0	0	3	0	0	16	3	0	1	54	0	77	
5:20 PM	0	0	0	0	0	0	0	3	0	0	28	3	0	2	44	0	80	
5:25 PM	0	0	0	0	0	1	0	1	0	0	31	3	0	1	45	0	82	
5:30 PM	0	0	0	0	0	4	0	2	0	0	26	2	0	0	31	0	65	
5:35 PM	0	0	0	0	0	3	0	1	0	0	25	3	0	1	51	0	84	
5:40 PM	0	0	0	0	0	0	0	1	0	0	29	6	0	2	35	0	73	
5:45 PM	0	0	0	0	0	3	0	2	0	0	30	3	0	1	35	0	74	
5:50 PM	0	0	0	0	0	1	0	3	0	0	33	6	0	0	34	0	77	
5:55 PM	0	0	0	0	0	1	0	1	0	0	32	10	0	1	26	0	71	
Count Total	0	0	0	0	0	41	0	44	0	0	675	70	0	36	1,120	0	1,986	
Peak Hour	0	0	0	0	0	23	0	28	0	0	347	30	0	22	622	0	1,072	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

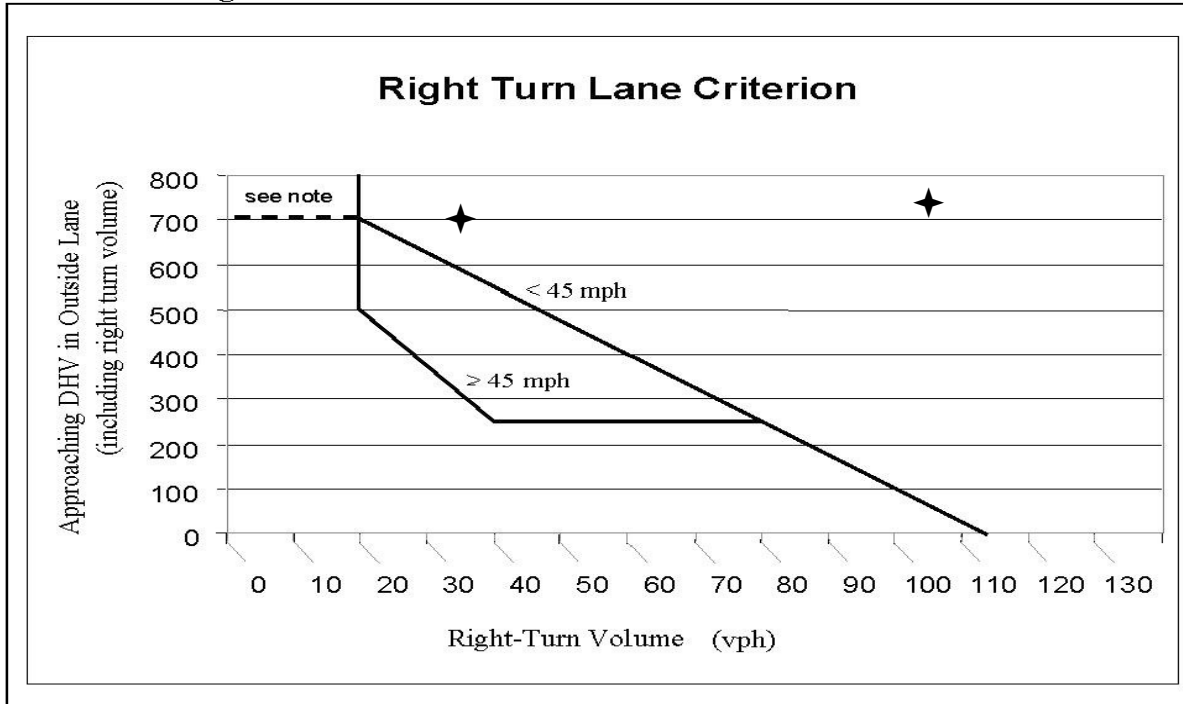
Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	2	2	4:00 PM	0	0	0	0	0
4:05 PM	0	1	0	1	2	4:05 PM	0	1	0	0	1	4:05 PM	0	0	0	0	0
4:10 PM	0	1	0	0	1	4:10 PM	0	0	0	0	0	4:10 PM	0	0	0	0	0
4:15 PM	0	0	0	2	2	4:15 PM	0	1	0	0	1	4:15 PM	0	0	0	0	0
4:20 PM	0	1	0	4	5	4:20 PM	0	1	0	0	1	4:20 PM	0	0	0	0	0
4:25 PM	0	1	0	1	2	4:25 PM	0	0	0	0	0	4:25 PM	0	0	0	0	0
4:30 PM	0	0	0	1	1	4:30 PM	0	0	0	0	0	4:30 PM	0	0	0	0	0
4:35 PM	0	0	0	0	0	4:35 PM	0	0	0	0	0	4:35 PM	0	0	0	0	0
4:40 PM	0	0	0	0	0	4:40 PM	0	0	0	1	1	4:40 PM	0	0	0	2	2
4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	0
4:50 PM	0	1	0	2	3	4:50 PM	0	1	0	0	1	4:50 PM	0	0	0	0	0
4:55 PM	0	1	0	1	2	4:55 PM	0	0	0	0	0	4:55 PM	0	0	0	0	0
5:00 PM	0	1	0	2	3	5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0
5:05 PM	0	2	0	1	3	5:05 PM	0	0	0	0	0	5:05 PM	0	0	0	0	0
5:10 PM	0	0	0	2	2	5:10 PM	0	0	0	0	0	5:10 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0	5:15 PM	0	1	0	0	1	5:15 PM	0	0	0	0	0
5:20 PM	0	0	0	2	2	5:20 PM	0	1	0	0	1	5:20 PM	0	0	0	0	0
5:25 PM	0	0	0	0	0	5:25 PM	0	0	0	0	0	5:25 PM	0	0	0	0	0
5:30 PM	0	0	0	1	1	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0
5:35 PM	0	0	0	1	1	5:35 PM	0	3	0	0	3	5:35 PM	0	0	0	0	0
5:40 PM	0	2	0	1	3	5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0
5:45 PM	0	1	0	2	3	5:45 PM	0	1	0	0	1	5:45 PM	0	0	2	0	2
5:50 PM	0	1	0	1	2	5:50 PM	0	1	0	1	2	5:50 PM	0	0	0	0	0
5:55 PM	0	2	0	0	2	5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0
Count Total	0	15	0	25	40	Count Total	0	11	0	4	15	Count Total	0	0	2	2	4
Peak Hour	0	7	0	14	21	Peak Hour	0	3	0	1	4	Peak Hour	0	0	0	2	2

Oregon Department of Transportation - Right Turn Lane Criteria

I. Criterion 1: Vehicular Volume

The vehicular volume criterion is intended for application where the volume of the intersection traffic is the principal reason for considering installation of a right turn lane. The vehicular volume criteria is determined using the curve in Exhibit 12-2.

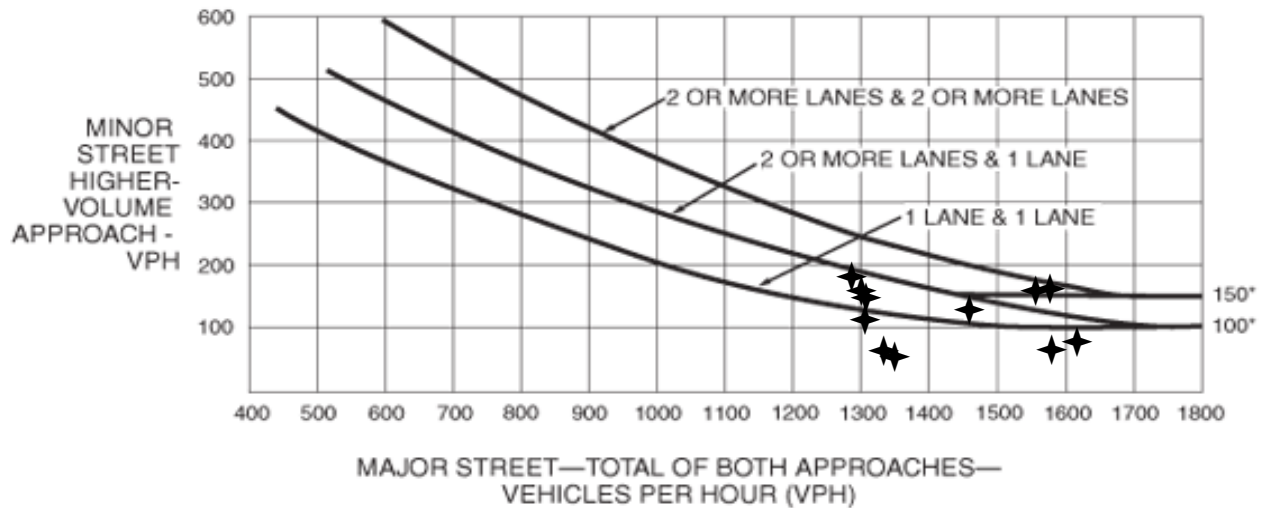
Exhibit 12-2 Right Turn Lane Criterion



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.

Intersection	Mov't	Analysis Period	Speed (mph)	Advancing Volume (vph)	Right Turns in Advancing Volume (vph)	Storage Req'd?
Street 'H' & Boones Fy Rd	NB RT	2026 Total Traffic, AM Peak	35	708	35	Yes
		2026 Total Traffic, PM Peak		739	115	Yes

Figure 4C-3. Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Table for Figure 4C-3

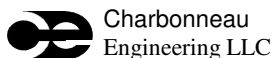
One lane and one lane		Two or more lanes and one lane		Two or more lanes and two or more lanes	
VPH on the major street (Total of both approaches)	VPH on the minor street (Higher volume approach)	VPH on the major street (Total of both approaches)	VPH on the minor street (Higher volume approach)	VPH on the major street (Total of both approaches)	VPH on the minor street (Higher volume approach)
1800	100	1800	100 or 150*	1800	150
1700	100	1700	100 or 150*	1700	150
1600	100	1600	120 or 150*	1600	170
1500	100	1500	145 or 150*	1500	180
1400	120	1400	155	1400	220
1300	130	1300	190	1300	250
1200	150	1200	220	1200	285
1100	175	1100	250	1100	340
1000	200	1000	285	1000	370
900	245	900	325	900	425
800	285	800	360	800	475
700	325	700	420	700	540
600	360	600	460	600	590
500	420	500	Not available	500	Not available

* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Peak hour volume warrant for signalization data.

Intersection	Analysis Period	Major Street Speed (mph)	Major Street		Minor Street High Volume Approach		Signal Warranted?
			Volume (vph)	Lanes (#)	Volume (vph)	Lanes (#)	
Iowa Drive & Boones Ferry Road	2026 Total Traffic - AM Peak	35	1,305	2	109	1	No
	2026 Total Traffic - PM Peak		1,622		76		No
Norwood Road & Boones Ferry Road	2026 Total Traffic - AM Peak	35	1,289	2	187	1	No
	2026 Total Traffic - PM Peak		1,581		159		Yes
	2026 Bkgd. Traffic - PM Peak		1,558		154		Yes
	Year 2021 Traffic - PM Peak		1,310		112		No
	Year 2021 + growth (5 yrs) + site		1,464		129		No
Horizon HS/Pvt Drwy & Boones Ferry Road	2026 Total Traffic - AM Peak	35	1,337	2	69	1	No
	2026 Total Traffic - PM Peak		1,354		51		No
Street 'H' & Boones Ferry Road	2026 Total Traffic - AM Peak	35	1,301	2	158	1	No
	2026 Total Traffic - PM Peak		1,582		73		No

Source: Manual on Uniform Traffic Control Devices (MUTCD), 2003 Edition.



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

CITY OF TUALATIN, WASHINGTON COUNTY

Intersectional Crashes SW Boones Ferry Rd & SW Iowa Dr
January 1, 2014 through December 31, 2018

Table with columns: SER#, INVEST, UNLOC?, E, L, M, H, R, D, C, J, L, K, DATE, FC, DISTNC, CITY STREET, RD CHAR, INT-TYP, INT-REL, OFF-RD, WTHR, CRASH TYP, SPCL, MOVE, PRTC, INJ, A, S, G, E, LICNS, PED, LOC, ERROR, ACTN, EVENT, CAUSE. Rows include crash details for various dates and locations like SW Boones Ferry Rd and SW Iowa Dr.

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

CITY OF TUALATIN, WASHINGTON COUNTY

Intersectional Crashes SW Boones Ferry Rd & SW Norwood Rd
January 1, 2014 through December 31, 2018

Table with columns: SER#, INVEST, UNLOC?, P, E, D, G, L, M, C, S, H, W, R, DATE, FC, CITY STREET, RD CHAR, INT-TYP, INT-REL, OFF-RD, WTHR, CRASH TYP, SPCL, MOVE, PRTC, INJ, A, S, G, E, X, LICNS, PED, LOC, ERROR, ACTN, EVENT, CAUSE. Rows include crash details for 08636, 03180, 00979, 05132, and 07146.

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

CITY OF TUALATIN, WASHINGTON COUNTY

Crashes on SW Boones Ferry Rd, within 1050 ft South of Intersection with SW Norwood Rd in Tualatin, OR.
 January 1, 2015 through December 31, 2019

SER#	INVEST	UNLOC?	E A / C O	DATE	FC	CITY STREET	RD CHAR	INT-TYP	INT-REL	OFF-RD	WTHR	CRASH TYP	SPCL	MOVE	A S	G E	LICNS	PED	ACTN	EVENT	CAUSE		
																						TRAF-LEGS	RDNDBT
D C J L K	D C J L K	D C J L K	D C J L K	D C J L K	D C J L K	D C J L K	D C J L K	D C J L K	D C J L K	D C J L K	D C J L K	D C J L K	D C J L K	D C J L K	D C J L K	D C J L K	D C J L K	D C J L K	D C J L K	D C J L K	D C J L K		
06351	N N N			10/11/2017	16	SW BOONES FERRY RD	STRGHT	N	N	RAIN	S-1STOP	01 NONE	0 STRGHT								29		
NONE			N	Wed 7A	100	SW NORWOOD RD	S	(NONE)	UNKNOWN	N WET	REAR	PRVTE	S N								000	00	
No	45 21 12.05	-122 46 29.05				1	08			N DAY	INJ	PSNGR CAR		01	DRVR	NONE	25 F	OR-Y		026	000	29	
								(02)															
												02 NONE	0 STOP										
												PRVTE	S N									011	00
												PSNGR CAR		01	DRVR	INJC	47 F	OR-Y			000	000	00
														02	PSNG	INJC	16 F	OR<25			000	000	00

OREGON DEPARTMENT OF TRANSPORTATION - POLICY, DATA AND ANALYSIS DIVISION
 TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
 CONTINUOUS SYSTEM CRASH LISTING

141 BEAVERTON-TUALATIN

Intersectional Crashes at SW Boones Ferry Rd & SW Day Rd
 January 1, 2014 through December 31, 2018

SER#	E A / C O DATE	COUNTY	RD# FC CONN #	INT-TYP	SPCL USE	ACTN EVENT	CAUSE
INVEST	E L M H R DAY/TIME	CITY	CMPT/MLG FIRST STREET	RD CHAR (MEDIAN)	TRLR QTY		
UNLOC?	D C J L K LAT/LONG	URBAN AREA	MILEPNT SECOND STREET	DIRECT LEGS TRAF-	OWNER FROM	PRTC INJ	G E LICNS PED
			LRS INTERSECTION SEQ#	LOCTN (#LANES) CNTL	VEH TYPE TO	SVRTY	E X RES LOC ERROR
06703	NNNNN 10/04/2016	WASHINGTON	1 16	INTER	0 STRGHT		26
COUNTY	N Tue 4P	WILSONVILLE	MN 0 SW BEAV-TUALATIN HY	S	PRVTE S N		00
		PORTLAND UA	12.47 SW DAY RD	06		01 DRVR INJC 55 M OR-Y	000
No	45 20 24.73 -122 46 24.67		014100100S00	1		OR<25	000
					02 PSNG INJC 54 F		000
					02 NONE 0 STRGHT		007
					PRVTE N S		00
					PSNGR CAR	01 DRVR NONE 45 M OR-Y	000
						OR<25	26

Lanes, Volumes, Timings
 1: SW Boones Ferry Road & SW Iowa Drive

Year 2021 Traffic, AM Peak Hour

09/21/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Volume (vph)	46	2	51	27	0	29	13	612	9	18	422	16
Future Volume (vph)	46	2	51	27	0	29	13	612	9	18	422	16
Confl. Peds. (#/hr)	13		5	1		9	5		1	9		13
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	7%	7%	7%	6%	6%	6%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary												
Control Type: Unsignalized												
Intersection Capacity Utilization 47.8%						ICU Level of Service A						
Analysis Period (min) 15												

Intersection												
Int Delay, s/veh	6.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	46	2	51	27	0	29	13	612	9	18	422	16
Future Vol, veh/h	46	2	51	27	0	29	13	612	9	18	422	16
Conflicting Peds, #/hr	13	0	5	1	0	9	5	0	1	9	0	13
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	95	-	-	105	-	-
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	7	7	7	6	6	6
Mvmt Flow	55	2	61	32	0	35	15	729	11	21	502	19

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	1362	1346	530	1364	1350	757	534	0	0	749	0	0
Stage 1	567	567	-	774	774	-	-	-	-	-	-	-
Stage 2	795	779	-	590	576	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.17	-	-	4.16	-	-
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	2.263	-	-	2.254	-	-
Pot Cap-1 Maneuver	126	153	553	126	152	411	1009	-	-	842	-	-
Stage 1	512	510	-	394	411	-	-	-	-	-	-	-
Stage 2	384	409	-	497	505	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	109	144	544	106	143	402	997	-	-	835	-	-
Mov Cap-2 Maneuver	109	144	-	106	143	-	-	-	-	-	-	-
Stage 1	498	491	-	385	401	-	-	-	-	-	-	-
Stage 2	341	399	-	426	486	-	-	-	-	-	-	-












Approach	EB		WB		NB		SB	
HCM Control Delay, s	52.3		38.9		0.2		0.4	
HCM LOS	F		E					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	997	-	-	187	171	835	-	-
HCM Lane V/C Ratio	0.016	-	-	0.63	0.39	0.026	-	-
HCM Control Delay (s)	8.7	-	-	52.3	38.9	9.4	-	-
HCM Lane LOS	A	-	-	F	E	A	-	-
HCM 95th %tile Q(veh)	0	-	-	3.6	1.7	0.1	-	-

Lanes, Volumes, Timings
 2: SW Boones Ferry Road & SW Norwood Road

Year 2021 Traffic, AM Peak Hour

09/21/2021

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	70	55	579	28	48	441
Future Volume (vph)	70	55	579	28	48	441
Confl. Peds. (#/hr)	4	4		4	4	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	2%	2%	6%	6%	5%	5%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free
Intersection Summary						
Control Type: Unsignalized						
Intersection Capacity Utilization 52.0%			ICU Level of Service A			
Analysis Period (min) 15						

Intersection						
Int Delay, s/veh	4.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘↗		↑	↗↘	↘↗	↑
Traffic Vol, veh/h	70	55	579	28	48	441
Future Vol, veh/h	70	55	579	28	48	441
Conflicting Peds, #/hr	4	4	0	4	4	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	65	290	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	2	2	6	6	5	5
Mvmt Flow	80	63	666	32	55	507

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1291	674	0	0	702
Stage 1	670	-	-	-	-
Stage 2	621	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.15
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.245
Pot Cap-1 Maneuver	180	455	-	-	882
Stage 1	509	-	-	-	-
Stage 2	536	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	167	452	-	-	879
Mov Cap-2 Maneuver	167	-	-	-	-
Stage 1	507	-	-	-	-
Stage 2	500	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	43.2	0	0.9
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	231	879
HCM Lane V/C Ratio	-	-	0.622	0.063
HCM Control Delay (s)	-	-	43.2	9.4
HCM Lane LOS	-	-	E	A
HCM 95th %tile Q(veh)	-	-	3.7	0.2

Lanes, Volumes, Timings
 3: SW Boones Ferry Road & Pvt Drwy/Horizon HS access

Year 2021 Traffic, AM Peak Hour

09/21/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↙	↘			↙	↘	↙	↘	
Traffic Volume (vph)	0	0	0	38	0	31	0	577	72	48	449	0
Future Volume (vph)	0	0	0	38	0	31	0	577	72	48	449	0
Peak Hour Factor	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	2%	6%	6%	6%
Shared Lane Traffic (%)												
Sign Control	Stop			Stop			Free			Free		

Intersection Summary

Control Type: Unsignalized

Intersection Capacity Utilization 49.9% ICU Level of Service A

Analysis Period (min) 15

Intersection												
Int Delay, s/veh	5.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕	↕	↕	↕	
Traffic Vol, veh/h	0	0	0	38	0	31	0	577	72	48	449	0
Future Vol, veh/h	0	0	0	38	0	31	0	577	72	48	449	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	-	-	-	25	-	-	-	-	70	250	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	67	67	67	67	67	67	67	67	67	67	67	67
Heavy Vehicles, %	0	0	0	0	0	0	2	2	2	6	6	6
Mvmt Flow	0	0	0	57	0	46	0	861	107	72	670	0

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1752	1782	670	1675	1675	861	670	0	0	968	0	0
Stage 1	814	814	-	861	861	-	-	-	-	-	-	-
Stage 2	938	968	-	814	814	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.12	-	-	4.16	-	-
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	2.218	-	-	2.254	-	-
Pot Cap-1 Maneuver	68	83	460	77	96	358	920	-	-	696	-	-
Stage 1	375	394	-	353	375	-	-	-	-	-	-	-
Stage 2	320	335	-	375	394	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	55	74	460	71	86	358	920	-	-	696	-	-
Mov Cap-2 Maneuver	55	74	-	71	86	-	-	-	-	-	-	-
Stage 1	375	353	-	353	375	-	-	-	-	-	-	-
Stage 2	279	335	-	336	353	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	91.6	0	1
HCM LOS	A	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	920	-	-	-	71	358	696	-	-
HCM Lane V/C Ratio	-	-	-	-	0.799	0.129	0.103	-	-
HCM Control Delay (s)	0	-	-	0	152.8	16.5	10.8	-	-
HCM Lane LOS	A	-	-	A	F	C	B	-	-
HCM 95th %tile Q(veh)	0	-	-	-	3.8	0.4	0.3	-	-

Lanes, Volumes, Timings
6: SW Boones Ferry Road & SW Day Road

Year 2021 Traffic, AM Peak Hour

09/21/2021

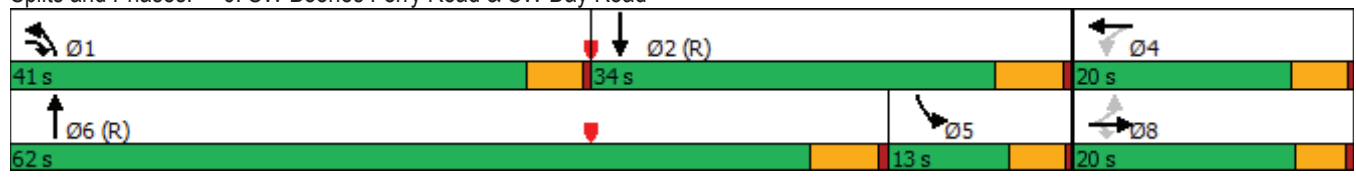


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔		↔		↔	↔		↔	↔	↔
Traffic Volume (vph)	162	0	528	0	0	0	584	447	0	0	465	47
Future Volume (vph)	162	0	528	0	0	0	584	447	0	0	465	47
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	14%	14%	14%	0%	0%	0%	14%	14%	14%	7%	7%	7%
Shared Lane Traffic (%)												
Turn Type	Perm	NA	pm+ov				Prot	NA		Prot	NA	
Protected Phases		8	1		4		1	6		5	2	
Permitted Phases	8		8	4								
Detector Phase	8	8	1	4	4		1	6		5	2	
Switch Phase												
Minimum Initial (s)	6.0	6.0	4.0	6.0	6.0		4.0	10.0		4.0	10.0	
Minimum Split (s)	32.2	32.2	8.5	37.5	37.5		8.5	22.4		9.2	38.4	
Total Split (s)	20.0	20.0	41.0	20.0	20.0		41.0	62.0		13.0	34.0	
Total Split (%)	21.1%	21.1%	43.2%	21.1%	21.1%		43.2%	65.3%		13.7%	35.8%	
Yellow Time (s)	3.5	3.5	4.0	4.0	4.0		4.0	4.7		4.0	4.7	
All-Red Time (s)	0.7	0.7	0.5	0.5	0.5		0.5	0.7		0.5	0.7	
Lost Time Adjust (s)		-0.2	-0.5		-0.5		-0.5	-1.4		-0.5	-1.4	
Total Lost Time (s)		4.0	4.0		4.0		4.0	4.0		4.0	4.0	
Lead/Lag			Lead				Lead	Lead		Lag	Lag	
Lead-Lag Optimize?			Yes				Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None	None		None	C-Min		None	C-Min	
Act Effct Green (s)		17.6	50.4				28.8	69.4			36.6	
Actuated g/C Ratio		0.19	0.53				0.30	0.73			0.39	
v/c Ratio		0.77	0.73				0.80	0.41			0.44	
Control Delay		59.9	18.0				37.8	6.3			24.1	
Queue Delay		0.0	0.0				0.0	0.0			0.0	
Total Delay		59.9	18.0				37.8	6.3			24.1	
LOS		E	B				D	A			C	
Approach Delay		27.8						24.1			24.1	
Approach LOS		C						C			C	

Intersection Summary

Cycle Length: 95
 Actuated Cycle Length: 95
 Offset: 3 (3%), Referenced to phase 2:SBT and 6:NBT, Start of Green
 Natural Cycle: 105
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.80
 Intersection Signal Delay: 25.2
 Intersection LOS: C
 Intersection Capacity Utilization 53.7%
 ICU Level of Service A
 Analysis Period (min) 15





















Splits and Phases: 6: SW Boones Ferry Road & SW Day Road



HCM 6th Signalized Intersection Summary
6: SW Boones Ferry Road & SW Day Road

Year 2021 Traffic, AM Peak Hour

09/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	162	0	528	0	0	0	584	447	0	0	465	47
Future Volume (veh/h)	162	0	528	0	0	0	584	447	0	0	465	47
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1693	1693	1693	1900	1900	1900	1693	1693	1693	1796	1796	1796
Adj Flow Rate, veh/h	180	0	404	0	0	0	649	497	0	0	517	50
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	14	14	14	0	0	0	14	14	14	7	7	7
Cap, veh/h	292	0	631	0	326	0	736	609	0	569	1364	132
Arrive On Green	0.17	0.00	0.17	0.00	0.00	0.00	0.27	0.36	0.00	0.00	0.43	0.42
Sat Flow, veh/h	1283	0	1434	0	1900	0	2740	1693	0	1711	3145	303
Grp Volume(v), veh/h	180	0	404	0	0	0	649	497	0	0	280	287
Grp Sat Flow(s),veh/h/ln	1283	0	1434	0	1900	0	1370	1693	0	1711	1706	1742
Q Serve(g_s), s	12.9	0.0	16.3	0.0	0.0	0.0	21.6	25.3	0.0	0.0	10.6	10.7
Cycle Q Clear(g_c), s	12.9	0.0	16.3	0.0	0.0	0.0	21.6	25.3	0.0	0.0	10.6	10.7
Prop In Lane	1.00		1.00	0.00		0.00	1.00		0.00	1.00		0.17
Lane Grp Cap(c), veh/h	289	0	631	0	326	0	736	609	0	569	740	755
V/C Ratio(X)	0.62	0.00	0.64	0.00	0.00	0.00	0.88	0.82	0.00	0.00	0.38	0.38
Avail Cap(c_a), veh/h	289	0	631	0	326	0	1067	1033	0	569	740	755
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	38.3	0.0	20.7	0.0	0.0	0.0	33.3	27.5	0.0	0.0	18.2	18.3
Incr Delay (d2), s/veh	3.7	0.0	2.0	0.0	0.0	0.0	5.3	11.5	0.0	0.0	1.5	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.2	0.0	6.8	0.0	0.0	0.0	7.4	11.6	0.0	0.0	4.1	4.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.0	0.0	22.7	0.0	0.0	0.0	38.6	39.0	0.0	0.0	19.7	19.8
LnGrp LOS	D	A	C	A	A	A	D	D	A	A	B	B
Approach Vol, veh/h		584			0			1146			567	
Approach Delay, s/veh		28.7			0.0			38.8			19.7	
Approach LOS		C						D			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	29.5	45.2		20.3	36.5	38.2		20.3				
Change Period (Y+Rc), s	4.5	* 5.4		4.5	* 5.4	* 5.4		* 4.5				
Max Green Setting (Gmax), s	36.5	* 29		15.5	* 8.5	* 57		* 16				
Max Q Clear Time (g_c+I1), s	23.6	12.7		0.0	0.0	27.3		18.3				
Green Ext Time (p_c), s	1.4	4.4		0.0	0.0	5.5		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			31.5									
HCM 6th LOS			C									
Notes												
User approved pedestrian interval to be less than phase max green.												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

Lanes, Volumes, Timings
 1: SW Boones Ferry Road & SW Iowa Drive

Year 2021 Traffic, PM Peak Hour

09/21/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Volume (vph)	36	0	33	12	1	37	32	465	28	34	740	48
Future Volume (vph)	36	0	33	12	1	37	32	465	28	34	740	48
Confl. Peds. (#/hr)			4	4			4		4			
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	5%	5%	5%	2%	2%	2%	3%	3%	3%	1%	1%	1%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary												
Control Type: Unsignalized												
Intersection Capacity Utilization 57.3%						ICU Level of Service B						
Analysis Period (min) 15												

Intersection												
Int Delay, s/veh	4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	36	0	33	12	1	37	32	465	28	34	740	48
Future Vol, veh/h	36	0	33	12	1	37	32	465	28	34	740	48
Conflicting Peds, #/hr	0	0	4	4	0	0	4	0	4	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	-	-	-	-	-	-	95	-	-	105	-	-
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, %	5	5	5	2	2	2	3	3	3	1	1	1
Mvmt Flow	38	0	35	13	1	39	34	495	30	36	787	51

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1487	1486	821	1488	1496	514	842	0	0	529	0	0
Stage 1	889	889	-	582	582	-	-	-	-	-	-	-
Stage 2	598	597	-	906	914	-	-	-	-	-	-	-
Critical Hdwy	7.15	6.55	6.25	7.12	6.52	6.22	4.13	-	-	4.11	-	-
Critical Hdwy Stg 1	6.15	5.55	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.15	5.55	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.545	4.045	3.345	3.518	4.018	3.318	2.227	-	-	2.209	-	-
Pot Cap-1 Maneuver	101	123	370	102	123	560	789	-	-	1043	-	-
Stage 1	334	357	-	499	499	-	-	-	-	-	-	-
Stage 2	484	487	-	331	352	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	87	113	367	86	113	558	786	-	-	1039	-	-
Mov Cap-2 Maneuver	87	113	-	86	113	-	-	-	-	-	-	-
Stage 1	318	343	-	476	476	-	-	-	-	-	-	-
Stage 2	429	464	-	288	338	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB			
HCM Control Delay, s	58.2		25		0.6		0.4			
HCM LOS	F		D							

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	786	-	-	137	233	1039	-	-
HCM Lane V/C Ratio	0.043	-	-	0.536	0.228	0.035	-	-
HCM Control Delay (s)	9.8	-	-	58.2	25	8.6	-	-
HCM Lane LOS	A	-	-	F	D	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	2.6	0.9	0.1	-	-

Lanes, Volumes, Timings
 2: SW Boones Ferry Road & SW Norwood Road

Year 2021 Traffic, PM Peak Hour

09/21/2021



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	37	75	461	90	88	671
Future Volume (vph)	37	75	461	90	88	671
Confl. Peds. (#/hr)	2	2		2	2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	2%	3%	3%	2%	2%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary

Control Type: Unsignalized	
Intersection Capacity Utilization 49.2%	ICU Level of Service A
Analysis Period (min) 15	

Intersection						
Int Delay, s/veh	2.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↑	↔	↔	↑
Traffic Vol, veh/h	37	75	461	90	88	671
Future Vol, veh/h	37	75	461	90	88	671
Conflicting Peds, #/hr	2	2	0	2	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	65	290	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	3	3	2	2
Mvmt Flow	39	79	485	95	93	706

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1381	489	0	0	582	0
Stage 1	487	-	-	-	-	-
Stage 2	894	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	159	579	-	-	992	-
Stage 1	618	-	-	-	-	-
Stage 2	399	-	-	-	-	-
Platoon blocked, %			-	-		
Mov Cap-1 Maneuver	143	577	-	-	990	-
Mov Cap-2 Maneuver	143	-	-	-	-	-
Stage 1	617	-	-	-	-	-
Stage 2	361	-	-	-	-	-





















Approach	WB	NB	SB
HCM Control Delay, s	25.9	0	1
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	288	990
HCM Lane V/C Ratio	-	-	0.409	0.094
HCM Control Delay (s)	-	-	25.9	9
HCM Lane LOS	-	-	D	A
HCM 95th %tile Q(veh)	-	-	1.9	0.3

Lanes, Volumes, Timings
 3: SW Boones Ferry Road & Pvt Drwy/Horizon HS access

Year 2021 Traffic, PM Peak Hour

09/21/2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	23	0	28	0	386	30	22	692	0
Future Volume (vph)	0	0	0	23	0	28	0	386	30	22	692	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Control Type: Unsignalized												
Intersection Capacity Utilization 46.4%						ICU Level of Service A						
Analysis Period (min) 15												

Intersection												
Int Delay, s/veh	1.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕	↕	↕	↕	
Traffic Vol, veh/h	0	0	0	23	0	28	0	386	30	22	692	0
Future Vol, veh/h	0	0	0	23	0	28	0	386	30	22	692	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	-	-	-	25	-	-	-	-	70	250	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	25	0	30	0	420	33	24	752	0

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1252	1253	752	1220	1220	420	752	0	0	453	0	0
Stage 1	800	800	-	420	420	-	-	-	-	-	-	-
Stage 2	452	453	-	800	800	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	149	172	410	157	180	633	858	-	-	1108	-	-
Stage 1	379	397	-	611	589	-	-	-	-	-	-	-
Stage 2	587	570	-	379	397	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	139	168	410	154	176	633	858	-	-	1108	-	-
Mov Cap-2 Maneuver	139	168	-	154	176	-	-	-	-	-	-	-
Stage 1	379	388	-	611	589	-	-	-	-	-	-	-
Stage 2	559	570	-	371	388	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	20.9	0	0.3
HCM LOS	A	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	858	-	-	-	154	633	1108	-	-
HCM Lane V/C Ratio	-	-	-	-	0.162	0.048	0.022	-	-
HCM Control Delay (s)	0	-	-	0	32.9	11	8.3	-	-
HCM Lane LOS	A	-	-	A	D	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	0.6	0.2	0.1	-	-

Lanes, Volumes, Timings
5: SW Boones Ferry Road & SW Day Road

Year 2021 Traffic, PM Peak Hour

09/21/2021

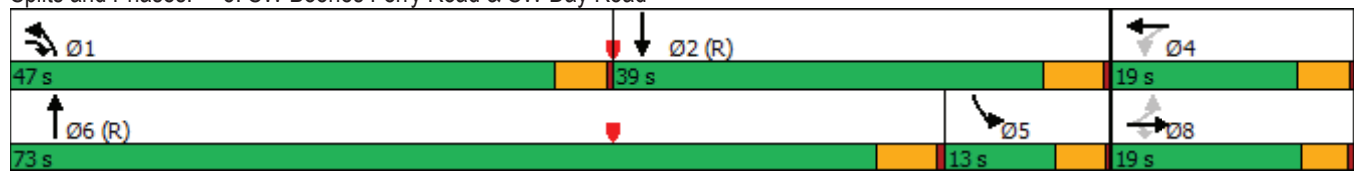


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔		↔		↔	↔		↔	↔	↔
Traffic Volume (vph)	3	0	704	0	0	0	577	549	0	0	664	64
Future Volume (vph)	3	0	704	0	0	0	577	549	0	0	664	64
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	3%	3%	3%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	Perm	NA	pm+ov				Prot	NA		Prot	NA	
Protected Phases		8	1		4		1	6		5	2	
Permitted Phases	8		8	4								
Detector Phase	8	8	1	4	4		1	6		5	2	
Switch Phase												
Minimum Initial (s)	6.0	6.0	4.0	6.0	6.0		4.0	10.0		4.0	10.0	
Minimum Split (s)	32.2	32.2	8.5	37.5	37.5		8.5	22.4		9.2	38.4	
Total Split (s)	19.0	19.0	47.0	19.0	19.0		47.0	73.0		13.0	39.0	
Total Split (%)	18.1%	18.1%	44.8%	18.1%	18.1%		44.8%	69.5%		12.4%	37.1%	
Yellow Time (s)	3.5	3.5	4.0	4.0	4.0		4.0	4.7		4.0	4.7	
All-Red Time (s)	0.7	0.7	0.5	0.5	0.5		0.5	0.7		0.5	0.7	
Lost Time Adjust (s)		-0.2	-0.5		-0.5		-0.5	-1.4		0.5	-1.4	
Total Lost Time (s)		4.0	4.0		4.0		4.0	4.0		5.0	4.0	
Lead/Lag			Lead				Lead	Lead		Lag	Lag	
Lead-Lag Optimize?			Yes				Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None	None		None	C-Min		None	C-Min	
Act Effct Green (s)		8.0	51.9				48.1	100.4			45.1	
Actuated g/C Ratio		0.08	0.49				0.46	0.96			0.43	
v/c Ratio		0.02	0.98				0.52	0.36			0.55	
Control Delay		42.3	50.7				22.0	1.7			25.6	
Queue Delay		0.0	0.0				0.0	0.0			0.0	
Total Delay		42.3	50.7				22.0	1.7			25.6	
LOS		D	D				C	A			C	
Approach Delay		50.7						12.1			25.6	
Approach LOS		D						B			C	

Intersection Summary

Cycle Length: 105
 Actuated Cycle Length: 105
 Offset: 3 (3%), Referenced to phase 2:SBT and 6:NBT, Start of Green
 Natural Cycle: 105
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.98
 Intersection Signal Delay: 26.6
 Intersection LOS: C
 Intersection Capacity Utilization 70.7%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 5: SW Boones Ferry Road & SW Day Road



HCM 6th Signalized Intersection Summary
5: SW Boones Ferry Road & SW Day Road

Year 2021 Traffic, PM Peak Hour
09/21/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔		↔		↔	↔		↔	↔	↔
Traffic Volume (veh/h)	3	0	704	0	0	0	577	549	0	0	664	64
Future Volume (veh/h)	3	0	704	0	0	0	577	549	0	0	664	64
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1900	1900	1900	1856	1856	1856	1885	1885	1885
Adj Flow Rate, veh/h	3	0	602	0	0	0	663	631	0	0	763	71
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	0	0	0	3	3	3	1	1	1
Cap, veh/h	271	0	649	0	277	0	746	762	0	559	1577	147
Arrive On Green	0.14	0.00	0.15	0.00	0.00	0.00	0.26	0.41	0.00	0.00	0.48	0.46
Sat Flow, veh/h	1417	0	1585	0	1900	0	2827	1856	0	1795	3312	308
Grp Volume(v), veh/h	3	0	602	0	0	0	663	631	0	0	412	422
Grp Sat Flow(s),veh/h/ln	1418	0	1585	0	1900	0	1414	1856	0	1795	1791	1830
Q Serve(g_s), s	0.2	0.0	15.3	0.0	0.0	0.0	23.7	31.9	0.0	0.0	16.5	16.5
Cycle Q Clear(g_c), s	0.2	0.0	15.3	0.0	0.0	0.0	23.7	31.9	0.0	0.0	16.5	16.5
Prop In Lane	1.00		1.00	0.00		0.00	1.00		0.00	1.00		0.17
Lane Grp Cap(c), veh/h	268	0	649	0	277	0	746	762	0	559	853	871
V/C Ratio(X)	0.01	0.00	0.93	0.00	0.00	0.00	0.89	0.83	0.00	0.00	0.48	0.48
Avail Cap(c_a), veh/h	268	0	649	0	277	0	1158	1219	0	559	853	871
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	38.7	0.0	29.5	0.0	0.0	0.0	37.2	27.6	0.0	0.0	18.7	18.8
Incr Delay (d2), s/veh	0.0	0.0	19.4	0.0	0.0	0.0	4.5	10.0	0.0	0.0	2.0	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	17.0	0.0	0.0	0.0	8.4	15.6	0.0	0.0	6.7	6.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.8	0.0	48.9	0.0	0.0	0.0	41.7	37.7	0.0	0.0	20.7	20.7
LnGrp LOS	D	A	D	A	A	A	D	D	A	A	C	C
Approach Vol, veh/h		605			0			1294			834	
Approach Delay, s/veh		48.9			0.0			39.7			20.7	
Approach LOS		D						D			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	31.7	54.0		19.3	38.6	47.1		19.3				
Change Period (Y+Rc), s	4.5	* 5.4		4.5	* 5.4	* 5.4		* 4.5				
Max Green Setting (Gmax), s	42.5	* 34		14.5	* 8.5	* 68		* 15				
Max Q Clear Time (g_c+I1), s	25.7	18.5		0.0	0.0	33.9		17.3				
Green Ext Time (p_c), s	1.5	6.4		0.0	0.0	7.9		0.0				

Intersection Summary

HCM 6th Ctrl Delay	36.0
HCM 6th LOS	D



















Notes

- User approved pedestrian interval to be less than phase max green.
- * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings
 1: SW Boones Ferry Road & SW Iowa Drive

2026 Background Traffic, AM Peak Hour

01/25/2022

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	51	2	56	30	0	32	14	741	10	20	486	18
Future Volume (vph)	51	2	56	30	0	32	14	741	10	20	486	18
Confl. Peds. (#/hr)	13		5	1		9	5		1	9		13
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	7%	7%	7%	6%	6%	6%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Control Type: Unsignalized												
Intersection Capacity Utilization 55.2%						ICU Level of Service B						
Analysis Period (min) 15												

Intersection												
Int Delay, s/veh	14.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	51	2	56	30	0	32	14	741	10	20	486	18
Future Vol, veh/h	51	2	56	30	0	32	14	741	10	20	486	18
Conflicting Peds, #/hr	13	0	5	1	0	9	5	0	1	9	0	13
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	95	-	-	105	-	-
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	7	7	7	6	6	6
Mvmt Flow	61	2	67	36	0	38	17	882	12	24	579	21

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	1605	1588	608	1608	1592	910	613	0	0	903	0	0
Stage 1	651	651	-	931	931	-	-	-	-	-	-	-
Stage 2	954	937	-	677	661	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.17	-	-	4.16	-	-
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	2.263	-	-	2.254	-	-
Pot Cap-1 Maneuver	86	109	499	85	108	336	942	-	-	737	-	-
Stage 1	461	468	-	323	348	-	-	-	-	-	-	-
Stage 2	313	346	-	446	463	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	71	101	490	68	100	329	930	-	-	731	-	-
Mov Cap-2 Maneuver	71	101	-	68	100	-	-	-	-	-	-	-
Stage 1	447	447	-	314	339	-	-	-	-	-	-	-
Stage 2	268	337	-	369	442	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	149.5		80.4		0.2		0.4	
HCM LOS	F		F					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	930	-	-	128	115	731	-	-
HCM Lane V/C Ratio	0.018	-	-	1.014	0.642	0.033	-	-
HCM Control Delay (s)	8.9	-	-	149.5	80.4	10.1	-	-
HCM Lane LOS	A	-	-	F	F	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	7.1	3.3	0.1	-	-

Lanes, Volumes, Timings
 2: SW Boones Ferry Road & SW Norwood Road

2026 Background Traffic, AM Peak Hour

01/25/2022



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	91	93	672	36	64	496
Future Volume (vph)	91	93	672	36	64	496
Confl. Peds. (#/hr)	4	4		4	4	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	2%	2%	6%	6%	5%	5%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary	
Control Type:	Unsignalized
Intersection Capacity Utilization	60.2% ICU Level of Service B
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	20.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘↗		↑	↗↘	↘↗	↑
Traffic Vol, veh/h	91	93	672	36	64	496
Future Vol, veh/h	91	93	672	36	64	496
Conflicting Peds, #/hr	4	4	0	4	4	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	65	290	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	2	2	6	6	5	5
Mvmt Flow	105	107	772	41	74	570

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1498	780	0	0	817
Stage 1	776	-	-	-	-
Stage 2	722	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.15
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.245
Pot Cap-1 Maneuver	135	395	-	-	798
Stage 1	454	-	-	-	-
Stage 2	481	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	122	392	-	-	795
Mov Cap-2 Maneuver	122	-	-	-	-
Stage 1	452	-	-	-	-
Stage 2	435	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	157	0	1.1
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	187	795
HCM Lane V/C Ratio	-	-	1.131	0.093
HCM Control Delay (s)	-	-	157	10
HCM Lane LOS	-	-	F	A
HCM 95th %tile Q(veh)	-	-	10.6	0.3



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↙	↘			↖	↗	↙	↘	↗
Traffic Volume (vph)	0	0	0	38	0	31	0	675	72	48	519	0
Future Volume (vph)	0	0	0	38	0	31	0	675	72	48	519	0
Peak Hour Factor	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	2%	6%	6%	6%
Shared Lane Traffic (%)												
Sign Control	Stop			Stop			Free			Free		

Intersection Summary

Control Type: Unsignalized

Intersection Capacity Utilization 49.9% ICU Level of Service A

Analysis Period (min) 15

Intersection												
Int Delay, s/veh	10.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕	↕	↕	↕	
Traffic Vol, veh/h	0	0	0	38	0	31	0	675	72	48	519	0
Future Vol, veh/h	0	0	0	38	0	31	0	675	72	48	519	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	-	-	-	25	-	-	-	-	70	250	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	67	67	67	67	67	67	67	67	67	67	67	67
Heavy Vehicles, %	0	0	0	0	0	0	2	2	2	6	6	6
Mvmt Flow	0	0	0	57	0	46	0	1007	107	72	775	0

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	2003	2033	775	1926	1926	1007	775	0	0	1114	0	0
Stage 1	919	919	-	1007	1007	-	-	-	-	-	-	-
Stage 2	1084	1114	-	919	919	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.12	-	-	4.16	-	-
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	2.218	-	-	2.254	-	-
Pot Cap-1 Maneuver	45	58	401	~ 51	67	295	841	-	-	612	-	-
Stage 1	328	353	-	293	321	-	-	-	-	-	-	-
Stage 2	265	286	-	328	353	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	35	51	401	~ 46	59	295	841	-	-	612	-	-
Mov Cap-2 Maneuver	35	51	-	~ 46	59	-	-	-	-	-	-	-
Stage 1	328	311	-	293	321	-	-	-	-	-	-	-
Stage 2	223	286	-	289	311	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	201.8	0	1
HCM LOS	A	F		











Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	841	-	-	-	46	295	612	-	-
HCM Lane V/C Ratio	-	-	-	-	1.233	0.157	0.117	-	-
HCM Control Delay (s)	0	-	-	0	350.5	19.5	11.7	-	-
HCM Lane LOS	A	-	-	A	F	C	B	-	-
HCM 95th %tile Q(veh)	0	-	-	-	5.3	0.5	0.4	-	-

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lanes, Volumes, Timings
 4: SW Boones Ferry Road & Street 'H'

2026 Background Traffic, AM Peak Hour

01/25/2022

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	92	35	673	30	11	576
Future Volume (vph)	92	35	673	30	11	576
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	0%	6%	6%	5%	5%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free
Intersection Summary						
Control Type: Unsignalized						
Intersection Capacity Utilization 51.1%			ICU Level of Service A			
Analysis Period (min) 15						

Intersection						
Int Delay, s/veh	2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↔		↔	↔
Traffic Vol, veh/h	92	35	673	30	11	576
Future Vol, veh/h	92	35	673	30	11	576
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	150	-
Veh in Median Storage, #	2	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	6	6	5	5
Mvmt Flow	102	39	748	33	12	640

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1429	765	0	0	781
Stage 1	765	-	-	-	-
Stage 2	664	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.15
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.245
Pot Cap-1 Maneuver	150	406	-	-	823
Stage 1	463	-	-	-	-
Stage 2	516	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	148	406	-	-	823
Mov Cap-2 Maneuver	353	-	-	-	-
Stage 1	463	-	-	-	-
Stage 2	508	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	20.9	0	0.2
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	366	823
HCM Lane V/C Ratio	-	-	0.386	0.015
HCM Control Delay (s)	-	-	20.9	9.4
HCM Lane LOS	-	-	C	A
HCM 95th %tile Q(veh)	-	-	1.8	0

Lanes, Volumes, Timings
6: SW Boones Ferry Road & SW Day Road

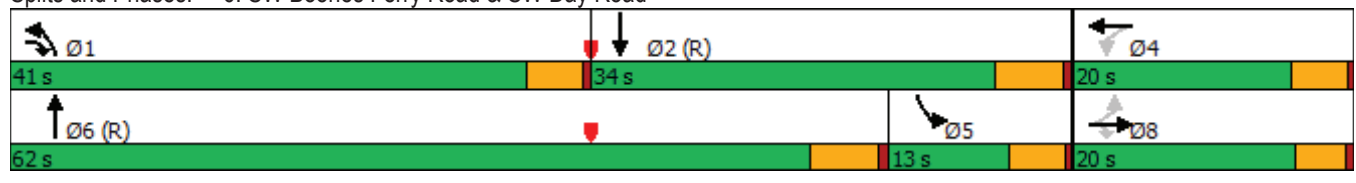
2026 Background Traffic, AM Peak Hour
01/25/2022

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	179	0	581	0	0	0	642	516	0	0	583	56
Future Volume (vph)	179	0	581	0	0	0	642	516	0	0	583	56
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	14%	14%	14%	0%	0%	0%	14%	14%	14%	7%	7%	7%
Shared Lane Traffic (%)												
Turn Type	Perm	NA	pm+ov				Prot	NA		Prot	NA	
Protected Phases		8	1		4		1	6		5	2	
Permitted Phases	8		8	4								
Detector Phase	8	8	1	4	4		1	6		5	2	
Switch Phase												
Minimum Initial (s)	6.0	6.0	4.0	6.0	6.0		4.0	10.0		4.0	10.0	
Minimum Split (s)	32.2	32.2	8.5	37.5	37.5		8.5	22.4		9.2	38.4	
Total Split (s)	20.0	20.0	41.0	20.0	20.0		41.0	62.0		13.0	34.0	
Total Split (%)	21.1%	21.1%	43.2%	21.1%	21.1%		43.2%	65.3%		13.7%	35.8%	
Yellow Time (s)	3.5	3.5	4.0	4.0	4.0		4.0	4.7		4.0	4.7	
All-Red Time (s)	0.7	0.7	0.5	0.5	0.5		0.5	0.7		0.5	0.7	
Lost Time Adjust (s)		-0.2	-0.5		-0.5		-0.5	-1.4		-0.5	-1.4	
Total Lost Time (s)		4.0	4.0		4.0		4.0	4.0		4.0	4.0	
Lead/Lag			Lead				Lead	Lead		Lag	Lag	
Lead-Lag Optimize?			Yes				Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None	None		None	C-Min		None	C-Min	
Act Effct Green (s)		18.1	52.6				30.6	68.9			34.4	
Actuated g/C Ratio		0.19	0.55				0.32	0.73			0.36	
v/c Ratio		0.83	0.78				0.82	0.47			0.59	
Control Delay		66.7	21.4				38.0	6.9			27.6	
Queue Delay		0.0	0.0				0.0	0.0			0.0	
Total Delay		66.7	21.4				38.0	6.9			27.6	
LOS		E	C				D	A			C	
Approach Delay		32.1						24.2			27.6	
Approach LOS		C						C			C	

Intersection Summary

Cycle Length: 95
 Actuated Cycle Length: 95
 Offset: 3 (3%), Referenced to phase 2:SBT and 6:NBT, Start of Green
 Natural Cycle: 105
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.83
 Intersection Signal Delay: 27.4
 Intersection LOS: C
 Intersection Capacity Utilization 60.5%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 6: SW Boones Ferry Road & SW Day Road



HCM 6th Signalized Intersection Summary
6: SW Boones Ferry Road & SW Day Road

2026 Background Traffic, AM Peak Hour

01/25/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔		↔		↔	↔		↔	↔	↔
Traffic Volume (veh/h)	179	0	581	0	0	0	642	516	0	0	583	56
Future Volume (veh/h)	179	0	581	0	0	0	642	516	0	0	583	56
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1693	1693	1693	1900	1900	1900	1693	1693	1693	1796	1796	1796
Adj Flow Rate, veh/h	199	0	463	0	0	0	713	573	0	0	648	60
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	14	14	14	0	0	0	14	14	14	7	7	7
Cap, veh/h	292	0	664	0	326	0	799	688	0	489	1297	120
Arrive On Green	0.17	0.00	0.17	0.00	0.00	0.00	0.29	0.41	0.00	0.00	0.41	0.40
Sat Flow, veh/h	1283	0	1434	0	1900	0	2740	1693	0	1711	3158	292
Grp Volume(v), veh/h	199	0	463	0	0	0	713	573	0	0	350	358
Grp Sat Flow(s),veh/h/ln	1283	0	1434	0	1900	0	1370	1693	0	1711	1706	1744
Q Serve(g_s), s	14.5	0.0	16.3	0.0	0.0	0.0	23.7	28.8	0.0	0.0	14.4	14.5
Cycle Q Clear(g_c), s	14.5	0.0	16.3	0.0	0.0	0.0	23.7	28.8	0.0	0.0	14.4	14.5
Prop In Lane	1.00		1.00	0.00		0.00	1.00		0.00	1.00		0.17
Lane Grp Cap(c), veh/h	289	0	664	0	326	0	799	688	0	489	701	716
V/C Ratio(X)	0.69	0.00	0.70	0.00	0.00	0.00	0.89	0.83	0.00	0.00	0.50	0.50
Avail Cap(c_a), veh/h	289	0	664	0	326	0	1067	1033	0	489	701	716
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	39.0	0.0	20.2	0.0	0.0	0.0	32.2	25.3	0.0	0.0	20.8	20.9
Incr Delay (d2), s/veh	6.3	0.0	3.0	0.0	0.0	0.0	6.9	11.3	0.0	0.0	2.5	2.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.9	0.0	7.9	0.0	0.0	0.0	8.3	13.0	0.0	0.0	5.8	5.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.3	0.0	23.2	0.0	0.0	0.0	39.2	36.6	0.0	0.0	23.3	23.4
LnGrp LOS	D	A	C	A	A	A	D	D	A	A	C	C
Approach Vol, veh/h		662			0			1286			708	
Approach Delay, s/veh		29.8			0.0			38.0			23.3	
Approach LOS		C						D			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	31.7	43.0		20.3	32.1	42.6		20.3				
Change Period (Y+Rc), s	4.5	* 5.4		4.5	* 5.4	* 5.4		* 4.5				
Max Green Setting (Gmax), s	36.5	* 29		15.5	* 8.5	* 57		* 16				
Max Q Clear Time (g_c+I1), s	25.7	16.5		0.0	0.0	30.8		18.3				
Green Ext Time (p_c), s	1.5	4.7		0.0	0.0	6.4		0.0				

Intersection Summary

HCM 6th Ctrl Delay	32.1
HCM 6th LOS	C

Notes

- User approved pedestrian interval to be less than phase max green.
- * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings
 1: SW Boones Ferry Road & SW Iowa Drive

2026 Background Traffic, PM Peak Hour

01/25/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Volume (vph)	40	0	36	13	1	41	35	556	31	37	890	53
Future Volume (vph)	40	0	36	13	1	41	35	556	31	37	890	53
Confl. Peds. (#/hr)			4	4			4		4			
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	5%	5%	5%	2%	2%	2%	3%	3%	3%	1%	1%	1%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary												
Control Type: Unsignalized												
Intersection Capacity Utilization 66.3%						ICU Level of Service C						
Analysis Period (min) 15												

Intersection												
Int Delay, s/veh	8.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Vol, veh/h	40	0	36	13	1	41	35	556	31	37	890	53
Future Vol, veh/h	40	0	36	13	1	41	35	556	31	37	890	53
Conflicting Peds, #/hr	0	0	4	4	0	0	4	0	4	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	-	-	-	-	-	-	95	-	-	105	-	-
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, %	5	5	5	2	2	2	3	3	3	1	1	1
Mvmt Flow	43	0	38	14	1	44	37	591	33	39	947	56

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	1761	1759	983	1762	1771	612	1007	0	0	628	0	0
Stage 1	1057	1057	-	686	686	-	-	-	-	-	-	-
Stage 2	704	702	-	1076	1085	-	-	-	-	-	-	-
Critical Hdwy	7.15	6.55	6.25	7.12	6.52	6.22	4.13	-	-	4.11	-	-
Critical Hdwy Stg 1	6.15	5.55	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.15	5.55	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.545	4.045	3.345	3.518	4.018	3.318	2.227	-	-	2.209	-	-
Pot Cap-1 Maneuver	65	83	298	66	83	493	684	-	-	959	-	-
Stage 1	269	298	-	438	448	-	-	-	-	-	-	-
Stage 2	423	436	-	266	293	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	54	75	296	53	75	491	681	-	-	955	-	-
Mov Cap-2 Maneuver	54	75	-	53	75	-	-	-	-	-	-	-
Stage 1	253	285	-	413	422	-	-	-	-	-	-	-
Stage 2	364	411	-	221	280	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	159	39.6	0.6	0.3
HCM LOS	F	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	681	-	-	88	161	955	-	-
HCM Lane V/C Ratio	0.055	-	-	0.919	0.363	0.041	-	-
HCM Control Delay (s)	10.6	-	-	159	39.6	8.9	-	-
HCM Lane LOS	B	-	-	F	E	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	5.1	1.5	0.1	-	-

Lanes, Volumes, Timings
 2: SW Boones Ferry Road & SW Norwood Road

2026 Background Traffic, PM Peak Hour

01/25/2022



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	50	104	530	117	135	776
Future Volume (vph)	50	104	530	117	135	776
Confl. Peds. (#/hr)	2	2		2	2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	2%	3%	3%	2%	2%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary	
Control Type:	Unsignalized
Intersection Capacity Utilization	57.1% ICU Level of Service B
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	6.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↑	↔	↔	↑
Traffic Vol, veh/h	50	104	530	117	135	776
Future Vol, veh/h	50	104	530	117	135	776
Conflicting Peds, #/hr	2	2	0	2	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	65	290	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	3	3	2	2
Mvmt Flow	53	109	558	123	142	817

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1663	562	0	0	683
Stage 1	560	-	-	-	-
Stage 2	1103	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	107	526	-	-	910
Stage 1	572	-	-	-	-
Stage 2	318	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	90	524	-	-	908
Mov Cap-2 Maneuver	90	-	-	-	-
Stage 1	571	-	-	-	-
Stage 2	268	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	68.3	0	1.4
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	204	908
HCM Lane V/C Ratio	-	-	0.795	0.157
HCM Control Delay (s)	-	-	68.3	9.7
HCM Lane LOS	-	-	F	A
HCM 95th %tile Q(veh)	-	-	5.6	0.6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↖	↗			↖	↗	↖	↗	
Traffic Volume (vph)	0	0	0	23	0	28	0	466	30	22	808	0
Future Volume (vph)	0	0	0	23	0	28	0	466	30	22	808	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Control Type: Unsignalized	
Intersection Capacity Utilization 52.5%	ICU Level of Service A
Analysis Period (min) 15	

Intersection												
Int Delay, s/veh	1.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕	↕	↕	↕	
Traffic Vol, veh/h	0	0	0	23	0	28	0	466	30	22	808	0
Future Vol, veh/h	0	0	0	23	0	28	0	466	30	22	808	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	-	-	-	25	-	-	-	-	70	250	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	25	0	30	0	507	33	24	878	0

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1465	1466	878	1433	1433	507	878	0	0	540	0	0
Stage 1	926	926	-	507	507	-	-	-	-	-	-	-
Stage 2	539	540	-	926	926	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	106	128	347	112	134	566	769	-	-	1028	-	-
Stage 1	322	347	-	548	539	-	-	-	-	-	-	-
Stage 2	527	521	-	322	347	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	98	125	347	110	131	566	769	-	-	1028	-	-
Mov Cap-2 Maneuver	98	125	-	110	131	-	-	-	-	-	-	-
Stage 1	322	339	-	548	539	-	-	-	-	-	-	-
Stage 2	499	521	-	314	339	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	27.7	0	0.2
HCM LOS	A	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	769	-	-	-	110	566	1028	-	-
HCM Lane V/C Ratio	-	-	-	-	0.227	0.054	0.023	-	-
HCM Control Delay (s)	0	-	-	0	47.1	11.7	8.6	-	-
HCM Lane LOS	A	-	-	A	E	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	0.8	0.2	0.1	-	-

Lanes, Volumes, Timings
 4: SW Boones Ferry Road & Street 'H'

2026 Background Traffic, PM Peak Hour

01/25/2022



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	60	23	624	101	38	788
Future Volume (vph)	60	23	624	101	38	788
Confl. Peds. (#/hr)	2	2		2	2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	0%	3%	3%	2%	2%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary	
Control Type:	Unsignalized
Intersection Capacity Utilization	53.5%
Analysis Period (min)	15
	ICU Level of Service A

Intersection						
Int Delay, s/veh	1.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	60	23	624	101	38	788
Future Vol, veh/h	60	23	624	101	38	788
Conflicting Peds, #/hr	2	2	0	2	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	150	-
Veh in Median Storage, #	2	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	3	3	2	2
Mvmt Flow	67	26	693	112	42	876

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1713	753	0	0	807
Stage 1	751	-	-	-	-
Stage 2	962	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.12
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.218
Pot Cap-1 Maneuver	101	413	-	-	818
Stage 1	470	-	-	-	-
Stage 2	374	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	95	411	-	-	816
Mov Cap-2 Maneuver	282	-	-	-	-
Stage 1	469	-	-	-	-
Stage 2	354	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	21.5	0	0.4
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	309	816
HCM Lane V/C Ratio	-	-	0.298	0.052
HCM Control Delay (s)	-	-	21.5	9.7
HCM Lane LOS	-	-	C	A
HCM 95th %tile Q(veh)	-	-	1.2	0.2

Lanes, Volumes, Timings
5: SW Boones Ferry Road & SW Day Road

2026 Background Traffic, PM Peak Hour

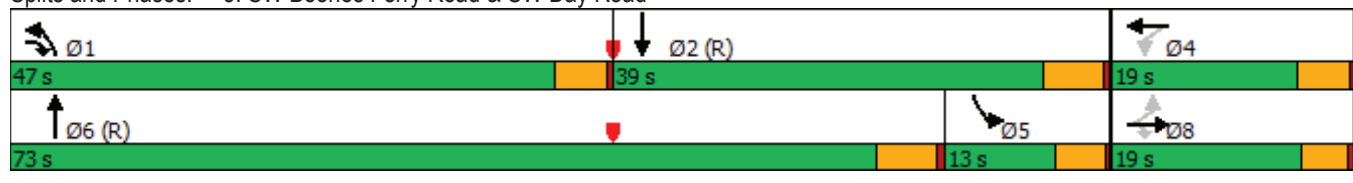
01/25/2022

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	0	774	0	0	0	635	684	0	0	776	73
Future Volume (vph)	8	0	774	0	0	0	635	684	0	0	776	73
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	3%	3%	3%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	Perm	NA	pm+ov				Prot	NA		Prot	NA	
Protected Phases		8	1		4		1	6		5	2	
Permitted Phases	8		8	4								
Detector Phase	8	8	1	4	4		1	6		5	2	
Switch Phase												
Minimum Initial (s)	6.0	6.0	4.0	6.0	6.0		4.0	10.0		4.0	10.0	
Minimum Split (s)	32.2	32.2	8.5	37.5	37.5		8.5	22.4		9.2	38.4	
Total Split (s)	19.0	19.0	47.0	19.0	19.0		47.0	73.0		13.0	39.0	
Total Split (%)	18.1%	18.1%	44.8%	18.1%	18.1%		44.8%	69.5%		12.4%	37.1%	
Yellow Time (s)	3.5	3.5	4.0	4.0	4.0		4.0	4.7		4.0	4.7	
All-Red Time (s)	0.7	0.7	0.5	0.5	0.5		0.5	0.7		0.5	0.7	
Lost Time Adjust (s)		-0.2	-0.5		-0.5		-0.5	-1.4		0.5	-1.4	
Total Lost Time (s)		4.0	4.0		4.0		4.0	4.0		5.0	4.0	
Lead/Lag			Lead				Lead	Lead		Lag	Lag	
Lead-Lag Optimize?			Yes				Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None	None		None	C-Min		None	C-Min	
Act Effct Green (s)		8.0	57.4				51.5	97.5			39.6	
Actuated g/C Ratio		0.08	0.55				0.49	0.93			0.38	
v/c Ratio		0.07	0.99				0.53	0.46			0.73	
Control Delay		43.9	48.6				20.8	2.7			33.0	
Queue Delay		0.0	0.0				0.0	0.0			0.0	
Total Delay		43.9	48.6				20.8	2.7			33.0	
LOS		D	D				C	A			C	
Approach Delay		48.6						11.4			33.0	
Approach LOS		D						B			C	

Intersection Summary

Cycle Length: 105
 Actuated Cycle Length: 105
 Offset: 3 (3%), Referenced to phase 2:SBT and 6:NBT, Start of Green
 Natural Cycle: 105
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.99
 Intersection Signal Delay: 27.5
 Intersection LOS: C
 Intersection Capacity Utilization 78.4%
 ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 5: SW Boones Ferry Road & SW Day Road



HCM 6th Signalized Intersection Summary
5: SW Boones Ferry Road & SW Day Road

2026 Background Traffic, PM Peak Hour

01/25/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔		↔		↔	↔		↔	↔	↔
Traffic Volume (veh/h)	8	0	774	0	0	0	635	684	0	0	776	73
Future Volume (veh/h)	8	0	774	0	0	0	635	684	0	0	776	73
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1900	1900	1900	1856	1856	1856	1885	1885	1885
Adj Flow Rate, veh/h	9	0	683	0	0	0	730	786	0	0	892	81
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	0	0	0	3	3	3	1	1	1
Cap, veh/h	271	0	687	0	277	0	813	922	0	404	1502	136
Arrive On Green	0.14	0.00	0.15	0.00	0.00	0.00	0.29	0.50	0.00	0.00	0.45	0.44
Sat Flow, veh/h	1418	0	1585	0	1900	0	2827	1856	0	1795	3320	302
Grp Volume(v), veh/h	9	0	683	0	0	0	730	786	0	0	481	492
Grp Sat Flow(s),veh/h/ln	1418	0	1585	0	1900	0	1414	1856	0	1795	1791	1831
Q Serve(g_s), s	0.6	0.0	15.3	0.0	0.0	0.0	26.0	38.8	0.0	0.0	21.1	21.2
Cycle Q Clear(g_c), s	0.6	0.0	15.3	0.0	0.0	0.0	26.0	38.8	0.0	0.0	21.1	21.2
Prop In Lane	1.00		1.00	0.00		0.00	1.00		0.00	1.00		0.16
Lane Grp Cap(c), veh/h	268	0	687	0	277	0	813	922	0	404	810	828
V/C Ratio(X)	0.03	0.00	0.99	0.00	0.00	0.00	0.90	0.85	0.00	0.00	0.59	0.59
Avail Cap(c_a), veh/h	268	0	687	0	277	0	1158	1219	0	404	810	828
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	38.9	0.0	29.6	0.0	0.0	0.0	35.9	23.1	0.0	0.0	21.5	21.6
Incr Delay (d2), s/veh	0.0	0.0	32.9	0.0	0.0	0.0	6.1	9.9	0.0	0.0	3.2	3.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	22.1	0.0	0.0	0.0	9.4	18.3	0.0	0.0	8.9	9.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.9	0.0	62.5	0.0	0.0	0.0	42.1	32.9	0.0	0.0	24.7	24.7
LnGrp LOS	D	A	E	A	A	A	D	C	A	A	C	C
Approach Vol, veh/h		692			0			1516			973	
Approach Delay, s/veh		62.2			0.0			37.3			24.7	
Approach LOS		E						D			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	34.2	51.5		19.3	29.5	56.2		19.3				
Change Period (Y+Rc), s	4.5	* 5.4		4.5	* 5.4	* 5.4		* 4.5				
Max Green Setting (Gmax), s	42.5	* 34		14.5	* 8.5	* 68		* 15				
Max Q Clear Time (g_c+I1), s	28.0	23.2		0.0	0.0	40.8		17.3				
Green Ext Time (p_c), s	1.7	5.8		0.0	0.0	9.9		0.0				

Intersection Summary

HCM 6th Ctrl Delay	38.9
HCM 6th LOS	D

Notes

- User approved pedestrian interval to be less than phase max green.
- * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings
 1: SW Boones Ferry Road & SW Iowa Drive

2026 Total Traffic, AM Peak Hour
 01/25/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Volume (vph)	51	2	56	30	0	32	14	753	10	20	490	18
Future Volume (vph)	51	2	56	30	0	32	14	753	10	20	490	18
Confl. Peds. (#/hr)	13		5	1		9	5		1	9		13
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	7%	7%	7%	6%	6%	6%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary												
Control Type: Unsignalized												
Intersection Capacity Utilization 55.9%						ICU Level of Service B						
Analysis Period (min) 15												

Intersection												
Int Delay, s/veh	15.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	51	2	56	30	0	32	14	753	10	20	490	18
Future Vol, veh/h	51	2	56	30	0	32	14	753	10	20	490	18
Conflicting Peds, #/hr	13	0	5	1	0	9	5	0	1	9	0	13
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	95	-	-	105	-	-
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	7	7	7	6	6	6
Mvmt Flow	61	2	67	36	0	38	17	896	12	24	583	21

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	1623	1606	612	1626	1610	924	617	0	0	917	0	0
Stage 1	655	655	-	945	945	-	-	-	-	-	-	-
Stage 2	968	951	-	681	665	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.17	-	-	4.16	-	-
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	2.263	-	-	2.254	-	-
Pot Cap-1 Maneuver	83	106	497	83	106	329	939	-	-	728	-	-
Stage 1	458	466	-	317	343	-	-	-	-	-	-	-
Stage 2	308	341	-	444	461	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	69	99	489	67	99	322	927	-	-	722	-	-
Mov Cap-2 Maneuver	69	99	-	67	99	-	-	-	-	-	-	-
Stage 1	444	445	-	308	334	-	-	-	-	-	-	-
Stage 2	263	332	-	367	440	-	-	-	-	-	-	-












Approach	EB		WB		NB		SB	
HCM Control Delay, s	158.7		83.1		0.2		0.4	
HCM LOS	F		F					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	927	-	-	125	113	722	-	-
HCM Lane V/C Ratio	0.018	-	-	1.038	0.653	0.033	-	-
HCM Control Delay (s)	9	-	-	158.7	83.1	10.2	-	-
HCM Lane LOS	A	-	-	F	F	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	7.3	3.4	0.1	-	-

Lanes, Volumes, Timings
 2: SW Boones Ferry Road & SW Norwood Road

2026 Total Traffic, AM Peak Hour

01/25/2022

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	93	93	684	41	64	500
Future Volume (vph)	93	93	684	41	64	500
Confl. Peds. (#/hr)	4	4		4	4	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	2%	2%	6%	6%	5%	5%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free
Intersection Summary						
Control Type: Unsignalized						
Intersection Capacity Utilization 60.9%			ICU Level of Service B			
Analysis Period (min) 15						

Intersection						
Int Delay, s/veh	22.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↑	↔	↔	↑
Traffic Vol, veh/h	93	93	684	41	64	500
Future Vol, veh/h	93	93	684	41	64	500
Conflicting Peds, #/hr	4	4	0	4	4	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	65	290	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	2	2	6	6	5	5
Mvmt Flow	107	107	786	47	74	575

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1517	794	0	0	837	0
Stage 1	790	-	-	-	-	-
Stage 2	727	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.15	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.245	-
Pot Cap-1 Maneuver	131	388	-	-	784	-
Stage 1	447	-	-	-	-	-
Stage 2	478	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	118	385	-	-	781	-
Mov Cap-2 Maneuver	118	-	-	-	-	-
Stage 1	445	-	-	-	-	-
Stage 2	431	-	-	-	-	-




















Approach	WB	NB	SB
HCM Control Delay, s	176.3	0	1.1
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	181	781
HCM Lane V/C Ratio	-	-	1.181	0.094
HCM Control Delay (s)	-	-	176.3	10.1
HCM Lane LOS	-	-	F	B
HCM 95th %tile Q(veh)	-	-	11.2	0.3

Lanes, Volumes, Timings
 3: SW Boones Ferry Road & Pvt Drwy/Horizon HS access

2026 Total Traffic, AM Peak Hour

01/25/2022

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	38	0	31	0	692	72	48	525	0
Future Volume (vph)	0	0	0	38	0	31	0	692	72	48	525	0
Peak Hour Factor	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	2%	6%	6%	6%
Shared Lane Traffic (%)												
Sign Control	Stop			Stop			Free			Free		
Intersection Summary												
Control Type: Unsignalized												
Intersection Capacity Utilization 49.9% ICU Level of Service A												
Analysis Period (min) 15												

Intersection												
Int Delay, s/veh	11.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕	↕	↕	↕	
Traffic Vol, veh/h	0	0	0	38	0	31	0	692	72	48	525	0
Future Vol, veh/h	0	0	0	38	0	31	0	692	72	48	525	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	-	-	-	25	-	-	-	-	70	250	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	67	67	67	67	67	67	67	67	67	67	67	67
Heavy Vehicles, %	0	0	0	0	0	0	2	2	2	6	6	6
Mvmt Flow	0	0	0	57	0	46	0	1033	107	72	784	0

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	2038	2068	784	1961	1961	1033	784	0	0	1140	0	0
Stage 1	928	928	-	1033	1033	-	-	-	-	-	-	-
Stage 2	1110	1140	-	928	928	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.12	-	-	4.16	-	-
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	2.218	-	-	2.254	-	-
Pot Cap-1 Maneuver	42	55	396	~48	64	285	834	-	-	598	-	-
Stage 1	324	349	-	283	312	-	-	-	-	-	-	-
Stage 2	256	278	-	324	349	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	32	48	396	~44	56	285	834	-	-	598	-	-
Mov Cap-2 Maneuver	32	48	-	~44	56	-	-	-	-	-	-	-
Stage 1	324	307	-	283	312	-	-	-	-	-	-	-
Stage 2	214	278	-	285	307	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	217.9	0	1
HCM LOS	A	F		











Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	834	-	-	-	44	285	598	-	-
HCM Lane V/C Ratio	-	-	-	-	1.289	0.162	0.12	-	-
HCM Control Delay (s)	0	-	-	0	379.2	20.1	11.8	-	-
HCM Lane LOS	A	-	-	A	F	C	B	-	-
HCM 95th %tile Q(veh)	0	-	-	-	5.5	0.6	0.4	-	-

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lanes, Volumes, Timings
 4: SW Boones Ferry Road & Street 'H'

2026 Total Traffic, AM Peak Hour

01/25/2022

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	106	52	673	35	17	576
Future Volume (vph)	106	52	673	35	17	576
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	0%	6%	6%	5%	5%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free
Intersection Summary						
Control Type: Unsignalized						
Intersection Capacity Utilization 53.3%			ICU Level of Service A			
Analysis Period (min) 15						

Intersection						
Int Delay, s/veh	3.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	106	52	673	35	17	576
Future Vol, veh/h	106	52	673	35	17	576
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	6	6	5	5
Mvmt Flow	118	58	748	39	19	640

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1446	768	0	0	787
Stage 1	768	-	-	-	-
Stage 2	678	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.15
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.245
Pot Cap-1 Maneuver	147	405	-	-	819
Stage 1	461	-	-	-	-
Stage 2	508	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	144	405	-	-	819
Mov Cap-2 Maneuver	284	-	-	-	-
Stage 1	461	-	-	-	-
Stage 2	496	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	29.9	0	0.3
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	315	819
HCM Lane V/C Ratio	-	-	0.557	0.023
HCM Control Delay (s)	-	-	29.9	9.5
HCM Lane LOS	-	-	D	A
HCM 95th %tile Q(veh)	-	-	3.2	0.1

Lanes, Volumes, Timings
6: SW Boones Ferry Road & SW Day Road

2026 Total Traffic, AM Peak Hour

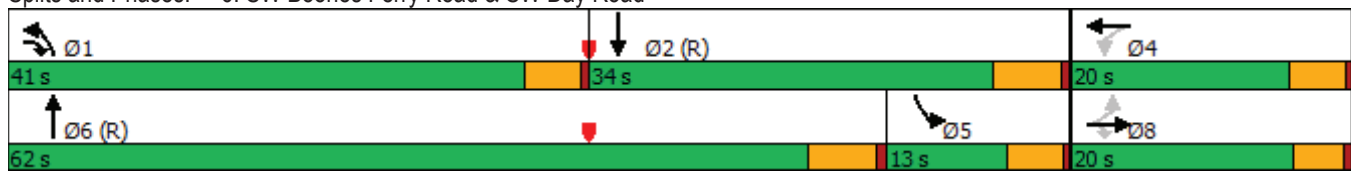
01/25/2022

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	179	0	581	0	0	0	642	520	0	0	594	56
Future Volume (vph)	179	0	581	0	0	0	642	520	0	0	594	56
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	14%	14%	14%	0%	0%	0%	14%	14%	14%	7%	7%	7%
Shared Lane Traffic (%)												
Turn Type	Perm	NA	pm+ov				Prot	NA		Prot	NA	
Protected Phases		8	1		4		1	6		5	2	
Permitted Phases	8		8	4								
Detector Phase	8	8	1	4	4		1	6		5	2	
Switch Phase												
Minimum Initial (s)	6.0	6.0	4.0	6.0	6.0		4.0	10.0		4.0	10.0	
Minimum Split (s)	32.2	32.2	8.5	37.5	37.5		8.5	22.4		9.2	38.4	
Total Split (s)	20.0	20.0	41.0	20.0	20.0		41.0	62.0		13.0	34.0	
Total Split (%)	21.1%	21.1%	43.2%	21.1%	21.1%		43.2%	65.3%		13.7%	35.8%	
Yellow Time (s)	3.5	3.5	4.0	4.0	4.0		4.0	4.7		4.0	4.7	
All-Red Time (s)	0.7	0.7	0.5	0.5	0.5		0.5	0.7		0.5	0.7	
Lost Time Adjust (s)		-0.2	-0.5		-0.5		-0.5	-1.4		-0.5	-1.4	
Total Lost Time (s)		4.0	4.0		4.0		4.0	4.0		4.0	4.0	
Lead/Lag			Lead				Lead	Lead		Lag	Lag	
Lead-Lag Optimize?			Yes				Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None	None		None	C-Min		None	C-Min	
Act Effct Green (s)		17.9	52.7				30.8	69.1			34.3	
Actuated g/C Ratio		0.19	0.55				0.32	0.73			0.36	
v/c Ratio		0.84	0.78				0.82	0.48			0.60	
Control Delay		67.8	21.3				37.5	6.9			27.8	
Queue Delay		0.0	0.0				0.0	0.0			0.0	
Total Delay		67.8	21.3				37.5	6.9			27.8	
LOS		E	C				D	A			C	
Approach Delay		32.3						23.8			27.8	
Approach LOS		C						C			C	

Intersection Summary

Cycle Length: 95
 Actuated Cycle Length: 95
 Offset: 3 (3%), Referenced to phase 2:SBT and 6:NBT, Start of Green
 Natural Cycle: 105
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.84
 Intersection Signal Delay: 27.3
 Intersection LOS: C
 Intersection Capacity Utilization 60.8%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 6: SW Boones Ferry Road & SW Day Road



HCM 6th Signalized Intersection Summary
6: SW Boones Ferry Road & SW Day Road

2026 Total Traffic, AM Peak Hour

01/25/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕		↗	↖		↖	↕	↖
Traffic Volume (veh/h)	179	0	581	0	0	0	642	520	0	0	594	56
Future Volume (veh/h)	179	0	581	0	0	0	642	520	0	0	594	56
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1693	1693	1693	1900	1900	1900	1693	1693	1693	1796	1796	1796
Adj Flow Rate, veh/h	199	0	463	0	0	0	713	578	0	0	660	60
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	14	14	14	0	0	0	14	14	14	7	7	7
Cap, veh/h	292	0	664	0	326	0	799	693	0	484	1299	118
Arrive On Green	0.17	0.00	0.17	0.00	0.00	0.00	0.29	0.41	0.00	0.00	0.41	0.40
Sat Flow, veh/h	1283	0	1434	0	1900	0	2740	1693	0	1711	3164	287
Grp Volume(v), veh/h	199	0	463	0	0	0	713	578	0	0	356	364
Grp Sat Flow(s),veh/h/ln	1283	0	1434	0	1900	0	1370	1693	0	1711	1706	1745
Q Serve(g_s), s	14.5	0.0	16.3	0.0	0.0	0.0	23.7	29.1	0.0	0.0	14.7	14.8
Cycle Q Clear(g_c), s	14.5	0.0	16.3	0.0	0.0	0.0	23.7	29.1	0.0	0.0	14.7	14.8
Prop In Lane	1.00		1.00	0.00		0.00	1.00		0.00	1.00		0.16
Lane Grp Cap(c), veh/h	289	0	664	0	326	0	799	693	0	484	701	716
V/C Ratio(X)	0.69	0.00	0.70	0.00	0.00	0.00	0.89	0.83	0.00	0.00	0.51	0.51
Avail Cap(c_a), veh/h	289	0	664	0	326	0	1067	1033	0	484	701	716
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	39.0	0.0	20.2	0.0	0.0	0.0	32.2	25.1	0.0	0.0	20.8	21.0
Incr Delay (d2), s/veh	6.3	0.0	3.0	0.0	0.0	0.0	6.9	11.3	0.0	0.0	2.6	2.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.9	0.0	7.9	0.0	0.0	0.0	8.3	13.1	0.0	0.0	5.9	6.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.3	0.0	23.2	0.0	0.0	0.0	39.2	36.4	0.0	0.0	23.5	23.5
LnGrp LOS	D	A	C	A	A	A	D	D	A	A	C	C
Approach Vol, veh/h		662			0			1291			720	
Approach Delay, s/veh		29.8			0.0			37.9			23.5	
Approach LOS		C						D			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	31.7	43.0		20.3	31.8	42.9		20.3				
Change Period (Y+Rc), s	4.5	* 5.4		4.5	* 5.4	* 5.4		* 4.5				
Max Green Setting (G_max), s	30.5	* 29		15.5	* 8.5	* 57		* 16				
Max Q Clear Time (g_c+2p), s	25.7	16.8		0.0	0.0	31.1		18.3				
Green Ext Time (p_c), s	1.5	4.7		0.0	0.0	6.4		0.0				

Intersection Summary

HCM 6th Ctrl Delay	32.0
HCM 6th LOS	C

Notes

- User approved pedestrian interval to be less than phase max green.
- * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings
 1: SW Boones Ferry Road & SW Iowa Drive

2026 Total Traffic, PM Peak Hour
 01/25/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Volume (vph)	40	0	36	13	1	41	35	564	31	37	902	53
Future Volume (vph)	40	0	36	13	1	41	35	564	31	37	902	53
Confl. Peds. (#/hr)			4	4			4		4			
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	5%	5%	5%	2%	2%	2%	3%	3%	3%	1%	1%	1%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary												
Control Type: Unsignalized												
Intersection Capacity Utilization 67.0%						ICU Level of Service C						
Analysis Period (min) 15												

Intersection												
Int Delay, s/veh	9.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Vol, veh/h	40	0	36	13	1	41	35	564	31	37	902	53
Future Vol, veh/h	40	0	36	13	1	41	35	564	31	37	902	53
Conflicting Peds, #/hr	0	0	4	4	0	0	4	0	4	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	-	-	-	-	-	-	95	-	-	105	-	-
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, %	5	5	5	2	2	2	3	3	3	1	1	1
Mvmt Flow	43	0	38	14	1	44	37	600	33	39	960	56

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1783	1781	996	1784	1793	621	1020	0	0	637	0	0
Stage 1	1070	1070	-	695	695	-	-	-	-	-	-	-
Stage 2	713	711	-	1089	1098	-	-	-	-	-	-	-
Critical Hdwy	7.15	6.55	6.25	7.12	6.52	6.22	4.13	-	-	4.11	-	-
Critical Hdwy Stg 1	6.15	5.55	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.15	5.55	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.545	4.045	3.345	3.518	4.018	3.318	2.227	-	-	2.209	-	-
Pot Cap-1 Maneuver	62	81	293	63	81	487	676	-	-	951	-	-
Stage 1	264	294	-	433	444	-	-	-	-	-	-	-
Stage 2	418	432	-	261	289	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	52	73	291	50	73	485	673	-	-	947	-	-
Mov Cap-2 Maneuver	52	73	-	50	73	-	-	-	-	-	-	-
Stage 1	248	281	-	407	418	-	-	-	-	-	-	-
Stage 2	359	407	-	216	276	-	-	-	-	-	-	-












Approach	EB		WB		NB		SB	
HCM Control Delay, s	171.5		42		0.6		0.3	
HCM LOS	F		E					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	673	-	-	85	154	947	-	-
HCM Lane V/C Ratio	0.055	-	-	0.951	0.38	0.042	-	-
HCM Control Delay (s)	10.7	-	-	171.5	42	9	-	-
HCM Lane LOS	B	-	-	F	E	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	5.3	1.6	0.1	-	-

Lanes, Volumes, Timings
 2: SW Boones Ferry Road & SW Norwood Road

2026 Total Traffic, PM Peak Hour

01/25/2022

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	55	104	538	120	135	788
Future Volume (vph)	55	104	538	120	135	788
Confl. Peds. (#/hr)	2	2		2	2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	2%	3%	3%	2%	2%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free
Intersection Summary						
Control Type: Unsignalized						
Intersection Capacity Utilization 58.0%			ICU Level of Service B			
Analysis Period (min) 15						

Intersection						
Int Delay, s/veh	8.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↑	↔	↔	↑
Traffic Vol, veh/h	55	104	538	120	135	788
Future Vol, veh/h	55	104	538	120	135	788
Conflicting Peds, #/hr	2	2	0	2	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	65	290	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	3	3	2	2
Mvmt Flow	58	109	566	126	142	829

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1683	570	0	0	694
Stage 1	568	-	-	-	-
Stage 2	1115	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	104	521	-	-	901
Stage 1	567	-	-	-	-
Stage 2	314	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	87	519	-	-	899
Mov Cap-2 Maneuver	87	-	-	-	-
Stage 1	566	-	-	-	-
Stage 2	264	-	-	-	-




















Approach	WB	NB	SB
HCM Control Delay, s	86.6	0	1.4
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	191	899
HCM Lane V/C Ratio	-	-	0.876	0.158
HCM Control Delay (s)	-	-	86.6	9.8
HCM Lane LOS	-	-	F	A
HCM 95th %tile Q(veh)	-	-	6.6	0.6

Lanes, Volumes, Timings
 3: SW Boones Ferry Road & Pvt Drwy/Horizon HS access

2026 Total Traffic, PM Peak Hour

01/25/2022

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	23	0	28	0	477	30	22	825	0
Future Volume (vph)	0	0	0	23	0	28	0	477	30	22	825	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Control Type: Unsignalized												
Intersection Capacity Utilization 53.4%						ICU Level of Service A						
Analysis Period (min) 15												

Intersection												
Int Delay, s/veh	1.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕	↕	↕	↕	
Traffic Vol, veh/h	0	0	0	23	0	28	0	477	30	22	825	0
Future Vol, veh/h	0	0	0	23	0	28	0	477	30	22	825	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	-	-	-	25	-	-	-	-	70	250	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	25	0	30	0	518	33	24	897	0

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1495	1496	897	1463	1463	518	897	0	0	551	0	0
Stage 1	945	945	-	518	518	-	-	-	-	-	-	-
Stage 2	550	551	-	945	945	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	101	123	339	107	129	558	757	-	-	1019	-	-
Stage 1	314	340	-	541	533	-	-	-	-	-	-	-
Stage 2	519	515	-	314	340	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	94	120	339	105	126	558	757	-	-	1019	-	-
Mov Cap-2 Maneuver	94	120	-	105	126	-	-	-	-	-	-	-
Stage 1	314	332	-	541	533	-	-	-	-	-	-	-
Stage 2	491	515	-	307	332	-	-	-	-	-	-	-











Approach	EB	WB	NB	SB
HCM Control Delay, s	0	28.9	0	0.2
HCM LOS	A	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	757	-	-	-	105	558	1019	-	-
HCM Lane V/C Ratio	-	-	-	-	0.238	0.055	0.023	-	-
HCM Control Delay (s)	0	-	-	0	49.7	11.8	8.6	-	-
HCM Lane LOS	A	-	-	A	E	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	0.9	0.2	0.1	-	-

Lanes, Volumes, Timings
 4: SW Boones Ferry Road & Street 'H'

2026 Total Traffic, PM Peak Hour

01/25/2022

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	69	34	624	115	55	788
Future Volume (vph)	69	34	624	115	55	788
Confl. Peds. (#/hr)	2	2		2	2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	0%	3%	3%	2%	2%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free
Intersection Summary						
Control Type: Unsignalized						
Intersection Capacity Utilization 58.8%			ICU Level of Service B			
Analysis Period (min) 15						

Intersection						
Int Delay, s/veh	1.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↔		↔	↔
Traffic Vol, veh/h	69	34	624	115	55	788
Future Vol, veh/h	69	34	624	115	55	788
Conflicting Peds, #/hr	2	2	0	2	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	150	-
Veh in Median Storage, #	2	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	3	3	2	2
Mvmt Flow	77	38	693	128	61	876

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1759	761	0	0	823
Stage 1	759	-	-	-	-
Stage 2	1000	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.12
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.218
Pot Cap-1 Maneuver	94	409	-	-	807
Stage 1	466	-	-	-	-
Stage 2	359	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	86	407	-	-	805
Mov Cap-2 Maneuver	267	-	-	-	-
Stage 1	465	-	-	-	-
Stage 2	331	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	24.1	0	0.6
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	301	805
HCM Lane V/C Ratio	-	-	0.38	0.076
HCM Control Delay (s)	-	-	24.1	9.8
HCM Lane LOS	-	-	C	A
HCM 95th %tile Q(veh)	-	-	1.7	0.2

Lanes, Volumes, Timings
5: SW Boones Ferry Road & SW Day Road

2026 Total Traffic, PM Peak Hour

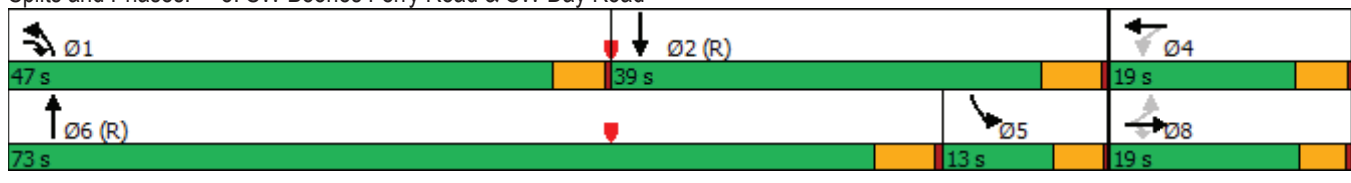
01/25/2022

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	0	774	0	0	0	635	695	0	0	783	73
Future Volume (vph)	8	0	774	0	0	0	635	695	0	0	783	73
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	3%	3%	3%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	Perm	NA	pm+ov				Prot	NA		Prot	NA	
Protected Phases		8	1		4		1	6		5	2	
Permitted Phases	8		8	4								
Detector Phase	8	8	1	4	4		1	6		5	2	
Switch Phase												
Minimum Initial (s)	6.0	6.0	4.0	6.0	6.0		4.0	10.0		4.0	10.0	
Minimum Split (s)	32.2	32.2	8.5	37.5	37.5		8.5	22.4		9.2	38.4	
Total Split (s)	19.0	19.0	47.0	19.0	19.0		47.0	73.0		13.0	39.0	
Total Split (%)	18.1%	18.1%	44.8%	18.1%	18.1%		44.8%	69.5%		12.4%	37.1%	
Yellow Time (s)	3.5	3.5	4.0	4.0	4.0		4.0	4.7		4.0	4.7	
All-Red Time (s)	0.7	0.7	0.5	0.5	0.5		0.5	0.7		0.5	0.7	
Lost Time Adjust (s)		-0.2	-0.5		-0.5		-0.5	-1.4		0.5	-1.4	
Total Lost Time (s)		4.0	4.0		4.0		4.0	4.0		5.0	4.0	
Lead/Lag			Lead				Lead	Lead		Lag	Lag	
Lead-Lag Optimize?			Yes				Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None	None		None	C-Min		None	C-Min	
Act Effct Green (s)		8.0	57.4				51.5	97.5			39.6	
Actuated g/C Ratio		0.08	0.55				0.49	0.93			0.38	
v/c Ratio		0.07	0.99				0.53	0.47			0.74	
Control Delay		43.9	48.5				20.8	2.7			33.2	
Queue Delay		0.0	0.0				0.0	0.0			0.0	
Total Delay		43.9	48.5				20.8	2.7			33.2	
LOS		D	D				C	A			C	
Approach Delay		48.4						11.4			33.2	
Approach LOS		D						B			C	

Intersection Summary

Cycle Length: 105
 Actuated Cycle Length: 105
 Offset: 3 (3%), Referenced to phase 2:SBT and 6:NBT, Start of Green
 Natural Cycle: 105
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.99
 Intersection Signal Delay: 27.4
 Intersection LOS: C
 Intersection Capacity Utilization 78.6%
 ICU Level of Service D
 Analysis Period (min) 15





















Splits and Phases: 5: SW Boones Ferry Road & SW Day Road



HCM 6th Signalized Intersection Summary
5: SW Boones Ferry Road & SW Day Road

2026 Total Traffic, PM Peak Hour

01/25/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	0	774	0	0	0	635	695	0	0	783	73
Future Volume (veh/h)	8	0	774	0	0	0	635	695	0	0	783	73
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1900	1900	1900	1856	1856	1856	1885	1885	1885
Adj Flow Rate, veh/h	9	0	683	0	0	0	730	799	0	0	900	81
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	0	0	0	3	3	3	1	1	1
Cap, veh/h	271	0	687	0	277	0	813	934	0	392	1503	135
Arrive On Green	0.14	0.00	0.15	0.00	0.00	0.00	0.29	0.50	0.00	0.00	0.45	0.44
Sat Flow, veh/h	1418	0	1585	0	1900	0	2827	1856	0	1795	3323	299
Grp Volume(v), veh/h	9	0	683	0	0	0	730	799	0	0	485	496
Grp Sat Flow(s),veh/h/ln	1418	0	1585	0	1900	0	1414	1856	0	1795	1791	1831
Q Serve(g_s), s	0.6	0.0	15.3	0.0	0.0	0.0	26.0	39.4	0.0	0.0	21.4	21.4
Cycle Q Clear(g_c), s	0.6	0.0	15.3	0.0	0.0	0.0	26.0	39.4	0.0	0.0	21.4	21.4
Prop In Lane	1.00		1.00	0.00		0.00	1.00		0.00	1.00		0.16
Lane Grp Cap(c), veh/h	268	0	687	0	277	0	813	934	0	392	810	828
V/C Ratio(X)	0.03	0.00	0.99	0.00	0.00	0.00	0.90	0.86	0.00	0.00	0.60	0.60
Avail Cap(c_a), veh/h	268	0	687	0	277	0	1158	1219	0	392	810	828
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	38.9	0.0	29.6	0.0	0.0	0.0	35.9	22.7	0.0	0.0	21.6	21.7
Incr Delay (d2), s/veh	0.0	0.0	32.9	0.0	0.0	0.0	6.1	9.9	0.0	0.0	3.3	3.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	22.1	0.0	0.0	0.0	9.4	18.5	0.0	0.0	9.0	9.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.9	0.0	62.5	0.0	0.0	0.0	42.1	32.6	0.0	0.0	24.8	24.9
LnGrp LOS	D	A	E	A	A	A	D	C	A	A	C	C
Approach Vol, veh/h		692			0			1529			981	
Approach Delay, s/veh		62.2			0.0			37.1			24.9	
Approach LOS		E						D			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	34.2	51.5		19.3	28.8	56.9		19.3				
Change Period (Y+Rc), s	4.5	* 5.4		4.5	* 5.4	* 5.4		* 4.5				
Max Green Setting (Gmax), s	42.5	* 34		14.5	* 8.5	* 68		* 15				
Max Q Clear Time (g_c+I1), s	28.0	23.4		0.0	0.0	41.4		17.3				
Green Ext Time (p_c), s	1.7	5.8		0.0	0.0	10.1		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			38.8									
HCM 6th LOS			D									
Notes												
User approved pedestrian interval to be less than phase max green.												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

Queues
6: SW Boones Ferry Road & SW Day Road

Year 2021 Traffic, AM Peak Hour

09/19/2021



Lane Group	EBT	EBR	NBL	NBT	SBT
Lane Group Flow (vph)	180	587	649	497	569
v/c Ratio	0.77	0.73	0.80	0.41	0.44
Control Delay	59.9	18.0	37.8	6.3	24.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	59.9	18.0	37.8	6.3	24.1
Queue Length 50th (ft)	100	188	211	110	134
Queue Length 95th (ft)	#225	284	248	134	197
Internal Link Dist (ft)	705			1336	2053
Turn Bay Length (ft)			200		
Base Capacity (vph)	242	921	1048	1218	1290
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.74	0.64	0.62	0.41	0.44

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues
5: SW Boones Ferry Road & SW Day Road

Year 2021 Traffic, PM Peak Hour

09/19/2021



Lane Group	EBT	EBR	NBL	NBT	SBT
Lane Group Flow (vph)	3	809	663	631	837
v/c Ratio	0.02	0.98	0.52	0.36	0.55
Control Delay	42.3	50.7	22.0	1.7	25.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	42.3	50.7	22.0	1.7	25.6
Queue Length 50th (ft)	2	~570	193	0	196
Queue Length 95th (ft)	10	539	268	153	310
Internal Link Dist (ft)	705			1336	2053
Turn Bay Length (ft)			200		
Base Capacity (vph)	266	826	1291	1764	1520
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.01	0.98	0.51	0.36	0.55

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

Queues
6: SW Boones Ferry Road & SW Day Road

2026 Background Traffic, AM Peak Hour

01/24/2022



Lane Group	EBT	EBR	NBL	NBT	SBT
Lane Group Flow (vph)	199	646	713	573	710
v/c Ratio	0.83	0.78	0.82	0.47	0.59
Control Delay	66.7	21.4	38.0	6.9	27.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	66.7	21.4	38.0	6.9	27.6
Queue Length 50th (ft)	113	234	230	136	185
Queue Length 95th (ft)	#255	368	280	164	255
Internal Link Dist (ft)	705			1336	2053
Turn Bay Length (ft)			200		
Base Capacity (vph)	239	915	1048	1209	1211
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.83	0.71	0.68	0.47	0.59

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues
5: SW Boones Ferry Road & SW Day Road

2026 Background Traffic, PM Peak Hour

01/24/2022



Lane Group	EBT	EBR	NBL	NBT	SBT
Lane Group Flow (vph)	9	890	730	786	976
v/c Ratio	0.07	0.99	0.53	0.46	0.73
Control Delay	43.9	48.6	20.8	2.7	33.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	43.9	48.6	20.8	2.7	33.0
Queue Length 50th (ft)	6	468	158	0	312
Queue Length 95th (ft)	20	#735	301	217	375
Internal Link Dist (ft)	705			1336	2053
Turn Bay Length (ft)			200		
Base Capacity (vph)	231	901	1374	1713	1337
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.04	0.99	0.53	0.46	0.73

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues
6: SW Boones Ferry Road & SW Day Road

2026 Total Traffic, AM Peak Hour

01/24/2022



Lane Group	EBT	EBR	NBL	NBT	SBT
Lane Group Flow (vph)	199	646	713	578	722
v/c Ratio	0.84	0.78	0.82	0.48	0.60
Control Delay	67.8	21.3	37.5	6.9	27.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	67.8	21.3	37.5	6.9	27.8
Queue Length 50th (ft)	113	235	230	136	188
Queue Length 95th (ft)	#255	368	280	167	260
Internal Link Dist (ft)	705			1336	2053
Turn Bay Length (ft)			200		
Base Capacity (vph)	238	913	1048	1211	1210
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.84	0.71	0.68	0.48	0.60

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues
5: SW Boones Ferry Road & SW Day Road

2026 Total Traffic, PM Peak Hour

01/24/2022



Lane Group	EBT	EBR	NBL	NBT	SBT
Lane Group Flow (vph)	9	890	730	799	984
v/c Ratio	0.07	0.99	0.53	0.47	0.74
Control Delay	43.9	48.5	20.8	2.7	33.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	43.9	48.5	20.8	2.7	33.2
Queue Length 50th (ft)	6	468	158	0	315
Queue Length 95th (ft)	20	#735	301	222	380
Internal Link Dist (ft)	705			1336	2053
Turn Bay Length (ft)			200		
Base Capacity (vph)	231	902	1375	1713	1335
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.04	0.99	0.53	0.47	0.74

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lanes, Volumes, Timings
 1: SW Boones Ferry Road & SW Iowa Drive

Year 2021 Traffic-MIT #1, AM Peak Hour

09/19/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	46	2	51	27	0	29	13	612	9	18	422	16
Future Volume (vph)	46	2	51	27	0	29	13	612	9	18	422	16
Confl. Peds. (#/hr)	13		5	1		9	5		1	9		13
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	7%	7%	7%	6%	6%	6%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary												
Control Type: Unsignalized												
Intersection Capacity Utilization 50.6%						ICU Level of Service A						
Analysis Period (min) 15												

Intersection												
Int Delay, s/veh	5.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗			↕		↖	↗		↖	↗	
Traffic Vol, veh/h	46	2	51	27	0	29	13	612	9	18	422	16
Future Vol, veh/h	46	2	51	27	0	29	13	612	9	18	422	16
Conflicting Peds, #/hr	13	0	5	1	0	9	5	0	1	9	0	13
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	-	-	-	95	-	-	105	-	-
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	7	7	7	6	6	6
Mvmt Flow	55	2	61	32	0	35	15	729	11	21	502	19

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1362	1346	530	1364	1350	757	534	0	0	749	0	0
Stage 1	567	567	-	774	774	-	-	-	-	-	-	-
Stage 2	795	779	-	590	576	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.17	-	-	4.16	-	-
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	2.263	-	-	2.254	-	-
Pot Cap-1 Maneuver	126	153	553	126	152	411	1009	-	-	842	-	-
Stage 1	512	510	-	394	411	-	-	-	-	-	-	-
Stage 2	384	409	-	497	505	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	109	144	544	106	143	402	997	-	-	835	-	-
Mov Cap-2 Maneuver	109	144	-	106	143	-	-	-	-	-	-	-
Stage 1	498	491	-	385	401	-	-	-	-	-	-	-
Stage 2	341	399	-	426	486	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	38.5		38.9		0.2		0.4	
HCM LOS	E		E					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	997	-	-	109	492	171	835	-	-
HCM Lane V/C Ratio	0.016	-	-	0.502	0.128	0.39	0.026	-	-
HCM Control Delay (s)	8.7	-	-	67.5	13.4	38.9	9.4	-	-
HCM Lane LOS	A	-	-	F	B	E	A	-	-
HCM 95th %tile Q(veh)	0	-	-	2.3	0.4	1.7	0.1	-	-

Lanes, Volumes, Timings
2: SW Boones Ferry Road & SW Norwood Road

Year 2021 Traffic-MIT #1, AM Peak Hour

09/19/2021

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	70	55	579	28	48	441
Future Volume (vph)	70	55	579	28	48	441
Confl. Peds. (#/hr)	4	4		4	4	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	2%	2%	6%	6%	5%	5%
Shared Lane Traffic (%)						
Turn Type	Prot		NA	Perm	pm+pt	NA
Protected Phases	3		2		1	6
Permitted Phases				2	6	
Detector Phase	3		2	2	1	6
Switch Phase						
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0
Minimum Split (s)	9.5		22.5	22.5	9.5	22.5
Total Split (s)	12.0		38.5	38.5	9.5	48.0
Total Split (%)	20.0%		64.2%	64.2%	15.8%	80.0%
Yellow Time (s)	3.5		3.5	3.5	3.5	3.5
All-Red Time (s)	1.0		1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5		4.5	4.5	4.5	4.5
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None		Min	Min	None	Min
Act Effect Green (s)	7.2		30.2	30.2	33.5	35.0
Actuated g/C Ratio	0.15		0.64	0.64	0.71	0.74
v/c Ratio	0.47		0.58	0.03	0.12	0.38
Control Delay	21.2		10.9	3.5	3.1	4.2
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	21.2		10.9	3.5	3.1	4.2
LOS	C		B	A	A	A
Approach Delay	21.2		10.5			4.1
Approach LOS	C		B			A

Intersection Summary

Cycle Length: 60
 Actuated Cycle Length: 47
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.58
 Intersection Signal Delay: 9.0
 Intersection Capacity Utilization 53.3%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A












Splits and Phases: 2: SW Boones Ferry Road & SW Norwood Road



HCM 6th Signalized Intersection Summary
 2: SW Boones Ferry Road & SW Norwood Road

Year 2021 Traffic-MIT #1, AM Peak Hour




















09/19/2021

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	70	55	579	28	48	441
Future Volume (veh/h)	70	55	579	28	48	441
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	0.98		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1811	1811	1826	1826
Adj Flow Rate, veh/h	80	63	666	32	55	507
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	6	6	5	5
Cap, veh/h	101	79	865	730	417	1195
Arrive On Green	0.11	0.11	0.48	0.48	0.06	0.65
Sat Flow, veh/h	932	734	1811	1528	1739	1826
Grp Volume(v), veh/h	144	0	666	32	55	507
Grp Sat Flow(s),veh/h/ln	1678	0	1811	1528	1739	1826
Q Serve(g_s), s	3.2	0.0	11.5	0.4	0.5	5.0
Cycle Q Clear(g_c), s	3.2	0.0	11.5	0.4	0.5	5.0
Prop In Lane	0.56	0.44		1.00	1.00	
Lane Grp Cap(c), veh/h	181	0	865	730	417	1195
V/C Ratio(X)	0.79	0.00	0.77	0.04	0.13	0.42
Avail Cap(c_a), veh/h	332	0	1626	1372	546	2098
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.5	0.0	8.2	5.3	5.9	3.1
Incr Delay (d2), s/veh	7.6	0.0	1.5	0.0	0.1	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	2.9	0.1	0.1	0.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	24.1	0.0	9.7	5.3	6.1	3.4
LnGrp LOS	C	A	A	A	A	A
Approach Vol, veh/h	144		698			562
Approach Delay, s/veh	24.1		9.5			3.6
Approach LOS	C		A			A
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	6.7	22.6			29.3	8.6
Change Period (Y+Rc), s	4.5	4.5			4.5	4.5
Max Green Setting (Gmax), s	5.0	34.0			43.5	7.5
Max Q Clear Time (g_c+11), s	2.5	13.5			7.0	5.2
Green Ext Time (p_c), s	0.0	4.6			3.5	0.1
Intersection Summary						
HCM 6th Ctrl Delay			8.6			
HCM 6th LOS			A			

Lanes, Volumes, Timings
 1: SW Boones Ferry Road & SW Iowa Drive

Year 2021 Traffic-MIT #1, PM Peak Hour

09/19/2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	0	33	12	1	37	32	465	28	34	740	48
Future Volume (vph)	36	0	33	12	1	37	32	465	28	34	740	48
Confl. Peds. (#/hr)			4	4			4		4			
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	5%	5%	5%	2%	2%	2%	3%	3%	3%	1%	1%	1%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Control Type: Unsignalized												
Intersection Capacity Utilization 58.2%						ICU Level of Service B						
Analysis Period (min) 15												

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	36	0	33	12	1	37	32	465	28	34	740	48
Future Vol, veh/h	36	0	33	12	1	37	32	465	28	34	740	48
Conflicting Peds, #/hr	0	0	4	4	0	0	4	0	4	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	150	-	-	-	-	-	95	-	-	105	-	-
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, %	5	5	5	2	2	2	3	3	3	1	1	1
Mvmt Flow	38	0	35	13	1	39	34	495	30	36	787	51

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1487	1486	821	1488	1496	514	842	0	0	529	0	0
Stage 1	889	889	-	582	582	-	-	-	-	-	-	-
Stage 2	598	597	-	906	914	-	-	-	-	-	-	-
Critical Hdwy	7.15	6.55	6.25	7.12	6.52	6.22	4.13	-	-	4.11	-	-
Critical Hdwy Stg 1	6.15	5.55	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.15	5.55	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.545	4.045	3.345	3.518	4.018	3.318	2.227	-	-	2.209	-	-
Pot Cap-1 Maneuver	101	123	370	102	123	560	789	-	-	1043	-	-
Stage 1	334	357	-	499	499	-	-	-	-	-	-	-
Stage 2	484	487	-	331	352	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	87	113	367	86	113	558	786	-	-	1039	-	-
Mov Cap-2 Maneuver	87	113	-	86	113	-	-	-	-	-	-	-
Stage 1	318	343	-	476	476	-	-	-	-	-	-	-
Stage 2	429	464	-	288	338	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	46.9		25		0.6		0.4	
HCM LOS	E		D					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	786	-	-	87	367	233	1039	-	-
HCM Lane V/C Ratio	0.043	-	-	0.44	0.096	0.228	0.035	-	-
HCM Control Delay (s)	9.8	-	-	75.5	15.8	25	8.6	-	-
HCM Lane LOS	A	-	-	F	C	D	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	1.8	0.3	0.9	0.1	-	-

Lanes, Volumes, Timings
2: SW Boones Ferry Road & SW Norwood Road

Year 2021 Traffic-MIT #1, PM Peak Hour

09/19/2021

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	37	75	461	90	88	671
Future Volume (vph)	37	75	461	90	88	671
Confl. Peds. (#/hr)	2	2		2	2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	2%	3%	3%	2%	2%
Shared Lane Traffic (%)						
Turn Type	Prot		NA	Perm	pm+pt	NA
Protected Phases	3		2		1	6
Permitted Phases				2	6	
Detector Phase	3		2	2	1	6
Switch Phase						
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0
Minimum Split (s)	9.5		22.5	22.5	9.5	22.5
Total Split (s)	14.0		36.0	36.0	10.0	46.0
Total Split (%)	23.3%		60.0%	60.0%	16.7%	76.7%
Yellow Time (s)	3.5		3.5	3.5	3.5	3.5
All-Red Time (s)	1.0		1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5		4.5	4.5	4.5	4.5
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None		Min	Min	None	Min
Act Effect Green (s)	7.1		25.4	25.4	29.3	30.7
Actuated g/C Ratio	0.17		0.59	0.59	0.68	0.72
v/c Ratio	0.35		0.44	0.10	0.16	0.53
Control Delay	12.2		10.2	2.9	3.8	6.1
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	12.2		10.2	2.9	3.8	6.1
LOS	B		B	A	A	A
Approach Delay	12.2		9.0			5.9
Approach LOS	B		A			A

Intersection Summary

Cycle Length: 60
 Actuated Cycle Length: 42.8
 Natural Cycle: 45
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.53
 Intersection Signal Delay: 7.6
 Intersection Capacity Utilization 49.6%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service A












Splits and Phases: 2: SW Boones Ferry Road & SW Norwood Road



HCM 6th Signalized Intersection Summary
 2: SW Boones Ferry Road & SW Norwood Road

Year 2021 Traffic-MIT #1, PM Peak Hour

09/19/2021

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	37	75	461	90	88	671
Future Volume (veh/h)	37	75	461	90	88	671
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	0.99		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1856	1856	1870	1870
Adj Flow Rate, veh/h	39	79	485	95	93	706
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	3	3	2	2
Cap, veh/h	55	111	718	607	524	1152
Arrive On Green	0.10	0.10	0.39	0.39	0.09	0.62
Sat Flow, veh/h	537	1088	1856	1568	1781	1870
Grp Volume(v), veh/h	119	0	485	95	93	706
Grp Sat Flow(s),veh/h/ln	1639	0	1856	1568	1781	1870
Q Serve(g_s), s	2.2	0.0	6.9	1.3	0.8	7.4
Cycle Q Clear(g_c), s	2.2	0.0	6.9	1.3	0.8	7.4
Prop In Lane	0.33	0.66		1.00	1.00	
Lane Grp Cap(c), veh/h	167	0	718	607	524	1152
V/C Ratio(X)	0.71	0.00	0.68	0.16	0.18	0.61
Avail Cap(c_a), veh/h	488	0	1831	1547	674	2431
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.9	0.0	8.1	6.4	5.0	3.8
Incr Delay (d2), s/veh	5.5	0.0	1.1	0.1	0.2	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	1.7	0.2	0.1	0.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	19.4	0.0	9.2	6.5	5.2	4.3
LnGrp LOS	B	A	A	A	A	A
Approach Vol, veh/h	119		580			799
Approach Delay, s/veh	19.4		8.8			4.4
Approach LOS	B		A			A
Timer - Assigned Phs	1	2				6
Phs Duration (G+Y+Rc), s	7.3	16.9				24.2
Change Period (Y+Rc), s	4.5	4.5				4.5
Max Green Setting (Gmax), s	5.5	31.5				41.5
Max Q Clear Time (g_c+1), s	2.8	8.9				9.4
Green Ext Time (p_c), s	0.0	3.3				5.4
0.1						
Intersection Summary						
HCM 6th Ctrl Delay			7.3			
HCM 6th LOS			A			

Lanes, Volumes, Timings
 1: SW Boones Ferry Road & SW Iowa Drive

2026 Background Traffic-MIT #1, AM Peak Hour

01/24/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	51	2	56	30	0	32	14	741	10	20	486	18
Future Volume (vph)	51	2	56	30	0	32	14	741	10	20	486	18
Confl. Peds. (#/hr)	13		5	1		9	5		1	9		13
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	7%	7%	7%	6%	6%	6%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary												
Control Type: Unsignalized												
Intersection Capacity Utilization 57.7%						ICU Level of Service B						
Analysis Period (min) 15												

Intersection												
Int Delay, s/veh	10.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗			↕		↖	↗		↖	↗	
Traffic Vol, veh/h	51	2	56	30	0	32	14	741	10	20	486	18
Future Vol, veh/h	51	2	56	30	0	32	14	741	10	20	486	18
Conflicting Peds, #/hr	13	0	5	1	0	9	5	0	1	9	0	13
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	-	-	-	95	-	-	105	-	-
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	7	7	7	6	6	6
Mvmt Flow	61	2	67	36	0	38	17	882	12	24	579	21

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	1605	1588	608	1608	1592	910	613	0	0	903	0	0
Stage 1	651	651	-	931	931	-	-	-	-	-	-	-
Stage 2	954	937	-	677	661	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.17	-	-	4.16	-	-
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	2.263	-	-	2.254	-	-
Pot Cap-1 Maneuver	86	109	499	85	108	336	942	-	-	737	-	-
Stage 1	461	468	-	323	348	-	-	-	-	-	-	-
Stage 2	313	346	-	446	463	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	71	101	490	68	100	329	930	-	-	731	-	-
Mov Cap-2 Maneuver	71	101	-	68	100	-	-	-	-	-	-	-
Stage 1	447	447	-	314	339	-	-	-	-	-	-	-
Stage 2	268	337	-	369	442	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	85.8		80.4		0.2		0.4	
HCM LOS	F		F					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	930	-	-	71	433	115	731	-	-
HCM Lane V/C Ratio	0.018	-	-	0.855	0.159	0.642	0.033	-	-
HCM Control Delay (s)	8.9	-	-	166.5	14.9	80.4	10.1	-	-
HCM Lane LOS	A	-	-	F	B	F	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	4.2	0.6	3.3	0.1	-	-

Lanes, Volumes, Timings
2: SW Boones Ferry Road & SW Norwood Road

2026 Background Traffic-MIT #1, AM Peak Hour

01/24/2022

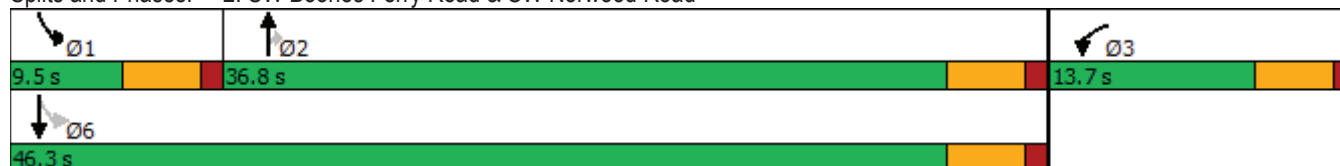


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↑	↗	↖	↗
Traffic Volume (vph)	91	93	672	36	64	496
Future Volume (vph)	91	93	672	36	64	496
Confl. Peds. (#/hr)	4	4		4	4	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	2%	2%	6%	6%	5%	5%
Shared Lane Traffic (%)						
Turn Type	Prot		NA	Perm	pm+pt	NA
Protected Phases	3		2		1	6
Permitted Phases				2	6	
Detector Phase	3		2	2	1	6
Switch Phase						
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0
Minimum Split (s)	9.5		22.5	22.5	9.5	22.5
Total Split (s)	13.7		36.8	36.8	9.5	46.3
Total Split (%)	22.8%		61.3%	61.3%	15.8%	77.2%
Yellow Time (s)	3.5		3.5	3.5	3.5	3.5
All-Red Time (s)	1.0		1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5		4.5	4.5	4.5	4.5
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None		Min	Min	None	Min
Act Effect Green (s)	8.4		29.8	29.8	34.8	34.8
Actuated g/C Ratio	0.16		0.57	0.57	0.66	0.66
v/c Ratio	0.65		0.76	0.05	0.21	0.47
Control Delay	27.1		16.8	4.2	4.5	5.8
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	27.1		16.8	4.2	4.5	5.8
LOS	C		B	A	A	A
Approach Delay	27.1		16.1			5.6
Approach LOS	C		B			A

Intersection Summary












Cycle Length: 60
 Actuated Cycle Length: 52.5
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.76
 Intersection Signal Delay: 13.5
 Intersection LOS: B
 Intersection Capacity Utilization 61.7%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 2: SW Boones Ferry Road & SW Norwood Road



HCM 2010 Signalized Intersection Summary 2026 Background Traffic-MIT #1, AM Peak Hour
 2: SW Boones Ferry Road & SW Norwood Road

01/24/2022

								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations								
Traffic Volume (veh/h)	91	93	672	36	64	496		
Future Volume (veh/h)	91	93	672	36	64	496		
Number	3	18	2	12	1	6		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	0.99		1.00	1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1900	1792	1792	1810	1810		
Adj Flow Rate, veh/h	105	107	772	41	74	570		
Adj No. of Lanes	0	0	1	1	1	1		
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87		
Percent Heavy Veh, %	2	2	6	6	5	5		
Cap, veh/h	129	131	903	765	341	1194		
Arrive On Green	0.16	0.16	0.50	0.50	0.06	0.66		
Sat Flow, veh/h	819	835	1792	1518	1723	1810		
Grp Volume(v), veh/h	213	0	772	41	74	570		
Grp Sat Flow(s),veh/h/ln	1662	0	1792	1518	1723	1810		
Q Serve(g_s), s	6.1	0.0	18.5	0.7	0.9	7.7		
Cycle Q Clear(g_c), s	6.1	0.0	18.5	0.7	0.9	7.7		
Prop In Lane	0.49	0.50		1.00	1.00			
Lane Grp Cap(c), veh/h	261	0	903	765	341	1194		
V/C Ratio(X)	0.82	0.00	0.85	0.05	0.22	0.48		
Avail Cap(c_a), veh/h	311	0	1177	997	405	1538		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	20.0	0.0	10.6	6.2	8.7	4.1		
Incr Delay (d2), s/veh	13.4	0.0	5.0	0.0	0.3	0.3		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	3.8	0.0	10.3	0.3	0.5	3.9		
LnGrp Delay(d),s/veh	33.4	0.0	15.7	6.3	9.0	4.4		
LnGrp LOS	C		B	A	A	A		
Approach Vol, veh/h	213		813			644		
Approach Delay, s/veh	33.4		15.2			5.0		
Approach LOS	C		B			A		
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	7.7	29.3				37.0		12.2
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	5.0	32.3				41.8		9.2
Max Q Clear Time (g_c+I1), s	2.9	20.5				9.7		8.1
Green Ext Time (p_c), s	0.0	4.3				4.0		0.1
Intersection Summary								
HCM 2010 Ctrl Delay			13.6					
HCM 2010 LOS			B					

Lanes, Volumes, Timings
 1: SW Boones Ferry Road & SW Iowa Drive

2026 Background Traffic-MIT #1, PM Peak Hour

01/24/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	0	36	13	1	41	35	556	31	37	890	53
Future Volume (vph)	40	0	36	13	1	41	35	556	31	37	890	53
Confl. Peds. (#/hr)			4	4			4		4			
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	5%	5%	5%	2%	2%	2%	3%	3%	3%	1%	1%	1%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary		
Control Type: Unsignalized		
Intersection Capacity Utilization 66.7%	ICU Level of Service C	
Analysis Period (min) 15		

Intersection												
Int Delay, s/veh	6.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗			↕		↖	↗		↖	↗	
Traffic Vol, veh/h	40	0	36	13	1	41	35	556	31	37	890	53
Future Vol, veh/h	40	0	36	13	1	41	35	556	31	37	890	53
Conflicting Peds, #/hr	0	0	4	4	0	0	4	0	4	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	150	-	-	-	-	-	95	-	-	105	-	-
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, %	5	5	5	2	2	2	3	3	3	1	1	1
Mvmt Flow	43	0	38	14	1	44	37	591	33	39	947	56

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	1761	1759	983	1762	1771	612	1007	0	0	628	0	0
Stage 1	1057	1057	-	686	686	-	-	-	-	-	-	-
Stage 2	704	702	-	1076	1085	-	-	-	-	-	-	-
Critical Hdwy	7.15	6.55	6.25	7.12	6.52	6.22	4.13	-	-	4.11	-	-
Critical Hdwy Stg 1	6.15	5.55	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.15	5.55	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.545	4.045	3.345	3.518	4.018	3.318	2.227	-	-	2.209	-	-
Pot Cap-1 Maneuver	65	83	298	66	83	493	684	-	-	959	-	-
Stage 1	269	298	-	438	448	-	-	-	-	-	-	-
Stage 2	423	436	-	266	293	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	54	75	296	53	75	491	681	-	-	955	-	-
Mov Cap-2 Maneuver	54	75	-	53	75	-	-	-	-	-	-	-
Stage 1	253	285	-	413	422	-	-	-	-	-	-	-
Stage 2	364	411	-	221	280	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	106.4		39.6		0.6		0.3	
HCM LOS	F		E					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	681	-	-	54	296	161	955	-	-
HCM Lane V/C Ratio	0.055	-	-	0.788	0.129	0.363	0.041	-	-
HCM Control Delay (s)	10.6	-	-	185	19	39.6	8.9	-	-
HCM Lane LOS	B	-	-	F	C	E	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	3.3	0.4	1.5	0.1	-	-

Lanes, Volumes, Timings
2: SW Boones Ferry Road & SW Norwood Road

2026 Background Traffic-MIT #1, PM Peak Hour

01/24/2022



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↑	↗	↖	↗
Traffic Volume (vph)	50	104	530	117	135	776
Future Volume (vph)	50	104	530	117	135	776
Confl. Peds. (#/hr)	2	2		2	2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	2%	3%	3%	2%	2%
Shared Lane Traffic (%)						
Turn Type	Prot		NA	Perm	pm+pt	NA
Protected Phases	3		2		1	6
Permitted Phases				2	6	
Detector Phase	3		2	2	1	6
Switch Phase						
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0
Minimum Split (s)	9.5		22.5	22.5	9.5	22.5
Total Split (s)	12.0		34.0	34.0	14.0	48.0
Total Split (%)	20.0%		56.7%	56.7%	23.3%	80.0%
Yellow Time (s)	3.5		3.5	3.5	3.5	3.5
All-Red Time (s)	1.0		1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5		4.5	4.5	4.5	4.5
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None		Min	Min	None	Min
Act Effect Green (s)	6.8		25.3	25.3	32.6	34.0
Actuated g/C Ratio	0.15		0.55	0.55	0.71	0.74
v/c Ratio	0.48		0.55	0.14	0.25	0.59
Control Delay	15.0		12.7	3.6	3.9	6.3
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	15.0		12.7	3.6	3.9	6.3
LOS	B		B	A	A	A
Approach Delay	15.0		11.1			5.9
Approach LOS	B		B			A

Intersection Summary

Cycle Length: 60
 Actuated Cycle Length: 45.8
 Natural Cycle: 55
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.59
 Intersection Signal Delay: 8.7
 Intersection Capacity Utilization 57.7%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service B

Splits and Phases: 2: SW Boones Ferry Road & SW Norwood Road



HCM 6th Signalized Intersection Summary 2026 Background Traffic-MIT #1, PM Peak Hour
 2: SW Boones Ferry Road & SW Norwood Road 01/24/2022



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↶		↑	↷	↶	↑
Traffic Volume (veh/h)	50	104	530	117	135	776
Future Volume (veh/h)	50	104	530	117	135	776
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	0.99		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1856	1856	1870	1870
Adj Flow Rate, veh/h	53	109	558	123	142	817
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	3	3	2	2
Cap, veh/h	66	136	761	643	496	1186
Arrive On Green	0.12	0.12	0.41	0.41	0.10	0.63
Sat Flow, veh/h	532	1095	1856	1569	1781	1870
Grp Volume(v), veh/h	163	0	558	123	142	817
Grp Sat Flow(s),veh/h/ln	1637	0	1856	1569	1781	1870
Q Serve(g_s), s	3.6	0.0	9.5	1.9	1.4	10.6
Cycle Q Clear(g_c), s	3.6	0.0	9.5	1.9	1.4	10.6
Prop In Lane	0.33	0.67		1.00	1.00	
Lane Grp Cap(c), veh/h	204	0	761	643	496	1186
V/C Ratio(X)	0.80	0.00	0.73	0.19	0.29	0.69
Avail Cap(c_a), veh/h	329	0	1469	1242	766	2183
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.9	0.0	9.3	7.0	6.0	4.4
Incr Delay (d2), s/veh	7.1	0.0	1.4	0.1	0.3	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	0.0	2.7	0.4	0.3	1.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	23.0	0.0	10.7	7.2	6.3	5.2
LnGrp LOS	C	A	B	A	A	A
Approach Vol, veh/h	163		681			959
Approach Delay, s/veh	23.0		10.0			5.3
Approach LOS	C		B			A
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	8.4	19.8			28.1	9.1
Change Period (Y+Rc), s	4.5	4.5			4.5	4.5
Max Green Setting (Gmax), s	9.5	29.5			43.5	7.5
Max Q Clear Time (g_c+I1), s	3.4	11.5			12.6	5.6
Green Ext Time (p_c), s	0.2	3.8			6.8	0.1
Intersection Summary						
HCM 6th Ctrl Delay			8.7			
HCM 6th LOS			A			

Lanes, Volumes, Timings
 1: SW Boones Ferry Road & SW Iowa Drive

2026 Total Traffic-MIT #1, AM Peak Hour

01/24/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	51	2	56	30	0	32	14	753	10	20	490	18
Future Volume (vph)	51	2	56	30	0	32	14	753	10	20	490	18
Confl. Peds. (#/hr)	13		5	1		9	5		1	9		13
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	7%	7%	7%	6%	6%	6%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary		
Control Type: Unsignalized		
Intersection Capacity Utilization 58.3%	ICU Level of Service B	
Analysis Period (min) 15		

Intersection												
Int Delay, s/veh	10.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗			↕		↖	↗		↖	↗	
Traffic Vol, veh/h	51	2	56	30	0	32	14	753	10	20	490	18
Future Vol, veh/h	51	2	56	30	0	32	14	753	10	20	490	18
Conflicting Peds, #/hr	13	0	5	1	0	9	5	0	1	9	0	13
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	-	-	-	95	-	-	105	-	-
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	7	7	7	6	6	6
Mvmt Flow	61	2	67	36	0	38	17	896	12	24	583	21

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1623	1606	612	1626	1610	924	617	0	0	917	0	0
Stage 1	655	655	-	945	945	-	-	-	-	-	-	-
Stage 2	968	951	-	681	665	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.17	-	-	4.16	-	-
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	2.263	-	-	2.254	-	-
Pot Cap-1 Maneuver	83	106	497	83	106	329	939	-	-	728	-	-
Stage 1	458	466	-	317	343	-	-	-	-	-	-	-
Stage 2	308	341	-	444	461	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	69	99	489	67	99	322	927	-	-	722	-	-
Mov Cap-2 Maneuver	69	99	-	67	99	-	-	-	-	-	-	-
Stage 1	444	445	-	308	334	-	-	-	-	-	-	-
Stage 2	263	332	-	367	440	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	90.5		83.1		0.2		0.4	
HCM LOS	F		F					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	927	-	-	69	431	113	722	-	-
HCM Lane V/C Ratio	0.018	-	-	0.88	0.16	0.653	0.033	-	-
HCM Control Delay (s)	9	-	-	176.4	14.9	83.1	10.2	-	-
HCM Lane LOS	A	-	-	F	B	F	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	4.3	0.6	3.4	0.1	-	-

Lanes, Volumes, Timings
2: SW Boones Ferry Road & SW Norwood Road

2026 Total Traffic-MIT #1, AM Peak Hour
01/24/2022

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	93	93	684	41	64	500
Future Volume (vph)	93	93	684	41	64	500
Confl. Peds. (#/hr)	4	4		4	4	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	2%	2%	6%	6%	5%	5%
Shared Lane Traffic (%)						
Turn Type	Prot		NA	Perm	pm+pt	NA
Protected Phases	3		2		1	6
Permitted Phases				2	6	
Detector Phase	3		2	2	1	6
Switch Phase						
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0
Minimum Split (s)	9.5		22.5	22.5	9.5	22.5
Total Split (s)	13.8		36.7	36.7	9.5	46.2
Total Split (%)	23.0%		61.2%	61.2%	15.8%	77.0%
Yellow Time (s)	3.5		3.5	3.5	3.5	3.5
All-Red Time (s)	1.0		1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5		4.5	4.5	4.5	4.5
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None		Min	Min	None	Min
Act Effect Green (s)	8.4		30.6	30.6	35.6	35.6
Actuated g/C Ratio	0.16		0.57	0.57	0.67	0.67
v/c Ratio	0.66		0.77	0.05	0.22	0.48
Control Delay	27.7		17.2	4.2	4.5	5.8
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	27.7		17.2	4.2	4.5	5.8
LOS	C		B	A	A	A
Approach Delay	27.7		16.4			5.6
Approach LOS	C		B			A

Intersection Summary

Cycle Length: 60
 Actuated Cycle Length: 53.3
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.77
 Intersection Signal Delay: 13.7
 Intersection LOS: B
 Intersection Capacity Utilization 62.5%
 ICU Level of Service B
 Analysis Period (min) 15












Splits and Phases: 2: SW Boones Ferry Road & SW Norwood Road



HCM 6th Signalized Intersection Summary
 2: SW Boones Ferry Road & SW Norwood Road

2026 Total Traffic-MIT #1, AM Peak Hour

01/24/2022

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	93	93	684	41	64	500
Future Volume (veh/h)	93	93	684	41	64	500
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	0.99		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1811	1811	1826	1826
Adj Flow Rate, veh/h	107	107	786	47	74	575
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	6	6	5	5
Cap, veh/h	131	131	917	774	339	1207
Arrive On Green	0.16	0.16	0.51	0.51	0.06	0.66
Sat Flow, veh/h	830	830	1811	1529	1739	1826
Grp Volume(v), veh/h	215	0	786	47	74	575
Grp Sat Flow(s),veh/h/ln	1667	0	1811	1529	1739	1826
Q Serve(g_s), s	6.2	0.0	18.8	0.8	0.9	7.7
Cycle Q Clear(g_c), s	6.2	0.0	18.8	0.8	0.9	7.7
Prop In Lane	0.50	0.50		1.00	1.00	
Lane Grp Cap(c), veh/h	263	0	917	774	339	1207
V/C Ratio(X)	0.82	0.00	0.86	0.06	0.22	0.48
Avail Cap(c_a), veh/h	312	0	1174	991	402	1532
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.2	0.0	10.7	6.3	8.9	4.2
Incr Delay (d2), s/veh	13.5	0.0	5.3	0.0	0.3	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	0.0	6.5	0.2	0.3	1.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	33.7	0.0	16.0	6.3	9.2	4.5
LnGrp LOS	C	A	B	A	A	A
Approach Vol, veh/h	215		833			649
Approach Delay, s/veh	33.7		15.4			5.0
Approach LOS	C		B			A
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	7.7	29.6			37.3	12.3
Change Period (Y+Rc), s	4.5	4.5			4.5	4.5
Max Green Setting (Gmax), s	5.0	32.2			41.7	9.3
Max Q Clear Time (g_c+1), s	2.9	20.8			9.7	8.2
Green Ext Time (p_c), s	0.0	4.3			4.1	0.1
Intersection Summary						
HCM 6th Ctrl Delay			13.8			
HCM 6th LOS			B			

Lanes, Volumes, Timings
 1: SW Boones Ferry Road & SW Iowa Drive

2026 Total Traffic-MIT #1, PM Peak Hour

01/24/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	0	36	13	1	41	35	564	31	37	902	53
Future Volume (vph)	40	0	36	13	1	41	35	564	31	37	902	53
Confl. Peds. (#/hr)			4	4			4		4			
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	5%	5%	5%	2%	2%	2%	3%	3%	3%	1%	1%	1%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary		
Control Type: Unsignalized		
Intersection Capacity Utilization 67.3%	ICU Level of Service C	
Analysis Period (min) 15		

Intersection												
Int Delay, s/veh	6.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗			↕		↖	↗		↖	↗	
Traffic Vol, veh/h	40	0	36	13	1	41	35	564	31	37	902	53
Future Vol, veh/h	40	0	36	13	1	41	35	564	31	37	902	53
Conflicting Peds, #/hr	0	0	4	4	0	0	4	0	4	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	150	-	-	-	-	-	95	-	-	105	-	-
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, %	5	5	5	2	2	2	3	3	3	1	1	1
Mvmt Flow	43	0	38	14	1	44	37	600	33	39	960	56

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1783	1781	996	1784	1793	621	1020	0	0	637	0	0
Stage 1	1070	1070	-	695	695	-	-	-	-	-	-	-
Stage 2	713	711	-	1089	1098	-	-	-	-	-	-	-
Critical Hdwy	7.15	6.55	6.25	7.12	6.52	6.22	4.13	-	-	4.11	-	-
Critical Hdwy Stg 1	6.15	5.55	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.15	5.55	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.545	4.045	3.345	3.518	4.018	3.318	2.227	-	-	2.209	-	-
Pot Cap-1 Maneuver	62	81	293	63	81	487	676	-	-	951	-	-
Stage 1	264	294	-	433	444	-	-	-	-	-	-	-
Stage 2	418	432	-	261	289	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	52	73	291	50	73	485	673	-	-	947	-	-
Mov Cap-2 Maneuver	52	73	-	50	73	-	-	-	-	-	-	-
Stage 1	248	281	-	407	418	-	-	-	-	-	-	-
Stage 2	359	407	-	216	276	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	113.4		42		0.6		0.3	
HCM LOS	F		E					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	673	-	-	52	291	154	947	-	-
HCM Lane V/C Ratio	0.055	-	-	0.818	0.132	0.38	0.042	-	-
HCM Control Delay (s)	10.7	-	-	198.2	19.2	42	9	-	-
HCM Lane LOS	B	-	-	F	C	E	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	3.4	0.4	1.6	0.1	-	-

Lanes, Volumes, Timings
2: SW Boones Ferry Road & SW Norwood Road

2026 Total Traffic-MIT #1, PM Peak Hour

01/24/2022

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	55	104	538	120	135	788
Future Volume (vph)	55	104	538	120	135	788
Confl. Peds. (#/hr)	2	2		2	2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	2%	3%	3%	2%	2%
Shared Lane Traffic (%)						
Turn Type	Prot		NA	Perm	pm+pt	NA
Protected Phases	3		2		1	6
Permitted Phases				2	6	
Detector Phase	3		2	2	1	6
Switch Phase						
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0
Minimum Split (s)	9.5		22.5	22.5	9.5	22.5
Total Split (s)	14.6		34.8	34.8	10.6	45.4
Total Split (%)	24.3%		58.0%	58.0%	17.7%	75.7%
Yellow Time (s)	3.5		3.5	3.5	3.5	3.5
All-Red Time (s)	1.0		1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5		4.5	4.5	4.5	4.5
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None		Min	Min	None	Min
Act Effct Green (s)	7.6		25.9	25.9	32.3	33.8
Actuated g/C Ratio	0.16		0.56	0.56	0.70	0.73
v/c Ratio	0.47		0.55	0.14	0.27	0.61
Control Delay	13.9		12.7	3.6	4.5	7.3
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	13.9		12.7	3.6	4.5	7.3
LOS	B		B	A	A	A
Approach Delay	13.9		11.0			6.9
Approach LOS	B		B			A

Intersection Summary












Cycle Length: 60
 Actuated Cycle Length: 46.3
 Natural Cycle: 55
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.61
 Intersection Signal Delay: 9.1
 Intersection LOS: A
 Intersection Capacity Utilization 58.6%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 2: SW Boones Ferry Road & SW Norwood Road



HCM 6th Signalized Intersection Summary
 2: SW Boones Ferry Road & SW Norwood Road

2026 Total Traffic-MIT #1, PM Peak Hour
 01/24/2022

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	55	104	538	120	135	788
Future Volume (veh/h)	55	104	538	120	135	788
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	0.99		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1856	1856	1870	1870
Adj Flow Rate, veh/h	58	109	566	126	142	829
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	3	3	2	2
Cap, veh/h	74	138	767	648	488	1185
Arrive On Green	0.13	0.13	0.41	0.41	0.10	0.63
Sat Flow, veh/h	566	1065	1856	1569	1781	1870
Grp Volume(v), veh/h	168	0	566	126	142	829
Grp Sat Flow(s),veh/h/ln	1641	0	1856	1569	1781	1870
Q Serve(g_s), s	3.8	0.0	9.8	1.9	1.4	11.1
Cycle Q Clear(g_c), s	3.8	0.0	9.8	1.9	1.4	11.1
Prop In Lane	0.35	0.65		1.00	1.00	
Lane Grp Cap(c), veh/h	213	0	767	648	488	1185
V/C Ratio(X)	0.79	0.00	0.74	0.19	0.29	0.70
Avail Cap(c_a), veh/h	436	0	1478	1249	592	2011
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.0	0.0	9.4	7.1	6.1	4.6
Incr Delay (d2), s/veh	6.4	0.0	1.4	0.1	0.3	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	0.0	2.8	0.4	0.3	1.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	22.4	0.0	10.8	7.3	6.4	5.3
LnGrp LOS	C	A	B	A	A	A
Approach Vol, veh/h	168		692			971
Approach Delay, s/veh	22.4		10.2			5.5
Approach LOS	C		B			A
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	8.4	20.2			28.6	9.4
Change Period (Y+Rc), s	4.5	4.5			4.5	4.5
Max Green Setting (Gmax), s	6.1	30.3			40.9	10.1
Max Q Clear Time (g_c+11), s	3.4	11.8			13.1	5.8
Green Ext Time (p_c), s	0.1	3.9			6.7	0.2
Intersection Summary						
HCM 6th Ctrl Delay			8.8			
HCM 6th LOS			A			

Lanes, Volumes, Timings
1: SW Boones Ferry Road & SW Iowa Drive

Year 2021 Traffic-MIT #2, AM Peak Hour

09/19/2021

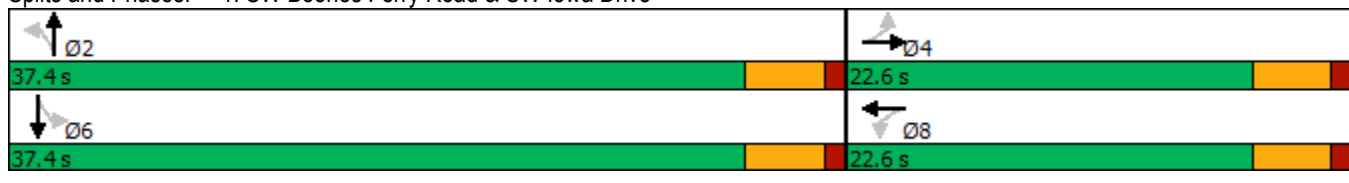


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Volume (vph)	46	2	51	27	0	29	13	612	9	18	422	16
Future Volume (vph)	46	2	51	27	0	29	13	612	9	18	422	16
Confl. Peds. (#/hr)	13		5	1		9	5		1	9		13
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	7%	7%	7%	6%	6%	6%
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	22.6	22.6		22.6	22.6		37.4	37.4		37.4	37.4	
Total Split (%)	37.7%	37.7%		37.7%	37.7%		62.3%	62.3%		62.3%	62.3%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effect Green (s)		7.7			7.7		28.8	28.8		28.8	28.8	
Actuated g/C Ratio		0.18			0.18		0.69	0.69		0.69	0.69	
v/c Ratio		0.38			0.22		0.03	0.60		0.06	0.42	
Control Delay		13.5			11.9		4.0	8.2		4.4	5.9	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		13.5			11.9		4.0	8.2		4.4	5.9	
LOS		B			B		A	A		A	A	
Approach Delay		13.5			11.9			8.2			5.8	
Approach LOS		B			B			A			A	

Intersection Summary

Cycle Length: 60
 Actuated Cycle Length: 41.7
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.60
 Intersection Signal Delay: 7.9
 Intersection Capacity Utilization 48.9%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 1: SW Boones Ferry Road & SW Iowa Drive



HCM 6th Signalized Intersection Summary
 1: SW Boones Ferry Road & SW Iowa Drive

Year 2021 Traffic-MIT #2, AM Peak Hour

09/19/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Volume (veh/h)	46	2	51	27	0	29	13	612	9	18	422	16
Future Volume (veh/h)	46	2	51	27	0	29	13	612	9	18	422	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.96	0.97		0.97	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1796	1796	1796	1811	1811	1811
Adj Flow Rate, veh/h	55	2	61	32	0	35	15	729	11	21	502	19
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	0	0	0	0	0	0	7	7	7	6	6	6
Cap, veh/h	257	32	131	251	42	137	534	969	15	387	951	36
Arrive On Green	0.17	0.17	0.17	0.17	0.00	0.17	0.55	0.55	0.55	0.55	0.55	0.55
Sat Flow, veh/h	541	188	780	496	248	814	842	1765	27	695	1733	66
Grp Volume(v), veh/h	118	0	0	67	0	0	15	0	740	21	0	521
Grp Sat Flow(s),veh/h/ln	1509	0	0	1559	0	0	842	0	1791	695	0	1798
Q Serve(g_s), s	1.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	10.1	0.8	0.0	5.9
Cycle Q Clear(g_c), s	2.1	0.0	0.0	1.1	0.0	0.0	6.2	0.0	10.1	10.9	0.0	5.9
Prop In Lane	0.47		0.52	0.48		0.52	1.00		0.01	1.00		0.04
Lane Grp Cap(c), veh/h	420	0	0	429	0	0	534	0	983	387	0	987
V/C Ratio(X)	0.28	0.00	0.00	0.16	0.00	0.00	0.03	0.00	0.75	0.05	0.00	0.53
Avail Cap(c_a), veh/h	1005	0	0	1007	0	0	942	0	1853	725	0	1860
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.9	0.0	0.0	11.5	0.0	0.0	6.5	0.0	5.5	9.7	0.0	4.6
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.2	0.0	0.0	0.0	0.0	1.2	0.1	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.0	0.3	0.0	0.0	0.0	0.0	1.4	0.1	0.0	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.2	0.0	0.0	11.6	0.0	0.0	6.5	0.0	6.7	9.7	0.0	5.0
LnGrp LOS	B	A	A	B	A	A	A	A	A	A	A	A
Approach Vol, veh/h		118			67			755			542	
Approach Delay, s/veh		12.2			11.6			6.7			5.2	
Approach LOS		B			B			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		22.0		9.8		22.0		9.8				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		32.9		18.1		32.9		18.1				
Max Q Clear Time (g_c+1), s		12.1		4.1		12.9		3.1				
Green Ext Time (p_c), s		5.3		0.5		3.4		0.2				
Intersection Summary												
HCM 6th Ctrl Delay				6.8								
HCM 6th LOS				A								

Lanes, Volumes, Timings
1: SW Boones Ferry Road & SW Iowa Drive

Year 2021 Traffic-MIT #2, PM Peak Hour

09/19/2021

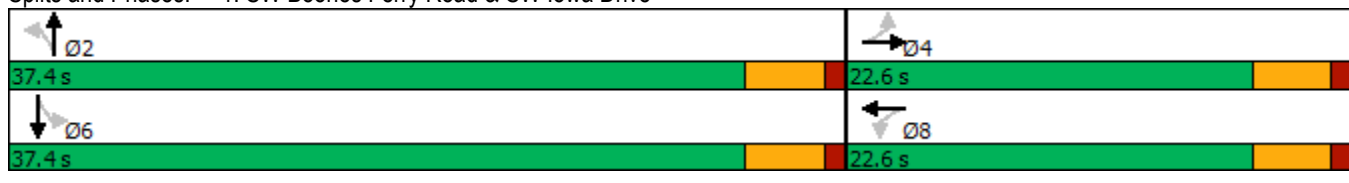


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Volume (vph)	36	0	33	12	1	37	32	465	28	34	740	48
Future Volume (vph)	36	0	33	12	1	37	32	465	28	34	740	48
Confl. Peds. (#/hr)			4	4			4		4			
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	5%	5%	5%	2%	2%	2%	3%	3%	3%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	22.6	22.6		22.6	22.6		37.4	37.4		37.4	37.4	
Total Split (%)	37.7%	37.7%		37.7%	37.7%		62.3%	62.3%		62.3%	62.3%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effect Green (s)		7.1			7.1		33.6	33.6		33.6	33.6	
Actuated g/C Ratio		0.17			0.17		0.79	0.79		0.79	0.79	
v/c Ratio		0.29			0.19		0.09	0.36		0.05	0.57	
Control Delay		14.7			11.1		4.0	4.2		3.5	6.3	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		14.7			11.1		4.0	4.2		3.5	6.3	
LOS		B			B		A	A		A	A	
Approach Delay		14.7			11.1			4.2			6.2	
Approach LOS		B			B			A			A	

Intersection Summary

Cycle Length: 60
 Actuated Cycle Length: 42.4
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.57
 Intersection Signal Delay: 6.1
 Intersection Capacity Utilization 58.4%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service B

Splits and Phases: 1: SW Boones Ferry Road & SW Iowa Drive



HCM 6th Signalized Intersection Summary
 1: SW Boones Ferry Road & SW Iowa Drive

Year 2021 Traffic-MIT #2, PM Peak Hour

09/19/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Volume (veh/h)	36	0	33	12	1	37	32	465	28	34	740	48
Future Volume (veh/h)	36	0	33	12	1	37	32	465	28	34	740	48
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826	1870	1870	1870	1856	1856	1856	1885	1885	1885
Adj Flow Rate, veh/h	38	0	35	13	1	39	34	495	30	36	787	51
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	5	5	5	2	2	2	3	3	3	1	1	1
Cap, veh/h	252	14	87	174	18	140	399	1030	62	609	1042	68
Arrive On Green	0.12	0.00	0.12	0.12	0.12	0.12	0.60	0.60	0.60	0.60	0.60	0.60
Sat Flow, veh/h	657	115	711	269	144	1151	651	1731	105	883	1751	113
Grp Volume(v), veh/h	73	0	0	53	0	0	34	0	525	36	0	838
Grp Sat Flow(s),veh/h/ln	1483	0	0	1565	0	0	651	0	1836	883	0	1865
Q Serve(g_s), s	0.4	0.0	0.0	0.0	0.0	0.0	1.3	0.0	5.2	0.8	0.0	10.5
Cycle Q Clear(g_c), s	1.3	0.0	0.0	0.9	0.0	0.0	11.8	0.0	5.2	5.9	0.0	10.5
Prop In Lane	0.52		0.48	0.25		0.74	1.00		0.06	1.00		0.06
Lane Grp Cap(c), veh/h	353	0	0	332	0	0	399	0	1093	609	0	1110
V/C Ratio(X)	0.21	0.00	0.00	0.16	0.00	0.00	0.09	0.00	0.48	0.06	0.00	0.76
Avail Cap(c_a), veh/h	983	0	0	1008	0	0	684	0	1899	997	0	1929
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.8	0.0	0.0	12.7	0.0	0.0	9.1	0.0	3.6	5.3	0.0	4.7
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.2	0.0	0.0	0.1	0.0	0.3	0.0	0.0	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	0.3	0.0	0.0	0.1	0.0	0.4	0.1	0.0	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.1	0.0	0.0	12.9	0.0	0.0	9.2	0.0	4.0	5.4	0.0	5.8
LnGrp LOS	B	A	A	B	A	A	A	A	A	A	A	A
Approach Vol, veh/h		73			53			559			874	
Approach Delay, s/veh		13.1			12.9			4.3			5.8	
Approach LOS		B			B			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		23.4		8.4		23.4		8.4				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		32.9		18.1		32.9		18.1				
Max Q Clear Time (g_c+1), s		13.8		3.3		12.5		2.9				
Green Ext Time (p_c), s		3.5		0.3		6.4		0.2				
Intersection Summary												
HCM 6th Ctrl Delay				5.8								
HCM 6th LOS				A								

Lanes, Volumes, Timings
1: SW Boones Ferry Road & SW Iowa Drive

2026 Background Traffic-MIT #2, AM Peak Hour

01/24/2022

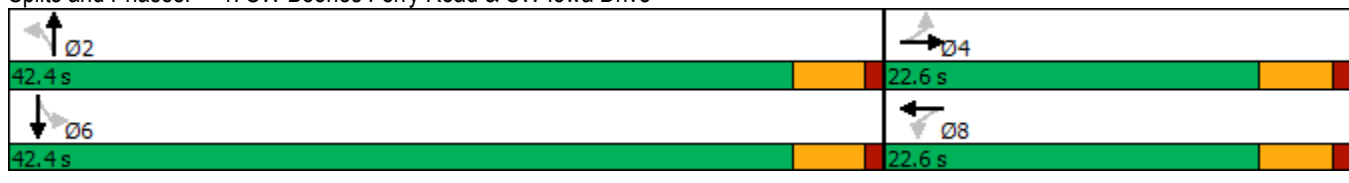


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Volume (vph)	51	2	56	30	0	32	14	741	10	20	486	18
Future Volume (vph)	51	2	56	30	0	32	14	741	10	20	486	18
Confl. Peds. (#/hr)	13		5	1		9	5		1	9		13
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	7%	7%	7%	6%	6%	6%
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	22.6	22.6		22.6	22.6		42.4	42.4		42.4	42.4	
Total Split (%)	34.8%	34.8%		34.8%	34.8%		65.2%	65.2%		65.2%	65.2%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effect Green (s)		8.2			8.2		35.2	35.2		35.2	35.2	
Actuated g/C Ratio		0.17			0.17		0.73	0.73		0.73	0.73	
v/c Ratio		0.45			0.27		0.03	0.69		0.08	0.46	
Control Delay		16.6			14.4		3.9	10.3		4.5	5.9	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		16.6			14.4		3.9	10.3		4.5	5.9	
LOS		B			B		A	B		A	A	
Approach Delay		16.6			14.4			10.2			5.9	
Approach LOS		B			B			B			A	

Intersection Summary

Cycle Length: 65
 Actuated Cycle Length: 48.5
 Natural Cycle: 65
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.69
 Intersection Signal Delay: 9.3
 Intersection Capacity Utilization 56.3%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service B

Splits and Phases: 1: SW Boones Ferry Road & SW Iowa Drive



HCM 6th Signalized Intersection Summary
1: SW Boones Ferry Road & SW Iowa Drive

2026 Background Traffic-MIT #2, AM Peak Hour

01/24/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Volume (veh/h)	51	2	56	30	0	32	14	741	10	20	486	18
Future Volume (veh/h)	51	2	56	30	0	32	14	741	10	20	486	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.96	0.97		0.97	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1796	1796	1796	1811	1811	1811
Adj Flow Rate, veh/h	61	2	67	36	0	38	17	882	12	24	579	21
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	0	0	0	0	0	0	7	7	7	6	6	6
Cap, veh/h	222	30	127	220	39	132	508	1082	15	316	1062	39
Arrive On Green	0.16	0.16	0.16	0.16	0.00	0.16	0.61	0.61	0.61	0.61	0.61	0.61
Sat Flow, veh/h	551	184	782	529	240	812	784	1768	24	603	1736	63
Grp Volume(v), veh/h	130	0	0	74	0	0	17	0	894	24	0	600
Grp Sat Flow(s),veh/h/ln	1517	0	0	1581	0	0	784	0	1792	603	0	1799
Q Serve(g_s), s	1.5	0.0	0.0	0.0	0.0	0.0	0.5	0.0	15.4	1.3	0.0	7.7
Cycle Q Clear(g_c), s	3.0	0.0	0.0	1.5	0.0	0.0	8.3	0.0	15.4	16.7	0.0	7.7
Prop In Lane	0.47		0.52	0.49		0.51	1.00		0.01	1.00		0.04
Lane Grp Cap(c), veh/h	379	0	0	391	0	0	508	0	1097	316	0	1101
V/C Ratio(X)	0.34	0.00	0.00	0.19	0.00	0.00	0.03	0.00	0.82	0.08	0.00	0.55
Avail Cap(c_a), veh/h	803	0	0	809	0	0	773	0	1703	520	0	1710
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.2	0.0	0.0	14.6	0.0	0.0	6.9	0.0	6.0	12.5	0.0	4.5
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.2	0.0	0.0	0.0	0.0	1.8	0.1	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.0	0.5	0.0	0.0	0.1	0.0	2.7	0.1	0.0	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.7	0.0	0.0	14.9	0.0	0.0	6.9	0.0	7.8	12.6	0.0	4.9
LnGrp LOS	B	A	A	B	A	A	A	A	A	B	A	A
Approach Vol, veh/h		130			74			911				624
Approach Delay, s/veh		15.7			14.9			7.8				5.2
Approach LOS		B			B			A				A
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		28.9		11.0		28.9		11.0				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		37.9		18.1		37.9		18.1				
Max Q Clear Time (g_c+1), s		17.4		5.0		18.7		3.5				
Green Ext Time (p_c), s		7.0		0.5		4.0		0.3				
Intersection Summary												
HCM 6th Ctrl Delay				7.8								
HCM 6th LOS				A								

Lanes, Volumes, Timings
1: SW Boones Ferry Road & SW Iowa Drive

2026 Background Traffic-MIT #2, PM Peak Hour

01/24/2022

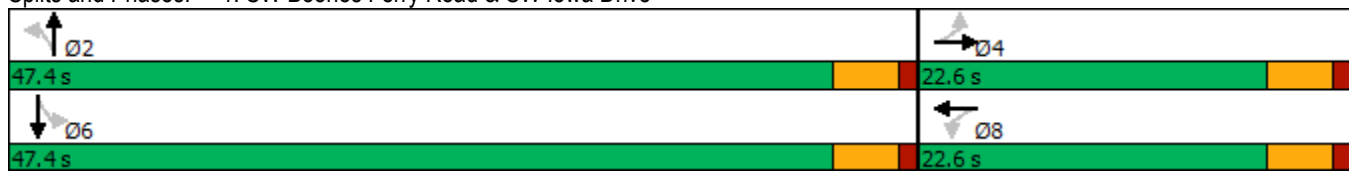


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Volume (vph)	40	0	36	13	1	41	35	556	31	37	890	53
Future Volume (vph)	40	0	36	13	1	41	35	556	31	37	890	53
Confl. Peds. (#/hr)			4	4			4		4			
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	5%	5%	5%	2%	2%	2%	3%	3%	3%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	22.6	22.6		22.6	22.6		47.4	47.4		47.4	47.4	
Total Split (%)	32.3%	32.3%		32.3%	32.3%		67.7%	67.7%		67.7%	67.7%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effect Green (s)		7.7			7.7		41.5	41.5		41.5	41.5	
Actuated g/C Ratio		0.14			0.14		0.77	0.77		0.77	0.77	
v/c Ratio		0.36			0.23		0.14	0.44		0.07	0.70	
Control Delay		19.2			13.1		4.6	4.9		3.3	9.0	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		19.2			13.1		4.6	4.9		3.3	9.0	
LOS		B			B		A	A		A	A	
Approach Delay		19.2			13.1			4.9			8.8	
Approach LOS		B			B			A			A	

Intersection Summary

Cycle Length: 70
 Actuated Cycle Length: 54.1
 Natural Cycle: 70
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.70
 Intersection Signal Delay: 8.0
 Intersection Capacity Utilization 67.4%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service C

Splits and Phases: 1: SW Boones Ferry Road & SW Iowa Drive



HCM 6th Signalized Intersection Summary
 1: SW Boones Ferry Road & SW Iowa Drive

2026 Background Traffic-MIT #2, PM Peak Hour

01/24/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Volume (veh/h)	40	0	36	13	1	41	35	556	31	37	890	53
Future Volume (veh/h)	40	0	36	13	1	41	35	556	31	37	890	53
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.98	0.99		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826	1870	1870	1870	1856	1856	1856	1885	1885	1885
Adj Flow Rate, veh/h	43	0	38	14	1	44	37	591	33	39	947	56
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	5	5	5	2	2	2	3	3	3	1	1	1
Cap, veh/h	211	15	79	137	17	133	332	1159	65	575	1174	69
Arrive On Green	0.11	0.00	0.11	0.11	0.11	0.11	0.67	0.67	0.67	0.67	0.67	0.67
Sat Flow, veh/h	665	128	701	246	154	1174	557	1741	97	806	1762	104
Grp Volume(v), veh/h	81	0	0	59	0	0	37	0	624	39	0	1003
Grp Sat Flow(s),veh/h/ln	1495	0	0	1575	0	0	557	0	1838	806	0	1866
Q Serve(g_s), s	0.5	0.0	0.0	0.0	0.0	0.0	2.1	0.0	7.0	1.0	0.0	15.8
Cycle Q Clear(g_c), s	1.9	0.0	0.0	1.4	0.0	0.0	17.9	0.0	7.0	8.0	0.0	15.8
Prop In Lane	0.53		0.47	0.24		0.75	1.00		0.05	1.00		0.06
Lane Grp Cap(c), veh/h	304	0	0	287	0	0	332	0	1224	575	0	1243
V/C Ratio(X)	0.27	0.00	0.00	0.21	0.00	0.00	0.11	0.00	0.51	0.07	0.00	0.81
Avail Cap(c_a), veh/h	769	0	0	787	0	0	547	0	1935	887	0	1966
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.8	0.0	0.0	16.6	0.0	0.0	11.4	0.0	3.4	5.5	0.0	4.9
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.3	0.0	0.0	0.1	0.0	0.3	0.0	0.0	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.0	0.5	0.0	0.0	0.2	0.0	0.8	0.1	0.0	2.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.3	0.0	0.0	17.0	0.0	0.0	11.5	0.0	3.8	5.5	0.0	6.3
LnGrp LOS	B	A	A	B	A	A	B	A	A	A	A	A
Approach Vol, veh/h		81			59			661			1042	
Approach Delay, s/veh		17.3			17.0			4.2			6.3	
Approach LOS		B			B			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		31.6		9.1		31.6		9.1				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		42.9		18.1		42.9		18.1				
Max Q Clear Time (g_c+1), s		19.9		3.9		17.8		3.4				
Green Ext Time (p_c), s		4.7		0.3		9.3		0.2				
Intersection Summary												
HCM 6th Ctrl Delay				6.4								
HCM 6th LOS				A								

Lanes, Volumes, Timings
1: SW Boones Ferry Road & SW Iowa Drive

2026 Total Traffic-MIT #2, AM Peak Hour

01/24/2022



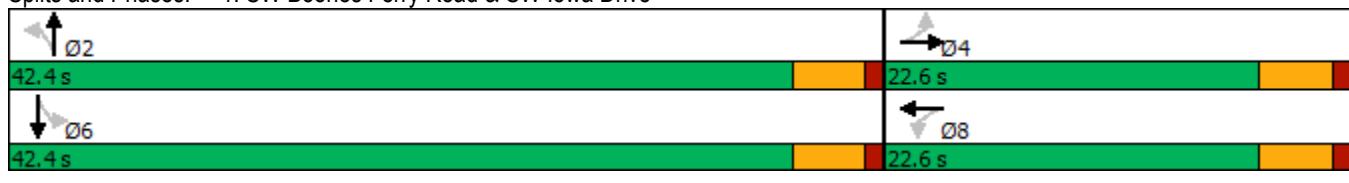
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Volume (vph)	51	2	56	30	0	32	14	753	10	20	490	18
Future Volume (vph)	51	2	56	30	0	32	14	753	10	20	490	18
Confl. Peds. (#/hr)	13		5	1		9	5		1	9		13
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	7%	7%	7%	6%	6%	6%
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2				6
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6		6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0		5.0
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5		22.5
Total Split (s)	22.6	22.6		22.6	22.6		42.4	42.4		42.4		42.4
Total Split (%)	34.8%	34.8%		34.8%	34.8%		65.2%	65.2%		65.2%		65.2%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5		3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0		1.0
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0		0.0
Total Lost Time (s)		4.5			4.5		4.5	4.5		4.5		4.5
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Min	Min		Min		Min
Act Effect Green (s)		8.2			8.2		35.9	35.9		35.9		35.9
Actuated g/C Ratio		0.17			0.17		0.73	0.73		0.73		0.73
v/c Ratio		0.45			0.27		0.03	0.70		0.08		0.46
Control Delay		16.8			14.5		3.9	10.6		4.6		5.9
Queue Delay		0.0			0.0		0.0	0.0		0.0		0.0
Total Delay		16.8			14.5		3.9	10.6		4.6		5.9
LOS		B			B		A	B		A		A
Approach Delay		16.8			14.5			10.5				5.9
Approach LOS		B			B			B				A

Intersection Summary

Cycle Length: 65
 Actuated Cycle Length: 49.2
 Natural Cycle: 65
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.70
 Intersection Signal Delay: 9.5
 Intersection Capacity Utilization 57.0%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service B

Splits and Phases: 1: SW Boones Ferry Road & SW Iowa Drive



HCM 6th Signalized Intersection Summary
 1: SW Boones Ferry Road & SW Iowa Drive

2026 Total Traffic-MIT #2, AM Peak Hour

01/24/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Volume (veh/h)	51	2	56	30	0	32	14	753	10	20	490	18
Future Volume (veh/h)	51	2	56	30	0	32	14	753	10	20	490	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.96	0.97		0.97	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1796	1796	1796	1811	1811	1811
Adj Flow Rate, veh/h	61	2	67	36	0	38	17	896	12	24	583	21
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	0	0	0	0	0	0	7	7	7	6	6	6
Cap, veh/h	219	30	126	218	38	131	508	1091	15	310	1071	39
Arrive On Green	0.16	0.16	0.16	0.16	0.00	0.16	0.62	0.62	0.62	0.62	0.62	0.62
Sat Flow, veh/h	551	184	782	532	238	813	781	1768	24	595	1736	63
Grp Volume(v), veh/h	130	0	0	74	0	0	17	0	908	24	0	604
Grp Sat Flow(s),veh/h/ln	1517	0	0	1582	0	0	781	0	1792	595	0	1799
Q Serve(g_s), s	1.5	0.0	0.0	0.0	0.0	0.0	0.5	0.0	16.0	1.3	0.0	7.9
Cycle Q Clear(g_c), s	3.0	0.0	0.0	1.5	0.0	0.0	8.4	0.0	16.0	17.3	0.0	7.9
Prop In Lane	0.47		0.52	0.49		0.51	1.00		0.01	1.00		0.03
Lane Grp Cap(c), veh/h	375	0	0	387	0	0	508	0	1105	310	0	1110
V/C Ratio(X)	0.35	0.00	0.00	0.19	0.00	0.00	0.03	0.00	0.82	0.08	0.00	0.54
Avail Cap(c_a), veh/h	789	0	0	794	0	0	755	0	1671	498	0	1678
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.5	0.0	0.0	14.9	0.0	0.0	6.9	0.0	6.0	12.8	0.0	4.5
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.2	0.0	0.0	0.0	0.0	2.1	0.1	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.0	0.6	0.0	0.0	0.1	0.0	2.9	0.2	0.0	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.0	0.0	0.0	15.2	0.0	0.0	6.9	0.0	8.1	12.9	0.0	4.9
LnGrp LOS	B	A	A	B	A	A	A	A	A	B	A	A
Approach Vol, veh/h		130			74			925			628	
Approach Delay, s/veh		16.0			15.2			8.1			5.2	
Approach LOS		B			B			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		29.6		11.1		29.6		11.1				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		37.9		18.1		37.9		18.1				
Max Q Clear Time (g_c+11), s		18.0		5.0		19.3		3.5				
Green Ext Time (p_c), s		7.1		0.5		4.0		0.3				
Intersection Summary												
HCM 6th Ctrl Delay				8.0								
HCM 6th LOS				A								

Lanes, Volumes, Timings
1: SW Boones Ferry Road & SW Iowa Drive

2026 Total Traffic-MIT #2, PM Peak Hour
01/24/2022

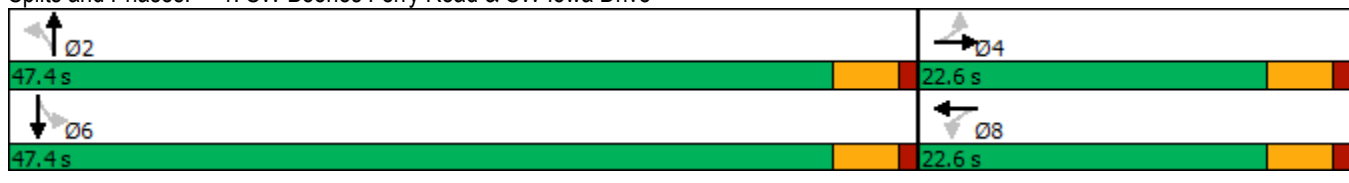


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↗	↘		↗	↘	
Traffic Volume (vph)	40	0	36	13	1	41	35	564	31	37	902	53
Future Volume (vph)	40	0	36	13	1	41	35	564	31	37	902	53
Confl. Peds. (#/hr)			4	4			4		4			
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	5%	5%	5%	2%	2%	2%	3%	3%	3%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2				6
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	22.6	22.6		22.6	22.6		47.4	47.4		47.4	47.4	
Total Split (%)	32.3%	32.3%		32.3%	32.3%		67.7%	67.7%		67.7%	67.7%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effct Green (s)		7.7			7.7		42.2	42.2		42.2	42.2	
Actuated g/C Ratio		0.14			0.14		0.77	0.77		0.77	0.77	
v/c Ratio		0.37			0.23		0.14	0.45		0.07	0.71	
Control Delay		19.4			13.2		4.6	4.9		3.3	9.2	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		19.4			13.2		4.6	4.9		3.3	9.2	
LOS		B			B		A	A		A	A	
Approach Delay		19.4			13.2			4.9			9.0	
Approach LOS		B			B			A			A	

Intersection Summary

Cycle Length: 70
 Actuated Cycle Length: 54.8
 Natural Cycle: 70
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.71
 Intersection Signal Delay: 8.1
 Intersection Capacity Utilization 68.0%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service C

Splits and Phases: 1: SW Boones Ferry Road & SW Iowa Drive



HCM 6th Signalized Intersection Summary
 1: SW Boones Ferry Road & SW Iowa Drive

2026 Total Traffic-MIT #2, PM Peak Hour

01/24/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Volume (veh/h)	40	0	36	13	1	41	35	564	31	37	902	53
Future Volume (veh/h)	40	0	36	13	1	41	35	564	31	37	902	53
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.98	0.99		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826	1870	1870	1870	1856	1856	1856	1885	1885	1885
Adj Flow Rate, veh/h	43	0	38	14	1	44	37	600	33	39	960	56
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	5	5	5	2	2	2	3	3	3	1	1	1
Cap, veh/h	208	14	79	135	17	132	326	1168	64	572	1182	69
Arrive On Green	0.11	0.00	0.11	0.11	0.11	0.11	0.67	0.67	0.67	0.67	0.67	0.67
Sat Flow, veh/h	666	128	702	246	154	1175	551	1742	96	800	1764	103
Grp Volume(v), veh/h	81	0	0	59	0	0	37	0	633	39	0	1016
Grp Sat Flow(s),veh/h/ln	1496	0	0	1576	0	0	551	0	1838	800	0	1867
Q Serve(g_s), s	0.5	0.0	0.0	0.0	0.0	0.0	2.2	0.0	7.2	1.1	0.0	16.3
Cycle Q Clear(g_c), s	1.9	0.0	0.0	1.4	0.0	0.0	18.4	0.0	7.2	8.2	0.0	16.3
Prop In Lane	0.53		0.47	0.24		0.75	1.00		0.05	1.00		0.06
Lane Grp Cap(c), veh/h	301	0	0	284	0	0	326	0	1232	572	0	1251
V/C Ratio(X)	0.27	0.00	0.00	0.21	0.00	0.00	0.11	0.00	0.51	0.07	0.00	0.81
Avail Cap(c_a), veh/h	757	0	0	775	0	0	528	0	1905	865	0	1935
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.1	0.0	0.0	16.9	0.0	0.0	11.6	0.0	3.4	5.5	0.0	4.9
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.4	0.0	0.0	0.2	0.0	0.3	0.0	0.0	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.0	0.5	0.0	0.0	0.2	0.0	0.8	0.1	0.0	2.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.6	0.0	0.0	17.3	0.0	0.0	11.8	0.0	3.8	5.5	0.0	6.5
LnGrp LOS	B	A	A	B	A	A	B	A	A	A	A	A
Approach Vol, veh/h		81			59			670			1055	
Approach Delay, s/veh		17.6			17.3			4.2			6.5	
Approach LOS		B			B			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		32.2		9.1		32.2		9.1				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		42.9		18.1		42.9		18.1				
Max Q Clear Time (g_c+1), s		20.4		3.9		18.3		3.4				
Green Ext Time (p_c), s		4.7		0.3		9.4		0.2				
Intersection Summary												
HCM 6th Ctrl Delay				6.5								
HCM 6th LOS				A								

Preliminary Drainage Report

Plambeck Gardens

23500 & 23550 SW Boones Ferry Road
Tualatin, Oregon 97062

Date:

February 25, 2022

Revised:

May 2, 2022

Owner:

Community Partners for Affordable Housing
6380 SW Capitol Highway #151
Portland, OR 97239

Prepared by: Brynne Healy

Engineer of Record:

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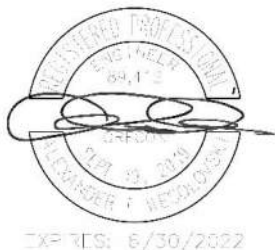


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	Stormwater Plans
	Catchment Map
	Stormwater Facility Details
B	Calculations
	HydroCad Reports
	Water Quality Calculations
C	Operations & Maintenance Plan
	<i>To Be Provided at Building Permit</i>
D	Additional Forms
	TR55 Runoff Curve Numbers
E	Associated Reports
	Downstream Analysis
	Geotechnical Report

Project Overview and Description

Location 23500 & 23550 SW Boones Ferry Road Tualatin, Oregon 97062

Site Area 203,082 sf (4.66 acres)

Vicinity Map



Zoning RH Zone – High Density Residential

Existing Conditions The site consists of two single family houses and various structures connected by gravel driveways.

Existing Drainage **Site Topography:** The existing grades of the site range from $\pm 3\%$ to $\pm 7\%$ with the highest elevation of ± 357 feet along the northeastern portion of the site and the lowest elevation of ± 330 feet along the northwestern portion of the site near SW Boones Ferry Road.

Soil Type: The existing underlying geology was identified as the Sentinel Bluffs Member (Tgsb). Missoula floods deposited were also identified on site and consist of unconsolidated stratified clay, silt, sand, and gravel. Surface soils were identified by the US Soil Survey as Unit 28B: Laurelwood silt loam.

Site Drainage: Currently, onsite stormwater is directed to catch basins on SW Boones Ferry Road on the northwestern and southwestern portions of the site. Water is then gravity fed to nearby streams.

Development Description Two new 4-story multi-family residential buildings and a new 1-story community building. Parking improvements include a new parking lot and three new 1-story garage structures. Site improvements include two new trash enclosures, play structures, picnic shelters, sport court, play field, and community gardens.

Jurisdictional Requirements

Water Quantity Per CWS and R&O 19-05 standards as outlined in section 4.02, Water Quantity Control Requirements for Conveyance Capacity, “each new development shall incorporate techniques for mitigating its impacts on the public stormwater system in accordance with Section 5.05.”.

Hydromodification Per Clean Water Services (CWS) Design and Construction Standards Manual for Sanitary Sewer and Surface Water Management (R&O 19-05) standards as outlined in section 4.03, Hydromodification Approach Requirements, and Table 4-2, the project site is identified as Category 3. Therefore, the CWS hydromodifications requirements will be met by providing peak-flow matching detention and LIDA. Peak-Flow Matching Detention using design criteria described in Section 4.08.6 and management of runoff from 30% of the impervious area using any LIDA in Table 4-3, sized in accordance with Section 4.08.4.b, and described in section 4.09, will be used.

Water Quality Per CWS and R&O 19-05 standards, stormwater quality approaches shall be designed to remove 65 percent of the total phosphorus from the runoff from the impervious area that is tributary to the facility. This criteria will be applied to ½ of the 2-yr, 24-hr storm event to meet the Department of Housing and Urban Development (HUD) requirements as well.

Design Methodology

Computation Methods & Software HydroCAD software was used to develop the Santa Barbara Urban Hydrograph (SBUH), Type 1A storm for the peak-flow matching detention and water quality design, in accordance with Table 4-7 of the CWS standards to analyze the stormwater runoff from the project site.

Relevant Design Storms Water Quality Treatment Storm, CWS – 0.36 inches in 4 hours with average return period of 96 hours.
Water Quality Treatment Storm, HUD – 1.25 inches, 24hrs
2-yr – 2.50 inches, 24hrs (CWS, HUD)
5-yr – 3.10 inches, 24hrs (CWS, HUD)
10yr – 3.45 inches, 24hrs (CWS, HUD)
25yr – 3.90 inches, 24hrs

Infiltration Testing Results

Due to poor infiltration rates along most of the eastern portion of the site and groundwater being encountered at 4 – 7.5 feet below grade, infiltration was not considered as a reasonable means of stormwater mitigation.

Proposed Stormwater Management System

The proposed stormwater management consists of two stormwater basins (one with CUDO detention cubes below grade) in the northwestern and southwestern portions of the site. The north basin will manage a total of 119,142 SF of combined impervious and pervious area, while the south basin will manage a total of 89,933 SF. Additional impervious area in the ROW not directed to the basins will be accounted for by oversizing the facilities to meet predeveloped flow rates. See Table 1 and Catchment Map, Appendix A.

All roof and area drains will collect stormwater from new impervious surfaces created and be directed to the stormwater basins, which are sized to manage the CWS and HUD water quality storm events. The basins, with the addition of CUDO detention cubes, will provide storage to manage flow rates. The basins will then connect to an MH with orifice flow control, and will discharge to the public system in SW Boones Ferry Rd. The north basin will connect to an existing stormwater inlet in the ROW. The south basin will connect to a proposed stormwater main extension which will tie into the existing system to the south of the project site.

Analysis

Curve Numbers	A curve number (CN) of 98 was used for newly constructed impervious areas on site. A pre-developed adjusted CN of 69 was used as recommended for the SBUH for sites with over 75% grass cover and soil groups B. It was then adjusted to 70 and 72 for the North and South basins, respectively, to account for differing areas of gravel/farrow soil present in each basin. See Appendix D for the TR55 runoff curve number table.
Time of Concentration	10 minutes was used for the time of concentration for all post-developed basins. 34.6 minutes was used for the time of concentration for the pre-developed, southern portion of the site. 28.1 minutes was used for the time of concentration for the pre-developed, northern portion of the site.
Water Quantity	Flow control for the proposed project will utilize a combination of stormwater basins, CUDO detention cubes, and orifice flow control to limit the post-development peak flow rates to the allowable pre-development peak flows for each storm event. For driveway and ROW sidewalk area that cannot be directly managed by the stormwater facilities, the additional runoff will be accounted for by oversizing the facility to continue meeting pre-developed rates. See Table 2.
Hydromodification	The proposed project will generate approx. 124,981 SF of proposed impervious area. Per CWS Category 3, the site will provide peak-flow matching detention (see Table 2) and will utilize vegetated stormwater basins to meet LIDA requirements.
Water Quality	Water Quality for the proposed project will be provided via two stormwater basins designs to CWS and HUD standards. They have been sized to treat impervious area runoff from the proposed project. See Appendix B for Water Quality Calculations.

Table 1 – Catchment and Facility Summary-Water Quantity

Catchment or Facility ID	Area Type	Area (sf)	Facility 1	Facility Size	Facility 2	Facility Size
North (8S)	Roof/Parking/Sidewalk	63,615	Stormwater Basin	2200 sf (bottom area)	CUDO storage	555 2x2 units
	Pervious/Landscape	51,060				
	Unmanaged Impervious	4,467				
South (9S)	Roof/Parking/Sidewalk	61,366	Stormwater Basin	2016 sf (bottom area)	N/A	N/A
	Pervious/Landscape	37,309				
	Unmanaged Impervious	1,258				
TOTAL		209,075				

Table 2 – Pre vs. Post Construction Flow Rates

Catchment or Facility ID	Peak Flow Rate (cfs)							
	2 yr		5 yr		10 yr		25 yr	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
North (8S)	0.07	0.06	0.16	0.16	0.24	0.23	0.35	0.30
South (9S)	0.11	0.05	0.24	0.17	0.32	0.22	0.45	0.32
TOTAL	0.18	0.11	0.40	0.33	0.56	0.45	0.80	0.62

Engineering Conclusions

Water Quantity

In addition to stormwater basins, CUDOs detention cubes (North basin) with orifice flow control will be utilized below the finished grade of the basins to manage stormwater quantity, per CWS standards. Runoff from area and roof drains throughout the site will be directed to the basins before entering the detention cubes and being transported to the City storm system on Boones Ferry Road. All water quantity storm events are meeting management requirements, except for the 2-yr, 24hr storm event at the North basin due to the minimum orifice size requirement of ½ inch.

Hydromodification

Using the CWS Hydromod Planning Tool, the project site is located within an expansion area and drains to a high-risk level exiting stream. The project site is over 80,000 square feet, classifying it as Large project. Based on the parameters mentioned above and in Table 4-2 from the CWS Design and Construction Standards, the project site is within Category 3 for the Hydromodification Approach.

As a requirement for Category 3 projects, the site will provide peak-flow matching detention, using criteria from sections 4.08.6 of the CWS Design and Construction Standards. Specifically, the post-developed 5 and 10 year, 24 hour storm peak runoff rate will match the pre-developed 5 and 10 year, 24 hour storm peak runoff rate and the post-developed 2 year, 24 hour storm peak runoff rate will not exceed more than 50% of the pre-developed 2 year, 24 hour storm peak runoff rate.

Water Quality

Per CWS Design and Construction Standards, Chapter 4, the proposed stormwater quality basins are designed to remove 65 percent of the total phosphorus from runoff of a storm event totaling 0.96 inches of precipitation falling in four hours with an average return period of 96 hours from newly constructed impervious surfaces. This approach was then applied to ½-2yr, 24hr storm event to meet HUD water quality requirements.

Conveyance

Calculations have been performed using HydroCAD to determine the stormwater conveyance design for the development based on CWS standards, which require a minimum 10-inch pipe size for the runoff based on a 25-year storm event.

Upstream / Downstream Impacts

The on-site stormwater system meets the high-risk design requirements via on-site detention and flow control for all of the required predeveloped peak flow storm events. See Downstream Analysis (Appendix E) for exhibits and calculations.

Northern Basin

Stormwater runoff will be conveyed to an existing Boones Ferry Road stormwater system catch basin through a 10" stormwater pipe connection. Runoff will flow approximately 315 feet north through the downstream 12" public stormwater main to a maintenance hole, which serves a portion of the remaining drainage basin prior to the discharge point via an 18" main. It discharges to a drainageway, flowing approximately 1,400 feet to Tapman Creek. During the 25-year storm event, the 12" and 18" mains are at 6% and 28% capacity, respectively. At the point of discharge to the drainageway, the site represents 2.9% of the total tributary drainage flow during the 25-year storm event.

A quarter-mile downstream visual study was performed confirming there are no downstream obstructions.

There are no facilities upstream of the north basin.

Southern Basin

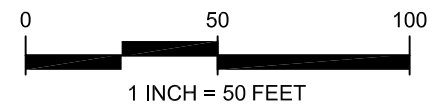
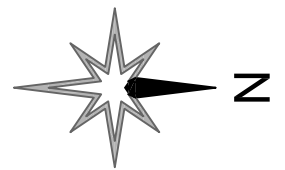
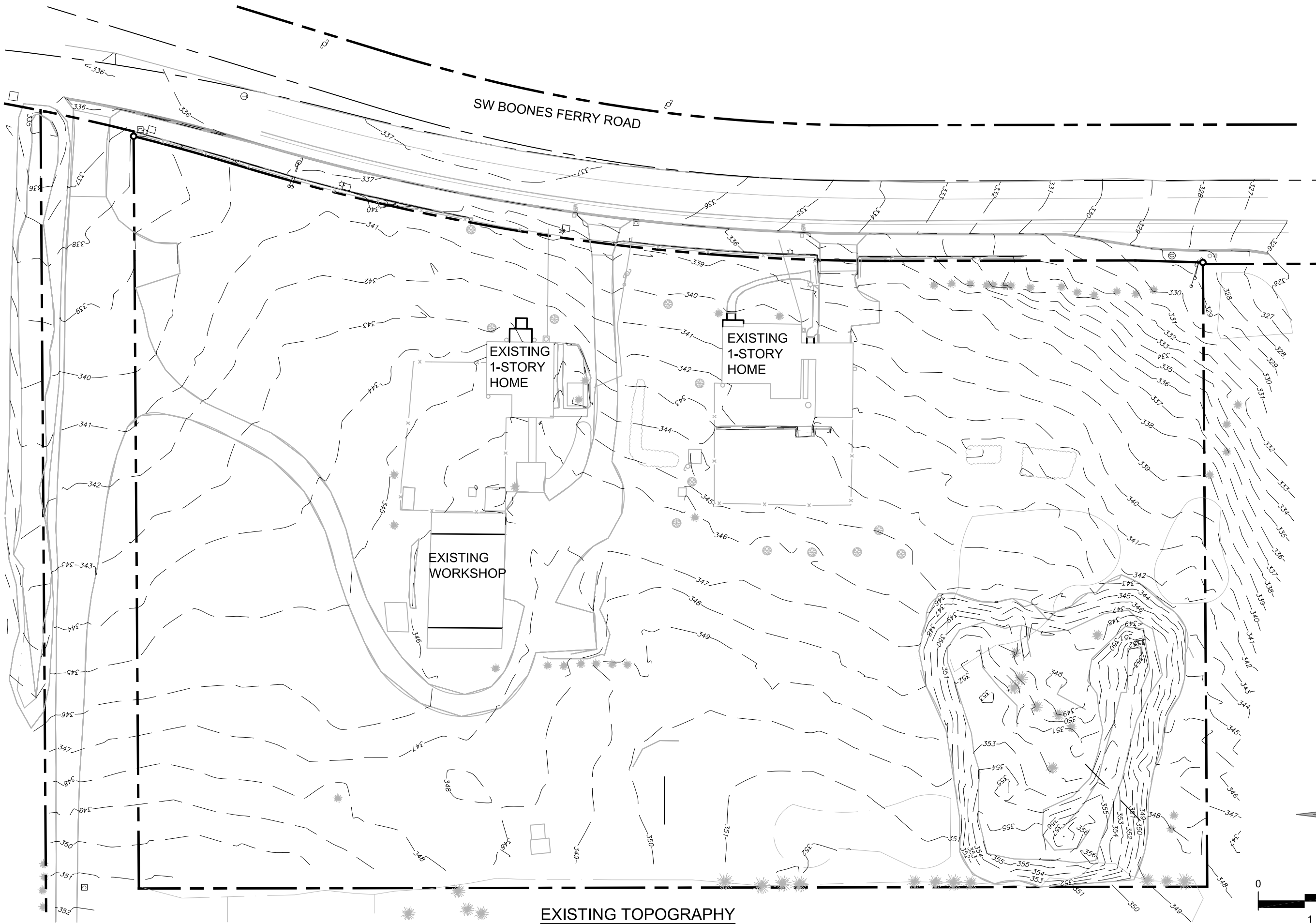
Stormwater runoff will be directed through a 10" stormwater pipe to the existing 12" stormwater system within Boones Ferry Road. It will flow approximately 750 feet south to a maintenance hole, which serves a portion of the remaining drainage basin prior to the discharge point. The downstream stormwater system then continues as a 15", which ultimately serves as the discharge point to a drainageway serving Tapman Creek. The drainageway is approximately 570 feet long. During the 25-year storm event, the 12" and 15" stormwater mains will be at 19% and 23% capacity, respectively. At the discharge point to the drainageway, runoff from the site represents 1.2% of the total tributary drainage flow during the 25-year storm event.

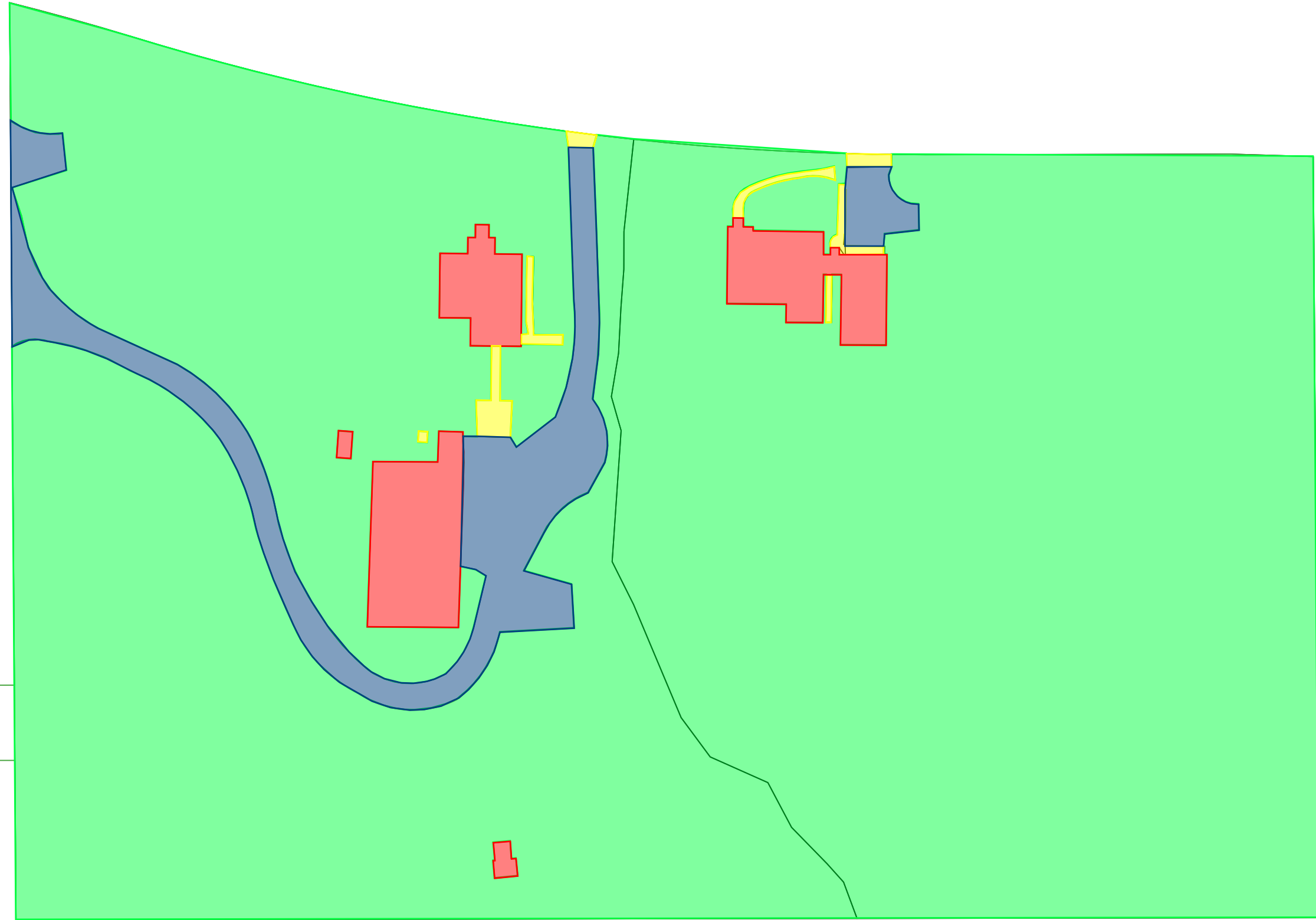
A quarter-mile downstream visual study was performed confirming there are no downstream obstructions.

There are no facilities upstream of the south basin.





Appendix A: Stormwater Facility Details / Exhibits

Existing Topography
Existing Ground Cover Site Map
Proposed Topography
Stormwater Plans
Catchment Map
Stormwater Facility Details













SITE TOTAL AREAS

	GRAVEL = 11,003 SF
	PAVING = 1,072 SF
	ROOF = 7,145 SF
	LANDSCAPE = 188,622 SF
	TOTAL = 207,842 SF

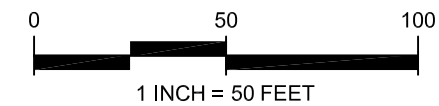
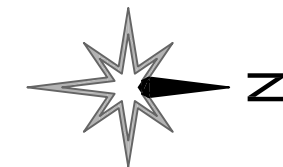
NORTH BASIN

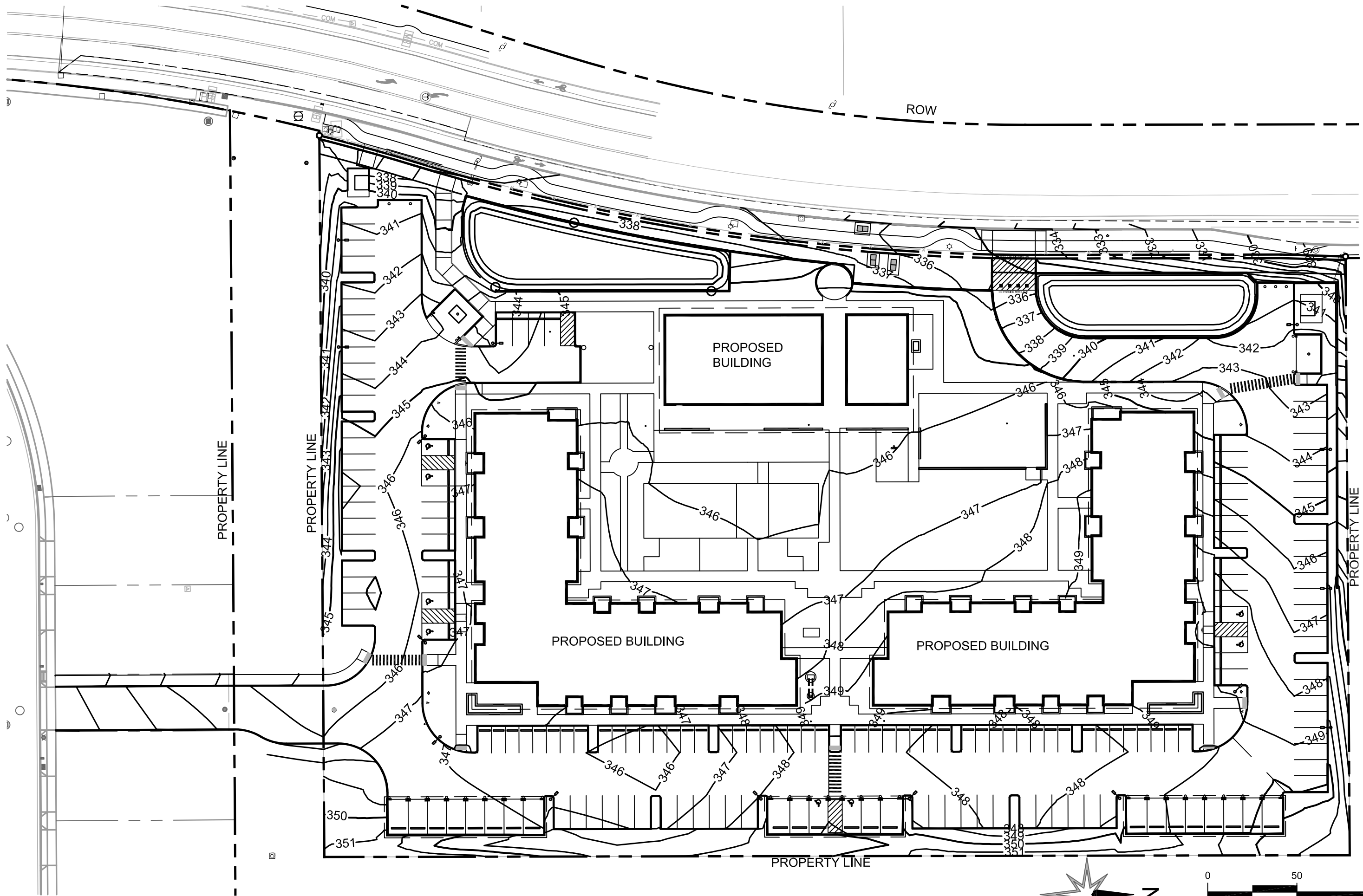
	GRAVEL = 860 SF
	PAVING = 450 SF
	ROOF = 2,422 SF
	LANDSCAPE = 92,895 SF
	TOTAL = 96,627 SF

SOUTH BASIN

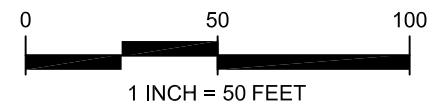
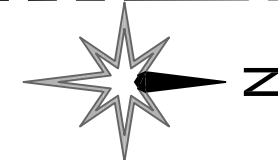
	GRAVEL = 10,143 SF
	PAVING = 622 SF
	ROOF = 4,723 SF
	LANDSCAPE = 95,727 SF
	TOTAL = 111,215 SF

EXISTING GROUND COVER SITE MAP





PROPOSED TOPOGRAPHY





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STORMWATER PLAN -
OVERALL

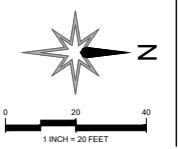
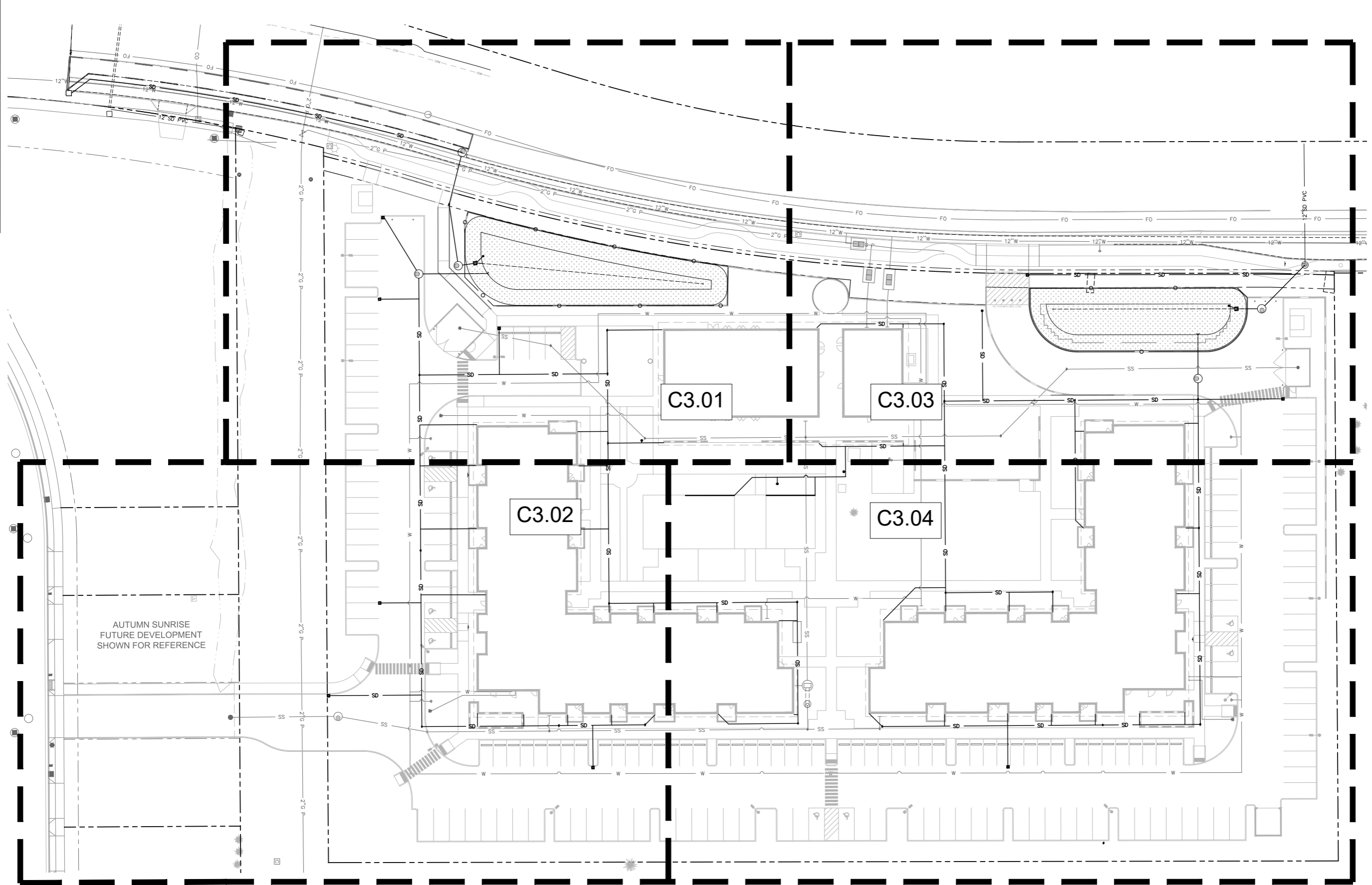
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03.04.2022

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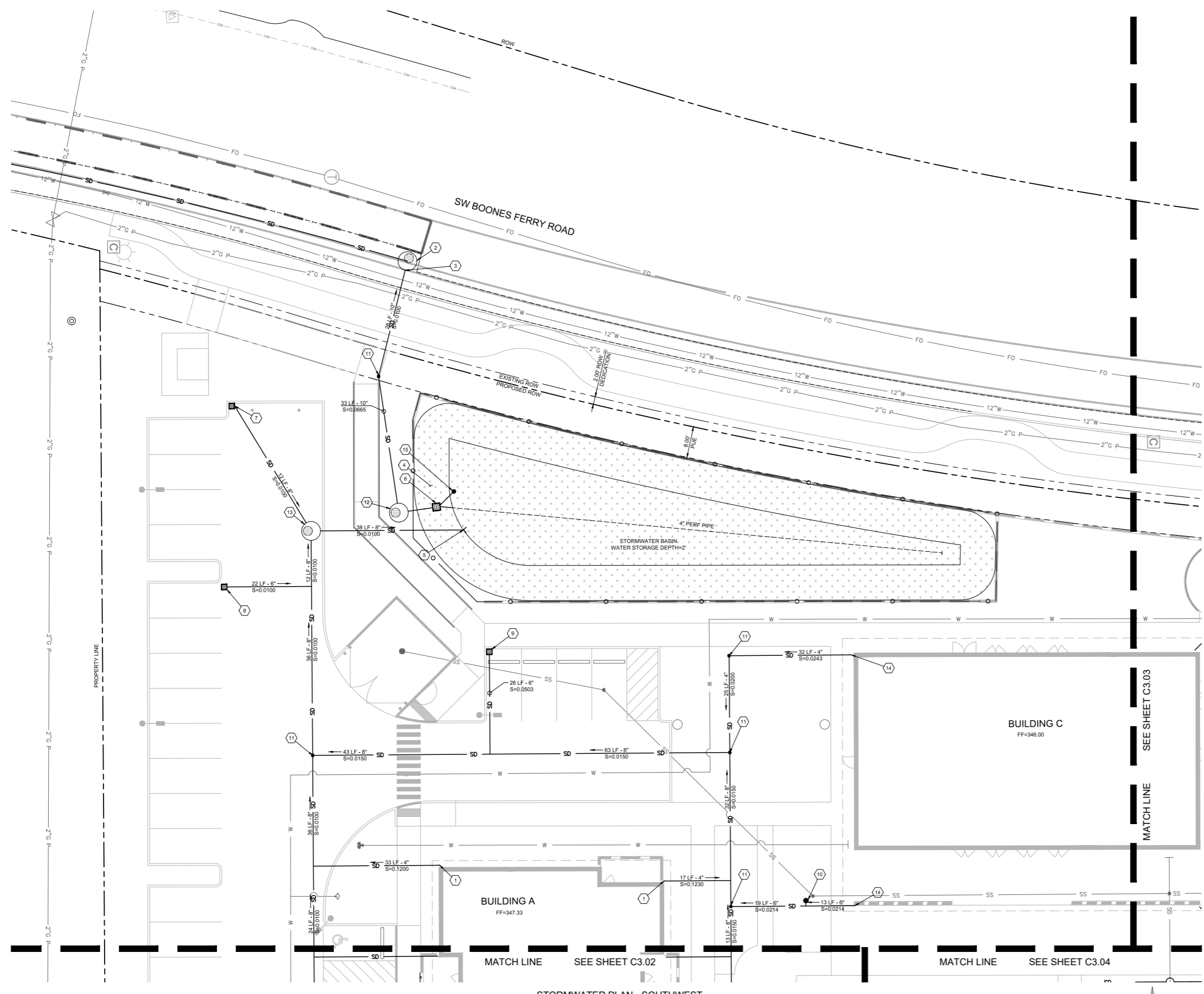


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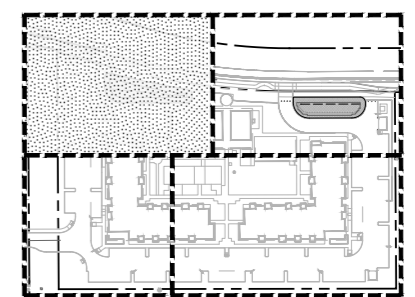
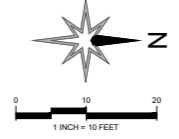
- ALL WORK IN PUBLIC RIGHT-OF-WAY UNDER SEPARATE CITY OF TUALATIN PUBLIC WORKS PERMIT AND WASHINGTON COUNTY FACILITIES PERMIT. REFERENCE PUBLIC PLANS.
- INSTALL "NO DUMPING / LEADS TO GROUNDWATER" MARKER AT ALL ONSITE CATCH BASINS PER DETAIL 11/C6.00.
- FOR OTHER UTILITIES SEE SHEET C4.01.
- COORDINATE ALL RETAINING WALL PENETRATIONS WITH STRUCTURAL.

STORMWATER NOTES

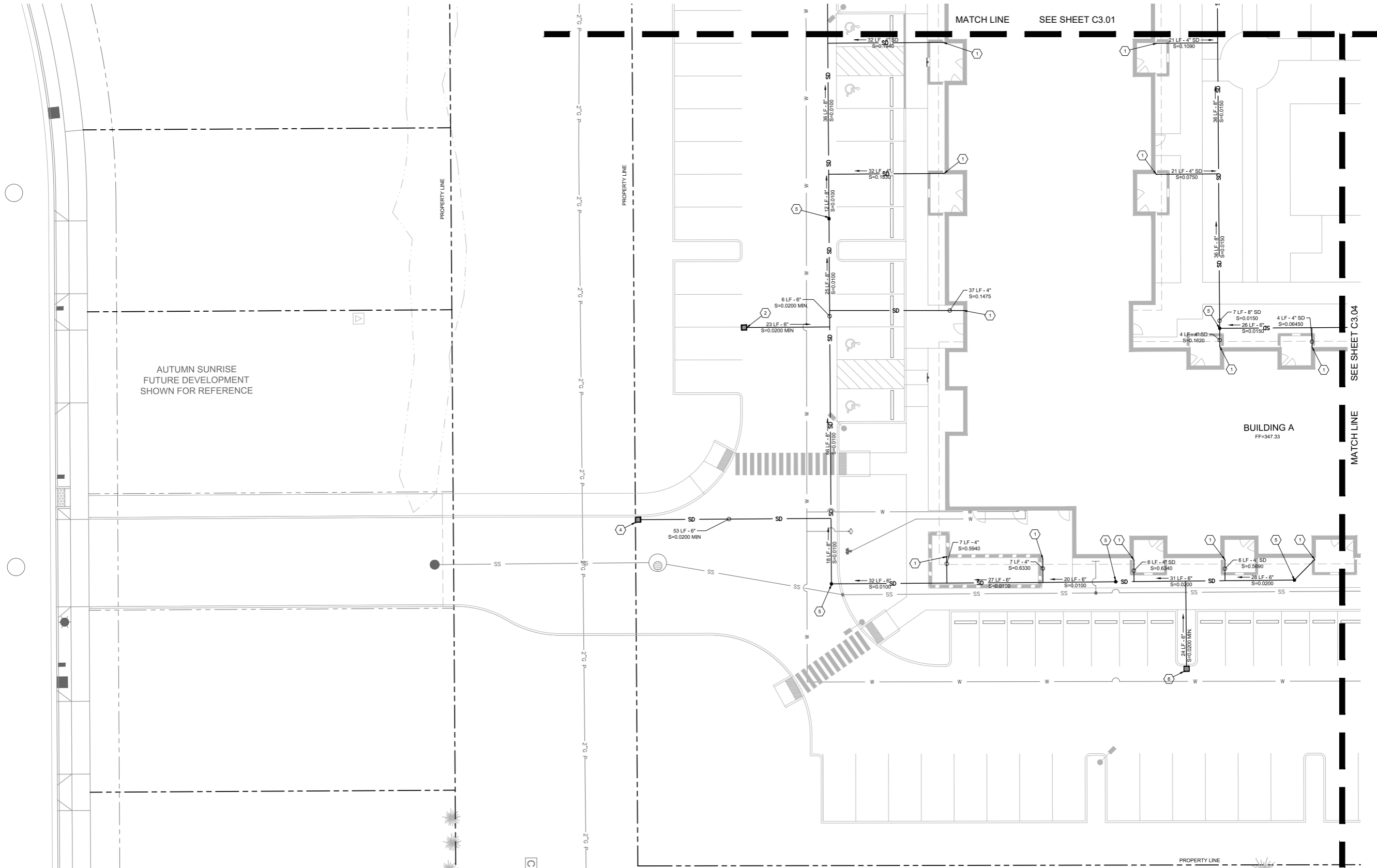
- ROOF DRAIN CONNECTION FROM BUILDING A.
IE=343.33
- 48" STORMWATER MANHOLE AT CONNECTION TO NEW PUBLIC STORM MAIN. UNDER SEPARATE PUBLIC WORKS PERMIT. SEE C8.00 SHEETS.
- STORMWATER CONNECTION TO PUBLIC MANHOLE.
IE=332.00
RIM=336.40
- STORMWATER BASIN PER DETAIL 8/C6.01
AREA MANAGED=61,351 SF
BOTTOM AREA=2,016 SF
BOTTOM ELEVATION=338.17
WATER STORAGE DEPTH=2.0'
- OUTFALL TO STORMWATER BASIN.
IE=338.17
- DITCH INLET PER CWS STANDARD DRAWING NO. 390
FLOW INVERT=340.00
IE IN=335.83
IE OUT=333.83
- 18" SQUARE PARKING LOT CATCH BASIN PER DETAIL 4/C6.01
RIM=340.47
IE=338.95
- 18" SQUARE PARKING LOT CATCH BASIN PER DETAIL 4/C6.01
RIM=340.44
IE=339.94
- 18" SQUARE PARKING LOT CATCH BASIN PER DETAIL 4/C6.01
RIM=343.09
IE=341.09
- 12" DOMED LANDSCAPE AREA DRAIN PER DETAIL 3/C6.01
RIM=343.75
IE=342.75
- STORMWATER CLEANOUT TO GRADE PER DETAIL 5/C6.01.
- FLOW CONTROL MANHOLE PER CWS STANDARD DRAWING NO. 270.
RIM=341.17
10" OVERFLOW=339.71
1" ORIFICE=333.47
IE=333.47
- WATER QUALITY MANHOLE PER CWS STANDARD DRAWINGS NO. 250 AND 260.
RIM=340.42
IE=338.58
- ROOF DRAIN CONNECTION FROM BUILDING C.
IE=342.00
- 12" STEEL GIBSON CATCH BASIN WITH DOMED TOP AND 0.72" ORIFICE FLOW CONTROL PER DETAIL 13/C6.01.
RIM=338.17
IE=337.17



STORMWATER PLAN - SOUTHWEST
SCALE: 1"=10'



KEY MAP
SCALE: 1"=120'



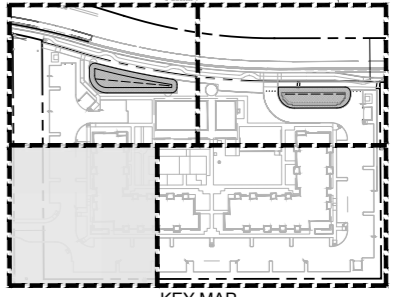
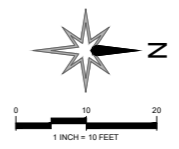
AUTUMN SUNRISE
FUTURE DEVELOPMENT
SHOWN FOR REFERENCE

BUILDING A
FF=347.33

STORMWATER PLAN - SOUTHEAST
SCALE: 1"=10'

- STORMWATER NOTES**
1. ROOF DRAIN CONNECTION FROM BUILDING A.
IE=343.33
 2. 18" SQUARE PARKING LOT CATCH BASIN PER DETAIL 4/C6.01
RIM=344.86
IE=342.86
 3. 18" SQUARE PARKING LOT CATCH BASIN PER DETAIL 4/C6.01
RIM=345.58
IE=343.58
 4. 18" SQUARE PARKING LOT CATCH BASIN PER DETAIL 4/C6.01
RIM=346.30
IE=341.30
 5. STORMWATER CLEANOUT TO GRADE PER DETAIL 5/C6.01
 6. 18" SQUARE PARKING LOT CATCH BASIN PER DETAIL 4/C6.01
RIM=345.58
IE=343.58

- GENERAL NOTES**
1. INSTALL "NO DUMPING / LEADS TO GROUNDWATER" MARKER AT ALL ONSITE CATCH BASINS PER DETAIL 11/C6.00.
 2. FOR OTHER UTILITIES SEE SHEET C4.02.
 3. COORDINATE ALL RETAINING WALL PENETRATIONS WITH STRUCTURAL PLANS.



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LAND USE: ARCHITECTURAL REVIEW

STORMWATER PLAN -
NORTHWEST

PROJECT NO.
#19031

03.04.2022

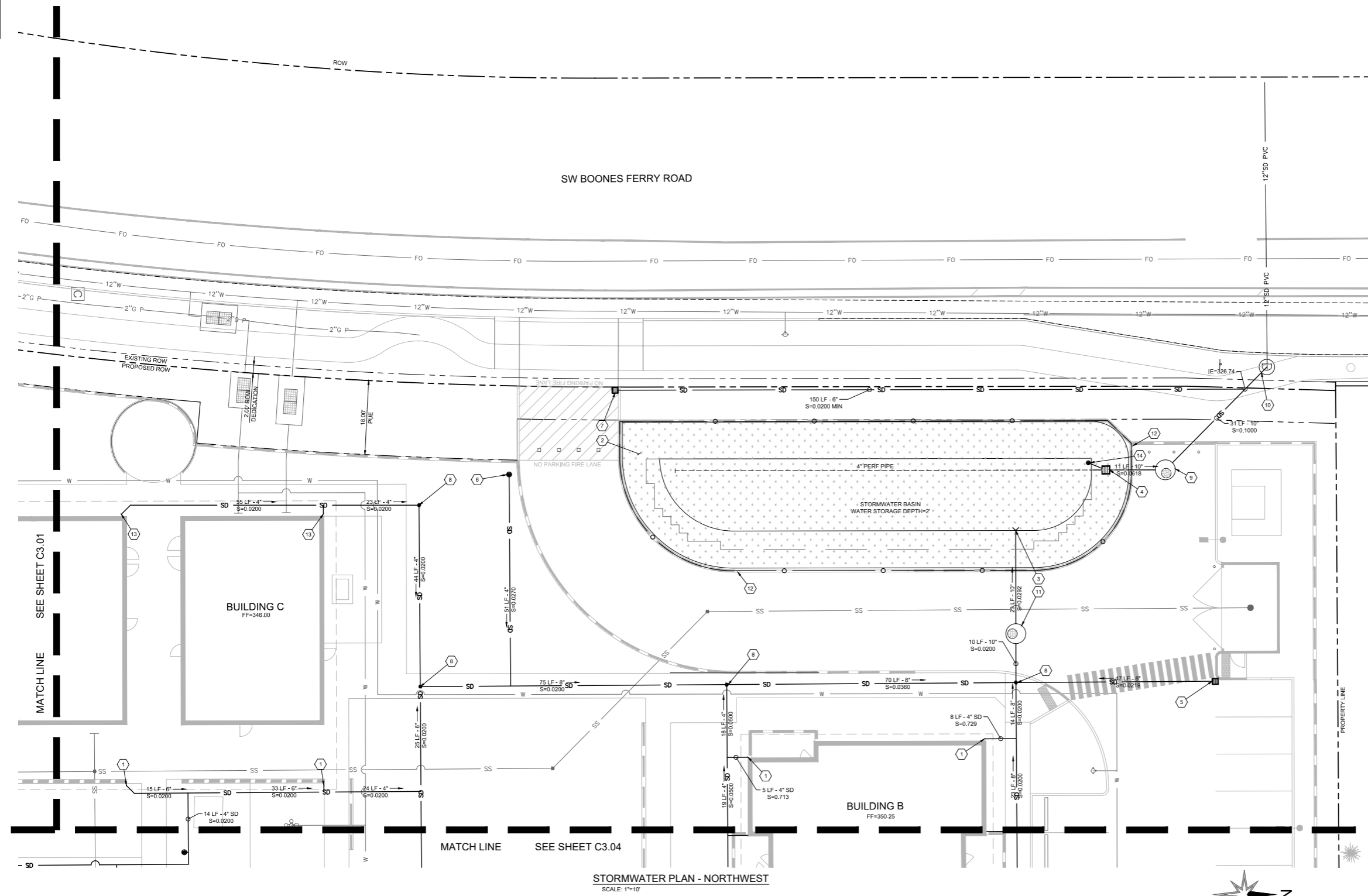
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GENERAL NOTES

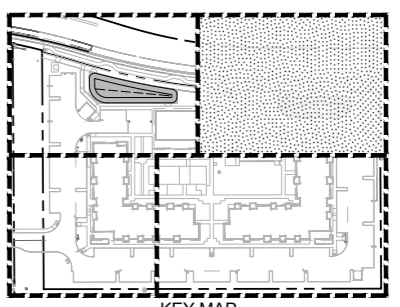
- ALL WORK IN PUBLIC RIGHT-OF-WAY UNDER SEPARATE CITY OF TUALATIN PUBLIC WORKS PERMIT AND WASHINGTON COUNTY FACILITIES PERMIT. REFERENCE PUBLIC PLANS.
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- FOR OTHER UTILITIES SEE SHEET C4.01.
- COORDINATE ALL RETAINING WALL PENETRATIONS WITH STRUCTURAL PLANS.

STORMWATER NOTES

- ROOF DRAIN CONNECTION FROM BUILDING B.
IE=343.00
- STORMWATER BASIN WITH 550 OLDCASTLE CUDO STORAGE CHAMBERS PER DETAIL 7/C6.01
AREA MANAGED=66,473 SF
BOTTOM AREA=2,200 SF
BOTTOM ELEVATION=336.25
WATER STORAGE DEPTH=2.0'
- OUTFALL TO STORMWATER BASIN.
IE=336.25
- DITCH INLET PER CWS STANDARD DRAWING NO. 390
FLOW INVERT=337.95
IE.IN=329.83
IE.OUT=329.83
- 18" SQUARE PARKING LOT CATCH BASIN PER DETAIL 4/C6.01
RIM=342.46
IE=340.46
- 12" DOMED AREA DRAIN PER DETAIL 3/C6.01
RIM=343.42
IE=340.32
- 18" SQUARE PARKING LOT CATCH BASIN PER DETAIL 4/C6.01
RIM=333.67
IE=332.17
- STORMWATER CLEANOUT TO GRADE PER DETAIL 5/C6.01.
- FLOW CONTROL MANHOLE PER DETAIL 6/C6.01
RIM=340.50
10" OVERFLOW=337.20
3.0" ORIFICE=336.88
0.5" ORIFICE=329.00
IE.IN=329.00
- CONNECT TO EXISTING STORM FACILITY
RIM=328.89
IE(E)=323.05
NEW 12" IE=326.04
- WATER QUALITY MANHOLE PER CWS STANDARD DRAWING NO. 250 AND 260
RIM=342.91
IE=336.91
- CURB SCUPPER PER DETAIL 10/C6.01.
- ROOF DRAIN CONNECTION FROM BUILDING C.
IE=342.50
- 12" STEEL GIBSON CATCH BASIN WITH DOMED TOP AND 0.71" ORIFICE FLOW CONTROL PER DETAIL 13/C6.01.
RIM=336.25
IE=335.25



STORMWATER PLAN - NORTHWEST
SCALE: 1"=10'

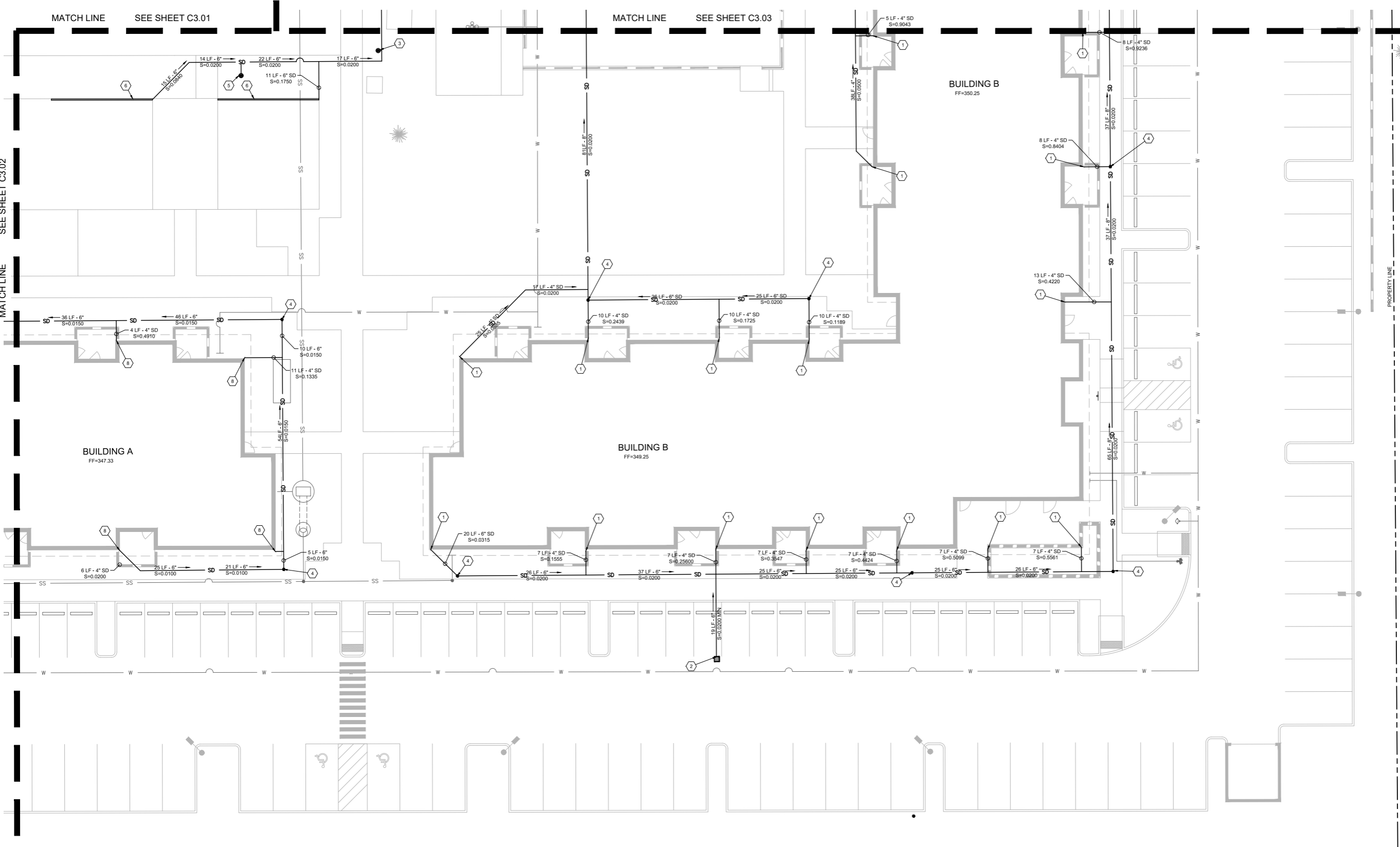


KEY MAP
SCALE: 1"=120'

MATCH LINE SEE SHEET C3.01

MATCH LINE SEE SHEET C3.04

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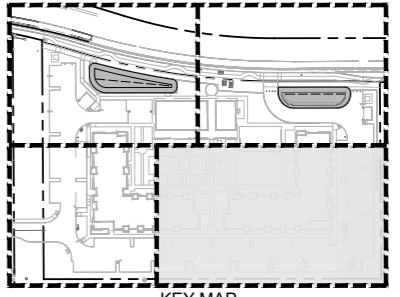
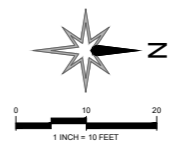
STORMWATER PLAN - NORTHEAST
SCALE: 1"=10'

STORMWATER NOTES

1. ROOF DRAIN CONNECTION FROM BUILDING B.
IE=344.75
2. 18" SQUARE PARKING LOT CATCH BASIN PER DETAIL 4/C6.01
RIM=346.65
IE=344.65
3. 12" DOMED LANDSCAPE AREA DRAIN PER DETAIL 3/C6.01
RIM=345.85
IE=343.85
4. STORMWATER CLEANOUT TO GRADE PER DETAIL 5/C6.01
IE=343.33
RIM=345.33
5. 12" DOMED LANDSCAPE AREA DRAIN PER DETAIL 3/C6.01
IE=343.33
RIM=345.33
6. TRENCH DRAIN, SEE ARCHITECTURAL PLANS
RIM=345.65
IE=344.15
7. TRENCH DRAIN, SEE ARCHITECTURAL PLANS
RIM=345.75
IE=344.25
8. ROOF DRAIN CONNECTION FROM BUILDING A.
IE=345.83

GENERAL NOTES

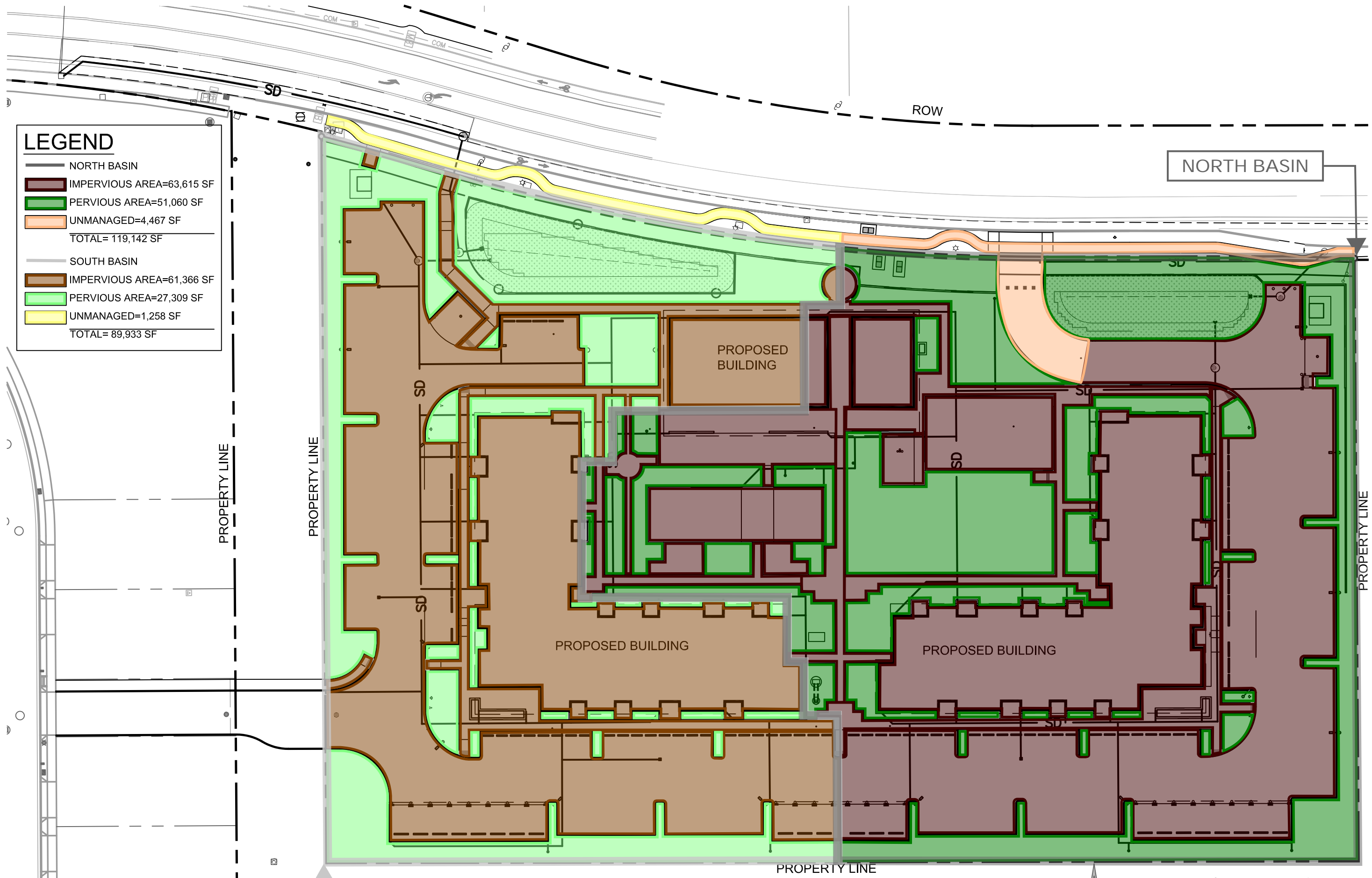
1. INSTALL "NO DUMPING / LEADS TO GROUNDWATER" MARKER AT ALL ONSITE CATCH BASINS PER DETAIL 11/C6.00.
2. FOR OTHER UTILITIES SEE SHEET C4.02.
3. COORDINATE ALL RETAINING WALL PENETRATIONS WITH STRUCTURAL PLANS.



KEY MAP
SCALE: 1"=120'

LEGEND

- NORTH BASIN
- IMPERVIOUS AREA=63,615 SF
- PERVIOUS AREA=51,060 SF
- UNMANAGED=4,467 SF
- TOTAL= 119,142 SF
- SOUTH BASIN
- IMPERVIOUS AREA=61,366 SF
- PERVIOUS AREA=27,309 SF
- UNMANAGED=1,258 SF
- TOTAL= 89,933 SF



NORTH BASIN

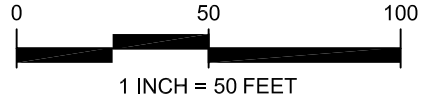
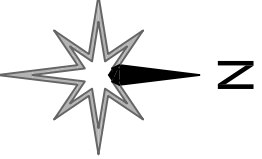
PROPOSED BUILDING

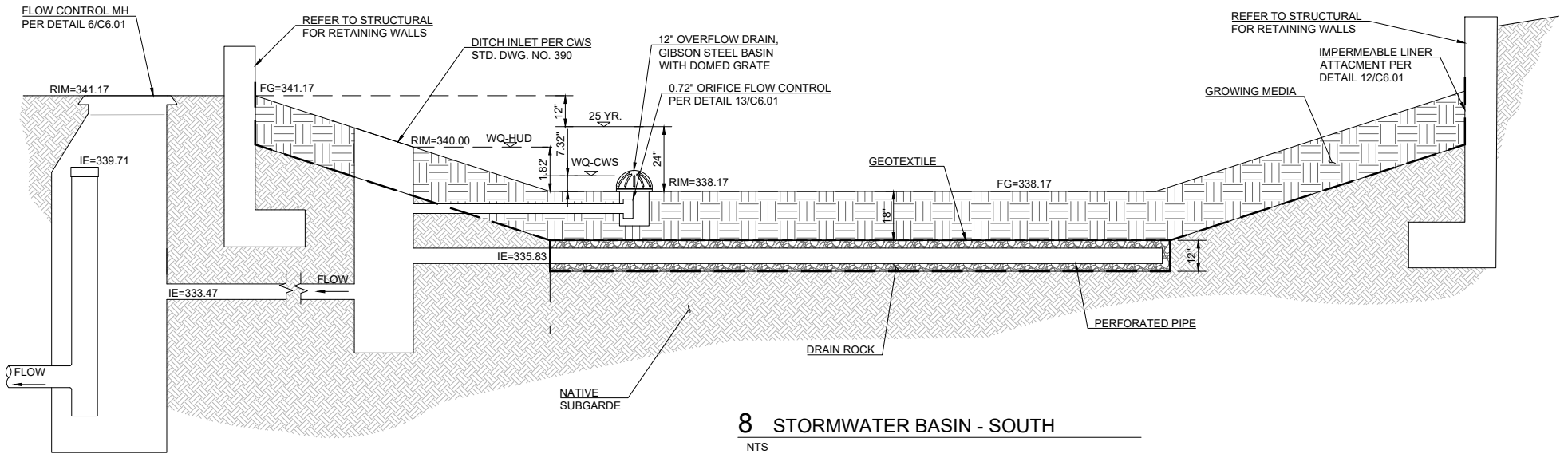
PROPOSED BUILDING

PROPOSED BUILDING

SOUTH BASIN

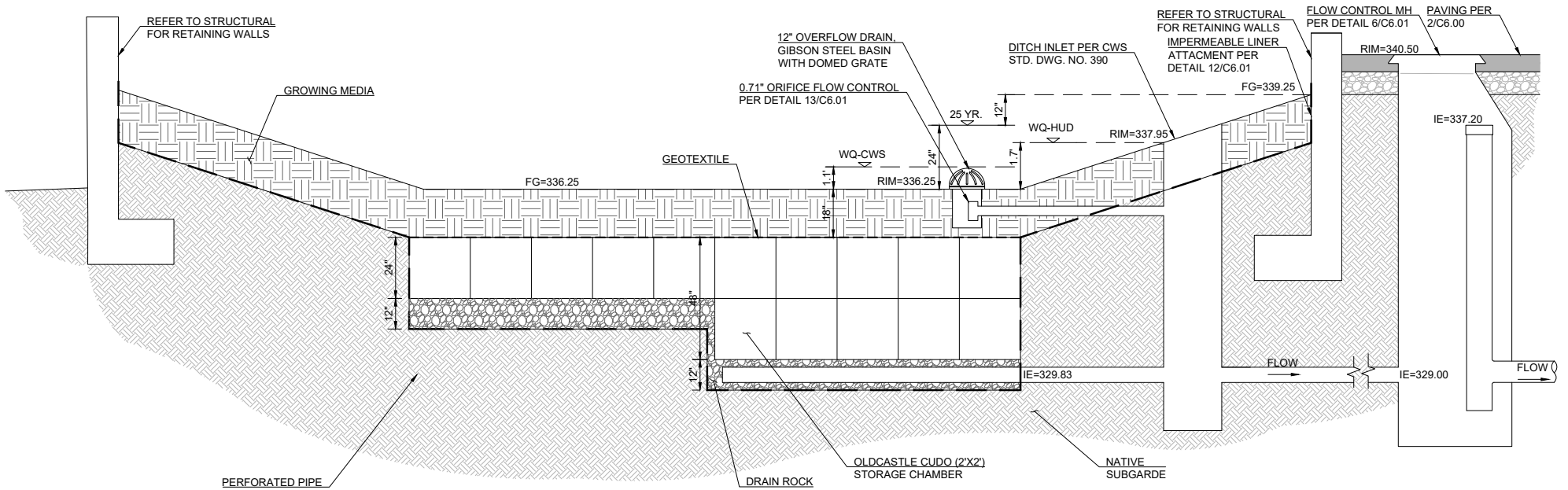
CATCHMENT MAP





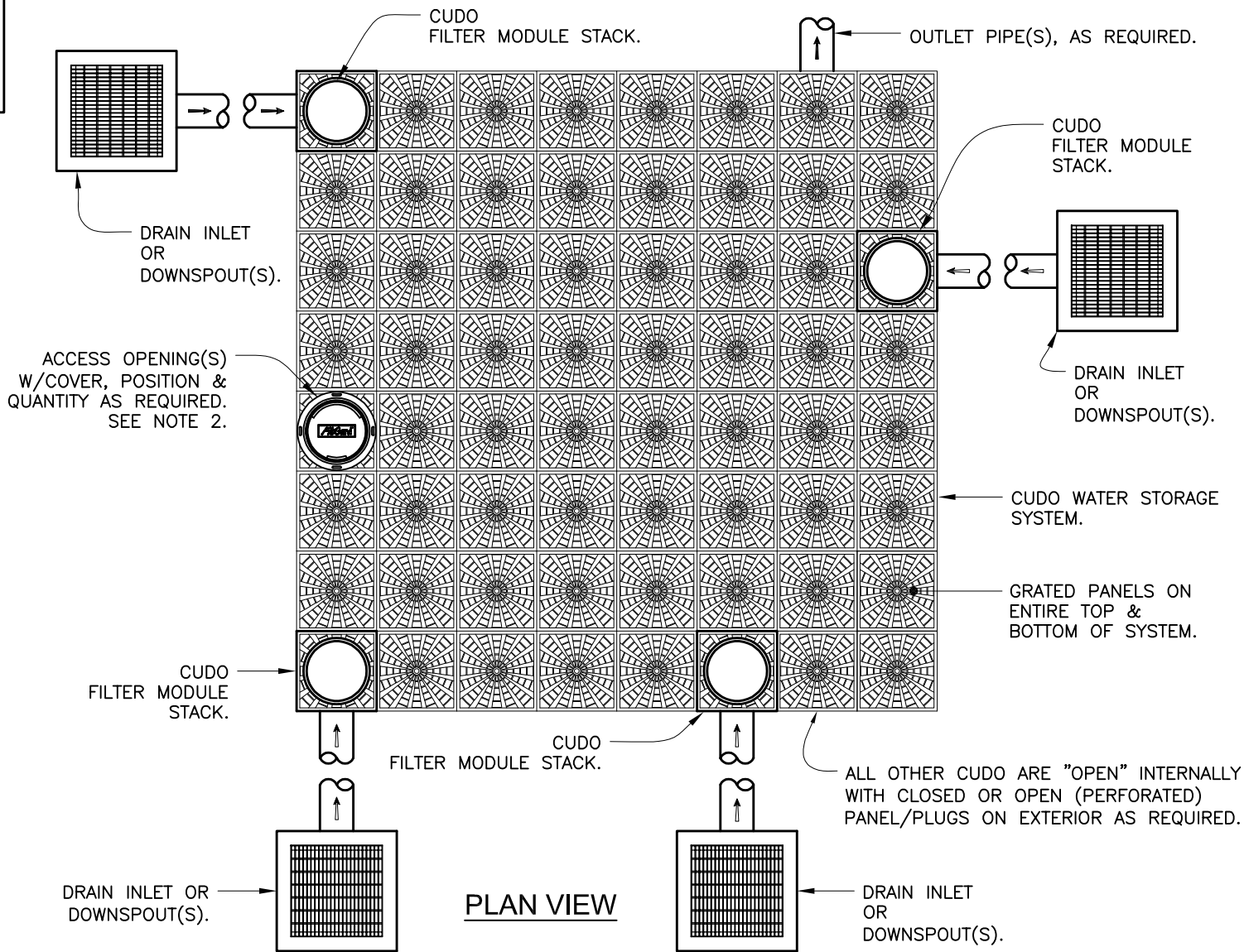
8 STORMWATER BASIN - SOUTH

NTS

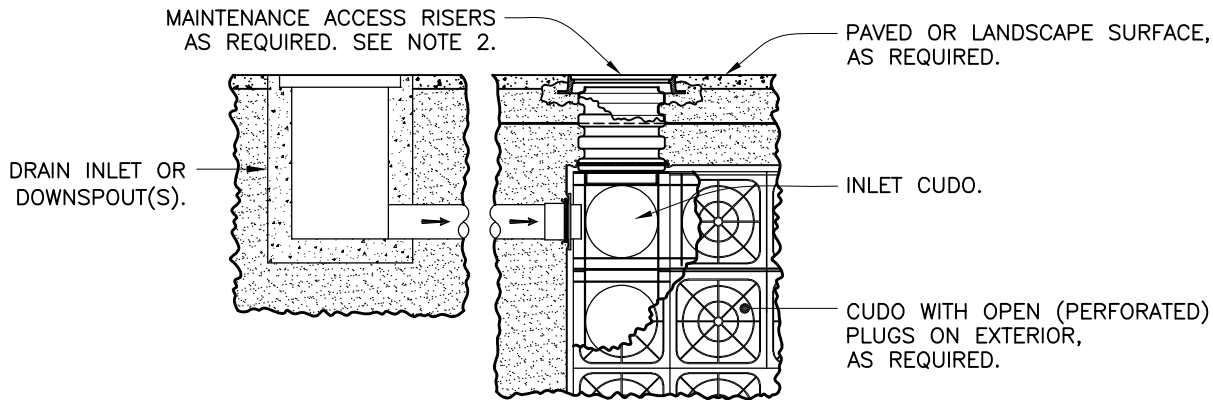


7 STORMWATER BASIN - NORTH

NTS



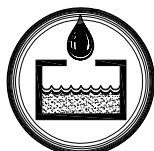
PLAN VIEW



SIDE SECTION VIEW

NOTES:

1. REFER TO CUDO INSTALLATION DETAILS.
2. SEE CUDO-0008 FOR TYPICAL MAINTENANCE ACCESS CONFIGURATION.



Detention/
Infiltration

CUDO®
Water Storage System
Typical System Layout
w/ Filter Module Stacks



Oldcastle®
Stormwater Solutions

7921 Southpark Plaza, Suite 200 | Littleton, CO | 80120 | Ph: 800.579.8819 | oldcastlestormwater.com

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DRAWING NO. CUDO-0007	REV C	ECO ECO-0154 ZHD 2/6/18	DATE JPR 5/2/08	SHEET 1 OF 1
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Appendix B: Stormwater Calculations

HydroCad Reports

Water Quality Calculations

HYDROCAD REPORT

TABLE OF CONTENTS

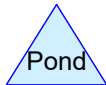
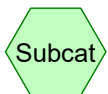
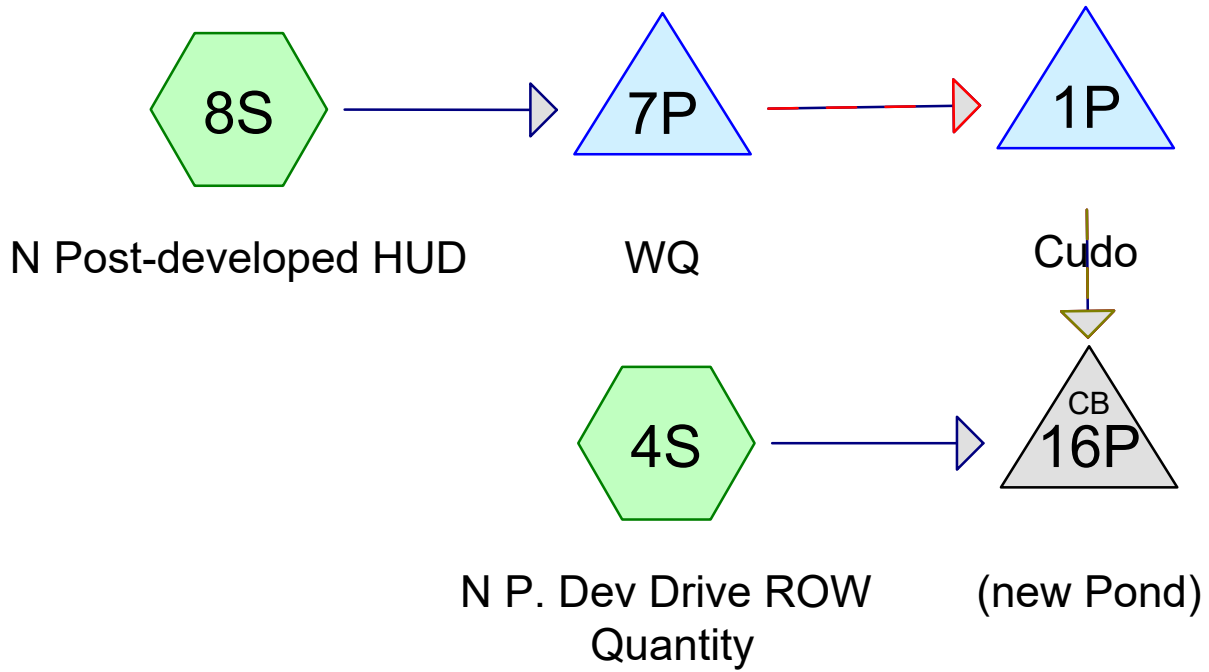
NORTH BASIN

2-YEAR STORM
5-YEAR STORM
10-YEAR STORM
25-YEAR STORM
WQ STORM - HUD

SOUTH BASIN

2-YEAR STORM
5-YEAR STORM
10-YEAR STORM
25-YEAR STORM
WQ STORM - HUD

NORTH BASIN ROUTING DIAGRAM



NORTH BASIN 2-YEAR STORM

NORTH PREDEVELOPED 2-YEAR STORM

Plambeck Gardens AW

Type IA 24-hr 2-yr Rainfall=2.50"

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Page 1

Summary for Subcatchment 2S: Pre North

Runoff = 0.07 cfs @ 8.98 hrs, Volume= 3,915 cf, Depth= 0.47"

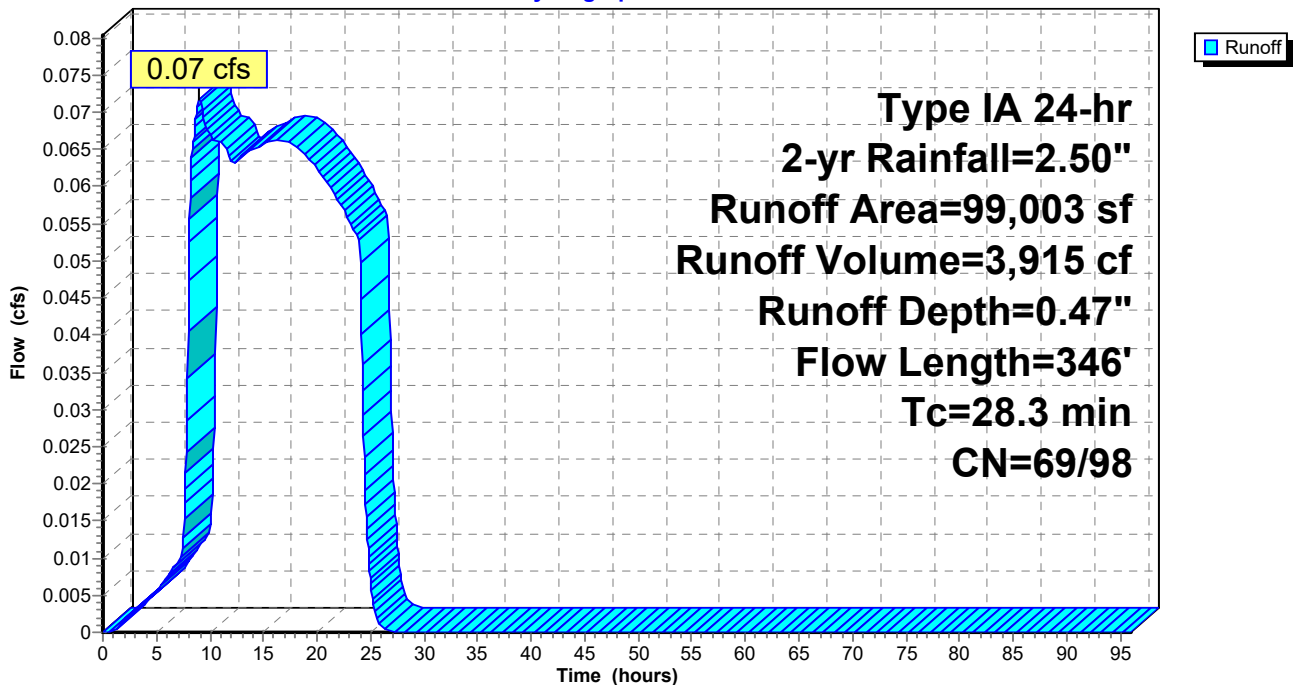
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2-yr Rainfall=2.50"

Area (sf)	CN	Description
860	85	Gravel roads, HSG B
450	98	Paved parking, HSG B
2,422	98	Roofs, HSG B
92,895	69	Pasture/grassland/range, Fair, HSG B
2,376	69	Pasture/grassland/range, Fair, HSG B
99,003	70	Weighted Average
96,131	69	97.10% Pervious Area
2,872	98	2.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.1	300	0.0450	0.18		Sheet Flow, sheet flow Grass: Dense n= 0.240 P2= 2.50"
0.2	46	0.0650	3.82		Shallow Concentrated Flow, shallow Grassed Waterway Kv= 15.0 fps
28.3	346	Total			

Subcatchment 2S: Pre North

Hydrograph



NORTH POST-DEVELOPED BASIN RUNOFF - 2-YEAR STORM

Plambeck Gardens AW

Type IA 24-hr 2-yr Rainfall=2.50"

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Summary for Subcatchment 8S: N Post-developed HUD

Runoff = 0.83 cfs @ 7.99 hrs, Volume= 13,975 cf, Depth= 1.46"

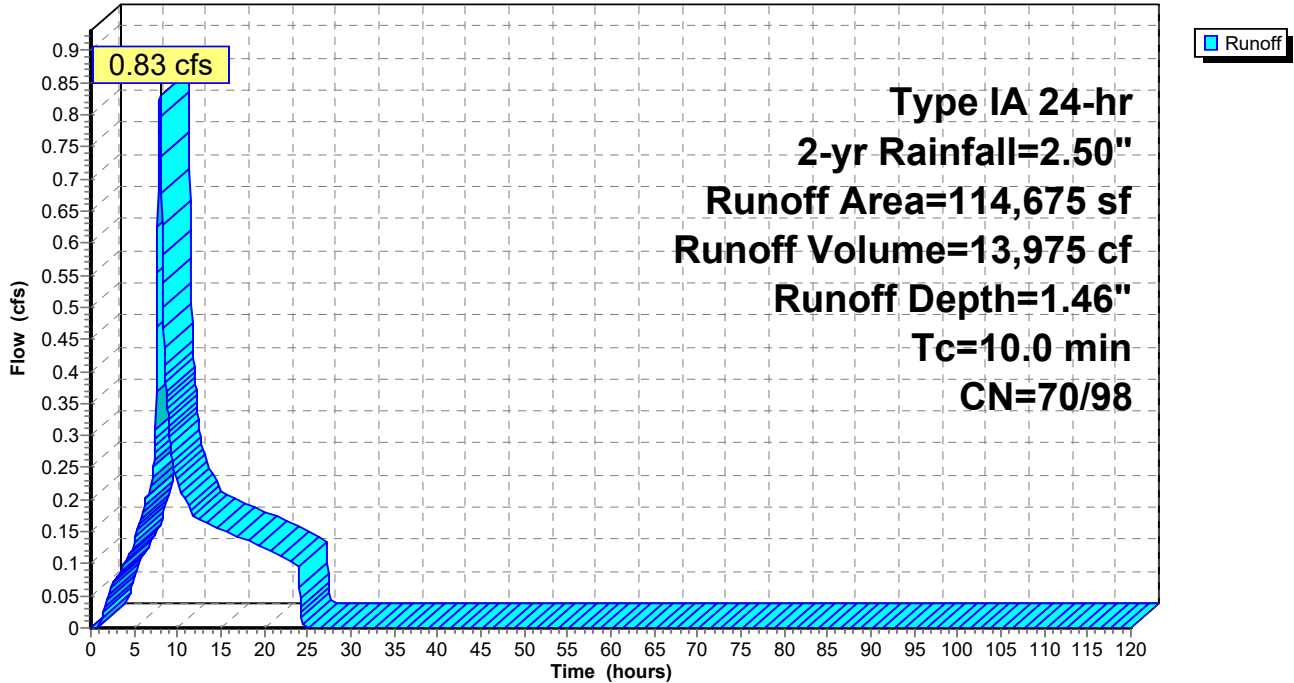
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2-yr Rainfall=2.50"

	Area (sf)	CN	Description
*	63,615	98	
	3,514	85	Gravel roads, HSG B
	47,546	69	50-75% Grass cover, Fair, HSG B
<hr/>			
	114,675	86	Weighted Average
	51,060	70	44.53% Pervious Area
	63,615	98	55.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Subcatchment 8S: N Post-developed HUD

Hydrograph



Plambeck Gardens AW

Type IA 24-hr 2-yr Rainfall=2.50"

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Summary for Pond 1P: Cudo

[81] Warning: Exceeded Pond 7P by 4.51' @ 114.75 hrs

[81] Warning: Exceeded Pond 7P by 4.51' @ 114.75 hrs

Inflow Area = 114,675 sf, 55.47% Impervious, Inflow Depth > 1.41" for 2-yr event
 Inflow = 0.33 cfs @ 8.93 hrs, Volume= 13,439 cf
 Outflow = 0.01 cfs @ 48.27 hrs, Volume= 5,778 cf, Atten= 95%, Lag= 2,360.2 min
 Primary = 0.01 cfs @ 48.27 hrs, Volume= 5,778 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 Peak Elev= 105.11' @ 48.27 hrs Surf.Area= 2,854 sf Storage= 8,686 cf

Plug-Flow detention time= 3,200.9 min calculated for 5,776 cf (43% of inflow)
 Center-of-Mass det. time= 2,086.6 min (3,906.2 - 1,819.6)

Volume	Invert	Avail.Storage	Storage Description			
#1	100.00'	13,467 cf	Custom Stage Data (Pyramidal) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
100.00	2,220	0.0	0	0	2,220	
101.00	2,220	30.0	666	666	2,408	
103.00	2,220	95.0	4,218	4,884	2,785	
103.01	1,722	20.0	4	4,888	3,283	
103.51	1,722	20.0	172	5,060	3,366	
106.50	4,067	100.0	8,407	13,467	5,794	

Device	Routing	Invert	Outlet Devices	
#1	Primary	100.00'	0.50" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads	
#2	Secondary	105.13'	3.00" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads	
#3	Tertiary	105.45'	10.00" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads	

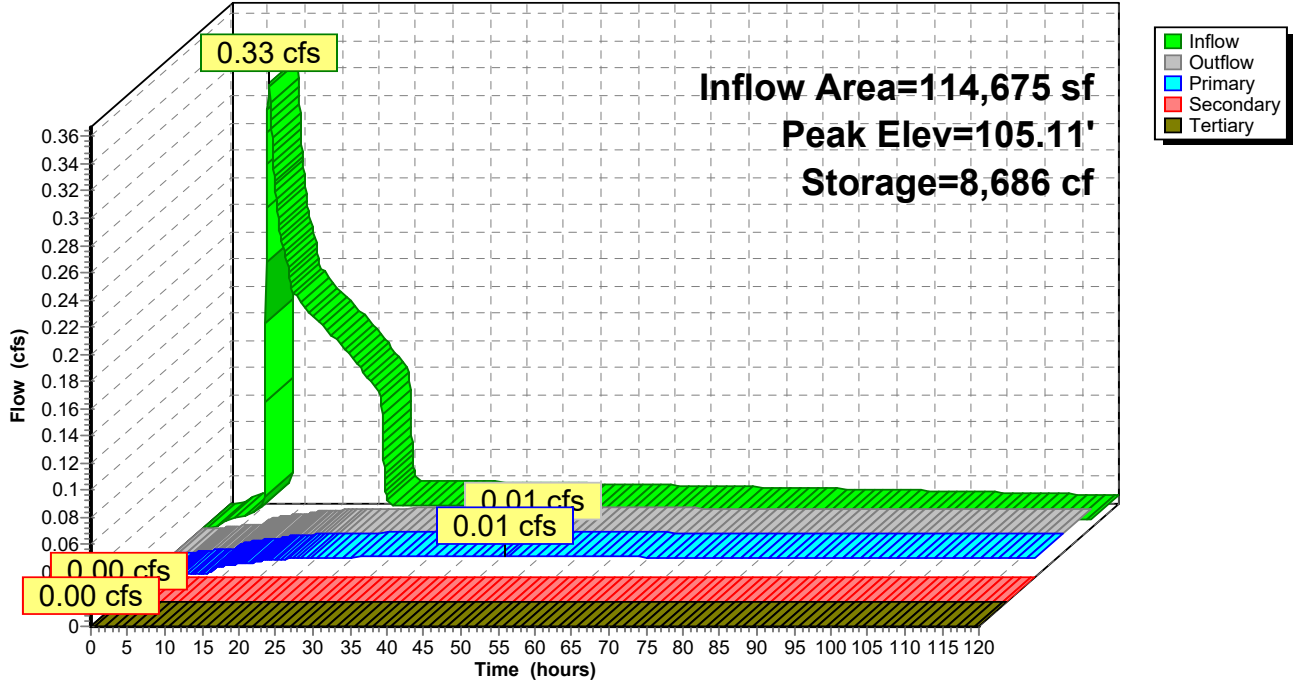
Primary OutFlow Max=0.01 cfs @ 48.27 hrs HW=105.11' (Free Discharge)
 ↳1=Orifice/Grate (Orifice Controls 0.01 cfs @ 10.89 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=100.00' (Free Discharge)
 ↳2=Orifice/Grate (Controls 0.00 cfs)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=100.00' (Free Discharge)
 ↳3=Orifice/Grate (Controls 0.00 cfs)

Pond 1P: Cudo

Hydrograph



Plambeck Gardens AW

Type IA 24-hr 2-yr Rainfall=2.50"

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Summary for Pond 7P: WQ

Inflow Area = 114,675 sf, 55.47% Impervious, Inflow Depth = 1.46" for 2-yr event
 Inflow = 0.83 cfs @ 7.99 hrs, Volume= 13,975 cf
 Outflow = 0.33 cfs @ 8.93 hrs, Volume= 13,439 cf, Atten= 61%, Lag= 56.7 min
 Primary = 0.02 cfs @ 8.93 hrs, Volume= 5,363 cf
 Secondary = 0.31 cfs @ 8.93 hrs, Volume= 8,076 cf

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 Peak Elev= 101.80' @ 8.93 hrs Surf.Area= 3,279 sf Storage= 4,949 cf

Plug-Flow detention time= 1,129.4 min calculated for 13,433 cf (96% of inflow)
 Center-of-Mass det. time= 1,103.8 min (1,819.6 - 715.8)

Volume	Invert	Avail.Storage	Storage Description			
#1	100.00'	9,360 cf	Custom Stage Data (Pyramidal) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
100.00	2,261	0.0	0	0	2,261	
103.00	4,067	100.0	9,360	9,360	4,187	

Device	Routing	Invert	Outlet Devices	
#1	Primary	100.01'	0.71" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads	
#2	Secondary	101.70'	12.00" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads	

Primary OutFlow Max=0.02 cfs @ 8.93 hrs HW=101.80' (Free Discharge)
 ↑1=Orifice/Grate (Orifice Controls 0.02 cfs @ 6.44 fps)

Secondary OutFlow Max=0.31 cfs @ 8.93 hrs HW=101.80' (Free Discharge)
 ↑2=Orifice/Grate (Weir Controls 0.31 cfs @ 1.02 fps)

Plambeck Gardens AW

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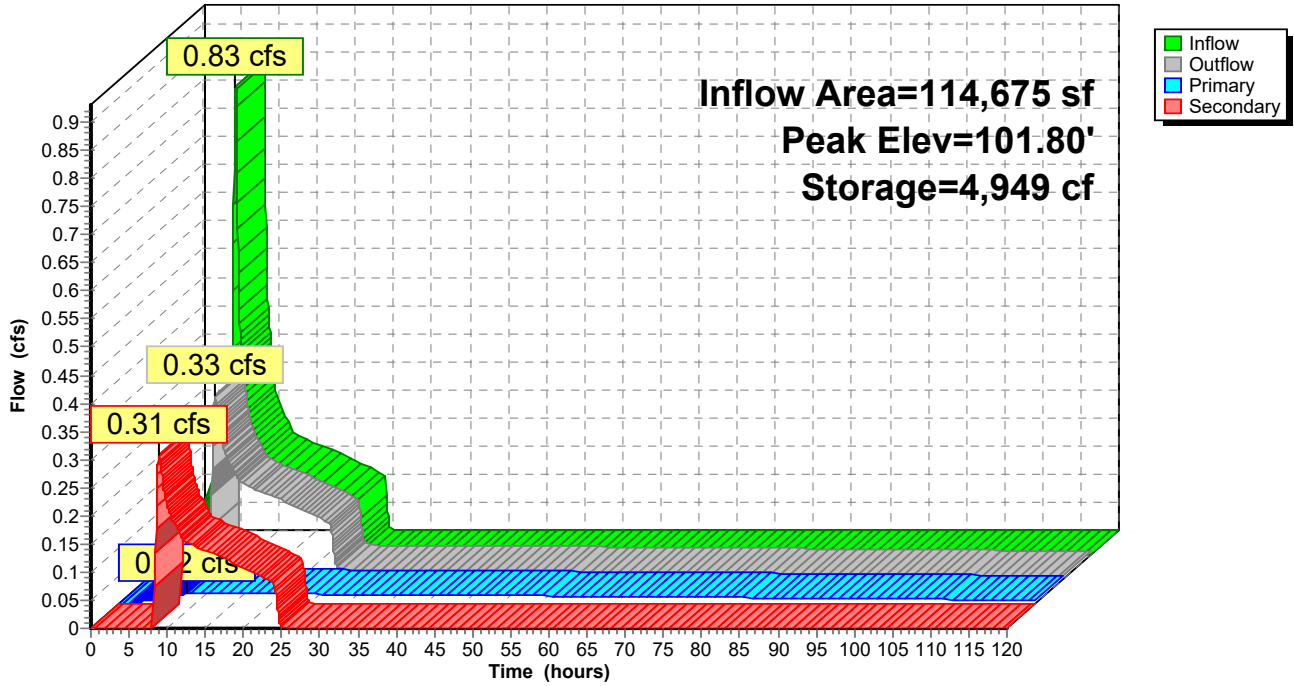
Type IA 24-hr 2-yr Rainfall=2.50"

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Pond 7P: WQ

Hydrograph



NORTH UNMANAGED DRIVEWAY RUNOFF - 2-YEAR STORM

Plambeck Gardens AW

Type IA 24-hr 2-yr Rainfall=2.50"

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Page 2

Summary for Subcatchment 4S: N P. Dev Drive ROW Quantity

Runoff = 0.06 cfs @ 7.98 hrs, Volume= 845 cf, Depth= 2.27"

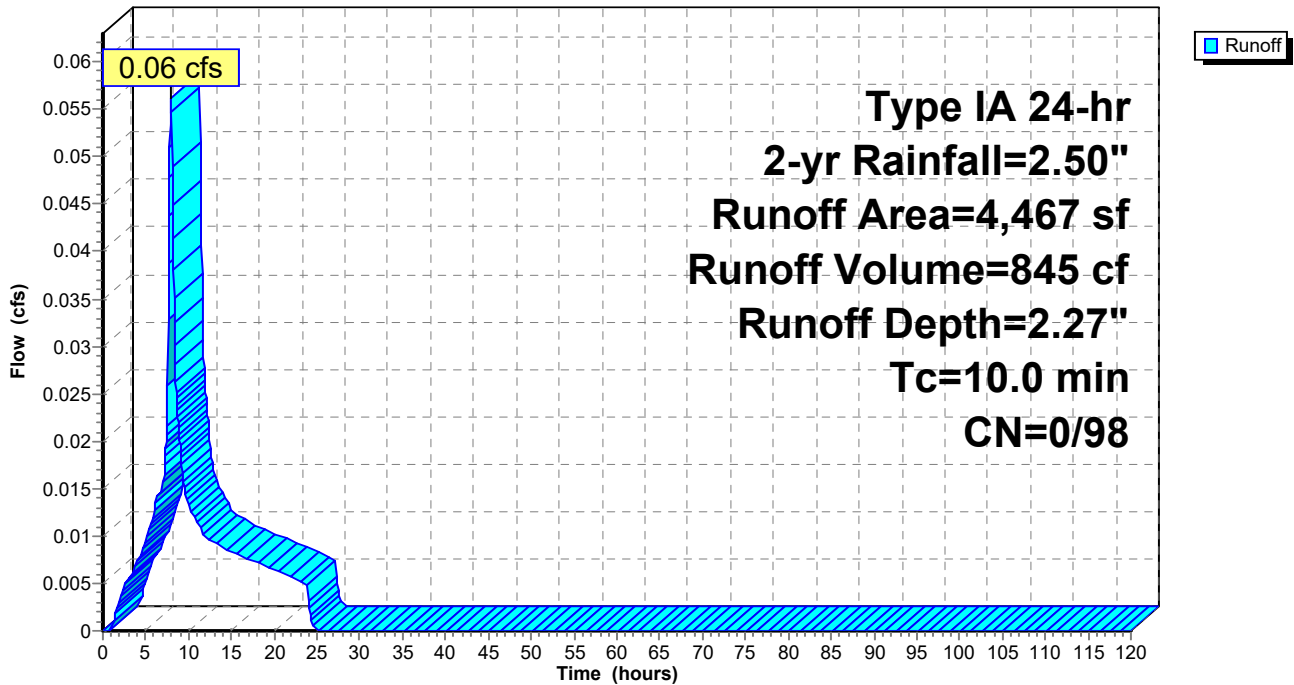
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2-yr Rainfall=2.50"

	Area (sf)	CN	Description
*	4,467	98	New driveway
	4,467	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Subcatchment 4S: N P. Dev Drive ROW Quantity

Hydrograph



NORTH TOTAL DISCHARGE FROM SITE - 2-YEAR STORM

Plambeck Gardens AW

Type IA 24-hr 2-yr Rainfall=2.50"

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Summary for Pond 16P: (new Pond)

[57] Hint: Peaked at 93.10' (Flood elevation advised)

Inflow Area = 119,142 sf, 57.14% Impervious, Inflow Depth > 0.67" for 2-yr event
Inflow = 0.06 cfs @ 7.98 hrs, Volume= 6,623 cf
Outflow = 0.06 cfs @ 7.98 hrs, Volume= 6,623 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.06 cfs @ 7.98 hrs, Volume= 6,623 cf

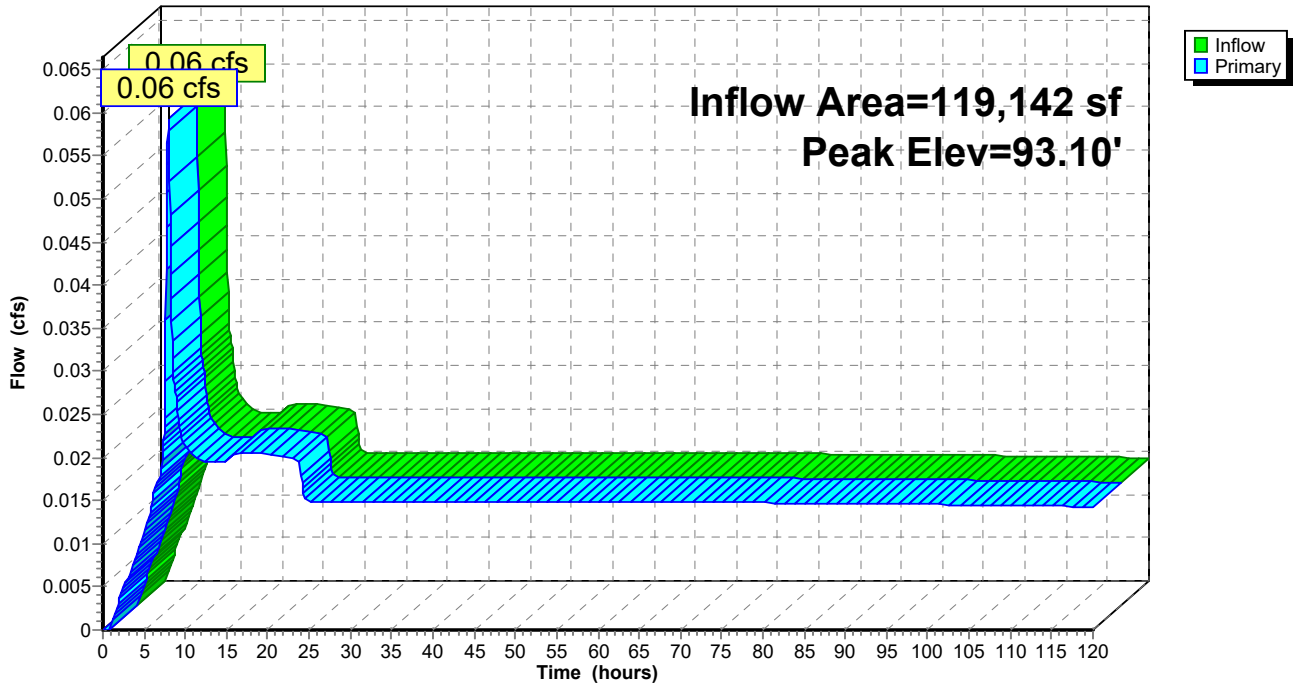
Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 93.10' @ 7.98 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	93.00'	20.00" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=0.06 cfs @ 7.98 hrs HW=93.10' (Free Discharge)
↑1=Orifice/Grate (Orifice Controls 0.06 cfs @ 1.08 fps)

Pond 16P: (new Pond)

Hydrograph



NORTH BASIN 5-YEAR STORM

NORTH PREDEVELOPED 5-YEAR STORM

Plambeck Gardens AW

Type IA 24-hr 5-yr Rainfall=3.10"

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Page 2

Summary for Subcatchment 2S: Pre North

Runoff = 0.16 cfs @ 8.28 hrs, Volume= 6,486 cf, Depth= 0.79"

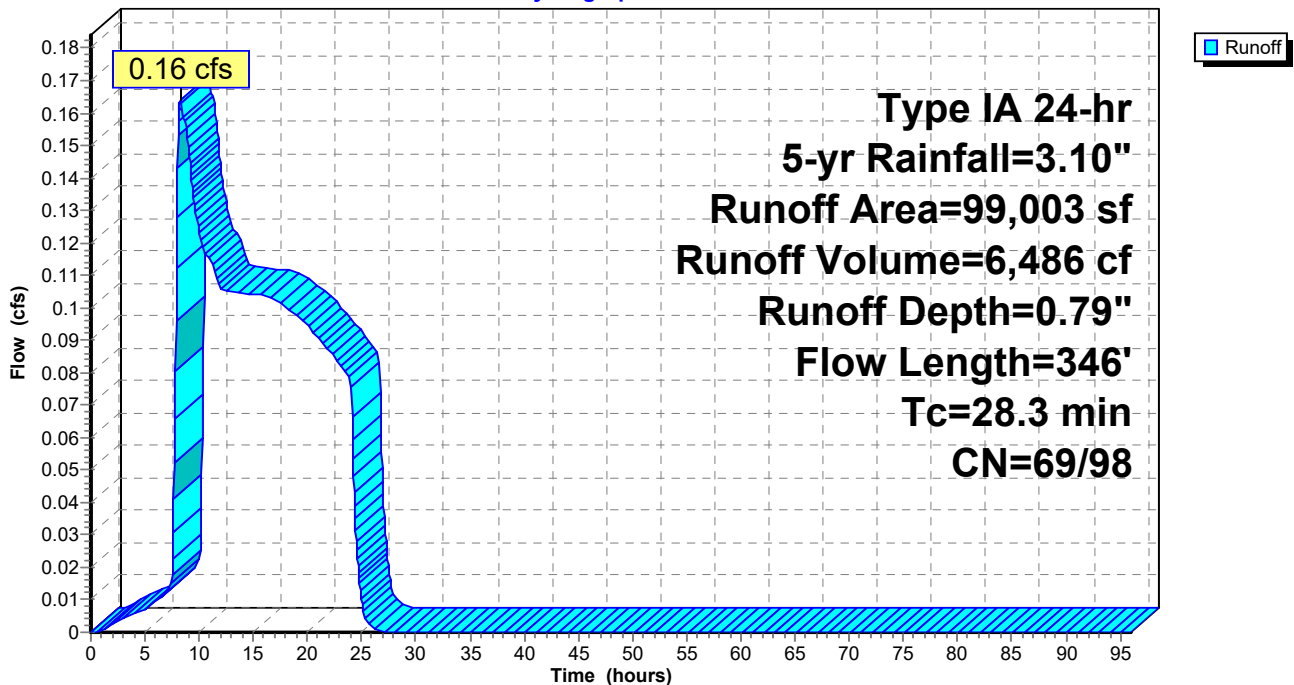
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type IA 24-hr 5-yr Rainfall=3.10"

Area (sf)	CN	Description
860	85	Gravel roads, HSG B
450	98	Paved parking, HSG B
2,422	98	Roofs, HSG B
92,895	69	Pasture/grassland/range, Fair, HSG B
2,376	69	Pasture/grassland/range, Fair, HSG B
99,003	70	Weighted Average
96,131	69	97.10% Pervious Area
2,872	98	2.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.1	300	0.0450	0.18		Sheet Flow, sheet flow Grass: Dense n= 0.240 P2= 2.50"
0.2	46	0.0650	3.82		Shallow Concentrated Flow, shallow Grassed Waterway Kv= 15.0 fps
28.3	346	Total			

Subcatchment 2S: Pre North

Hydrograph



NORTH POST-DEVELOPED BASIN RUNOFF - 5-YEAR STORM

Plambeck Gardens AW

Type IA 24-hr 5-yr Rainfall=3.10"

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Summary for Subcatchment 8S: N Post-developed HUD

Runoff = 1.12 cfs @ 7.99 hrs, Volume= 18,482 cf, Depth= 1.93"

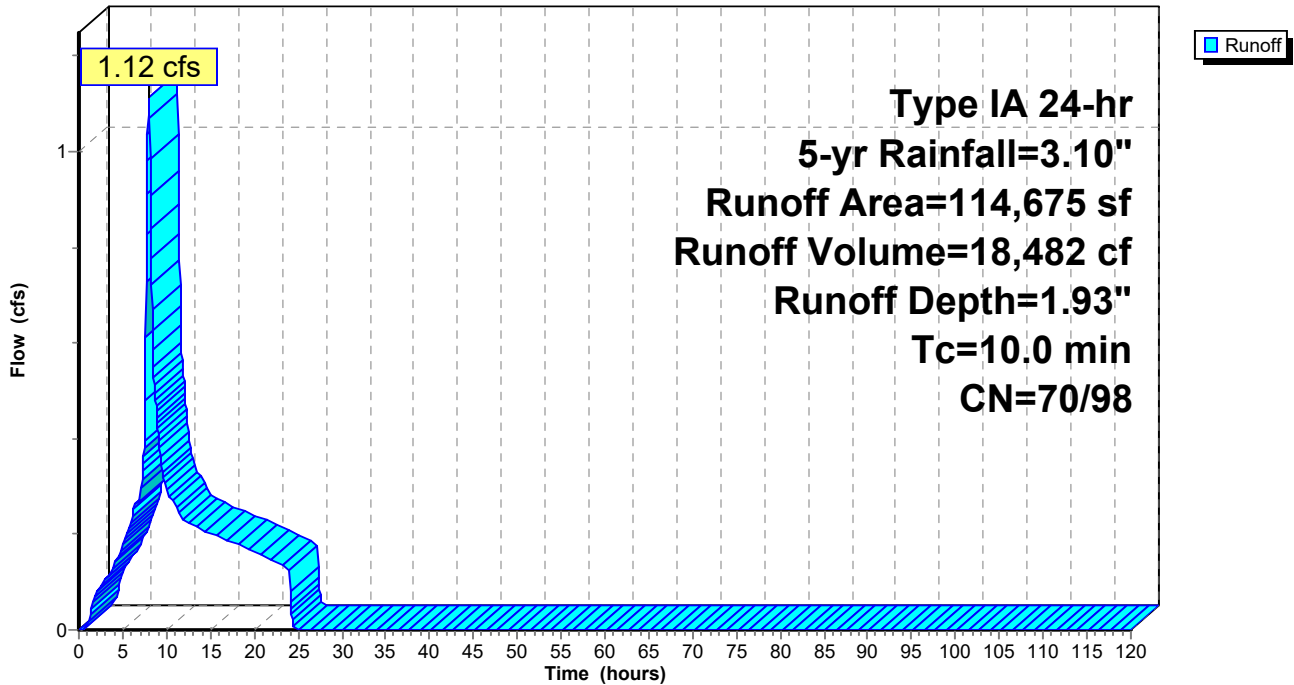
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Type IA 24-hr 5-yr Rainfall=3.10"

	Area (sf)	CN	Description
*	63,615	98	
	3,514	85	Gravel roads, HSG B
	47,546	69	50-75% Grass cover, Fair, HSG B
<hr/>			
	114,675	86	Weighted Average
	51,060	70	44.53% Pervious Area
	63,615	98	55.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Subcatchment 8S: N Post-developed HUD

Hydrograph



Plambeck Gardens AW

Type IA 24-hr 5-yr Rainfall=3.10"

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Summary for Pond 1P: Cudo

[81] Warning: Exceeded Pond 7P by 4.53' @ 114.70 hrs

[81] Warning: Exceeded Pond 7P by 4.53' @ 114.70 hrs

Inflow Area = 114,675 sf, 55.47% Impervious, Inflow Depth > 1.88" for 5-yr event
 Inflow = 0.80 cfs @ 8.24 hrs, Volume= 17,944 cf
 Outflow = 0.15 cfs @ 21.94 hrs, Volume= 10,232 cf, Atten= 82%, Lag= 822.0 min
 Primary = 0.02 cfs @ 21.94 hrs, Volume= 5,922 cf
 Secondary = 0.13 cfs @ 21.94 hrs, Volume= 4,310 cf
 Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 Peak Elev= 105.45' @ 21.94 hrs Surf.Area= 3,127 sf Storage= 9,686 cf

Plug-Flow detention time= 2,072.4 min calculated for 10,228 cf (57% of inflow)
 Center-of-Mass det. time= 1,227.7 min (2,781.1 - 1,553.4)

Volume	Invert	Avail.Storage	Storage Description			
#1	100.00'	13,467 cf	Custom Stage Data (Pyramidal) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
100.00	2,220	0.0	0	0	2,220	
101.00	2,220	30.0	666	666	2,408	
103.00	2,220	95.0	4,218	4,884	2,785	
103.01	1,722	20.0	4	4,888	3,283	
103.51	1,722	20.0	172	5,060	3,366	
106.50	4,067	100.0	8,407	13,467	5,794	

Device	Routing	Invert	Outlet Devices
#1	Primary	100.00'	0.50" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Secondary	105.13'	3.00" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Tertiary	105.45'	10.00" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

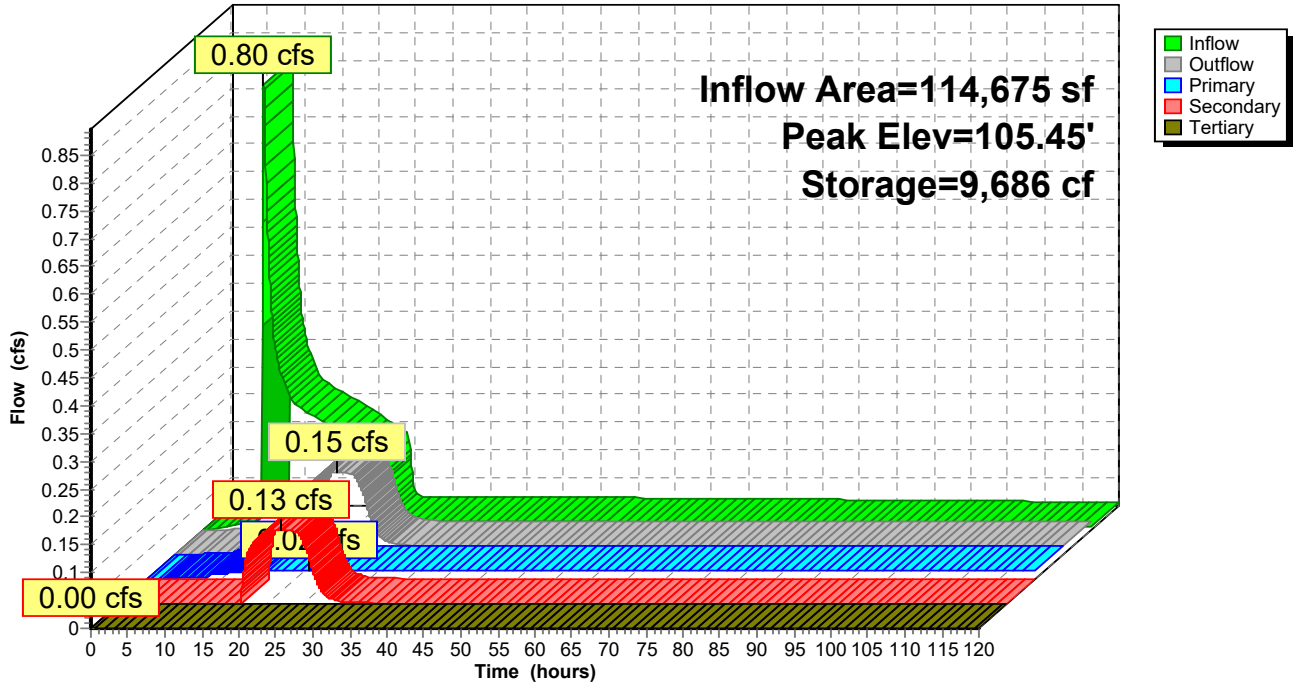
Primary OutFlow Max=0.02 cfs @ 21.94 hrs HW=105.45' (Free Discharge)
 ↖**1=Orifice/Grate** (Orifice Controls 0.02 cfs @ 11.24 fps)

Secondary OutFlow Max=0.13 cfs @ 21.94 hrs HW=105.45' (Free Discharge)
 ↖**2=Orifice/Grate** (Orifice Controls 0.13 cfs @ 2.71 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=100.00' (Free Discharge)
 ↖**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 1P: Cudo

Hydrograph



Plambeck Gardens AW

Type IA 24-hr 5-yr Rainfall=3.10"

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Summary for Pond 7P: WQ

Inflow Area = 114,675 sf, 55.47% Impervious, Inflow Depth = 1.93" for 5-yr event
 Inflow = 1.12 cfs @ 7.99 hrs, Volume= 18,482 cf
 Outflow = 0.80 cfs @ 8.24 hrs, Volume= 17,944 cf, Atten= 28%, Lag= 15.0 min
 Primary = 0.02 cfs @ 8.24 hrs, Volume= 5,406 cf
 Secondary = 0.78 cfs @ 8.24 hrs, Volume= 12,538 cf

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 Peak Elev= 101.88' @ 8.24 hrs Surf.Area= 3,331 sf Storage= 5,222 cf

Plug-Flow detention time= 858.9 min calculated for 17,936 cf (97% of inflow)
 Center-of-Mass det. time= 839.9 min (1,553.4 - 713.5)

Volume	Invert	Avail.Storage	Storage Description			
#1	100.00'	9,360 cf	Custom Stage Data (Pyramidal) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
100.00	2,261	0.0	0	0	2,261	
103.00	4,067	100.0	9,360	9,360	4,187	

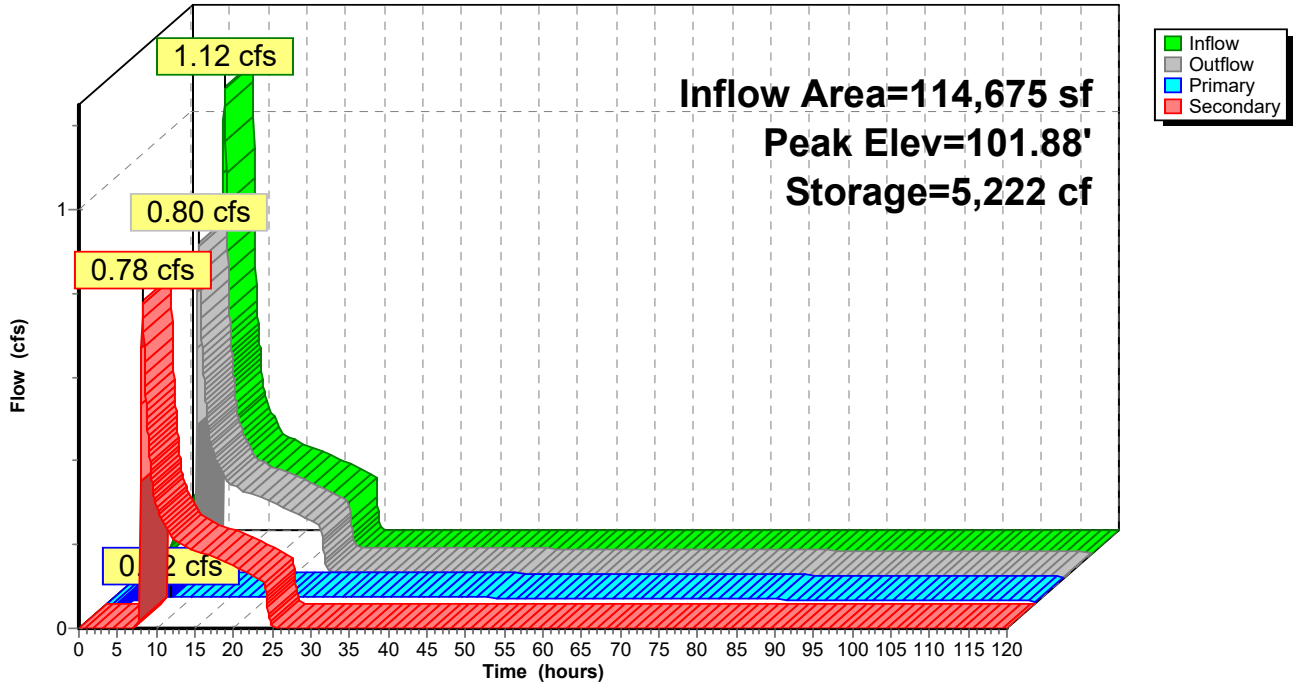
Device	Routing	Invert	Outlet Devices	
#1	Primary	100.01'	0.71" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads	
#2	Secondary	101.70'	12.00" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads	

Primary OutFlow Max=0.02 cfs @ 8.24 hrs HW=101.88' (Free Discharge)
 ↑**1=Orifice/Grate** (Orifice Controls 0.02 cfs @ 6.58 fps)

Secondary OutFlow Max=0.78 cfs @ 8.24 hrs HW=101.88' (Free Discharge)
 ↑**2=Orifice/Grate** (Weir Controls 0.78 cfs @ 1.38 fps)

Pond 7P: WQ

Hydrograph



NORTH UNMANAGED DRIVEWAY RUNOFF - 5-YEAR STORM

Plambeck Gardens AW

Type IA 24-hr 5-yr Rainfall=3.10"

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Summary for Subcatchment 4S: N P. Dev Drive ROW Quantity

Runoff = 0.07 cfs @ 7.98 hrs, Volume= 1,068 cf, Depth= 2.87"

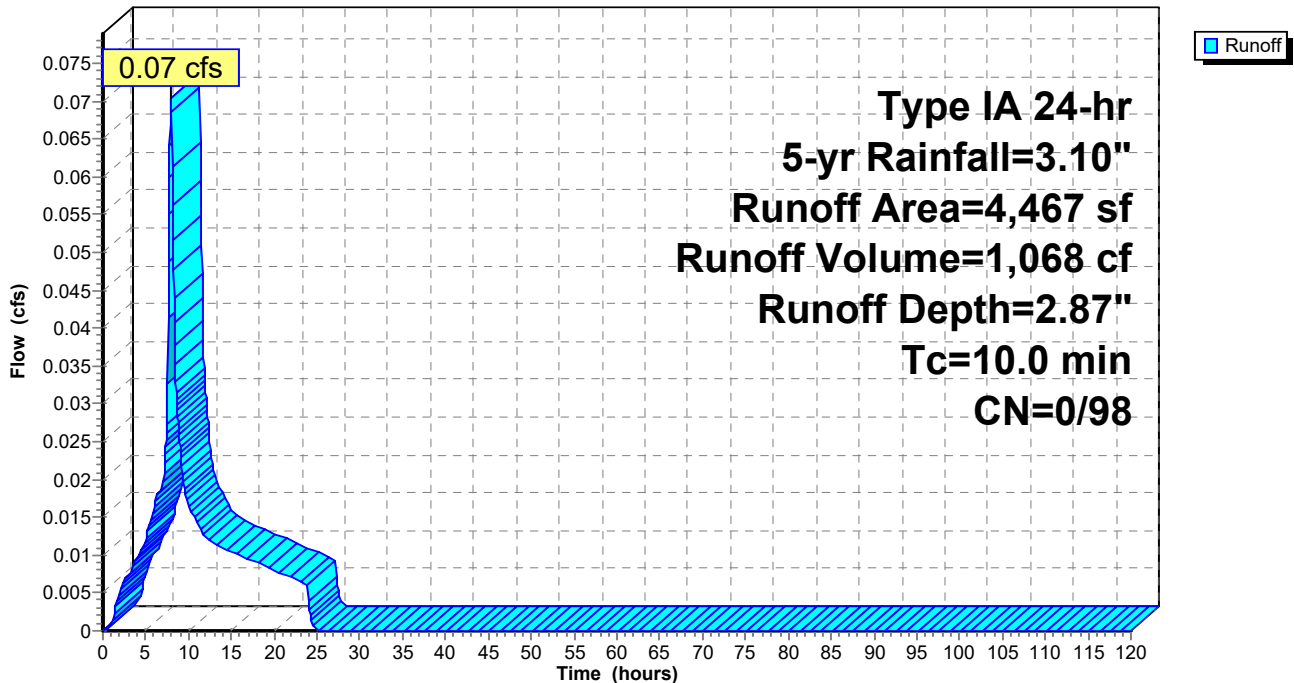
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Type IA 24-hr 5-yr Rainfall=3.10"

Area (sf)	CN	Description
* 4,467	98	New driveway
4,467	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Subcatchment 4S: N P. Dev Drive ROW Quantity

Hydrograph



NORTH TOTAL DISCHARGE FROM SITE - 5-YEAR STORM

Plambeck Gardens AW

Type IA 24-hr 5-yr Rainfall=3.10"

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Summary for Pond 16P: (new Pond)

[57] Hint: Peaked at 93.17' (Flood elevation advised)

Inflow Area = 119,142 sf, 57.14% Impervious, Inflow Depth > 1.14" for 5-yr event
Inflow = 0.16 cfs @ 21.73 hrs, Volume= 11,300 cf
Outflow = 0.16 cfs @ 21.73 hrs, Volume= 11,300 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.16 cfs @ 21.73 hrs, Volume= 11,300 cf

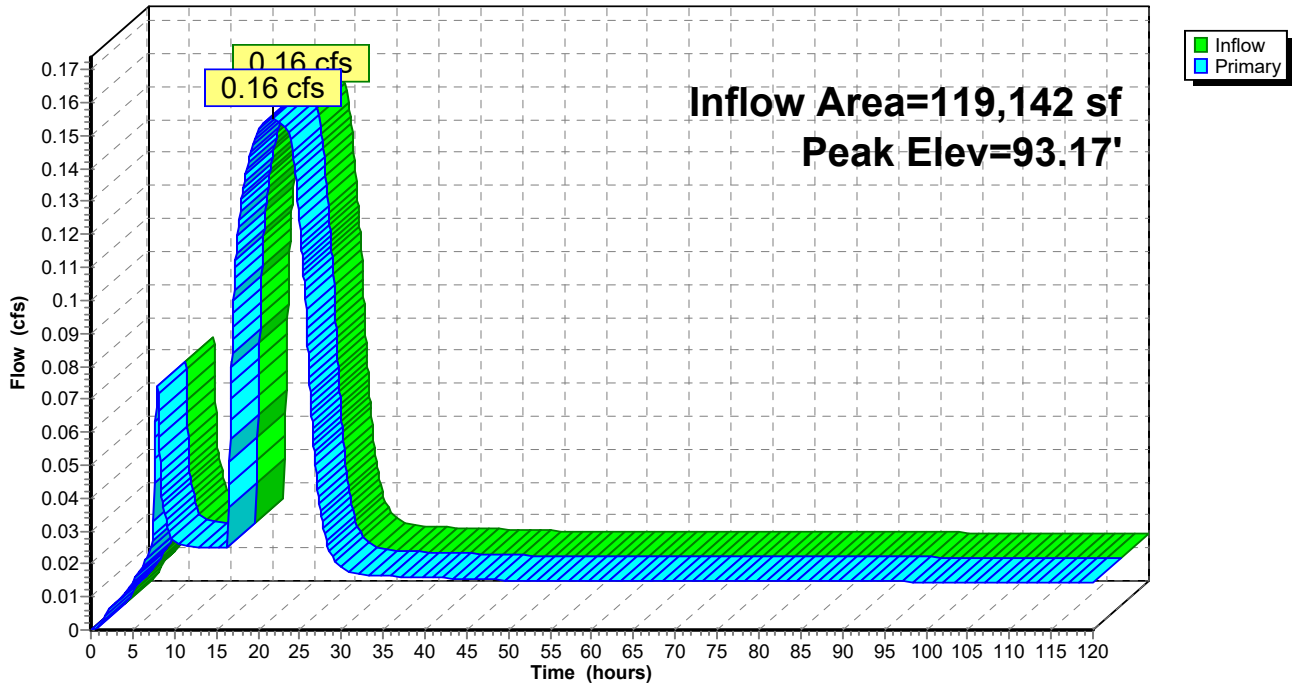
Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 93.17' @ 21.73 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	93.00'	20.00" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=0.16 cfs @ 21.73 hrs HW=93.17' (Free Discharge)
↑=Orifice/Grate (Orifice Controls 0.16 cfs @ 1.38 fps)

Pond 16P: (new Pond)

Hydrograph



NORTH BASIN 10-YEAR STORM

NORTH PREDEVELOPED 10-YEAR STORM

Plambeck Gardens AW

Type IA 24-hr 10-yr Rainfall=3.45"

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Page 3

Summary for Subcatchment 2S: Pre North

Runoff = 0.24 cfs @ 8.21 hrs, Volume= 8,173 cf, Depth= 0.99"

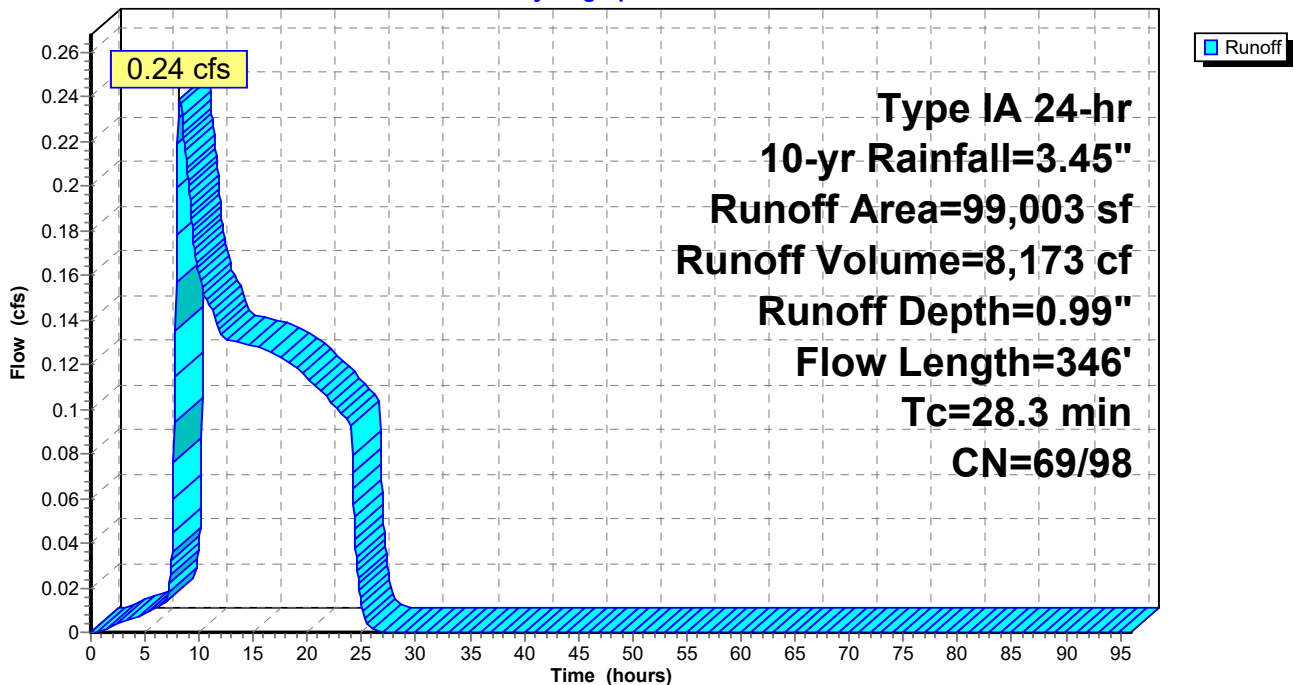
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10-yr Rainfall=3.45"

Area (sf)	CN	Description
860	85	Gravel roads, HSG B
450	98	Paved parking, HSG B
2,422	98	Roofs, HSG B
92,895	69	Pasture/grassland/range, Fair, HSG B
2,376	69	Pasture/grassland/range, Fair, HSG B
99,003	70	Weighted Average
96,131	69	97.10% Pervious Area
2,872	98	2.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.1	300	0.0450	0.18		Sheet Flow, sheet flow Grass: Dense n= 0.240 P2= 2.50"
0.2	46	0.0650	3.82		Shallow Concentrated Flow, shallow Grassed Waterway Kv= 15.0 fps
28.3	346	Total			

Subcatchment 2S: Pre North

Hydrograph



NORTH POST-DEVELOPED BASIN RUNOFF - 10-YEAR STORM

Plambeck Gardens AW

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Type IA 24-hr 10-yr Rainfall=3.45"

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Summary for Subcatchment 8S: N Post-developed HUD

Runoff = 1.29 cfs @ 7.99 hrs, Volume= 21,211 cf, Depth= 2.22"

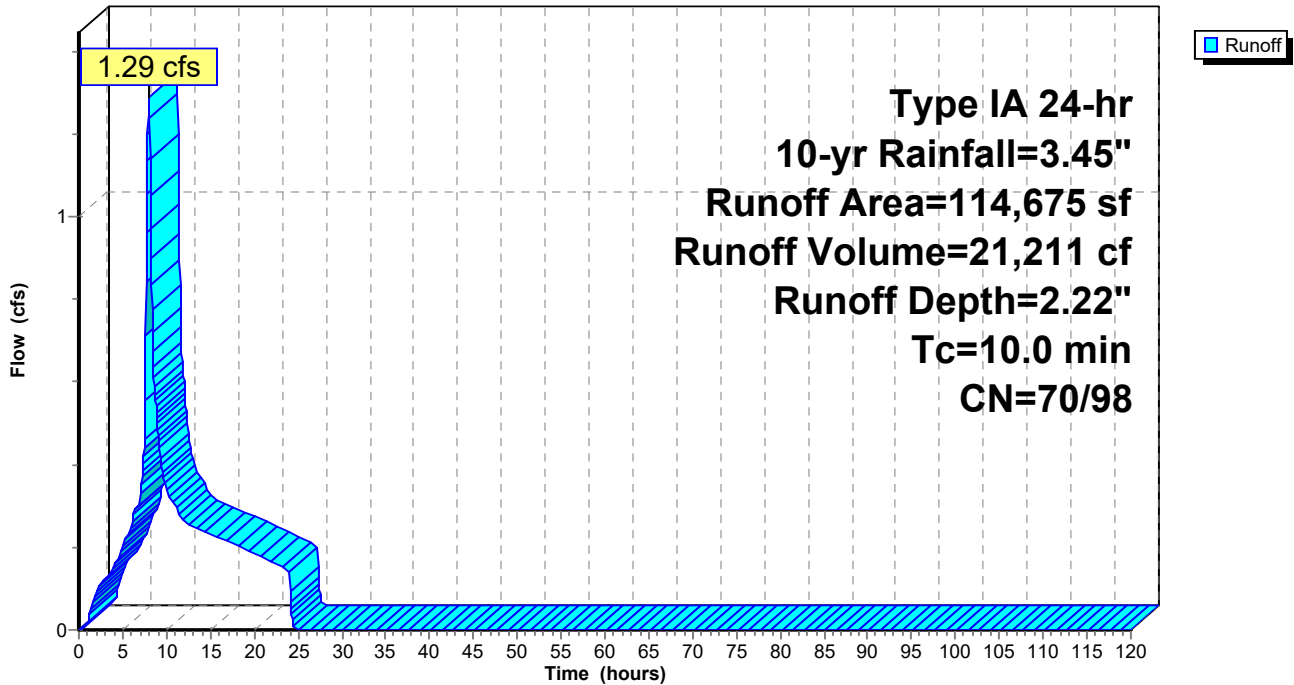
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10-yr Rainfall=3.45"

	Area (sf)	CN	Description
*	63,615	98	
	3,514	85	Gravel roads, HSG B
	47,546	69	50-75% Grass cover, Fair, HSG B
	114,675	86	Weighted Average
	51,060	70	44.53% Pervious Area
	63,615	98	55.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Subcatchment 8S: N Post-developed HUD

Hydrograph



Plambeck Gardens AW

Type IA 24-hr 10-yr Rainfall=3.45"

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Summary for Pond 1P: Cudo

[81] Warning: Exceeded Pond 7P by 4.53' @ 114.75 hrs

[81] Warning: Exceeded Pond 7P by 4.53' @ 114.75 hrs

Inflow Area = 114,675 sf, 55.47% Impervious, Inflow Depth > 2.16" for 10-yr event
 Inflow = 1.11 cfs @ 8.12 hrs, Volume= 20,672 cf
 Outflow = 0.22 cfs @ 17.08 hrs, Volume= 12,959 cf, Atten= 81%, Lag= 537.9 min
 Primary = 0.02 cfs @ 17.08 hrs, Volume= 5,966 cf
 Secondary = 0.14 cfs @ 17.08 hrs, Volume= 5,991 cf
 Tertiary = 0.06 cfs @ 17.08 hrs, Volume= 1,003 cf

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 Peak Elev= 105.48' @ 17.08 hrs Surf.Area= 3,156 sf Storage= 9,795 cf

Plug-Flow detention time= 1,709.7 min calculated for 12,959 cf (63% of inflow)
 Center-of-Mass det. time= 971.7 min (2,419.0 - 1,447.3)

Volume	Invert	Avail.Storage	Storage Description			
#1	100.00'	13,467 cf	Custom Stage Data (Pyramidal) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
100.00	2,220	0.0	0	0	2,220	
101.00	2,220	30.0	666	666	2,408	
103.00	2,220	95.0	4,218	4,884	2,785	
103.01	1,722	20.0	4	4,888	3,283	
103.51	1,722	20.0	172	5,060	3,366	
106.50	4,067	100.0	8,407	13,467	5,794	

Device	Routing	Invert	Outlet Devices
#1	Primary	100.00'	0.50" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Secondary	105.13'	3.00" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Tertiary	105.45'	10.00" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

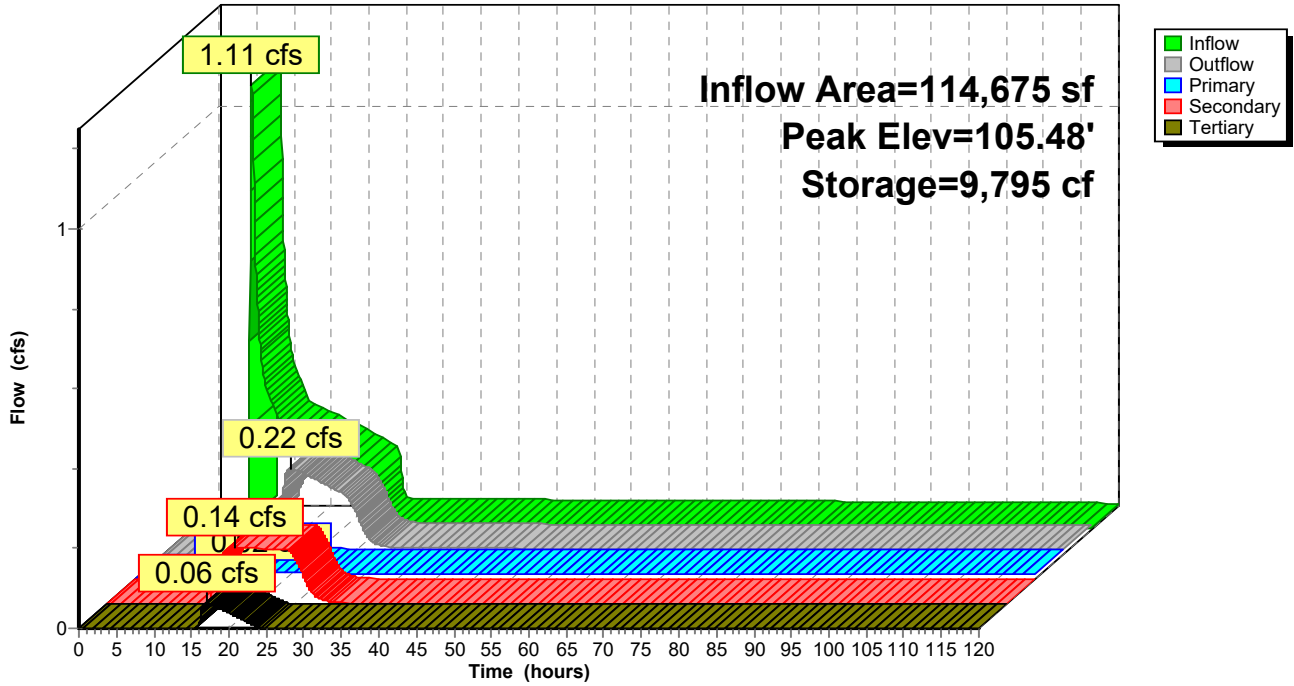
Primary OutFlow Max=0.02 cfs @ 17.08 hrs HW=105.48' (Free Discharge)
 ↖**1=Orifice/Grate** (Orifice Controls 0.02 cfs @ 11.27 fps)

Secondary OutFlow Max=0.14 cfs @ 17.08 hrs HW=105.48' (Free Discharge)
 ↖**2=Orifice/Grate** (Orifice Controls 0.14 cfs @ 2.85 fps)

Tertiary OutFlow Max=0.05 cfs @ 17.08 hrs HW=105.48' (Free Discharge)
 ↖**3=Orifice/Grate** (Weir Controls 0.05 cfs @ 0.57 fps)

Pond 1P: Cudo

Hydrograph



Plambeck Gardens AW

Type IA 24-hr 10-yr Rainfall=3.45"

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Summary for Pond 7P: WQ

Inflow Area = 114,675 sf, 55.47% Impervious, Inflow Depth = 2.22" for 10-yr event
 Inflow = 1.29 cfs @ 7.99 hrs, Volume= 21,211 cf
 Outflow = 1.11 cfs @ 8.12 hrs, Volume= 20,672 cf, Atten= 14%, Lag= 8.0 min
 Primary = 0.02 cfs @ 8.12 hrs, Volume= 5,428 cf
 Secondary = 1.10 cfs @ 8.12 hrs, Volume= 15,244 cf

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 Peak Elev= 101.92' @ 8.12 hrs Surf.Area= 3,359 sf Storage= 5,374 cf

Plug-Flow detention time= 751.5 min calculated for 20,663 cf (97% of inflow)
 Center-of-Mass det. time= 735.2 min (1,447.3 - 712.2)

Volume	Invert	Avail.Storage	Storage Description			
#1	100.00'	9,360 cf	Custom Stage Data (Pyramidal) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
100.00	2,261	0.0	0	0	2,261	
103.00	4,067	100.0	9,360	9,360	4,187	

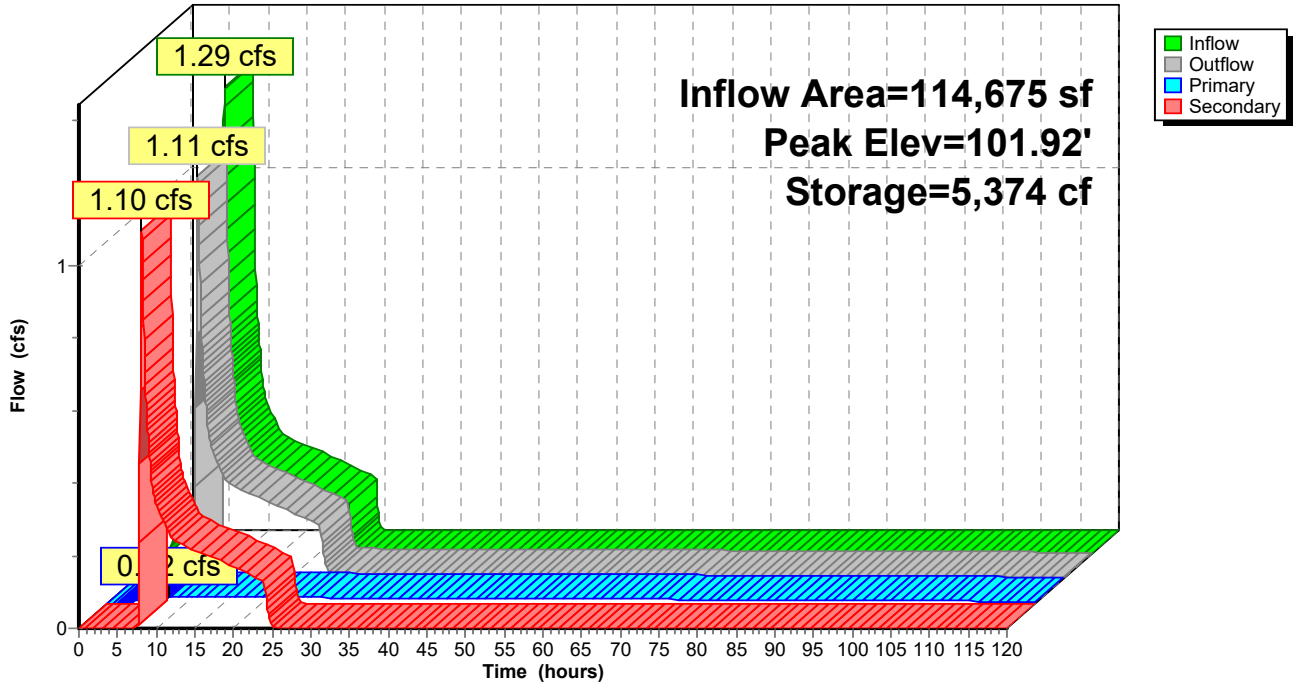
Device	Routing	Invert	Outlet Devices	
#1	Primary	100.01'	0.71" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads	
#2	Secondary	101.70'	12.00" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads	

Primary OutFlow Max=0.02 cfs @ 8.12 hrs HW=101.92' (Free Discharge)
 ↑**1=Orifice/Grate** (Orifice Controls 0.02 cfs @ 6.66 fps)

Secondary OutFlow Max=1.09 cfs @ 8.12 hrs HW=101.92' (Free Discharge)
 ↑**2=Orifice/Grate** (Weir Controls 1.09 cfs @ 1.55 fps)

Pond 7P: WQ

Hydrograph



NORTH UNMANAGED DRIVEWAY RUNOFF - 10-YEAR STORM

Plambeck Gardens AW

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Type IA 24-hr 10-yr Rainfall=3.45"

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Summary for Subcatchment 4S: N P. Dev Drive ROW Quantity

Runoff = 0.08 cfs @ 7.98 hrs, Volume= 1,197 cf, Depth= 3.22"

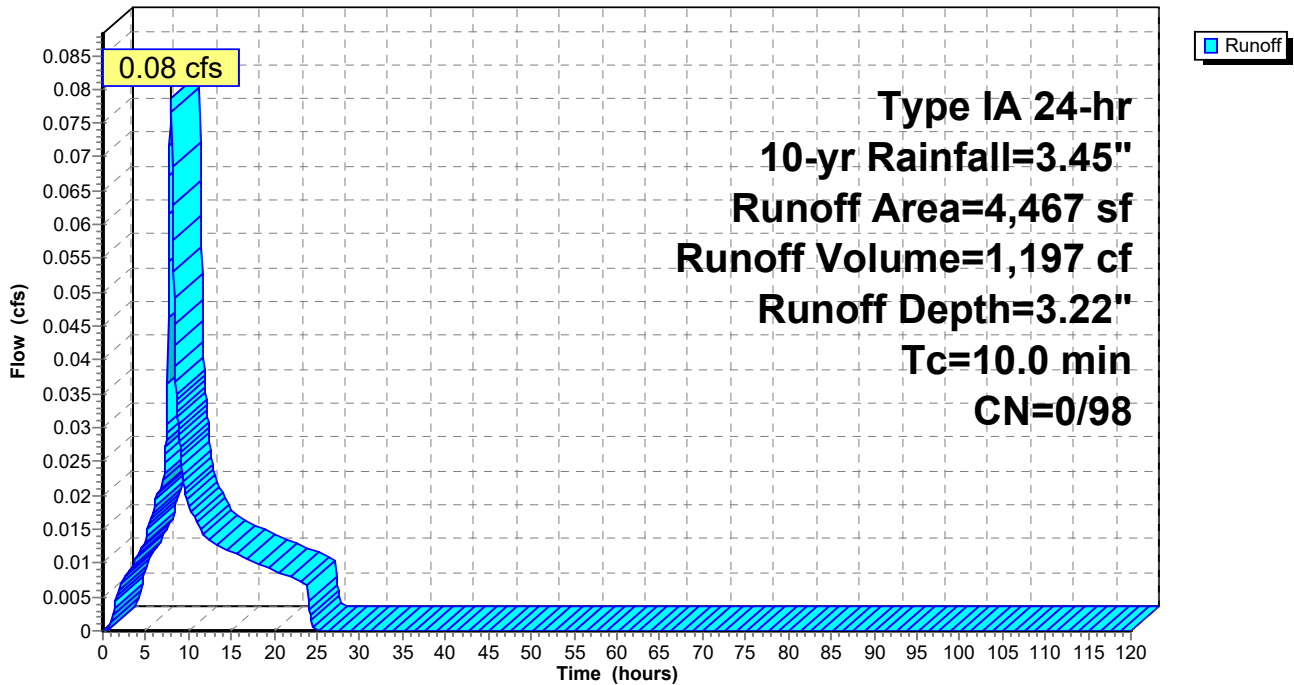
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10-yr Rainfall=3.45"

Area (sf)	CN	Description
4,467	98	New driveway
4,467	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Subcatchment 4S: N P. Dev Drive ROW Quantity

Hydrograph



NORTH TOTAL DISCHARGE FROM SITE - 10-YEAR STORM

Plambeck Gardens AW

Type IA 24-hr 10-yr Rainfall=3.45"

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Summary for Pond 16P: (new Pond)

[57] Hint: Peaked at 93.20' (Flood elevation advised)

Inflow Area = 119,142 sf, 57.14% Impervious, Inflow Depth > 1.43" for 10-yr event
Inflow = 0.23 cfs @ 17.07 hrs, Volume= 14,157 cf
Outflow = 0.23 cfs @ 17.07 hrs, Volume= 14,157 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.23 cfs @ 17.07 hrs, Volume= 14,157 cf

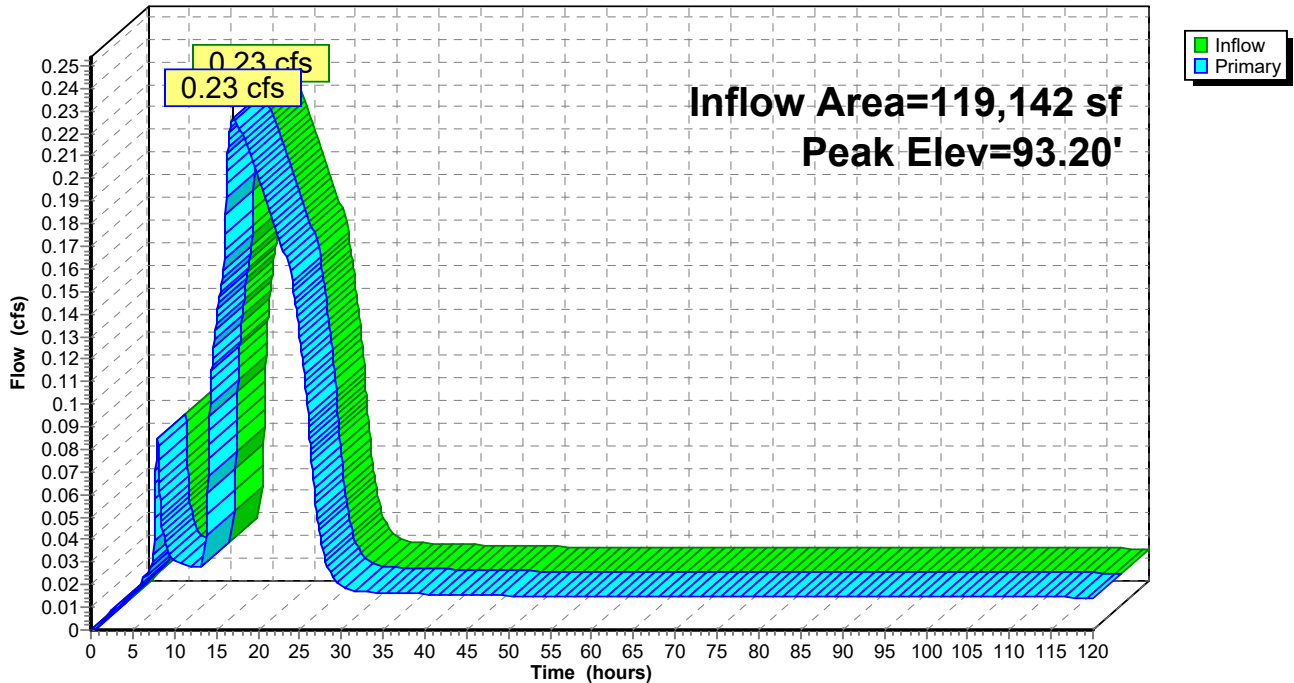
Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 93.20' @ 17.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	93.00'	20.00" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=0.23 cfs @ 17.07 hrs HW=93.20' (Free Discharge)
↑=Orifice/Grate (Orifice Controls 0.23 cfs @ 1.52 fps)

Pond 16P: (new Pond)

Hydrograph



NORTH BASIN 25-YEAR STORM

NORTH PREDEVELOPED 25-YEAR STORM

Plambeck Gardens AW

Type IA 24-hr 25-yr Rainfall=3.90"

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Page 4

Summary for Subcatchment 2S: Pre North

Runoff = 0.35 cfs @ 8.16 hrs, Volume= 10,507 cf, Depth= 1.27"

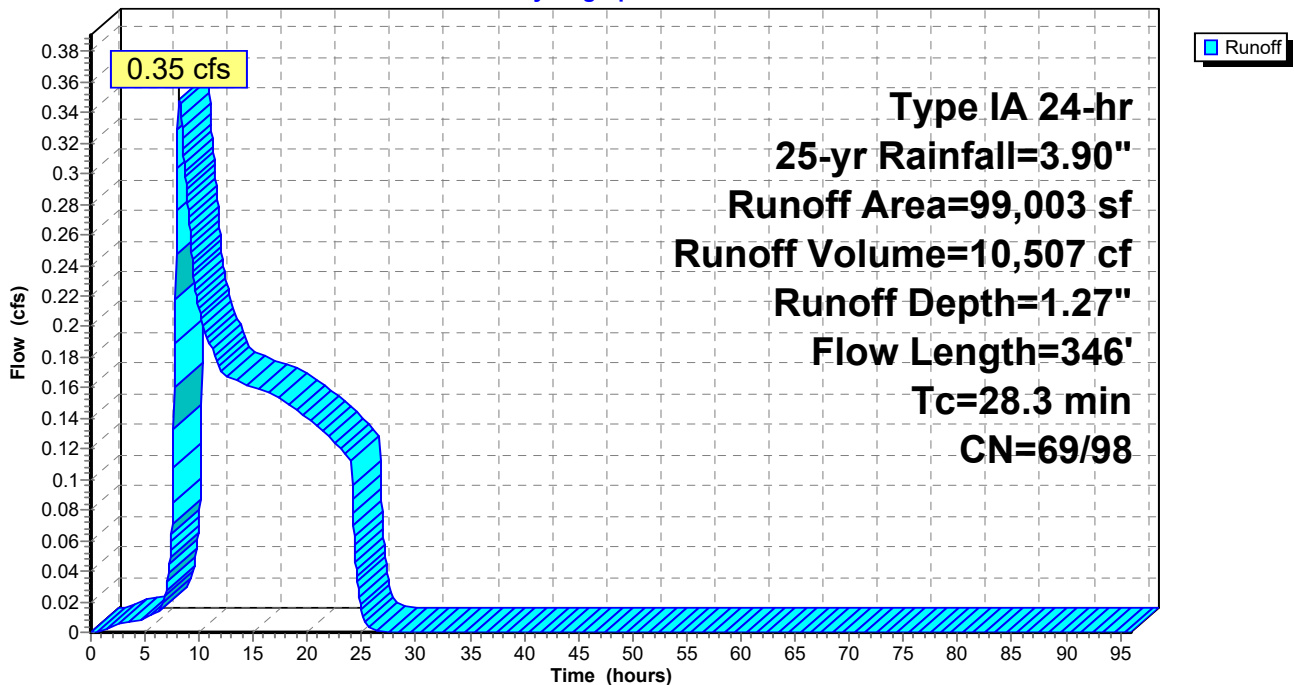
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-yr Rainfall=3.90"

Area (sf)	CN	Description
860	85	Gravel roads, HSG B
450	98	Paved parking, HSG B
2,422	98	Roofs, HSG B
92,895	69	Pasture/grassland/range, Fair, HSG B
2,376	69	Pasture/grassland/range, Fair, HSG B
99,003	70	Weighted Average
96,131	69	97.10% Pervious Area
2,872	98	2.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.1	300	0.0450	0.18		Sheet Flow, sheet flow Grass: Dense n= 0.240 P2= 2.50"
0.2	46	0.0650	3.82		Shallow Concentrated Flow, shallow Grassed Waterway Kv= 15.0 fps
28.3	346	Total			

Subcatchment 2S: Pre North

Hydrograph



NORTH POST-DEVELOPED BASIN RUNOFF - 25-YEAR STORM

Plambeck Gardens AW

Type IA 24-hr 25-yr Rainfall=3.90"

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Summary for Subcatchment 8S: N Post-developed HUD

Runoff = 1.52 cfs @ 7.99 hrs, Volume= 24,807 cf, Depth= 2.60"

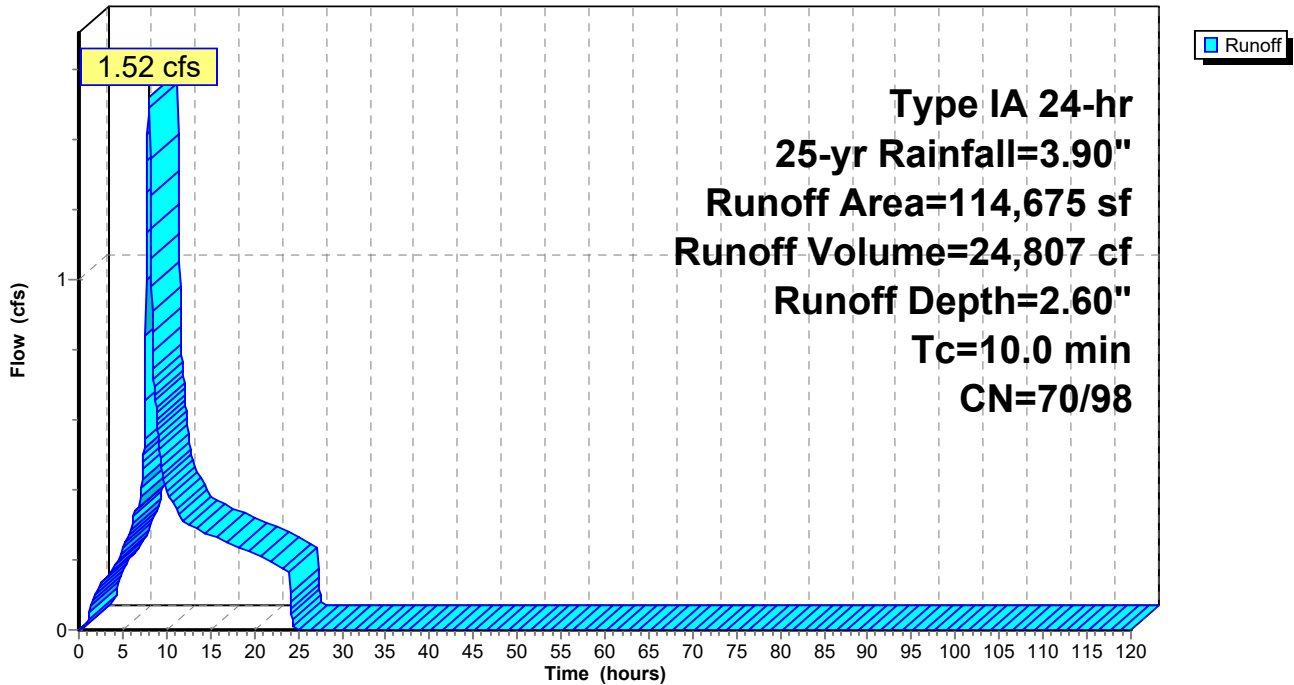
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-yr Rainfall=3.90"

	Area (sf)	CN	Description
*	63,615	98	
	3,514	85	Gravel roads, HSG B
	47,546	69	50-75% Grass cover, Fair, HSG B
<hr/>			
	114,675	86	Weighted Average
	51,060	70	44.53% Pervious Area
	63,615	98	55.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Subcatchment 8S: N Post-developed HUD

Hydrograph



Plambeck Gardens AW

Type IA 24-hr 25-yr Rainfall=3.90"

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Summary for Pond 1P: Cudo

[81] Warning: Exceeded Pond 7P by 4.53' @ 114.75 hrs

[81] Warning: Exceeded Pond 7P by 4.53' @ 114.75 hrs

Inflow Area = 114,675 sf, 55.47% Impervious, Inflow Depth > 2.54" for 25-yr event
 Inflow = 1.42 cfs @ 8.07 hrs, Volume= 24,267 cf
 Outflow = 0.28 cfs @ 13.90 hrs, Volume= 16,553 cf, Atten= 80%, Lag= 350.0 min
 Primary = 0.02 cfs @ 13.90 hrs, Volume= 6,002 cf
 Secondary = 0.14 cfs @ 13.90 hrs, Volume= 7,415 cf
 Tertiary = 0.12 cfs @ 13.90 hrs, Volume= 3,136 cf

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 Peak Elev= 105.50' @ 13.90 hrs Surf.Area= 3,176 sf Storage= 9,871 cf

Plug-Flow detention time= 1,383.3 min calculated for 16,546 cf (68% of inflow)
 Center-of-Mass det. time= 753.7 min (2,096.7 - 1,343.0)

Volume	Invert	Avail.Storage	Storage Description			
#1	100.00'	13,467 cf	Custom Stage Data (Pyramidal) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
100.00	2,220	0.0	0	0	2,220	
101.00	2,220	30.0	666	666	2,408	
103.00	2,220	95.0	4,218	4,884	2,785	
103.01	1,722	20.0	4	4,888	3,283	
103.51	1,722	20.0	172	5,060	3,366	
106.50	4,067	100.0	8,407	13,467	5,794	

Device	Routing	Invert	Outlet Devices	
#1	Primary	100.00'	0.50" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads	
#2	Secondary	105.13'	3.00" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads	
#3	Tertiary	105.45'	10.00" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads	

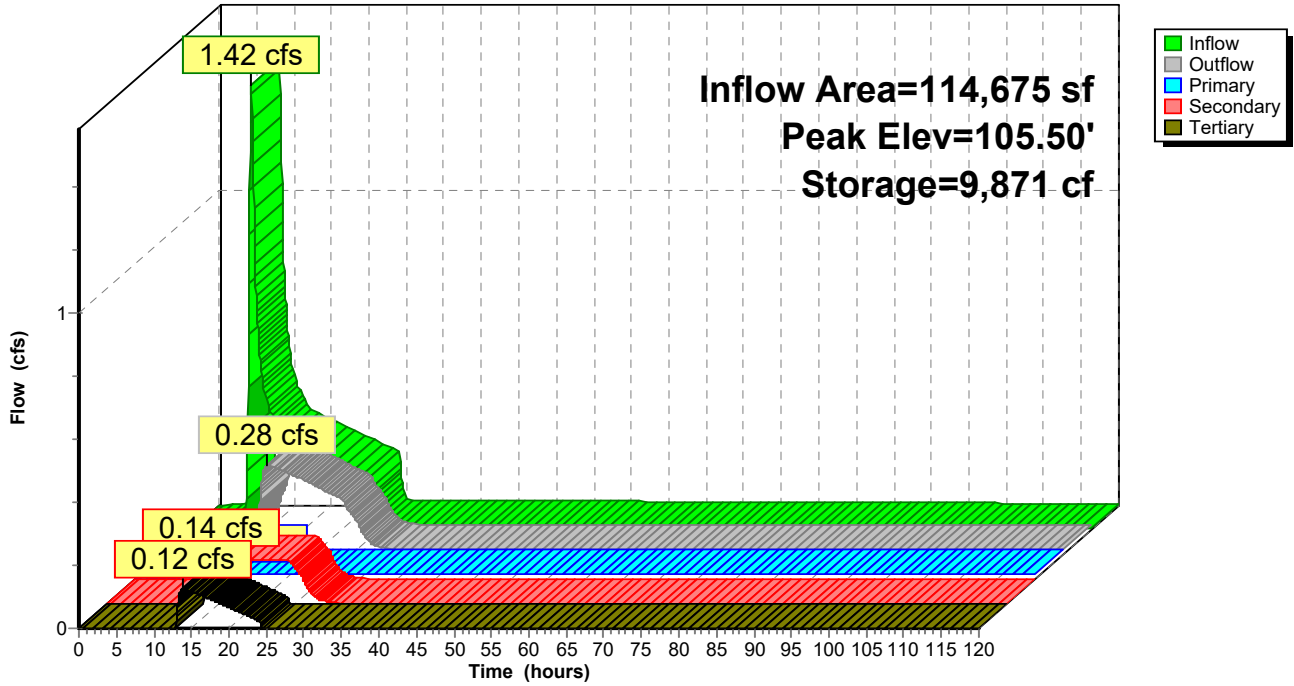
Primary OutFlow Max=0.02 cfs @ 13.90 hrs HW=105.50' (Free Discharge)
 ↖**1=Orifice/Grate** (Orifice Controls 0.02 cfs @ 11.30 fps)

Secondary OutFlow Max=0.14 cfs @ 13.90 hrs HW=105.50' (Free Discharge)
 ↖**2=Orifice/Grate** (Orifice Controls 0.14 cfs @ 2.95 fps)

Tertiary OutFlow Max=0.11 cfs @ 13.90 hrs HW=105.50' (Free Discharge)
 ↖**3=Orifice/Grate** (Weir Controls 0.11 cfs @ 0.76 fps)

Pond 1P: Cudo

Hydrograph



Plambeck Gardens AW

Type IA 24-hr 25-yr Rainfall=3.90"

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Summary for Pond 7P: WQ

Inflow Area = 114,675 sf, 55.47% Impervious, Inflow Depth = 2.60" for 25-yr event
 Inflow = 1.52 cfs @ 7.99 hrs, Volume= 24,807 cf
 Outflow = 1.42 cfs @ 8.07 hrs, Volume= 24,267 cf, Atten= 7%, Lag= 5.1 min
 Primary = 0.02 cfs @ 8.07 hrs, Volume= 5,453 cf
 Secondary = 1.40 cfs @ 8.07 hrs, Volume= 18,814 cf

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 Peak Elev= 101.96' @ 8.07 hrs Surf.Area= 3,384 sf Storage= 5,507 cf

Plug-Flow detention time= 646.4 min calculated for 24,257 cf (98% of inflow)
 Center-of-Mass det. time= 632.6 min (1,343.0 - 710.4)

Volume	Invert	Avail.Storage	Storage Description			
#1	100.00'	9,360 cf	Custom Stage Data (Pyramidal) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
100.00	2,261	0.0	0	0	2,261	
103.00	4,067	100.0	9,360	9,360	4,187	

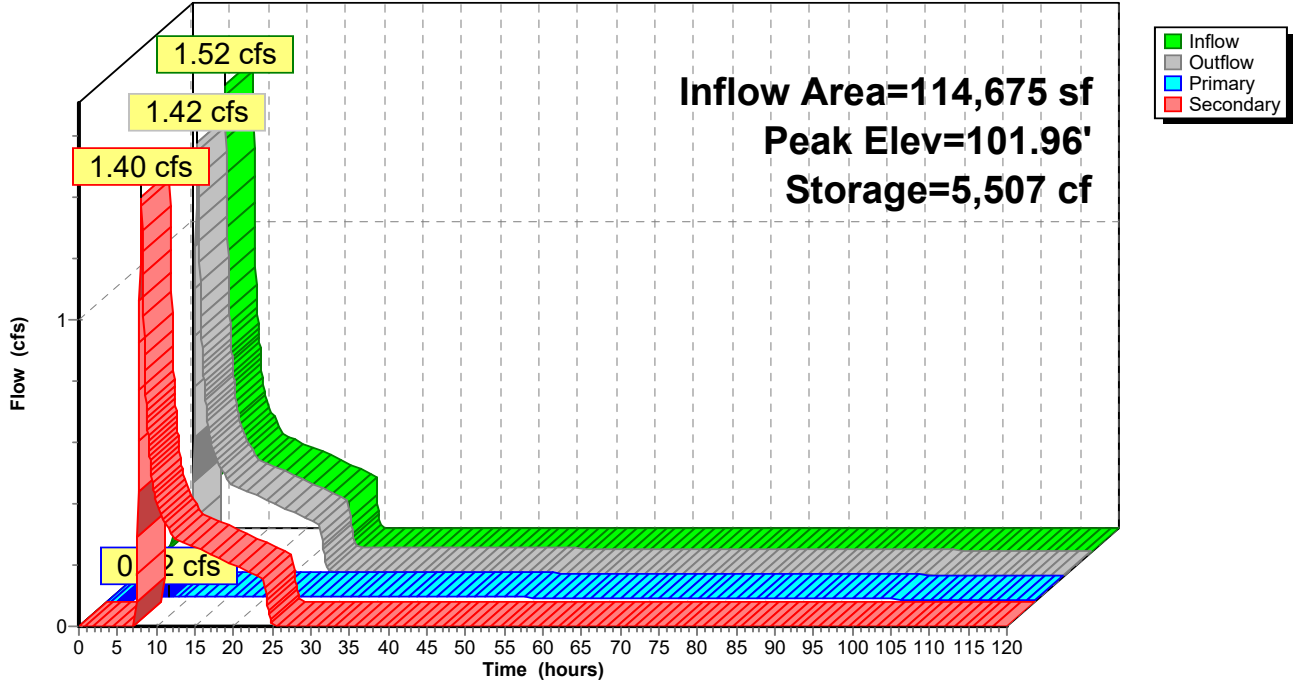
Device	Routing	Invert	Outlet Devices	
#1	Primary	100.01'	0.71" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads	
#2	Secondary	101.70'	12.00" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads	

Primary OutFlow Max=0.02 cfs @ 8.07 hrs HW=101.96' (Free Discharge)
 ↑1=Orifice/Grate (Orifice Controls 0.02 cfs @ 6.73 fps)

Secondary OutFlow Max=1.39 cfs @ 8.07 hrs HW=101.96' (Free Discharge)
 ↑2=Orifice/Grate (Weir Controls 1.39 cfs @ 1.68 fps)

Pond 7P: WQ

Hydrograph



NORTH UNMANAGED DRIVEWAY RUNOFF - 25-YEAR STORM

Plambeck Gardens AW

Prepared by {enter your company name here}

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Type IA 24-hr 25-yr Rainfall=3.90"

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Summary for Subcatchment 4S: N P. Dev Drive ROW Quantity

Runoff = 0.09 cfs @ 7.98 hrs, Volume= 1,364 cf, Depth= 3.67"

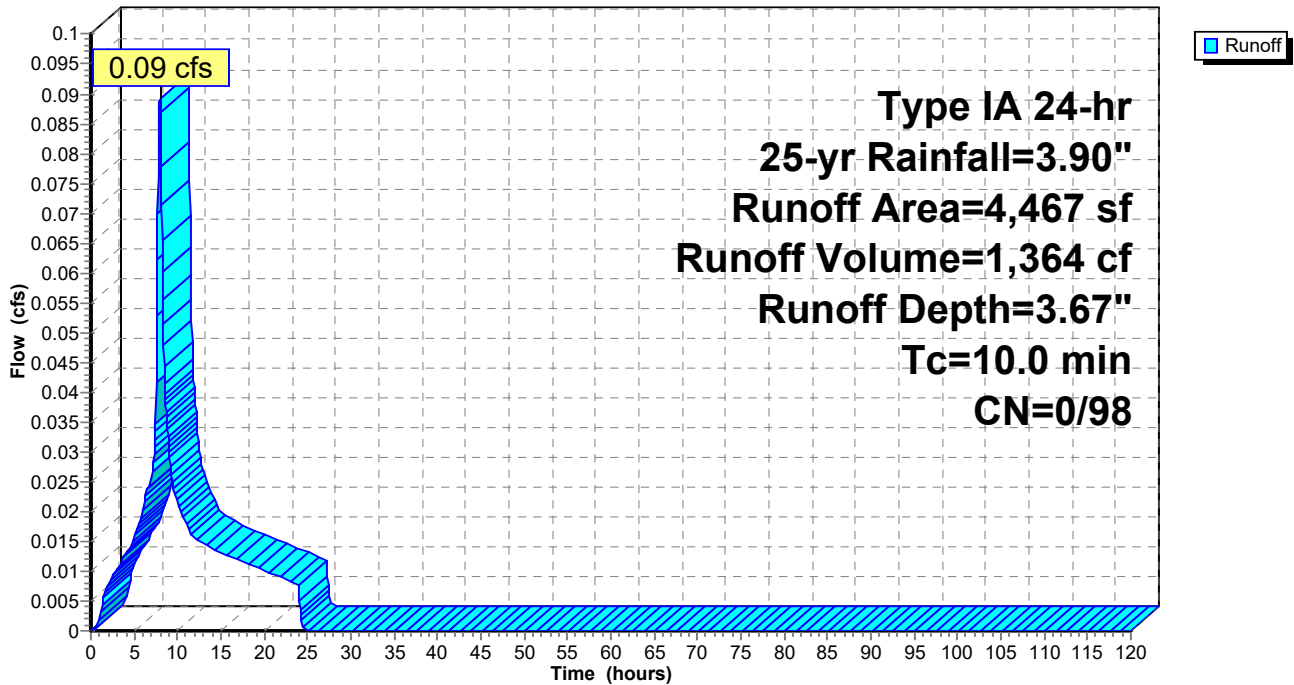
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-yr Rainfall=3.90"

Area (sf)	CN	Description
4,467	98	New driveway
4,467	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Subcatchment 4S: N P. Dev Drive ROW Quantity

Hydrograph



NORTH TOTAL DISCHARGE FROM SITE - 25-YEAR STORM

Plambeck Gardens AW

Type IA 24-hr 25-yr Rainfall=3.90"

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Summary for Pond 16P: (new Pond)

[57] Hint: Peaked at 93.23' (Flood elevation advised)

Inflow Area = 119,142 sf, 57.14% Impervious, Inflow Depth > 1.80" for 25-yr event
Inflow = 0.30 cfs @ 13.89 hrs, Volume= 17,917 cf
Outflow = 0.30 cfs @ 13.89 hrs, Volume= 17,917 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.30 cfs @ 13.89 hrs, Volume= 17,917 cf

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Peak Elev= 93.23' @ 13.89 hrs

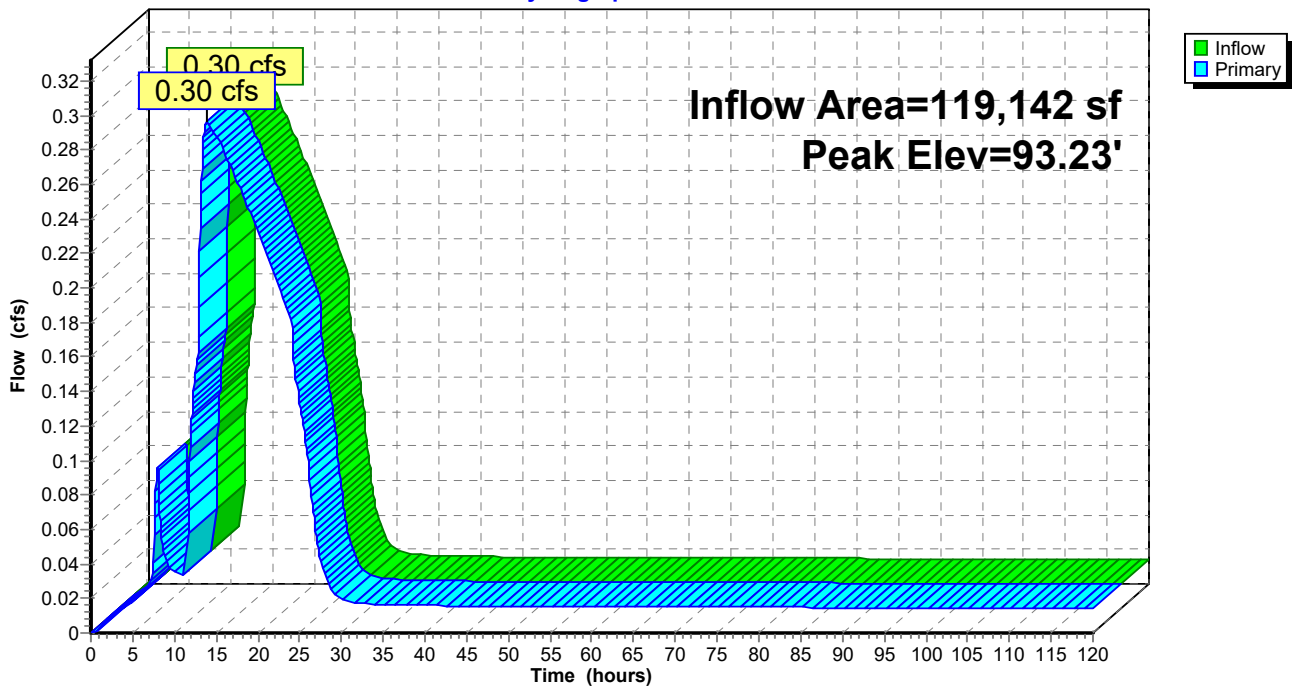
Device	Routing	Invert	Outlet Devices
#1	Primary	93.00'	20.00" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=0.30 cfs @ 13.89 hrs HW=93.23' (Free Discharge)

↑1=Orifice/Grate (Orifice Controls 0.30 cfs @ 1.63 fps)

Pond 16P: (new Pond)

Hydrograph



NORTH BASIN WQ-HUD STORM

NORTH POST-DEVELOPED BASIN RUNOFF - WQ-HUD STORM

Plambeck Gardens AW

Type IA 24-hr WQ-HUD Rainfall=1.25"

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Summary for Subcatchment 8S: N Post-developed HUD

Runoff = 0.37 cfs @ 7.98 hrs, Volume= 5,625 cf, Depth= 0.59"

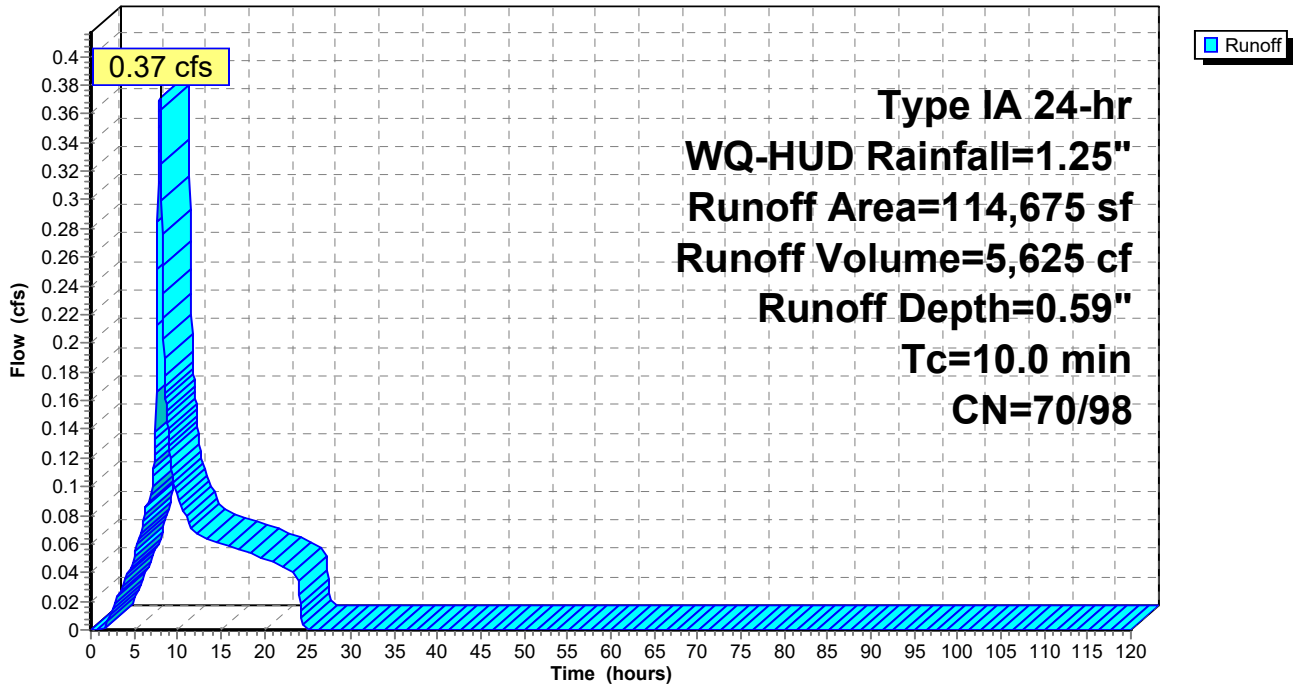
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Type IA 24-hr WQ-HUD Rainfall=1.25"

Area (sf)	CN	Description
* 63,615	98	
3,514	85	Gravel roads, HSG B
47,546	69	50-75% Grass cover, Fair, HSG B
<hr/>		
114,675	86	Weighted Average
51,060	70	44.53% Pervious Area
63,615	98	55.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Subcatchment 8S: N Post-developed HUD

Hydrograph



Plambeck Gardens AW

Type IA 24-hr WQ-HUD Rainfall=1.25"

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Summary for Pond 7P: WQ

Inflow Area = 114,675 sf, 55.47% Impervious, Inflow Depth = 0.59" for WQ-HUD event
 Inflow = 0.37 cfs @ 7.98 hrs, Volume= 5,625 cf
 Outflow = 0.02 cfs @ 24.16 hrs, Volume= 5,108 cf, Atten= 95%, Lag= 971.0 min
 Primary = 0.02 cfs @ 24.16 hrs, Volume= 5,108 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 Peak Elev= 101.70' @ 24.16 hrs Surf.Area= 3,219 sf Storage= 4,630 cf

Plug-Flow detention time= 2,654.6 min calculated for 5,106 cf (91% of inflow)
 Center-of-Mass det. time= 2,592.3 min (3,311.1 - 718.8)

Volume	Invert	Avail.Storage	Storage Description			
#1	100.00'	9,360 cf	Custom Stage Data (Pyramidal) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
100.00	2,261	0.0	0	0	2,261	
103.00	4,067	100.0	9,360	9,360	4,187	

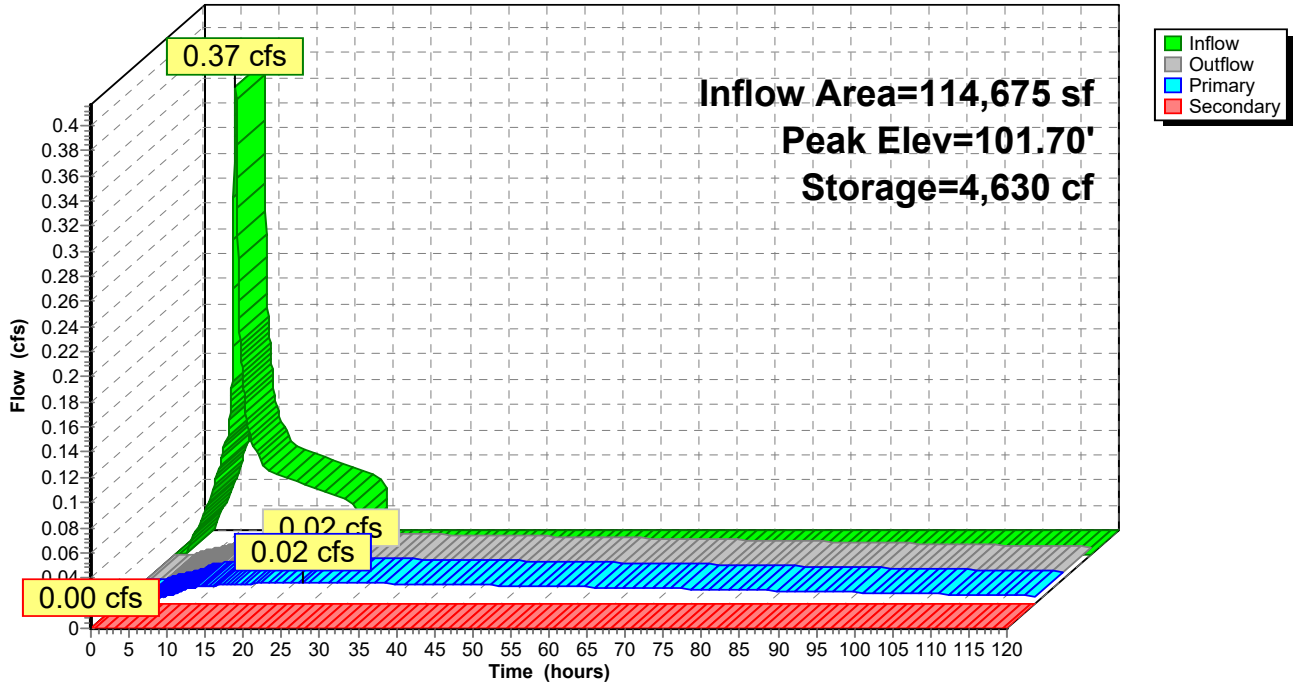
Device	Routing	Invert	Outlet Devices	
#1	Primary	100.01'	0.71" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads	
#2	Secondary	101.70'	12.00" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads	

Primary OutFlow Max=0.02 cfs @ 24.16 hrs HW=101.70' (Free Discharge)
 ↑1=Orifice/Grate (Orifice Controls 0.02 cfs @ 6.26 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=100.00' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)

Pond 7P: WQ

Hydrograph



WQ-HUD STORM - NORTH TOTAL DISCHARGE FROM SITE

Plambeck Gardens AW

Type IA 24-hr WQ-HUD Rainfall=1.25"

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Summary for Pond 16P: (new Pond)

[57] Hint: Peaked at 93.07' (Flood elevation advised)

Inflow Area = 119,142 sf, 57.14% Impervious, Inflow Depth > 0.35" for WQ-HUD event
Inflow = 0.03 cfs @ 7.98 hrs, Volume= 3,456 cf
Outflow = 0.03 cfs @ 7.98 hrs, Volume= 3,456 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.03 cfs @ 7.98 hrs, Volume= 3,456 cf

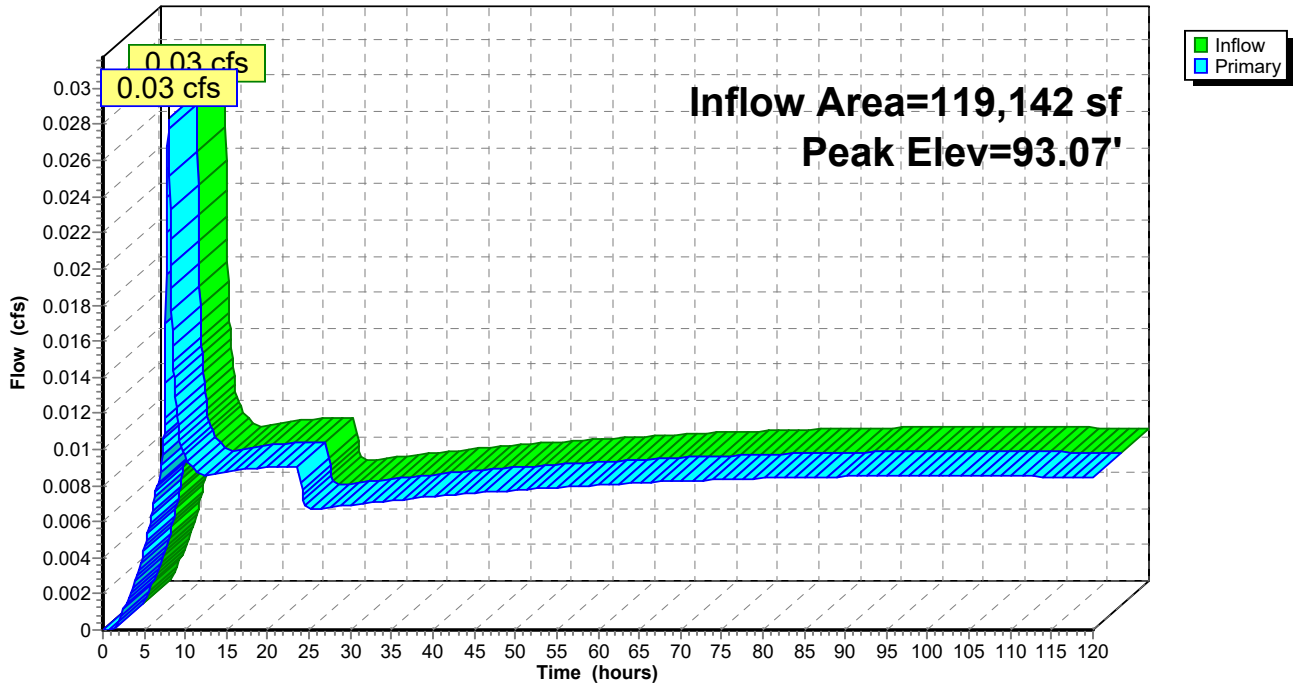
Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 93.07' @ 7.98 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	93.00'	20.00" Vert. Orifice/Grate C= 0.600

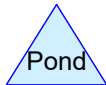
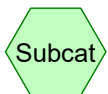
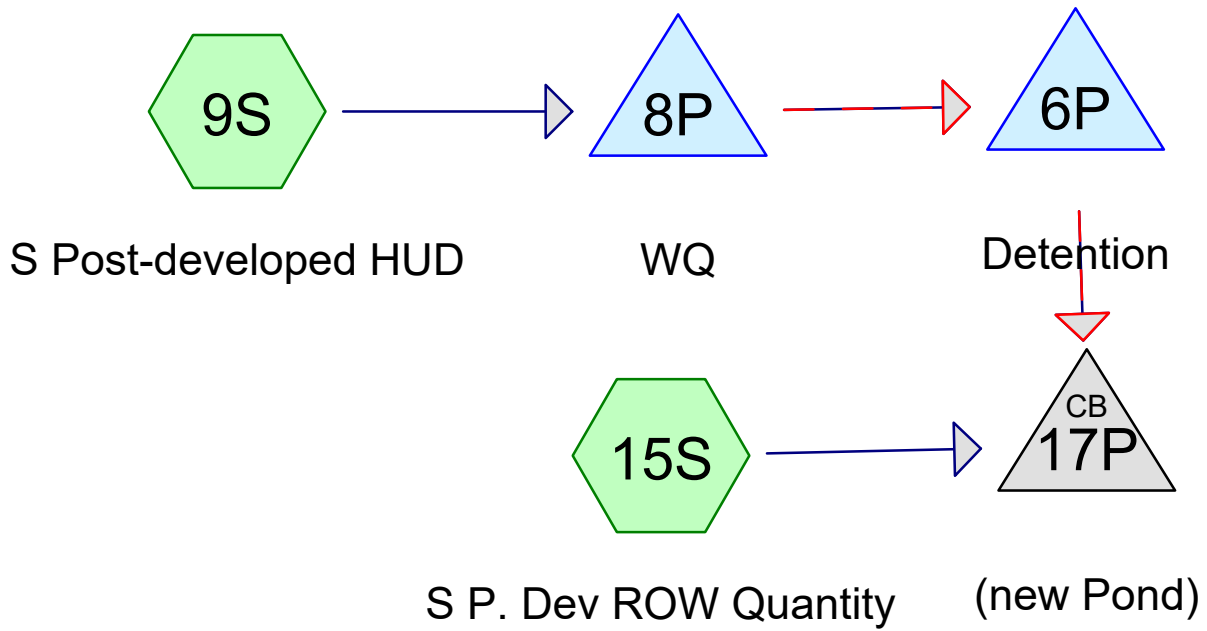
Primary OutFlow Max=0.03 cfs @ 7.98 hrs HW=93.07' (Free Discharge)
↑1=Orifice/Grate (Orifice Controls 0.03 cfs @ 0.90 fps)

Pond 16P: (new Pond)

Hydrograph



SOUTH BASIN ROUTING DIAGRAM



SOUTH BASIN 2-YEAR STORM

SOUTH PRE-DEVELOPED 2-YEAR STORM

Plambeck Gardens AW

Type IA 24-hr 2-yr Rainfall=2.50"

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Page 1

Summary for Subcatchment 3S: Pre South

Runoff = 0.11 cfs @ 8.79 hrs, Volume= 5,396 cf, Depth= 0.58"

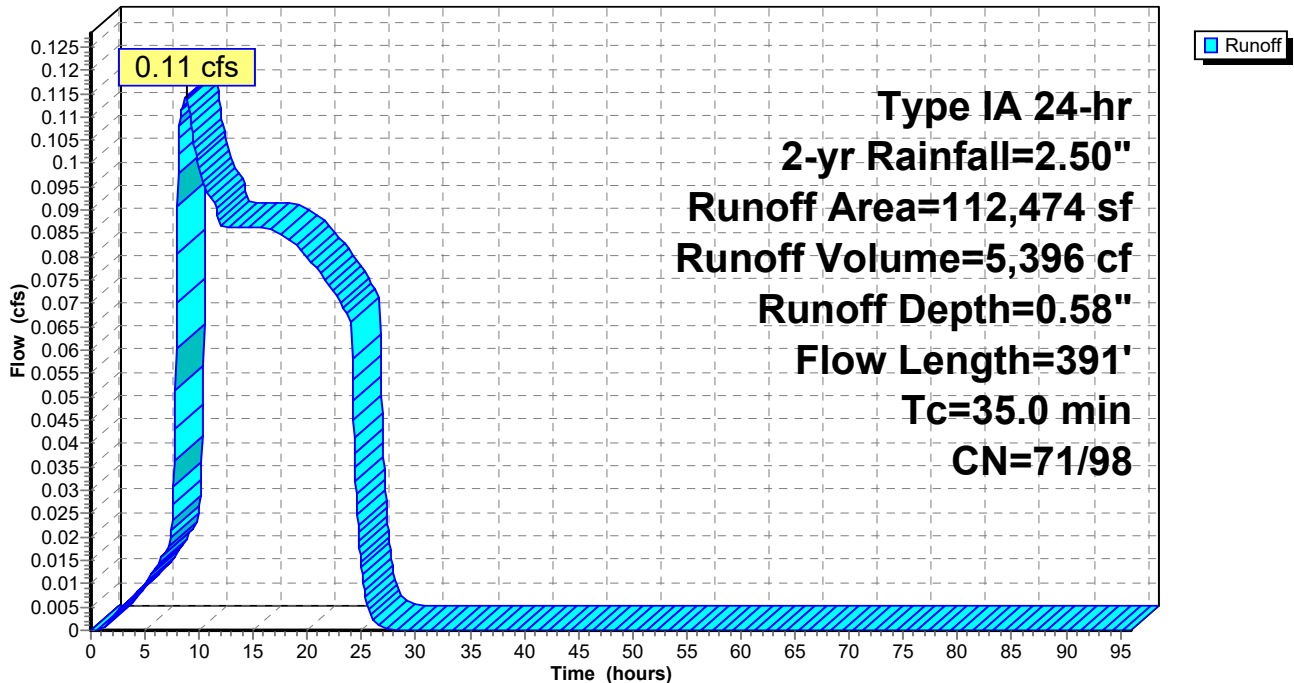
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2-yr Rainfall=2.50"

Area (sf)	CN	Description
10,143	85	Gravel roads, HSG B
622	98	Paved parking, HSG B
4,723	98	Roofs, HSG B
95,727	69	Pasture/grassland/range, Fair, HSG B
1,259	69	Pasture/grassland/range, Fair, HSG B
112,474	72	Weighted Average
107,129	71	95.25% Pervious Area
5,345	98	4.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
34.6	300	0.0267	0.14		Sheet Flow, sheet flow Grass: Dense n= 0.240 P2= 2.50"
0.4	91	0.0570	3.58		Shallow Concentrated Flow, shallow Grassed Waterway Kv= 15.0 fps
35.0	391	Total			

Subcatchment 3S: Pre South

Hydrograph



SOUTH POST-DEVELOPED BASIN RUNOFF - 2-YEAR STORM

Plambeck Gardens AW

Type IA 24-hr 2-yr Rainfall=2.50"

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Summary for Subcatchment 9S: S Post-developed HUD

Runoff = 0.78 cfs @ 7.98 hrs, Volume= 12,570 cf, Depth= 1.70"

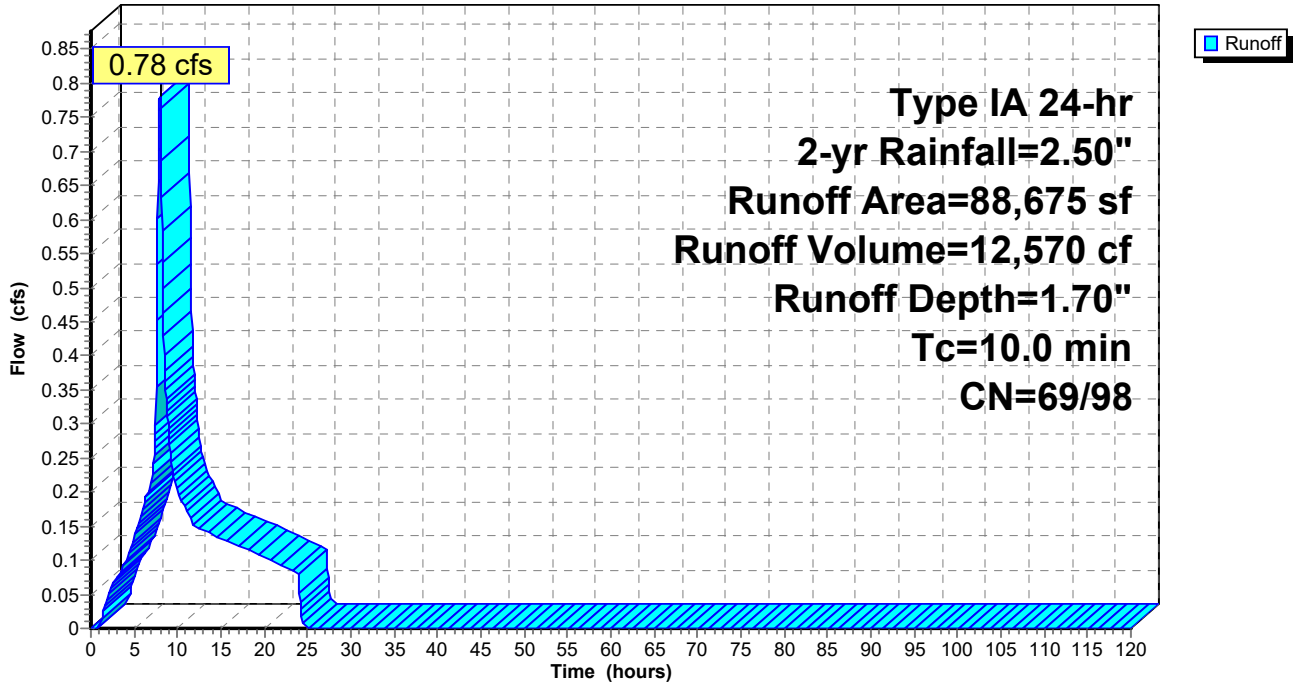
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2-yr Rainfall=2.50"

	Area (sf)	CN	Description
*	61,366	98	
	27,309	69	50-75% Grass cover, Fair, HSG B
	88,675	89	Weighted Average
	27,309	69	30.80% Pervious Area
	61,366	98	69.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Subcatchment 9S: S Post-developed HUD

Hydrograph



Plambeck Gardens AW

Type IA 24-hr 2-yr Rainfall=2.50"

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Summary for Pond 6P: Detention

Inflow Area = 88,675 sf, 69.20% Impervious, Inflow Depth > 1.67" for 2-yr event
 Inflow = 0.23 cfs @ 9.41 hrs, Volume= 12,347 cf
 Outflow = 0.05 cfs @ 24.65 hrs, Volume= 12,319 cf, Atten= 77%, Lag= 914.3 min
 Primary = 0.05 cfs @ 24.65 hrs, Volume= 12,319 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 Peak Elev= 97.54' @ 24.65 hrs Surf.Area= 3,173 sf Storage= 5,167 cf

Plug-Flow detention time= 893.8 min calculated for 12,319 cf (100% of inflow)
 Center-of-Mass det. time= 882.1 min (2,784.8 - 1,902.7)

Volume	Invert	Avail.Storage	Storage Description			
#1	93.50'	10,759 cf	Custom Stage Data (Pyramidal) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
93.50	2,016	0.0	0	0	2,016	
94.50	2,016	30.0	605	605	2,196	
96.00	2,016	20.0	605	1,210	2,465	
99.00	4,516	100.0	9,549	10,759	5,054	

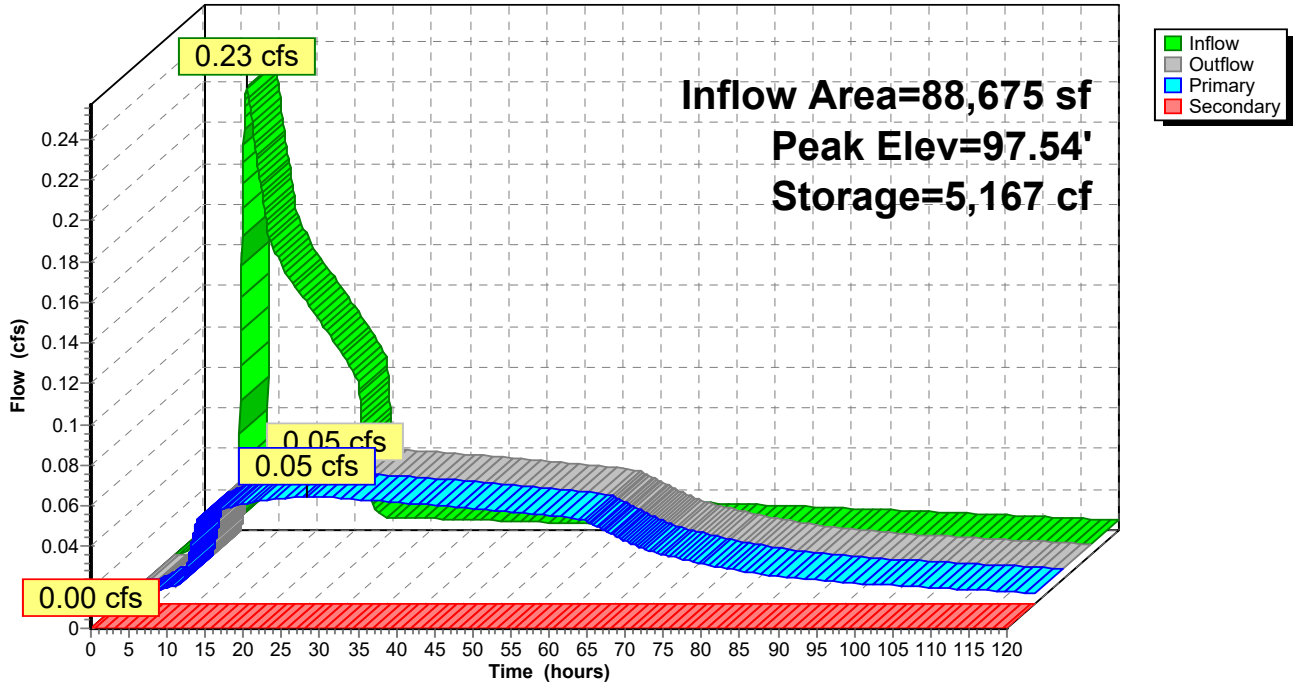
Device	Routing	Invert	Outlet Devices
#1	Primary	93.50'	1.00" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Secondary	97.54'	10.00" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.05 cfs @ 24.65 hrs HW=97.54' (Free Discharge)
 ↑1=Orifice/Grate (Orifice Controls 0.05 cfs @ 9.68 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=93.50' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)

Pond 6P: Detention

Hydrograph



Plambeck Gardens AW

Type IA 24-hr 2-yr Rainfall=2.50"

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Summary for Pond 8P: WQ

Inflow Area = 88,675 sf, 69.20% Impervious, Inflow Depth = 1.70" for 2-yr event
 Inflow = 0.78 cfs @ 7.98 hrs, Volume= 12,570 cf
 Outflow = 0.23 cfs @ 9.41 hrs, Volume= 12,347 cf, Atten= 71%, Lag= 85.5 min
 Primary = 0.02 cfs @ 9.41 hrs, Volume= 5,601 cf
 Secondary = 0.21 cfs @ 9.41 hrs, Volume= 6,745 cf

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 Peak Elev= 102.05' @ 9.41 hrs Surf.Area= 3,141 sf Storage= 4,965 cf

Plug-Flow detention time= 1,214.0 min calculated for 12,341 cf (98% of inflow)
 Center-of-Mass det. time= 1,202.8 min (1,902.7 - 699.9)

Volume	Invert	Avail.Storage	Storage Description			
#1	100.00'	8,299 cf	Custom Stage Data (Pyramidal) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
100.00	1,763	0.0	0	0	1,763	
103.00	3,910	100.0	8,299	8,299	4,000	

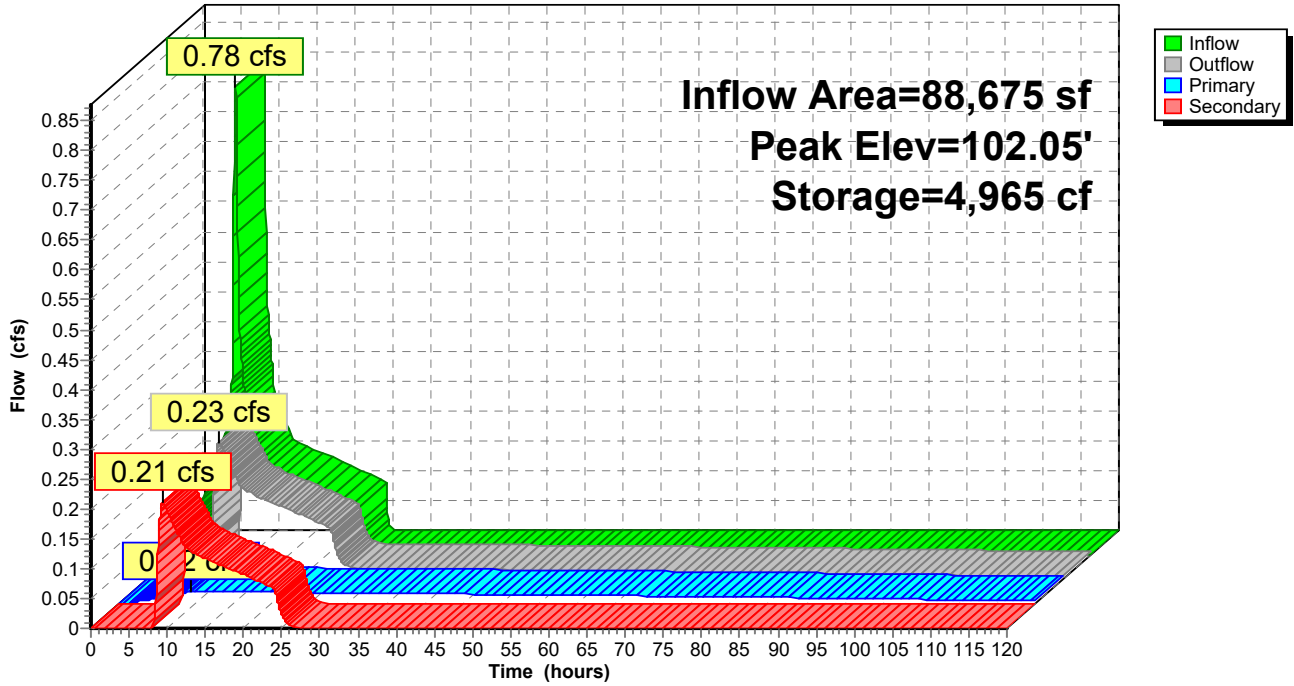
Device	Routing	Invert	Outlet Devices	
#1	Primary	100.00'	0.72" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads	
#2	Secondary	101.83'	12.00" Vert. Orifice/Grate C= 0.600	

Primary OutFlow Max=0.02 cfs @ 9.41 hrs HW=102.05' (Free Discharge)
 ↑1=Orifice/Grate (Orifice Controls 0.02 cfs @ 6.90 fps)

Secondary OutFlow Max=0.21 cfs @ 9.41 hrs HW=102.05' (Free Discharge)
 ↑2=Orifice/Grate (Orifice Controls 0.21 cfs @ 1.61 fps)

Pond 8P: WQ

Hydrograph



SOUTH UNMANAGED DRIVEWAY RUNOFF - 2-YEAR STORM

Plambeck Gardens AW

Type IA 24-hr 2-yr Rainfall=2.50"

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Summary for Subcatchment 15S: S P. Dev ROW Quantity

Runoff = 0.02 cfs @ 7.98 hrs, Volume= 238 cf, Depth= 2.27"

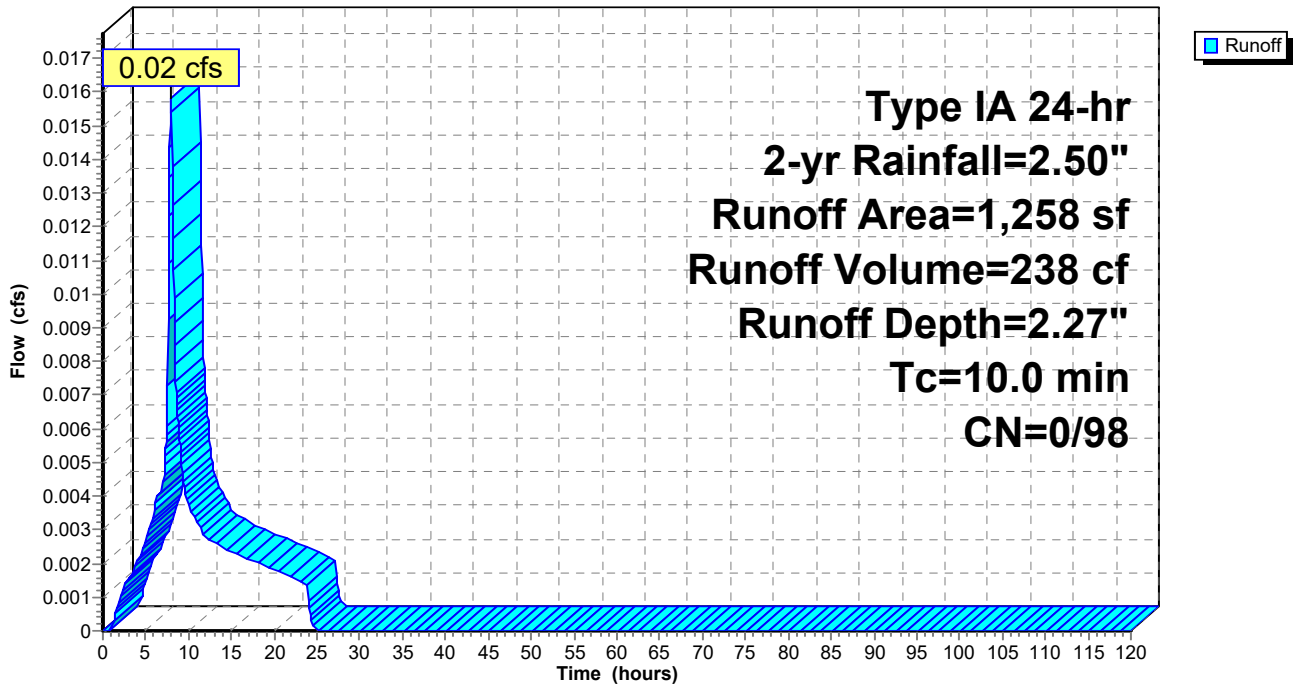
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2-yr Rainfall=2.50"

Area (sf)	CN	Description
* 1,258	98	south sw
1,258	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Subcatchment 15S: S P. Dev ROW Quantity

Hydrograph



SOUTH TOTAL SITE DISCHARGE- 2-YEAR STORM

Plambeck Gardens AW

Type IA 24-hr 2-yr Rainfall=2.50"

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Summary for Pond 17P: (new Pond)

[57] Hint: Peaked at 93.11' (Flood elevation advised)

Inflow Area =	89,933 sf, 69.63% Impervious,	Inflow Depth > 1.68"	for 2-yr event
Inflow =	0.05 cfs @ 24.00 hrs,	Volume=	12,557 cf
Outflow =	0.05 cfs @ 24.00 hrs,	Volume=	12,557 cf, Atten= 0%, Lag= 0.0 min
Primary =	0.05 cfs @ 24.00 hrs,	Volume=	12,557 cf

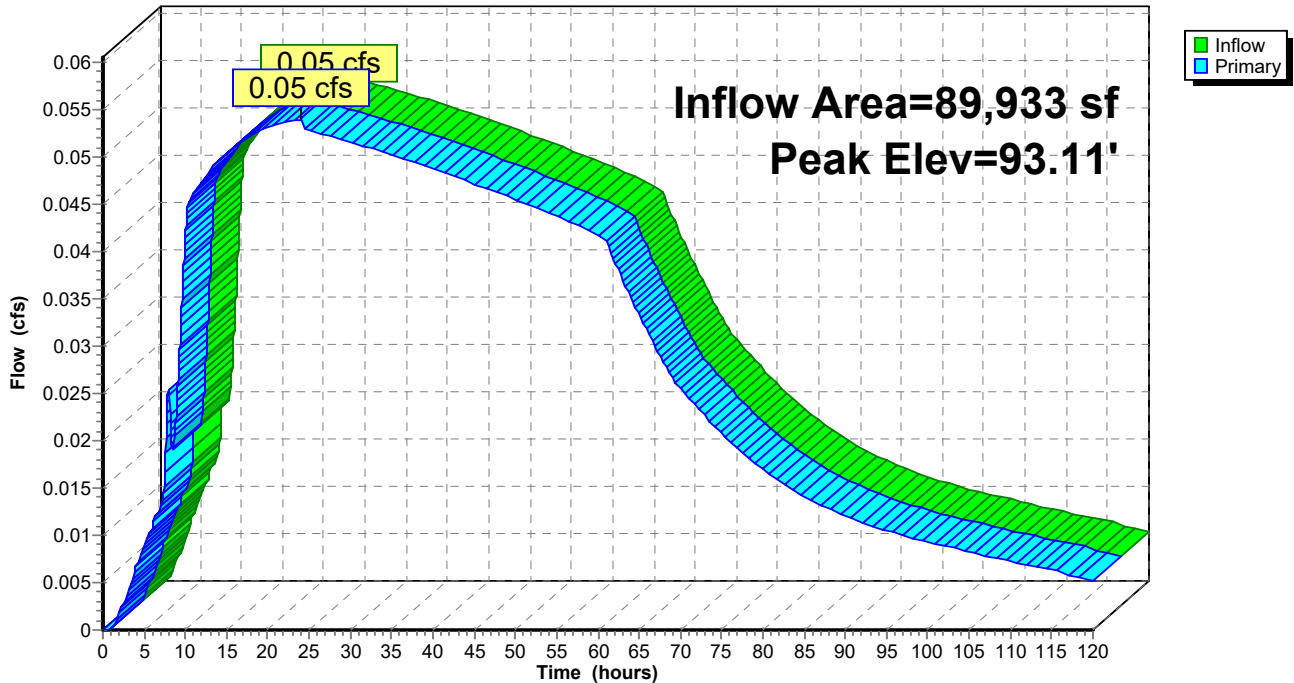
Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 93.11' @ 24.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	93.00'	12.00" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=0.05 cfs @ 24.00 hrs HW=93.11' (Free Discharge)
↑1=Orifice/Grate (Orifice Controls 0.05 cfs @ 1.13 fps)

Pond 17P: (new Pond)

Hydrograph



SOUTH BASIN 5-YEAR STORM

SOUTH PRE-DEVELOPED 5-YEAR STORM

Plambeck Gardens AW

Type IA 24-hr 5-yr Rainfall=3.10"

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Page 2

Summary for Subcatchment 3S: Pre South

Runoff = 0.24 cfs @ 8.27 hrs, Volume= 8,585 cf, Depth= 0.92"

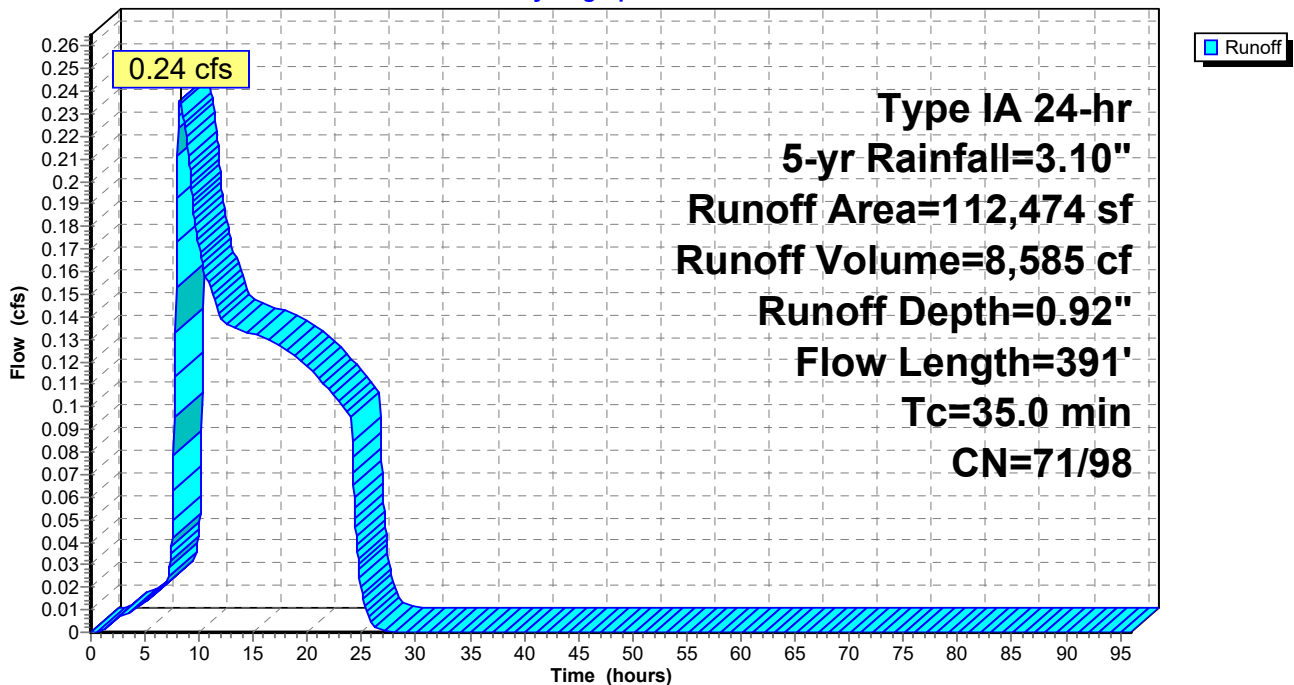
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type IA 24-hr 5-yr Rainfall=3.10"

Area (sf)	CN	Description
10,143	85	Gravel roads, HSG B
622	98	Paved parking, HSG B
4,723	98	Roofs, HSG B
95,727	69	Pasture/grassland/range, Fair, HSG B
1,259	69	Pasture/grassland/range, Fair, HSG B
112,474	72	Weighted Average
107,129	71	95.25% Pervious Area
5,345	98	4.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
34.6	300	0.0267	0.14		Sheet Flow, sheet flow Grass: Dense n= 0.240 P2= 2.50"
0.4	91	0.0570	3.58		Shallow Concentrated Flow, shallow Grassed Waterway Kv= 15.0 fps
35.0	391	Total			

Subcatchment 3S: Pre South

Hydrograph



SOUTH POST-DEVELOPED BASIN RUNOFF - 5-YEAR STORM

Plambeck Gardens AW

Type IA 24-hr 5-yr Rainfall=3.10"

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Summary for Subcatchment 9S: S Post-developed HUD

Runoff = 1.02 cfs @ 7.98 hrs, Volume= 16,313 cf, Depth= 2.21"

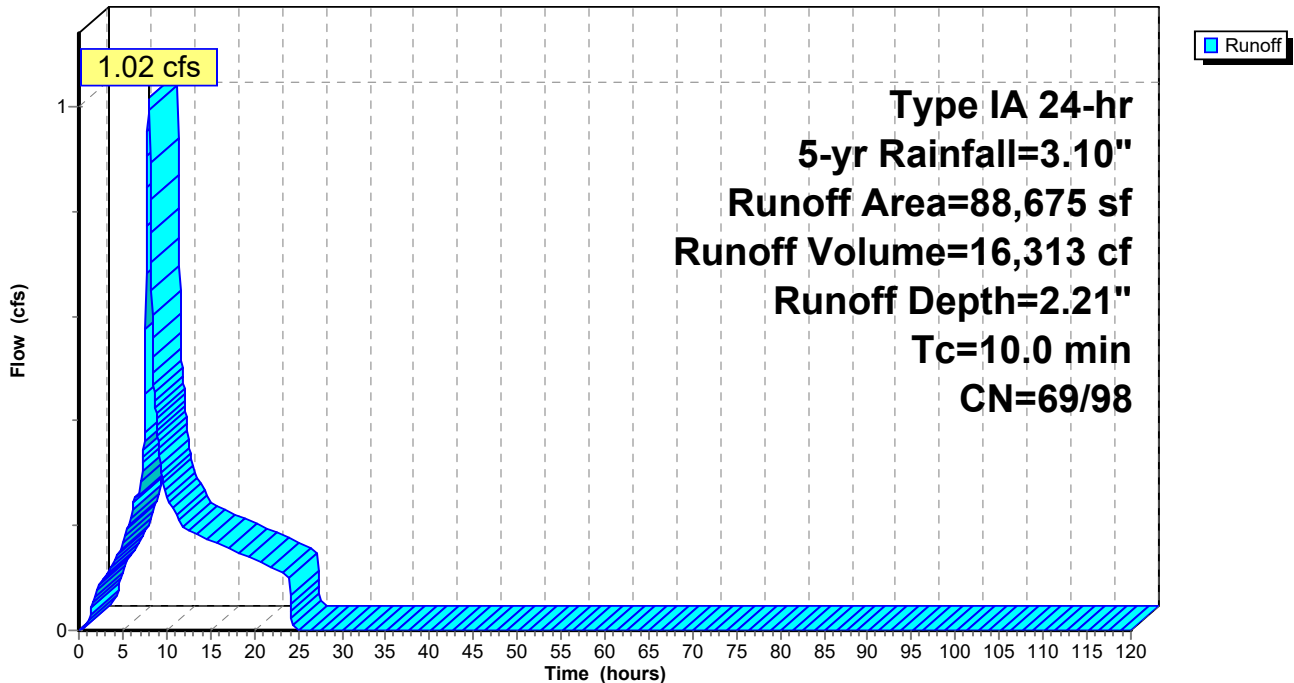
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Type IA 24-hr 5-yr Rainfall=3.10"

	Area (sf)	CN	Description
*	61,366	98	
	27,309	69	50-75% Grass cover, Fair, HSG B
	88,675	89	Weighted Average
	27,309	69	30.80% Pervious Area
	61,366	98	69.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Subcatchment 9S: S Post-developed HUD

Hydrograph



Plambeck Gardens AW

Type IA 24-hr 5-yr Rainfall=3.10"

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Summary for Pond 6P: Detention

Inflow Area = 88,675 sf, 69.20% Impervious, Inflow Depth > 2.18" for 5-yr event
 Inflow = 0.50 cfs @ 8.49 hrs, Volume= 16,087 cf
 Outflow = 0.17 cfs @ 15.50 hrs, Volume= 16,059 cf, Atten= 66%, Lag= 420.9 min
 Primary = 0.05 cfs @ 15.50 hrs, Volume= 12,701 cf
 Secondary = 0.12 cfs @ 15.50 hrs, Volume= 3,358 cf

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 Peak Elev= 97.59' @ 15.50 hrs Surf.Area= 3,221 sf Storage= 5,346 cf

Plug-Flow detention time= 775.7 min calculated for 16,052 cf (100% of inflow)
 Center-of-Mass det. time= 765.9 min (2,405.0 - 1,639.1)

Volume	Invert	Avail.Storage	Storage Description		
#1	93.50'	10,759 cf	Custom Stage Data (Pyramidal) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
93.50	2,016	0.0	0	0	2,016
94.50	2,016	30.0	605	605	2,196
96.00	2,016	20.0	605	1,210	2,465
99.00	4,516	100.0	9,549	10,759	5,054

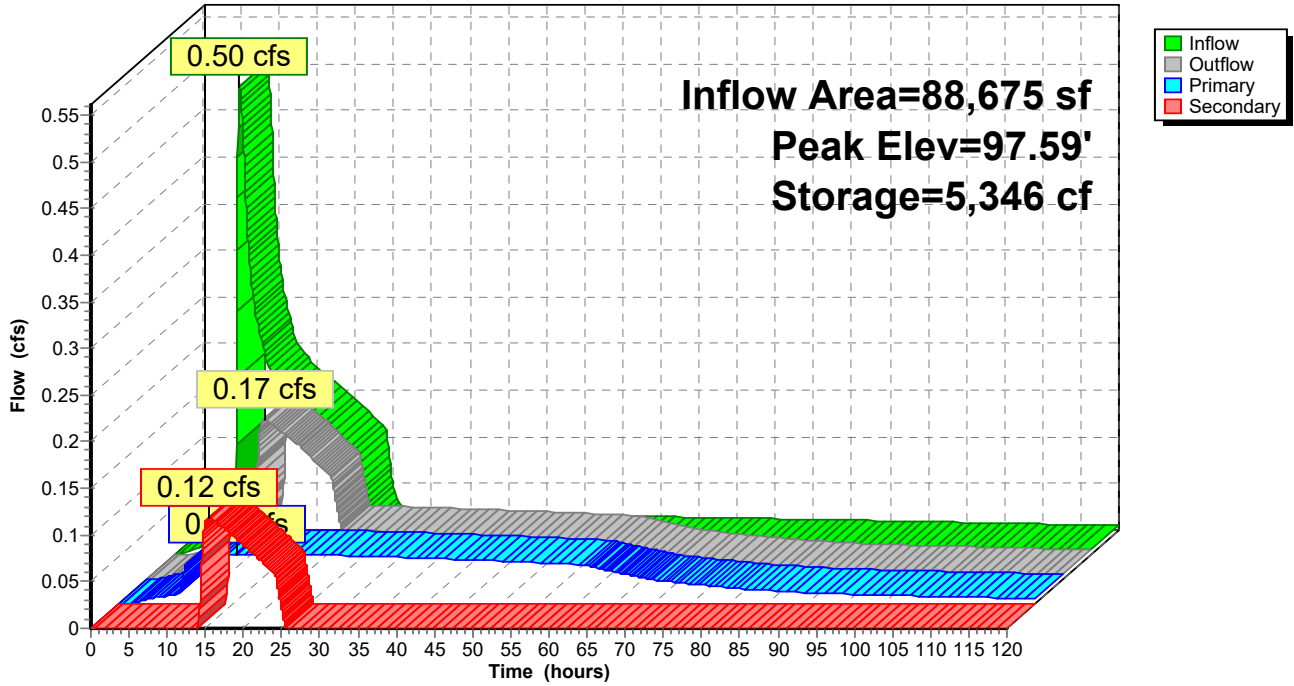
Device	Routing	Invert	Outlet Devices
#1	Primary	93.50'	1.00" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Secondary	97.54'	10.00" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.05 cfs @ 15.50 hrs HW=97.59' (Free Discharge)
 ↑1=Orifice/Grate (Orifice Controls 0.05 cfs @ 9.74 fps)

Secondary OutFlow Max=0.11 cfs @ 15.50 hrs HW=97.59' (Free Discharge)
 ↑2=Orifice/Grate (Weir Controls 0.11 cfs @ 0.76 fps)

Pond 6P: Detention

Hydrograph



Plambeck Gardens AW

Type IA 24-hr 5-yr Rainfall=3.10"

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Summary for Pond 8P: WQ

Inflow Area = 88,675 sf, 69.20% Impervious, Inflow Depth = 2.21" for 5-yr event
 Inflow = 1.02 cfs @ 7.98 hrs, Volume= 16,313 cf
 Outflow = 0.50 cfs @ 8.49 hrs, Volume= 16,087 cf, Atten= 51%, Lag= 30.3 min
 Primary = 0.02 cfs @ 8.49 hrs, Volume= 5,659 cf
 Secondary = 0.48 cfs @ 8.49 hrs, Volume= 10,428 cf

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 Peak Elev= 102.18' @ 8.49 hrs Surf.Area= 3,235 sf Storage= 5,356 cf

Plug-Flow detention time= 952.9 min calculated for 16,087 cf (99% of inflow)
 Center-of-Mass det. time= 942.5 min (1,639.1 - 696.6)

Volume	Invert	Avail.Storage	Storage Description			
#1	100.00'	8,299 cf	Custom Stage Data (Pyramidal) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
100.00	1,763	0.0	0	0	1,763	
103.00	3,910	100.0	8,299	8,299	4,000	

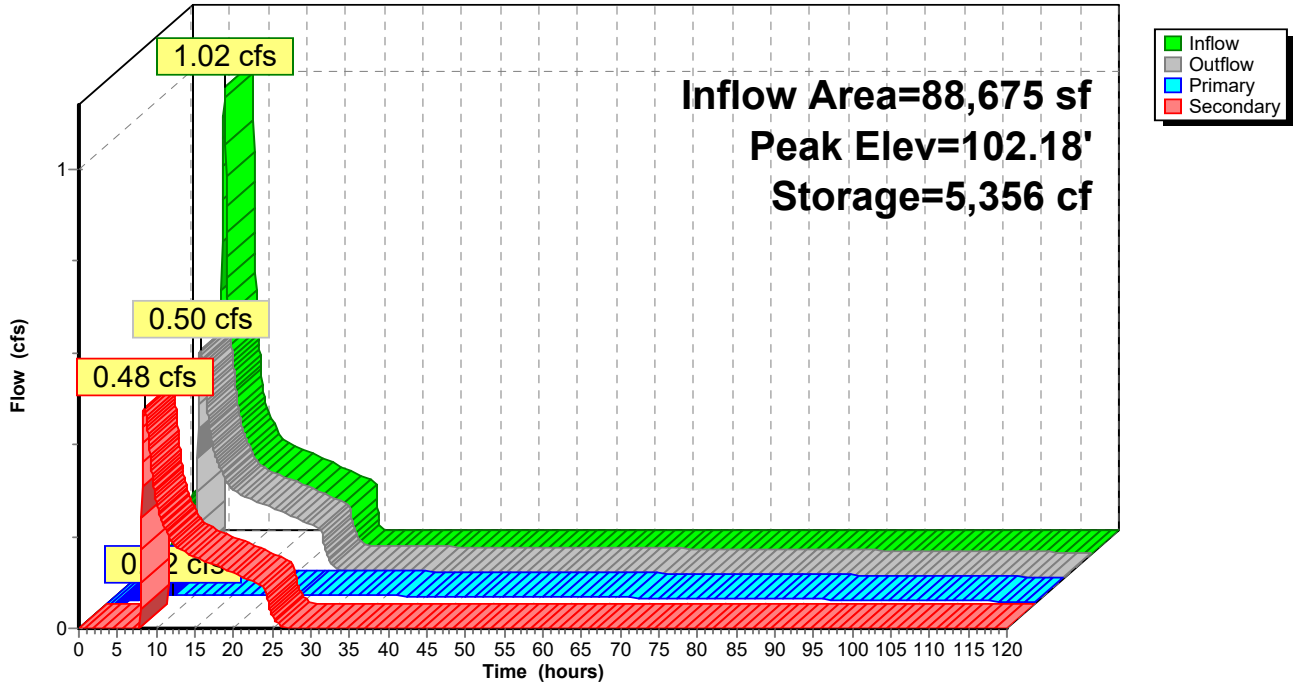
Device	Routing	Invert	Outlet Devices	
#1	Primary	100.00'	0.72" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads	
#2	Secondary	101.83'	12.00" Vert. Orifice/Grate C= 0.600	

Primary OutFlow Max=0.02 cfs @ 8.49 hrs HW=102.17' (Free Discharge)
 ↑1=Orifice/Grate (Orifice Controls 0.02 cfs @ 7.10 fps)

Secondary OutFlow Max=0.48 cfs @ 8.49 hrs HW=102.17' (Free Discharge)
 ↑2=Orifice/Grate (Orifice Controls 0.48 cfs @ 2.00 fps)

Pond 8P: WQ

Hydrograph



SOUTH UNMANAGED DRIVEWAY RUNOFF - 5-YEAR STORM

Plambeck Gardens AW

Type IA 24-hr 5-yr Rainfall=3.10"

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Summary for Subcatchment 15S: S P. Dev ROW Quantity

Runoff = 0.02 cfs @ 7.98 hrs, Volume= 301 cf, Depth= 2.87"

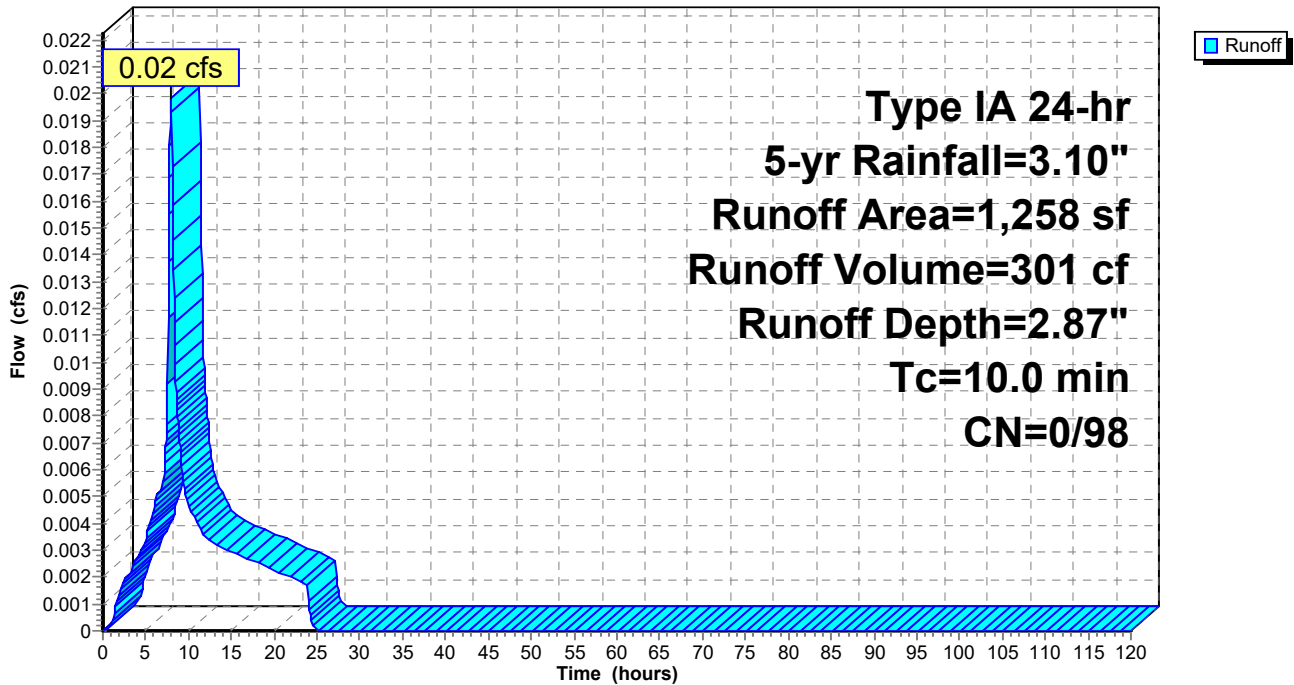
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Type IA 24-hr 5-yr Rainfall=3.10"

	Area (sf)	CN	Description
*	1,258	98	south sw
	1,258	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Subcatchment 15S: S P. Dev ROW Quantity

Hydrograph



SOUTH TOTAL DISCHARGE FROM SITE - 5-YEAR STORM

Plambeck Gardens AW

Type IA 24-hr 5-yr Rainfall=3.10"

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Summary for Pond 17P: (new Pond)

[57] Hint: Peaked at 93.20' (Flood elevation advised)

Inflow Area =	89,933 sf, 69.63% Impervious,	Inflow Depth > 2.18"	for 5-yr event
Inflow =	0.17 cfs @ 15.50 hrs,	Volume=	16,360 cf
Outflow =	0.17 cfs @ 15.50 hrs,	Volume=	16,360 cf, Atten= 0%, Lag= 0.0 min
Primary =	0.17 cfs @ 15.50 hrs,	Volume=	16,360 cf

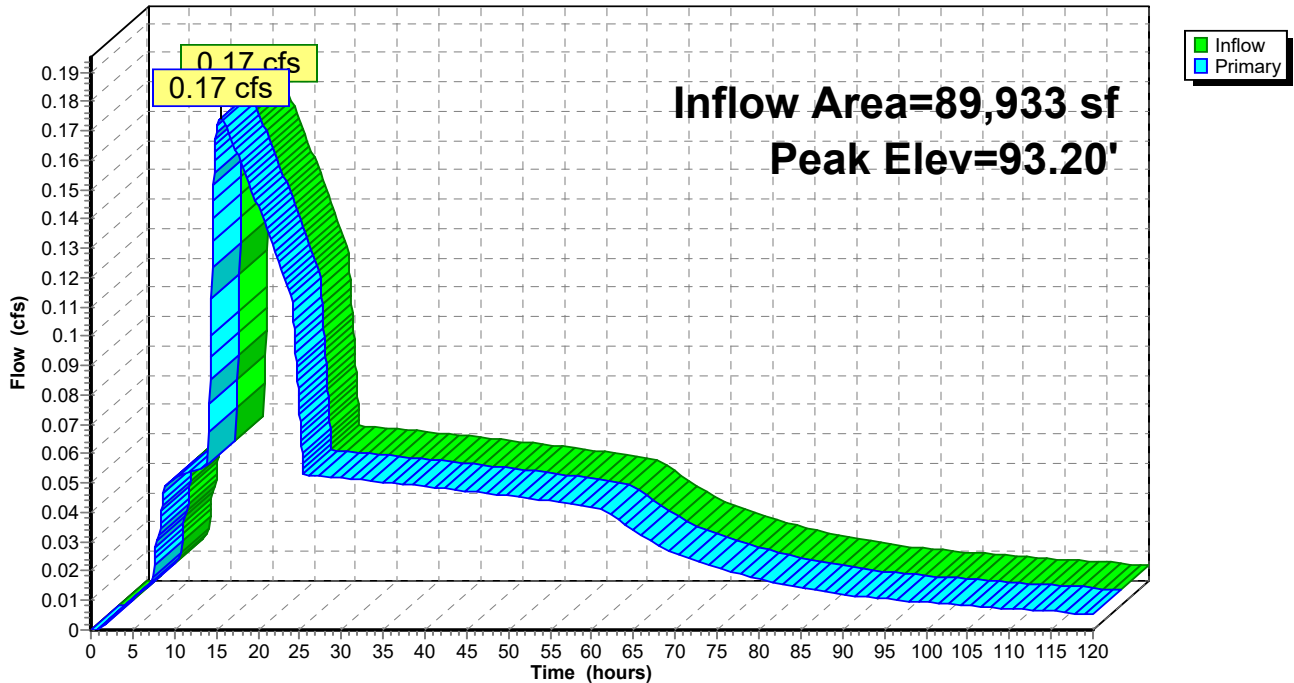
Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 93.20' @ 15.50 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	93.00'	12.00" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=0.17 cfs @ 15.50 hrs HW=93.20' (Free Discharge)
↑1=Orifice/Grate (Orifice Controls 0.17 cfs @ 1.53 fps)

Pond 17P: (new Pond)

Hydrograph



SOUTH BASIN 10-YEAR STORM

SOUTH PREDEVELOPED RUNOFF - 10-YEAR STORM

Plambeck Gardens AW

Type IA 24-hr 10-yr Rainfall=3.45"

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Summary for Subcatchment 3S: Pre South

Runoff = 0.32 cfs @ 8.23 hrs, Volume= 10,647 cf, Depth= 1.14"

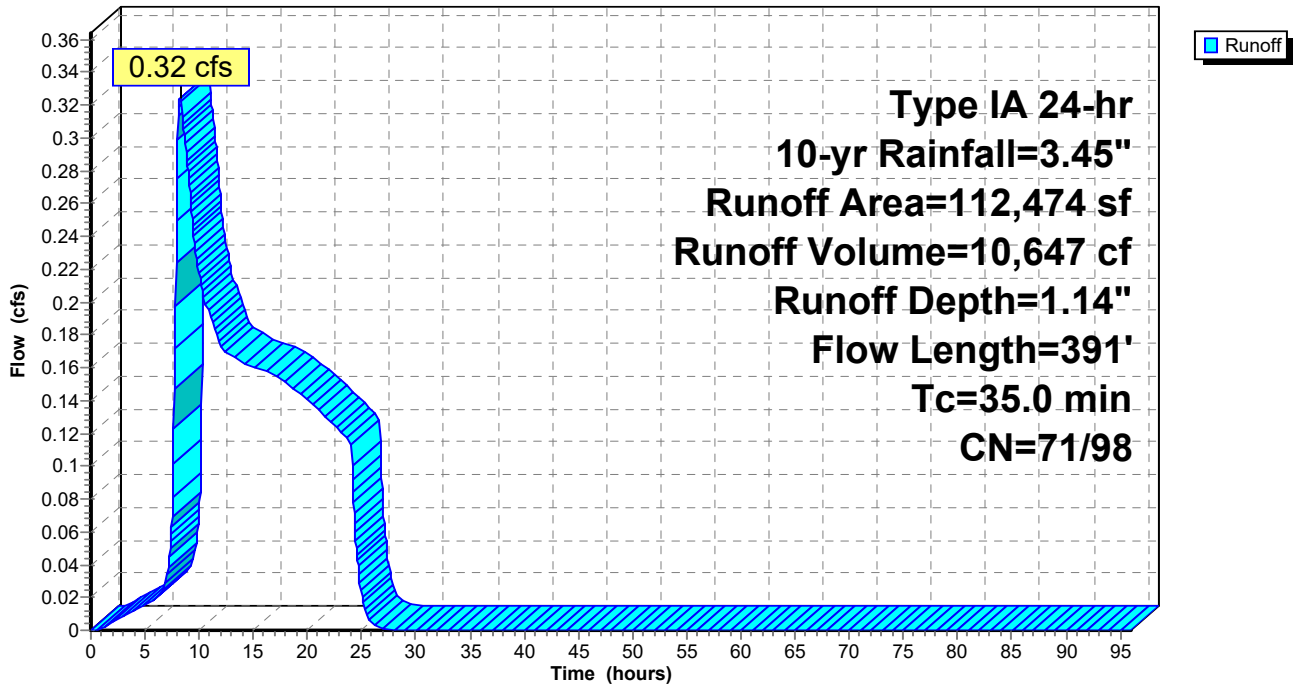
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10-yr Rainfall=3.45"

Area (sf)	CN	Description
10,143	85	Gravel roads, HSG B
622	98	Paved parking, HSG B
4,723	98	Roofs, HSG B
95,727	69	Pasture/grassland/range, Fair, HSG B
1,259	69	Pasture/grassland/range, Fair, HSG B
112,474	72	Weighted Average
107,129	71	95.25% Pervious Area
5,345	98	4.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
34.6	300	0.0267	0.14		Sheet Flow, sheet flow Grass: Dense n= 0.240 P2= 2.50"
0.4	91	0.0570	3.58		Shallow Concentrated Flow, shallow Grassed Waterway Kv= 15.0 fps
35.0	391	Total			

Subcatchment 3S: Pre South

Hydrograph



SOUTH POST-DEVELOPED BASIN RUNOFF - 10-YEAR STORM

Plambeck Gardens AW

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Type IA 24-hr 10-yr Rainfall=3.45"

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Summary for Subcatchment 9S: S Post-developed HUD

Runoff = 1.16 cfs @ 7.98 hrs, Volume= 18,552 cf, Depth= 2.51"

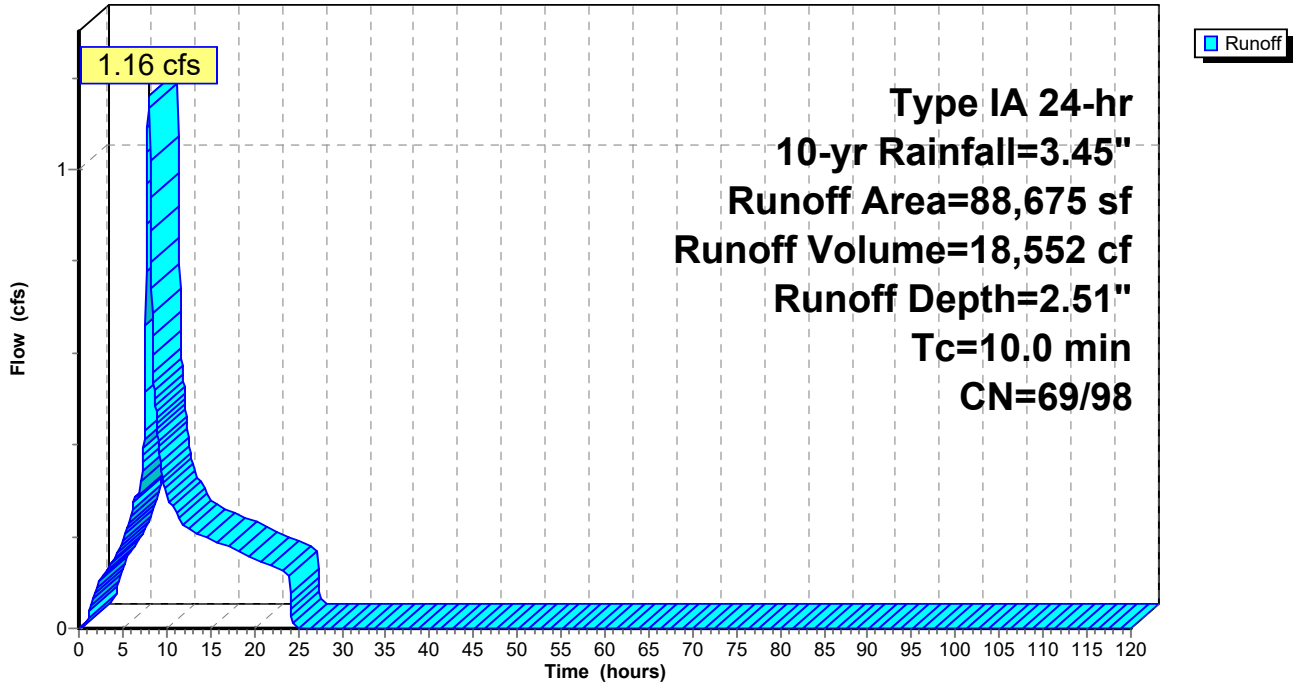
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10-yr Rainfall=3.45"

	Area (sf)	CN	Description
*	61,366	98	
	27,309	69	50-75% Grass cover, Fair, HSG B
	88,675	89	Weighted Average
	27,309	69	30.80% Pervious Area
	61,366	98	69.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Subcatchment 9S: S Post-developed HUD

Hydrograph



Plambeck Gardens AW

Type IA 24-hr 10-yr Rainfall=3.45"

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Summary for Pond 6P: Detention

Inflow Area = 88,675 sf, 69.20% Impervious, Inflow Depth > 2.48" for 10-yr event
 Inflow = 0.73 cfs @ 8.31 hrs, Volume= 18,324 cf
 Outflow = 0.22 cfs @ 12.93 hrs, Volume= 18,297 cf, Atten= 70%, Lag= 276.6 min
 Primary = 0.05 cfs @ 12.93 hrs, Volume= 12,801 cf
 Secondary = 0.17 cfs @ 12.93 hrs, Volume= 5,495 cf

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 Peak Elev= 97.61' @ 12.93 hrs Surf.Area= 3,234 sf Storage= 5,396 cf

Plug-Flow detention time= 701.2 min calculated for 18,289 cf (100% of inflow)
 Center-of-Mass det. time= 692.5 min (2,223.6 - 1,531.2)

Volume	Invert	Avail.Storage	Storage Description		
#1	93.50'	10,759 cf	Custom Stage Data (Pyramidal) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
93.50	2,016	0.0	0	0	2,016
94.50	2,016	30.0	605	605	2,196
96.00	2,016	20.0	605	1,210	2,465
99.00	4,516	100.0	9,549	10,759	5,054

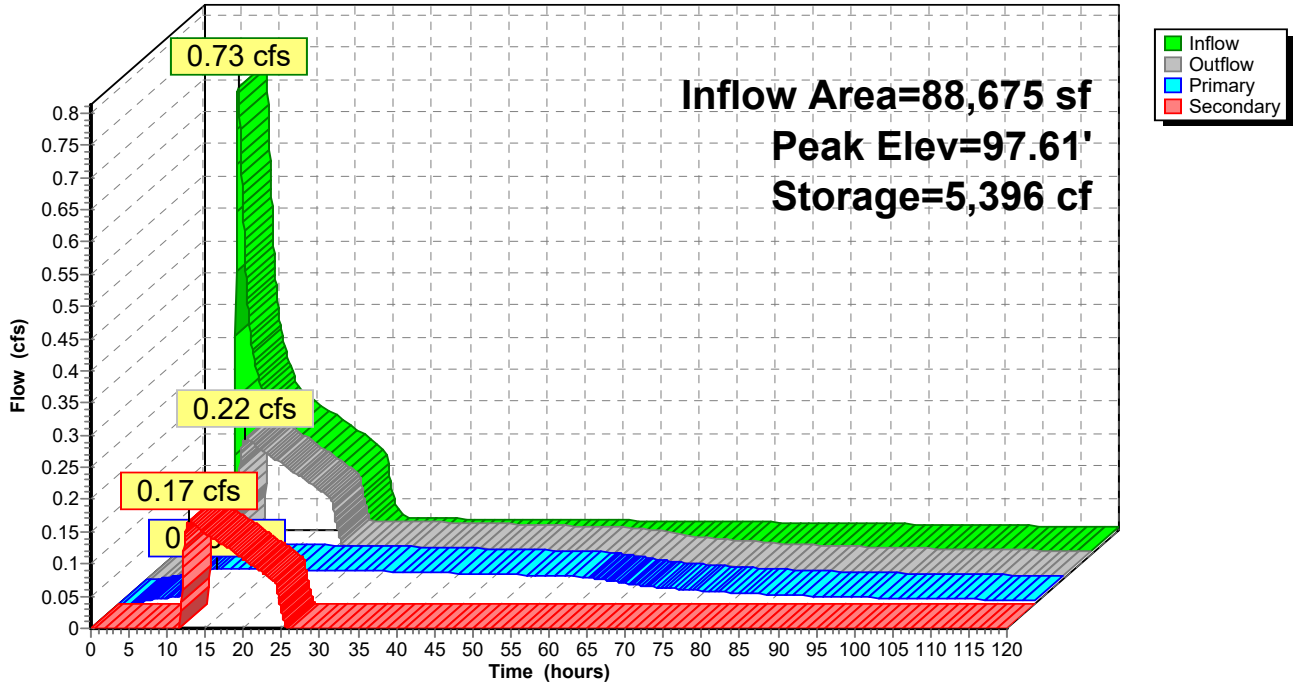
Device	Routing	Invert	Outlet Devices
#1	Primary	93.50'	1.00" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Secondary	97.54'	10.00" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.05 cfs @ 12.93 hrs HW=97.61' (Free Discharge)
 ↑1=Orifice/Grate (Orifice Controls 0.05 cfs @ 9.76 fps)

Secondary OutFlow Max=0.16 cfs @ 12.93 hrs HW=97.61' (Free Discharge)
 ↑2=Orifice/Grate (Weir Controls 0.16 cfs @ 0.86 fps)

Pond 6P: Detention

Hydrograph



Plambeck Gardens AW

Type IA 24-hr 10-yr Rainfall=3.45"

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Summary for Pond 8P: WQ

Inflow Area = 88,675 sf, 69.20% Impervious, Inflow Depth = 2.51" for 10-yr event
 Inflow = 1.16 cfs @ 7.98 hrs, Volume= 18,552 cf
 Outflow = 0.73 cfs @ 8.31 hrs, Volume= 18,324 cf, Atten= 37%, Lag= 20.0 min
 Primary = 0.02 cfs @ 8.31 hrs, Volume= 5,687 cf
 Secondary = 0.71 cfs @ 8.31 hrs, Volume= 12,637 cf

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 Peak Elev= 102.25' @ 8.31 hrs Surf.Area= 3,298 sf Storage= 5,616 cf

Plug-Flow detention time= 845.4 min calculated for 18,324 cf (99% of inflow)
 Center-of-Mass det. time= 836.2 min (1,531.2 - 695.0)

Volume	Invert	Avail.Storage	Storage Description			
#1	100.00'	8,299 cf	Custom Stage Data (Pyramidal) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
100.00	1,763	0.0	0	0	1,763	
103.00	3,910	100.0	8,299	8,299	4,000	

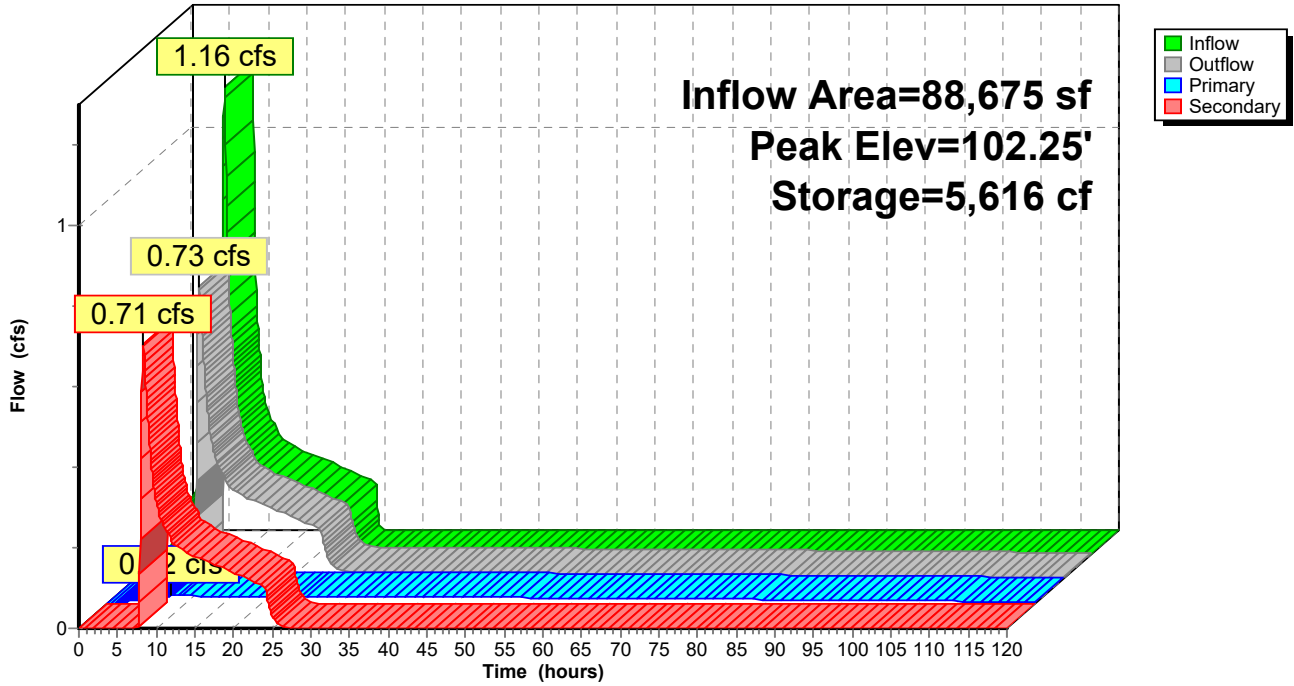
Device	Routing	Invert	Outlet Devices	
#1	Primary	100.00'	0.72" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads	
#2	Secondary	101.83'	12.00" Vert. Orifice/Grate C= 0.600	

Primary OutFlow Max=0.02 cfs @ 8.31 hrs HW=102.25' (Free Discharge)
 ↑1=Orifice/Grate (Orifice Controls 0.02 cfs @ 7.23 fps)

Secondary OutFlow Max=0.70 cfs @ 8.31 hrs HW=102.25' (Free Discharge)
 ↑2=Orifice/Grate (Orifice Controls 0.70 cfs @ 2.22 fps)

Pond 8P: WQ

Hydrograph



SOUTH UNMANAGED DRIVEWAY RUNOFF - 10-YEAR STORM

Plambeck Gardens AW

Type IA 24-hr 10-yr Rainfall=3.45"

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Summary for Subcatchment 15S: S P. Dev ROW Quantity

Runoff = 0.02 cfs @ 7.98 hrs, Volume= 337 cf, Depth= 3.22"

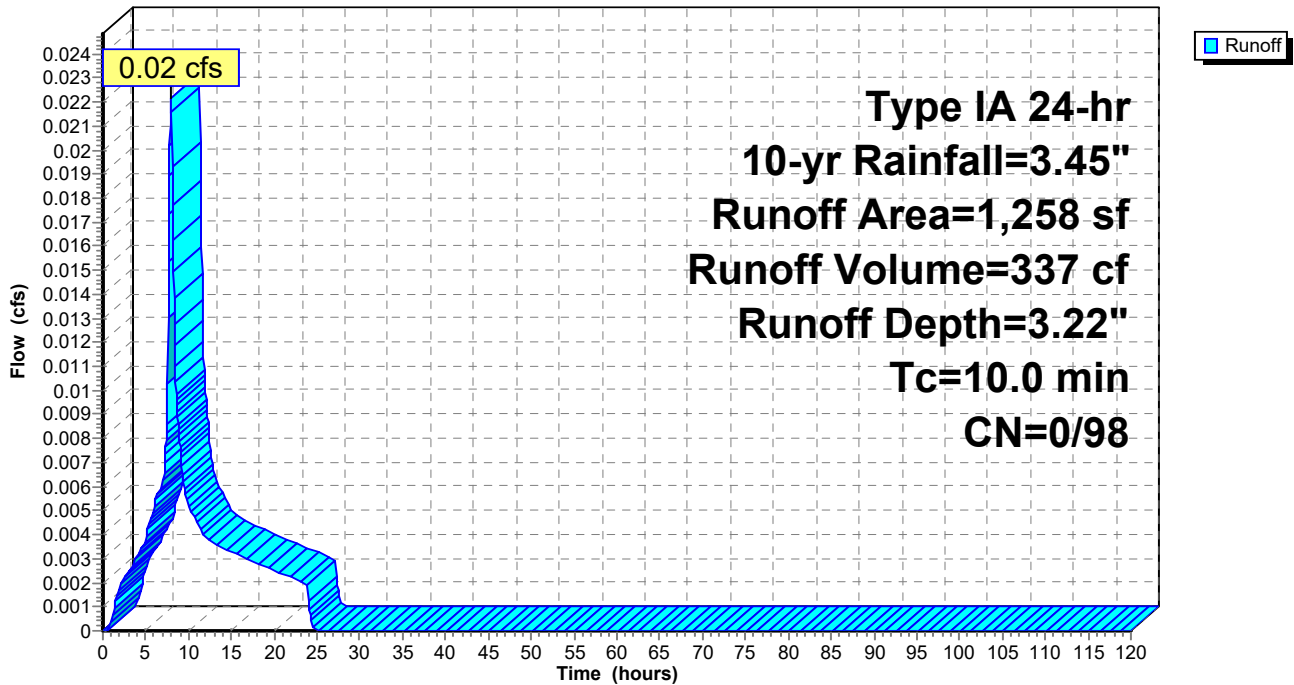
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10-yr Rainfall=3.45"

	Area (sf)	CN	Description
*	1,258	98	south sw
	1,258	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Subcatchment 15S: S P. Dev ROW Quantity

Hydrograph



SOUTH TOTAL SITE DISCHARGE - 10-YEAR STORM

Plambeck Gardens AW

Type IA 24-hr 10-yr Rainfall=3.45"

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Summary for Pond 17P: (new Pond)

[57] Hint: Peaked at 93.23' (Flood elevation advised)

Inflow Area =	89,933 sf, 69.63% Impervious,	Inflow Depth > 2.49"	for 10-yr event
Inflow =	0.22 cfs @ 12.92 hrs,	Volume=	18,634 cf
Outflow =	0.22 cfs @ 12.92 hrs,	Volume=	18,634 cf, Atten= 0%, Lag= 0.0 min
Primary =	0.22 cfs @ 12.92 hrs,	Volume=	18,634 cf

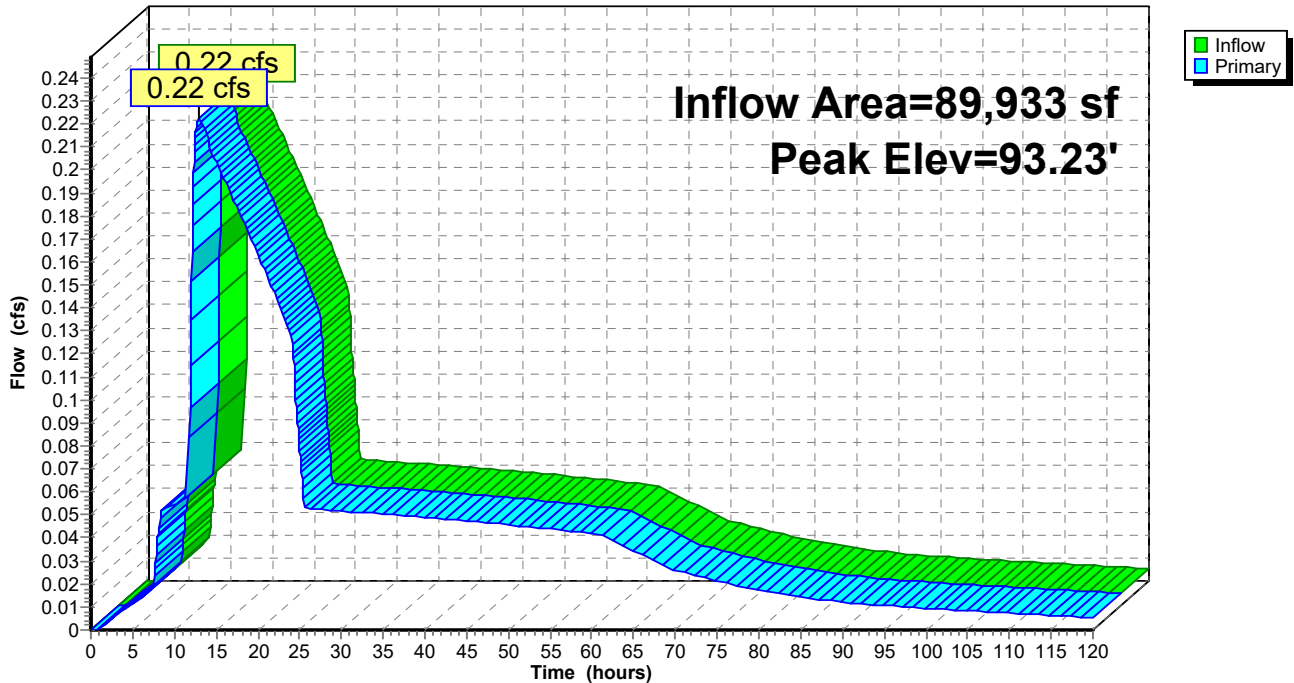
Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 Peak Elev= 93.23' @ 12.92 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	93.00'	12.00" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=0.22 cfs @ 12.92 hrs HW=93.23' (Free Discharge)
 ↳1=Orifice/Grate (Orifice Controls 0.22 cfs @ 1.63 fps)

Pond 17P: (new Pond)

Hydrograph



SOUTH BASIN 25-YEAR STORM

SOUTH PREDEVELOPED 25-YEAR STORM

Plambeck Gardens AW

Type IA 24-hr 25-yr Rainfall=3.90"

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Summary for Subcatchment 3S: Pre South

Runoff = 0.45 cfs @ 8.19 hrs, Volume= 13,472 cf, Depth= 1.44"

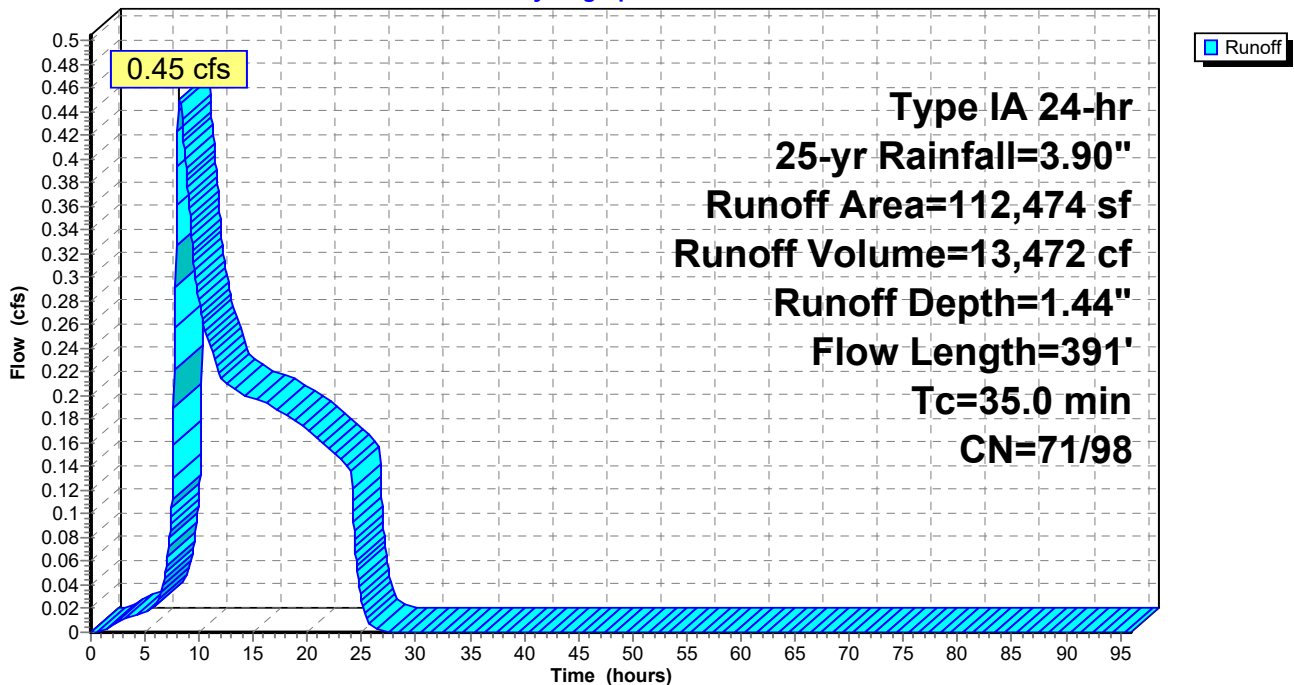
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-yr Rainfall=3.90"

Area (sf)	CN	Description
10,143	85	Gravel roads, HSG B
622	98	Paved parking, HSG B
4,723	98	Roofs, HSG B
95,727	69	Pasture/grassland/range, Fair, HSG B
1,259	69	Pasture/grassland/range, Fair, HSG B
112,474	72	Weighted Average
107,129	71	95.25% Pervious Area
5,345	98	4.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
34.6	300	0.0267	0.14		Sheet Flow, sheet flow Grass: Dense n= 0.240 P2= 2.50"
0.4	91	0.0570	3.58		Shallow Concentrated Flow, shallow Grassed Waterway Kv= 15.0 fps
35.0	391	Total			

Subcatchment 3S: Pre South

Hydrograph



SOUTH POST-DEVELOPED BASIN RUNOFF - 25-YEAR STORM

Plambeck Gardens AW

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Type IA 24-hr 25-yr Rainfall=3.90"

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Summary for Subcatchment 9S: S Post-developed HUD

Runoff = 1.35 cfs @ 7.98 hrs, Volume= 21,480 cf, Depth= 2.91"

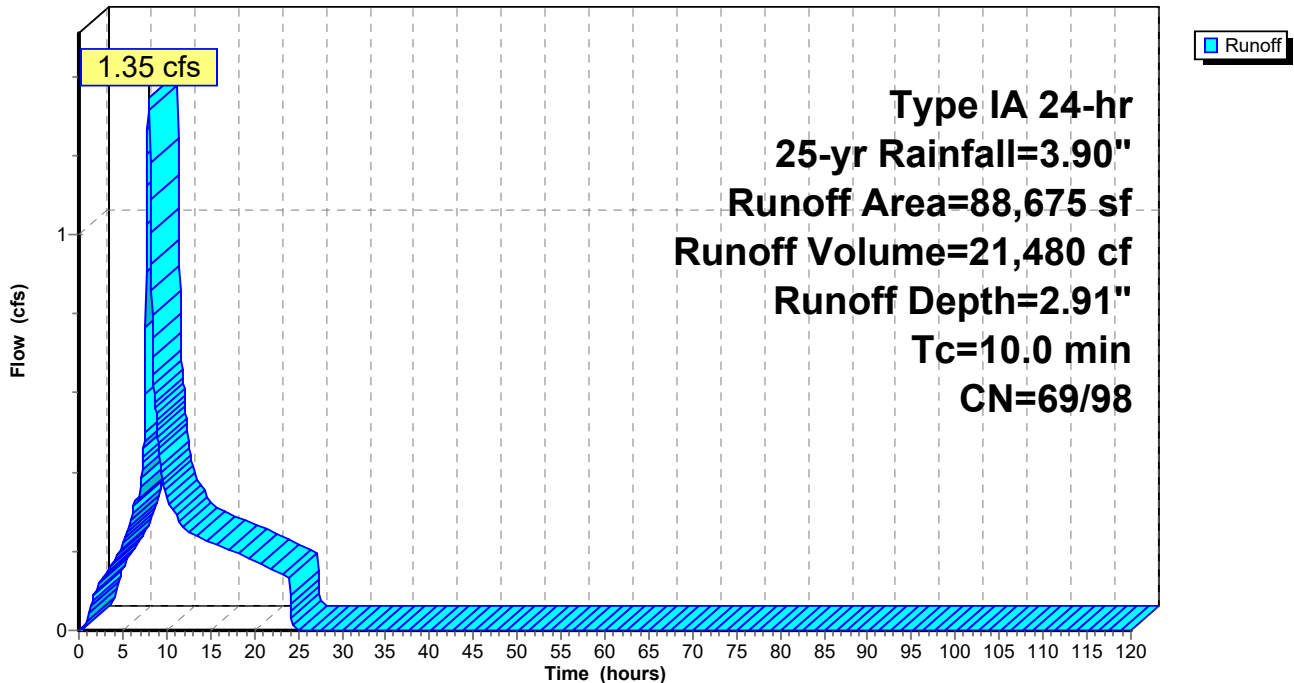
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-yr Rainfall=3.90"

	Area (sf)	CN	Description
*	61,366	98	
	27,309	69	50-75% Grass cover, Fair, HSG B
	88,675	89	Weighted Average
	27,309	69	30.80% Pervious Area
	61,366	98	69.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Subcatchment 9S: S Post-developed HUD

Hydrograph



Plambeck Gardens AW

Type IA 24-hr 25-yr Rainfall=3.90"

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Summary for Pond 6P: Detention

Inflow Area = 88,675 sf, 69.20% Impervious, Inflow Depth > 2.88" for 25-yr event
 Inflow = 1.00 cfs @ 8.20 hrs, Volume= 21,250 cf
 Outflow = 0.32 cfs @ 10.94 hrs, Volume= 21,222 cf, Atten= 68%, Lag= 164.0 min
 Primary = 0.05 cfs @ 10.94 hrs, Volume= 12,889 cf
 Secondary = 0.27 cfs @ 10.94 hrs, Volume= 8,334 cf

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 Peak Elev= 97.64' @ 10.94 hrs Surf.Area= 3,257 sf Storage= 5,486 cf

Plug-Flow detention time= 618.2 min calculated for 21,222 cf (100% of inflow)
 Center-of-Mass det. time= 610.7 min (2,034.0 - 1,423.3)

Volume	Invert	Avail.Storage	Storage Description		
#1	93.50'	10,759 cf	Custom Stage Data (Pyramidal) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
93.50	2,016	0.0	0	0	2,016
94.50	2,016	30.0	605	605	2,196
96.00	2,016	20.0	605	1,210	2,465
99.00	4,516	100.0	9,549	10,759	5,054

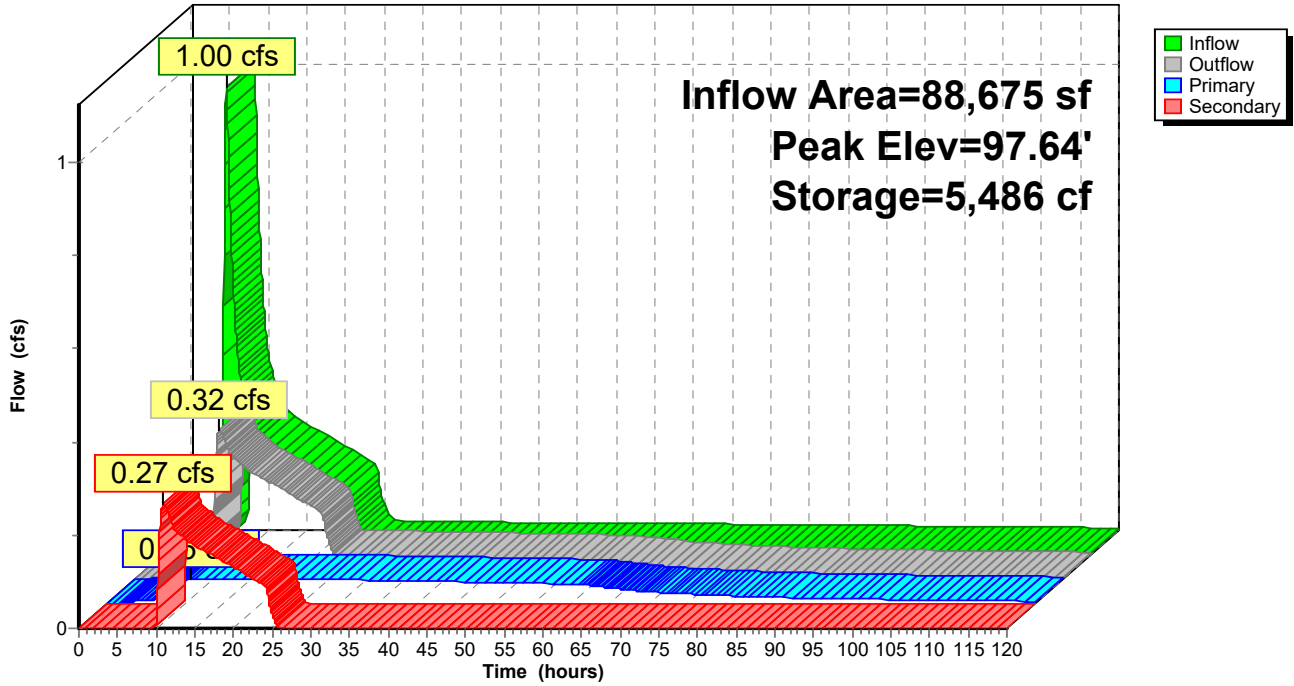
Device	Routing	Invert	Outlet Devices
#1	Primary	93.50'	1.00" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Secondary	97.54'	10.00" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.05 cfs @ 10.94 hrs HW=97.64' (Free Discharge)
 ↑1=Orifice/Grate (Orifice Controls 0.05 cfs @ 9.79 fps)

Secondary OutFlow Max=0.26 cfs @ 10.94 hrs HW=97.64' (Free Discharge)
 ↑2=Orifice/Grate (Weir Controls 0.26 cfs @ 1.02 fps)

Pond 6P: Detention

Hydrograph



Plambeck Gardens AW

Type IA 24-hr 25-yr Rainfall=3.90"

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Summary for Pond 8P: WQ

Inflow Area = 88,675 sf, 69.20% Impervious, Inflow Depth = 2.91" for 25-yr event
 Inflow = 1.35 cfs @ 7.98 hrs, Volume= 21,480 cf
 Outflow = 1.00 cfs @ 8.20 hrs, Volume= 21,250 cf, Atten= 26%, Lag= 13.3 min
 Primary = 0.02 cfs @ 8.20 hrs, Volume= 5,719 cf
 Secondary = 0.98 cfs @ 8.20 hrs, Volume= 15,531 cf

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 Peak Elev= 102.34' @ 8.20 hrs Surf.Area= 3,366 sf Storage= 5,904 cf

Plug-Flow detention time= 736.2 min calculated for 21,241 cf (99% of inflow)
 Center-of-Mass det. time= 730.3 min (1,423.3 - 693.1)

Volume	Invert	Avail.Storage	Storage Description			
#1	100.00'	8,299 cf	Custom Stage Data (Pyramidal) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
100.00	1,763	0.0	0	0	1,763	
103.00	3,910	100.0	8,299	8,299	4,000	

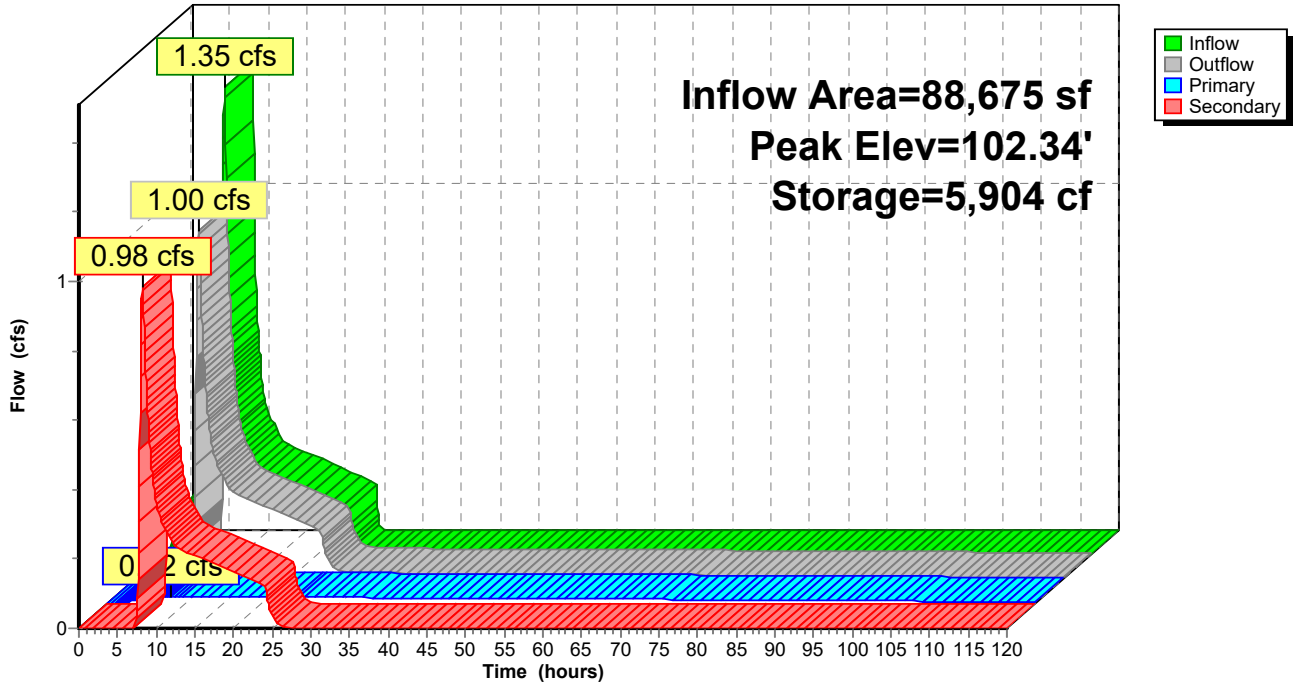
Device	Routing	Invert	Outlet Devices	
#1	Primary	100.00'	0.72" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads	
#2	Secondary	101.83'	12.00" Vert. Orifice/Grate C= 0.600	

Primary OutFlow Max=0.02 cfs @ 8.20 hrs HW=102.34' (Free Discharge)
 ↑**1=Orifice/Grate** (Orifice Controls 0.02 cfs @ 7.37 fps)

Secondary OutFlow Max=0.98 cfs @ 8.20 hrs HW=102.34' (Free Discharge)
 ↑**2=Orifice/Grate** (Orifice Controls 0.98 cfs @ 2.43 fps)

Pond 8P: WQ

Hydrograph



SOUTH UNMANAGED DRIVEWAY RUNOFF - 25-YEAR STORM

Plambeck Gardens AW

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Type IA 24-hr 25-yr Rainfall=3.90"

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Summary for Subcatchment 15S: S P. Dev ROW Quantity

Runoff = 0.03 cfs @ 7.98 hrs, Volume= 384 cf, Depth= 3.67"

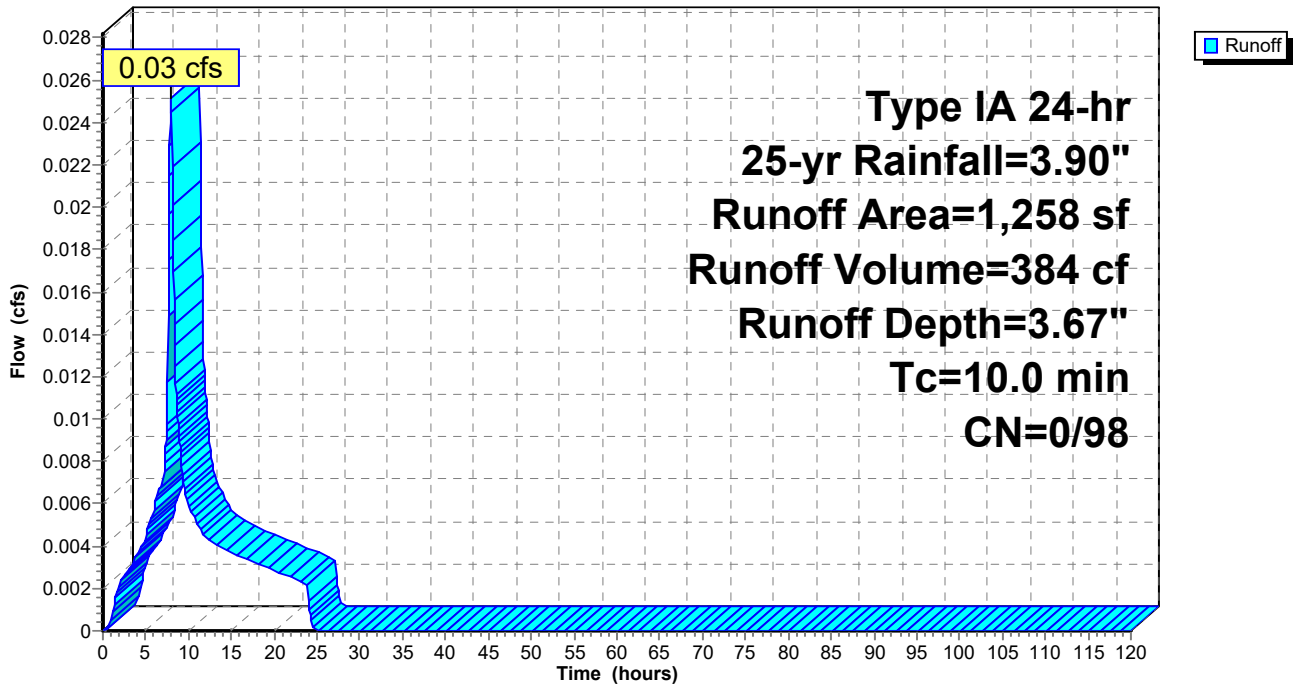
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-yr Rainfall=3.90"

Area (sf)	CN	Description
* 1,258	98	south sw
1,258	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Subcatchment 15S: S P. Dev ROW Quantity

Hydrograph



SOUTH TOTAL DISCHARGE FROM SITE - 25-YEAR STORM

Plambeck Gardens AW

Type IA 24-hr 25-yr Rainfall=3.90"

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Summary for Pond 17P: (new Pond)

[57] Hint: Peaked at 93.28' (Flood elevation advised)

Inflow Area =	89,933 sf, 69.63% Impervious,	Inflow Depth > 2.88"	for 25-yr event
Inflow =	0.32 cfs @ 10.93 hrs,	Volume=	21,606 cf
Outflow =	0.32 cfs @ 10.93 hrs,	Volume=	21,606 cf, Atten= 0%, Lag= 0.0 min
Primary =	0.32 cfs @ 10.93 hrs,	Volume=	21,606 cf

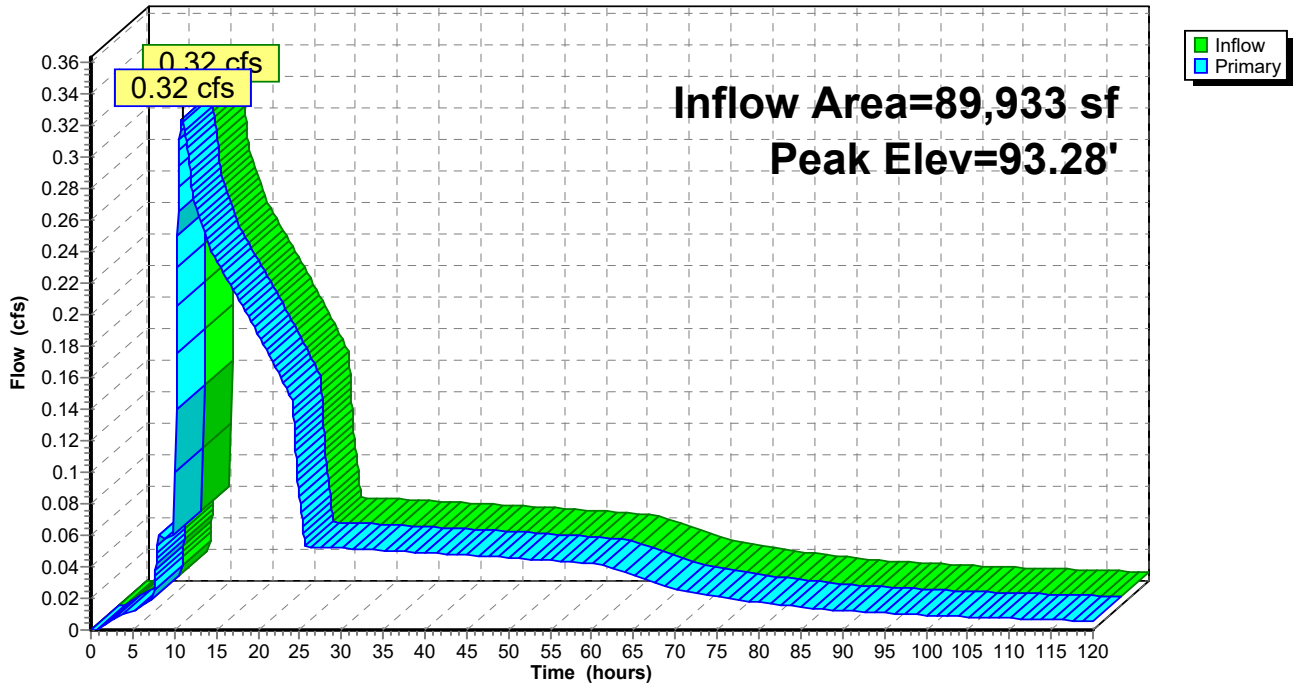
Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 93.28' @ 10.93 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	93.00'	12.00" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=0.32 cfs @ 10.93 hrs HW=93.28' (Free Discharge)
↑1=Orifice/Grate (Orifice Controls 0.32 cfs @ 1.80 fps)

Pond 17P: (new Pond)

Hydrograph



SOUTH BASIN WQ-HUD STORM

SOUTH POST-DEVELOPED BASIN RUNOFF - WQ-HUD STORM

Plambeck Gardens AW

Type IA 24-hr WQ-HUD Rainfall=1.25"

Prepared by {enter your company name here}

Printed 2/25/2022

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Summary for Subcatchment 9S: S Post-developed HUD

Runoff = 0.36 cfs @ 7.98 hrs, Volume= 5,349 cf, Depth= 0.72"

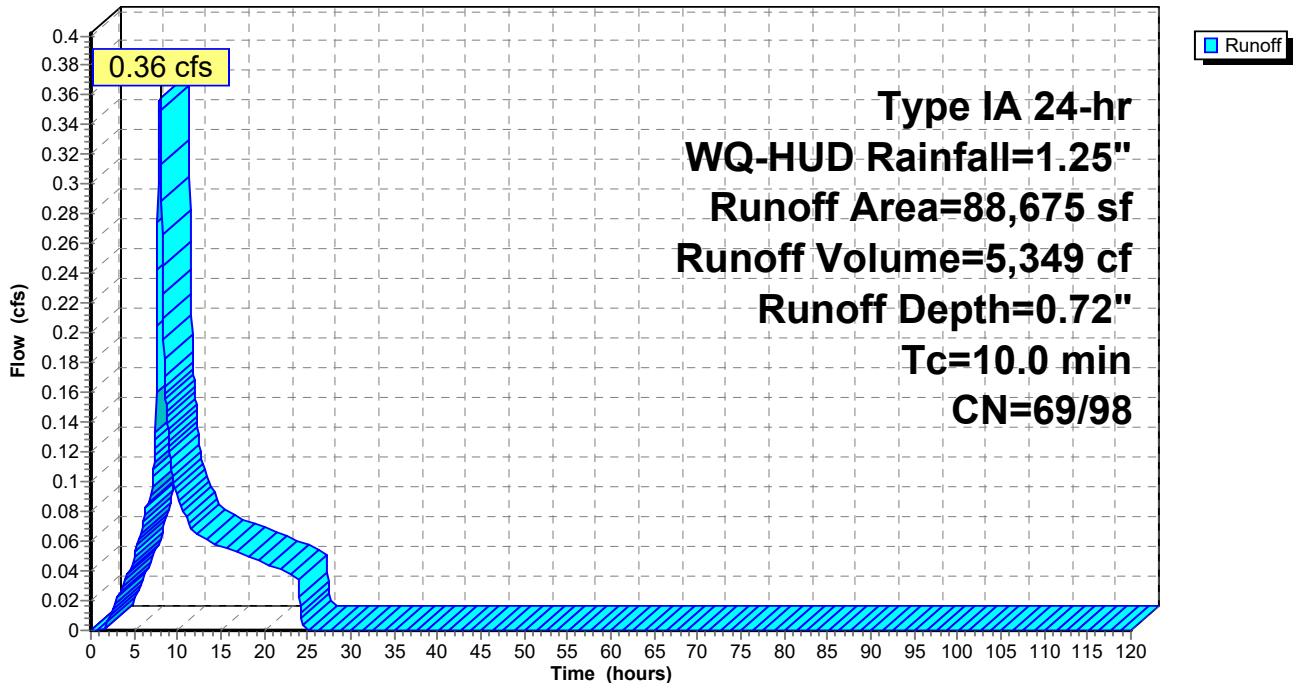
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Type IA 24-hr WQ-HUD Rainfall=1.25"

	Area (sf)	CN	Description
*	61,366	98	
	27,309	69	50-75% Grass cover, Fair, HSG B
	88,675	89	Weighted Average
	27,309	69	30.80% Pervious Area
	61,366	98	69.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Subcatchment 9S: S Post-developed HUD

Hydrograph



Plambeck Gardens AW

Type IA 24-hr WQ-HUD Rainfall=1.25"

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Summary for Pond 8P: WQ

Inflow Area = 88,675 sf, 69.20% Impervious, Inflow Depth = 0.72" for WQ-HUD event
 Inflow = 0.36 cfs @ 7.98 hrs, Volume= 5,349 cf
 Outflow = 0.02 cfs @ 24.14 hrs, Volume= 5,179 cf, Atten= 95%, Lag= 969.4 min
 Primary = 0.02 cfs @ 24.14 hrs, Volume= 5,179 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 Peak Elev= 101.82' @ 24.14 hrs Surf.Area= 2,966 sf Storage= 4,261 cf

Plug-Flow detention time= 2,472.0 min calculated for 5,177 cf (97% of inflow)
 Center-of-Mass det. time= 2,450.5 min (3,162.9 - 712.4)

Volume	Invert	Avail.Storage	Storage Description			
#1	100.00'	8,299 cf	Custom Stage Data (Pyramidal) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
100.00	1,763	0.0	0	0	1,763	
103.00	3,910	100.0	8,299	8,299	4,000	

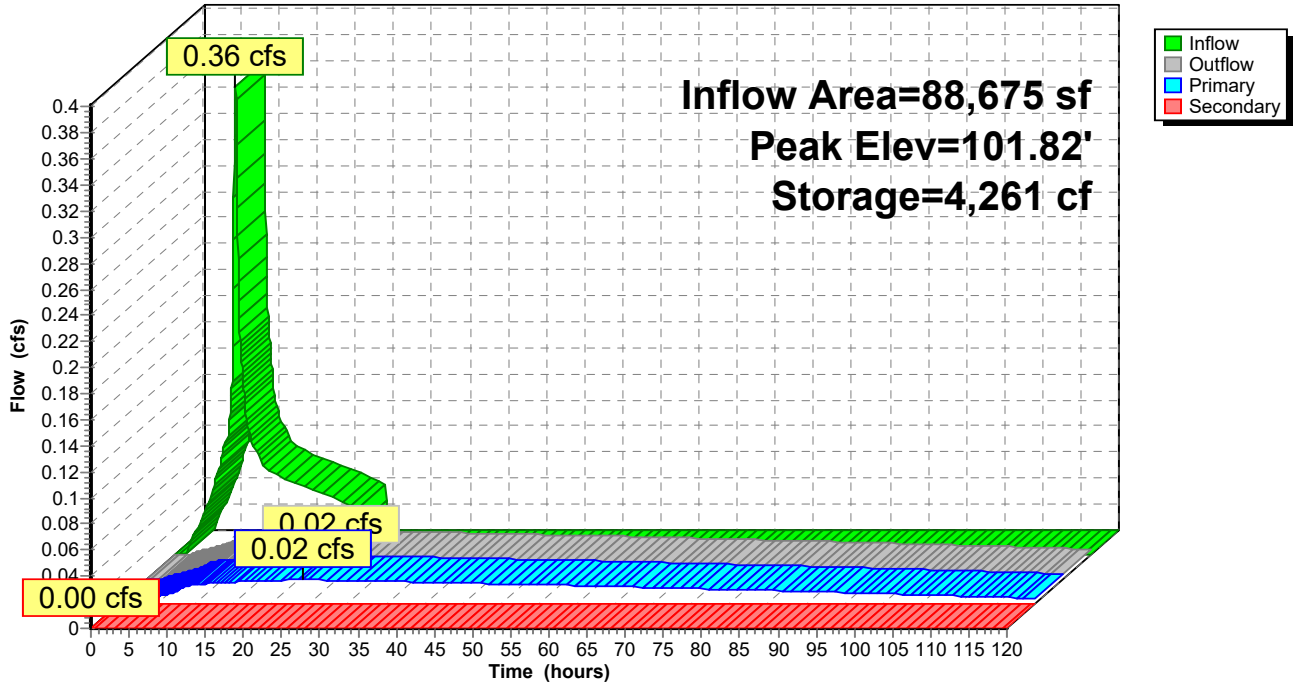
Device	Routing	Invert	Outlet Devices	
#1	Primary	100.00'	0.72" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads	
#2	Secondary	101.83'	12.00" Vert. Orifice/Grate C= 0.600	

Primary OutFlow Max=0.02 cfs @ 24.14 hrs HW=101.82' (Free Discharge)
 ↑1=Orifice/Grate (Orifice Controls 0.02 cfs @ 6.50 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=100.00' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)

Pond 8P: WQ

Hydrograph



SOUTH TOTAL SITE RUNOFF - WQ-HUD STORM

Plambeck Gardens AW

Type IA 24-hr WQ-HUD Rainfall=1.25"

Prepared by {enter your company name here}

Printed 2/25/2022

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Summary for Pond 17P: (new Pond)

[57] Hint: Peaked at 93.06' (Flood elevation advised)

Inflow Area =	89,933 sf, 69.63% Impervious,	Inflow Depth > 0.70"	for WQ-HUD event
Inflow =	0.02 cfs @ 33.14 hrs,	Volume=	5,264 cf
Outflow =	0.02 cfs @ 33.14 hrs,	Volume=	5,264 cf, Atten= 0%, Lag= 0.0 min
Primary =	0.02 cfs @ 33.14 hrs,	Volume=	5,264 cf

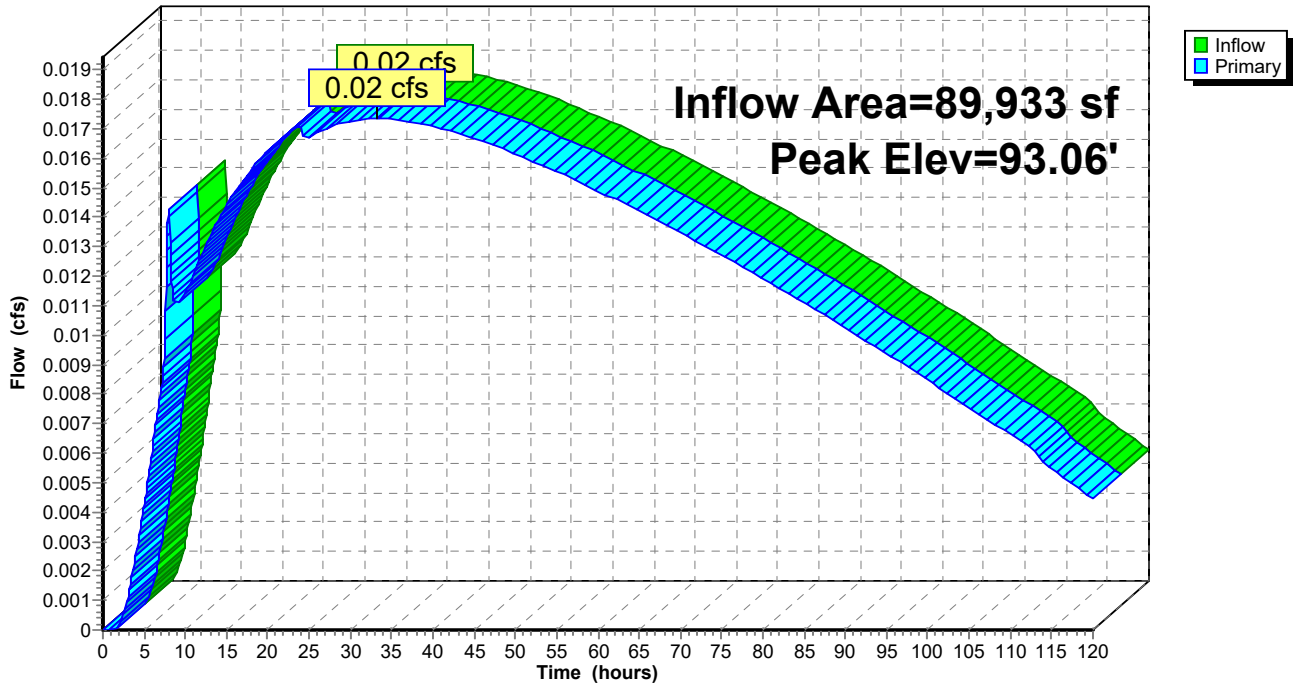
Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 93.06' @ 33.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	93.00'	12.00" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=0.02 cfs @ 33.14 hrs HW=93.06' (Free Discharge)
↑1=Orifice/Grate (Orifice Controls 0.02 cfs @ 0.85 fps)

Pond 17P: (new Pond)

Hydrograph



North Basin

$$\text{Water Quality Volume} = \frac{0.36 \text{ (in)} \times 63,615 \text{ (ft}^2\text{)}}{12 \text{ (in/ft)}} = 1,908.5 \text{ ft}^3$$

$$\text{Water Quality Flow} = \frac{1,908.5 \text{ (ft}^3\text{)}}{14,400 \text{ (sec)}} = 0.133 \text{ (ft}^3\text{/sec)}$$

$$Q = \frac{1,908.5 \text{ (ft}^3\text{)}}{48 \text{ (hr)} \times 60 \text{ (min/hr)} \times 60 \text{ (sec/min)}} = 0.011 \text{ (ft}^3\text{/sec)}$$

$$H = 2/3 \times \frac{1,908.5 \text{ (ft}^3\text{)}}{1,722 \text{ (ft}^2\text{)}} = 0.74 \text{ ft}$$

$$\text{Orifice Size} = 24 \times [(0.011 \text{ (ft}^3\text{/sec)} / (0.62(2 \times 32.2 \times 0.74)^{0.5}) / \pi]^{0.5} = 0.71 \text{ in}$$

South Basin

$$\text{Water Quality Volume} = \frac{0.36 \text{ (in)} \times 61,366 \text{ (ft}^2\text{)}}{12 \text{ (in/ft)}} = 1,841.0 \text{ ft}^3$$

$$\text{Water Quality Flow} = \frac{1,841.0 \text{ (ft}^3\text{)}}{14,400 \text{ (sec)}} = 0.128 \text{ (ft}^3\text{/sec)}$$

$$Q = \frac{1,841.0 \text{ (ft}^3\text{)}}{48 \text{ (hr)} \times 60 \text{ (min/hr)} \times 60 \text{ (sec/min)}} = 0.011 \text{ (ft}^3\text{/sec)}$$

$$H = 2/3 \times \frac{1,841.0 \text{ (ft}^3\text{)}}{2,016 \text{ (ft}^2\text{)}} = .61 \text{ ft}$$

$$\text{Orifice Size} = 24 \times [(0.011 \text{ (ft}^3\text{/sec)} / (0.62(2 \times 32.2 \times 0.61)^{0.5}) / \pi]^{0.5} = 0.72 \text{ in}$$

2. Water Quality Volume (WQV)

The WQV is the volume of water that is produced by the water quality storm. The WQV equals 0.36 inches over the impervious area that is required to be treated as shown in the formula below:

$$\text{Water Quality Volume (cu.ft.)} = \frac{0.36 \text{ (in.)} \times \text{Area (sq.ft.)}}{12 \text{ (in./ft.)}}$$

3. Water Quality Flow (WQF)

The WQF is the average design flow anticipated from the water quality storm as shown in the formulas below:

$$\text{Water Quality Flow (cfs)} = \frac{\text{Water Quality Volume (cu.ft.)}}{14,400 \text{ seconds}}$$

or

$$\text{Water Quality Flow (cfs)} = \frac{0.36 \text{ (in.)} \times \text{Area (sq.ft.)}}{12 \text{ (in/ft)}(4 \text{ hr})(60 \text{ min/hr})(60 \text{ sec/min)}}$$

1. Permanent Pool Depth: 0.4 feet
2. Permanent pool is to cover the entire bottom of the basin.
3. Minimum Water Quality Detention Volume: 1.0 x Water Quality Volume (WQV)
4. Water Quality Drawdown Time: 48 hours
5. **Orifice Size:**
USE: $D = 24 * [(Q / (C[2gH]^{0.5}) / \pi]^{0.5}$
Where:
D (in) = diameter of orifice
Q(cfs) = WQV(cf) / (48*60*60)
C = 0.62

Appendix D: Additional Forms

TR55 Curve Runoff Numbers

Table 2-2a Runoff curve numbers for urban areas ^{1/}

Cover description	Average percent impervious area ^{2/}	Curve numbers for hydrologic soil group			
		A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.) ^{3/} :					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)					
		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)					
		98	98	98	98
Paved; open ditches (including right-of-way)					
		83	89	92	93
Gravel (including right-of-way)					
		76	85	89	91
Dirt (including right-of-way)					
		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) ^{4/}					
		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)					
		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82

Developing urban areas

Newly graded areas
(pervious areas only, no vegetation) ^{5/}

		77	86	91	94
--	--	----	----	----	----

Idle lands (CN's are determined using cover types
similar to those in table 2-2c).

¹ Average runoff condition, and $I_a = 0.2S$.

² The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.

³ CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

⁴ Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.

⁵ Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

Table 2-2b Runoff curve numbers for cultivated agricultural lands ^{1/}

Cover description			Curve numbers for hydrologic soil group			
Cover type	Treatment ^{2/}	Hydrologic condition ^{3/}	A	B	C	D
Fallow	Bare soil	—	77	86	91	94
	Crop residue cover (CR)	Poor	76	85	90	93
		Good	74	83	88	90
Row crops	Straight row (SR)	Poor	72	81	88	91
		Good	67	78	85	89
	SR + CR	Poor	71	80	87	90
		Good	64	75	82	85
	Contoured (C)	Poor	70	79	84	88
		Good	65	75	82	86
	C + CR	Poor	69	78	83	87
		Good	64	74	81	85
	Contoured & terraced (C&T)	Poor	66	74	80	82
		Good	62	71	78	81
C&T+ CR	Poor	65	73	79	81	
	Good	61	70	77	80	
Small grain	SR	Poor	65	76	84	88
		Good	63	75	83	87
	SR + CR	Poor	64	75	83	86
		Good	60	72	80	84
	C	Poor	63	74	82	85
		Good	61	73	81	84
	C + CR	Poor	62	73	81	84
		Good	60	72	80	83
	C&T	Poor	61	72	79	82
		Good	59	70	78	81
C&T+ CR	Poor	60	71	78	81	
	Good	58	69	77	80	
Close-seeded or broadcast legumes or rotation meadow	SR	Poor	66	77	85	89
		Good	58	72	81	85
	C	Poor	64	75	83	85
		Good	55	69	78	83
	C&T	Poor	63	73	80	83
		Good	51	67	76	80

¹ Average runoff condition, and $I_a=0.2S$

² Crop residue cover applies only if residue is on at least 5% of the surface throughout the year.

³ Hydraulic condition is based on combination factors that affect infiltration and runoff, including (a) density and canopy of vegetative areas, (b) amount of year-round cover, (c) amount of grass or close-seeded legumes, (d) percent of residue cover on the land surface (good $\geq 20\%$), and (e) degree of surface roughness.

Poor: Factors impair infiltration and tend to increase runoff.

Good: Factors encourage average and better than average infiltration and tend to decrease runoff.

Table 2-2c Runoff curve numbers for other agricultural lands ^{1/}

Cover description	Hydrologic condition	Curve numbers for hydrologic soil group			
		A	B	C	D
Pasture, grassland, or range—continuous forage for grazing. ^{2/}	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Meadow—continuous grass, protected from grazing and generally mowed for hay.	—	30	58	71	78
Brush—brush-weed-grass mixture with brush the major element. ^{3/}	Poor	48	67	77	83
	Fair	35	56	70	77
	Good	30 ^{4/}	48	65	73
Woods—grass combination (orchard or tree farm). ^{5/}	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods. ^{6/}	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	30 ^{4/}	55	70	77
Farmsteads—buildings, lanes, driveways, and surrounding lots.	—	59	74	82	86

¹ Average runoff condition, and $I_a = 0.2S$.

² **Poor:** <50% ground cover or heavily grazed with no mulch.

Fair: 50 to 75% ground cover and not heavily grazed.

Good: > 75% ground cover and lightly or only occasionally grazed.

³ **Poor:** <50% ground cover.

Fair: 50 to 75% ground cover.

Good: >75% ground cover.

⁴ Actual curve number is less than 30; use CN = 30 for runoff computations.

⁵ CN's shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture.

⁶ **Poor:** Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.

Fair: Woods are grazed but not burned, and some forest litter covers the soil.

Good: Woods are protected from grazing, and litter and brush adequately cover the soil.

Table 2-2d Runoff curve numbers for arid and semiarid rangelands ^{1/}

Cover description		Curve numbers for hydrologic soil group			
Cover type	Hydrologic condition ^{2/}	A ^{3/}	B	C	D
Herbaceous—mixture of grass, weeds, and low-growing brush, with brush the minor element.	Poor		80	87	93
	Fair		71	81	89
	Good		62	74	85
Oak-aspen—mountain brush mixture of oak brush, aspen, mountain mahogany, bitter brush, maple, and other brush.	Poor		66	74	79
	Fair		48	57	63
	Good		30	41	48
Pinyon-juniper—pinyon, juniper, or both; grass understory.	Poor		75	85	89
	Fair		58	73	80
	Good		41	61	71
Sagebrush with grass understory.	Poor		67	80	85
	Fair		51	63	70
	Good		35	47	55
Desert shrub—major plants include saltbush, greasewood, creosotebush, blackbrush, bursage, palo verde, mesquite, and cactus.	Poor	63	77	85	88
	Fair	55	72	81	86
	Good	49	68	79	84

¹ Average runoff condition, and $I_a = 0.2S$. For range in humid regions, use table 2-2c.

² Poor: <30% ground cover (litter, grass, and brush overstory).

Fair: 30 to 70% ground cover.

Good: > 70% ground cover.

³ Curve numbers for group A have been developed only for desert shrub.

Appendix E: Associated Reports

Downstream Analysis
Geotechnical Report

Downstream Analysis

Plambeck Gardens

23500 & 23550 SW Boones Ferry Road
Tualatin, Oregon 97062

Date:

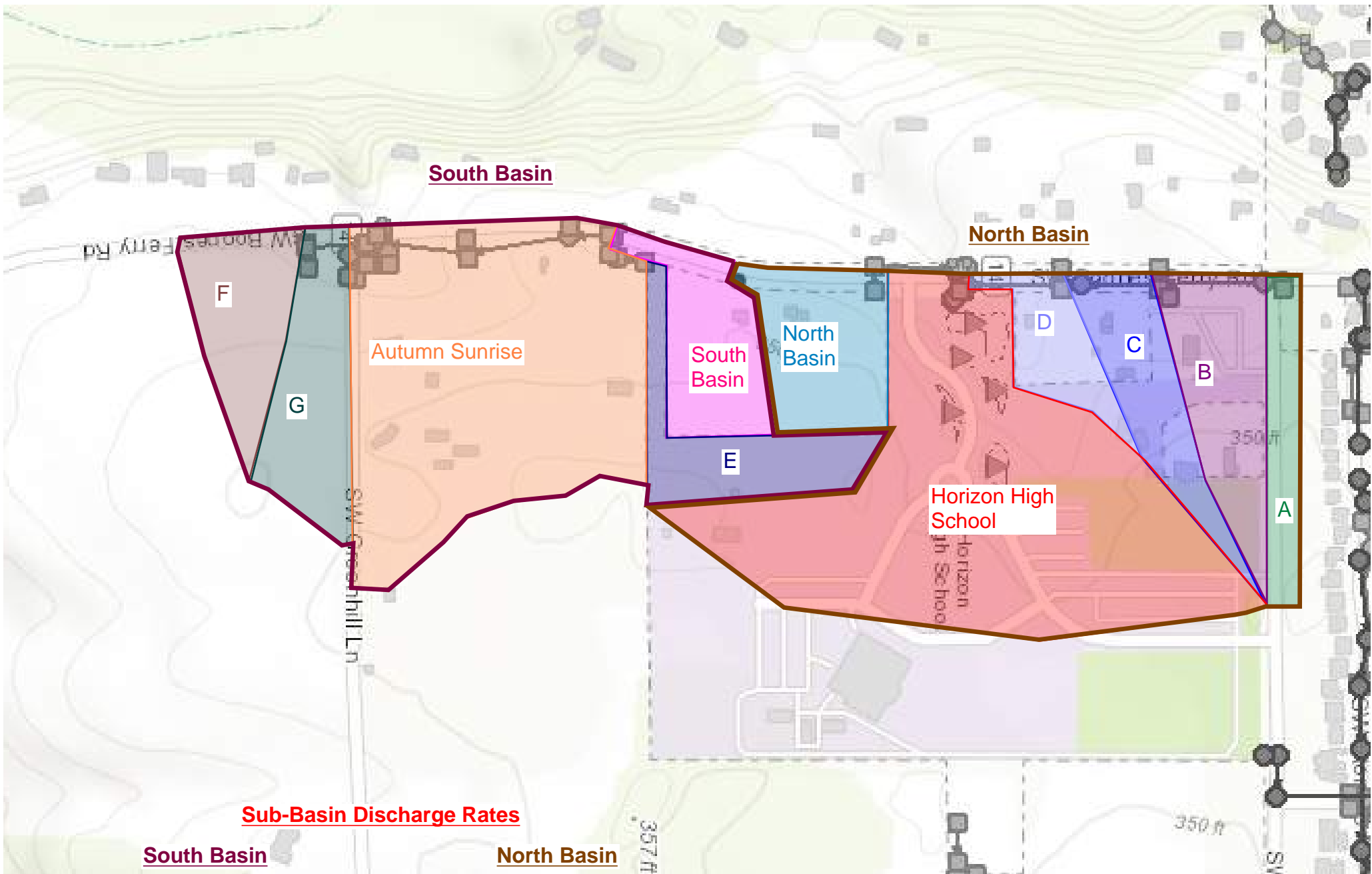
May 2, 2022

Prepared by Alex Wesolovski

STORMWATER CONVEYANCE CALCULATIONS

Design Storm: 25 YR
 Storm Duration: 24 HRS
 Precipitation: 3.9 IN
 Manning's "n" 0.013 (FOR PVC STORM PIPE)

LINE	INC. AREA (AC)	INC. % IMP.	CUM. AREA TOTAL (AC)	CUM. AREA PERV. (AC)	CN PER.	CUM. AREA IMP. (AC)	CN IMP.	TIME (MIN)	Q (CFS)	PIPE Dia. (IN)	SLOPE (FT/FT)	Qf (CFS)	Q/Qf (%)	Depth (in)	Depth/ Dia.	V (fps)	LENGTH (FT)	INC. TIME (MIN)	
south basin - Project Site									0.24										
E	3.970	12.00	3.9700	3.4936	61	0.4764	98	5.00	0.98	12	0.0200	5.05	0.19	3.59	0.30	4.97	609.0	2.04	
F	3.900	14.50	7.8700	7.3045	61	0.5655	98	7.04	2.08	15	0.0200	9.16	0.23	4.87	0.32	6.03	102.0	0.28	
G	2.630	11.00	10.5000	10.2107	61	0.2893	98	7.32	1.05	12	0.0200	5.05	0.21	3.72	0.31	5.07	248.0	0.82	
Autumn Sunrise									15.22	24	0.0200	32.08	0.47	11.66	0.49	10.06	78.0	0.13	
South Drainage Basin, Total									19.57										



Sub-Basin Discharge Rates

South Basin

North Basin

- South Basin = 0.24cfs
- E = 0.74cfs
- Autumn Sunrise = 14.17cfs
- F = 1.10cfs
- G = 1.05cfs

- A = 0.28cfs
- B = 1.52cfs
- C = 0.92cfs
- D = 1.12cfs
- Horizon High School = 5.77cfs
- North Basin = 0.31cfs

Downstream Analysis Basin Map



Earth
Engineers,
Inc.

2411 Southeast 8th Avenue • Camas • WA 98607

Phone: 360-567-1806

www.earth-engineers.com

March 17, 2021

Community Partners for Affordable Housing

P.O. Box 23206

Tigard, Oregon 97239

Attention: Jilian Saurage Felton, Housing Development Director

Phone: 503-293-4038

E-mail: jsaurage@cpahoregon.org

**Subject: Geotechnical Investigation Report
Proposed Basalt Creek Affordable Housing Project
23500 and 23550 Southwest Boones Ferry Road
Tualatin, Washington County, Oregon
EEI Report No. 21-023-1**

Dear Ms. Saurage Felton:

Earth Engineers, Inc. (EEI) is pleased to provide our attached Geotechnical Investigation Report for the above referenced project. This report includes the results of our field investigation, an evaluation of geotechnical factors that may influence the proposed construction, and geotechnical recommendations for the proposed structure and general site development.

We appreciate the opportunity to perform this geotechnical study and look forward to continued participation during the design and construction phases of this project. If you have any questions pertaining to this report, or if we may be of further service, please contact our office at 360-567-1806.

Sincerely,

Earth Engineers, Inc.

Troy Hull, P.E., G.E.
Principal Geotechnical Engineer

Anita Bauer
Geologic Associate

Attachment: Geotechnical Investigation Report

Distribution: Addressee

Rachel Loftin, CPAH (rloftin@cpahoregon.org)

Melissa Soots, Carlton Hart Architecture (Melissa.soots@carltonhart.com)

GEOTECHNICAL INVESTIGATION REPORT

for the

**Proposed Basalt Creek Affordable Housing Project
23500 and 23550 Southwest Boones Ferry Road
Tualatin, Washington County, Oregon**

Prepared for

**Community Partners for Affordable Housing
P.O. Box 23206
Tigard, Oregon 97239**

Prepared by

**Earth Engineers, Inc.
2411 Southeast 8th Avenue
Camas, Washington 98607
Telephone (360) 567-1806**

EEl Report No. 21-023-1

March 17, 2021



**Earth
Engineers,
Inc.**

Anita Bauer

**Anita Bauer
Geologic Associate**



EXPIRES: 6/30 21

**Troy Hull, P.E., G.E.
Principal Geotechnical
Engineer**

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1.0 PROJECT INFORMATION

1.1 Project Authorization

Earth Engineers, Inc. (EEI) has completed a geotechnical investigation report for the proposed Basalt Creek affordable housing project to be located at 23500 and 23550 Southwest Boones Ferry Road in Tualatin, Washington County, Oregon. Our geotechnical services were authorized by Jilian Saurage Felton, Housing Development Director for Community Partners for Affordable Housing (CPAH) on February 3, 2021 by signing EEI Proposal No. 21-P004-R1 dated January 20, 2021.

1.2 Project Description

Our current understanding of the project is based on information Rachel Loftin with CPAH, Melissa Soots with Carleton Hart Architecture (CHA) and Kim Shera with Vega Civil provided to EEI Principal Geotechnical Engineer Troy Hull. The following are the most up-to-date documents provided to us:

- **Undated Preliminary Site Plan, Sheet A0.00, by Carleton Hart Architecture, received by e-mail on February 17, 2021.** This drawing replaced 2 previous drawings by CHA dated May 15, 2020 that shows the locations of test pits and infiltration test locations.

Briefly, we understand the project will consist of demolishing the 2 existing homes on the 2 lots and constructing a multi-family housing complex consisting of the following:

- Three, 3-story residential buildings (A, B, and C) that are anticipated to have floor slabs on grade.
- A community building. We assume this will be 1 or 2 stories and have a floor slabs on grade.
- 3 detached garage buildings
- Paved parking and drive lanes, including some permeable pavement.

We have not been provided any foundation load information. For the purposes of this report, we are assuming maximum foundation loads of 6 kips per linear foot for wall footings, 60 kips for column footings, and 150 psf for floor slabs. Other than underground utilities, we assume there will be no below grade construction. We assume cuts and fills will generally be no greater than about 2 feet. Finally, we have assumed that the buildings will be constructed in accordance with the 2019 Oregon Structural Specialty Code (OSSC), an amendment to the 2018 International Building Code (IBC).

As far as stormwater disposal is concerned, we understand the current plan is to use permeable pavement at the north end of the project (beneath a sport court) and in the parking stalls, and surface infiltration in storm swales along the west edge and middle of the project.

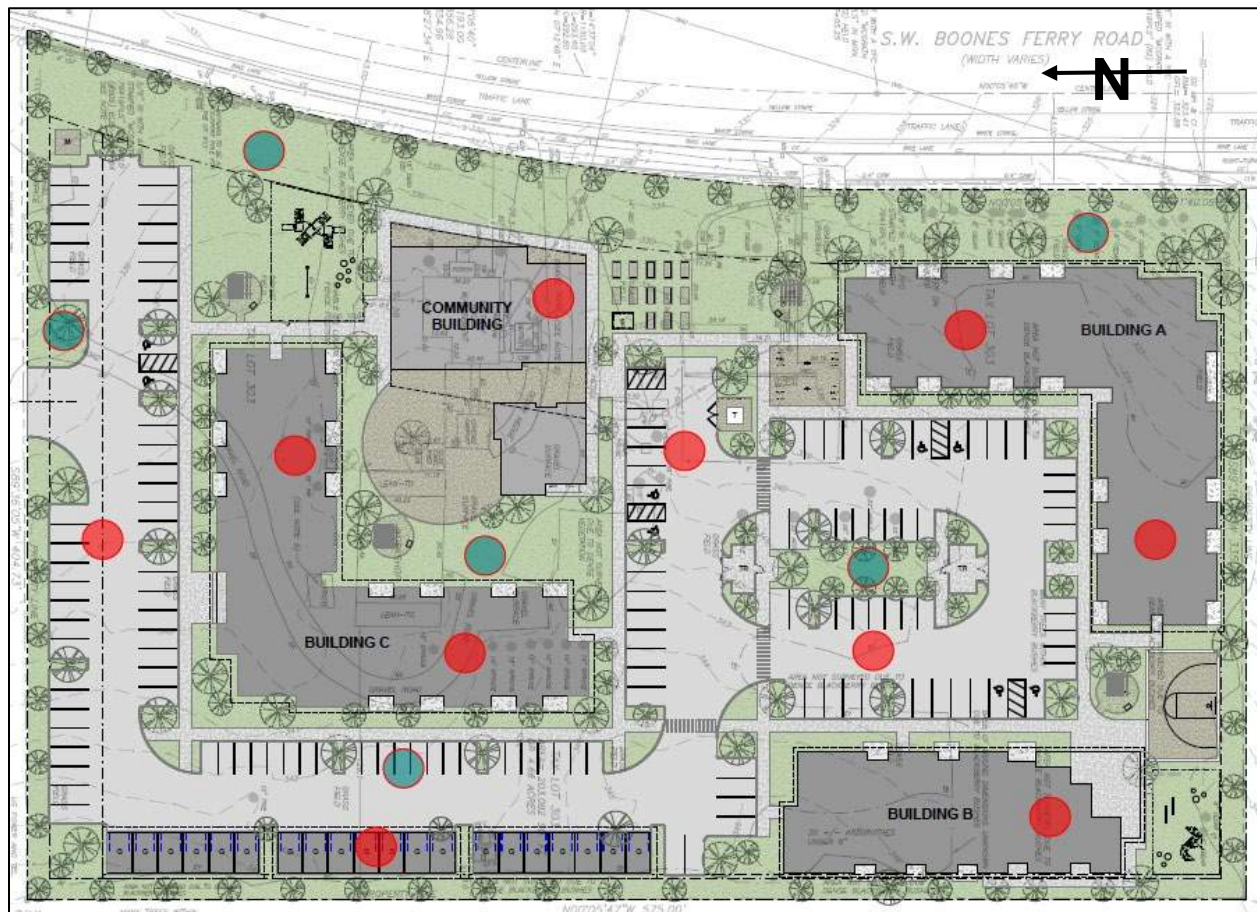


Figure 1: Proposed site plan (source: undated Sheet A0.00 by Carleton Hart Architecture).

1.3 Purpose and Scope of Services

The purpose of our services was to explore the subsurface conditions at the site to better define the existing soil, rock, and groundwater properties in order to provide geotechnical related recommendations for the proposed new building construction. Our site investigation consisted of excavating 10 test pits (TP-1 to TP-10) to depths ranging from 7 to 10 feet below ground surface (bgs) with a Hitachi Zaxis 40U excavator subcontracted from Dan Fischer Excavating. Drive probe testing was performed adjacent to test pits TP-1 through TP-7 to better characterize the soil strength. The approximate test pit locations are shown in Appendix B. Grab soil samples were obtained at the discretion of the Geotechnical Engineer's field representative and returned to our office for testing.

Our site investigation scope also included infiltration testing in general accordance with Clean Water Services at the locations specified by Vega Civil.

Laboratory testing was performed on select grab samples to determine the material properties for our evaluation and, in general accordance with ASTM procedures. This included moisture content (ASTM D2216), material finer than #200 Sieve - washed (ASTM D1140), Atterberg limits (ASTM D4318), and classification of soils by the Unified Soil Classification System [USCS] (ASTM D2487 and D2488).

This report briefly outlines the testing procedures, presents available project information, describes the site and subsurface conditions, and presents recommendations regarding the following:

- A discussion of subsurface conditions encountered including pertinent soil and groundwater conditions.
- Seismic design parameters in accordance with the 2019 OSSC and ASCE 7-16.
- Geotechnical related recommendations for foundation design including allowable bearing capacity, minimum footing dimensions and estimated settlements.
- Structural fill recommendations, including an evaluation of whether the in-situ soils can be used as structural fill.
- Grading recommendations, including special considerations for wet weather grading.
- Retaining wall design parameter recommendations, including coefficient of friction and earth pressures.
- Floor slab support recommendations.
- Pavement section thickness recommendations based on an assumed CBR value and assumed traffic loading conditions.
- Results of our infiltration testing to aid the project Civil Engineer in designing the on-site stormwater disposal system.
- Other discussion on geotechnical issues that may impact the project.

2.0 SITE AND SUBSURFACE CONDITIONS

2.1 Site Location and Description

The property is located at 23500 and 23550 Southwest Boones Ferry Road in Tualatin, Washington County, Oregon. The subject property is bordered by Southwest Boones Ferry Road to the west, an existing residence and New Horizon Church to the east, the driveway access for New Horizon Church to the north, and a large field to the south.

In terms of topography, the subject property mostly is generally level to slightly sloping. There is a large fill mound that is several feet high at the north edge of the property. The property is generally covered with grass, bushes, and young and mature trees. See Photos 1 through 5 below for the site conditions.



Photo 1: Looking west from the east-central portion of the site at an existing barn structure to be demolished.



Photo 2: Looking south from the northwest corner of the project site at an existing house to be demolished.



Photo 3: Looking west at the fill mound at the north end of the site.



Photo 4: Looking north at the west property boundary along Southwest Boones Ferry Road.



Photo 5: Looking northeast at the project site from the southwest corner of the property.

2.2 Mapped Soils and Geology

The subject property is regionally located on the east side of Parrett Mountain and the Chehalem Mountain range that separates the sediment filled Tualatin and Northern Willamette Valley drainage basins. The subject property is bordered by the Tualatin Basin to the north, the Northern Willamette Valley Basin to the south, Parrett Mountain to the west and the Portland Hills to the northeast. The Portland Hills, Chehalem Mountain range, and Parrett Mountain are relatively small mountain ranges composed of Miocene aged (23 to 5 million years ago) basalt from the Columbia River Basalt Group (CRBG) that had been folded and uplifted around the Tualatin Basin during the late Neogene (roughly 3 million years ago)¹.

In the vicinity of the subject property, the underlying geology is mapped as the Sentinel Bluffs Member (Tgsb) which is an informal unit of Miocene aged Grande Ronde Basalt and part of the Columbia River Basalt Group. Pleistocene aged (2.6 million to 11,700 years ago) Missoula flood deposits (Qf) are also mapped in the area. The Sentinel Bluffs Member consists of light to dark gray, columnar-jointed basalt with vesicular flow tops. Weathered surfaces are greenish gray to pale gray and the unit thickness typically ranges from about 30 to 75 feet. Missoula flood deposits (Qf) consist of unconsolidated stratified clay, silt, sand and gravel that originated from Lake Missoula, flowed down the Columbia River and flooded the Tualatin and Willamette Valley Basins².

The surface soils on the project site are mapped by the US Soil Survey as Unit 28B: Laurelwood silt loam on 3 to 7 percent slopes. This soil is formed on hills and comes from a loess (i.e. wind-blown) parent material. A typical profile for this unit consists of silt loam approximately 0-11 inches bgs, followed by silty clay loam 11-52 inches bgs, and overlying silty clay 52 to 72 inches bgs. This typically well-drained soil has a moderately high transmissivity of water (0.20 to 0.57 inches per hour)³.

We reviewed the Oregon Department of Geology and Mineral Industries (DOGAMI) Statewide Geohazards Information Database for Oregon (HazVu) website (<https://gis.dogami.oregon.gov/hazvu/>) to report the applicable hazards for the subject property. This database maps the property within a very strong to sever expected earthquake shaking hazard and very strong Cascadia earthquake expected shaking. In addition, the subject property's proximity to the Canby-Molalla fault is approximately 3.3 miles to the northeast; see Figure 2 below. The Canby-Molalla fault is moderately constrained, late Quaternary (<130,000 years) in age, has a right lateral slip sense

¹ D.K. McPhee, V.E. Langenheim, R.E. Wells, R.J. Blakely; Tectonic evolution of the Tualatin basin, northwest Oregon, as revealed by inversion of gravity data. *Geosphere* 2014;; 10 (2): 264–275. doi:

² Wells, R.E., Haugerud, R.A., Niem, A.R., Niem, W.A., Ma, L., Evarts, R.C., O'Connor, J.E., Madin, I.P., Sherrod, D.R., Beeson, M.H., Tolan, T.L., Wheeler, K.L., Hanson, W.B., and Sawlan, M.G., 2020, Geologic map of the greater Portland metropolitan area and surrounding region, Oregon and Washington: U.S. Geological Survey Scientific Investigations Map 3443, pamphlet 55 p., 2 sheets, scale 1:63,360, <https://doi.org/10.3133/sim3443>.

³ Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at <http://websoilsurvey.nrcs.usda.gov/> accessed 3/16/2021.

with a slip rate of less than 0.2mm/year⁴. The database also maps the subject property within moderate landslide susceptibility on the north end of the property. It should be noted that the surrounding, previously developed properties are also mapped within these same hazards.

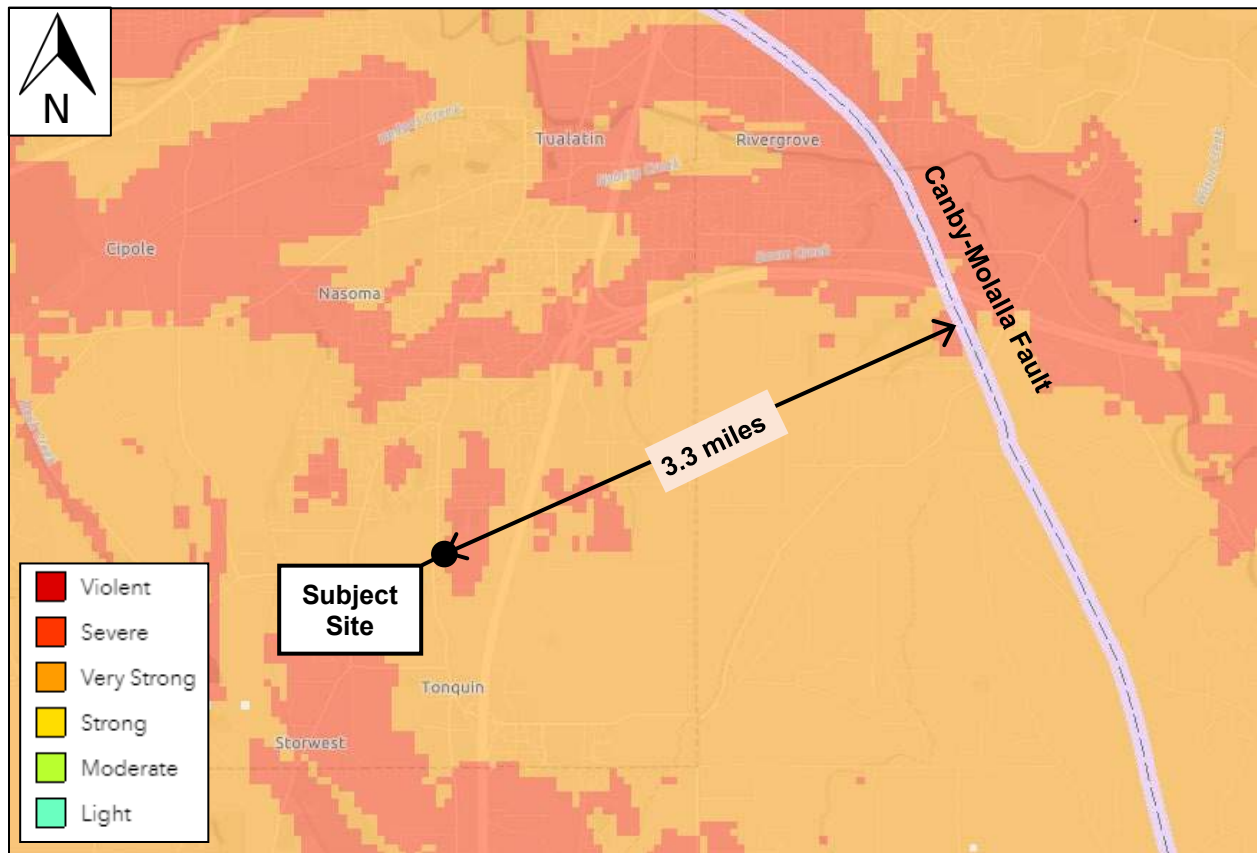


Figure 2: Earthquake hazard map of the subject property and vicinity (base map source: DOGAMI HazVu).

2.3 Subsurface Materials

The subsurface conditions at the site were explored with 10 test pits (TP-1 through TP-10) excavated with a Hitachi Zaxis 40U excavator to depths ranging from 7 to 10 feet bgs. To better characterize the soil strengths, we performed drive probe testing adjacent to test pits TP-1 through TP-7. The drive probe test is based on a “relative density” exploration device used to determine the distribution and to estimate strength of the subsurface soil units. The resistance to penetration is measured in blows-per-½-foot of an 11-pound hammer which free falls roughly 3½ feet driving a 1-inch diameter pipe into the ground. This measure of resistance to penetration can be used to

⁴ United States Geologic Survey, U.S. Quaternary Faults database. Available online at <https://usgs.maps.arcgis.com/apps/webappviewer/index.html?id=5a6038b3a1684561a9b0aadf88412fcf> accessed 3/16/21

estimate relative density of soils. For a more detailed description of this geotechnical exploration method, please refer to the Slope Stability Reference Guide for National Forests in the United States, Volume I, USDA, EM-7170-13, August 1994, P 317-321. The drive probe test results are summarized in the test pit logs in Appendix C.

Disturbed “grab” soil samples were obtained in the test pits from each major soil stratum. The soil samples were tested in the laboratory to determine material properties for our evaluation. Laboratory testing was accomplished in accordance with ASTM procedures which included moisture content tests (ASTM D2216), fines content determinations (ASTM D1140), and Atterberg limits (ASTM D4318). The test results have been included on the Exploration Logs in Appendix C.

In general, we encountered topsoil overlying native fine-grained soils (i.e. silt and clay) that graded to decomposed/intensely weathered basalt with increasing depth. In a few isolated locations, we encountered existing fill soil. Each of the strata we encountered in our exploration are described individually below:

Topsoil – Topsoil was encountered in all of the test pits, except TP-5 and TP-9, which were located in the fill mound at the north end of the project site. The topsoil generally consisted of dark brown sandy silt with roots, occasional gravels, and ranged in thickness from about 6 inches to 2 feet. It should also be noted we did encounter some old PVC irrigation pipes within the upper 2 feet throughout the site.

Fill – Fill was encountered in test pits TP-5 through TP-10. The fill in TP-5 and TP-9 was from a fill mound (i.e. stockpile). The fill soil in the test pits in general consisted of silt with organics (i.e. roots and rootlets), asphalt chunks, gravel and cobble size rocks, and trace charcoal and brick fragments. The fill in our test pits extended to a depth below the general site grade of 1.5 to 3.5 feet bgs.

Silt (ML) - Below the surficial topsoil and fill layers, we encountered soft to very stiff, brown with some orange and black mottling, silt. Moisture contents of the samples tested ranged from 24 to 31 percent, indicating the soils are generally moist to wet.

Elastic Silt (MH) – Generally below the silt (ML) layer, we encountered a high plasticity silt starting at a depth of 2.5 to 7.5 feet bgs. This soil unit was brown to reddish brown and medium stiff to hard. Moisture contents of the samples tested ranged from 26 to 49 percent, indicating the soils are generally moist to wet. An Atterberg limits test on this material indicated a Liquid Limit (LL) of 54, Plastic Limit (PL) of 23, and a Plasticity Index (PI) of 31. Based on this test result, we consider this soil to be moderately expansive and to have moderate risk of heaving and shrinking due to moisture change. This soil unit graded from decomposed to intensely weathered basalt bedrock with increasing depth. Where the test pits indicate the digging became “hard” at depth, we interpret that to be the less weathered basalt bedrock stratum. That depth generally ranged from about 6.5 to 8.5 feet bgs in our test pits.

The classifications noted above were made in general accordance with the USCS as shown in Appendix D. The above subsurface description is of a generalized nature to highlight the major subsurface stratification features and material characteristics. The exploration logs included in the Appendix should be reviewed for specific information at specific locations. These records include soil descriptions, stratifications, and locations of the samples. The stratifications shown on the logs represent the conditions only at the actual exploration locations.

The fill extent at each boring location was estimated based on an examination of the soil samples, the presence of foreign materials, field measurements, and the subsurface data. The explorations performed are not adequate to accurately identify the full extent of existing fill across the site. Consequently, the actual fill extent may be much greater than that shown on the exploration logs and discussed herein.

Soil variations may occur and should be expected between locations. The stratifications represent the approximate boundary between subsurface materials and the actual transition may be gradual. Water level information obtained during field operations is also shown on these logs. The samples that were not altered by laboratory testing will be retained for 90 days from the date of this report and then will be discarded.

2.4 Groundwater Information

Groundwater was encountered in all of our test pits except TP-8 and TP-9. The depth of groundwater ranged from 4 to 7.5 feet bgs. We do anticipate that the relatively shallow depth to groundwater could potentially impact the proposed construction. It should be noted that groundwater elevations can fluctuate annually and seasonally, especially during periods of extended wet or dry weather, or from changes in land use.

2.5 Seismicity

In accordance with Section 1613.2.2 of the 2019 OSSC and Table 20.3-1 of ASCE 7-16, we recommend a Site Class D (stiff soil profile with an average standard penetration resistance of between 15 and 50 blows per foot) when considering the average of the upper 100 feet of bearing material beneath the proposed foundations. This recommendation is based on our observations in the test pits, our drive probe test data, as well as our local knowledge of the area geology. Inputting our recommended Site Class as well as the site latitude and longitude into the Structural Engineers Association of California (SEAOC) – OSHPD Seismic Design Maps website (<http://seismicmaps.org>) which is based on the United States Geological Survey, we obtained the seismic design parameters shown in Table 1 below.

Table 1: Seismic Design Parameter Recommendations (ASCE 7-16)

PARAMETER	RECOMMENDATION
Site Class	D
S_s	0.830g
S_1	0.386g
F_a	1.168
F_v	Null – See Section 11.4.8
$S_{MS} (=S_s \times F_a)$	0.970g
$S_{M1} (=S_1 \times F_v)$	Null – See Section 11.4.8
$S_{DS} (=2/3 \times S_s \times F_a)$	0.646g
Design PGA ($=S_{DS} / 2.5$)	0.258g
MCE_G PGA	0.378g
F_{PGA}	1.222
$PGA_M (MCE_G \text{ PGA} * F_{PGA})$	0.462g

Note: Site latitude = Latitude 45.3502154, longitude = Longitude -122.77435

The return interval for the ground motions reported in the table above is 2 percent probability of exceedance in 50 years.

Per Section 11.4.8 of ASCE 7-16 a site-specific seismic site response is required for structures on Site Class D and E sites with S_1 greater than or equal to 0.2g. The S_1 value for this site is greater than 0.2g as shown in Table 1 above. Therefore a site response analysis is required as part of the design phase. However, Section 11.4.8 does provide an exception for not requiring a site response analysis (reference Sections 11.4.8.1, 11.4.8.2 and 11.4.8.3). The project Structural Engineer should determine if the proposed buildings will meet any of the exceptions— if the buildings do not meet the exception requirements then EEI should be retained to perform a site-specific site response analysis.

We understand a Supplement 1 dated December 12, 2018 has been issued for ASCE 7-16 to correct some issues in the original publication. One of the corrections in the Supplement pertains to Table 11.4-2 (see table below) for determining the value of the Long-Period Site Coefficient, F_v , which is then used to calculate the value of T_s . The T_s value is needed for one of the exceptions in Section 11.4.8. Without the correction in Supplement 1, it would not be possible to determine F_v and calculate T_s . Based on Supplement 1, the F_v value may be determined from the following corrected table.

Table 2: Long-Period Site Coefficient, F_V (corrected Table 11.4-2 in ASCE 7-16).

Site Class	Mapped Risk-Targeted Maximum Considered Earthquake (MCE_R) Spectral Response Acceleration Parameter at 1-s Period					
	$S_1 \leq 0.1$	$S_1 \leq 0.2$	$S_1 \leq 0.3$	$S_1 \leq 0.4$	$S_1 \leq 0.5$	$S_1 \geq 0.6$
A	0.8	0.8	0.8	0.8	0.8	0.8
B	0.8	0.8	0.8	0.8	0.8	0.8
C	1.5	1.5	1.5	1.5	1.5	1.4
D	2.4	2.2^a	2.0^a	1.9^a	1.8^a	1.7^a
E	4.2	3.3^a	2.8^a	2.4^a	2.2^a	2.0^a
F	See Section 11.4.8	See Section 11.4.8	See Section 11.4.8	See Section 11.4.8	See Section 11.4.8	See Section 11.4.8

Note: use linear interpolation for intermediate values of S_1 .

^a See requirements for site-specific ground motions in Section 11.4.8. These values of F_V shall be used only for calculation of T_S .

2.6 Infiltration Testing

The infiltration testing was conducted in general accordance with the Clean Water Services requirements for the single ring, falling head test procedure. As requested, a total of 5 test locations (IT-1 through IT-5) were completed. Three separate trials (i.e. standpipes) were performed at each of the 5 test locations. Each test location was cased with a 6-inch diameter PVC pipe and seated at least 4-inches into the bottom of the test pit. Approximately 2-inches of clean gravel was placed in the bottom of the pipes to prevent scouring. 12-inches of water was then placed into the pipes and allowed to drain. Because the 12 inches of water did not drain away in 10 minutes or less, a 4-hour minimum presoak was required for all of the tests performed. After the 4-hour presoak period, we took repeated 30-minute readings with six inches of water in the standpipe until a consistent rate was observed. The location of the infiltration testing can be seen in Appendix B. Disturbed grab samples were taken at the bottom of each test location and soil samples were returned to our laboratory for testing (i.e. moisture content and wash #200).

The results of our lab testing and infiltration tests are shown in Table 3 below. The infiltration test results should be considered ultimate values and do not include a factor of safety. Clean Water Services recommends a factor of safety of 2. We recommend that during construction, field verification testing be performed to confirm the actual infiltration rates are consistent with the values in Table 3 below.



Photo 6: Setting the 3 standpipes in the test pit trench at one of the infiltration test locations.



Photo 7: Backfilling around the 3 standpipes in the test pit trench at one of the infiltration test locations prior to conducting the infiltration testing.

Table 3: Summary of Infiltration Test Results.

Test #	Test Depth, bgs (inches)	Soil Description	% Fines	% Moisture	Tested Infiltration Rate (inches/hour)*
IT-1a	24	Silt	90	28	0.5
IT-1b	30		76	28	2.0
IT-1c	30		92	28	5.2
IT-2a	28	Silt	89	26	8.2
IT-2b	30		88	27	6.0
IT-2c	24		91	22	2.2
IT-3a	24	Silt	94	28	1.0
IT-3b	36		94	29	5.5
IT-3c	36		94	30	19.3
IT-4a	24	Silt	91	29	40.5
IT-4b	36		91	27	22.0
IT-4c	39		91	27	9.2
IT-5a	24	Silt	92	26	6.8
IT-5b	33		92	27	1.7
IT-5c	30		92	28	7.2

*No safety factors have been applied to the test rates above.

3.0 EVALUATION AND FOUNDATION RECOMMENDATIONS

3.1 Geotechnical Discussion

It is our professional opinion that the following factors may influence the proposed construction:

- 1. Presence of existing fill soils** – We encountered fill soils below existing grade generally throughout the property, as well as at a large fill mound at the north end of the project. At least some of the fill encountered below existing grade appears to be grading for the driveways and home developments. The fill mound at the north end of the property appears to be stockpiled soil. Some of the fill appeared firm and well compacted, while some was very soft and poorly compacted. In general, the fill closer to the ground surface was more firm, presumably from past vehicular traffic driving over it. Excluding the fill mound, the fill was generally 1.5 to 3.5 feet deep. However, it should be assumed that the fill soils could be variable across the property.

Because of the variability in strength (i.e. compaction), we recommend structures not be supported directly on the existing fill soils. One mitigation option would be recompact all of the existing fill beneath all building structures (i.e. footings and slabs). Another option would be to limit the overexcavation to the native soils just beneath footing areas and only do a partial overexcavation beneath floor slabs to reduce the risk of future floor slab settlement. This second option carries more risk of settlement cracking for the floor slab areas, but reduces the construction cost.

The fill mound material appears generally suitable for use as fill. Ideally, it would be limited to landscape fill areas because it contains some organics. However, it could be used for structural fill provided the organic material is removed. Some minor (i.e. less than 5 percent) organics (i.e. rootlets) would be acceptable in the structural fill, but larger quantities of organics would need to be removed. Note that we only performed 2 test pits in the fill mound area so there is a large percentage of the mound that we did not investigate. If the contractor will rely on using the fill mound material in their construction cost, we recommend they consider further investigating the contents of the mound.

- 2. Presence of soft native soils** – The near-surface native silt soils in our test pits were generally soft. They are appropriate for supporting the proposed buildings, but will have a relatively low allowable soil bearing pressure (i.e. 1,500 pounds per square foot). Firmer (stiff) silt soils were encountered at a depth of 5 to 6 feet below grade. If a higher allowable soil bearing pressure (i.e. 2,500 psf) is desired, the footings could be overexcavated to this stiff soil stratum and then backfilled up to bottom of footing grade. Or rammed aggregate piers designed and installed by a geotechnical specialty contractor could also be used to achieve the same thing and also provide for a much higher allowable bearing capacity (i.e. on the order of 5,000 to 6,000 psf). One consideration with the overexcavation option is that groundwater may be encountered in the footing

overexcavations depending upon the time of year. We anticipate that during the summer months, the risk of groundwater interfering with footing overexcavations will be less.

3. **Presence of potentially expansive soils** – Based on our Atterberg limits testing, the clayey silt (MH) soils first encountered below a depth of about 2.5 to 7.5 feet bgs in our test pits are moderately expansive. It will be acceptable to support the proposed structures on this soil. The only mitigation recommendation we are providing is to not let this soil dry out if exposed. If it is exposed during excavation during the warmer months of the year, it should be covered the same day so it is not allowed to dry out.
4. **Shallow groundwater** – As discussed above, we did encounter shallow groundwater in our test pits—generally 4 to 7.5 feet bgs. Deep excavations (i.e. for trenches, etc.) may require dewatering.
5. **Existing buildings to be demolished** – The existing residences and associated improvements will need to be demolished before the proposed construction can begin. It will be important to remove all the construction debris from the site and to backfill any voids with properly compacted structural fill that is approved by a representative of the Geotechnical Engineer.
6. **Moisture sensitive soils** – This project will likely involve a significant amount of earthwork. The fine-grained site soils are sensitive to wet weather conditions. While not required, earthwork is expected to be easier and less expensive if conducted during the dry summer and early fall months.

In summary, it is acceptable to construct the proposed development on this property provided the recommendations in this report are followed.

3.2 General Site Preparation

Prior to the start of grading, we recommend our test pits performed for this report be located, excavated to their bottoms, and backfilled with properly compacted granular structural fill under the observation of a representative of the Geotechnical Engineer.

Existing pavement and structures will need to be demolished and completely removed from the site. Any topsoil, vegetation, roots, organic laden soils, debris, and any other deleterious soils should also be removed from building areas. It should be expected that the depth of these materials may vary across the site. Topsoil in our test pits ranged from about 6 to 24 inches thick. A representative of the Geotechnical Engineer should determine the depth of removal at the time of construction.

Existing utilities will need to be located and rerouted as necessary and any abandoned pipes or utility conduits should be removed or properly capped off to inhibit the potential for subsurface

soil erosion. Utility trench excavations should be backfilled with properly compacted structural fill that is constructed as outlined in Section 3.3 of this report.

After stripping and excavating to the proposed subgrade level, as required, building subgrade areas should be observed by a representative of the Geotechnical Engineer and proofrolled with a fully loaded tandem axle dump truck. If the subgrade cannot be accessed with a dump truck to perform a proofroll, then the subgrade will need to be evaluated by a representative of the Geotechnical Engineer by soil probing. Structural fill, as described in Section 3.3 below, should be placed on the prepared subgrade after it has been proofrolled or soil probed. Soils that are observed to be soft or are otherwise judged to be unsuitable should be undercut and replaced with properly compacted structural fill.

As noted in Section 3.1, the brown to red brown clayey silt soils encountered in our test pits at depths of 2.5 to 7.5 feet bgs are moderately potentially expansive. We recommend they be covered the same day if they are exposed during excavation so that they don't dry out.

3.3 Structural Fill

Any structural fill to be placed should be free of organics or other deleterious materials, have a maximum particle size less than 3 inches, be relatively well graded, and have a liquid limit less than 45 and plasticity index less than 25. In our professional opinion the onsite native low plasticity silt (ML) soils are appropriate for use as structural fill, however they may be difficult to compact without first adjusting the moisture content. As such, it may be more practical to import granular structural fill. Structural fill should be moisture conditioned to within 3 percentage points below and 2 percentage points above optimum moisture as determined by ASTM D1557 (Modified Proctor).

Fill should be placed in relatively uniform horizontal lifts on the prepared subgrade which has been stripped of deleterious materials and approved by the Geotechnical Engineer or their representative. If loose soils exist on the prepared subgrades, they should be re-compacted. Each loose lift should be about 1-foot thick. The type of compaction equipment used will ultimately determine the maximum lift thickness. Structural fill should be compacted to at least 95 percent of the maximum dry density as determined by ASTM D1557. Each lift of compacted engineered fill should be tested by a representative of the Geotechnical Engineer prior to placement of subsequent lifts.

To reiterate, each 12-inch thick lift of structural fill should be tested for compaction by a representative of the Geotechnical Engineer prior to placement of subsequent lifts.

3.4 Foundation Recommendations

Once the site has been properly prepared as discussed above, the proposed buildings can be supported on a conventional shallow foundation system. Spread footings for isolated columns and continuous bearing walls supported on the medium stiff silt soils or on granular structural fill overlying the medium stiff silt stratum can be designed for an allowable soil bearing pressure of up to 1,500 psf. The medium stiff silt was generally encountered immediately beneath the existing fill and topsoil.

If the footings will be overexcavated to the stiff silt soil generally encountered 5 to 6 feet below existing grade, then the footings may be designed for an allowable soil bearing pressure for up to 2,500 psf when bearing on the stiff silt or granular structural fill overlying the stiff silt. Note that the actual depth to the stiff silt stratum may be variable, but we expect that the average depth is 5 to 6 feet across the project site.

To be clear, we do not recommend the footings be supported on the existing fill soils as they were variable in strength and could lead to greater than normal settlement.

Our recommended allowable bearing capacity is based on dead load plus design live load, and can be increased by one-third when including short-term wind or seismic loads. Minimum footing dimensions should be 18 inches for continuous wall footings and 24 inches for isolated pad footings.

Lateral frictional resistance between the base of footings and the subgrade can be expressed as the applied vertical load multiplied by a coefficient of friction of 0.32 for concrete foundations bearing directly on the native silt soils or 0.42 when bearing on at least 12 inches of granular structural fill. In addition, lateral loads may be resisted by passive earth pressures based on an equivalent fluid pressure of 300 pounds per cubic foot (pcf) for footings poured “neat” against the dense to medium dense native soils, or properly backfilled structural fill. These are ultimate values—we recommend a factor of safety of 1.5 be applied to the equivalent fluid pressure, which is appropriate due to the amount of movement required to develop full passive resistance. To be clear, no safety factor has been applied to the friction coefficient discussed above.

Exterior footings and foundations in unheated areas should be located at a depth of at least 18 inches below the final exterior grade to provide adequate frost protection. If the additions are to be constructed during the winter months or if the foundation soils will likely be subjected to freezing temperatures after foundation construction, then the foundation soils should be adequately protected from freezing. Otherwise, interior foundations can be located at nominal depths compatible with architectural and structural considerations.

The foundation excavations should be observed by a representative of the Geotechnical Engineer prior to steel or concrete placement to assess that the foundation materials are capable of supporting the design loads and are consistent with the materials discussed in this report. Unsuitable soil zones encountered at the bottom of the foundation excavations should be

removed to the level of suitable soils or properly compacted structural fill as directed by the Geotechnical Engineer.

After opening, foundation excavations should be observed and concrete placed as quickly as possible to avoid exposure of the excavation bottoms to wetting and drying. Surface run-off water should be drained away from the excavations and not be allowed to pond. If possible, the foundation concrete should be placed during the same day the excavation is made. If the soils will be exposed for more than 2 days, consideration should be given to placing a thin layer of rock atop the exposed subgrade to protect it from the elements.

Based on the known subsurface conditions and site geology, laboratory testing and past experience, we anticipate that properly designed and constructed foundations supported on the recommended materials should not exceed maximum total and differential settlements of 1-inch and ½-inch between 25-foot column spans, respectively.

3.5 Floor Slab Recommendations

Given the presence of existing, variable strength fill soils, there is some risk of future floor slab settlement if the floor slabs are supported on the existing fill in its existing condition. To completely mitigate the settlement risk, the fill soils would be removed and replaced with properly compacted structural fill. However, given the thickness of the existing fill soils, that approach may not be economical. A more limited approach would be to partially overexcavate the existing fill soil at least 12 inches, recompact the exposed fill surface, and then replace with well-graded crushed rock gravel structural fill (subbase). Partial overexcavation carries a little more risk, but it's our opinion that risk is relatively low and would primarily result in some settlement cracking of slabs.

For the purposes of this report, we have assumed that maximum floor slab loads will not exceed 150 psf. Based on the existing soil conditions, the design of slabs-on-grade can be based on a subgrade modulus (k) of 125 pci. This subgrade modulus value represents an anticipated value which would be obtained in a standard in-situ plate test with a 1-foot square plate. Use of this subgrade modulus for design or other on-grade structural elements should include appropriate modification based on dimensions as necessary.

Concrete floor slabs-on-grade should be supported on a base course consisting of at least 6 inches of properly compacted, crushed rock gravel structural fill. The floor slabs should have an adequate number of joints to reduce cracking resulting from any differential movement and shrinkage.

Prior to placing the structural fill, the exposed subgrade surface should be prepared as discussed in Section 3.2 the subgrade will need to be visually evaluated by a representative of the Geotechnical Engineer by soil probing. If fill is required, the structural fill should be placed on the prepared subgrade after it has been approved by the Geotechnical Engineer.

The 6-inch thick crushed rock structural fill should provide a capillary break to limit migration of moisture through the slab. If additional protection against moisture vapor is desired, a moisture vapor retarding membrane may also be incorporated into the design. Factors such as cost, special considerations for construction, and the floor coverings suggest that decisions on the use of vapor retarding membranes be made by the project design team, the contractor and the owner.

3.6 Retaining Wall Recommendations

We are not aware of any retaining walls being planned for the project. As such, we are providing general retaining wall recommendations for preliminary use and should be provided retaining wall design specifics once they are known.

Retaining wall footings should be designed in general accordance with the recommendations contained in Section 3.4 above. Lateral earth pressures on walls, which are not restrained at the top, may be calculated on the basis of an “active” equivalent fluid pressure of 40 pcf for level backfill, and 65 pcf for sloping backfill with a maximum 2H:1V slope. Lateral earth pressures on walls that are restrained from yielding at the top may be calculated on the basis of an “at-rest” equivalent fluid pressure of 60 pcf for level backfill, and 95 pcf for sloping backfill with a maximum 2H:1V slope. The stated equivalent fluid pressures do not include surcharge loads, such as foundation, vehicle, equipment, etc., adjacent to walls, hydrostatic pressure buildup, or earthquake loading.

Lateral frictional resistance between the base of footings and the subgrade can be expressed as the applied vertical load multiplied by a coefficient of friction of 0.32 for concrete foundations bearing directly on native fine-grained soils or 0.42 for concrete foundations bearing on at least 12 inches of granular structural fill. In addition, lateral loads may be resisted by passive earth pressures based on an equivalent fluid density of 300 pounds per cubic foot (pcf) for footings poured “neat” against in-situ soils, or properly backfilled with structural fill. These are ultimate values - we recommend a factor of safety of 1.5 be applied to the equivalent fluid pressure, which is appropriate due to the amount of movement required to develop full passive resistance.

We recommend that retaining walls be designed for an earth pressure determined using the Mononobe-Okabe method to mitigate future seismic forces. Our calculations were based on one-half of the Design Peak Ground Acceleration (PGA) value of 0.278g, which was obtained from Table 2 above. For seismic loading on retaining walls with level backfill, new research indicates that the seismic load is to be applied at 1/3 H of the wall instead of 2/3 H, where H is the height of the wall⁵. We recommend that a Mononobe-Okabe earthquake thrust per linear foot of 7.5 psf * H² be applied at 1/3 H from the base of the wall, where H is the height of the wall measured in

⁵ Lew, M., et al (2010). “Seismic Earth Pressures on Deep Building Basements,” SEAOC 2010 Convention Proceedings, Indian Wells, CA.

feet. Note that the recommended earthquake thrust value is appropriate for slopes behind the retaining wall of up to 10 degrees.

All backfill for retaining walls should be select granular material, such as sand or crushed rock with a maximum particle size between $\frac{3}{4}$ and $1\frac{1}{2}$ inches, having less than five percent material passing the No. 200 sieve. Because of the fines content, the soil on site **will not** meet this requirement, and it will be necessary to import specified material to the project for structural drainage backfill behind retaining walls. Silty soils can be used for the last 18 to 24 inches of backfill, thus acting as a seal to the granular backfill.

All backfill behind retaining walls should be moisture conditioned to within +/- 2 percent of optimum moisture content and compacted to a minimum of 90 percent of the material's maximum dry density as determined in accordance with ASTM D1557. This recommendation applies to all backfill located within a horizontal distance equal to 75 percent of the wall height, but should be no less than 4 feet.

An adequate subsurface drain system will need to be designed and installed behind retaining walls to prevent hydrostatic buildup. A waterproofing system should be designed to mitigate against moisture intrusion.

3.7 Pavement Recommendations

After pavement subgrades have been stripped, the exposed pavement subgrade soil should be proofrolled with a fully loaded dual axle dump truck before the placement of any imported granular fill base rock. Areas found to be soft or yielding under the weight of the dump truck should be overexcavated as recommended by an EEI representative and replaced with properly compacted granular structural fill. Given the presence of existing, variably compacted fill soils, we expect that there could be some overexcavation recommended during construction.

The recommended pavement section thicknesses presented below should be considered typical and minimum for the assumed traffic loading parameters and assumed California Bearing Ratio (CBR) value of 6 for fine-grained soils. Using the ASSHTO method of flexible pavement design, the following design parameters have been assumed:

- Pavement design life of 20 years.
- Terminal serviceability (P_t) of 2 (i.e. poor condition).
- A regional factor (R) of 3.0 (generally moderate weather conditions).
- 18,000-pound equivalent single axle load (ESAL) of 5 per day for parking and 20 ESALs per day for driveways.

The project Civil Engineer should review our assumptions to confirm they are appropriate for the anticipated traffic loading. Using the above assumptions, we recommend the following typical

“standard” pavement section for the proposed development of the property. The tables below summarize our recommendations for asphaltic concrete and concrete pavement sections, and pervious concrete base course, respectively.

Table 4: Asphaltic Concrete Section Recommended Minimum Thicknesses

PAVEMENT MATERIAL	CAR PARKING	DRIVEWAY
Asphaltic Concrete (inches)	2.5	3
Crushed Aggregate Base Course (inches) underlain by Mirafi 500X or equivalent	7	9

Asphalt pavement base course material should consist of a well-graded 1½-inch or ¾-inch-minus crushed rock having less than 5 percent material passing the No. 200 sieve. The base course and asphaltic concrete materials should conform to the requirements set forth in the latest edition of the State of Oregon Standard Specifications for Highway Construction. Base course material should be moisture conditioned to within ± 2 percent of optimum moisture content, and compacted to a minimum of 95 percent of the material's maximum dry density as determined in accordance with ASTM D1557 (Modified Proctor). Fill materials should be placed in layers that, when compacted, do not exceed about 8 inches. Asphaltic concrete material should be compacted to at least 91 percent of the material's theoretical maximum density as determined in accordance ASTM D2041 (Rice Specific Gravity).

As requested, we are also providing a gravel section thickness for permeable pavement to support traffic loading. Our recommendations in Table 5 below do not include any strength contribution from the permeable pavement section (i.e. we are relying entirely on the gravel).

Table 5: Permeable Pavement Section Recommended Minimum Thicknesses

PAVEMENT MATERIAL	CAR PARKING	DRIVEWAY
Crushed Aggregate Base Course (inches) underlain by Mirafi 500X or equivalent	14	18

A representative of the Geotechnical Engineer should approve any selected granular fill material before importing it to the site. Each lift of compacted engineered fill should be evaluated by a representative of the Geotechnical Engineer prior to placement of subsequent lifts. The base course fill should extend horizontally outward beyond the exterior perimeter of the pavement at least three feet, prior to sloping.

In order to achieve the assumed 20-year design life, pavement does need regular maintenance to protect the underlying subgrade from being damaged. The primary concern is subgrade saturation which can cause it to weaken. Proper site drainage should be maintained to protect pavement areas. In addition, cracks that develop in the pavement should be sealed on a regular basis.

4.0 CONSTRUCTION CONSIDERATIONS

EEl should be retained to provide observation and testing of construction activities involved in the foundation, earthwork, and related activities of this project. EEl cannot accept any responsibility for any conditions that deviate from those described in this report, nor for the performance of the foundations if not engaged to also provide construction observation for this project.

4.1 Moisture Sensitive Soils/Weather Related Concerns

The soils encountered at this site are expected to be sensitive to disturbances caused by construction traffic and to changes in moisture content. During wet weather periods, increases in the moisture content of the soil can cause significant reduction in the soil strength and support capabilities. In addition, soils that become wet may be slow to dry and thus significantly retard the progress of grading and compaction activities. It will, therefore, be advantageous to perform earthwork and foundation construction activities during dry weather.

4.2 Drainage and Groundwater Considerations

Water should not be allowed to collect in the foundation excavations or on prepared subgrades for the slabs during construction. Positive site drainage should be maintained throughout construction activities. Undercut or excavated areas should be sloped toward one corner to facilitate removal of any collected rainwater, groundwater, or surface runoff.

The site grading plan should be developed to provide rapid drainage of surface water away from the building areas and to inhibit infiltration of surface water around the perimeter of the proposed structure. The grades should be sloped away from the construction area to prevent saturation of the foundation/slab subgrades which could lead to softening of the soils and excessive settlement.

4.3 Excavations

In Federal Register, Volume 54, No. 209 (October 1989), the United States Department of Labor, Occupational Safety and Health Administration (OSHA) amended its "Construction Standards for Excavations, 29 CFR, part 1926, Subpart P". This document and subsequent updates were issued to better insure the safety of workmen entering trenches or excavations. It is mandated by this federal regulation that excavations, whether they be utility trenches, basement excavations or footing excavations, be constructed in accordance with the new OSHA guidelines. It is our understanding that these regulations are being strictly enforced and if they are not closely followed, the owner and the contractor could be liable for substantial penalties.

The contractor is solely responsible for designing and constructing stable, temporary excavations and should shore, slope, or bench the sides of the excavations as required to maintain stability of both the excavation sides and bottom. The contractor's "responsible person", as defined in 29 CFR Part 1926, should evaluate the soil exposed in the excavations as part of the contractor's safety procedures. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in local, state, and federal safety regulations.

We are providing this information solely as a service to our client. EEI does not assume responsibility for construction site safety or the contractor's compliance with local, state, and federal safety or other regulations.

5.0 REPORT LIMITATIONS

As is standard practice in the geotechnical industry, the conclusions contained in our report are considered preliminary because they are based on assumptions made about the soil, rock, and groundwater conditions exposed at the site during our subsurface investigation. A more complete extent of the actual subsurface conditions can only be identified when they are exposed during construction. Therefore, EEI should be retained as your consultant during construction to observe the actual conditions and to provide our final conclusions. If a different geotechnical consultant is retained to perform geotechnical inspection during construction then they should be relied upon to provide final design conclusions and recommendations, and should assume the role of geotechnical engineer of record.

The geotechnical recommendations presented in this report are based on the available project information, and the subsurface materials described in this report. If any of the noted information is incorrect, please inform EEI in writing so that we may amend the recommendations presented in this report if appropriate and if desired by the client. EEI will not be responsible for the implementation of its recommendations when it is not notified of changes in the project.

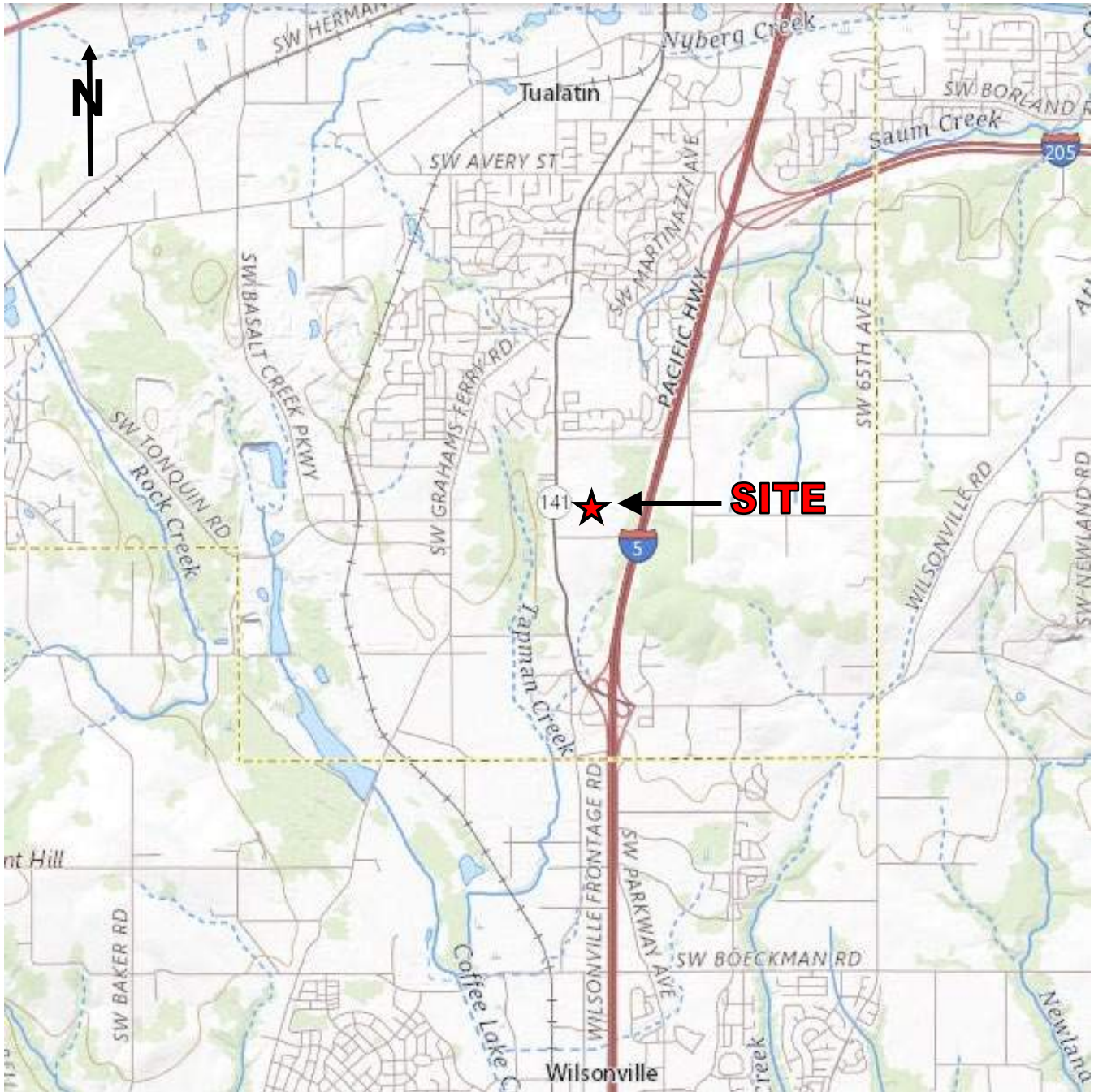
Once construction plans are finalized and a grading plan has been prepared, EEI should be retained to review those plans, and modify our existing recommendations related to the proposed construction, if determined to be necessary.

The Geotechnical Engineer warrants that the findings, recommendations, specifications, or professional advice contained herein have been made in accordance with generally accepted professional geotechnical engineering practices in the local area. No other warranties are implied or expressed.

This report has been prepared for the exclusive use of Community Partners for Affordable Housing for the specific application to the proposed Basalt Creek Affordable Housing development to be located at 23500 and 23550 Southwest Boones Ferry Road in Tualatin, Washington County, Oregon. EEI does not authorize the use of the advice herein nor the reliance upon the report by third parties without prior written authorization by EEI.

APPENDICES

APPENDIX A – SITE LOCATION PLAN



Base map source: <https://apps.nationalmap.gov/viewer/>.



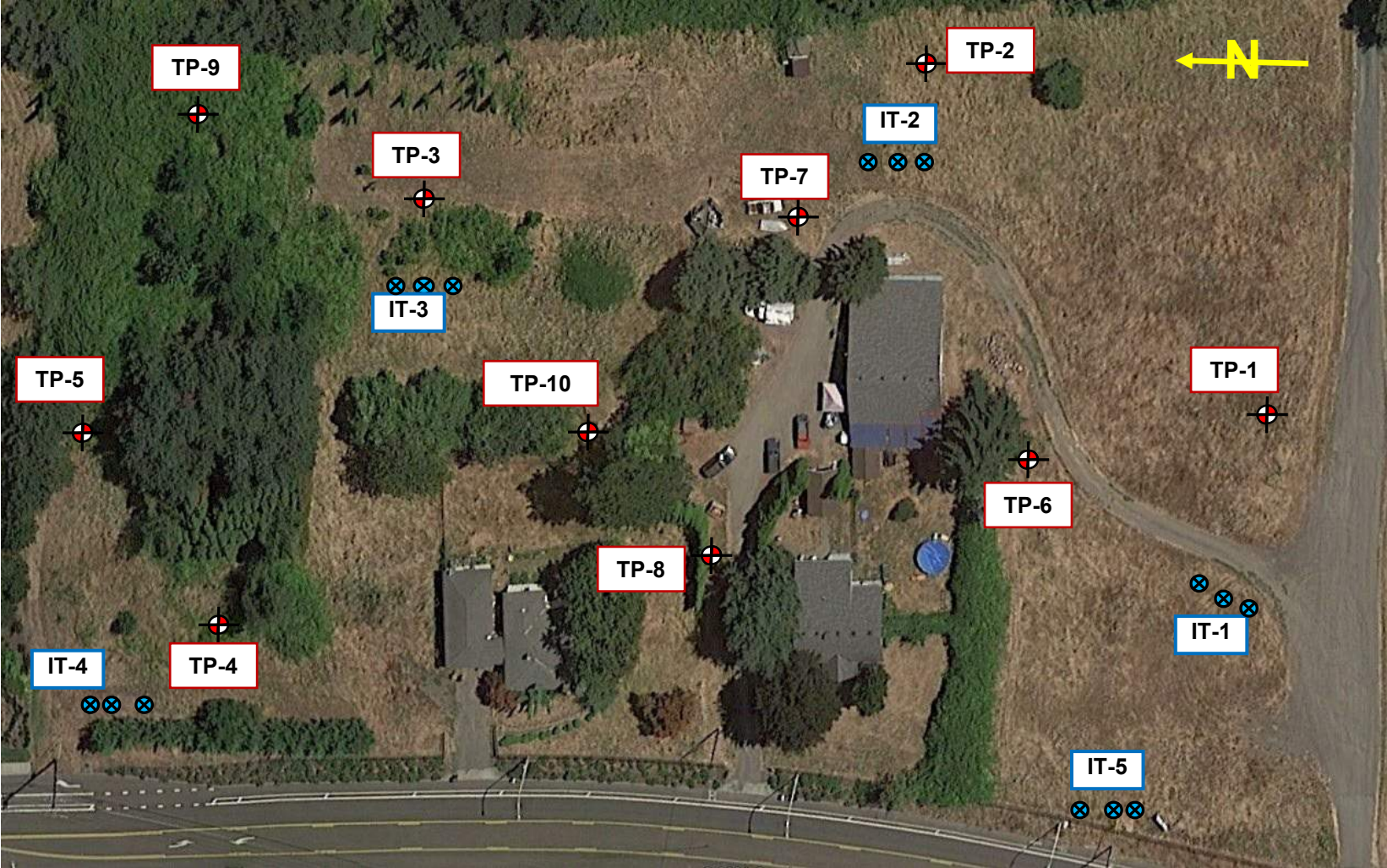
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**Proposed Basalt Creek Affordable Housing Project
2350 and 2355 Southwest Boones Ferry Road
Tualatin, Washington County, Oregon**

**Report No.
21-023-1**

March 17, 2021

APPENDIX B – EXPLORATION LOCATION PLAN



Base drawing source: "Preliminary" drawing A0.00 by Carlton Hart Architecture, undated.



**Proposed Basalt Creek Affordable Housing Project
23500 and 23550 Southwest Boones Ferry Road
Tualatin, Washington County, Oregon**

**Report No.
20-023-1**

March 17, 2021



**Earth
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Appendix C: Test Pit TP-1

Sheet 1 of 1

Client: Community Partners for Affordable Housing
 Project: Basalt Creek Affordable Housing Project
 Site Address: 23500 & 23550 SW Boones Ferry Road
 Tualatin, Oregon
 Location of Exploration: See Appendix B
 Logged By: Anita Bauer

Report Number: 21-023-1
 Excavation Contractor: Dan Fischer Excavating
 Excavation Method: Excavator with 2 foot toothed bucket
 Excavation Equipment: Hitachi Zaxis 40U
 Approximate Ground Surface Elevation (ft msl): 347
 Date of Exploration: March 1, 2021

Depth (ft)	Water Level	Lithology		Sampling Data							Remarks		
		Lithologic Symbol	Geologic Description of Soil and Rock Strata	Sample Number	Digging Effort	Drive Probe Blows Per 6 Inches	Pocket Pen. (tsf)	Moisture Content (%)	% Passing #200 Sieve	Liquid Limit		Plastic Limit	
0			Topsoil - dark brown sandy silt with gravel, roots, and rootlets, moist		Easy	9							
1			Silt (ML) - brown silt with orange and black mottling, very stiff to medium stiff, moist to wet			26							
2				GRAB 1		16	3	24	89				
3						14							
4						9							
5			Clayey Silt (MH) - brown to reddish brown elastic silt with red and black staining (decomposing to intensely weathered basalt), stiff to hard, moist to wet			6							
6				GRAB 2		6	0.75	31	92	38	25		
7						6							
8						9							
9				GRAB 3		13							
						23							
						26							
						25							
				GRAB 4		20		29					
						21							
						22							
						28							
						41							
					Hard	58		31					

Notes: Test pit terminated at a depth of approximately 9 feet bgs. Drive probe terminated at a depth of approximately 9 feet bgs. Groundwater seepage was encountered at depth of about 4 feet bgs at the time of our exploration. Test pit loosely backfilled with excavated soil on 3/1/2021. Approximate elevation based on Google Earth.



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Appendix C: Test Pit TP-2

Sheet 1 of 1

Client: Community Partners for Affordable Housing
 Project: Basalt Creek Affordable Housing Project
 Site Address: 23500 & 23550 SW Boones Ferry Road
 Tualatin, Oregon
 Location of Exploration: See Appendix B
 Logged By: Anita Bauer

Report Number: 21-023-1
 Excavation Contractor: Dan Fischer Excavating
 Excavation Method: Excavator with 2 foot toothed bucket
 Excavation Equipment: Hitachi Zaxis 40U
 Approximate Ground Surface Elevation (ft msl): 353
 Date of Exploration: March 1, 2021

Depth (ft)	Water Level	Lithology			Sampling Data							Remarks		
		Lithologic Symbol	Geologic Description of Soil and Rock Strata	Sample Number	Digging Effort	Drive Probe Blows Per 6 Inches	Pocket Pen. (tsf)	Moisture Content (%)	% Passing #200 Sieve	Liquid Limit	Plastic Limit			
0			Topsoil - dark brown sandy silt with roots, and rootlets, moist		Easy	3								
1			Silt (ML) - brown silt with orange and black mottling, soft to medium stiff, moist	GRAB 1		4	0.75	31						
2						4								Hit a white PCV pipe
3						4								
4			Clayey Silt (MH) - brown to reddish brown elastic silt with red and black staining (decomposing to intensely weathered basalt), medium stiff to hard, moist to wet	GRAB 2		7								
5						8								
6						12	2.5	31						
7						14								
8						17								
9						17								
10						16								
						18								
						18								
						27								
						32		49						
						30								
						42								
						55								
								47						

Notes: Test pit terminated at a depth of approximately 10 feet bgs. Drive probe terminated at a depth of approximately 9.5 feet bgs. Groundwater seepage was encountered at depth of about 4 feet bgs at the time of our exploration. Test pit loosely backfilled with excavated soil on 3/1/2021. Approximate elevation based on Google Earth.



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Appendix C: Test Pit TP-3

Sheet 1 of 1

Client: Community Partners for Affordable Housing
 Project: Basalt Creek Affordable Housing Project
 Site Address: 23500 & 23550 SW Boones Ferry Road
 Tualatin, Oregon
 Location of Exploration: See Appendix B
 Logged By: Anita Bauer

Report Number: 21-023-1
 Excavation Contractor: Dan Fischer Excavating
 Excavation Method: Excavator with 2 foot toothed bucket
 Excavation Equipment: Hitachi Zaxis 40U
 Approximate Ground Surface Elevation (ft msl): 354
 Date of Exploration: March 1, 2021

Depth (ft)	Water Level	Lithology			Sampling Data						Remarks		
		Lithologic Symbol	Geologic Description of Soil and Rock Strata	Sample Number	Digging Effort	Drive Probe Blows Per 6 Inches	Pocket Pen. (tsf)	Moisture Content (%)	% Passing #200 Sieve	Liquid Limit		Plastic Limit	
0			Topsoil - dark brown sandy silt with roots and rootlets, moist		Easy	3							
1						7							
2			Silt (ML) - brown silt with orange and black mottling, medium stiff, moist			5							
3						3						Hit a white PCV pipe	
4			Clayey Silt (MH) - brown to reddish brown elastic silt with red and black staining (decomposing to intensely weathered basalt), medium stiff to hard, moist to wet	GRAB 1		6	0.5						
5							7						
6							7						
7							10	1.5					
8							17						
9							15						
10							9						
11							14						
12							19						
13							26						
14					27								
15				GRAB 2		32	27						
16						41							
17						44	33						
18				GRAB 3	Hard	38							
19						43							
20						45							
21						43							
22						52							

Notes: Test pit terminated at a depth of approximately 9 feet bgs. Drive probe terminated at a depth of approximately 11.5 feet bgs. Groundwater seepage was encountered at depth of about 6.5 feet bgs at the time of our exploration. Test pit loosely backfilled with excavated soil on 3/1/2021. Approximate elevation based on Google Earth.



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Appendix C: Test Pit TP-4

Sheet 1 of 1

Client: Community Partners for Affordable Housing
 Project: Basalt Creek Affordable Housing Project
 Site Address: 23500 & 23550 SW Boones Ferry Road
 Tualatin, Oregon
 Location of Exploration: See Appendix B
 Logged By: Anita Bauer

Report Number: 21-023-1
 Excavation Contractor: Dan Fischer Excavating
 Excavation Method: Excavator with 2 foot toothed bucket
 Excavation Equipment: Hitachi Zaxis 40U
 Approximate Ground Surface Elevation (ft msl): 344
 Date of Exploration: March 1, 2021

Depth (ft)	Water Level	Lithology		Sampling Data							Remarks		
		Lithologic Symbol	Geologic Description of Soil and Rock Strata	Sample Number	Digging Effort	Drive Probe Blows Per 6 Inches	Pocket Pen. (tsf)	Moisture Content (%)	% Passing #200 Sieve	Liquid Limit		Plastic Limit	
0			Topsoil - dark brown sandy silt with gravel, roots, and rootlets, moist		Easy	3							
1			Silt (ML) - brown silt, medium stiff, moist			6							
2						6	1.25						
3						6							
4			Clayey Silt (MH) - brown to reddish brown elastic silt with red and black staining (decomposing to intensely weathered basalt), stiff to hard, moist to wet	GRAB 1		4							
5						8	1.25						
6						12		31					
7			Basalt - gray, moderately weathered, hard, moist	GRAB 2	Hard	15							
						18							
						22							
						25							
						22							
						24		27					

Notes: Test pit terminated at a depth of approximately 7 feet bgs due to practical digging refusal. Drive probe terminated at a depth of approximately 7 feet bgs due to refusal. Groundwater seepage was encountered at depth of about 6 feet bgs at the time of our exploration. Test pit loosely backfilled with excavated soil on 3/1/2021. Approximate elevation based on Google Earth.



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Appendix C: Test Pit TP-5

Sheet 1 of 1

Client: Community Partners for Affordable Housing
 Project: Basalt Creek Affordable Housing Project
 Site Address: 23500 & 23550 SW Boones Ferry Road
 Tualatin, Oregon
 Location of Exploration: See Appendix B
 Logged By: Anita Bauer

Report Number: 21-023-1
 Excavation Contractor: Dan Fischer Excavating
 Excavation Method: Excavator with 2 foot toothed bucket
 Excavation Equipment: Hitachi Zaxis 40U
 Approximate Ground Surface Elevation (ft msl): 346
 Date of Exploration: March 1, 2021

Depth (ft)	Water Level	Lithology		Sampling Data							Remarks		
		Lithologic Symbol	Geologic Description of Soil and Rock Strata	Sample Number	Digging Effort	Drive Probe Blows Per 6 Inches	Pocket Pen. (tsf)	Moisture Content (%)	% Passing #200 Sieve	Liquid Limit		Plastic Limit	
0		[Cross-hatched symbol]	Fill - brown to dark brown silt with roots, rootlets, asphalt chunks, and rocks, moist		Easy	3							
1					7								
2					10								
3				GRAB 1									
3							0.75	23	69				
4													
4		[Vertical line symbol]	Silt (ML) - brown silt with some black mottling, stiff to very stiff, moist			11							
5					15								
6					19								
6													
6			Clayey Silt (MH) - brown to reddish brown elastic silt with red and black staining (decomposing to intensely weathered basalt), very stiff to hard, moist to wet			22							
7					35								
7					55	Hard							
8													
9				GRAB 3									
9								44					
10													
11													
12													

Notes: Test pit terminated at a depth of approximately 9 feet bgs. Drive probe terminated at a depth of approximately 7 feet bgs due to refusal. Groundwater seepage was encountered at depth of about 6 feet bgs at the time of our exploration. Test pit loosely backfilled with excavated soil on 3/1/2021. Approximate elevation based on Google Earth.



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Inc.**

Appendix C: Test Pit TP-6

Sheet 1 of 1

Client: Community Partners for Affordable Housing
 Project: Basalt Creek Affordable Housing Project
 Site Address: 23500 & 23550 SW Boones Ferry Road
 Tualatin, Oregon
 Location of Exploration: See Appendix B
 Logged By: Anita Bauer

Report Number: 21-023-1
 Excavation Contractor: Dan Fischer Excavating
 Excavation Method: Excavator with 2 foot toothed bucket
 Excavation Equipment: Hitachi Zaxis 40U
 Approximate Ground Surface Elevation (ft msl): 348
 Date of Exploration: March 2, 2021

Depth (ft)	Water Level	Lithology		Sampling Data							Remarks		
		Lithologic Symbol	Geologic Description of Soil and Rock Strata	Sample Number	Digging Effort	Drive Probe Blows Per 6 Inches	Pocket Pen. (tsf)	Moisture Content (%)	% Passing #200 Sieve	Liquid Limit		Plastic Limit	
0			Topsoil - dark brown sandy silt with gravel, roots, and rootlets, moist		Mod.	24							
0.5			Fill - dark brown silt with gravel and some charcoal and brick fragments, moist			14							
1			Silt (ML) - brown silt with orange and black mottling, medium stiff to stiff, moist to wet	GRAB 1		7	2.25	26					
2					Easy	5							
3						9							
4			Clayey Silt (MH) - brown to reddish brown elastic silt with red and black staining (decomposing to intensely weathered basalt), very stiff to hard, moist to wet	GRAB 2		9	1.25	24					
5						8							
6							19						
7							23						
8					GRAB 3		17		26				
9							21						
10							26						
11							26						
12						29							
13						40							
14						51							
15				GRAB 4	Hard	60		28					

Notes: Test pit terminated at a depth of approximately 9 feet bgs. Drive probe terminated at a depth of approximately 9 feet bgs. Groundwater seepage was encountered at depth of about 7.5 feet bgs at the time of our exploration. Test pit loosely backfilled with excavated soil on 3/2/2021. Approximate elevation based on Google Earth.



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Appendix C: Test Pit TP-7

Sheet 1 of 1

Client: Community Partners for Affordable Housing
 Project: Basalt Creek Affordable Housing Project
 Site Address: 23500 & 23550 SW Boones Ferry Road
 Tualatin, Oregon
 Location of Exploration: See Appendix B
 Logged By: Anita Bauer

Report Number: 21-023-1
 Excavation Contractor: Dan Fischer Excavating
 Excavation Method: Excavator with 2 foot toothed bucket
 Excavation Equipment: Hitachi Zaxis 40U
 Approximate Ground Surface Elevation (ft msl): 352
 Date of Exploration: March 2, 2021

Depth (ft)	Water Level	Lithology		Sampling Data							Remarks		
		Lithologic Symbol	Geologic Description of Soil and Rock Strata	Sample Number	Digging Effort	Drive Probe Blows Per 6 Inches	Pocket Pen. (tsf)	Moisture Content (%)	% Passing #200 Sieve	Liquid Limit		Plastic Limit	
0			Topsoil - dark brown sandy silt with gravel, roots, and rootlets, moist		Mod.	18							
1			Fill - dark brown silt with gravel and some charcoal and brick fragments	GRAB 1		15	0.5	25					
2			Silt (ML) - brown silt with orange and black mottling, medium stiff, moist		Easy	6							
3			Clayey Silt (MH) - brown to reddish brown elastic silt with red and black staining (decomposing to intensely weathered basalt), medium stiff to hard, moist to wet	GRAB 2		6	1.5	28	92	54	23		
4					GRAB 3		12	2	29				
5							18						
6							25						
7						21							
8						23							
9				GRAB 4	Hard	28							
						32							
						37							
						44							
						47							
						54		31					

Notes: Test pit terminated at a depth of approximately 9 feet bgs. Drive probe terminated at a depth of approximately 9 feet bgs. Groundwater seepage was encountered at depth of about 4.5 feet bgs at the time of our exploration. Test pit loosely backfilled with excavated soil on 3/2/2021. Approximate elevation based on Google Earth.



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Appendix C: Test Pit TP-8

Sheet 1 of 1

Client: Community Partners for Affordable Housing
 Project: Basalt Creek Affordable Housing Project
 Site Address: 23500 & 23550 SW Boones Ferry Road
 Tualatin, Oregon
 Location of Exploration: See Appendix B
 Logged By: Anita Bauer

Report Number: 21-023-1
 Excavation Contractor: Dan Fischer Excavating
 Excavation Method: Excavator with 2 foot toothed bucket
 Excavation Equipment: Hitachi Zaxis 40U
 Approximate Ground Surface Elevation (ft msl): 348
 Date of Exploration: March 2, 2021

Depth (ft)	Water Level	Lithology		Sampling Data							Remarks		
		Lithologic Symbol	Geologic Description of Soil and Rock Strata	Sample Number	Digging Effort	Drive Probe Blows Per 6 Inches	Pocket Pen. (tsf)	Moisture Content (%)	% Passing #200 Sieve	Liquid Limit		Plastic Limit	
0			Topsoil- dark brown sandy silt with roots and rootlets, moist		Mod.								
1			Fill - brown clayey silt with gravel, charcoal, and bricks, moist	GRAB 1			2	24					Hit a steel water line
3			Silt (ML) - brown silt, very stiff to medium stiff to very stiff, moist to wet	GRAB 2	Easy		0.5	26					
6			Clayey Silt (MH) - brown to reddish brown elastic silt with red and black staining (decomposing to intensely weathered basalt), very stiff to hard, moist	GRAB 3				28					
9				GRAB 4	Hard			28					

Notes: Test pit terminated at a depth of approximately 9 feet bgs. Drive probe testing not attempted at this location. Groundwater was not encountered at the time of our exploration. Test pit loosely backfilled with excavated soil on 3/2/2021. Approximate elevation based on Google Earth.



**Earth
Engineers,
Inc.**

Appendix C: Test Pit TP-9

Sheet 1 of 1

Client: Community Partners for Affordable Housing
 Project: Basalt Creek Affordable Housing Project
 Site Address: 23500 & 23550 SW Boones Ferry Road
 Tualatin, Oregon
 Location of Exploration: See Appendix B
 Logged By: Anita Bauer

Report Number: 21-023-1
 Excavation Contractor: Dan Fischer Excavating
 Excavation Method: Excavator with 2 foot toothed bucket
 Excavation Equipment: Hitachi Zaxis 40U
 Approximate Ground Surface Elevation (ft msl): 354
 Date of Exploration: March 2, 2021

Depth (ft)	Water Level	Lithology		Sampling Data							Remarks		
		Lithologic Symbol	Geologic Description of Soil and Rock Strata	Sample Number	Digging Effort	Drive Probe Blows Per 6 Inches	Pocket Pen. (tsf)	Moisture Content (%)	% Passing #200 Sieve	Liquid Limit		Plastic Limit	
0			Fill - brown to dark brown silt with roots, rootlets, charcoal, and rocks, moist										
1				Easy									
2								1					
3				GRAB 1					24				
4													
5													
6													
7			Silt (ML) - brown silt, medium stiff to stiff, moist	GRAB 2					26				Becomes Stiff
8			Clayey Silt (MH) - brown to reddish brown elastic silt with red and black staining (decomposing basalt), stiff										
9				GRAB 3					28				
10													
11													
12													

Notes: Test pit terminated at a depth of approximately 9.5 feet bgs. Drive probe testing not attempted at this location. Groundwater was not encountered at the time of our exploration. Test pit loosely backfilled with excavated soil on 3/2/2021. Approximate elevation based on Google Earth.



**Earth
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Inc.**

Appendix C: Test Pit TP-10

Sheet 1 of 1

Client: Community Partners for Affordable Housing
 Project: Basalt Creek Affordable Housing Project
 Site Address: 23500 & 23550 SW Boones Ferry Road
 Tualatin, Oregon
 Location of Exploration: See Appendix B
 Logged By: Anita Bauer

Report Number: 21-023-1
 Excavation Contractor: Dan Fischer Excavating
 Excavation Method: Excavator with 2 foot toothed bucket
 Excavation Equipment: Hitachi Zaxis 40U
 Approximate Ground Surface Elevation (ft msl): 349
 Date of Exploration: March 2, 2021

Depth (ft)	Water Level	Lithology		Sampling Data							Remarks		
		Lithologic Symbol	Geologic Description of Soil and Rock Strata	Sample Number	Digging Effort	Drive Probe Blows Per 6 Inches	Pocket Pen. (tsf)	Moisture Content (%)	% Passing #200 Sieve	Liquid Limit		Plastic Limit	
0			Topsoil- dark brown sandy silt with roots and rootlets, moist	GRAB 1	Mod.			30					
1			Fill - brown to reddish brown silt with bricks and charcoal, moist	GRAB 2			1	28					
2													
3													
4			Clayey Silt (MH) - brown to reddish brown elastic silt with red and black staining (decomposing to intensely weathered basalt), stiff to hard, moist to wet	GRAB 3			2	30	94				
5													
6				GRAB 4				28					
7													
8													
9				GRAB 5	Hard			27					
10													
11													
12													

Notes: Test pit terminated at a depth of approximately 9 feet bgs. Drive probe testing not attempted at this location. Groundwater seepage was encountered at a depth of about 6 feet bgs at the time of our exploration. Test pit loosely backfilled with excavated soil on 3/2/2021. Approximate elevation based on Google Earth.

APPENDIX D: SOIL CLASSIFICATION LEGEND

APPARENT CONSISTENCY OF COHESIVE SOILS (PECK, HANSON & THORNBURN 1974, AASHTO 1988)				
Descriptor	SPT N ₆₀ (blows/foot)*	Pocket Penetrometer, Qp (tsf)	Torvane (tsf)	Field Approximation
Very Soft	< 2	< 0.25	< 0.12	Easily penetrated several inches by fist
Soft	2 – 4	0.25 – 0.50	0.12 – 0.25	Easily penetrated several inches by thumb
Medium Stiff	5 – 8	0.50 – 1.0	0.25 – 0.50	Penetrated several inches by thumb w/moderate effort
Stiff	9 – 15	1.0 – 2.0	0.50 – 1.0	Readily indented by thumbnail
Very Stiff	16 – 30	2.0 – 4.0	1.0 – 2.0	Indented by thumb but penetrated only with great effort
Hard	> 30	> 4.0	> 2.0	Indented by thumbnail with difficulty

* Using SPT N₆₀ is considered a crude approximation for cohesive soils.

APPARENT DENSITY OF COHESIONLESS SOILS (AASHTO 1988)	
Descriptor	SPT N ₆₀ Value (blows/foot)
Very Loose	0 – 4
Loose	5 – 10
Medium Dense	11 – 30
Dense	31 – 50
Very Dense	> 50

MOISTURE (ASTM D2488-06)	
Descriptor	Criteria
Dry	Absence of moisture, dusty, dry to the touch, well below optimum moisture content (per ASTM D698 or D1557)
Moist	Damp but no visible water
Wet	Visible free water, usually soil is below water table, well above optimum moisture content (per ASTM D698 or D1557)

PERCENT OR PROPORTION OF SOILS (ASTM D2488-06)	
Descriptor	Criteria
Trace	Particles are present but estimated < 5%
Few	5 – 10%
Little	15 – 25%
Some	30 – 45%
Mostly	50 – 100%
Percentages are estimated to nearest 5% in the field. Use "about" unless percentages are based on laboratory testing.	

SOIL PARTICLE SIZE (ASTM D2488-06)	
Descriptor	Size
Boulder	> 12 inches
Cobble	3 to 12 inches
Gravel - Coarse Fine	¾ inch to 3 inches No. 4 sieve to ¾ inch
Sand - Coarse Medium Fine	No. 10 to No. 4 sieve (4.75mm) No. 40 to No. 10 sieve (2mm) No. 200 to No. 40 sieve (.425mm)
Silt and Clay ("fines")	Passing No. 200 sieve (0.075mm)

UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D2488)			
Major Division		Group Symbol	Description
Coarse Grained Soils (more than 50% retained on #200 sieve)	Gravel (50% or more retained on No. 4 sieve)	Clean Gravel	GW Well-graded gravels and gravel-sand mixtures, little or no fines
		Gravel with fines	GP Poorly graded gravels and gravel-sand mixtures, little or no fines
			GM Silty gravels and gravel-sand-silt mixtures
	Sand (> 50% passing No. 4 sieve)	Clean sand	GC Clayey gravels and gravel-sand-clay mixtures
		Sand with fines	SW Well-graded sands and gravelly sands, little or no fines
			SP Poorly-graded sands and gravelly sands, little or no fines
Fine Grained Soils (50% or more passing #200 sieve)	Silt and Clay (liquid limit < 50)	SM Silty sands and sand-silt mixtures	
		SC Clayey sands and sand-clay mixtures	
		ML Inorganic silts, rock flour and clayey silts	
	Silt and Clay (liquid limit > 50)	CL Inorganic clays of low-medium plasticity, gravelly, sandy & lean clays	
		OL Organic silts and organic silty clays of low plasticity	
		MH Inorganic silts and clayey silts	
Highly Organic Soils		CH Inorganic clays or high plasticity, fat clays	
		OH Organic clays of medium to high plasticity	
		PT Peat, muck and other highly organic soils	



GRAPHIC SYMBOL LEGEND		
GRAB	☒	Grab sample
SPT	■	Standard Penetration Test (2" OD), ASTM D1586
ST	▨	Shelby Tube, ASTM D1587 (pushed)
DM	⊞	Dames and Moore ring sampler (3.25" OD and 140-pound hammer)
CORE	▨	Rock coring

APPENDIX E: SURCHARGE-INDUCED LATERAL EARTH PRESSURES FOR WALL DESIGN

LINE LOAD (applicable for retaining walls not exceeding 20 feet in height):

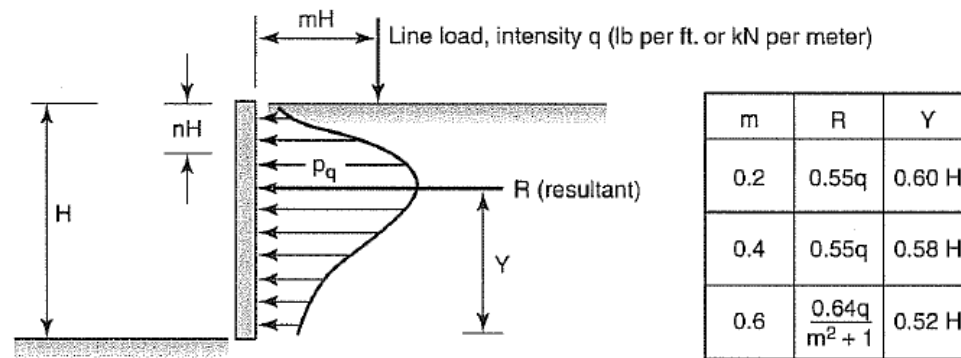


Figure 16-28 Pressure distribution against vertical wall resulting from line load of intensity q .

CONCENTRATED POINT LOAD (applicable for retaining walls not exceeding 20 feet in height):

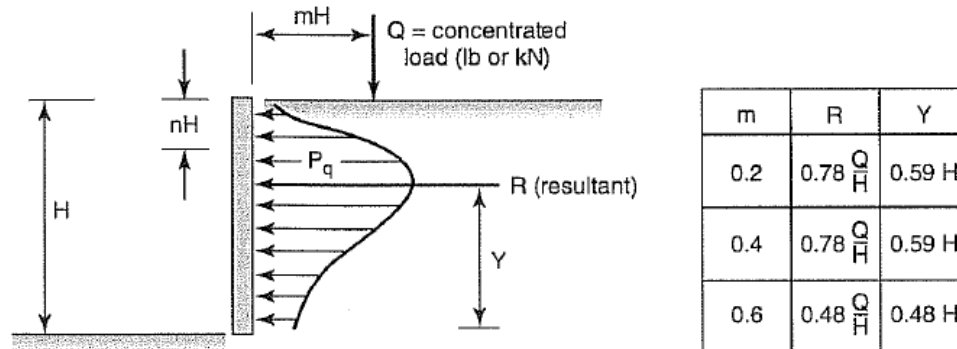


Figure 16-27 Pressure distribution against vertical wall resulting from point load, Q .

AREAL LOAD:

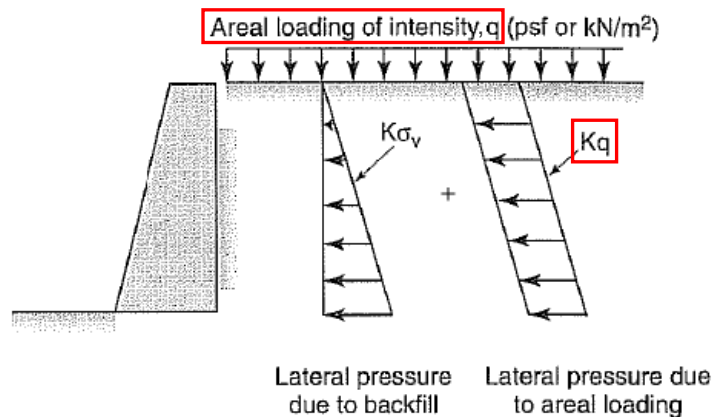
Figure 16-26 Influence of areal loading on wall pressures.

use $K=0.4$ for active condition
(i.e. top of wall allowed to
deflect laterally)

use $K=0.9$ for at-rest condition
(i.e. top of wall not allowed to
deflect laterally)

Resultant, $R = K * q * H$

Where H = wall height (feet)



Source of Figures: McCarthy, D.F., 1998, "Essentials of Soil Mechanics and foundations, Basic Geotechnics, Fifth Edition."



**Earth
Engineers,
Inc.**

**Proposed Basalt Creek Affordable Housing Project
23500 and 23550 Southwest Boones Ferry Road
Tualatin, Washington County, Oregon**

**Report No.
21-023-1**

March 17, 2021



**APPENDIX F: LAB TEST RESULTS
REPORT OF ATTERBERG LIMITS
ASTM D 4318**

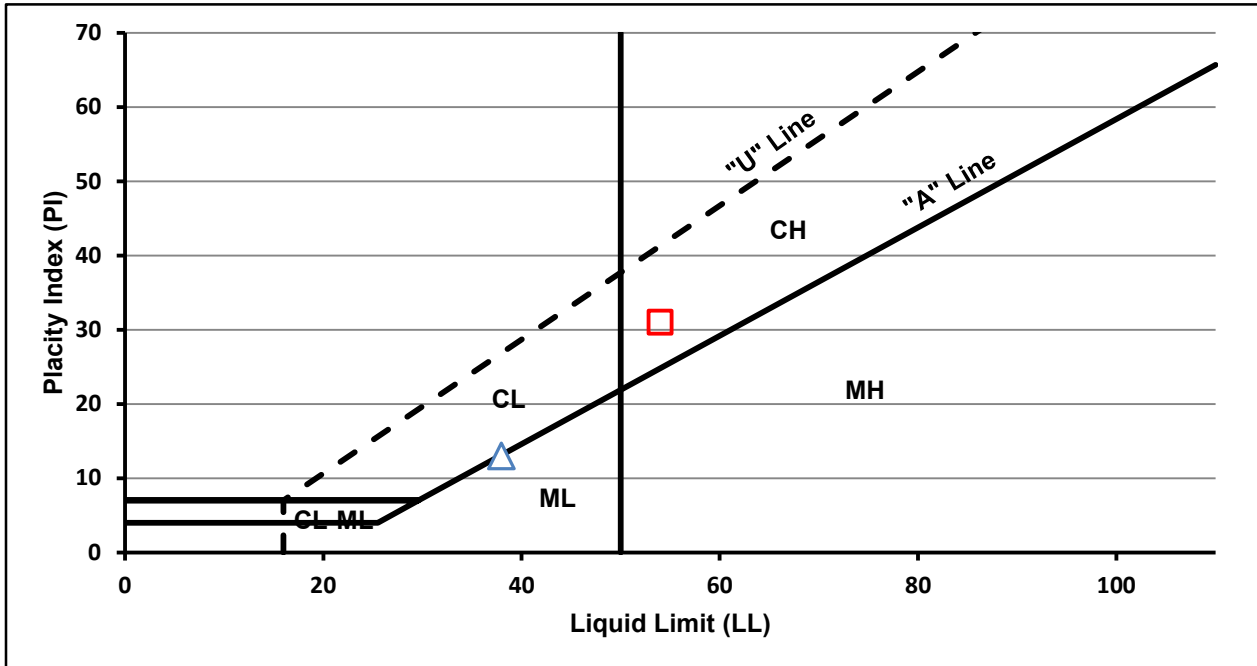
TESTED FOR: Community Partners for Affordable Housing
P.O. Box 23206
Tigard, Oregon 97239
Attention: Jilian Saurage Felton

PROJECT: Basalt Creek Affordable Housing
23500 and 23550 Southwest
Boones Ferry Road
Tualatin, Washington County, OR

DATE: 3/12/2021

REPORT NO.: 21-023-1

TEST DATA



Location	Depth (feet)	Description (USCS)	Moisture Content, %	% Passing #200 Sieve	Atterberg Limits		
					LL	PL	PI
△ TP-1	3	Silt (ML)	31	92	38	25	13
□ TP-7	2.5	Elastic Silt (MH)	28	92	54	23	31

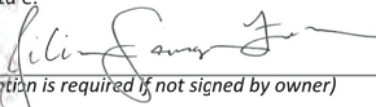
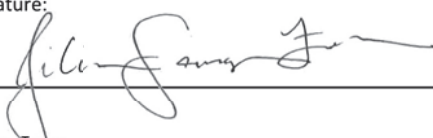
Remarks:
Lab Technician: Anita B.

Respectfully Submitted,
Earth Engineers, Inc.

USCS Classification per ASTM D 2487
Moisture Content per ASTM D 2216
Percent Passing #200 Sieve per ASTM D 1140
Atterberg Limits per ASTM D 4318

Troy Hull, P.E., G.E.

Land Use Application

Project Information		
Project Title: Plambeck Gardens		
Brief Description: Plambeck Gardens is an multifamily affordable housing project that will provide 116 new affordable units, ranging from 1-bedroom to 4-bedroom units. The project will consist of two 4-story residential buildings and one 1-story community building for residents with site features including a variety of outdoor seating, play areas, and a community garden.		
Property Information		
Address: 23500 & 23550 SW Boones Ferry Road		
Assessor's Map Number and Tax Lots: Tax Lot 303		
Applicant/Primary Contact		
Name: Jilian Saurage Felton	Company Name: Community Partners for Affordable Housing	
Address: 6380 SW Capitol Highway, #151		
City: Portland	State: Oregon	ZIP: 97239
Phone: 503-293-4038	Email: jsaurage@cpahoregon.org	
Property Owner		
Name: Community Partners for Affordable Housing		
Address: 6380 SW Capitol Highway, #151		
City: Portland	State: Oregon	ZIP: 97239
Phone: 503-293-4038	Email: jsaurage@cpahoregon.org	
Property Owner's Signature: 		Date: 03/04/2022
<i>(Note: Letter of authorization is required if not signed by owner)</i>		
AS THE PERSON RESPONSIBLE FOR THIS APPLICATION, I HEREBY ACKNOWLEDGE THAT I HAVE READ THIS APPLICATION AND STATE THAT THE INFORMATION IN AND INCLUDED WITH THIS APPLICATION IN ITS ENTIRETY IS CORRECT. I AGREE TO COMPLY WITH ALL APPLICABLE CITY AND COUNTY ORDINANCES AND STATE LAWS REGARDING BUILDING CONSTRUCTION AND LAND USE.		
Applicant's Signature: 		Date: 03/04/2022
Land Use Application Type:		
<input type="checkbox"/> Annexation (ANN)	<input type="checkbox"/> Historic Landmark (HIST)	<input type="checkbox"/> Minor Architectural Review (MAR)
<input checked="" type="checkbox"/> Architectural Review (AR)	<input type="checkbox"/> Industrial Master Plan (IMP)	<input type="checkbox"/> Minor Variance (MVAR)
<input type="checkbox"/> Architectural Review—Single Family (ARSF)	<input type="checkbox"/> Plan Map Amendment (PMA)	<input type="checkbox"/> Sign Variance (SVAR)
<input type="checkbox"/> Architectural Review—ADU (ARADU)	<input type="checkbox"/> Plan Text Amendment (PTA)	<input type="checkbox"/> Variance (VAR)
<input type="checkbox"/> Conditional Use (CUP)	<input type="checkbox"/> Tree Removal/Review (TCP)	
Office Use		
Case No:	Date Received:	Received by:
Fee:	Receipt No:	



25 NW 23rd Place Suite 1 / Commercial Dept
Portland, OR 97210
Phone (503) 219-9088 Fax (503) 477-6476

WFG National Title Insurance Company
Trevor Cheyne
25 NW 23rd Place Suite 1 / Commercial Dept
Portland, OR 97210

Date Prepared: January 4, 2021

FIRST SUPPLEMENTAL PRELIMINARY TITLE REPORT

Order Number: **19-338106**
Escrow Officer: Trevor Cheyne
Phone: (503) 444-7047
Fax: (503) 296-5869
Email: tcheyne@wfgnationaltitle.com

Seller(s): Community Partners for Affordable Housing
Buyer(s): Partnership or LLC to be formed

Property: 23500 SW Boones Ferry Road, Tualatin, OR 97062

23550 SW Boones Ferry Road, Tualatin, OR 97062

The following items have been amended:

Change vestee; show taxes paid; removed Trust deed on prior owner; remove Farm deferral; and add pre-development Trust deed.

Stewart Title Guaranty Company, is prepared to issue a title insurance policy, as of the effective date and in the form and amount shown on Schedule A, subject to the conditions, stipulations and exclusions from coverage appearing in the policy form and subject to the exceptions shown on Schedule B. This Report (and any Amendments) is preliminary to and issued solely for the purpose of facilitating the issuance of a policy of title insurance at the time the real estate transaction in question is closed and no liability is assumed in the Report. The Report shall become null and void unless a policy is issued and the full premium paid.

This report is for the exclusive use of the person to whom it is addressed. Title insurance is conditioned on recordation of satisfactory instruments that establish the interests of the parties to be insured; until such recordation, the Company may cancel or revise this report for any reason.

SCHEDULE A

1. The effective date of this preliminary title report is **8:00 A.M. on 28th day of December, 2020**
2. The policies and endorsements to be insured and the related charges are:

<u>Policy/Endorsement Description</u>	<u>Liability</u>		<u>Charge</u>
ALTA 2006 EXT. Owners Policy Short Term Rate	TBD	\$0.00	\$0.00

Proposed Insured: Community Partners for Affordable Housing, Inc.

<u>Policy/Endorsement Description</u>	<u>Liability</u>		<u>Charge</u>
ALTA 2006 Ext. Loan Policy Short Term Rate	TBD	\$0.00	\$100.00
OTIRO 209.10 and 222 Commercial		\$100.00	

Proposed Insured: To Follow

Government Service Fee: \$0.00

This is a preliminary billing only, a consolidated statement of charges, credits and advances, if any, in connection with this order will be provided at closing.

3. Title to the land described herein is vested in:

Community Partners for Affordable Housing, an Oregon Non-Profit Public Benefit Corporation

4. The estate or interest in land is:

Fee Simple

5. The land referred to in this report is described as follows:

SEE ATTACHED EXHIBIT "A" ATTACHED HERETO AND MADE A PART HEREOF

EXHIBIT "A"
LEGAL DESCRIPTION

A tract of land in the Southeast one-quarter of Section 35, Township 2 South, Range 1 West of the Willamette Meridian, in the County of Washington and State of Oregon, described as follows:

Beginning at a point which is 295 feet North of the Southwest corner of the Northwest one-quarter of the Southeast one-quarter of said Section 35, Township 2 South, Range 1 West of the Willamette Meridian; thence East 380 feet to a point; thence South 575 feet to a point; thence West to a point in the center of SW Boones Ferry Road (State Highway No. 217); thence in a Northerly direction along the center line of SW Boones Ferry Road to the point of beginning.

EXCEPTING that portion lying within SW Boones Ferry Road (County Road No. 125, 60 feet wide).

FURTHER EXCEPTING THEREFROM that portion described in Dedication Deed to Washington County, a political subdivision of the State of Oregon, recorded September 14, 2012, Recording No. 2012-076374.

SCHEDULE B

GENERAL 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.
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 (of existing improvements located on the subject land onto adjoining land or of existing improvements located on adjoining land onto the subject land), encumbrance, violation, variation, or adverse circumstance affecting the title that would be disclosed by an accurate and complete land survey of the subject 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. Easement, including the terms and provisions thereof:
 - For : Pole Line with Anchors
 - Granted to : The Pacific Telephone and Telegraph Company, a California corporation
 - Recorded : August 14, 1948
 - Recording No(s) : [\(book\) 288 \(page\) 14](#)
 - Affects : a portion of the premises herein
7. Easement, including the terms and provisions thereof:
 - For : Anchor
 - Granted to : Portland General Electric Company, an Oregon corporation
 - Recorded : August 17, 2006
 - Recording No(s) : [2006-098380](#)
 - Affects : see document for location
8. Easement, including the terms and provisions thereof:
 - For : Permanent Utility
 - Granted to : Washington County, a political subdivision of the State of Oregon
 - Recorded : September 14, 2012
 - Recording No(s) : [2012-076374](#)
 - Affects : a strip of land along the Westerly lot line, abutting SW Boones Ferry Road

9. Deed of Trust, Assignment of Leases and Rents, Security Agreement, and Fixture Filing (Pre-Development Loan), including the terms and provisions thereof to secure the amount noted below and other amounts secured thereunder, if any:
- | | | |
|-----------------|---|--|
| Grantor | : | Community Partners for Affordable Housing, an Oregon nonprofit public benefit corporation |
| Trustee | : | First American Title Insurance Company |
| Beneficiary | : | Network for Oregon Affordable Housing (NOAH), an Oregon nonprofit public benefit corporation |
| Dated | : | March 30, 2020 |
| Recorded | : | March 30, 2020 |
| Recording No(s) | : | 2020-026649 |
| Amount | : | \$1,782,500.00 |
10. Any unrecorded leases or rights of tenants in possession.
11. Statutory liens for labor or materials, including liens for contributions due to the State of Oregon for unemployment compensation and for workmen's compensation, which have now gained or hereafter may gain priority over the lien of the insured mortgage where no notice of such liens appear of record.
12. For title insurance purposes in connection with transactions involving real property interests held by non-profit organizations, we will require copies of the following:
- (a) Resolution authorizing the transaction.
 - (c) Minutes of the meeting at which said resolution was passed.
13. This Commitment is subject to approval by personnel of WFG National Title Insurance Company and any additional limitations, requirements or exceptions made by WFG National Title Insurance Company.
14. We are informed that the proposed owner's policy is to be an ALTA Extended Form. Prior to issuing the policy in such form without including the 5 standard pre-printed exceptions contained herein, we will require the following which may result in additional exceptions to the title policy:
- (a) Current ALTA/NSPS survey
 - (b) The ALTA/NSPS survey request must include Standards Table A, Option 11 for location of utilities.
 - (c) A physical inspection of the herein described premises to be made by WFG National Title Insurance Company.
 - (d) An Indemnity Agreement executed by the owners regarding any matters which do not appear as exceptions on this Preliminary Report which the owner has actual knowledge of, including but not limited to, negotiable instruments, taxes and assessments, debts and liens, including statutory liens for labor or materials, including liens for contributions due to the State of Oregon for unemployment compensation and for workmen's compensations and regarding parties in possession or claiming to be in possession, other than the vestees shown herein and unrecorded leaseholds, and security interest in trade fixtures, personal property or unattached improvements.

LINKS FOR ADDITIONAL SUPPORTING DOCUMENTS:

- [Assessor's map](#)
- [Taxes](#)
- [Vested Deed](#)
- [Deed 2012-076374 excepted in legal](#)

END OF EXCEPTIONS

NOTE: We find NO judgments or Federal Tax Liens against the name(s) of Community Partners for Affordable Housing, an Oregon Non-Profit Public Benefit Corporation

NOTE: Taxes paid in full for 2020 -2021:

Levied Amount	:	\$13,358.65
Property ID No.	:	R1136023
Levy Code	:	088.13
Map Tax Lot No.	:	2S135D0-00303

The above taxes include \$3,142.09 for special assessment. Levied taxes for farmland lien.

NOTE: In no event shall WFG National Title Insurance Company have any liability for the tax assessor's imposition of any additional assessments for omitted taxes unless such taxes have been added to the tax roll and constitute liens on the property as of the date of closing. Otherwise, such omitted taxes shall be the sole, joint and several responsibility of seller(s) and buyer(s), as they may determine between themselves.

NOTE: The Oregon Corporation Commission disclosed that [Community Partners for Affordable Housing](#), is an active Oregon non profit public benefit corporation:

Filed : September 25, 1993
President : Judith Werner
Secretary : Marianne Potts
Registered Agent : Rachael Duke

NOTE: The following is incorporated herein for information purposes only and is not part of the exception from coverage (Schedule B-II of the prelim and Schedule B of the policy):The following instrument(s), affecting said property, is (are) the last instrument(s) conveying subject property filed for record within 24 months of the effective date of this preliminary title report:

Warranty Deed

Grantee(s): Community Partners for Affordable Housing, an Oregon Non-Profit Public Benefit Corporation
Grantor(s): Thomas J. Re and Kathryn S. Re, as tenants by the entirety
Recorded Date: March 30, 2020
Recording No: (instrument) 2020-026648, of Official Records
COMMENTS: [2020-026648](#)

NOTE: Due to current conflicts or potential conflicts between state and federal law, which conflicts may extend to local law, regarding marijuana, if the transaction to be insured involves property which is currently used or is to be used in connection with a marijuana enterprise, including but not limited to the cultivation, storage, distribution, transport, manufacture, or sale of marijuana and/or products containing marijuana, the Company declines to close or insure the transaction, and this Preliminary Title Report shall automatically be considered null and void and of no force and effect.

NOTE: The following applicable recording fees will be charged by the county:

Multnomah County-First Page \$86.00
Washington County-First Page \$81.00
Clackamas County-First Page \$93.00
Each Additional Page \$ 5.00
Non-standard Document Fee \$20.00
E-recording Fee \$ 3.00

Washington County Ordinance No. 193, recorded May 13, 1977 in Washington County, Oregon imposes a tax of \$1.00 per \$1,000.00 or fraction thereof on the transfer of real property located within Washington County.

NOTE: IMPORTANT INFORMATION REGARDING PROPERTY TAX PAYMENTS

Fiscal Year: July 1st through June 30th
Taxes become a lien on real property, but are not yet payable. July 1st
Taxes become certified and payable (approximately on this date) October 15th
First one third payment of taxes are due November 15th
Second one third payment of taxes are due February 15th
Final payment of taxes are due May 15th

Discounts: If two thirds are paid by November 15th, a 2% discount will apply.
If the full amount of the taxes are paid by November 15th, a 3% discount will apply.

Interest: Interest accrues as of the 15th of each month based on any amount that is unpaid by the due date.
No interest is charged if the minimum amount is paid according to the above mentioned payment schedule.

NOTE: THE FOLLOWING NOTICE IS REQUIRED BY STATE LAW: YOU WILL BE REVIEWING, APPROVING AND SIGNING IMPORTANT DOCUMENTS AT CLOSING. LEGAL CONSEQUENCES FOLLOW FROM THE SELECTION AND USE OF THESE DOCUMENTS. YOU MAY CONSULT AN ATTORNEY ABOUT THESE DOCUMENTS. YOU SHOULD CONSULT AN ATTORNEY IF YOU HAVE QUESTIONS OR CONCERNS ABOUT THE TRANSACTION OR ABOUT THESE DOCUMENTS. IF YOU WISH TO REVIEW TRANSACTION DOCUMENTS THAT YOU HAVE NOT SEEN, CONTACT THE ESCROW AGENT.

End of Report

Your Escrow Officer

Trevor Cheyne
WFG National Title Insurance Company
25 NW 23rd Place Suite 1 / Commercial Dept
Portland, OR 97210
Phone: **(503) 444-7047**
Fax: **(503) 296-5869**
Email: **TeamTrevor@wfgnationaltitle.com**

Your Title Officer

Diane Brokke
WFG National Title Insurance Company
12909 SW 68th Pkwy., Suite 350
Portland, OR 97223
Phone: **(503) 431-8504**
Fax: **(503) 684-2978**
Email: **dbrokke@wfgnationaltitle.com**



After recording return to:
Community Partners for Affordable
Housing
PO Box 23206
Tigard, OR 97281

Until a change is requested all tax
statements shall be sent to the
following address:
Community Partners for Affordable
Housing
PO Box 23206
Tigard, OR 97281

File No.: 7013-3372515 (as)
Date: December 22, 2019

Washington County, Oregon **2020-026648**
D-DW
Stn=4 A STROM **03/30/2020 02:12:24 PM**
\$15.00 \$11.00 \$5.00 \$60.00 \$2,320.00 **\$2,411.00**

I, Margaret Garza, Interim Director of Assessment and Taxation and
Ex-Officio County Clerk for Washington County, Oregon, do hereby
certify that the within Instrument of writing was received and
recorded in the book of records of said county.

Margaret Garza, Interim Director of
Assessment and Taxation, Ex-Officio

THIS SPACE RESE

STATUTORY WARRANTY DEED

Thomas J. Re and Kathryn S. Re, as tenants by the entirety, Grantor, conveys and warrants to
**Community Partners for Affordable Housing, an Oregon Non-Profit Public Benefit
Corporation**, Grantee, the following described real property free of liens and encumbrances, except as
specifically set forth herein:

See Legal Description attached hereto as Exhibit A and by this reference incorporated herein.

Subject to:

1. Covenants, conditions, restrictions and/or easements, if any, affecting title, which may appear in the public record, including those shown on any recorded plat or survey.

The true consideration for this conveyance is **\$2,320,000.00**. (Here comply with requirements of ORS 93.030)

FIRST AMERICAN 3372515-44W



After recording return to:
Community Partners for Affordable
Housing
PO Box 23206
Tigard, OR 97281

Until a change is requested all tax
statements shall be sent to the
following address:
Community Partners for Affordable
Housing
PO Box 23206
Tigard, OR 97281

File No.: 7013-3372515 (as)
Date: December 22, 2019

THIS SPACE RESERVED FOR RECORDER'S USE

STATUTORY WARRANTY DEED

Thomas J. Re and Kathryn S. Re, as tenants by the entirety, Grantor, conveys and warrants to **Community Partners for Affordable Housing, an Oregon Non-Profit Public Benefit Corporation**, Grantee, the following described real property free of liens and encumbrances, except as specifically set forth herein:

See Legal Description attached hereto as Exhibit A and by this reference incorporated herein.

Subject to:

1. Covenants, conditions, restrictions and/or easements, if any, affecting title, which may appear in the public record, including those shown on any recorded plat or survey.

The true consideration for this conveyance is **\$2,320,000.00**. (Here comply with requirements of ORS 93.030)

FIRST AMERICAN 3372515-HW

BEFORE SIGNING OR ACCEPTING THIS INSTRUMENT, THE PERSON TRANSFERRING FEE TITLE SHOULD INQUIRE ABOUT THE PERSON'S RIGHTS, IF ANY, UNDER ORS 195.300, 195.301 AND 195.305 TO 195.336 AND SECTIONS 5 TO 11, CHAPTER 424, OREGON LAWS 2007, SECTIONS 2 TO 9 AND 17, CHAPTER 855, OREGON LAWS 2009, AND SECTIONS 2 TO 7, CHAPTER 8, OREGON LAWS 2010. THIS INSTRUMENT DOES NOT ALLOW USE OF THE PROPERTY DESCRIBED IN THIS INSTRUMENT IN VIOLATION OF APPLICABLE LAND USE LAWS AND REGULATIONS. BEFORE SIGNING OR ACCEPTING THIS INSTRUMENT, THE PERSON ACQUIRING FEE TITLE TO THE PROPERTY SHOULD CHECK WITH THE APPROPRIATE CITY OR COUNTY PLANNING DEPARTMENT TO VERIFY THAT THE UNIT OF LAND BEING TRANSFERRED IS A LAWFULLY ESTABLISHED LOT OR PARCEL, AS DEFINED IN ORS 92.010 OR 215.010, TO VERIFY THE APPROVED USES OF THE LOT OR PARCEL, TO DETERMINE ANY LIMITS ON LAWSUITS AGAINST FARMING OR FOREST PRACTICES, AS DEFINED IN ORS 30.930, AND TO INQUIRE ABOUT THE RIGHTS OF NEIGHBORING PROPERTY OWNERS, IF ANY, UNDER ORS 195.300, 195.301 AND 195.305 TO 195.336 AND SECTIONS 5 TO 11, CHAPTER 424, OREGON LAWS 2007, SECTIONS 2 TO 9 AND 17, CHAPTER 855, OREGON LAWS 2009, AND SECTIONS 2 TO 7, CHAPTER 8, OREGON LAWS 2010.

Dated this 27th day of MARCH, 2020.

[Signature]
Thomas J. Re

[Signature]
Kathryn S. Re

STATE OF Oregon)
County of Multnomah)ss.
)

This instrument was acknowledged before me on this 27th day of March, 2020
by **Thomas J. Re and Kathryn S. Re.**



[Signature]
Notary Public for Oregon
My commission expires: 8-11-23

APN: R1136023

Statutory Warranty Deed
- continued

File No.: 7013-3372515 (as)

EXHIBIT A

LEGAL DESCRIPTION: Real property in the County of Washington, State of Oregon, described as follows:

Beginning at a point which is 295 feet North of the Southwest corner of the Northwest one-quarter of the Southeast one-quarter of Section 35, Township 2 South, Range 1 West of the Willamette Meridian, in the County of Washington and State of Oregon; thence East 380 feet to a point; thence South 575 feet to a point; thence West to a point in the center of SW Boones Ferry Road (State Highway No. 217); thence in a Northerly direction along the center line of SW Boones Ferry Road to the point of beginning.

Excepting therefrom that portion conveyed to the Washington County, a political subdivision of the State of Oregon as disclosed in Dedication Deed recorded September 14, 2012 as Fee No. 2012 076374.

NOTE: This legal description was created prior to January 1, 2008.



FIRE CODE / LAND USE / BUILDING REVIEW APPLICATION

North Operating Center
 11945 SW 70th Avenue
 Tigard, OR 97223
 Phone: 503-649-8577

South Operating Center
 8445 SW Elligsen Rd
 Wilsonville, OR 97070
 Phone: 503-649-8577

REV 6-30-20

Project Information

Applicant Name: Jilian Saurage Felton
 Address: 6380 SW Capitol Hwy, #151, Portland, OR 97239
 Phone: (503) 293-4038
 Email: jsaurage@cpahoregon.org
 Site Address: 23500 & 23550 SW Boones Ferry Road
 City: Tualatin
 Map & Tax Lot #: 303
 Business Name: Community Partners for Affordable Housing
 Land Use/Building Jurisdiction: City of Tualatin
 Land Use/ Building Permit # VAR21-0003

Choose from: Beaverton, Tigard, Newberg, Tualatin North Plains, West Linn, Wilsonville, Sherwood, Rivergrove, Durham, King City, Washington County, Clackamas County, Multnomah County, Yamhill County

Project Description

Plambeck Gardens is an multifamily affordable housing project that will provide 116 new affordable units in the City of Tualatin. The project consists of two 4-story residential buildings and one 1-story community building for residents with three garages on site. The site will have one site access point along Boones Ferry Road on the northern end of the property and a second emergency access only point along Boones Ferry Road on the southern end of the site.

The project shows a future site access point to the south that will connect to the Autumn Sunrise development across the Horizon Community Church property. This future site access point will replace the northern site access point along Boones Ferry Road as the sole primary access to the site, as Washington County will require that connection be removed when the future access point can be established. The time line for this change is dependent on if and when the church decides to develop on their property, or grants an easement to the Plambeck Gardens project. There is no indication yet that an easement will be granted and the team is not aware of Horizon's development time line.

Permit/Review Type (check one):

Land Use / Building Review - Service Provider Permit
 Emergency Radio Responder Coverage Install/Test
 LPG Tank (Greater than 2,000 gallons)
 Flammable or Combustible Liquid Tank Installation (Greater than 1,000 gallons)
 * Exception: Underground Storage Tanks (UST) are deferred to DEQ for regulation.
 Explosives Blasting (Blasting plan is required)
 Exterior Toxic, Pyrophoric or Corrosive Gas Installation (in excess of 810 cu.ft.)
 Tents or Temporary Membrane Structures (in excess of 10,000 square feet)
 Temporary Haunted House or similar
 OLCC Cannabis Extraction License Review
 Ceremonial Fire or Bonfire (For gathering, ceremony or other assembly)

For Fire Marshal's Office Use Only

TVFR Permit # 2021-0095
 Permit Type: CPP
 Submittal Date: 09/14/2021
 Assigned To: MOONEY/DEBOIS
 Due Date: 03/09/2022
 Fees Due: TBD
 Fees Paid: PENDING/TBD

Approval/Inspection Conditions
 (For Fire Marshal's Office Use Only)

<p>This section is for application approval only</p> <p><u>DREW DEBOIS</u> <u>03/09/2021</u> Fire Marshal or Designee Date</p> <p>Conditions: <u>REVISION TO PREVIOUSLY APPROVED PROJECT. SEE PER REVIEW LETTER FROM DFM MOONEY DATED 09/2021 ERAS OR METAL SYSTEM REQUIRING</u></p> <p>See Attached Conditions: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Site Inspection Required: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p>	<p>This section used when site inspection is required</p> <p>Inspection Comments:</p> <p>Final TVFR Approval Signature & Emp ID _____ Date _____</p>
---	---

PRELIMINARY
NOT FOR
CONSTRUCTION

CARLETON HART ARCHITECTURE P.C.
930 SW 10th Avenue #200 Portland, OR 97205
503.243.2392 | www.carletonhart.com

PLAMBECK GARDENS
COMMUNITY PARTNERS FOR AFFORDABLE HOUSING
23500 & 23550 SW BOONES FERRY ROAD
TUALATIN, OREGON 97062
TVFR SUBMITTAL

SITE PLAN -
ARCHITECTURAL
PROJECT NO.
#19031
03.03.2022

REVISIONS:

FS-1

GENERAL NOTES:

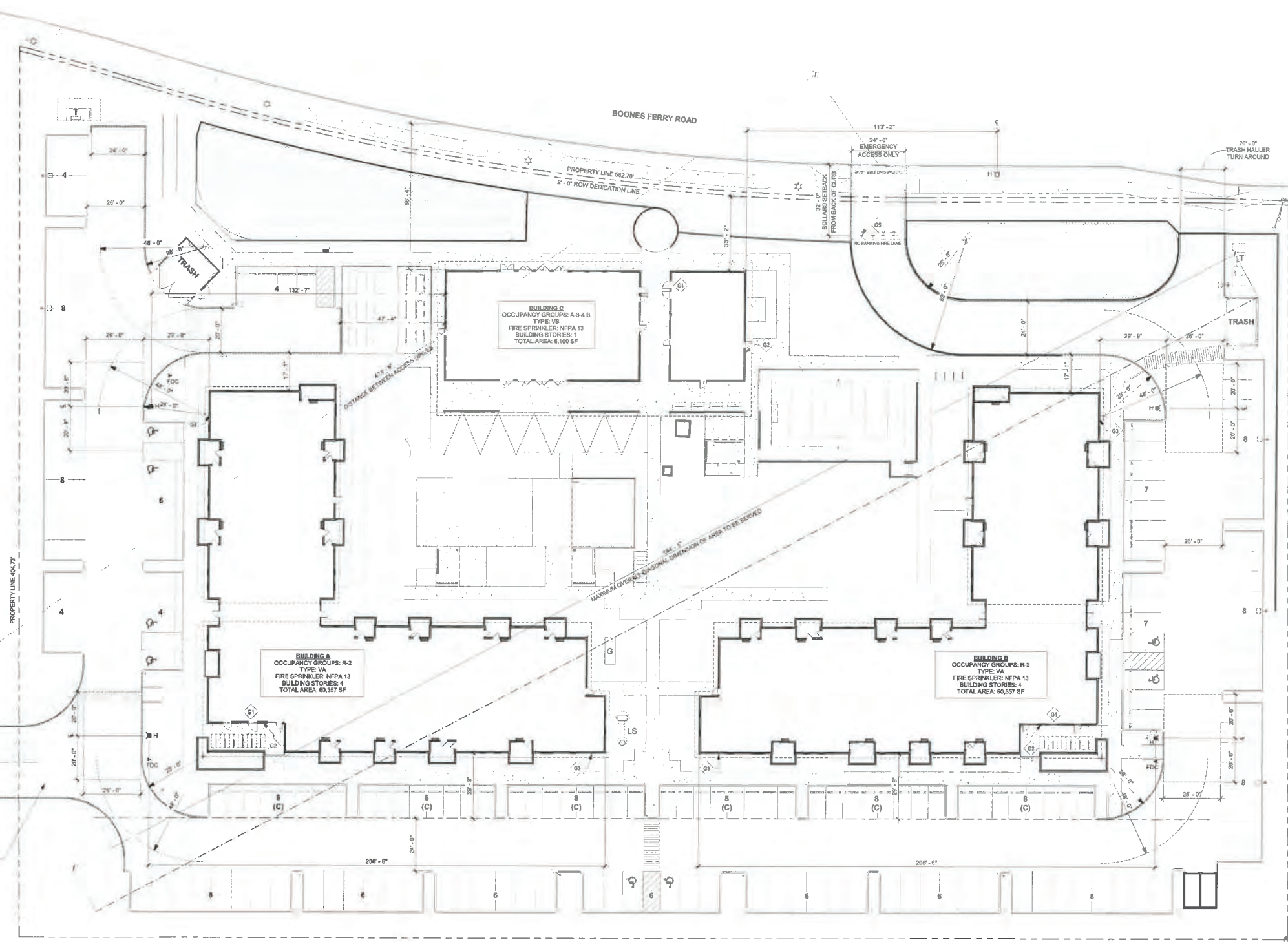
- A. EMERGENCY RESPONDER RADIO SYSTEM WILL BE A DEFERRED APPROVAL.

KEYNOTES:

- G1 FIRE RISER ROOM
- G2 PROPOSED FIRE DEPARTMENT KNOX BOX LOCATION
- G3 PROPOSED BUILDING SIGNAGE LOCATION
- G5 WRENCH OPERATED REMOVABLE BOLLARD - SAFETY YELLOW

LEGEND:

- PATH OF EGRESS OR EXIT DISCHARGE
- PROPERTY LINE
- IMAGINARY LOT LINE BETWEEN BUILDINGS TO DETERMINE PSD
- OUTLINE OF BUILDING ROOF ABOVE
- PAVING STRIPING & MARKED "NO PARKING FIRE LANE" PER TVFR - RED STRIPING & WHITE LETTERING
- CURBS - PAINTED RED & MARKED "NO PARKING FIRE LANE" PER TVFR
- HCI NEW PUBLIC FIRE HYDRANT - REFER TO CIVIL
- HE NEW PRIVATE FIRE HYDRANT - REFER TO CIVIL
- FDC FIRE DEPARTMENT CONNECTION
- T TRANSFORMER
- G GENERATOR
- LS LIFT STATION



TVFR - FLS SITE PLAN
SCALE: 1" = 20'-0"

TUALATIN VALLEY FIRE & RESCUE
APPROVED

CONDITIONALLY APPROVED

APPROVAL OF PLANS IS NOT AN APPROVAL OF OMISSIONS OR OVERSIGHTS.

SEE ATTACHED LETTER

PLANS EXAMINER

DATE

DATE: 03/01/2022
BY: DEBORAH DEMICHELI
PER: PERMITS #2021-0095

COPYRIGHT - CARLETON HART ARCHITECTURE P.C. ALL RIGHTS RESERVED. PHOTO BY PERMITS



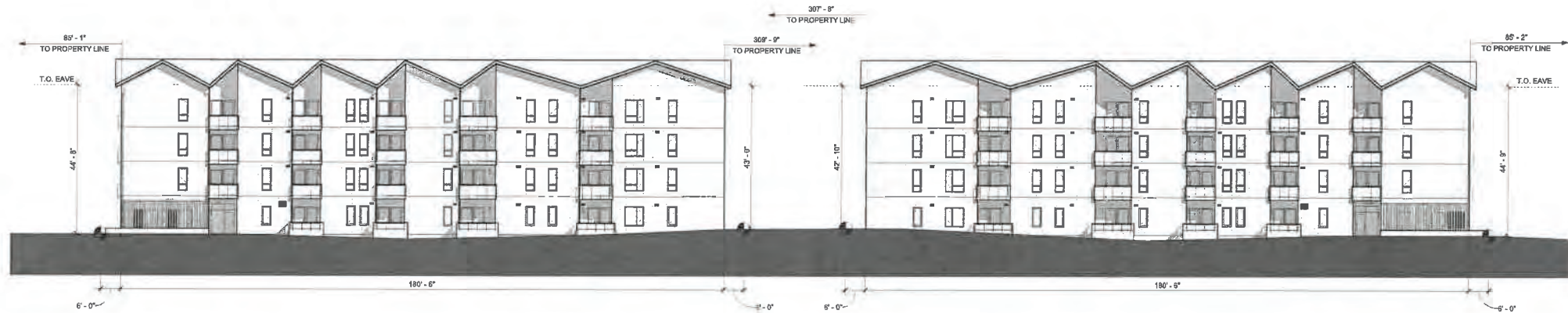
CARLETON HART ARCHITECTURE P.C.
830 SW 10th Avenue #200 Portland Oregon 97205
503 243 2452 | www.carletonhart.com



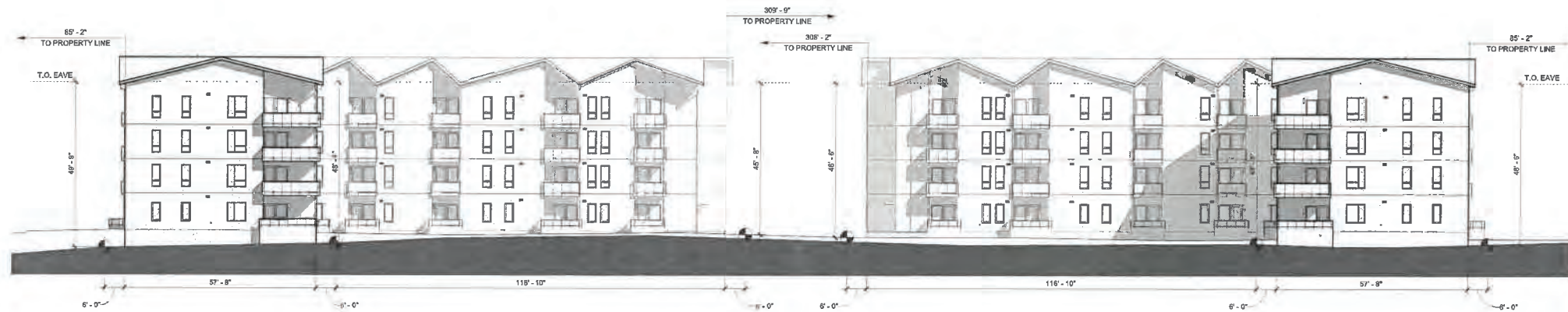
3 SOUTH ELEVATION - BUILDING A
SCALE: 1/16" = 1'-0"



4 NORTH ELEVATION - BUILDING B
SCALE: 1/16" = 1'-0"



1 EAST ELEVATION - BUILDINGS A & B
SCALE: 1/16" = 1'-0"



2 WEST ELEVATION - BUILDINGS A & B
SCALE: 1/16" = 1'-0"

PLAMBECK GARDENS
COMMUNITY PARTNERS FOR AFFORDABLE HOUSING
23500 & 23550 SW BOONES FERRY ROAD
TUALATIN, OREGON 97062
TVFR SUBMITTAL

BUILDING ELEVATIONS

PROJECT NO.
#19031

02.24.2022

REVISIONS:

COPYRIGHT: CARLETON HART ARCHITECTURE, INC. ALL RIGHTS RESERVED. WITHOUT PERMISSION

TUALATIN VALLEY FIRE & RESCUE
APPROVED _____
CONDITIONALLY APPROVED _____
APPROVAL OF PLANS IS NOT AN APPROVAL OF
OMISSIONS OR OVERSIGHTS.
SEE ATTACHED LETTER _____
PLANS EXAMINER _____ DATE 03/03/2022
DAVE DEBOIS DEM1 OFI
TFR PERMIT # 2021-0095

SENSITIVE AREA PRE-SCREENING SITE ASSESSMENT

Clean Water Services File Number

21-002248

1. **Jurisdiction:** Tualatin

2. **Property Information** (example: 1S234AB01400)

Tax lot ID(s): _____
2S135 D 00303

OR Site Address: 23500, 23550 SW Boones Ferry Road

City, State, Zip: Tualatin, OR, 97062

Nearest cross street: SW Norwood Road is 1000 feet north of the project site

3. **Owner Information**

Name: Jillian Saurage Felton

Company: Community Partners for Affordable Housing Inc. (CPAH)

Address: PO Box 23206

City, State, Zip: Tigard, OR, 97281

Phone/fax: 503-293-4038 ext 302

Email: jsaurage@cpahoregon.org

4. **Development Activity** (check **all** that apply)

- Addition to single family residence (rooms, deck, garage)
 Lot line adjustment Minor land partition
 Residential condominium Commercial condominium
 Residential subdivision Commercial subdivision
 Single lot commercial Multi lot commercial
 Other Two 4-story apartment buildings & community bdg

4. **Applicant Information**

Name: Kimberly Shera

Company: Vega Civil Engineering

Address: 1300 SE Stark Street #201

City, State, Zip: Portland, OR, 97214

Phone/fax: 9712667574

Email: kim@vegacivil.com

6. **Will the project involve any off-site work?** Yes No Unknown

Location and description of off-site work: _____

7. **Additional comments or information that may be needed to understand your project:** _____

Project is also required to meet HUD Funding requirements

This application does NOT replace Grading and Erosion Control Permits, Connection Permits, Building Permits, Site Development Permits, DEQ 1200-C Permit or other permits as issued by the Department of Environmental Quality, Department of State Lands and/or Department of the Army COE. All required permits and approvals must be obtained and completed under applicable local, state, and federal law.

By signing this form, the Owner or Owner's authorized agent or representative, acknowledges and agrees that employees of Clean Water Services have authority to enter the project site at all reasonable times for the purpose of inspecting project site conditions and gathering information related to the project site. I certify that I am familiar with the information contained in this document, and to the best of my knowledge and belief, this information is true, complete, and accurate.

Print/type name Kimberly Shera

Print/type title civil engineer

Signature ONLINE SUBMITTAL

Date 7/26/2021

FOR DISTRICT USE ONLY

- Sensitive areas potentially exist on site or within 200' of the site. **THE APPLICANT MUST PERFORM A SITE ASSESSMENT PRIOR TO ISSUANCE OF A SERVICE PROVIDER LETTER.** If Sensitive Areas exist on the site or within 200 feet on adjacent properties, a Natural Resources Assessment Report may also be required.
- Based on review of the submitted materials and best available information sensitive areas do not appear to exist on site or within 200' of the site. This Sensitive Area Pre-Screening Site Assessment does NOT eliminate the need to evaluate and protect water quality sensitive areas if they are subsequently discovered. This document will serve as your Service Provider Letter as required by Resolution and Order 19-5, Section 3.02.1, as amended by Resolution and Order 19-22. All required permits and approvals must be obtained and completed under applicable local, State and federal law.
- Based on review of the submitted materials and best available information the above referenced project will not significantly impact the existing or potentially sensitive area(s) found near the site. This Sensitive Area Pre-Screening Site Assessment does NOT eliminate the need to evaluate and protect additional water quality sensitive areas if they are subsequently discovered. This document will serve as your Service Provider Letter as required by Resolution and Order 19-5, Section 3.02.1, as amended by Resolution and Order 19-22. All required permits and approvals must be obtained and completed under applicable local, state and federal law.
- THIS SERVICE PROVIDER LETTER IS NOT VALID UNLESS _____ CWS APPROVED SITE PLAN(S) ARE ATTACHED.**
- The proposed activity does not meet the definition of development or the lot was platted after 9/9/95 ORS 92.040(2). **NO SITE ASSESSMENT OR SERVICE PROVIDER LETTER IS REQUIRED.**

Reviewed by Stacy Benjamin

Date 9/7/2021

Once complete, email to: SPLReview@cleanwaterservices.org • Fax: (503) 681-4439

OR mail to: SPL Review, Clean Water Services, 2550 SW Hillsboro Highway, Hillsboro, Oregon 97123



March 29, 2022

Kayla Zander
Carleton Hart Architecture
Re: Plambeck Gardens
23500 SW Boones Ferry Rd.
Tualatin, OR 97062

Dear Kayla,

Thank you, for sending us the preliminary site plans for this proposed development in Tualatin OR.

My Company: Republic Services of Clackamas and Washington Counties has the franchise agreement to service this area with the City of Tualatin. We will provide complete commercial waste removal and recycling services as needed on a weekly basis for this location.

We have reviewed the planned site access and the locations of two trash and recycle enclosures for this development and the planned traffic pattern for our trucks to service the enclosures (attached). Both enclosure approaches and turn-around spaces provided is adequate for our trucks to safely service.

The two enclosures with dimensions of 20' ft. wide X 10' ft. deep with double gates that will open 180 degrees and equipped with cane bolts to hold the gates in the open and closed position are adequate to house our equipment and for our trucks to safely service. The approach and transition from driveway to enclosure surface is adequate for our trucks to service both enclosures.

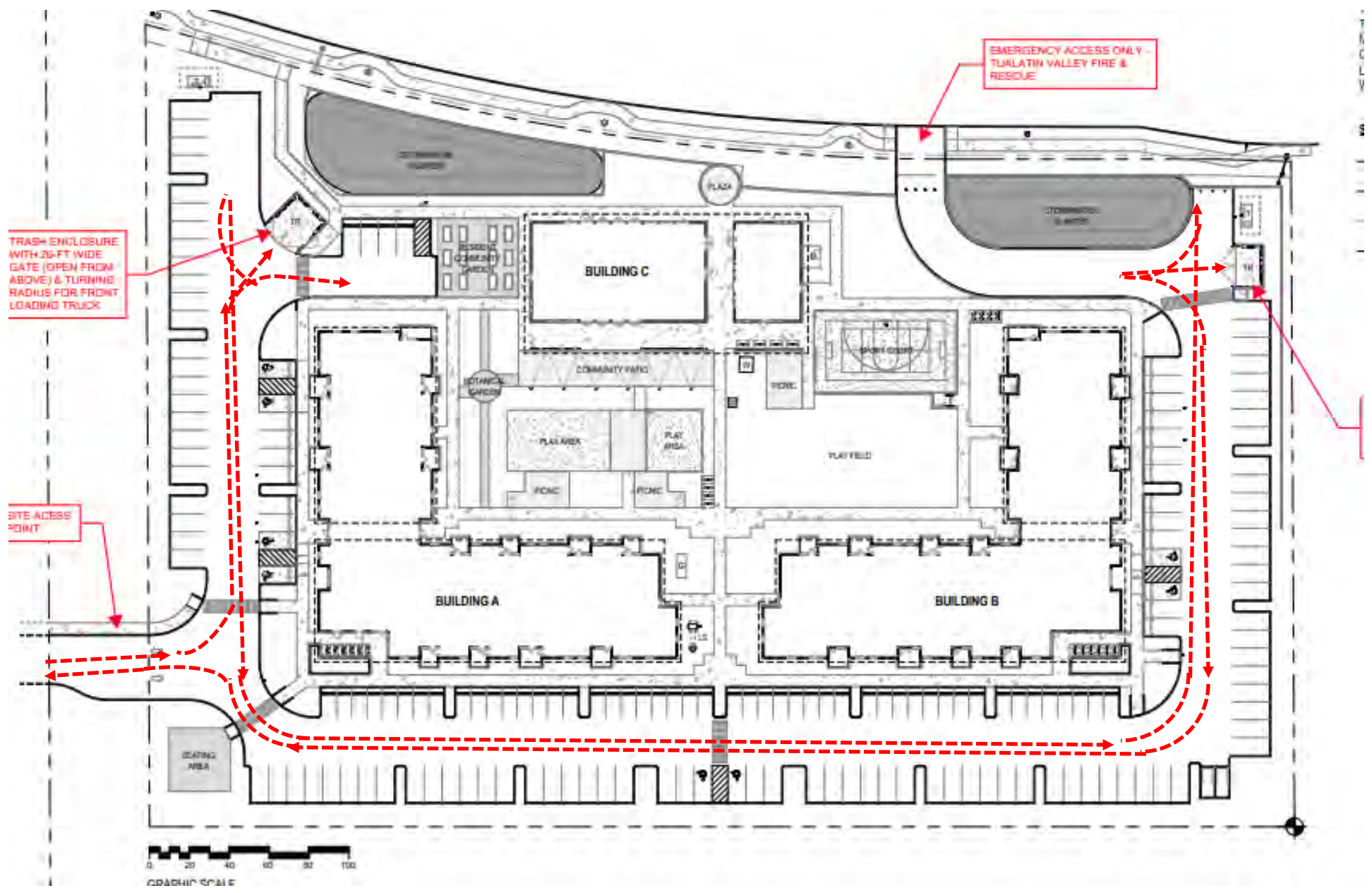
Trash service is available for this location Monday through Saturday. Recycle service is available Monday through Friday and both should be adequate for this site.

Thanks Kayla, for your help and concerns for our services prior to this project being developed.

Sincerely,

A handwritten signature in blue ink, appearing to read "Kelly Herrod", written over a light blue horizontal line.

Kelly Herrod
Operations Supervisor
Republic Services Inc.





Portland General Electric Company
2213 Southwest 153rd Drive • Beaverton, OR 97006

April 11, 2022

Company: Carleton Hart Architecture
ATTN: Attn Kayla Zander
23500 SW Boones Ferry Rd.
Tualatin, Or.
97062

Re: M3086677 for 2000amp & 2500amp 120/208v underground 3 phase service to 2 multi-unit residential buildings.

Dear Kayla:

I'm writing to you with regard to the Plambeck Gardens apartments project; specifically, the frontage improvements. The three poles on the project frontage are structural in nature, and I'll describe their individual roles below. The pole at the north end of the frontage, (PL-2978) directly supports our mainline/"feeder" where it comes across Boones Ferry Rd and continues north.

The pole in the middle of the frontage, (PL-1804) appears to be a simple 'clearance pole, supporting the overhead service drops to the 2 existing buildings that will be demolished for the project, but on closer inspection, also functions as a fulcrum to support the tapline extending west from our mainline pole on the west side of Boones Ferry Rd. PL-1804 can be removed relatively easily, but must be replaced on the west side of Boones Ferry (west of the mainline) in order to support the weight/tension of the overhead facilities extending west onto address 23465 SW Boones Ferry.

The pole at the south end of the frontage, (PL-18), performs a similar function to PL-1804, but it supports the angle in the mainline on the west side of Boones Ferry, rather than a tapline extending west of the mainline. In order to remove PL-18, we'd need to either find another structural way to support that angle in right of way, which could include a self-supporting steel pole (18month+ lead time and \$\$\$), or the project acquiring/obtaining easement from the properties on the west side of Boones Ferry for us to realign the mainline to eliminate the angle(s).

PGE *could* design to underground the project frontage (at the project's expense), but where the mainline circuit transitions underground or back to overhead, our requirement is 2 poles for each transition for redundancy & reliability, so it would actually take the installation of 5 poles to remove 3.

Please let me know if that all makes sense. I'd be happy to have a virtual-, or onsite meeting if you'd like to discuss further.

If there will be street lights required for this project, please contact our Service Coordinators at Service.Coordinators@pgn.com or 503 323 6700 and reference M3086677. They'll duplicate that work order to the correct format for the lighting design.

If you have any questions, please contact me at Henry.English@pgn.com or 503 672 5489.

Sincerely,

Hap English
Portland General Electric Company
Service and Design Project Manager
503-672-5489



NOTICE OF ADOPTION

On November 18, 2021 the City of Tualatin’s Planning Commission adopted a written order approving File No. VAR 21-0003 to grant a Variance request related to the maximum structure height standard in the High Density Residential (RH) zone and to the minimum parking requirements for multi-family dwellings in complexes with private internal driveways at 23500 & 23550 SW Boones Ferry Rd.

Summary of proposal:

The Planning Commission has approved the Variance request for the future multi-family development with the following Conditions of Approval:

- VAR-1** Development of the proposed 116-unit multi-family project will require submittal and approval of an Architectural Review (Type III) application, in accordance with TDC 33.020(3)(d)(iii).
- VAR-2** Modification to this approval will require submittal and approval of a new Type III Variance application in accordance with TDC.
- VAR-3** Structure height for proposed 116-unit multi-family project shall not be more than 54 feet in as measured in TDC 31.060.
- VAR-4** A minimum of 170 vehicle parking spaces shall be provided for the proposed 116-unit multi-family project.

A copy of the written order and findings is available for review at the following location:

<https://www.tualatinoregon.gov/planning/var-21-0003-plambeck-gardens-variance-building-height-and-parking-standards>

The applicant or any person who submitted written comments or testified orally at the Tualatin Planning Commission hearing and who may be adversely affected by the Commission's decision may file a request for review of the final decision of the Variance request to the City Council.

The Tualatin Planning Commission’s decision will be final after 14 calendar days from the mailing of this order, unless a written appeal is received by the Community Development Department, Planning Division at: planning@tualatin.gov, before 5:00 p.m., December 6, 2021. The appeal must be submitted on the City appeal form with all the information requested provided thereon and signed by the appellant. The record and appeal forms are available at the Planning Division offices. The appeal forms must include reasons and the applicable appeal fee and meet the requirements of Section 32.310 of the Tualatin Development Code. The City Council will review and make a decision. The parties will be notified of the Council meeting date.

Date posted: November 22, 2021

CERTIFICATION OF SIGN POSTING



The applicant must provide and post a sign pursuant to Tualatin Development Code (TDC 32.150). The block around the word "NOTICE" must remain yellow composed of the RGB color values Red 255, Green 255, and Blue 0. A template is available at:

<https://www.tualatinoregon.gov/planning/land-use-application-sign-templates>

NOTE: For larger projects, the Community Development Department may require the posting of additional signs in conspicuous locations.

As the applicant for the Plambeck Gardens project,
I hereby certify that on this day, April 21st, 2022 sign(s) was/were posted on the subject property in
accordance with the requirements of the Tualatin Development Code and the Community Development Division.

Applicant's Name: Jilian Saurage Felton, Housing Director, CPAH

(Please Print)

Applicant's Signature: 

Date: 4/25/2022

AFFIDAVIT OF MAILING NOTICE

STATE OF OREGON)
) SS
COUNTY OF ~~WASHINGTON~~) MULTNOMAH

I, Geoffrey M. Taylor being first duly sworn, depose and say:

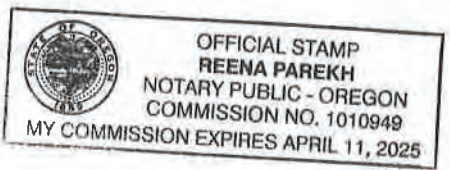
That on the 28th day of July, 2021, I served upon the persons shown on Exhibit "A" (Mailing Area List), attached hereto and by this reference incorporated herein, a copy of the Notice of Neighborhood/Developer Meeting marked Exhibit "B," attached hereto and by this reference incorporated herein, by mailing to them a true and correct copy of the original hereof. I further certify that the addresses shown on said Exhibit "A" are their regular addresses as determined from the books and records of the Washington County and/or Clackamas County Departments of Assessment and Taxation Tax Rolls, and that said envelopes were placed in the United States Mail with postage fully prepared thereon.

Geoffrey M. Taylor
Signature

SUBSCRIBED AND SWORN to before me this 1st day of September, 2021.

Reena Parekh
Notary Public for Oregon
My commission expires: APRIL 11, 2025

RE: Plambeck





NEIGHBORHOOD MEETING MAILING LIST – PROVIDED BY CITY OF TUALATIN

TLID	Owner	Owner Address	Owner City	Owner State	Owner Zip
2S135D000102	Diane M & Gannett Tod C Yackley	23240 Sw Boones Ferry Rd	Tualatin	OR	97062
2S135D000108	Tom K Williams	9300 Sw Norwood Rd	Tualatin	OR	97062
2S135CA00200	John V Trust Venables	6140 Sw Boundary St Apt 145	Portland	OR	97221
2S135D000107	City Of Tualatin	18880 Sw Martinazzi Ave	Tualatin	OR	97062
2S135D000109	Tualatin Hills Christian Church Inc	23050 Sw Boones Ferry Rd	Tualatin	OR	97062
3S102B000104	Scott A & Lisa G Shamburg	Po Box 829	Tualatin	OR	97062
2S135CA00600	Shawn O Riley	23365 Sw Boones Ferry Rd	Tualatin	OR	97062
2S135CA00700	Dylan D & Michelle P Potter	23405 Sw Boones Ferry Rd	Tualatin	OR	97062
2S135D000100	P3 Properties Llc	Po Box 691	White Salmon	WA	98672
2S135CA00800	Mcleod Trust	23465 Sw Boones Ferry Rd	Tualatin	OR	97062
2S135CD00400	Marvin R & Jeli Carlene Mast	23845 Sw Boones Ferry Rd	Tualatin	OR	97062
2S135CD00302	John W & Grace N Lucini Fam Trust	23677 Sw Boones Ferry Rd	Tualatin	OR	97062
2S135CA00300	Ledoux Family Trust	23155 Sw Boones Ferry Rd	Tualatin	OR	97062
2S135CD00200	Ronald A & Rebecca A Kimmel	23605 Sw Boones Ferry Rd	Tualatin	OR	97062
2S135D000106	Horizon Community Church	Po Box 2690	Tualatin	OR	97062
2S135CD00500	Todd J & Hickok Molly J Hickok	23855 Sw Boones Ferry Rd	Tualatin	OR	97062
2S135CA00100	Daniel M Helms	23035 Sw Boones Ferry Rd	Tualatin	OR	97062
2S135D000303	Community Partners For Affordable Housing	Po Box 23206	Tigard	OR	97281
2S135D000101	Kurt C & Tara Clark	3539 Dianna Way	Wenatchee	WA	98801
3S102AB00100	John & Chamberlain Debra Chamberlain	9000 Sw Greenhill Ln	Tualatin	OR	97062
2S135CA00400	James A & Julia A Bocci	23205 Sw Boones Ferry Rd	Tualatin	OR	97062
2S135CA00500	Christine Lee & John Joseph Bazant	36449 Hwy 34	Lebanon	OR	97355
2S135D000400	Autumn Sunrise Llc	485 S State St	Lake Oswego	OR	97034
2S135CD00100	Randall & Karen Alvstad	23515 Sw Boones Ferry Rd	Tualatin	OR	97062
2S135CD00300	Mehdi Aghazadeh-Sanaei & Nahid Asiaee	23745 Sw Boones Ferry Rd	Tualatin	OR	97062

July 27th, 2021

RE: Land Use Variance for 23500 SW Boones Ferry Road

Dear Property Owner:

You are cordially invited to attend a meeting on **August 11th, 2021 at 6:30pm** and via Microsoft Teams, with the URL for the meeting below. This meeting shall be held to discuss a proposed project located at 23500 SW Boones Ferry Road, Tualatin Oregon, 97062. The proposal is to request a variance for increase of structure height and parking reduction as part of the project's land use application. A call-in option is also available at 323-484-2116 with the conference ID 236 450 759# .

This is an informational meeting to share the development proposal with interested neighbors. You will have the opportunity to review preliminary plans and identify topics of interest or consideration by contacting me at the phone, email, or address below.

A previous version of this letter had a typo which stated the incorrect date of the meeting.

Regards,



Jilian Saurage Felton
Director of Housing Development
Community Partners for Affordable Housing
PO Box 23206
Tigard, OR 97281-3206
503-293-4038 x302
jsaurage@cpahoregon.org
URL for meeting

https://teams.microsoft.com/l/meetup-join/19%3ameeting_MWNIMmQyYzYtOGVIZC00NGZhLWlxMzltNTg0Y2QyZjM0OWU1%40thread.v2/0?context=%7b%22tid%22%3a%227bb8306d-7dd3-4968-bafd-8070ed4af3a3%22%2c%22oid%22%3a%2279cc59f2-1182-4864-82c2-dc736e7afe84%22%7d

a link may also be found at

<https://www.tualatinoregon.gov/planning/neighborhood-developer-meetings>

cc: lhagerman@tualatin.gov ; Tualatin Community Development Department
eengman@tualatin.gov ; Tualatin Planning Department

Kayla Zander

From: Jilian Saurage Felton <jsaurage@cpahoregon.org>
Sent: Tuesday, July 27, 2021 2:31 PM
To: Erin Engman; Kayla Zander; Lindsey Hagerman; Melissa Soots; Geoffrey Taylor
Cc: Sheri_Esser@outlook.com; stan.jernberg@outlook.com; dan@danhardyproperties.com; hgeorge@gmail.com; doug_ulmer@comcast.net; Jeanine@julianafamily.com; martinazziwoodscio@gmail.com; delmoore@frontier.com; jeremiah.baldwin@lamresearch.com; ardyth@comcast.net; janet7531@gmail.com; edkcnw@comcast.net; partricia.parsons@ctt.com; jmakarowsky@comcast.net; pdxalex@icloud.com; robikelly@earthlink.net; mwestenhaver@hotmail.com; deb.fant@gmail.com; scottm@capacitycommercial.com
Subject: Notice of Neighborhood Developer Meeting to Tualatin CIO

RE: Land Use Variance for 23500 SW Boones Ferry Road
Dear CIO Officers:

You are cordially invited to attend a meeting on July 23rd, 2021 at 6:30pm and via Microsoft Teams, with the URL for the meeting below. This meeting shall be held to discuss a proposed project located at 23500 SW Boones Ferry Road, Tualatin Oregon, 97062. The proposal is to request a variance for increase of structure height and parking reduction as part of the project's land use application. A call-in option is also available at 323-484-2116 with the conference ID 236 450 759# .

This is an informational meeting to share the development proposal with interested neighbors. You will have the opportunity to review preliminary plans and identify topics of interest or consideration by contacting me at the phone, email, or address below.

Regards,

[Click here to join the meeting](#)

A link may also be found at <https://www.tualatinoregon.gov/planning/neighborhood-developer-meetings>

cc: lhagerman@tualatin.gov ; Tualatin Community Development Department
eengman@tualatin.gov ; Tualatin Planning Department

Jilian Saurage Felton

Housing Director

Community Partners for Affordable Housing, Inc. (CPAH)
503-293-4038 ext. 302 phone / 503-293-4039 fax
jsaurage@cpahoregon.org PLEASE NOTE NEW EMAIL ADDRESS
www.cpahoregon.org
Pronouns: she/her



P Please consider the environment before printing this e-mail.

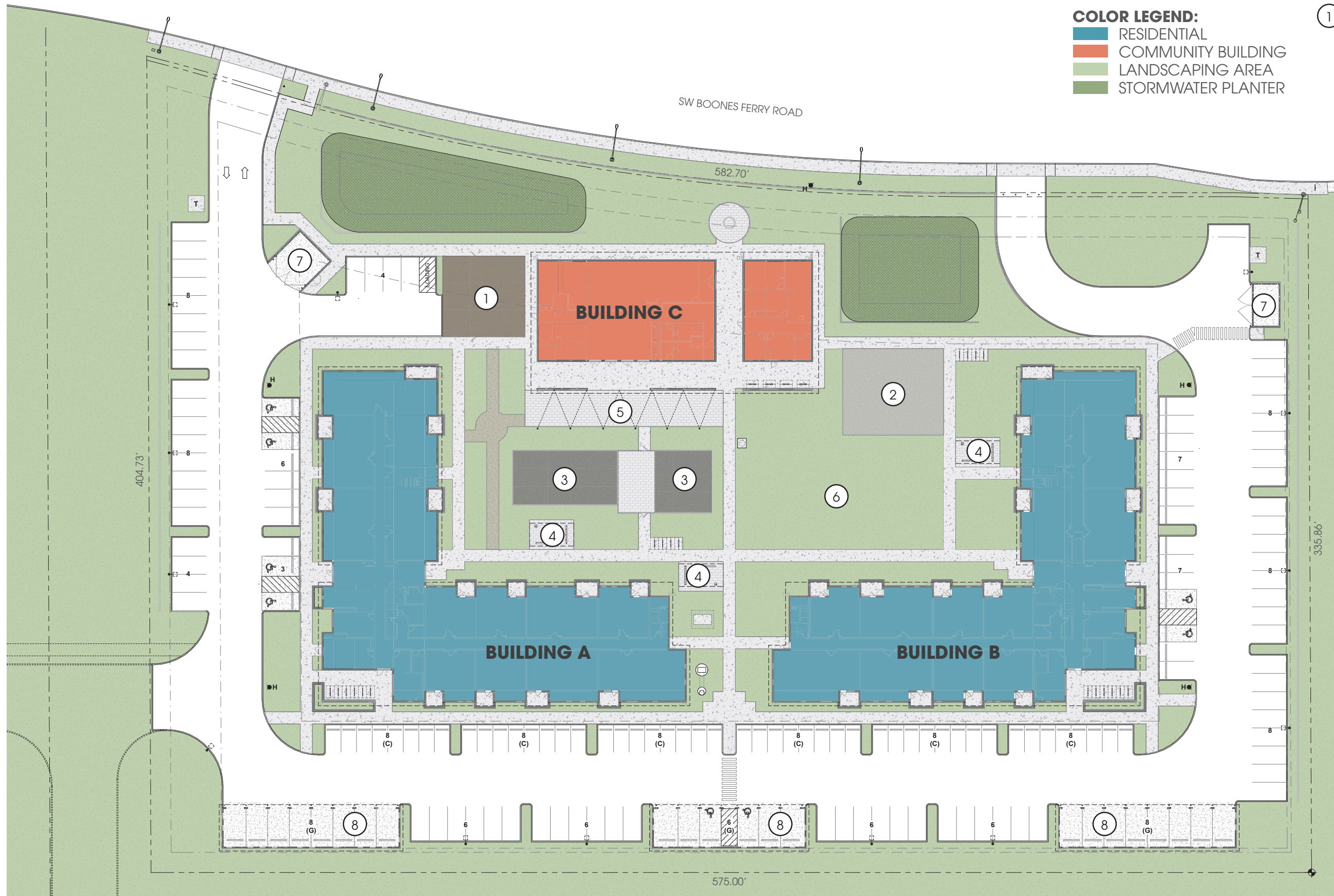
people will forget what you said, people will forget what you did, but people will never forget how you made them feel.
–Maya Angelou

Community Partners for Affordable Housing cares about our residents, our staff, and the community. We continue to take proactive and precautionary measures to guard against contraction spread of COVID-19. Although there are times that staff will be at the office or at our properties, and following social distancing guidelines, we will generally be working from home and meeting remotely. Please be safe.

PLAMBECK GARDENS

NEIGHBORHOOD MEETING / DEVELOPMENT MEETING

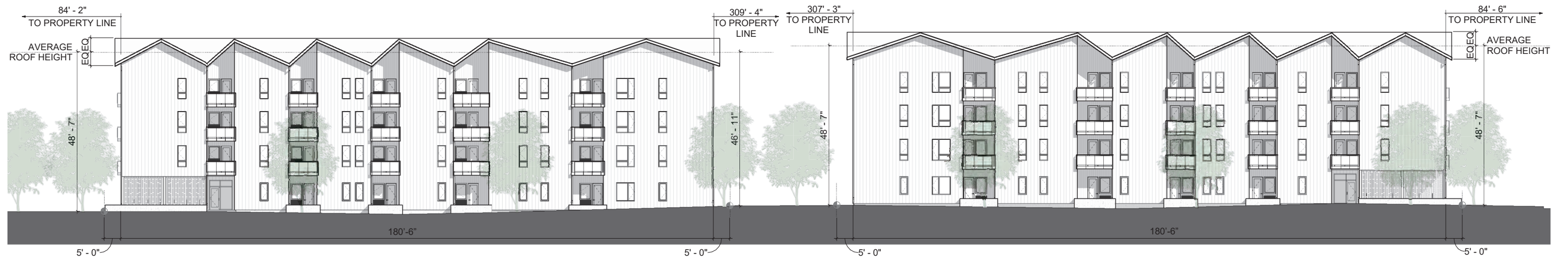




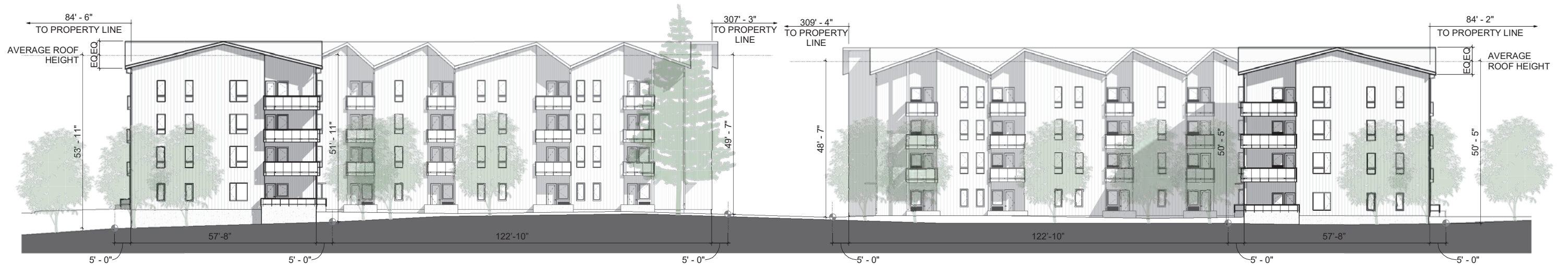
- COLOR LEGEND:**
- RESIDENTIAL
 - COMMUNITY BUILDING
 - LANDSCAPING AREA
 - STORMWATER PLANTER

- KEYNOTES:**
1. COMMUNITY GARDEN
 2. SPORT COURT
 3. PLAY AREA
 4. PICNIC SHELTER
 5. PATIO
 6. PLAY LAWN
 7. TRASH ENCLOSURE
 8. GARAGE

SITE PLAN
NOT TO SCALE



EAST ELEVATION | BUILDING A & B
NOT TO SCALE



WEST ELEVATION | BUILDING A & B
NOT TO SCALE



SOUTH ELEVATION | BUILDING A
NOT TO SCALE



NORTH ELEVATION | BUILDING B
NOT TO SCALE



SITE RENDERING

CERTIFICATION OF SIGN POSTING



In addition to the requirements of TDC 32.150, the 18" x 24" sign must display the meeting date, time, and address as well as a contact phone number. The block around the word "NOTICE" must remain **orange** composed of the **RGB color values Red 254, Green 127, and Blue 0**. A PowerPoint template of this sign is available at: <https://www.tualatinoregon.gov/planning/land-use-application-sign-templates>.

As the applicant for the Plambeck Gardens project, I hereby certify that on this day, July 28, 2021 sign(s) was/were posted on the subject property in accordance with the requirements of the Tualatin Development Code and the Community Development Division.

Applicant's Name: Jilian Saurage Felton, Housing Director, CPAH

Applicant's Signature: *Jilian Saurage Felton*
(Please Print)

Date: July 28, 2021



NEIGHBORHOOD MEETING SIGN-IN SHEET

Project: **19031 – Plambeck Gardens**

Date/ Time: **08/11/2021 – 6:30pm**

Project Team in Attendance:

Rachael Duke	Community Partners for Affordable Housing	rduke@cpahinc.org
Jilian Saurage Felton	Community Partners for Affordable Housing	jsaurage@cpahinc.org
Geoffrey Taylor	Community Partners for Affordable Housing	gtaylor@cpahoregon.org
Bobby Daniels	Wenaha Group	bobbyd@wenahagroup.com
Michelle Black	Carleton Hart Architecture	michelle.black@carletonhart.com
Melissa Soots	Carleton Hart Architecture	melissa.soots@carletonhart.com
Kayla Zander	Carleton Hart Architecture	kayla.zander@carletonhart.com
Noah Harvey	Carleton Hart Architecture	noah.harvey@carletonhart.com
Dristi Manandhar	Carleton Hart Architecture	dristi.manandhar@carletonhart.com

Neighbors in Attendance:

Ed Casey CIO Lead	22555 SW 102 nd Place Tualatin, Oregon
Alex Thurber Byrom CIO President	9875 SW Iowa Drive Tualatin, Oregon 97062
Mary Lyn Westenhaver	9845 SW Iowa Drive Tualatin, Oregon 97062
Rebecca Kimmel	23605 SW Boones Ferry Road Tualatin, Oregon 97062
Dylan Potter	23405 SW Boones Ferry Road Tualatin, Oregon 97062
John Lucini	23677 SW Boones Ferry Road Tualatin, Oregon 97062
Grace Lucini	23677 SW Boones Ferry Road Tualatin, Oregon 97062
Christine Bazant	23285 SW Boones Ferry Road Tualatin, Oregon 97062



NEIGHBORHOOD MEETING NOTES

Project: **19031 – Plambeck Gardens**

Date/ Time: **08/11/2021 – 6:30pm**

Project Team Presentation: 23 min

- Team member introductions from CPAH and Carleton Hart Architecture
- Introduction to Community Partners for Affordable Housing (CPAH)
 - o Located primarily in Washington County and SW Portland
 - o CPAH is a Tier 1 Community Housing Development Organization in Washington County
 - o Started 27 years ago from a group of people at St Anthony's Church. A group of people from the church came together to form a 501(c)(3) to provide affordable housing to people in the community.
 - o CPAH has 10 buildings, nearly 500 units – primarily multifamily buildings, with more than half of their units in Washington County.
 - o CPAH purchased the site in March of last year. The project is named after Doug Plambeck, who was a long term Tualatin resident and founding board member of CPAH.
 - o Approximately 25% of current Tualatin residents make less than \$41,000 a year, which is considered rent burdened based on current market rents.
 - o There is a deficit in Tualatin for affordable housing for residents making \$35,000 a year or less
 - o Plambeck Gardens will provide 116 units of affordable housing
 - 6 four-bedroom units
 - 16 three-bedroom units
 - 40 two-bedroom units
 - 54 one-bedroom units
 - o The project will have a full time resident services coordinator to help residents with things like after school programs, navigating various services with services providers, and operating community building.
 - o Who needs affordable housing? All units at Plambeck Gardens will be affordable to 60% Area Median Income (AMI) and below.
 - 60% AMI for a family of four is \$58,000. This is the salary range for jobs like a teacher, license practical nurse, two parents working full time at just above minimum wage.
 - 30% AMI is about \$29,000, which is about one full time minimum wage earner or two or more social security benefit recipients.
 - o The project applied and was awarded funds last year through the Metro Affordable Housing Bonds through the Washington County Housing Authority. The number one provider of affordable housing throughout the US does not come from HUD or Washington County, but rather the IRS through Low Income Housing Tax Credits (LIHTC). This project will also take advantage of the LIHTC, which then makes this a public/ private partnership. There is a private investor who invests funds by purchasing the tax credits. In turn, CPAH receives the money to build the project and the third component of the funding is debt. Putting the layers together takes time, which is what CPAH is working on while the design team works on the project. The Plambeck Gardens project is at about 50% of the way through the entire project timeline from acquisition to opening doors. This 50% mark indicates that financing has been arranged and design work is underway.
 - o CPAH does four things as an organization: build affordable housing, operate affordable housing, provide resident services for residents living in CPAH communities and other affordable communities, and advocate for affordable housing in Washington County.
 - o CPAH values housing as a human right and places value on creating spaces that not only serve their residents, but create a lasting benefit for the community. CPAH creates opportunity to integrate affordable housing with the community and vice versa.

- Variance Application
 - o The design team has explored many iterations of the site plan and thought about what best suits the conditions of the site, while meeting the programmatic needs and design goals of CPAH.
 - o We are still early in the design, so the graphics shared today will show building form and building placement on site, which will not be changing much as we go forward. Other items such as siding patterns and colors will continue to develop as well as the finer details of the project will continue to develop into spring of next year.
 - o Site Plan
 - Located on SW Boones Ferry Road.
 - North is to the right on the graphics, as indicated on the plan.
 - Horizon Community Church's property is to the north and wraps around the east with a little sliver/ pole lot to the south.
 - Further to the south of Horizon is the propose Autumn Sunrise development. Their Land Use process is similar to ours. However, it is a different project and a different property. Our teams are working together, but they have a different process than us.
 - The two residential buildings on site are 4-stories each and are L-shaped to create a courtyard space. These residential buildings include the units as well as some common area spaces such as laundry room, lounge, and meeting room. Additionally, there is a 1-story community building which will include administrative offices as well as large classrooms and gathering spaces for resident services and ultimately create a place for residents to gather and mingle.
 - We have provided covered outdoor space, play areas, community garden, a large play lawn and sport court with a variety of picnic shelters around the site. These spaces are joined together in a courtyard that is shaped by the two residential buildings.
 - Site plan includes multiple access points. We are still working out what the access to the site will look like. When we sent out this plan, the main access was in the southwest corner with fire truck emergency access located in the northwest corner. Since this plan was sent out, we have had conversations with Washington County and we think that the primary driveway will move to the northwest and the emergency access will move to the southwest.
 - In the southeast corner of the plane there are some dashed in lines, that indicate the future connection to the Autumn Sunrise development. This connection is encouraged by Washington County and the City of Tualatin. This is a longer process, as it requires easements as well as timing between developments.
 - There are some covered parking areas on the east side of the site plan, with the remaining parking stalls as surface parking stalls.
 - o Elevations
 - The residential buildings are four stories. Each unit will have its own balcony, which is emphasizes with the building form. Each unit will also have a storage closet either connected to the balcony, or elsewhere in the building.
 - You can see in the building elevations that the slopes across the site vary extensively.
 - Building height is one of the variances that we are applying for.
 - You can see that the two buildings are the same in number of levels, but that Building A is technically higher because the grade slopes down steeper around it.
- Site Challenges
 - o Initially when we looked at the site, we had planned on 3 three-story residential buildings, that would meet the maximum height per the zoning code without a variance. We had planned on that approach, but as we learned more about the site, including the steep grading along the north side of the property we had to change our plan. Additionally, when we did our geotechnical explorations, we discovered that there is a soft layer of soil at the top of the site that is not suitable for building. That soft soil is deepest at the north side of the site. Additionally, we are looking to make a gravity sewer connection to the south, so we need a certain finished floor height for the buildings to achieve that. These three factors made it so that we could not place a building on the north side of the site.

- We looked at different ways to make the three residential building design work, but realized we needed to consolidate to two buildings and in order to make everything fit on site, we needed to add another story to the residential buildings. After redesigning to two residential buildings, we felt that the development benefitted from the outdoor courtyard shape in the middle of the site that is framed by the buildings.
- By consolidating the building with a smaller footprint, we can meet the other zoning requirements for outdoor space. This was proving challenging with the larger unit sizes this project includes. With the larger units, we have a larger building, but still require the same amount of outdoor space.
- We have landed on a design that is close to the parking requirements, but every time a new site constraint was identified, we would have to lose a few more stalls. We are currently providing 170 parking spaces, with a code required 188 spaces. This is less than a 10% request in reduction to parking.
- Process
 - This meeting is part of our Land Use application process. Our next step is to submit variances for the parking reduction and building height increase.
 - The parking reduction is to permit 170 parking spaces in lieu of 188.
 - The height variance will be to go to 4-stories and exceed the 35'-0" height limit
 - From here, we will continue with design development and submit for the Land Use Architectural Review Submittal. At the same time, we will be requesting a design exception request for Washington County which will allow us to have access to Boones Ferry Road.
 - Assuming all the processes go smoothly we will be submitted for a building permit spring of 2022 and start construction in the spring of 2023, with construction wrapping up in summer of 2024.
- Parking Study Update
 - CPAH has elected to complete a parking study, which is not a requirement of the variance. The study included three other similar projects that were affordable multifamily projects with family size units with public transit located nearby. The three project sites were located in Tualatin, Wilsonville and Tigard.
 - Initial findings from the parking study indicate that for 116 units of affordable housing we would need to provide 151 parking spaces. Being able to provide 170 stalls, which is above the 151 study value has the team feeling good about the amount of parking provided.

Question & Answer Portion: 35 min

- Will open spaces be public?
 - There is not currently a partnership with the parks district. Community rooms are not open to the public, but can be used for CIO meetings, neighborhood meetings, etc if the organizations reach out to CPAH about reserving the space.
 - Play grounds and other outdoor elements will be for residents only.
- Gridlock from Day Road south to Tualatin High School or further north. Getting in and out of this development at the time when there is gridlock and lots of traffic on the road is difficult. Is there a traffic signal planned?
 - CPAH shared what is speculated at this point based on conversations with City, County and ODOT. The jurisdictions are considering adding a signal to the Autumn Sunrise development at the proposed H-Street location.
 - CPAH's preference would be to connect to Autumn Sunrise and have all Plambeck Gardens traffic flow through H-street. However, if the timing doesn't work out with Horizon, Autumn Sunrise and CPAH, we might need to wait to make that connection. The county has stated that if the traffic report indicates issues, that we could potentially have to do right turn in, right turn out only driveway. The traffic report is still a work in progress, as our traffic study and Autumn Sunrise traffic study are working together.
- Do you know where the proposed extension of 124th street, which is the bypass that Washington County has told Tualatin they must build? It will come from 124th at Grands Ferry and connect to Boones Ferry, not sure exactly where. It will dump a lot more people and will likely require a traffic signal. Not sure how

- far it will be from this project site. Currently there is an area called Victoria Woods, which is about 3 blocks south of Tualatin High School and they have a difficult time getting in and out of their subdivision.
- CPAH does not have any intel on this location, but has heard of various stop lights being proposed in different land use presentations. This issue is outside of our scope of work, and is something that ODOT will need to step in on.
 - What School District will this project be in?
 - TBD – The project is currently in the Sherwood school district, but is practically within walking distance of Tualatin High School. The two school districts will need to work together to determine what makes the most sense. CPAH is currently reaching out to both school districts to help figure out the school district for their residents.
 - Note from neighbor: The school district swap has been done in the past.
 - Currently, there is one bus line along there (TriMet – 96). South Metro Area Rapid Transit (SMART) doesn't have any coverage from Wilsonville for this. If this is low income housing, assuming people are taking public transit. Traffic signal will help with residents being able to cross the road to catch the southbound bus.
 - The design team has talked with TriMet and they are open to creating more stops along the 96 route. However, TriMet is reactionary, as they are not able to use a tax base that doesn't exist yet. TriMet bases their bus frequency on use and will create new bus lines based on ridership. Also, as part of the Basalt Creek Concept Plan, TriMet has said that they are interested in adding another bus line. CPAH is not sure on the specifics of that plan, but assumes once Autumn Sunrise and Plambeck Gardens are built, the ridership will increase and at that point we are guessing more frequent bus service, and then perhaps a new bus line will be developed.
 - Why the change in the location of the driveway access and emergency access?
 - This is in response to comments from Washington County as Autumn Sunrise develops their traffic study. The request from the County is that we be as far away as possible from H-Street. By switching them, we will be about 600-feet away from their driveway, which is Washington County's spacing requirements between streets, and is the safest location for the SW Boones Ferry Road access point.
 - The traffic studies look at both the existing conditions as well as any known or future conditions as well. Our traffic engineer and Autumn Sunrise's traffic engineer are working together with both the City and County as well.
 - Congrats to CPAH for finally getting this affordable housing project in the area. Resident expressed that they think it will be a great project if residents can get to and from it.
 - CPAH thanked the Tualatin resident for their support.
 - Are the visuals on screen available for those that cannot get into the meeting on a computer?
 - Yes, CPAH asked anyone who wanted the graphics to stay after the presentation and share their email, so the team can send it to them.
 - It was also noted that materials are posted by the City of Tualatin and were shared with attendees in team's chat log as well.
 - How many units are in the complex?
 - 116 units.
 - Are the only planned improvements to the roads only in front of the project site on Boones Ferry Road? Is CPAH required to help with the traffic that will back up by the high school or other places in Tualatin?
 - CPAH is held to the same standards as every other developer. CPAH will be completing right of way improvements and will also be contributing to the transportation development tax, which applies to this project just like every other project. The transportation development tax is not the same as property tax. It is what CPAH must pay per unit to develop. The tax is the money that is intended for Washington County to use for road improvements. It does not get earmarked for specific use along CPAH's property.
 - Anything required in front of our property will be determined with our final traffic study results. We don't know the results of our traffic study yet.

- The height variance seems like a high percentage of increase. Is this kind of variance typically approved?
 - o The team originally planned for three 3-story building, but given the challenges of the site it was not feasible to do three buildings on site, so that lead to a fourth story addition. The upside is that we can fit more parking on the site.
 - o One of the things that we did was that the style and location of the buildings will fit with the neighborhood. The buildings are setback a large distance from the property line and are more centrally located in the site, keeping them away from adjacent properties.
- Will there be any commercial space included?
 - o There will be no commercial space as part of this development. The community space is only for residents.
 - o However, it was noted by a resident that the Basalt Creek Concept Plan does include neighborhood commercial adjacent to our property on the Autumn Sunrise site.
- Another question was asked about the current plan entrance.
 - o The current plan has the main site access along the more northern access point and the emergency access along the southern end. The emergency access will be used less and have limited access for emergency vehicles only, which is why Washington County is okay with that being closer to H-Street on Autumn Sunrise's property.
- Does the parking provided on site include staff in addition to residents?
 - o The 170 parking spaces does include staff parking.
- Will residents have an assigned parking space and will there be assigned guest parking?
 - o CPAH will work on that plan when they get closer to opening. Most CPAH properties have a first come, first serve basis. However, this is a large site so it is yet to be determined. There are several garages, which will need to be reserved.

Questions Received by Email:

- What is the requirement for parking and what is the variance?
 - o The requirement by code is 188 stalls, the proposed plan includes 170.
- Does the number of bedrooms change the ratio of parking spaces per unit?
 - o Yes it does.
 - o 1-bedroom – 1.25 spaces
 - o 2-bedroom – 1.5 spaces
 - o 3-bedroom – 1.75 spaces + garage
 - o 4-bedroom – Following the 3-bedroom standard
- How are the number of visitor parking spaces determined?
 - o Tualatin does not have a requirement to separate visitor and resident parking. It is just a single value of stalls based on the size of the unit.
- How many people will be working there? Employees, provider of services and delivery support vehicles?
 - o The team has included a loading zone for deliveries.
 - o The employees and service providers are all included in the code required 188 parking stalls, which is therefore included in our request for 170 parks stalls.
- Does CPAH have written parking regulations as part of its lease agreement?
 - o There are certain requirements from the County and state regarding LIHTC units and what is allowed in the lease agreements. That process is currently being worked on with the property management company, as they work with CPAH to meet all the requirements of the various funders.
- Storm water questions
 - o The storm water does go both to the north and the south. We will be meeting all the requirements from CWS, HUD and NOAA.
 - o The driveways and storm water planters are still shifting as we are early in design. The specifics are not available yet, but as the city and county requirements for road and access get settled, then we will know where the storm water planters will be settled.
 - o HUD and NOAA standards are related to the funding sources for our project. That means we will not only be meeting local storm water standards, but federal standards as well. These standards have a higher standard than the local standard in some cases. This includes a requirement that all storm water leaving the site needs to match pre-development levels (ie: grassy field). If the

- entire site was a grassy field, the amount of storm water that would leave the site is what we need to match. For this reason, we are providing storm water storage both above and below ground. The design will meet the local jurisdiction, but also be reviewed by NOAA as well.
- Will there be overflow parking?
 - o We would have to check in with Autumn Sunrise to see if there is going to be street parking in their neighborhood, as there is no street parking along Boones Ferry Road. CPAH's experience with parking at affordable housing projects, statistically shows a trend in lower parking rates as compared to market rate housing. That reduction is pretty consistently about 30% fewer vehicles with an affordable housing development. Our parking study is supporting our current 170 parking stall design.
 - What will the water source be for residents?
 - o We will be required to bring in City water as the property currently is served by well water. We are bringing a public water line down from Norwood to the site and then Autumn Sunrise will connect to it and complete the water loop.
 - o We are not permitted to use the well for domestic water, but we are hoping to repurpose the well for irrigation.



PLAMBECK GARDENS

23500 & 23550 SW Boones Ferry Road
Pre-Application Meeting Summary

Thank you for discussing your proposed multifamily housing project. Below you will find a summary of our discussion points. If there is anything else from our meeting that you wish to document, please respond with your notes as well. Thank you.

Required Land Use Reviews

Submit electronically via eTrakit: <https://permits.ci.tualatin.or.us/eTrakit/>.

Neighborhood/Developer meeting

- Holding a Neighborhood/Developer meeting is required for both Variance and Architectural Review applications. The same meeting may be used for both applications.
- Neighborhood/Developer meetings should generally be held no more than six months prior to application. More detailed information about this meeting is online here: <https://www.tualatinoregon.gov/planning/neighborhood-developer-meetings>
- Applicants are responsible for mailing and posting notice of your Neighborhood Developer meeting. The City can provide a list of addresses for your notice letters. This mailing list includes neighboring property owners, but communicating with your current residents is also encouraged to proactively address concerns. Please email us at planning@tualatin.gov to request a Mailing List for a \$32 fee.

Variance:

- A variance for building height and parking minimum standards may be considered under the criteria of [TDC 33.120\(6\)](#)
- Application packet: https://www.tualatinoregon.gov/sites/default/files/fileattachments/planning/page/5086/varianceinstructions_withform.pdf
- Decided by Planning Commission, meetings held on the third Thursday of the month: <https://www.tualatinoregon.gov/tpc>
- Examples of recent variance applications are found on our projects website: https://www.tualatinoregon.gov/projects?term_node_tid_depth=All&field_project_status_value=All&field_project_type_tid=112&keys=

Architectural Review Application:

Type III Land Use Decision – See [TDC 33.020\(3\)](#)

https://www.tualatinoregon.gov/sites/default/files/fileattachments/planning/page/5081/ar_instructions_2019_withforms.pdf

Type III AR application and example for multi-family housing found here:

<https://www.tualatinoregon.gov/planning/ar18-0007-tualatin-apartments>

Criteria to address for your AR narrative includes:

- **Tualatin Municipal Code:**
 - [03-02: Sewer Regulations;](#)
 - [03-03: Water Service;](#)
 - [03-05: Soil Erosion, Surface Water Management, Water Quality Facilities, and Building & Sewers;](#)

- **Tualatin Development Code:**
 - [32: Procedures;](#)
 - [33.020: Architectural Review;](#)
 - [33.110: Tree Removal Permit/Review;](#)
 - [43: High-Density Residential Zone;](#)
 - [73A, 73B, 73C, 73D: Standards;](#)
 - [74: Public Improvements](#)
 - [75: Access Management](#)

Type III Timeline:

- Decided by Architectural Review Board, meets as needed on Wednesdays:
<https://www.tualatinoregon.gov/arb>
 - 30 day Completeness Review
 - Hearing typically scheduled within 60 days of complete application
 - Notice of Hearing:
 - 20 day prior to hearing
 - Those who comment gain standing for potential appeal
 - Notice of Decision:
 - 14 day appeal period – opportunity to appeal decision to City Council

Highlighted Site Design Standards

- A multi-family structure is a permitted housing type in the High-Density Residential district, see [Table 43-2](#).
- The site is not located in a dedicated fish or wildlife habitat
- Perimeter landscaping requirements found in [TDC 73C.210](#)
- Plant material requirements found in [TDC 73B.090](#)
- Storage requirements found in [TDC 73A.200\(6\)](#)

Tree Removal:

Tree removal is reviewed under the Architectural Review application. A tree preservation plan and a tree assessment report prepared by a certified arborist are required to address the approval criteria for tree removal found in [TDC 33.110\(5\)](#).

Natural resources:

Clean Water Services will comment on additional natural resource, through their Review process. The Service Provider Letter from CWS is a requirement of a complete land use or Engineering permit submittal. For more information, see <http://www.cleanwaterservices.org/permits-development/step-by-step-process/environmental-review/>

Public Utilities and Other Site Development

- Request available public utility as-builts by emailing tdoran@tualatin.gov. Washington County can provide public as-builts adjacent to your site within SW Boones Ferry Road.
- Apply for Tualatin Erosion Control, Public Works, Water Quality Permits, and Hydraulic Modeling requests electronically via eTrakit: <https://permits.ci.tualatin.or.us/eTrakit/>.
- Apply for a Washington County right-of-way permit and include a copy of plans within the Tualatin permit set: <https://www.co.washington.or.us/LUT/Divisions/Operations/Permits/row-permits.cfm>.
- An Erosion Control permit is required from Tualatin for projects disturbing over 500 square feet.
 - Additionally if between one and five acres are disturbed, a 1200CN is needed from CWS.
 - If over five acres are disturbed, a 1200C is needed from DEQ.
- A Water Quality Permit is needed for construction and modification of public and private impervious areas. The permit will include wetland mitigation/revegetation required by CWS SPL in addition to treatment, detention as required for conveyance, and hydromodification per CWS D&CS Ch 4.
 - Any additional permits from regulating agencies such as CWS Environmental Services
 - Include all private stormwater treatment and conveyance within a maintenance agreement including existing facilities.
 - For water quality permit application completeness submit stormwater plans and calculations certified by an Oregon registered, professional engineer in accordance with TMC 3-5-390(1) proving proposed systems:
 - In accordance with TMC 3-5-200 through 3-5-430, TDC 74.630 and 74.650, Public Works Construction Code (PWCC), and Clean Water Services' (CWS) Design and Construction Standards (D&CS) Chapter 4.
 - Show onsite facilities for proposed new and modified impervious areas.
 - Address runoff from all new and modified private impervious areas.
 - Treat new and modified impervious areas in accordance with CWS D&CS 4.08.1.d meeting phosphorous removal in accordance with TMC 3-5-350 per the design storm in accordance with TMC 3-5-360 and CWS D&CS 4.08.2.
 - Detain as needed TMC 3-5-220, TMC 3-5-230, and CWS D&CS 4.08.
 - Accommodate hydromodification in accordance with CWS D&CS 4.03.5.
 - Include conveyance calculations that accommodates up to a 25-year storm event with 100-year overland flow to the public stormwater system in accordance with TDC 74.640 and CWS D&CS 5.05.2.d.
 - Downstream evaluation with a maximum of 82% capacity within public lines per [TMC 3-5-210 - Review of Downstream System](#)
 - Demonstrate compliance with the Clean Water Services' Service Provider Letter CWS conditions sufficient to obtain a Stormwater Connection Permit Authorization Letter in accordance with TDC 74.650(2) and CWS D&CS 3.01.2(d).

- If the proposed water quality facility includes infiltration in the design, a Geotech/soil/infiltration report will need to be submitted to Engineering for a complete land use application.
- A Public Works Permit is needed for any sanitary sewer, stormwater, or water line work within right-of-way or public easements along with associated permits from Washington County.
 - Public sanitary sewer and water lines exist in SW Norwood Road. Extension of public systems, construction of a public sanitary sewer pump station, and potential upsizing of public lines must be determined. Private easements allowing a permanent gravity flow across Horizon and a temporary force main across Autumn Sunrise must be provided and recorded.
 - Dedication and construction of Arterial streets allows eligibility for credits per the [Washington County TDT Manual](#).
 - A public stormwater treatment and detention facility is normally needed to treat the right-of-way which could include a LIDA facility within the planter. Private facilities may be oversized to equivalently address the public stormwater requirements. Otherwise a separate Water Quality Permit is needed for the public facility.
- SW Boones Ferry Road is under Washington County jurisdiction and construction will require a Facility permit. This includes a total of 45 feet from centerline with a 6-foot wide sidewalk, 6-foot-wide planter with streetlights and street trees, curb and gutter, and pavement.
 - Provide improvements and dedication for the Washington County cross-section plus additional ROW for city standard 6 foot sidewalk with 6 foot planter strip (A-3 County standard includes a 5 foot planter strip with a 5 foot s/w).
 - https://library.municode.com/or/washington_county/codes/community_development_code?nodeId=ARTVPUFASE_501PUFASERE
- A Traffic Impact Analysis (noted in the section below) must evaluate and propose a connectivity plan to assure the proposed interim access can be redirected to a future local street to the south within the future Autumn Sunrise subdivision.
 - Access to SW Boones Ferry Road must meet Washington County requirements and allowances per design exception.
 - [TDC 75.040. - Driveway Approach Requirements](#)
 - The access may be made of pervious pavement to accommodate itself as 1:1 Water Quality Facility.
 - The emergency vehicle access must have a rolled curb and TVF&R approved locked gate at the right-of-way. We encourage onsite signing to clearly indicate the access is not to be blocked and for emergency vehicles only.
 - This must be planned connect to the local street constructed with Autumn Sunrise subdivision development via a platted public easement over a tract.
 - A curb tight sidewalk is acceptable.
 - If your plan results in utilizing the Horizon flag pole, Include private access agreements for sharing Horizon lot's access to SW Boones Ferry Road and for future redirection to the south.
 - You must clarify your plan to complete the connection to Autumn Sunrise's local street.
- Record an 8-foot wide public utility easement adjacent to right-of-way.
 - Underground utilities unless over 50kv (then associated existing utilities may remain above).

- Work directly with PGE regarding the existing lines and poles vs what they will require to serve your site and support poles on the west side of SW Boones Ferry Road.
 - Your conversations with PGE may result in their request of special circumstances to the City. Please provide us PGE's response early so we can provide any needed input.
 - Private retaining walls must be located outside of the public utility easement.
 - The maximum allowed slope within the public utility easement is per Washington County standards for SW Boones Ferry Road.
- Hydraulic Modeling is required for over 48,300 square footage of new building area, 870 gallons/acre/day use, and/or more than 49 residential units. Hydraulic Modeling may be requested in advance of application for a land use to confirm availability and requirements, but may need to be updated depending on changes due to conditions of approval. When submitting a modeling application include via eTrakit: <https://permits.ci.tualatin.or.us/eTrakit/>:
 - Requirements/alternatives allowed by Tom Mooney, TVF&R (503) 259-1419, thomas.mooney@tvfr.com
 - Hydrant flow test results have been performed nearby and results provided to your team by Mark Schlager. You may use that report instead of requesting testing via <https://www.tualatinoregon.gov/publicworks/hydrant-flow-tests>. For questions regarding testing contact Terrance Leahy, Water Division Manager, (503) 691-3095, tleahy@tualatin.gov.
 - After submittal Staff will coordinate with you regarding payment of the fee per the current [fee schedule](#). (Currently \$300/building)
 - As an alternative to the standard public utility location beneath a public street, the extension of public water line within SW Boones Ferry Road right-of-way may be located beneath the public sidewalk with construction per Public Works Construction Code. Developers are required to obtain any additional right-of-way required to match their proposed plans.

Transportation and Site Access

- Your transportation engineer must contact Mike McCarthy, Principal Traffic Engineer, mmccarthy@tualatin.gov (please also copy tdoran@tualatin.gov) to confirm proposed Traffic Impact Analysis scope. Mike will coordinate with Washington County and any other applicable agencies and jurisdictions. Mike may also be reached at (503) 691-3674.
- The Autumn Sunrise subdivision has been submitted. Submitted materials will be sent out by staff for a public comment period to nearby property owners and made available in the future on the [City's Project's page](#). Your traffic study will need to incorporate their study/development. Your traffic engineer's coordination with Mike should include this discussion.

Fire

- Tom Mooney, TVF&R (503) 259-1419; thomas.mooney@tvfr.com)
- A TVF&R Service Provider Letter will be required as part of your Architectural Review submittal, apply here: <https://protect-us.mimecast.com/s/2I9QC1wPBylBNqETLICJc?domain=tvfr.com>
- Flow testing: Terrance Leahy, Water Division Manager, (503) 691-3095; tleahy@tualatin.gov)

Fees

- Current fee schedule: <https://www.tualatinoregon.gov/finance/fee-schedule>
- For calculating SDC fees, please work with Lauren Gonzalez, lgonzalez@tualatin.gov

TLID	OWNER1	OWNERADDR
2S135D000108	WILLIAMS TOM K	9300 SW NORWOOD RD
2S135CA00300	VUKANOVICH MARK	23155 SW BOONES FERRY RD
2S135CA00200	VENABLES JOHN V TRUST	6140 SW BOUNDARY ST APT 145
2S135D000107	TUALATIN CITY OF	18880 SW MARTINAZZI AVE
2S135D000109	TUALATIN HILLS CHRISTIAN CHURCH INC	23050 SW BOONES FERRY RD
2S135D000102	SHAVLOVSKIY VITALIY & SHAVLOVSKIY NATALIA	32031 SW GUISS WAY
3S102B000104	SHAMBURG SCOTT A	PO BOX 908
2S135CA00600	RILEY SHAWN O	23365 SW BOONES FERRY RD
2S135CA00700	POTTER DYLAN D & POTTER MICHELLE P	23405 SW BOONES FERRY RD
2S135D000100	P3 PROPERTIES LLC	PO BOX 691
2S135CA00800	MCLEOD TRUST	23465 SW BOONES FERRY RD
2S135CD00400	MAST MARVIN R & JELI CARLENE M	23845 SW BOONES FERRY RD
2S135CD00302	LUCINI JOHN W & GRACE N FAM TRUST	23677 SW BOONES FERRY RD
2S135CD00200	KIMMEL RONALD A & KIMMEL REBECCA A	23605 SW BOONES FERRY RD
2S135D000106	HORIZON COMMUNITY CHURCH	PO BOX 2690
2S135CD00500	HICKOK TODD J & HICKOK MOLLY J	23855 SW BOONES FERRY RD
2S135CA00100	HELMS DANIEL M	23035 SW BOONES FERRY RD
2S135D000303	COMMUNITY PARTNERS FOR AFFORDABLE HOUSING	PO BOX 23206
2S135D000101	CLARK KURT C & CLARK TARA	3539 DIANNA WAY
3S102AB00100	CHAMBERLAIN JOHN & CHAMBERLAIN DEBRA	9000 SW GREENHILL LN
3S102AB00200	CHAMBERLAIN JOHN & CHAMBERLAIN DEBRA	9000 SW GREENHILL LN
3S102AB00300	CHAMBERLAIN JOHN & CHAMBERLAIN DEBRA	9000 SW GREENHILL LN
3S102AB00400	CHAMBERLAIN JOHN & CHAMBERLAIN DEBRA	9000 SW GREENHILL LN
3S102AB00500	CHAMBERLAIN JOHN & CHAMBERLAIN DEBRA	9000 SW GREENHILL LN
3S102AB00600	CHAMBERLAIN JOHN & CHAMBERLAIN DEBRA	9000 SW GREENHILL LN
2S135CA00400	BOCCI JAMES A & BOCCI JULIA A	23205 SW BOONES FERRY RD
2S135CA00500	BAZANT CHRISTINE LEE & BAZANT JOHN JOSEPH	36449 HWY 34
2S135D000400	AUTUMN SUNRISE LLC	8840 SW HOLLY LN
2S135D000401	AUTUMN SUNRISE LLC	8840 SW HOLLY LN
2S135D000500	AUTUMN SUNRISE LLC	8840 SW HOLLY LN
2S135D000501	AUTUMN SUNRISE LLC	8840 SW HOLLY LN
2S135D000600	AUTUMN SUNRISE LLC	8840 SW HOLLY LN
2S135D000800	AUTUMN SUNRISE LLC	8840 SW HOLLY LN
2S135D000900	AUTUMN SUNRISE LLC	8840 SW HOLLY LN
2S135CD00100	ALVSTAD RANDALL & ALVSTAD KAREN	23515 SW BOONES FERRY RD
2S135CD00300	AGHAZADEH-SANAEI MEHDI & ASIAEE NAHID Kayla Zander, Carleton Hart Architecture	23745 SW BOONES FERRY RD 830 SW 10th AVE #200

OWNERCITY	OWNERSTATE	OWNERZIP
TUALATIN	OR	97062
TUALATIN	OR	97062
PORTLAND	OR	97221
TUALATIN	OR	97062
TUALATIN	OR	97062
WILSONVILLE	OR	97070
WILSONVILLE	OR	97070
TUALATIN	OR	97062
TUALATIN	OR	97062
WHITE SALMON	WA	98672
TUALATIN	OR	97062
TUALATIN	OR	97062
TUALATIN	OR	97062
TUALATIN	OR	97062
TUALATIN	OR	97062
TUALATIN	OR	97062
TUALATIN	OR	97062
TIGARD	OR	97281
WENATCHEE	WA	98801
TUALATIN	OR	97062
TUALATIN	OR	97062
TUALATIN	OR	97062
TUALATIN	OR	97062
TUALATIN	OR	97062
TUALATIN	OR	97062
TUALATIN	OR	97062
LEBANON	OR	97355
WILSONVILLE	OR	97070
WILSONVILLE	OR	97070
WILSONVILLE	OR	97070
WILSONVILLE	OR	97070
WILSONVILLE	OR	97070
WILSONVILLE	OR	97070
WILSONVILLE	OR	97070
WILSONVILLE	OR	97070
TUALATIN	OR	97062
TUALATIN	OR	97062
PORTLAND	OR	97205



NOTICE OF HEARING AND OPPORTUNITY TO COMMENT
CASE FILE: AR 22-0001— PLAMBECK GARDENS

NOTICE IS HEREBY GIVEN that a public hearing before the Architectural Review Board will be held:

Wednesday, June 8, 2022 at 6:30 pm

Location: Tualatin Service Center
 10699 SW Herman Road, Tualatin, OR 97062

Zoom Teleconference: Link with log-in instructions available
www.tualatinoregon.gov/meetings

AR 22-0001
Plambeck Gardens Apartments

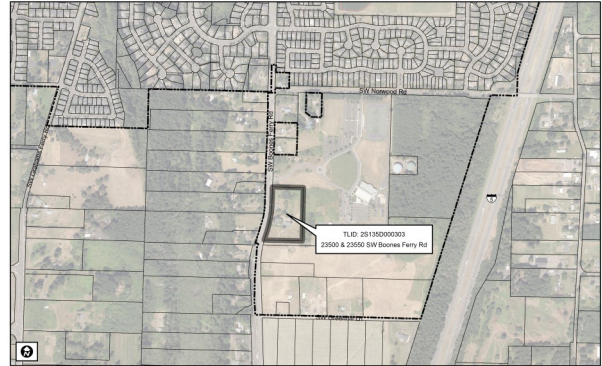
Carleton Hart Architecture, on behalf of Community Partners for Affordable Housing, is requesting approval to construct a 116 unit multi-family development on a 4.68 acre site zoned High Density Residential (RH).

To view the application materials, visit:
www.tualatinoregon.gov/projects

Comments and questions may be submitted to:
eengman@tualatin.gov

Planning Division
 Attn: Erin Engman

Located at: 23500 SW Boones Ferry Rd; **Tax Lot:** 2S135D000303



- **Type III Architectural Review Criteria:** Tualatin Development Code Chapters: 32, 33, 43, 73A-D, 74, 75
- **Staff report** will be available at least seven days before the hearing for inspection at no cost, and copies will be provided at a reasonable cost.
- **Print copies** of the application are available at a reasonable cost.
- **Individuals wishing to comment on the application** must do so in writing to the Planning Division prior to the hearing, or in writing and/or orally at the hearing. Materials must be received by May 25, to be included in the hearing packet.



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AR 22-0001
Plambeck Gardens Apartments

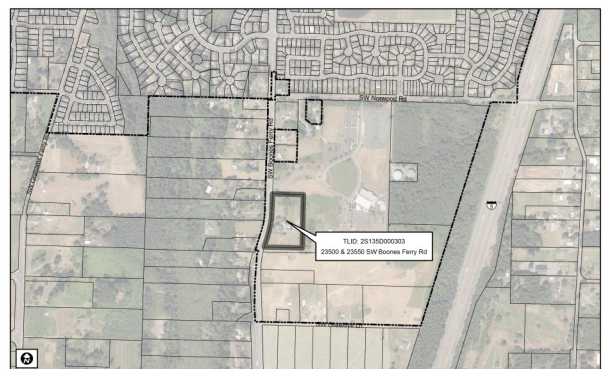
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- **All citizens are invited to attend and be heard:** Failure of an issue to be raised in the hearing, in person, or by letter, or failure to provide sufficient specificity to afford the decision maker an opportunity to respond to the issue precludes appeal to the State Land Use Board of Appeals (LUBA) based on that issue. The failure of the applicant to raise constitutional or other issues relating to the proposed conditions of approval with sufficient specificity to the decision maker to respond to the issue precludes an action for damages in circuit court.
- **Notice of the Decision** will only be provided to those who submit written comments regarding that application or testify at the hearing.

You received this mailing because you own property within 1,000 feet (ft) of the site or within a residential subdivision which is partly within 1,000 ft.

For additional information contact:

Erin Engman, Senior Planner, eengman@tualatin.gov and 503-691-3024

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Erin Engman, Senior Planner, eengman@tualatin.gov and 503-691-3024

From: Erin Engman <eengman@tualatin.gov>

Sent: Wednesday, April 27, 2022 2:29 PM

To: Erin Engman <eengman@tualatin.gov>; Jilian Saurage Felton <jsaurage@cpahoregon.org>; Kayla Zander <kayla.zander@carletonhart.com>

Cc: Alyssa Kerr <akerr@tualatin.gov>; Don Hudson <dhudson@tualatin.gov>; Heidi Springer <hspringer@tualatin.gov>; Jonathan Taylor <jtaylor@tualatin.gov>; Kim McMillan <kmcmillan@tualatin.gov>; Lindsey Hagerman <lhagerman@tualatin.gov>; Martin Loring <mloring@tualatin.gov>; Mike McCarthy <mmccarthy@tualatin.gov>; Rich Mueller <rmueller@tualatin.gov>; Sherilyn Lombos <slombos@tualatin.gov>; Steve Koper <skoper@tualatin.gov>; Terrance Leahy <[tleahy@tualatin.gov](mailto:t Leahy@tualatin.gov)>; Tom Scott <tscott@tualatin.gov>; Tom Steiger <TSteiger@tualatin.gov>; Tony Doran <TDORAN@tualatin.gov>; Hayden Ausland <hausland@tualatin.gov>; Keith Leonard <kleonard@tualatin.gov>; Madeleine Nelson <mnelson@tualatin.gov>; City of Wilsonville <neamtzu@ci.wilsonville.or.us>; DEQ <deqinfo@deq.state.or.us>; Metro <landusenotifications@oregonmetro.gov>; ODOT <ODOT_R1_DevRev@odot.state.or.us>; Trimet <baldwinb@trimet.org>; Clean Water Services <humphreysj@cleanwaterservices.org>; Naomi Vogel <Naomi_Vogel@co.washington.or.us>; Darby, Ty M. <Ty.Darby@tvfr.com>; Republic Services <jolivares@republicservices.com>; Sherwood School District <pjohanson@sherwood.k12.or.us>; The Intertwine Alliance <info@theintertwine.org>; Tualatin Chamber of Commerce <Caitlyn@tualatinchamber.com>; Ziply Fiber <OR.METRO.ENGINEERING@ZIPLY.COM>; PGE <tod.shattuck@pgn.com>; brandon.fleming@pgn.com; kenneth.spencer@pgn.com; NW Natural <richard.girard@nwnatural.com>; WCCCA <icrawford@wccca.com>

Subject: Notice of Hearing June 8th: AR 22-0001 Plambeck Gardens Apartments, 23500 SW Boones Ferry Road



NOTICE OF HEARING AND OPPORTUNITY TO COMMENT

NOTICE IS HEREBY GIVEN that a public hearing will be held before the City of Tualatin Architectural Review Board on Wednesday June 8, 2022 at 6:30 p.m. All are invited to attend the hearing and testify verbally. The hearing will be held at the Tualatin Service Center, 10699 SW Herman Road, Tualatin, OR 97062, and a Zoom meeting link will be published with the meeting agenda and packet materials at: www.tualatinoregon.gov/meetings.

Carleton Hart Architecture, on behalf of Community Partners for Affordable Housing, is requesting approval to construct a 116 unit multi-family development. The 4.68 acre site is zoned High Density Residential (RH) and located at 23500 SW Boones Ferry Road, Tax Lot: 2S135D000303.

You may view the application materials on our Projects web page:

<https://www.tualatinoregon.gov/planning/ar-22-0001-plambeck-gardens-apartments>.

Individuals wishing to comment may do so in writing to the Planning Division prior to the hearing and/or present written and/or verbal testimony to the Architectural Review Board at the hearing. To be included in the materials packet published ahead of the hearing, comments must be **received by May 25, 2022**. Hearings begin with a staff presentation, followed by testimony by proponents, testimony by opponents, and rebuttal. The time of individual testimony may be limited. If a participant requests before the hearing is closed, the record shall remain open for at least 7 days after the hearing.

All citizens are invited to attend and be heard upon the Architectural Features application: Failure of an issue to be raised in the hearing, in person, or by letter, or failure to provide sufficient specificity to afford the decision maker an opportunity to respond to the issue precludes appeal to the State Land Use Board of Appeals (LUBA) based on that issue. The failure of the applicant to raise constitutional or other issues relating to the proposed conditions of approval with sufficient specificity to the decision maker to respond to the issue precludes an action for damages in circuit court.

Type III Architectural Review Criteria: Tualatin Development Code Chapters: 32, 33, 43, 73A-D, 74, 75

A staff report will be available seven days prior to the public hearing, published at www.tualatinoregon.gov/meetings. This meeting and any materials being considered can be made accessible upon request.

Written comments and questions can be submitted to: eengman@tualatin.gov.

Erin Engman

Senior Planner

City of Tualatin | Planning Division

503.691.3024 | www.tualatinoregon.gov

From: [Erin Engman](#)
To: [Erin Engman](#); [Megan George](#); [Betsy Ruef](#)
Cc: [riverparkcio@gmail.com](#); [jasuwiz@gmail.com](#); [famtunstall1@frontier.com](#); [dan@danhardyproperties.com](#); [katepinamonti@hotmail.com](#); [jraikoglo@aol.com](#); [daniel@bachhuber.co](#); [cio.east.west@gmail.com](#); [doug_ulmer@comcast.net](#); [dana476@gmail.com](#); [mcrowell248@comcast.net](#); [tualatinmidwestcio@gmail.com](#); [tmpgarden@comcast.net](#); [MartinazziWoodsCIO@gmail.com](#); [solson.1827@gmail.com](#); [delmoore@frontier.com](#); [jamison.l.shields@gmail.com](#); [claudia.sterling@comcast.net](#); [janet7531@gmail.com](#); [roydloop@gmail.com](#); [Tualatinibachcio@gmail.com](#); [edkcnw@comcast.net](#); [jmakarowsky@comcast.net](#); [patricia.parsons@ctt.com](#); [rwcleanrooms@gmail.com](#); [byromcio@gmail.com](#); [pdxalex@icloud.com](#); [mwestenhaver@hotmail.com](#); [deb.fant@gmail.com](#); [tualatincommercialcio@gmail.com](#); [scottm@capacitycommercial.com](#); [famtunstall1@frontier.com](#); [brian@box2.com](#)
Subject: Notice of Hearing June 8th: AR 22-0001 Plambeck Gardens Apartments, 23500 SW Boones Ferry Road
Date: Wednesday, April 27, 2022 2:34:01 PM



NOTICE OF HEARING AND OPPORTUNITY TO COMMENT

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Carleton Hart Architecture, on behalf of Community Partners for Affordable Housing, is requesting approval to construct a 116 unit multi-family development. The 4.68 acre site is zoned High Density Residential (RH) and located at 23500 SW Boones Ferry Road, Tax Lot: 2S135D000303.

You may view the application materials on our Projects web page:
<https://www.tualatinoregon.gov/planning/ar-22-0001-plambeck-gardens-apartments>.

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court.

Type III Architectural Review Criteria: Tualatin Development Code Chapters: 32, 33, 43, 73A-D, 74, 75

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Written comments and questions can be submitted to: eengman@tualatin.gov.

Erin Engman

Senior Planner

City of Tualatin | Planning Division

503.691.3024 | www.tualatinoregon.gov



FIRE CODE / LAND USE / BUILDING REVIEW APPLICATION

North Operating Center
 11945 SW 70th Avenue
 Tigard, OR 97223
 Phone: 503-649-8577

South Operating Center
 8445 SW Elligsen Rd
 Wilsonville, OR 97070
 Phone: 503-649-8577

REV 6-30-20

Project Information

Applicant Name: Jilian Saurage Felton
 Address: 6380 SW Capitol Hwy, #151, Portland, OR 97239
 Phone: (503) 293-4038
 Email: jsaurage@cpahoregon.org
 Site Address: 23500 & 23550 SW Boones Ferry Road
 City: Tualatin
 Map & Tax Lot #: 303
 Business Name: Community Partners for Affordable Housing
 Land Use/Building Jurisdiction: City of Tualatin
 Land Use/ Building Permit # VAR21-0003

Choose from: Beaverton, Tigard, Newberg, Tualatin North Plains, West Linn, Wilsonville, Sherwood, Rivergrove, Durham, King City, Washington County, Clackamas County, Multnomah County, Yamhill County

Project Description

Plambeck Gardens is an multifamily affordable housing project that will provide 116 new affordable units in the City of Tualatin. The project consists of two 4-story residential buildings and one 1-story community building for residents with three garages on site. The site will have one site access point along Boones Ferry Road on the northern end of the property and a second emergency access only point along Boones Ferry Road on the southern end of the site.

The project shows a future site access point to the south that will connect to the Autumn Sunrise development across the Horizon Community Church property. This future site access point will replace the northern site access point along Boones Ferry Road as the sole primary access to the site, as Washington County will require that connection be removed when the future access point can be established. The time line for this change is dependent on if and when the church decides to develop on their property, or grants an easement to the Plambeck Gardens project. There is no indication yet that an easement will be granted and the team is not aware of Horizon's development time line.

Permit/Review Type (check one):

Land Use / Building Review - Service Provider Permit
 Emergency Radio Responder Coverage Install/Test
 LPG Tank (Greater than 2,000 gallons)
 Flammable or Combustible Liquid Tank Installation (Greater than 1,000 gallons)
 * Exception: Underground Storage Tanks (UST) are deferred to DEQ for regulation.
 Explosives Blasting (Blasting plan is required)
 Exterior Toxic, Pyrophoric or Corrosive Gas Installation (in excess of 810 cu.ft.)
 Tents or Temporary Membrane Structures (in excess of 10,000 square feet)
 Temporary Haunted House or similar
 OLCC Cannabis Extraction License Review
 Ceremonial Fire or Bonfire (For gathering, ceremony or other assembly)

For Fire Marshal's Office Use Only

TVFR Permit # 2021-0095
 Permit Type: CPP
 Submittal Date: 09/14/2021
 Assigned To: MOONEY/DEBOIS
 Due Date: 03/09/2022
 Fees Due: TBD
 Fees Paid: PENDING/TBD

Approval/Inspection Conditions
 (For Fire Marshal's Office Use Only)

<p>This section is for application approval only</p> <p><u>DREW DEBOIS</u> <u>03/09/2021</u> Fire Marshal or Designee Date</p> <p>Conditions: <u>REVISION TO PREVIOUSLY APPROVED PROJECT. SEE PER REVIEW LETTER FROM DFM MOONEY DATED 09/2021 ERAS OR METAL SYSTEM REQUIRING</u></p> <p>See Attached Conditions: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Site Inspection Required: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p>	<p>This section used when site inspection is required</p> <p>Inspection Comments:</p> <p>Final TVFR Approval Signature & Emp ID _____ Date _____</p>
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GENERAL NOTES:

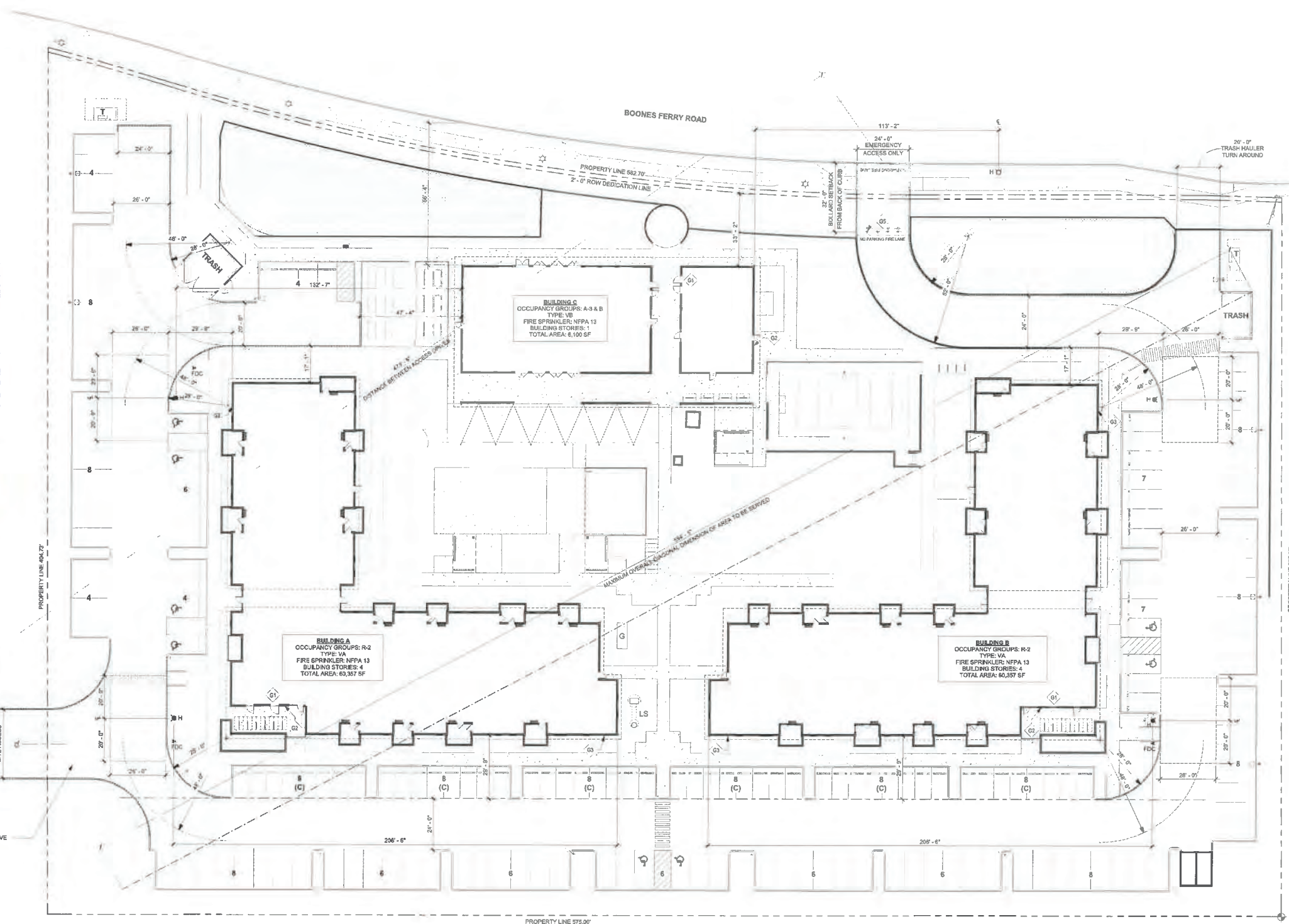
- A. EMERGENCY RESPONDER RADIO SYSTEM WILL BE A DEFERRED APPROVAL.

KEYNOTES:

- G1 FIRE RISER ROOM
- G2 PROPOSED FIRE DEPARTMENT KNOX BOX LOCATION
- G3 PROPOSED BUILDING SIGNAGE LOCATION
- G5 WRENCH OPERATED REMOVABLE BOLLARD - SAFETY YELLOW

LEGEND:

- PATH OF EGRESS OR EXIT DISCHARGE
- PROPERTY LINE
- IMAGINARY LOT LINE BETWEEN BUILDINGS TO DETERMINE PSD
- OUTLINE OF BUILDING ROOF ABOVE
- PAVING STRIPING & MARKED "NO PARKING FIRE LANE" PER TVFR - RED STRIPING & WHITE LETTERING
- CURBS - PAINTED RED & MARKED "NO PARKING FIRE LANE" PER TVFR
- HCI** NEW PUBLIC FIRE HYDRANT - REFER TO CIVIL
- HE** NEW PRIVATE FIRE HYDRANT - REFER TO CIVIL
- FDC** FIRE DEPARTMENT CONNECTION
- T** TRANSFORMER
- G** GENERATOR
- LS** LIFT STATION



TVFR - FLS SITE PLAN
SCALE: 1" = 20'-0"

TUALATIN VALLEY FIRE & RESCUE
APPROVED

CONDITIONALLY APPROVED

APPROVAL OF PLANS IS NOT AN APPROVAL OF OMISSIONS OR OVERSIGHTS.

SEE ATTACHED LETTER

PLANS EXAMINER

DATE

TVFR PERMITS #2021-0095

COMMENTS - CLIENTS MUST APPROVE THESE. DO NOT REPRODUCE WITHOUT PERMISSION.



CARLETON HART ARCHITECTURE P.C.
830 SW 10th Avenue #200 Portland Oregon 97205
503.243.2452 | www.carletonhart.com

PLAMBECK GARDENS
COMMUNITY PARTNERS FOR AFFORDABLE HOUSING
23500 & 23550 SW BOONES FERRY ROAD
TUALATIN, OREGON 97062
TVFR SUBMITTAL

BUILDING ELEVATIONS

PROJECT NO.
#19031

02.24.2022

REVISIONS:

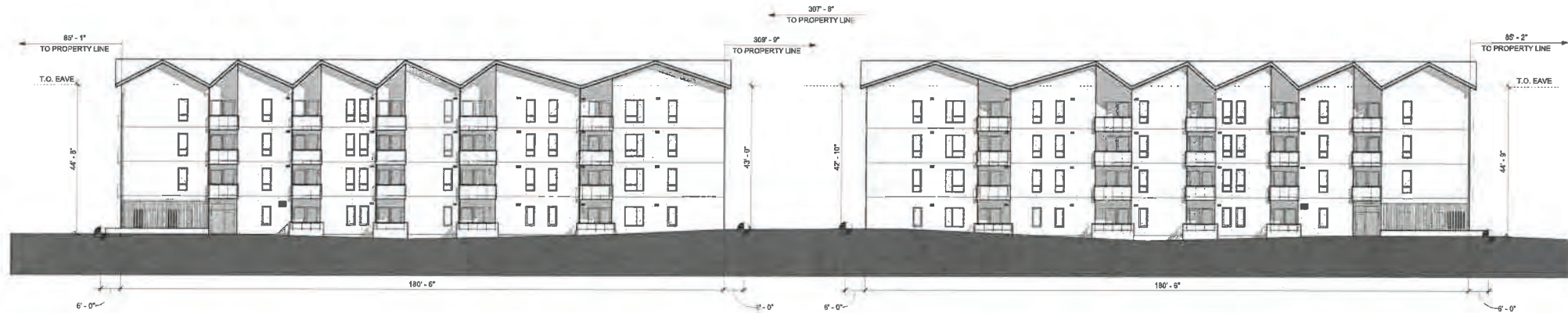
FS-2



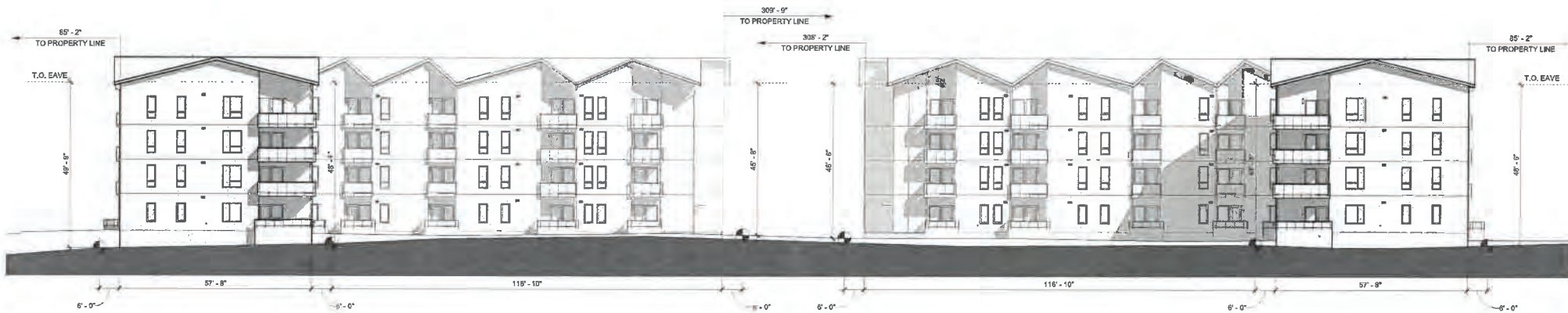
3 SOUTH ELEVATION - BUILDING A
SCALE: 1/16" = 1'-0"



4 NORTH ELEVATION - BUILDING B
SCALE: 1/16" = 1'-0"



1 EAST ELEVATION - BUILDINGS A & B
SCALE: 1/16" = 1'-0"



2 WEST ELEVATION - BUILDINGS A & B
SCALE: 1/16" = 1'-0"

TUALATIN VALLEY FIRE & RESCUE
APPROVED
CONDITIONALLY APPROVED
APPROVAL OF PLANS IS NOT AN APPROVAL OF
OMISSIONS OR OVERSIGHTS.

SEE ATTACHED LETTER
PLANS EXAMINER [Signature]
DATE 03/03/2022

DAVE DEBOIS DEM1 OFI
RFPN PERMIT # 2021-0095

DeBois, Drew S.

From: Kayla Zander <kayla.zander@carletonhart.com>
Sent: Thursday, March 3, 2022 10:31 AM
To: DeBois, Drew S.
Cc: Noah Harvey; Dristi Manandhar; Darby, Ty M.; Melissa Soots
Subject: RE: Plambeck Gardens | TVFR Site Plan
Attachments: Plambeck Gardens_TVFR_FS-1_Site Plan.pdf

The sender is from outside TVF&R – Do not click on links or attachments unless you are sure they are safe

Thanks for the clarification on that Drew. I have added that note to this site plan attached here. It is in the upper left corner in the “general” section.

Regards,

kayla zander, CPHC® | associate | project designer
pronouns: she/her/hers
CARLETON HART ARCHITECTURE PC
inspiring community through design for more than 25 years
830 sw 10th ave #200, portland, or 97205 | mobile 608.354.8163
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From: DeBois, Drew S. <Drew.DeBois@tvfr.com>
Sent: Thursday, March 3, 2022 9:33 AM
To: Kayla Zander <kayla.zander@carletonhart.com>
Cc: Noah Harvey <noah.harvey@carletonhart.com>; Dristi Manandhar <dristi.manandhar@carletonhart.com>; Darby, Ty M. <Ty.Darby@tvfr.com>; Melissa Soots <melissa.soots@carletonhart.com>
Subject: Re: Plambeck Gardens | TVFR Site Plan

Thanks for the updated information Kayla. In that you're still looking at options, the cleanest way to memorialize this would be to list the Emergency Responder Radio System as a deferred approval on sheet FS-1. You'll still have the flexibility to go the MERRC route up to the point of building permits and it will cover our policy requirements. If you can make that one minor adjustment I should be able to get everything back to you today.

Sincerely,

Drew DeBois
Deputy Fire Marshal/CFI
Tualatin Valley Fire & Rescue
503-259-1404

From: Kayla Zander <kayla.zander@carletonhart.com>
Sent: Wednesday, March 2, 2022 5:21 PM
To: DeBois, Drew S. <Drew.DeBois@tvfr.com>
Cc: Noah Harvey <noah.harvey@carletonhart.com>; Dristi Manandhar <dristi.manandhar@carletonhart.com>; Darby, Ty M. <Ty.Darby@tvfr.com>; Melissa Soots <melissa.soots@carletonhart.com>
Subject: RE: Plambeck Gardens | TVFR Site Plan

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Drew,

Thanks so much for helping us meet this deadline, it is much appreciated!!! See comments below in **RED**. Please note that north is to the right on our site plan, as it relates to my responses below.

kayla zander, CPHC® | associate | project designer

pronouns: she/her/hers

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From: DeBois, Drew S. <Drew.DeBois@tvfr.com>

Sent: Wednesday, March 2, 2022 4:53 PM

To: Kayla Zander <kayla.zander@carletonhart.com>

Cc: Noah Harvey <noah.harvey@carletonhart.com>; Dristi Manandhar <dristi.manandhar@carletonhart.com>; Darby, Ty M. <Ty.Darby@tvfr.com>; Melissa Soots <melissa.soots@carletonhart.com>

Subject: RE: Plambeck Gardens | TVFR Site Plan

Hi Kayla,

I should be able to get this back to you tomorrow. If you would, can you clarify the following:

- Please show the location of the campus Knox box. The original plan shows it on the small building just north of Building C. I'm assuming this is the leasing office?
 - We are currently showing one knox box at each building. They are labeled with Keynote G2 on the updated FS-1 sheet.
 - Building A - located on the east façade near the entry closest to the fire room (keynote G1)
 - Building B - located on the east façade near the entry closest to the fire room (keynote G1)
 - Building C (Leasing office/ community building) - North side of building – we are happy to move this wherever you think is the best location. G1 keynotes on the site plan notes the fire room locations.
- Please show the location of the FDC and fire hydrant that will service Building C. It appears that the original plan was using a public hydrant along SW Boones Ferry.
 - There are three FDCs proposed on our property, one for each building. They are shown on the updated FS-1 sheet and labeled "FDC" – refer to the legend in the lower right corner for symbol.
 - Building A - located in the southeast corner of the building – closest spot to the fire room and knox box for the building
 - Building B - located in the northeast corner of the building – closest spot to the fire room and knox box for the building
 - Building C - located near the southwest corner of Building A near the accessible parking stalls
- Is the plan to install an Emergency Responder Radio System in Buildings A & B or is the intent to go the Mobile Emergency Responder Radio Coverage (MERRC) fee in lieu of option? If you prefer the fixed systems, please list it as a deferred approval on Sheet FS-1. If the MERRC options looks attractive, please complete and return an application for both Building A & B (see attached PDF). Either option is acceptable however we've yet to have a developer select the fixed system route when presented with the MERRC option as it has always resulted in a cost savings.
 - The current drawings include a shaft and room for the Emergency Responder Radio System. I believe the client is planning to do whichever option is the most economical, but we are still

waiting on pricing for what the full Emergency Ratio System would cost. Is it possible to get an answer to this question down the road, but before we submit for permit. We are aware that it needs to be one of the two options, but just not 100% sure on which option we will be pursuing.

Thanks in advance and feel free to contact me if you have questions or need anything further.

Sincerely,

*Drew S. DeBois
Deputy Fire Marshal CFI
Tualatin Valley Fire & Rescue
11945 SW 70th Ave.
Tigard, Oregon, 97223
503-259-1404 Direct*

From: Kayla Zander <kayla.zander@carletonhart.com>

Sent: Wednesday, March 2, 2022 1:50 PM

To: DeBois, Drew S. <Drew.DeBois@tvfr.com>

Cc: Noah Harvey <noah.harvey@carletonhart.com>; Dristi Manandhar <dristi.manandhar@carletonhart.com>; Darby, Ty M. <Ty.Darby@tvfr.com>; Melissa Soots <melissa.soots@carletonhart.com>

Subject: RE: Plambeck Gardens | TVFR Site Plan

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Drew –

I wanted to follow up and see if it is possible to get this today or tomorrow to include in our architectural review submittal that is going to be submitted Friday morning.

Thanks!

kayla zander, CPHC® | associate | project designer

pronouns: she/her/hers

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From: Kayla Zander

Sent: Thursday, February 24, 2022 11:20 AM

To: DeBois, Drew S. <Drew.DeBois@tvfr.com>

Cc: Noah Harvey <noah.harvey@carletonhart.com>; Dristi Manandhar <dristi.manandhar@carletonhart.com>; Darby, Ty M. <Ty.Darby@tvfr.com>; Melissa Soots <melissa.soots@carletonhart.com>

Subject: RE: Plambeck Gardens | TVFR Site Plan

Importance: High

Drew -

Please see the updated documents. Please note, the only update since the set we sent you on January 20th is the site plan (FS-1) sheet. We are planning to submit the application next week, so anything you can do to help get this approval back to us by Wednesday next week would be greatly appreciated.

Thanks!

kayla zander, CPHC® | associate | project designer

pronouns: she/her/hers

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From: DeBois, Drew S. <Drew.DeBois@tvfr.com>

Sent: Wednesday, February 23, 2022 2:46 PM

To: Kayla Zander <kayla.zander@carletonhart.com>

Cc: Noah Harvey <noah.harvey@carletonhart.com>; Dristi Manandhar <dristi.manandhar@carletonhart.com>; Darby, Ty M. <Ty.Darby@tvfr.com>

Subject: RE: Plambeck Gardens | TVFR Site Plan

Hi Kayla,

Best bet would be to forward the most current drawing. Thanks for checking.

Sincerely,

Drew S. DeBois

Deputy Fire Marshal CFI

Tualatin Valley Fire & Rescue

11945 SW 70th Ave.

Tigard, Oregon, 97223

503-259-1404 Direct

From: Kayla Zander <kayla.zander@carletonhart.com>

Sent: Monday, February 21, 2022 8:43 AM

To: DeBois, Drew S. <Drew.DeBois@tvfr.com>

Cc: Noah Harvey <noah.harvey@carletonhart.com>; Dristi Manandhar <dristi.manandhar@carletonhart.com>

Subject: RE: Plambeck Gardens | TVFR Site Plan

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Drew –

I hope all is well. We have actually changed our site plan again to remove the garages on the east side of the site and replace with standard surface parking stalls. Do you need a new site plan capturing this change, or is the application and drawings we submitted on January 20th sufficient? We are looking to submit for land use in about 1-1.5 weeks, so I am hoping we can get the approval from you to include in the application by that point.

Thanks!

kayla zander, CPHC® | associate | project designer
pronouns: she/her/hers
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From: Kayla Zander
Sent: Thursday, January 20, 2022 2:17 PM
To: DeBois, Drew S. <Drew.DeBois@tvfr.com>
Cc: Noah Harvey <noah.harvey@carletonhart.com>; Dristi Manandhar <dristi.manandhar@carletonhart.com>
Subject: RE: Plambeck Gardens | TVFR Site Plan

Drew –

Please see the original application and the updated drawings. I also attached the files we received from the first round with Tom for your reference.

Thanks!

kayla zander, CPHC® | associate | project designer
pronouns: she/her/hers
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From: DeBois, Drew S. <Drew.DeBois@tvfr.com>
Sent: Tuesday, January 18, 2022 2:25 PM
To: Kayla Zander <kayla.zander@carletonhart.com>
Cc: Noah Harvey <noah.harvey@carletonhart.com>; Dristi Manandhar <dristi.manandhar@carletonhart.com>
Subject: RE: Plambeck Gardens | TVFR Site Plan

Hi Kayla,

Original application with the revised drawing should do it.

Thanks for checking.

Sincerely,

Drew S. DeBois
Deputy Fire Marshal CFI
Tualatin Valley Fire & Rescue
11945 SW 70th Ave.

Tigard, Oregon, 97223
503-259-1404 Direct

From: Kayla Zander <kayla.zander@carletonhart.com>
Sent: Tuesday, January 18, 2022 8:57 AM
To: DeBois, Drew S. <Drew.DeBois@tvfr.com>
Cc: Noah Harvey <noah.harvey@carletonhart.com>; Dristi Manandhar <dristi.manandhar@carletonhart.com>
Subject: FW: Plambeck Gardens | TVFR Site Plan
Importance: High

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Drew –

I hope you are well. We had submitted our site plan and elevations to Tom back in September for approval. Since then, our driveway location and configuration has changed. Do you want us to resubmit an entire new application, site plan and elevations, or should we send you the original application with the new drawings via email? We already have a permit number, so I am not sure the best way to send the updated information to you for approval.

Thanks!

kayla zander, CPHC® | associate | project designer
pronouns: she/her/hers
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From: Noah Harvey <noah.harvey@carletonhart.com>
Sent: Tuesday, January 11, 2022 8:22 AM
To: Kayla Zander <kayla.zander@carletonhart.com>
Subject: FW: Plambeck Gardens

FYI. Looks like we submitted the permit on 9/9.

noah harvey | job captain
CARLETON HART ARCHITECTURE PC
inspiring community through design for more than 25 years
830 sw 10th ave #200, portland, or 97205 | 971.266.0322

From: Mooney, Thomas A. <Thomas.Mooney@tvfr.com>
Sent: Tuesday, September 14, 2021 4:58 PM
To: Noah Harvey <noah.harvey@carletonhart.com>
Subject: Re: Plambeck Gardens

You will only need to submit the fee in lieu permit to us if you choose that path. This conditional permit will work for building permits. Just be aware they will not issue permits if you have not paid the fee in lieu to us.

Tom Mooney, IAAI-CFI, MIAAI
Deputy Fire Marshal | Tualatin Valley Fire & Rescue

Direct: 503-259-1419

www.tvfr.com

From: Noah Harvey <noah.harvey@carletonhart.com>

Sent: Tuesday, September 14, 2021 1:54:28 PM

To: Mooney, Thomas A. <Thomas.Mooney@tvfr.com>

Subject: RE: Plambeck Gardens

*****The sender is from outside TVF&R – Do not click on links or attachments unless you are sure they are safe*****

Thanks, Tom. I appreciate your quick turnaround on this. One follow-up, will we need to submit another TVFR permit application when we're ready to submit for building permit? Or will this conditional approval document be the same one we submit at permit intake?

Thanks again.

noah harvey | job captain

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830 sw 10th ave #200, portland, or 97205 | 971.266.0322

From: Mooney, Thomas A. <Thomas.Mooney@tvfr.com>

Sent: Tuesday, September 14, 2021 12:15 PM

To: Noah Harvey <noah.harvey@carletonhart.com>

Subject: Plambeck Gardens

Hi Noah,

Attached are your conditionally approved site plans and permit. Please submit this documentation to the City Of Tualatin along with your other land use items.

If you have any questions please feel free to contact me directly.

Thank you,

Tom Mooney, IAAI-CFI, MIAAI

Deputy Fire Marshal | Tualatin Valley Fire & Rescue

Direct: 503-259-1419

www.tvfr.com

M E M O R A N D U M

Date: May 23, 2022

To: Erin Engman, Senior Planner, City of Tualatin

From: Jackie Sue Humphreys, Clean Water Services (CWS)

Subject: Plambeck Garden Apartments, AR22-0001, 2S135D000303

Please include the following comments when writing your conditions of approval:

PRIOR TO ANY WORK ON THE SITE

A Clean Water Services (CWS) Storm Water Connection Permit Authorization must be obtained. Application for CWS Permit Authorization must be in accordance with the requirements of the Design and Construction Standards, Resolution and Order No. 19-5 as amended by R&O 19-22, or prior standards as meeting the implementation policy of R&O 18-28, and is to include:

- a. Detailed plans prepared in accordance with Chapter 2, Section 2.04.
- b. Detailed grading and erosion control plan. An Erosion Control Permit will be required. Area of Disturbance must be clearly identified on submitted construction plans. If site area and any offsite improvements required for this development exceed one-acre of disturbance, project will require a 1200-CN Erosion Control Permit.
- c. Detailed plans showing the development having direct access by gravity to public storm and sanitary sewer.
- d. Provisions for water quality in accordance with the requirements of the above named design standards. Water Quality is required for all new development and redevelopment areas per R&O 19-5, Section 4.04. Access shall be provided for maintenance of facility per R&O 19-5, Section 4.07.6.
- e. If use of an existing offsite or regional Water Quality Facility is proposed, it must be clearly identified on plans, showing its location, condition, capacity to treat this site and, any additional improvements and/or upgrades that may be needed to utilize that facility.

- f. If private lot LIDA systems proposed, must comply with the current CWS Design and Construction Standards. A private maintenance agreement, for the proposed private lot LIDA systems, needs to be provided to the City for review and acceptance.
- g. Show all existing and proposed easements on plans. Any required storm sewer, sanitary sewer, and water quality related easements must be granted to the City.
- h. Application may require additional permitting and plan review from CWS Source Control Program. For any questions or additional information, please contact Source Control at (503) 681-5175.
- i. Any proposed offsite construction activities will require an update or amendment to the current Service Provider Letter for this project.

CONCLUSION

This Land Use Review does not constitute CWS approval of storm or sanitary sewer compliance to the NPDES permit held by CWS. CWS, prior to issuance of any connection permits, must approve final construction plans and drainage calculations.



May 19, 2022

To: Tony Doran - Engineering Associate

From: Naomi Vogel - Associate Planner

RE: Plambeck Garden Apartments

City File Number: AR 22-0001

County File Number: CP22-907

Tax Map and Lot Number: 2S135D000303

Location: SW Boones Ferry Road

Washington County Department of Land Use and Transportation has reviewed the above noted development application to build a 116-unit apartment complex. Access to the site is proposed on future H Street via Tract L, which will be constructed by Autumn Sunrise Subdivision. H Street will provide access to SW Boones Ferry Road, a county-maintained Arterial.

The applicant submitted a Traffic Impact Analysis dated February 2022 (Charbonneau Engineering) for the proposed development. County Traffic Engineering has reviewed the TIA for compliance with County R&O 86-95 "Determining Safety Improvements for Traffic" and concurs with the findings and recommendations of the TIA. Conditions of approval have been included to address the site's access to SW Boones Ferry Road via H Street. Approval of direct access from the subject site to SW Boones Ferry Road has not been evaluated or requested by the applicant at this time.

CONDITIONS OF APPROVAL

I. PRIOR TO ISSUANCE OF A PUBLIC IMPROVEMENT PERMIT BY THE CITY OF TUALATIN:

- A. Obtain a Washington County Facility Permit for all public improvements on SW Boones Ferry Road as noted below.
 1. Submit to Washington County Public Assurance Staff: A completed "Design Option" form (original copy), City's Notice of Decision (NOD) and County's Letter dated May 19, 2022

**Department of Land Use & Transportation
Operations and Maintenance**

1400 SW Walnut Street, MS 51, Hillsboro, OR 97123-5625
phone: 503-846-7623 • fax: 503-846-7620
www.co.washington.or.us/lut • lutops@co.washington.or.us

2. **\$30,000.00** Administration Deposit

NOTE: The Administration Deposit is a cost-recovery account used to pay for County services provided to the developer, including plan review and approval, field inspections, as-built approval, and permit processing. The Administration Deposit amount noted above is an estimate of what it will cost to provide these services. If, during the project, the Administration Deposit account is running low, additional funds will be requested to cover the estimated time left on the project (at then-current rates per the adopted Washington County Fee Schedule). If there are any unspent funds at project close out, they will be refunded to the applicant. Any point of contact with County staff can be a chargeable cost. If project plans are not complete or do not comply with County standards and codes, costs will be higher. There is a charge to cover the cost of every field inspection. Costs for enforcement actions will also be charged to the applicant.

3. Electronic submittal of engineering plans, geotech/pavement report, engineer's estimate, preliminary sight distance certification and the "Engineer's Checklist" (Appendix 'E' of County Road Standards) for construction of the following public improvements:

Note: Improvements within the ROW may be required to be relocated or modified to permit the construction of public improvements. All public improvements and modifications shall meet current County and ADA standards. Public improvements that do not meet County standards shall submit a design exception to the County Engineer for approval.

SW Boones Ferry Road

- a. Construction of a 12-foot multi-use path and 4-foot planter strip (excludes curb) with street trees. Street trees shall be to City standards. NOTE: The planter strip and multi-use path widths can be modified per County/City Engineer approval.
- b. Installation/modification of street lighting and conduit along the site's frontage of SW Boones Ferry Road to County standards.
- c. Closure of all existing access on SW Boones Ferry Road not approved with this development.
- d. Interim access to SW Boones Ferry Road if access to H Street is not available at the time of Certificate of Occupancy request. NOTE: Prior approval of a Design Exception to the Access standards is required.
- e. Closure of the interim access on SW Boones Ferry Road if required. Note: Closure of interim access is required when access to H Street is available.
- f. Construction access and traffic circulation/control plan.
- g. Preliminary Sight Distance Certification for access to SW Boones Ferry Road if direct access from the subject site is needed in the interim.
- h. Emergency access to SW Boones Ferry Road to County/Fire Marshal standards.

II. PRIOR TO APPROVAL OF THE FACILITY PERMIT BY WASHINGTON COUNTY:

- A. The following shall be recorded with Washington County Survey Division (John Kidd, Survey Division - 503.846.7932):
1. Provision of a non-access restriction along the site's frontage of SW Boones Ferry Road.
 2. Dedication of right-of-way required to permit the construction of the public improvements on SW Boones Ferry Road.
 3. Dedication of a PUE along the site's frontage of SW Boones Ferry Road. Width shall be to city requirements.

III. PRIOR TO OCCUPANCY OF THE APARTMENT COMPLEX BY THE CITY OF TUALATIN:

- A. The road improvements required in condition **I.A.3.** above shall be completed and accepted by Washington County.
- B. The traffic signal that will be constructed by Autumn Sunrise Subdivision on SW Boones Ferry Road and H Street shall be installed and accepted by Washington County. Signal cannot be operational until the signal warrants are met (subject to County Engineer approval).
- C. Engineer's estimate and deposit for future closure of the interim access on SW Boones Ferry Road, if required.

If you have any questions, please contact me at 503-846-7639.

Cc: Road Engineering Services
Traffic Engineering Services
Assurances Section
Transportation File



NOTICE OF PLANNING COMMISSION DECISION

**** APPROVAL WITH CONDITIONS ****

November 18, 2021

Case #:	VAR 21-0003
Project:	Plambeck Gardens
Location:	23500 & 23550 SW Boones Ferry Rd; Tax ID: 2S135D000303
Applicant:	Jilian Saurage Felton, Community Partners for Affordable Housing
Property Owner:	Kayla Zander, Carleton Hart Architecture

I. FINDINGS

- A. An application for a Variance (VAR 21-0003) was filed by Carleton Hart Architecture on behalf of Community Partners for Affordable Housing for a variance to maximum structure height standard in the High Density Residential (RH) zone and to the minimum parking requirements for multi-family dwellings in complexes with private internal driveways.
- B. The Tualatin Planning Commission (TPC) conducted a noticed quasi-judicial public hearing on November 18, 2021 in conformance with the laws of the State of Oregon and the City of Tualatin.
- C. The Planning Commission found the proposed variance will comply with the standards of the Tualatin Development Code (TDC). The TPC finds that the findings and analysis, the staff presentation, testimony at the public hearing, materials in the record, and discussion on the record, support the approval of the VAR 21-0003 with Conditions of Approval. The TPC further adopted the applicant's Narrative as supplemental to the staff findings and analysis.

II. ACTION

The Tualatin Planning Commission approved VAR 21-0003 and adopted the staff analysis and findings, dated November 18, 2021, and the applicant's Narrative as supplemental, with the following Conditions of Approval:

VAR-1 Development of the proposed 116-unit multi-family project will require submittal and approval of an Architectural Review (Type III) application, in accordance with TDC 33.020(3)(d)(iii).

VAR-2 Modification to this approval will require submittal and approval of a new Type III Variance application in accordance with TDC.

VAR-3 Structure height for proposed 116-unit multi-family project shall not be more than 54 feet in as measured in TDC 31.060.

VAR-4 A minimum of 170 vehicle parking spaces shall be provided for the proposed 116-unit multi-family project.

III. APPEAL

The applicant or any person who submitted written comments or testified orally or in writing at the Tualatin Planning Commission hearing and who may be adversely affected by the Commission's decision may file a request for review of the final decision of the Variance land application to the City Council.

The Tualatin Planning Commission's decision will be final after 14 calendar days from the mailing of this order, unless a written appeal is received by the **Community Development Department Planning Division at 10699 SW Herman Road, Tualatin, Oregon, before 5:00 p.m., December 9, 2021. The appeal must be submitted on the City appeal form with all the information requested provided thereon and signed by the appellant.** The record and appeal forms are available at the Planning Division offices. The appeal forms must include reasons and the applicable appeal fee and meet the requirements of Section 32.310 of the Tualatin Development Code. The City Council will review and make a decision. The parties will be notified of the Council meeting date.

ADOPTED THIS 18th DAY OF NOVEMBER 2021.

CITY OF TUALATIN
PLANNING COMMISSION

BY:



Bill Beers, Chair
Tualatin Planning Commission

From: [Melissa Soots](#)
To: [Erin Engman](#)
Cc: [Steve Koper](#); [Jilian Saurage Felton](#); [Michelle Black](#); [Kayla Zander](#); [Geoffrey Taylor](#); [Kim McMillan](#); [Heidi Springer](#); [Tony Doran](#); [Lindsey Hagerman](#)
Subject: RE: AR21-0001 Plambeck Gardens Completeness Letter and Additional Documentation Request
Date: Monday, May 16, 2022 4:42:21 PM

Erin,

Thank you for the response and information. Regarding the lot coverage, we referred to the Variance application in our Arch Review documents where the information was previously provided, but we do have an update because the garages were removed which reduced the lot coverage:

Residential Building A: 15,195 SF
Residential Building B: 15,195 SF
Community Building: 6,100 SF
Total Building Footprint: 36,490 SF
Total Site Area: 203,082 SF

Total Lot Coverage: 17.97%

Please let me know if anything else is needed. Thank you,

melissa soots, NCARB | associate | project manager
pronouns: she/her/hers
[CARLETON HART ARCHITECTURE PC](#)
Inspiring community through design
830 sw 10th ave #200, portland, or 97205 | 503.206.3187

From: Erin Engman <eengman@tualatin.gov>
Sent: Monday, May 16, 2022 2:33 PM
To: Melissa Soots <melissa.soots@carletonhart.com>
Cc: Steve Koper <skoper@tualatin.gov>; Jilian Saurage Felton <jsaurage@cpahoregon.org>; Michelle Black <michelle.black@carletonhart.com>; Kayla Zander <kayla.zander@carletonhart.com>; Geoffrey Taylor <gtaylor@cpahoregon.org>; Kim McMillan <kmcmillan@tualatin.gov>; Heidi Springer <hspringer@tualatin.gov>; Tony Doran <TDORAN@tualatin.gov>; Lindsey Hagerman <lhagerman@tualatin.gov>
Subject: RE: AR21-0001 Plambeck Gardens Completeness Letter and Additional Documentation Request

Hi Melissa-

Thanks for the call and email. Please find my initial responses below and let me know if a follow-up call would be helpful.

Erin Engman

Senior Planner
City of Tualatin | Planning Division

DATE: 6-7-2022

TO: CITY OF TUALATIN ARCHITECTURAL REVIEW BOARD (ARB)

C/O ERIN ENGMAN CITY OF TUALATIN PLANNING DEPARTMENT

RE: 6-8-2022 MEETING AGENDA ITEM #1

CONSIDERATION AR22-0001 ARCHITECTURAL REVIEW APPLICATION

CPAH PLAMBECK GARDENS HIGH DENSITY RESIDENTIAL HOUSING

-Preliminary Stormwater Plan Included Within AR 22-0001 Application

FROM: JOHN & GRACE LUCINI

We request a timely forwarding of our comments to all members of the Architectural Review Board for their consideration during deliberations on this Land Use Action -prior to the 6-8-2022 ARB Public Meeting .

The Public Notice we received regarding the submitted AR 22-0001 Architectural Review for the CPAH Plambeck Gardens Project specified the Review Criteria would be: **Tualatin Development Code (TDC) Chapters 32, 33, 43, 73 A-D, 74 and 75**. We are in agreement with the stated purpose of TDC CHAPTER 74 - PUBLIC IMPROVEMENT REQUIREMENTS

TDC 74.010:

"Land development without adequate transportation and utility systems will adversely affect the overall economic growth of the City and cause undue damage to the public health and welfare of its citizens."

The State of Oregon has requirements for municipalities of over 2,500 for the adoption of a Stormwater Management Plan.

Of major significance and problematic in reviewing the CPAH proposed Stormwater Plan, is the fact the City of Tualatin lacks an adopted Stormwater Management Plan for the Basalt Creek Area -as required by -**State of Oregon Land Conservation and Development Department Chapter 660 Division 11 PUBLIC FACILITIES PLANNING (OAR 660-011-0000)**...

"The purpose of the plan is to help assure that urban development in such urban growth boundaries is guided and supported by types and levels of urban facilities and services appropriate for the needs and requirements of the urban areas to be serviced, and that those facilities and services are provided in a timely, orderly and efficient arrangement, as required by Goal 11"(underline added)

We continue to submit general concerns as to the need for effective Stormwater Management Planning as part of Land Use Planning Actions impacting the Basalt Creek Area. If inadequate or ineffective Stormwater Management Planning for the Basalt Creek Area occurs, there are concerns as to downstream impacts upon soil and land erosion, water pollution, negative impacts upon existing high valued upland and riparian habitats, land instability/landslide hazards, and the safety of local citizens. These are elements of the State's Statewide Land Use Planning Goals which Stormwater effective Management Planning attempts to incorporate and address.

- The existing stormwater system along SW Boones Ferry Road was designed and constructed based upon the management needs of rural residence on mostly undeveloped property- not the higher management needs of high-density urban development.
- Neither Washington County nor the City of Tualatin have made significant modifications to the existing stormwater system which discharges stormwater from the east side of SW Boones Ferry Road to mitigate future flooding downstream events to our property and the various Natural Resources downstream.
- This existing stormwater system has already proven to have failed and flooded our property.

Documentation Of The Failure Of The Existing Stormwater System Along SW Boones Ferry Road

[Video-Upstream Stormwater Flooding Property2015](#)

[Video-Stormwater Flooding Around Home](#)

The volume, the velocity and the color of the stormwater should be noted.

These photos taken during this flooding event provide a glimpse of the amount of stormwater collected in the stormwater system and allowed to flow downstream, as well as the amount of soil/sediment displacement caused by the flow of the stormwater.



CPAH Stormwater Planning

In response to our multiple submissions requesting additional information and clarity on CPAH's Stormwater Plan for the Plambeck Gardens, we received further clarification of our follow up email to the City of Tualatin and CPAH on 6-3-2022.

This afternoon's communication from CPAH helped us more clearly understand their current intentions as to their planning and that their offsite stormwater management will not use the Washington County Outflow #5 that discharges onto our property.

We also learned that CPAH intends to collect stormwater runoff from all of the parking area on the southern portion of their property, and convey that runoff into their planned southern stormwater basin.

We request if there are major changes in the Stormwater Plan as described today in the email from CPAH, we are asking to be notified by either CPAH or the City of Tualatin.

Copies of communications between Lucinis-City of Tualatin- CPAH

[2022 5-25 to 27 Email Chain Lucini-Tualatin-CPAH.pdf](#)

[2022 6-3 Request for Additional Clarification CPAH Stormwater](#)

[2022 6-7 Additional Response from CPAH](#)

GENERAL COMMENTS AS TO LAND USE PLANNING / STORMWATER PLANNING WITHIN THE BASALT CREEK AREA

Due to the existing conditions and potential negative impacts in the Basalt Creek Area upon steep slopes, and multiple Natural Resources downstream from the CPAH property; the lack of an adopted stormwater Management Plan for the Basalt Creek Area; the City's existing Stormwater Master Plan which does not provide current planning nor guidance for Stormwater Management Planning in the Basalt Creek Area

There are also various State Land Use Planning documents and requirements pertaining to the development of and implementation of Stormwater Management Plans. The City of Tualatin lacks appropriate integration of the Basalt Creek Area into many of the City's governing documents.

This impacts the effective evaluation of many Land Use Planning Actions in the Basalt Creek Area as the City of Tualatin moves forward in the urbanization of the Area- andalso affects the regulations for the protection of wetlands, and high valued habitats in the Basalt Creek Area.

- The City of Tualatin Stormwater Master Plan was developed and adopted in 1972... and is currently the City's adopted Stormwater Master Plan
 - Stormwater Management Planning and Standards have changed since this Governing Document was adopted 5 decades ago
 - The information relating to the City's adopted Stormwater Master Plan not current as to Land Use Planning Zoning/Designations within the Basalt Creek Area, which questions the

applicability of City Codes which reference this document in Stormwater Management Planning in the Basalt Creek Area by the City of Tualatin.

- While numerous City of Tualatin Development Codes include requirements for the protection of wetlands and habitats, the inadequate integration of the Basalt Creek Area into the City's Governing Documents apparently does not provide for the protection of wetlands or high valued habitats known to exist in the Basalt Creek Area.
- It should be noted, **Tualatin City Development Chapter 74 - PUBLIC IMPROVEMENT REQUIREMENTS** include specific reference to Chapter 72 in the City's Development Code. **TDC Chapter 72 CHAPTER 72. - NATURAL RESOURCE PROTECTION OVERLAY DISTRICT (NRPO) pertains to the protection and conservation of Natural Resources- including wetlands and riparian habitats.**

However, TDC Chapter 72 protection of Natural Resources does not appear to extend outside of the Tualatin River Basin or Tonquin Scablands. The majority of the Basalt Creek Area – including the CPAH property and the lands downstream to the south of the CPAH property are located within the Willamette River Basin- not the Tualatin River Basin identified in TDC Chapter 72 protections of Natural Resources.

In addition, Chapter 72 also specifically references the City's Natural Resource Maps 72-1 and 72-3 as to where and which Natural Resources are to be protected or conserved by the City of Tualatin Development Code regulations.

The City of Tualatin adopted Maps of Natural Resources- lack relevant information as to multiple Natural Resources which exist in the Basalt Creek Area.

[City of Tualatin Map 72-3 Significant Natural Resources Map-ORD 1427-19 11-25-2019.pdf](#)
[City Tualatin Map 72-1 Natural Resources Protection Overlay Map Ord 1427-19](#)

Yet other governmental agencies have documented the existence of multiple Natural Resources in the Basalt Creek Area.

[National Wetlands Inventory-Basalt Creek Area](#)
[State Wetlands Inventory 14+ Acres Basalt Creek Canyon](#)
[Tapman Creek -Basalt Creek Flows to Willamette River](#)
[Metro- Steep Slopes >25% Grade Downstream CPAH](#)
[Metro Title #13 Natural Resources Basalt Creek](#)
[Land Instability/ Potential Landslide Hazard-Basalt Creek](#)

As the City's adopted Natural Resource Maps 72-1 and 72-3 contain very little information on Natural Resources which are known to exist in the Basalt Creek Area, it appears several regulations of the City of Tualatin Development Code apparently will not provide protection of many of the Natural Resources in the Basalt Creek. This amplifies the need for critical review of proposed Stormwater Plans for the Basalt Creek Area – are well written, accurate, comprehensive and provide clear timing and sequencing of infrastructure to be planned and functional when changes occur due to development in the area- to avoid downstream planning or system errors.

- The lack of documentation of Natural Resources within the City's adopted Natural Resources Maps 72-1 and 72-3, is also problematic in effectively evaluating the implementation of the CPAH

Stormwater Plan and potential impacts to Oregon Statewide Land Use Planning Goals which also provide some elements of implementation of Stormwater Management Planning:

Goal #2 Land Use Planning –
Goal #5 Natural Resources
Goal #6 Water Quality
Goal # 7 Natural Hazards
Goal #11 Public Facilities Planning

We thank Erin Engman of the City of Tualatin Planning Department, and Melissa Soots of Carlton Hart for their response to Citizen concerns.

We also thank the City of Tualatin Architectural Review Board for its consideration of the issues we have presented.

Respectfully submitted

John and Grace Lucini

23677 SW Boones Ferry Road Tualatin Oregon 97062

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From: [Carol Greenough](#)
To: [Ext - Planning](#)
Cc: [Geoffrey Taylor](#)
Subject: Plambeck Gardens Apartments Project ID: AR 22-0001.
Date: Monday, June 6, 2022 10:43:48 AM

Attn: Erin Engman

Dear Architectural Review Board,

I am unable to attend your meeting this week but wanted to express my support for the Plambeck Gardens project and my gratitude for your oversight in assuring that it moves forward effectively and efficiently. As a board member of Family Promise of Tualatin Valley I see the need everyday for affordable, pleasant housing for families. This project helps Tualatin take care of our community members in a powerful way.

Thank you for your service,

Carol Greenough
503-975-7808

From: [G Lucini](#)
To: [Erin Engman](#); [Melissa Soots](#)
Cc: [John Lucini](#)
Subject: Requesting Additional Clarification on 5-27-22 Response on AR 22-0001-(re 5-25-22 Lucini & La Liberte Environmental Submission)
Date: Friday, June 3, 2022 1:53:20 PM

Erin and Melissa,
Thank you for the responses to our request for information and clarification re Tualatin AR22-0001 Arch Review for Public Record.
We are submitting the questions below for additional clarity and understanding and relate to those we previously submitted.

Thank you for explaining that the public works permit mentioned in construction note 2 has not been approved at this time. The purpose of our request was to understand where the stormwater from the South basin will be directed.

Page 7 of the Preliminary Drainage Plan 5-2-22 contains the following regarding the disposition of stormwater from the Southern Basin- including identification of the use of **an EXISTING 12" stormwater system within Boones Ferry Road** for conveyance of southern stormwater off site flow.

The 5-2-22 Plan states:

Southern Basin

Stormwater runoff will be directed through a 10" stormwater pipe to the existing 12" stormwater system within Boones Ferry Road. It will flow approximately 750 feet south to a maintenance hole, which serves a portion of the remaining drainage basin prior to the discharge point. The downstream stormwater system then continues as a 15", which ultimately serves as the discharge point to a drainageway serving Tapman Creek. The drainageway is approximately 570 feet long. During the 25-year storm event, the 12" and 15" stormwater mains will be at 19% and 23% capacity, respectively. At the discharge point to the drainageway, runoff from the site represents 1.2% of the total tributary drainage flow during the 25-year storm event.

A quarter-mile downstream visual study was performed confirming there are no downstream obstructions.

There are no facilities upstream of the south basin.

There are various existing stormwater pipes along SW Boones Ferry Road- Some on the soil side of the curb, and some on the street side of the curb. We could not identify on Sheet Plan 3.01 Stormwater Plan - Southwest where the specific existing 12" stormwater system referenced in the Drain Plan is located.

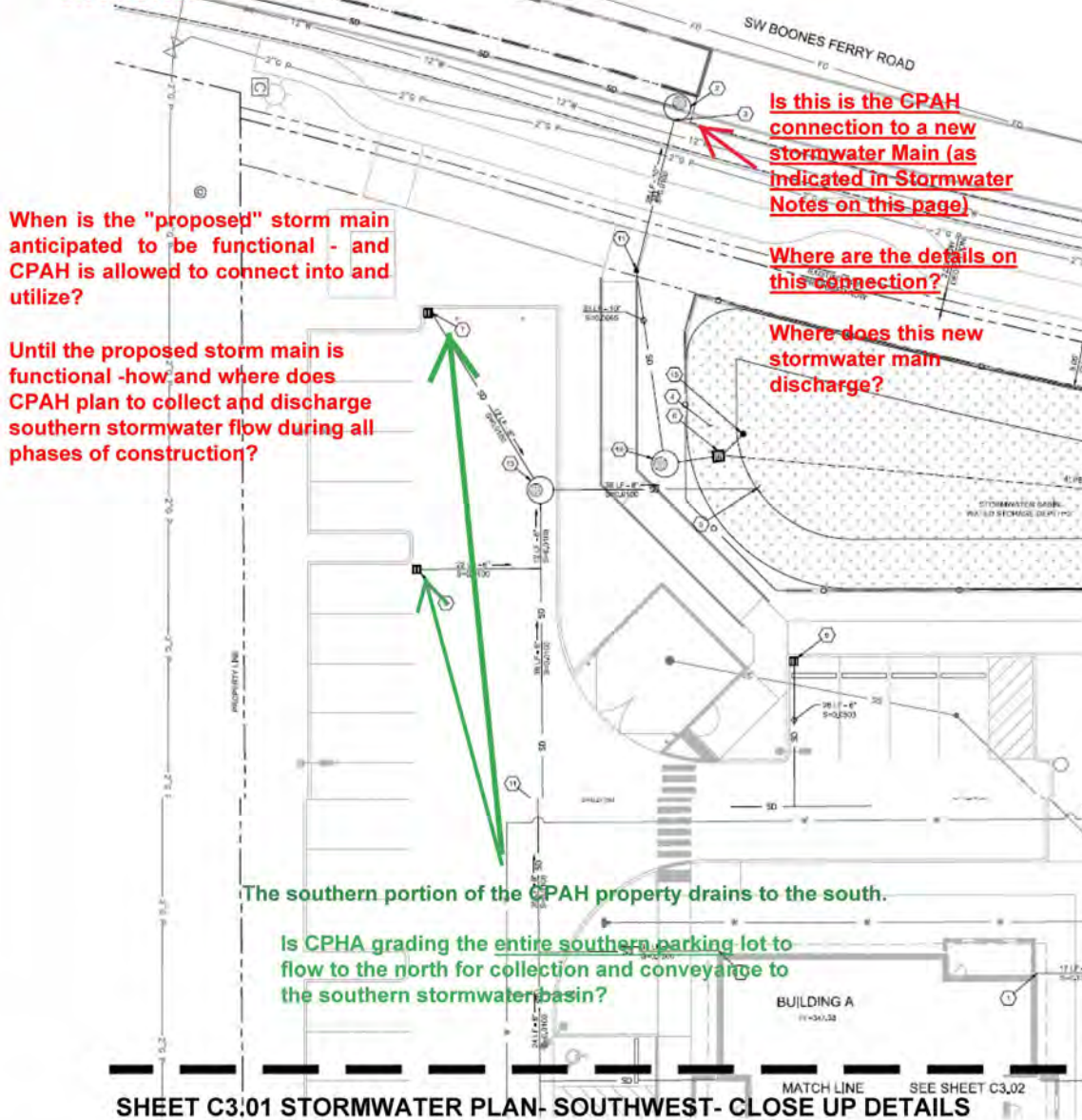
There appears to be conflicting information between these statements within **the 5-2-22 Drainage Report Southern Basin** information ----and the **Plan Set Map C3.01 Stormwater Plan Southwest** (both on the map and in the accompanying Stormwater Notes) submitted for the ARB 6-8-22 meeting.

We have included a copy of Plan Map 3.01 with our notations.

PLEASE PROVIDE CLARITY The multiple AR-22-0001 documents provide conflicting information

The Preliminary Storm Drainage Report Revised 5-2-22 page 7 -Southern Basin states 'planned connection to a 12" existing stormwater system within Boones Ferry Road.'

- WHERE IS THIS EXISTING PIPE IDENTIFIED ON THIS STORMWATER PLAN?
- WHERE DOES THIS EXISTING 12" PIPE DISCHARGE?
- THIS PLAN SHEET'S STORMWATER NOTE #2 STATES- CONNECTION TO NEW PUBLIC STORMWATER MAIN- BUT LACKS WHERE THIS NEW MAIN WOULD DISCHARGE



When is the "proposed" storm main anticipated to be functional - and CPAH is allowed to connect into and utilize?

Until the proposed storm main is functional -how and where does CPAH plan to collect and discharge southern stormwater flow during all phases of construction?

Is this the CPAH connection to a new stormwater Main (as indicated in Stormwater Notes on this page)

Where are the details on this connection?

Where does this new stormwater main discharge?

The southern portion of the CPAH property drains to the south.

Is CPAH grading the entire southern parking lot to flow to the north for collection and conveyance to the southern stormwater basin?

SHEET C3.01 STORMWATER PLAN- SOUTHWEST- CLOSE UP DETAILS

The SW Stormwater Plan Map 3.01 provided with the ARB submission does not provide information as to the location or diameter of the existing pipes referenced in the Drainage Plan- which is necessary to understand how CPAH is intending to convey stormwater runoff or overflow from the southern half of their property.

In addition, the SW Stormwater Plan Map 3.01 indicates use of a "connection to new public stormwater main"

Please provide clarification as to which and where CPAH is intending to discharge the southern stormwater

runoff or overflow

1. Will an existing pipe be used (as stated in the Drainage Report 5-2-22)?

A. If so, please clearly identify which one of the existing pipes will be used to convey the stormwater flow from the southern portion of the CPAP property offsite.

B. Please clearly identify where this pipe discharges.

There is an existing stormwater pipe along SW Boones Ferry Road which currently accepts stormwater runoff from the southern portion of the CPAH property and discharges onto our property on the west side of Boones Ferry Road.

As part of the Tualatin Planning Commission Final Decision of 12-13-21 for the Autumn Sunrise Subdivision ruling - Condition #36 requires the abandonment of the conduit discharging onto our property -Tax lot #302.

We want to remind the City and provide CPAH notice and understanding there will be changes in the existing downstream stormwater flow from their property, and that thoughtful and effective stormwater management and planning within the Basalt Creek Area is necessary for the protection of citizens, property and the environment- including the 14+ acres of wetlands where the southern flow which currently discharges onto our property flows.

2. It CPAH is planning to connect into a "new" or "proposed" stormwater main down SW Boones Ferry Road-there are concerns as to basing a Stormwater Plan for a large high density residential complex of buildings - on what has been referenced as a "proposed" or "new" stormwater main- without providing important specifics.

A. What is the status of the construction of the new main?

B. Who is the company or government in charge of the proposed stormwater main?

C. Have the plans and permits been drawn?

D. Has all funding for the project been obtained?

E. When is the anticipated date of completion of the stormwater main?

F. Has CPAH been authorized to connect into the main?

As part of the provision of Stormwater Management as a Key Public Service- to assure the safe and effective provision of stormwater management:

3. Has the City of Tualatin and/or Washington County and CPAH planned for timing and sequencing for the new main to be functional to accept stormwater runoff or overflow from the CPAH property-

A. knowing the existing stormwater system discharging onto our property has already proven to have failed? and

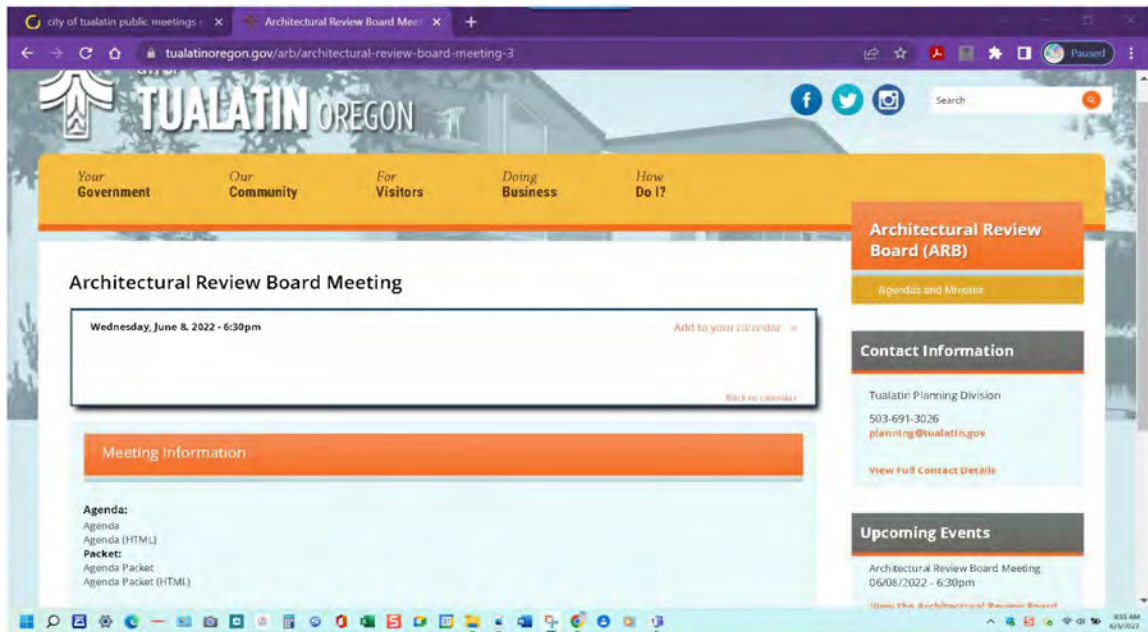
B. knowing there will be changes to the existing downstream system required as part of the Autumn Sunrise Development?

4. As the stormwater flow from the southern portion of the CPAH property flows south, Plan Sheet C3.01 indicates intake connections of stormwater runoff from the southern parking area centrally located in the parking area.

How does CPAH plan to collect the parking lot runoff south of these two intakes into the proposed system which is uphill?

Please see the CPAH document- Topographical Survey CPAH Var 21-0003 which indicates the existing grade of the southern portion of the CPAH property.

The City's website for the 6-8-22 Public Meeting lacks information on location or a virtual meeting link- this is a screenshot from the City's website for the Public Meeting.



We hope this information is useful to you,

Regards,

John and Grace Lucini

From: [Erin Engman](#)
To: [G Lucini](#)
Cc: [John Lucini](#); [Steve Koper](#); [Heidi Springer](#); [Tony Doran](#)
Subject: RE: Request for Information and Clarification RE: Tualatin AR 22-0001 CPAH Arch Review- for Public Record
Date: Friday, May 27, 2022 1:02:00 PM
Attachments: [RE Request for Information and Clarification RE Tualatin AR 22-0001 CPAH Arch Review- for Public Record.msg](#)

Happy Friday Grace-

And thank you for the follow up questions. To answer your first question, the published packet comprises the record for consideration by the Architectural Review Board. The applicant has provided us with the attached email including additional materials, and I will add these materials to the record reviewed by the ARB. If additional info is received after the packet is published, we will be sure to note that at the hearing.

Comments on the land use application should be directed to the applicable Architectural Review criteria and, as pertinent, would be addressed in the Findings and Analysis. The Findings and Analysis will be part of the hearing packet, and will published at least 7 days before the hearing:

<https://www.tualatinoregon.gov/meetings>

And to answer the second question, as the proposal will be decided by the Architectural Review Board, the information will be shared only with them to satisfy the Oregon land use goals/rules. We do not send public comments/questions to the Planning Commission for projects in which they are not the deciding body on.

Enjoy your holiday weekend!

Erin Engman

Senior Planner

City of Tualatin | Planning Division

503.691.3024 | www.tualatinoregon.gov

From: G Lucini <grluci@gmail.com>
Sent: Thursday, May 26, 2022 1:24 PM
To: Erin Engman <eengman@tualatin.gov>
Cc: John Lucini <jwluci@gmail.com>; Steve Koper <skoper@tualatin.gov>; Heidi Springer <hspringer@tualatin.gov>; Tony Doran <TDORAN@tualatin.gov>
Subject: Re: Request for Information and Clarification RE: Tualatin AR 22-0001 CPAH Arch Review- for Public Record

Hi Erin,
Thanks for your email.

A couple of questions...

- 1- If the applicant or their representatives submits to the City any additional information regarding their Architectural Review application- prior to the ARB meeting on June8, 2022- including information which relates or impacts their stormwater management plans previously posted on the City's website for

Public Review- would this newly submitted information be posted to the City's website or be available for Public Review prior to the ARB meeting?

--- Is there a mechanism by which we could be notified of additional information or changes to an application which would be provided to the ARB for their deliberations-which has been made since 5-8-22 to the City's website for AR 22-0001?

We understand some Public Agenda Items are dynamic and fluid- with negotiations occurring up to the minute of a Public Meeting- but there have been situations where changes to an application or to the supporting documents occur days in advance of a hearing.

When this situation occurs, and no notice or comment is included on changes made to the contents made on the Public Posting of the Informational Packet- it presents a situation where any interested party may have to continuously-review hundreds of pages of all of the documents in the Informational Packet, and attempt to determine if any changes have been made to any of the materials within the Informational Packet from the day of the 1st posting up until the day of the Public Meeting in order to fully understand the current issues to be presented to a governing body. This hampers the Public's knowledge and understanding of the current relevant facts of the materials submitted for consideration and inclusion for deliberation by the governing body.

We notice many of the Washington County's Public Meetings Agendas include a notification on the Agenda Subject Line if changes have been made to the Informational Packet on previously posted documents- this "Change Notice" notice is added to the Subject Line in Red Font which assists in alerting all interested parties of changes to information which may impact the ultimate outcomes or determinations of that agenda item, and provides an avenue for the General Public access to current facts and understanding of the issues.

2- We weren't sure from your email if our email from yesterday was forwarded to all members of the ARB and/or all members of the TPC (in the City's state role that the TPC fulfills all Goal #1 Citizen Involvement requirements for the City of Tualatin).

As we are requesting understanding of many of the technical issues and documents submitted within the application, if we are unable to contact the TPC with our questions, would you be able to direct us to whom we should contact within the City?

We have identified technical questions for which we are requesting additional clarification and understanding -in advance of the ARB meeting.

Some of these questions pertain to referenced plans for Public Facility projects referenced within the application but lacking significant and relevant supporting documentation within the Informational Packet

posted 5-8-2022 - including a *"new proposed storm main line within SW Boones Ferry Road before tying into the existing system along the Autumn Sunrise development frontage"*.

Does the City of Tualatin have knowledge and information pertaining to these Public Facility project/s mentioned in the AR 22-0001 application?

These are significant elements of a stormwater management plan - which are alluded to, but lack critical supporting documentation as to integration into the applicant's proposed Stormwater Plan.

Any assistance you can provide on how we can fully participate in the Citizen Involvement process for this Land Use project would be greatly appreciated.

Again, thanks for your prompt reply to yesterday's email.
John and Grace Lucini

On Wed, May 25, 2022 at 10:54 AM Erin Engman <eengman@tualatin.gov> wrote:

Good morning Grace and John-

I have received your comments and have shared them with the applicant team. The applicant may share additional documentation at their discretion; I did encourage them to respond to items that may affect Architectural Review approval criteria, including [TDC 74.630](#) related to the storm drainage system. I have also added your comments to the application record, and they will be included as an Exhibit for the Architectural Review Board hearing.

I appreciate you participating in the land use process,

Erin Engman

Senior Planner

City of Tualatin | Planning Division

503.691.3024 | www.tualatinoregon.gov

From: G Lucini <grluci@gmail.com>

Sent: Wednesday, May 25, 2022 8:48 AM

To: Erin Engman <eengman@tualatin.gov>

Cc: John Lucini <jwluci@gmail.com>

Subject: Request for Information and Clarification RE: Tualatin AR 22-0001 CPAH Arch Review- for Public Record

Good Morning Erin,

Please accept this request for additional information and clarification of information on the City's Architectural Review of the CPAH Plambeck Gardens submissions AR 22-0001- scheduled to be heard by the Architectural Review Board on June 8th.

We are submitting this information request at this time, and requesting that we receive an informative reply (prior to the end of the work day on Monday May 30th)-- to the questions presented and receive access to the documents various documents clearly identified in the 5-23-2022 Attachment titled "Missing Information Request- CPAH Plambeck Gardens by Liberte Environmental Associates Inc".

We request that you or a City of Tualatin staff member- upon receipt of this correspondence-forward this submission

- to all members of the Tualatin Architectural Review Board and
- to all members of the City of Tualatin Planning Commission- as CCI for Citizen Involvement for the City of Tualatin, and who fulfill the State of Oregon Land Use Planning Goal #1 for Citizen Involvement.

Thank you in advance for your assistance.
Grace and John Lucini

5-25-2022 FOR THE PUBLIC RECORD

TO: The City of Tualatin Planning Department- Attn: Erin Engman Senior Planner

Submitted to the city of Tualatin Planning Department for requested dissemination to:

- ALL Members of the City of Tualatin Architectural Review Board
- All Members of the City of Tualatin Planning Commission
AS CCI for Citizen Involvement for the City of Tualatin and fulfilling State of Oregon Land Use Planning Goal #1 for Citizen Involvement

RE: City of Tualatin CASE FILE # AR 22-0001

Information Request-Submitted Prior To The June 8, 2022, Architectural Review Hearing - on CPAH Plambeck Gardens

Upon receipt - due to lack of direct contact information, we request the City of Tualatin Planning Department- - to forward this information request to all of the members of the city of Tualatin Architectural Review Board and to all members of the City of Tualatin Planning Commission .

We noted the CPAH Architectural Review proposals for the CPAH Plambeck Gardens project are to be presented for hearing on June 8, 2022, to the City of Tualatin Architectural Review Board (ARB)- includes a proposed Stormwater Plan for the project.

We are Interested Citizens and downstream property owners who may be impacted by the proposed CPAH Plambeck Gardens project, as we have previously experienced a failure of the current Stormwater System from upstream stormwater from the CPAH property and the surrounding Lennar properties- which flooded our property. There have been minimal improvements to the upstream existing stormwater system since its failure.

We have reviewed the documents posted to the City's Planning Department Website for the proposed Architectural Review but have not been able to locate specific relevant facts and various documents referenced within the CPAH proposals which should provide access to- and understanding of- the various technical aspects of the proposals- a major element of Citizen Involvement.

To assist us in attempting to understand the proposed Stormwater Plan for the CPAH Plambeck Gardens, we hired Liberte Environmental Associates (a local established firm having notable environmental engineering and receiving water quality assessment experience and considerable alternative treatment analysis and cost evaluation capabilities) to review the documents posted to the City's website for this Architectural Review.

#1 Dave LaLiberte, P.E. has compiled a list of 7 (seven) documents we are requesting access and clarity of understanding - to be able to appropriately review the proposed Stormwater Management Plans for the Plambeck Gardens project. Please see the 6-page attachment for the list of the 7 documents being requested- titled:

May 23, 2022 "Missing Information Request -CPAH Plambeck Gardens by Liberte Environmental Associates Inc."

#2 We are also requesting specific clarification of information on the timing and sequencing of all phases of the implementation of the proposed CPAH Stormwater Plan to assure its successful integration into the existing and future stormwater infrastructure in the NE Basalt Creek Drainage Area.

The State of Oregon requires municipalities of 2,500 or more to adopt a Stormwater Management plan. (ORS 660-011-0000 Public Facilities Planning). The intention of this State mandate is to assist local governments in developing a framework and planning criteria to able to assure the provision of a comprehensive, coordinated, safe and effective Public Service of Stormwater Management for all lands within the region. The State requires assessments and calculations of future stormwater management needs which are based upon Land Use Designations. The City has made multiple changes to Land Use Designations in the Basalt Creek Area since adoption of the Basalt Creek Concept and Comprehensive Plans.

The City of Tualatin has not yet adopted the mandated Stormwater Management Plan for the Basalt Creek Area, yet is conducting a review of the proposed CPAH Stormwater Plan- with minimal specific information as to how

or when the plan for this one property will integrate into the existing stormwater system which has already proven to have failed, or addressing and resolving the timing and sequencing of anticipated future stormwater needs of all of the local properties- including those which lie downstream in the Basalt Creek Area.

An additional issue relating to the review of the proposed CPAH Stormwater Plan is the extremely dated information provided in the City's adopted Stormwater Master Plan (SWMP) developed in the 1970's which also does not include specific information regarding stormwater management planning for the Basalt Creek Area within the scope of the evaluations or analysis of the City's adopted SWMP.

Lacking the ability to rely upon important plans from documents which should be current and available to address stormwater management planning issues in the Basalt Creek, we ask the City and/or CPAH to provide additional information or relevant facts which were not clearly identified within the documents posted by the City for AR 22-0001.

- A. **When does CPAH plan to start any preparations for construction or take any actions which may cause changes to the existing land, topography, vegetation, or other factors which may change the volume, the rate or the amount of stormwater and/or sediment which may flow downstream to the south? An**
- B. **How and when do the CPAH Stormwater Plans sequence and integrate into the Lennar Autumn Sunrise Plans-- while providing continuous and effective downstream management throughout all phases of the CPAH Plambeck Gardens constructions?**
- C. The proposed Stormwater Plan for the CPAH project comments upon a "proposed" Stormwater Main Pipe down SW Boones Ferry Road.
Minimal information has been provided as to when the "proposed" Stormwater Main will be completed, become functional and be able to accept downstream flow or discharge from the CPAH project.
 - **What is the anticipated date when the City of Tualatin or Washington County will have vetted, funded, and constructed this pipe?**
 - **Have the two local governments (Tualatin and/or Washington County) provided written approval for CPAH to connect to this still conceptual stormwater pipe down SW Boones Ferry Road? If so, please provide a copy of the document/s.**
 - **Where will stormwater discharge or runoff from the CPAH property flow prior to successful connection into to the "proposed" stormwater pipe down SW Boones Ferry Road?**
- D. The City of Tualatin Planning Commission on 12-13-2021 adopted as part of their decision on the Lennar Autumn Sunrise Subdivision application, the following requirement:

"Prior to construction of the Autumn Sunrise Phase 2 temporary emergency access onto SW Boones Ferry Road, the applicant must abandon the existing stormwater outfall releasing flows onto Tax Lot 2S135CD00302 and reroute all upstream flows to Autumn Sunrise's existing southwest stormwater discharge point."

This requirement will change the current southern flow of stormwater from the CPAH and Lennar properties which discharges onto our property (Tax Lot 2S135CD00302 identified in the Planning Commission's ruling of 12-13-2021). Yet, the proposed CPAH Stormwater Plans does not clearly address nor acknowledgement any potential impact or planning sequencing accommodations to address the required future removal of a downstream stormwater conduit which is depicted in one or more of the proposed CPAH site maps.

We request additional information as to what actions are identified in the CPAH Stormwater Plans to address- the timing, sequencing, and coordination of stormwater management planning within the area - to mitigate any negative impacts of stormwater runoff or discharge from the CPAH property to

the south when the stormwater outfall to our property is abandoned as required for the Autumn Sunrise subdivision.

3) We remind the City and CPAH of our previous and still unfulfilled request for the HUD Stormwater Standards which the CPAH staff have repeatedly referenced and commented upon they would have to meet-due to their funding sources. CPAH staff also publicly commented the HUD Stormwater Management requirements are more stringent than the City's requirement, and therefore their proposed Stormwater Plans would exceed the Stormwater Standards and requirements of the City. Access and understanding of the HUD Stormwater Management requirements and the stated need by CPAH to meet the HUD requirements becomes a significant factor in the evaluation of the proposed CPAH Stormwater Plan. The lack of clarity and information provided within submitted documents or in response to specific requests for the HUD stormwater requirements is noteworthy.

On 11-1-2021, Mr. LaLiberte on our behalf, submitted an email to CPAH and the City requesting specific the HUD and NOAA standards CPAH referred to for in their requested Land Use Variances VAR 21-0003. His email included the comment his information request was time sensitive.

Over two weeks later, on 11-16-2021 and after multiple follow-up emails - just 2 days prior to the Planning Commission Hearing on VAR 21-000 , Mr. LaLiberte received an email from a CPAH Consultant providing a link to a NOAA Fisheries Consultation Services website which was not relevant to NOAA Stormwater Standards previously referenced by CPAH.

As yet, several months later, we have not been provided access or information to the apparently higher standards of Stormwater Management Planning which the CPAH representatives stated would be required for their project by HUD. The lack of response in the provision of the HUD Stormwater Standards referenced by CPAH staff is of concern not only as an affront to Citizen Involvement, but also reduces inclusion of apparently very applicable fact based information which may directly relate to the critical evaluation of the proposed CPAH Stormwater Plan within this review and evaluation process.

Based upon this previous experience, we are specifically requesting a timely response and substantive information to all of the requested documents identified in this submission--to be received prior to end of the business day Monday, May 30th.

Most, if not all, of the requested documents and information should have been previously generated and used as an integral part of the development of the proposed Stormwater Plan for the CPAH project. The requested information and documents should be readily available and therefore should not be an undue burden upon either CPAH, or the City of Tualatin in forwarding the requested information.

Our request for access to important (yet missing) supporting information in a timely manner- several business days prior to the Architectural Hearing is not frivolous but is based upon:

- 1) a need for us to be able to review, develop and submit informed Citizen Comments based upon all newly obtain requested information ---several business days prior to the date of the scheduled Hearing,
- 2) to provide time for our submitted Citizen Comments to be forwarded by the City Planning Department to the members of the Architectural Review Board (ARB)- in order to provide each member time to review and allow for adequate consideration of our submission- prior to the day of the Hearing. This will allow the members of the ARB access to additional pertinent facts (as required in State of Oregon Land Use Planning Goal #2 for Land Use Planning) upon which they will be able to make truly informed decisions.
- 3) and, to provide the City time to include our Citizen Comments as part of the Public Record and into the "Informational Packet" for the Architectural Review Board prior to the Hearing.

Our property and home have not been annexed into the City of Tualatin, and therefore we are not allowed membership within the City's Community Involvement Organizations (CIO's) to help facilitate our Involvement and effective participation in all phases of Land Use Planning within the Basalt Creek Area.

As the City has identified the Tualatin Planning Commission's role in the Citizen Involvement process... "The TPC fulfills Oregon Planning Goal 1, as the committee for citizen involvement in the Land Conservation and Development Commission planning process". (<https://www.tualatinoregon.gov/tpc>).

Should we again have difficulties in obtaining timely and productive responses to our requests for relevant facts relating to the proposed CPAH Stormwater Plans, we will be looking to the members of the City of Tualatin Planning Commission, to assist the City in implementing the roles and responsibilities of the State mandated Committee for Citizen Involvement (CCI) for Citizen Involvement in Land Use Actions OAR 660-015-0000(1)- should there be difficulties in obtaining timely access and understanding of the information or documents we have requested.

This information request and supporting statements are submitted for inclusion within the Public Record for the proposed CPAH Plambeck Gardens project- so that all members of the Public may gain insight and information regarding this proposed large multi acre, multiple building complex under consideration on undeveloped lands within the Basalt Creek Area.

We look forward to receiving access to the critical documents and information necessary for the appropriate evaluation of the proposed Stormwater Plan for the CPAH Plambeck Gardens in a timely manner so that we may have an appropriate amount of time to review and develop Citizen Comments- by Friday May 27th.

Please let us know if there are any difficulties in obtaining or forwarding the requested information.

Regards,

John and Grace Lucini
23677 SW Boones Ferry Road Tualatin Oregon 97062

Attachment:

[*May 23, 2022 "Missing Information Request -CPAH Plambeck Gardens by Liberte Environmental Associates Inc."*](#)

Missing Information Request - CPAH Plambeck Gardens

Compiled by Liberte Environmental Associates. Inc. (LEA)

By Dave LaLiberte, P.E.

Request 1. Clean Water Services *Design and Construction Standards* (CWS, December 2019) contains requirements for downstream conveyance hydraulic analysis. This analysis is not included in the materials made available for review by CPAH. The requirements for downstream conveyance hydraulic analysis are stated in CWS Chapter 2 Section m (see CWS Page 12). These requirements are excerpted in the attached appendix. This downstream conveyance analysis is requested.

Request 2. The profile and drawings with elevations are missing and are required for the new outfall (see Table 1). The outfall manhole is called out in the plan view and in the Construction Notes, numbers “2” and “3”, in CPAH Drawing C3.01 – Stormwater Plan Southwest. No profile and drawing are provided for the new outfall in the plan view called out in the Construction Notes as number “6” in CPAH Drawing C8.05 – SW Boones Ferry Road South Plan and Profile – South.

Table 1, Missing Info for New CPAH Outfall

Engineering Parameter	ft	
Outfall crown-of- pipe (COP) elevation	?	
Outlet Orientation	?	
Size of Outlet	?	
Outlet Armoring type and configuration	?	
Outfall Invert Elevation	332.0	From CPAH Drawing C3.01

Request 3. CPAH Drawing C3.01 – Stormwater Plan Southwest states Construction Note 2 that: “stormwater manhole at connection to new public storm main, under separate public works permit. See C8.00 sheets.” The C8.00 sheets referenced by CPAH do not contain information directly related to the public works permit. The public works permit information and engineering data supporting this CPAH project is requested.

Request 4. The C6 Series of drawings appears to be omitted and is requested. CPAH Drawing C3.01 – Stormwater Plan Southwest references Series C6 drawings a number of times in the construction Notes 7 through 11, and 15.

Request 5. The HydroCAD modeling by CPAH is missing the analysis for the downstream system below the Pond 17P. See Page 104 of CPAH stormwater CPAH Drawing C3.01 identifies one of the downstream pipe elements, the “stormwater connection to public manhole”, as having an invert elevation of IE=332.00. However, this pipe element and invert elevation do not appear in the downstream hydrologic analysis as it was not modeled.

Request 6. The hydraulic analysis between the end of the new CPAH outfall and the existing Washington County Outfall (#5) is omitted. This hydraulic analysis is requested.

Request 7. The hydraulic analysis from the end of the existing Washington County Outfall (#5) below Boones Ferry Road through the Lucini property to the Basalt Creek Wetlands is omitted. This section is a steep and vulnerable slope with a history of flooding and erosion that will be affected by the new proposed stormwater discharge. This hydraulic analysis is requested.,

Appendix

CWS - Design and Construction Standards - Excerpts

December 2019

DESIGN AND CONSTRUCTION STANDARDS

FOR SANITARY SEWER AND
SURFACE WATER
MANAGEMENT

DECEMBER 2019



1. Maps showing the following information:
 - A) Upstream basin flowing through the site with contours.
 - B) Downstream basin to the point where analysis is required in the downstream analysis detailed in subsection (3) and (4) below, with contours.
 - C) Site plan showing development layout with contours.
 - D) Existing stormwater facilities on and adjacent to the site.
 - E) Stormwater facilities proposed to be constructed by the project.

2. Calculations for:
 - A) Sizing of water quality and quantity facilities.
 - B) Sizing of conveyance system, including calculations showing portions of existing conveyance system that are not proposed to be altered have adequate capacity according to the criteria in these rules.

3. Review of Downstream Conveyance System:
 - A) For each development constructing new impervious surface of greater than 5,280 square feet, or collecting and discharging greater than 5,280 square feet of impervious area, except for the construction of a detached single family dwelling or duplex, the design Engineer shall perform a capacity and condition analysis of existing downstream storm facilities and conveyance elements receiving flow from the proposed development.
 - B) The analysis shall extend downstream to a point in the drainage system where the additional flow from the proposed development site constitutes 10 percent or less of the total tributary drainage flow.
 - C) Where the additional flow from the proposed development drops to less than 10 percent of the total tributary drainage flow, then the analysis will continue for the lesser of:
 - i. One-quarter (1/4) of a mile; or
 - ii. Until the additional flow constitutes less than 5 percent of the total tributary drainage flow.
 - D) When the downstream analysis does not continue for at least one-quarter (1/4) mile, the design engineer shall provide a stamped Certification of Investigation that states the design Engineer has visually investigated the downstream system for at least one-quarter (1/4) mile downstream and is aware of no observable downstream impacts to structures.

4. Hydromodification Assessment:
 - A) For each development meeting the criteria of Section 4.03.2, the applicant must submit a Hydromodification Assessment. The design Engineer shall determine the Risk Level by either

using the District's Hydromodification Map or by performing a site-specific evaluation of the Receiving Reach.

B) The analysis shall follow the conveyance system to the Point of Discharge and extend downstream for ¼ mile from the Point of Discharge, which is the Receiving Reach.

C) The analysis may be truncated at the point that the resulting Risk Level is High, because the highest result is used to determine the representative of the Hydromodification Project Category, as described in Section 4.03.3.

5. Narrative, with tables where appropriate, describing:

A) How water quality, hydromodification, conveyance capacity, and LIDA requirements of these rules are met by the project.

B) Areas and flows used for design calculations in subsection (2) above with results of analysis clearly stated.

C) Results of downstream analysis.

n. For privately maintained stormwater management approaches or conveyance systems, a maintenance plan that clearly identifies maintenance activities and frequency in a form that can be easily provided to and understood by the people responsible for maintenance.

2.04.3 Timing for Plan Review

a. The District shall endeavor to perform a completion check of the initial plan submittal for compliance with Section 2.04.2 within three working days of receipt. Submittals which are not in substantial compliance with Section 2.04.2 will be returned without further review.

b. Upon acceptance of a complete plan submittal in compliance with Section 2.04.2, the District shall endeavor to approve, return for revision, or reject the plans within 15 working days of receipt. If plans are rejected, the reasons shall be indicated in writing.

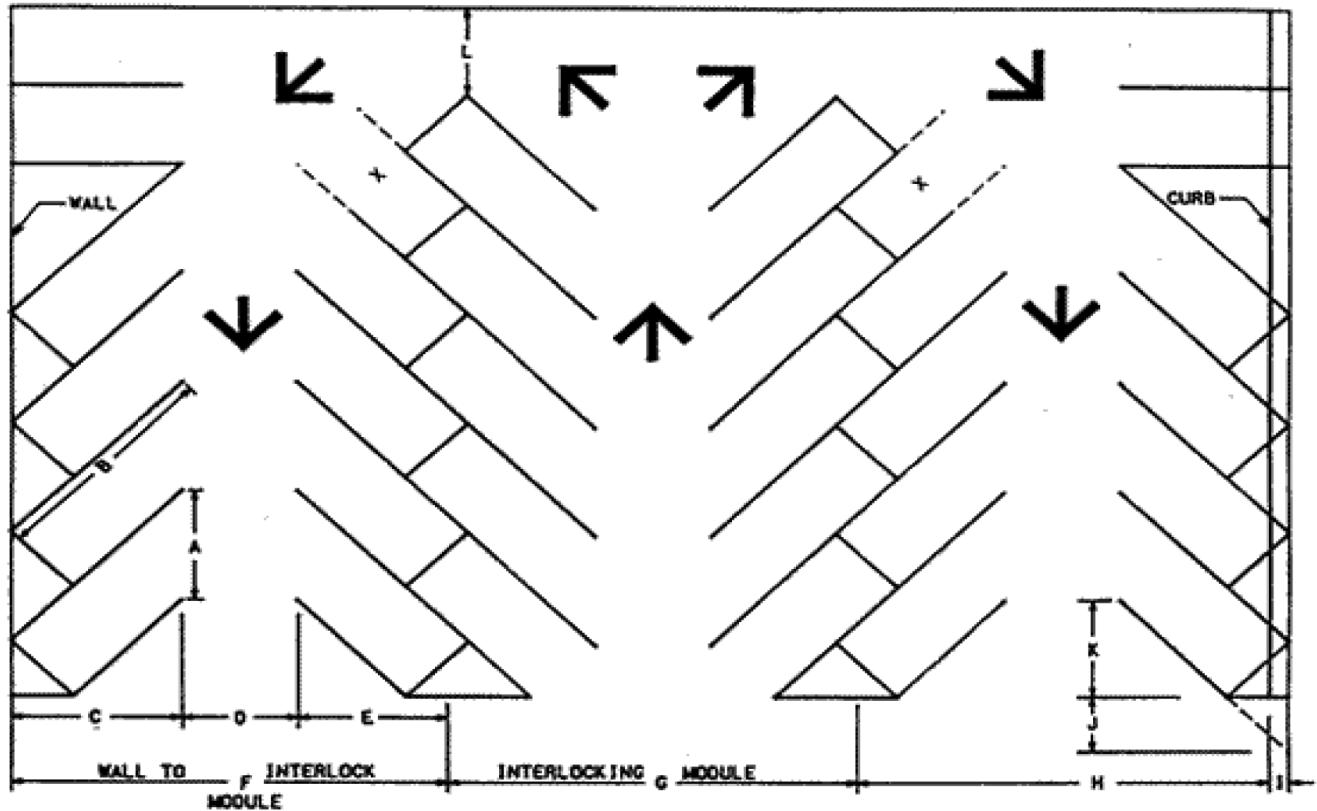
c. The District shall endeavor to approve, return for revision, or reject subsequent submittals within 10 working days.

2.04.4 Revised Plan Submittal and Approval

a. Plan Re-Submittal

After the initial review pursuant to section 2.04.3 is completed, a set of plans with comments and/or revisions shown in red shall be returned to the Engineer. Two sets of revised construction plans addressing all comments made by the District shall then be submitted for approval. Upon approval of the plans, a minimum of five plan sets shall be provided to the District.

**Tualatin Development Code - Figure 73-1
Parking Space Design Standards for 9-Foot Stalls**



<u>Dimension</u>	<u>On Diagram</u>	<u>45°</u>	<u>60°</u>	<u>75°</u>	<u>90°</u>
Stall width parallel to aisle	A	12.7	10.4	9.3	9.0
Stall Length of line	B	25.0	22.0	20.0	18.5
Stall depth to wall	C	17.5	19.0	19.5	18.5
Aisle width between stall lines	D	12.0	16.0	21.0	24.0
Stall depth, interlock	E	15.3	17.5	18.8	18.5
Module, wall to interlock	F	44.8	52.5	61.3	63.0
Module, interlocking	G	42.6	51.0	61.0	63.0
Module, interlocking to curb face	H	42.8	50.2	58.8	60.5
Bumper overhang (typical)	I	2.0	2.3	2.5	2.5
Offset	J	6.3	2.7	0.5	0.0
Setback	K	11.0	8.3	5.0	0.0
Cross aisle, one-way	L	12.0	12.0	12.0	12.0
Cross aisle, two way	-	22.0	22.0	22.0	22.0

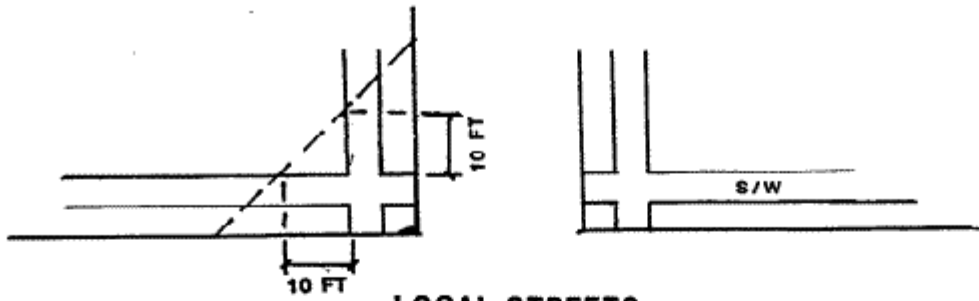
X = Stall not accessible in some cases.

Parking Dimensions for Subcompact Parking

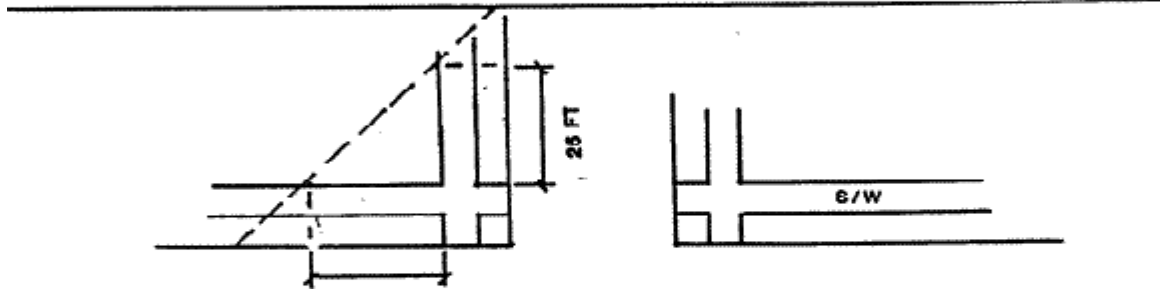
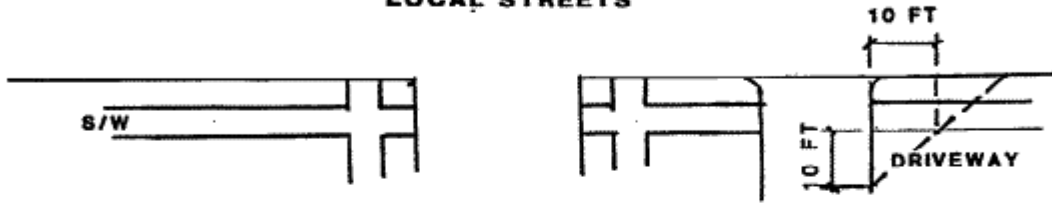
	<u>45°</u>	<u>60°</u>	<u>75°</u>	<u>90°</u>
Stall Width	7.5	7.5	7.5	7.7
Aisle Width per Stall	10.5	8.7	7.8	7.5
Depth of Stalls at right angle to aisle	16.0	16.7	16.3	15.0
Aisle Width	11.0	14.0	17.4	20.0
Wall-to-Wall module	43.0	47.4	50.0	50.0

Note: These measurements are inadequate for average compacts. Each stall depth should be increased about 1 foot (2 feet total for the module) to accommodate for the usual range of compact sizes.

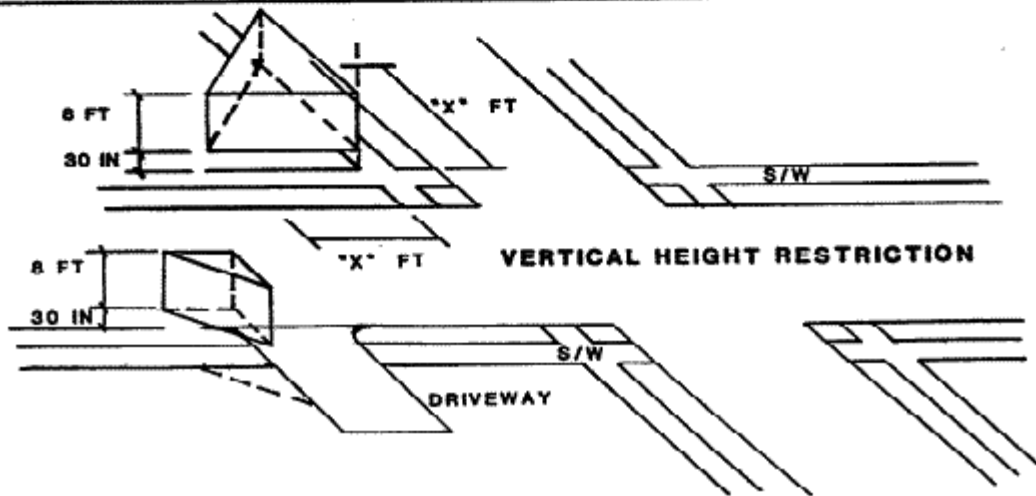
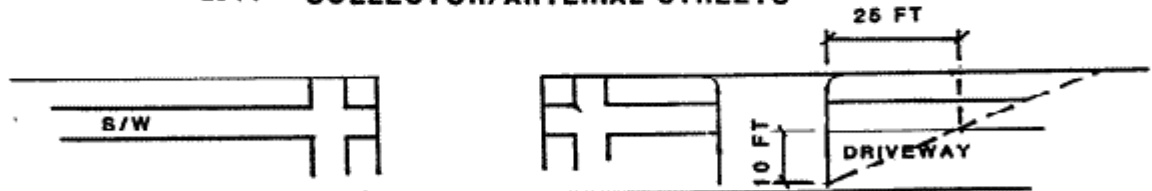
VISION CLEARANCE AREA



LOCAL STREETS



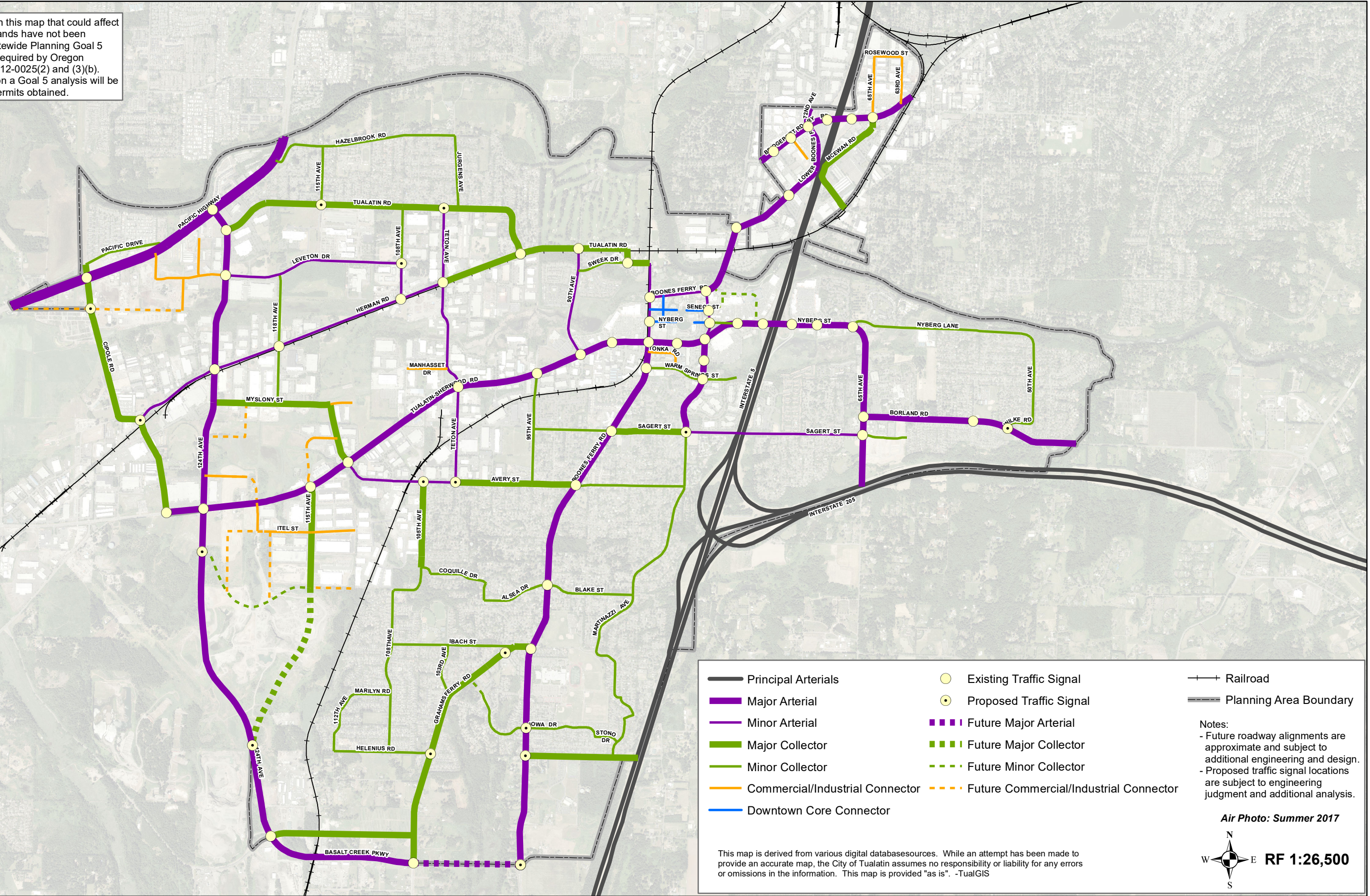
25 FT COLLECTOR/ARTERIAL STREETS



VERTICAL HEIGHT RESTRICTION

Map 8-1: Functional Classification and Traffic Signal Plan

The projects embodied in this map that could affect rivers, streams and wetlands have not been analyzed in terms of Statewide Planning Goal 5 (Natural Resources) as required by Oregon Administrative Rule 660-12-0025(2) and (3)(b). Thus, prior to construction a Goal 5 analysis will be completed and proper permits obtained.



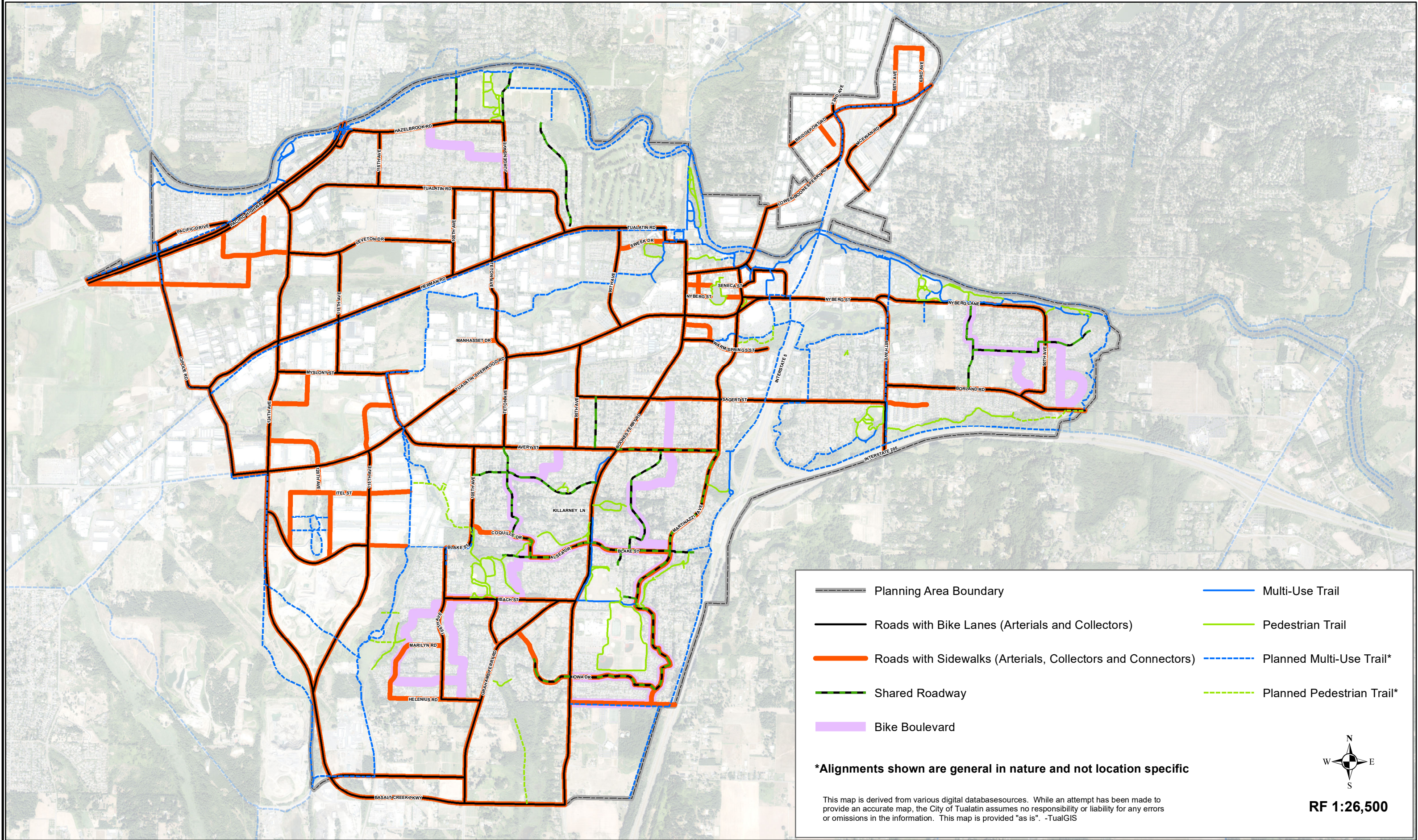
Principal Arterials	Existing Traffic Signal	Railroad
Major Arterial	Proposed Traffic Signal	Planning Area Boundary
Minor Arterial	Future Major Arterial	Notes: - Future roadway alignments are approximate and subject to additional engineering and design. - Proposed traffic signal locations are subject to engineering judgment and additional analysis.
Major Collector	Future Major Collector	
Minor Collector	Future Commercial/Industrial Connector	
Commercial/Industrial Connector		
Downtown Core Connector		

This map is derived from various digital databasesources. While an attempt has been made to provide an accurate map, the City of Tualatin assumes no responsibility or liability for any errors or omissions in the information. This map is provided "as is". -TualGIS

Air Photo: Summer 2017

RF 1:26,500

Map 8-4: Bicycle and Pedestrian Plan



- Planning Area Boundary
- Roads with Bike Lanes (Arterials and Collectors)
- Roads with Sidewalks (Arterials, Collectors and Connectors)
- Shared Roadway
- Bike Boulevard
- Multi-Use Trail
- Pedestrian Trail
- Planned Multi-Use Trail*
- Planned Pedestrian Trail*

***Alignments shown are general in nature and not location specific**

This map is derived from various digital databasesources. While an attempt has been made to provide an accurate map, the City of Tualatin assumes no responsibility or liability for any errors or omissions in the information. This map is provided "as is". -TualGIS



RF 1:26,500



**Engineering Memo for
AR22-0001 Plambeck Gardens
May 25, 2022**

Please incorporate the following conditions of approval and findings within the combined decision.

II. RECOMMENDED CONDITIONS OF APPROVAL

Based on the Findings and Conclusions presented herein, is **approved** subject to the following conditions:

PRIOR TO EROSION CONTROL, PUBLIC WORKS, AND WATER QUALITY PERMIT ISSUANCE:

Submit to the Engineering Division via [eTrakit](#) for review and approval:

1. In accordance with code section TMC 3-2, TDC 74.620, and the Public Works Construction Code the applicant must:
 - a. Submit sanitary sewer system plans that show:
 - i. Location of the lines, grade, materials, and other details.
 - ii. The gravity service lateral releasing to a public manhole at the north end of a public sanitary sewer easement to the south.
 - iii. Construct the public gravity sanitary sewer system as needed to serve this development within public sanitary sewer easements and right-of-way. If Plambeck Gardens sanitary sewer construction is proposed prior to approval of construction of portions of the public sanitary sewer system necessary to serve this development, the applicant must:
 1. Obtain approval from permittee(s) performing extension of the public sanitary sewer system from the north end of the vicinity of future Tract L approved within SB21-00001, Autumn Sunrise Subdivision to connect to approved and constructed mains plus the Clean Water Services' Norwood Road Pump Station approved within AR21-0014 or
 2. Obtain permits to construct all necessary portions of public system yet to be constructed through TLID 2S135D000106, owner Horizon Community Church; TLID 2S135D000401, owner Autumn Sunrise, LLC; TLID 2S135D000100, owner P3 Properties, LLC; within SW Norwood Road right-of-way, and the CWS Norwood pump station as approved within AR21-0014 remaining consistent with the vicinities approved within SB21-00001, Autumn Sunrise Subdivision of future Tract L, SW "H" (Mahogany) Street, SW Vermillion Drive, SW Norwood Road, and the CWS Norwood pump station as approved within SB21-0001, Autumn Sunrise Subdivision.

- b. Comply with the contractor insurance and bond requirements of the City of Tualatin.
2. In accordance with code section TMC 3-3, TDC 74.610, and the Public Works Construction Code the applicant must submit final water plans that show:
 - a. Construction of the C-Level public water system from the intersection of SW Boones Ferry Road and SW Norwood Road to the south property line of this development with a 12-inch diameter main to meet public water system requirements of the MurraySmith Technical Memorandum dated November 2, 2021.
 - b. A gate valve at the main for domestic and fire service laterals.
 - c. Adjacent to SW Boones Ferry Road right-of-way:
 - i. Reduced pressure backflow prevention and water meter for the domestic lateral,
 - ii. The water meter must be located within the planter strip. If inadequate width of strip is approved, then behind the sidewalk and within and surrounded by five feet of public utility easement,
 - iii. Irrigation after a domestic meter and reduced pressure backflow device, and
 - iv. The fire vault surrounded by five feet of public utility easement.
3. In accordance with TMC 3-5-050 and 3-5-060, TDC 74.640, Public Works Construction Code, and Clean Water Services' Design and Construction Standards Chapters 2 and 6 the applicant must submit final erosion control plans:
 - a. With grading within right-of-way and public easements as approved by the City Engineer.
 - b. Minimizing the impact of stormwater from the development to adjacent properties.
 - c. If the total disturbed area is:
 - i. Up to five acres, then sufficient to obtain a National Pollution Discharge Elimination System (NPDES) 1200-CN Stormwater Discharge Permit from Clean Water Services as an agent of Oregon DEQ, or
 - ii. Five or more acres, then with a copy of the National Pollution Discharge Elimination System (NPDES) 1200-C Construction Erosion Control permit from Oregon DEQ.
4. In accordance with TMC 3-5-200 through 3-5-430, TDC 74.630 and 74.650, Public Works Construction Code (PWCC), and Clean Water Services' (CWS) Design and Construction Standards (D&CS) Chapter 4 the applicant must submit:
 - a. Final stormwater plans and calculations certified by an Oregon registered, professional engineer in accordance with TMC 3-5-390(1) proving proposed systems:
 - i. Engineer to provide a downstream analysis, including but not limited to erosion, and include solutions within final plans for ¼ mile downstream from the release from the private development through the public stormwater system, in accordance with TMC 3-5-210(4).
 - ii. With gravity flow five feet from the outside of the established line of the building to the public stormwater system or as otherwise approved by the City Engineer, in accordance with CWS D&CS 1.03.39 and 5.09.3(a) (1) and (4).
 - iii. Discharge must be to an approved public system.
 - iv. Address runoff from all new and modified private and public impervious areas.

1. Include runoff from constructed driveways within a public access easement located on TLID 2S135D000106, owner Horizon Community Church, and TLID 2S135D000401, owner Autumn Sunrise, LLC's Tract L as approved within SB21-0001, Autumn Sunrise Subdivision.
 2. Runoff from these constructed driveways may be captured and treated within Plambeck Garden's facilities if using CWS D&CS approved Proprietary Treatment Systems or City Engineer approved alternative.
 - v. Treat new and modified impervious areas in accordance with CWS D&CS 4.08.1.d meeting phosphorous removal in accordance with TMC 3-5-350 per the design storm in accordance with TMC 3-5-360 and CWS D&CS 4.08.2.
 1. Stormwater from public impervious areas may be alternatively equivalently treated and detained within Plambeck Gardens' private facilities.
 2. Public water quality facilities may be LIDA street swales within appropriately sized planter strips or can connect runoff from public right-of-way to public water quality facility on the AB21-0001, Autumn Sunrise Subdivision development, if constructed.
 3. Additional dedication of right-of-way may be required to accommodate public stormwater facilities.
 - vi. Detain in accordance with TMC 3-5-220, TMC 3-5-230, and CWS D&CS 4.08.
 - vii. Show onsite facilities accommodating hydromodification including release rates for ½ the 2-year or 5-year storm events for proposed new and modified impervious areas in accordance with CWS D&CS 4.03.5.
 - viii. Submit conveyance calculations that accommodates up to a 25-year storm event within the public stormwater system in accordance with TDC 74.640 and CWS D&CS 5.05.2.d.
 - ix. In accordance with TDC 74.650(2) and CWS D&CS 3.01.2(d), comply with:
 1. The submitted Clean Water Services' Service Provider Letter CWS File Number 21-002248 dated September 7, 2021 conditions to obtain a Stormwater Connection Permit Authorization Letter.
 2. Any new or updated Service Provider Letter required due to final approved plans.
 3. Requirements stated within the Clean Water Services' Memorandum included as Exhibit D.
 - b. Submit financial assurance for construction performance in accordance with TMC 3-390(3), PWCC 102.14.00, and amount per CWS D&CS 2.07 Table 2-1.
 - c. Submit a copy of the recorded private stormwater maintenance agreement in accordance with TMD 3-5-390(4). The agreement must assure the owner as responsible for maintenance of the constructed portions of private stormwater systems within their lot. The identified system must include all conveyance, detention, hydromodification, and treatment.
5. In accordance with code sections TDC 74.120, 74.130, 74.210, 74.330, 74.420, 74.470, 74.485, 74.660, 74.765, 75.020, and 75.040 and Washington County's letter dated May 19, 2022:
 - a. For SW Boones Ferry Road the applicant must submit final plans that show construction to include:
 - i. Dedication of adequate right-of-way required to permit the construction of the public improvements,

- ii. Striping,
 - iii. Curbs and gutters,
 - iv. One 4-foot wide planter strip (the curb is not included in this width) on the east side,
 - v. Approvable street trees and planting locations with irrigation,
 - vi. A 12-foot wide multi-use path on the east side,
 - vii. A 6 to-8-foot wide public utility easement adjacent to right-of-way with additional as required to support any Portland General Electric support poles, water meters, and vaults, and
 - viii. With any modification for constructability as approved by the City Engineer.
- b. Access to SW Boones Ferry Road from this site:
- i. Interim access, if permitted by Washington County via Design Exception and/or
 - ii. As proposed, crossing lots to the south then west to SW Boones Ferry Road:
 - 1. Across TLID 2S135D000106, owner Horizon Community Church:
 - a. A blanket public access and utility easement,
 - b. A 5-foot wide sidewalk on the west side,
 - c. Curbs and gutters on both sides, and
 - d. A minimum of 24 feet paved travel surface to accommodate two-way traffic.
 - 2. If all improvements required by Conditions of Approval for SB21-0001, Autumn Sunrise Subdivision have not been constructed and accepted, then:
 - a. An agreement with the owners of developers permitting SB21-0001, Autumn Sunrise Subdivision approved by the City Engineer, or
 - b. Final plans must show all required improvements as determined by the City Engineer and up to and including:
 - i. For Private Tract L as identified within SB21-0001, Autumn Sunrise Subdivision, TLID 2S135D000401, owner Autumn Sunrise, LLC:
 - 1. A blanket public access and utility easement,
 - 2. A 5-foot wide sidewalk on the west side,
 - 3. Curbs and gutters on both sides,
 - 4. A minimum of 24 feet paved travel surface to accommodate two-way traffic, and
 - 5. A concrete approach to SW "H" (Mahogany) Street matching the travel surface width.
 - ii. For SW "H" (Mahogany) Street as identified within SB21-0001, Autumn Sunrise Subdivision, TLID 2S135D000 400 & 401, owner Autumn Sunrise, LLC:
 - 1. If needed, a traffic signal at SW Boones Ferry Road,
 - 2. Crosswalks and receiving ramp on the west side of SW Boones Ferry Road,
 - 3. Street signs with local street name for SW "H" (Mahogany) Street approved by the City Engineer, and
 - 4. Associated water quality and quantity facilities.

PRIOR TO BUILDING PERMIT ISSUANCE:

Submit to the Engineering Division via [eTrakit](#) for review and approval):

6. The applicant must obtain:
 - a. Design Exception and Facility Permits from Washington County,
 - b. If less than five acres are disturbed, a 1200-CN National Pollution Discharge Elimination System (NPDES) Stormwater Discharge Permit from Clean Water Services as an agent of Oregon DEQ, or if over five acres are disturbed, then a National Pollution Discharge Elimination System (NPDES) 1200-C Construction Erosion Control permit from Oregon DEQ, and
 - c. Erosion Control, Public Works, and Water Quality Permits from the City of Tualatin.

7. In accordance with code sections TDC 74.120, 74.210, 74.420, 74.470, 74.485, and 74.765 the applicant must submit a copy of recorded dedication of sufficient right-of-way for SW Boones Ferry Road from the centerline plus any additional to accommodate final accepted public street and stormwater improvements.

8. In accordance with TDC 74.330, the applicant must submit a copy of recorded easements:
 - a. The public utility easement, as approved by City Engineer, adjacent to SW Boones Ferry Road including
 - i. Five feet of public water easement surrounding water meter, backflow protection, and/or fire vaults, and
 - ii. Additional as needed for PGE support poles and guy wires.
 - b. Public access and utility easement for 24 foot-wide driveway plus 5 foot sidewalk on the west side and public sanitary sewer main across:
 - i. TLID 2S135D000106, owner Horizon Community Church,
 - ii. TLID 2S135D000401, owner Autumn Sunrise, LLC's Tract L as approved within SB21-0001, Autumn Sunrise Subdivision, and
 - iii. SW "H" (Mahogany) Street as identified within SB21-0001, Autumn Sunrise Subdivision, TLID 2S135D000 400 & 401, owner Autumn Sunrise, LLC.

PRIOR TO ISSUANCE OF CERTIFICATE OF OCCUPANCY AND/OR CERTIFICATE OF COMPLETION:

Submit to the Engineering Division via [eTrakit](#) for review and approval):

9. The applicant must complete all the private stormwater and public improvements as shown on the approved permit plans. All improvements must also be accepted by the City in accordance with TDC 74.120.

10. The applicant must submit paper and electronic as-builts of the Engineering permits along with maintenance bonds and any final fees for public and water quality improvements.

III. FINDINGS

These findings reference the Tualatin Development Code (TDC), unless otherwise noted.

[ENGINEERING FINDINGS]

Chapter 74 – Public Improvement Requirements

TDC 74.120 Public Improvements.

(1) Except as specially provided, all public improvements must be installed at the expense of the applicant. All public improvements installed by the applicant must be constructed and guaranteed as to workmanship and material as required by the Public Works Construction Code prior to acceptance by the City. Work must not be undertaken on any public improvement until after the construction plans have been approved by the City Manager and a Public Works Permit issued and the required fees paid.

TDC 74.130 Private Improvements.

All private improvements must be installed at the expense of the applicant. The property owner must retain maintenance responsibilities over all private improvements.

TDC 74.140 Construction Timing.

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

(2) All private improvements required under this Chapter must be approved by the City prior to the issuance of a Certificate of Occupancy; or for subdivision and partition applications, in accordance with the requirements of the Subdivision regulations.

Finding:

Private improvements must be installed and maintained at the expense of the applicant. All public and private improvements proposed and modified by conditions of approval must be completed prior to receiving a Certificate of Occupancy.

With recommended Conditions of Approval, these criteria are met.

Water

TDC 74.610 Water Service.

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

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

(3) As set forth in TDC Chapter 12, Water Service, the City has three water service levels. All development applicants must be required to connect the proposed development site to the service level in which the development site is located. If the development site is located on a boundary line between two service levels the applicant must be required to connect to the service level with the higher reservoir elevation. The applicant may also be required to install or provide pressure reducing valves to supply appropriate water pressure to the properties in the proposed development site.

[...]

TMC Chapter 03-03 – Water Service.

TMC 3-3-040 Separate Services Required.

(1) Except as authorized by the City Engineer, a separate service and meter to supply regular water service or fire protection service shall be required for each building, residential unit or structure served. For the purposes of this section, trailer parks and multi-family residences of more than four dwelling units shall constitute a single unit unless the City Engineer determines that separate services are required.

[...]

TMC 3-3-110 Construction Standards.

All water line construction and installation of services and equipment shall be in conformance with the City of Tualatin Public Works Construction Code. In addition, whenever a property owner extends a water line, which upon completion, is intended to be dedicated to the City as part of the public water system, said extension shall be carried to the opposite property line or to such other point as determined by the City Engineer. Water line size shall be determined by the City Engineer in accordance with the City's Development Code or implementing ordinances and the Public Works Construction Code.

TMC 3-3-120 Backflow Prevention Devices and Cross Connections.

(1) Except where this ordinance provides more stringent requirements, the definitions, standards, requirements and regulations set forth in the Oregon Administrative Rules pertaining to public water supply systems and specifically OAR 333 Division 61 in effect on the date this ordinance becomes effective are hereby adopted and incorporated by reference.

(2) The owner of property to which City water is furnished for human consumption shall install in accordance with City standards an appropriate backflow prevention device on the premises where any of the following circumstances exist:

(a) Those circumstances identified in regulations adopted under subsection (1) of this section;

(b) Where there is a fire protection service, an irrigation service or a nonresidential service connection which is two inches (2") or larger in size;

(c) Where the potable water supply provided inside a structure is 32 feet or more, higher than the elevation of the water main at the point of service connection;

(4) Except as otherwise provided in this subsection, all irrigation systems shall be installed with a double check valve assembly. Irrigation system backflow prevention device assemblies installed before the effective date of this ordinance, which were approved at the time they were installed but are not on the current list of approved device assemblies maintained by the Oregon State Health Division, shall be permitted to remain in service provided they are properly maintained, are commensurate with the degree of hazard, are tested at least annually, and perform satisfactorily. When devices of this type are moved, or require more than minimum maintenance, they shall be replaced by device assemblies which are on the Health Division list of approved device assemblies.

TMC 3-3-130 Control Valves.

The customer shall install a suitable valve, as close to the meter location as practical, the operation of which will control the entire water supply from the service. The operation by the customer of the curb stop in the meter box is prohibited.

[...]

Finding:

Murrysmith's Water System Capacity Analysis dated November 2, 2021 indicates the need for extension of the public C-Level water system from the intersection of SW Boones Ferry Road and SW Norwood Road south to serve this development. The public system must extend to the south property line.

The proposed domestic and fire service laterals with gate valves near the main must be connected to the proposed extension of the public water system. Vaults, the domestic meter, and backflow devices must be within the planter strip or located past the multi-use path surrounded by five feet of public utility easement.

With recommended Conditions of Approval, these criteria are met.

[...]

Sanitary Sewer

TDC 74.620 Sanitary Sewer Service.

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

(2) If there are undeveloped properties adjacent to the proposed development site which can be served by the gravity sewer system on the proposed development site, the applicant must extend public sanitary sewer lines to the common boundary line with these properties. The lines must be sized to convey flows to include all future development from all up stream areas that can be expected to drain through the lines on the site, in accordance with the City's Sanitary Sewer System Master Plan, TDC Chapter 13.

[...]

Finding:

The applicant's proposal is to connect via a private gravity lateral to future public sanitary sewer system approved within SB21-0001, Autumn Sunrise Subdivision then to a future Clean Water Services' sanitary sewer pump station approved within AR21-0014, Norwood Road Pump Station. The extension of public sanitary sewer lines and Clean Water Services' pump station could provide access to the public sanitary sewer main for all lots surrounding this development.

If any portion of the public system or pump station required to serve this development is not permitted at the time applicant requests issuance of construction permits, the applicant must include construction of those portions within their public works permit. Associated public sanitary sewer easements and access must be recorded. If any portion of the public system or pump station required to serve this development is permitted but not constructed and approved at the time applicant requests issuance of construction permits, the applicant must submit approval from the permittee(s) to connect to their unapproved sanitary sewer system.

Final sanitary sewer permit plans must be submitted that show cleanouts at the edge of public easements.

With recommended Conditions of Approval, these criteria are met.

[...]

Stormwater

TDC 74.630 Storm Drainage System.

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

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

(3) If there are undeveloped properties adjacent to the proposed development site which can be served by the storm drainage system on the proposed development site, the applicant must extend storm drainage lines to the common boundary line with these properties. The lines must be sized to convey expected flows to include all future development from all up stream areas that will drain through the lines on the site, in accordance with the Tualatin Drainage Plan in TDC Chapter 14.

[...]

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

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

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

(3) For on-site private and regional non-residential public facilities, the applicant must submit a stormwater facility agreement, which will include an operation and maintenance plan provided by the City, for the water quality facility for the City's review and approval. The applicant must submit an erosion control plan prior to issuance of a Public Works Permit. No construction or disturbing of the site must occur until the erosion control plan is approved by the City and the required measures are in place and approved by the City.

[...]

TMC Additional Surface Water Management Standards.

TMC 3-5-200 Downstream Protection Requirement.

Each new development is responsible for mitigating the impacts of that development upon the public storm water quantity system. The development may satisfy this requirement through the use of any of the following techniques, subject to the limitations and requirements in TMC 3-5-210:

- (1) Construction of permanent on-site stormwater quantity detention facilities designed in accordance with this title;**
- (2) Enlargement of the downstream conveyance system in accordance with this title and the Public Works Construction Code;**
- (3) The payment of a Storm and Surface Water Management System Development Charge, which includes a water quantity component designated to meet these requirements.**

TMC 3-5-210 Review of Downstream System.

For new development other than the construction of a single family house or duplex, plans shall document review by the design engineer of the downstream capacity of any existing storm drainage facilities impacted by the proposed development. That review shall extend downstream to a point where the impacts to the water surface elevation from the development will be insignificant, or to a point where the conveyance system has adequate capacity, as determined by the City Engineer. To determine the point at which the downstream impacts are insignificant or the drainage system has adequate capacity, the design engineer shall submit an analysis using the following guidelines:

- (1) Evaluate the downstream drainage system for at least ¼ mile;**
- (2) Evaluate the downstream drainage system to a point at which the runoff from the development in a build out condition is less than 10 percent of the total runoff of the basin in its current development status. Developments in the basin that have been approved may be**

considered in place and their conditions of approval to exist if the work has started on those projects;

(3) Evaluate the downstream drainage system throughout the following range of storms: 2, 5, 10, 25 year;

(4) The City Engineer may modify items 1, 2, 3 to require additional information to determine the impacts of the development or to delete the provision of unnecessary information.

TMC 3-5-220 Criteria for Requiring On-Site Detention to be Constructed.

The City shall determine whether the onsite facility shall be constructed. If the onsite facility is constructed, the development shall be eligible for a credit against Storm and Surface Water System Development Charges, as provided in City ordinance.

On-site facilities shall be constructed when any of the following conditions exist:

(1) There is an identified downstream deficiency, as defined in TMC 3-5-210, and detention rather than conveyance system enlargement is determined to be the more effective solution.

(2) There is an identified regional detention site within the boundary of the development.

(3) There is a site within the boundary of the development which would qualify as a regional detention site under criteria or capital plan adopted by the Unified Sewerage Agency.

(4) The site is located in the Hedges Creek Subbasin as identified in the Tualatin Drainage Plan and surface water runoff from the site flows directly or indirectly into the Wetland Protected Area (WPA) as defined in TDC 71.020. Properties located within the Wetland Protection District as described in TDC 71.010, or within the portion of the subbasin east of SW Tualatin Road are excepted from the on-site detention facility requirement.

TMC 3-5-230 On-Site Detention Design Criteria.

(1) Unless designed to meet the requirements of an identified downstream deficiency as defined in TMC 3-5.210, stormwater quantity onsite detention facilities shall be designed to capture run-off so the run-off rates from the site after development do not exceed predevelopment conditions, based upon a 25-year, 24-hour return storm.

(2) When designed to meet the requirements of an identified downstream deficiency as defined in TMC 3-5.210, stormwater quantity on-site detention facilities shall be designed such that the peak runoff rates will not exceed predevelopment rates for the 2 through 100 year storms, as required by the determined downstream deficiency.

(3) Construction of on-site detention shall not be allowed as an option if such a detention facility would have an adverse effect upon receiving waters in the basin or subbasin in the event of flooding, or would increase the likelihood or severity of flooding problems downstream of the site.

TMC 3-5-240 On-Site Detention Design Method.

(1) The procedure for determining the detention quantities is set forth in Section 4.4 Retention/Detention Facility Analysis and Design, King County, Washington, Surface Water Design Manual, January, 1990, except subchapters 4.4.5 Tanks, 4.4.6 Vaults and Figure 4.4.4G Permanent Surface Water Control Pond Sign. This reference shall be used for procedure only. The design criteria shall be as noted herein. Engineers desiring to utilize a procedure other than that set forth herein shall obtain City approval prior to submitting calculations utilizing the proposed procedure.

(3) All developments other than single family and duplex, whether residential, multi-family, commercial, industrial, or other uses, the sizing of stormwater quantity detention facilities shall be based on the impervious area to be created by the development, including structures and all roads and impervious areas which are assessed a surface water management monthly fee under Unified Sewerage Agency rules. Impervious surfaces shall be determined based upon building permits, construction plans, site visits or other appropriate methods deemed reliable by City.

[...]

TMC 3-5-280 Placement of Water Quality Facilities.

Title III specifies that certain properties shall install water quality facilities for the purpose of removing phosphorous. No such water quality facilities shall be constructed within the defined area of existing or created wetlands unless a mitigation action, approved by the City, is constructed to replace the area used for the water quality facility.

[...]

TMC 3-5-330 Permit Required.

Except as provided in TMC 3-5-310, no person shall cause any change to improved or unimproved real property that will, or is likely to, increase the rate or quantity of run-off or pollution from the site without first obtaining a permit from the City and following the conditions of the permit.

[...]

TMC 3-5-350 Phosphorous Removal Standard.

The stormwater quality control facilities shall be designed to remove 65 percent of the phosphorous from the runoff from 100 percent of the newly constructed impervious surfaces. Impervious surfaces shall include pavement, buildings, public and private roadways, and all other surfaces with similar runoff characteristics.

TMC 3-5-360 Design Storm.

The stormwater quality control facilities shall be designed to meet the removal efficiency of TMC 3-5-350 for a mean summertime storm event totaling 0.36 inches of precipitation falling in four hours with an average return period of 96 hours.

[...]

TMC 3-5-390 Facility Permit Approval.

A stormwater quality control facility permit shall be approved only if the following are met:

(1) The plat, site plan, or permit application includes plans and a certification prepared by an Oregon registered, professional engineer that the proposed stormwater quality control facilities have been designed in accordance with criteria expected to achieve removal efficiencies for total phosphorous required by this Title III. Clean Water Services Design and Construction Standards shall be used in preparing the plan for the water quality facility; and

(2) The plat, site plan, or permit application shall be consistent with the areas used to determine the removal required in TMC 3-5-350; and

(3) A financial assurance, or equivalent security acceptable to the City, is provided by the applicant which assures that the stormwater quality control facilities are constructed according to the plans established in the plat, site plan, or permit approval. The financial assurance may be combined with our financial assurance requirements imposed by the City; and

(4) A stormwater facility agreement identifies who will be responsible for assuring the long term compliance with the operation and maintenance plan.

[...]

Finding:

Two private extended dry detention basins serving as a stormwater quality and quantity control are shown on the site adjacent to SW Boones Ferry Road. These facilities are planned to serve equivalent public runoff required by the development. A Preliminary Drainage Report was prepared by Vega Civil Engineering revised May 2, 2022. The proposed facilities and conveyance must be sized to meet the current City of Tualatin and Clean Water Service requirements for stormwater quality and quantity. Final plans and stormwater calculations must prove gravity flow of stormwater from within 5 feet of buildings to the public main.

This site is within Basalt Creek Subbasin. TMC 3-5-220 states that sites without specified detention requirements must evaluate downstream requirements for conveyance and additional specified requirements The City has identified that erosion is a concern for the release of stormwater west of SW Boones Ferry Road to Basalt Creek. The applicant must include evaluation for ¼ mile from their site's release to the public system for the potential of erosion within their final stormwater report and include approved solutions within their final plans.

The final drainage report and plans must include hydromodification release rates for ½ the 2-year or 5-year storm events and detention as required by downstream analysis.

Final plans must show any stormwater laterals perpendicular to the public stormwater system within right-of-way and include a cleanout at right-of-way.

The applicant must provide financial assurance and obtain a Water Quality Permit for stormwater calculation evaluation and construction of new facilities prior to issuance of construction permits. The

final water quality facility plans and calculations must be certified by an Oregon registered, professional engineer.

The applicant's plans show no water quality facilities in created or existing wetlands. The public stormwater system extends within SW Boones Ferry Road to properties to the north and south.

The applicant has submitted a Clean Water Services' (CWS) Service Provider Letter File Number 21-002248 dated September 7, 2021. This indicates that no Sensitive Areas exist on the site that would be permanently impacted by the proposed improvements. Mitigation of Vegetated Corridor impacts must be met through purchase of Wetland Mitigation Bank Credit. A CWS Memorandum was received for development on this site and is included as Exhibit D. After land use decision issuance, final plans are provided by the City to Clean Water Services for final review. Upon approval by Clean Water Services they will provide the City authorization to issue construction permits. The applicant must submit final plans complying with the submitted CWS' Service Provider Letter conditions plus any new and/or revised letters and CWS Memorandum that are sufficient to obtain a Stormwater Connection Permit Authorization Letter from Clean Water Services in accordance with TDC 74.650(2) and CWS D&CS 3.01.2(d).

With recommended Conditions of Approval, these criteria are met.

[...]

TDC 74.640 Grading.

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

(2) A development applicant must submit a grading plan showing that all lots in all portions of the development will be served by gravity drainage from the building crawl spaces; and that this development will not affect the drainage on adjacent properties. The City Manager may require the applicant to remove all excess material from the development site.

TMC Chapter 03-05 – Erosion Control, Surface Water Management, Water Quality Facilities, and Building and Sewers.

TMC 3-5-050 Erosion Control Permits.

(1) Except as noted in subsection (3) of this section, no person shall cause any change to improved or unimproved real property that causes, will cause, or is likely to cause a temporary or permanent increase in the rate of soil erosion from the site without first obtaining a permit from the City and paying prescribed fees. Such changes to land shall include, but are not limited to, grading, excavating, filling, working of land, or stripping of soil or vegetation from land.

(2) No construction, land development, grading, excavation, fill, or the clearing of land is allowed until the City has issued an Erosion Control Permit covering such work, or the City has determined that no such permit is required. No public agency or body shall undertake any public works project without first obtaining from the City an Erosion Control Permit covering such work, or receiving a determination from the City that none is required.

[...]

Finding:

The plans indicate disturbance of approximately 4.66 acres. Final plans may include over 5 acres of disturbance based on conditions of approval. Erosion and sediment control plans and permit applications conforming to the requirements of the City of Tualatin, CWS, and Oregon Department of Environmental Quality must be provided with the construction permit submittal documents. The applicant must obtain:

- *An erosion control permit from the City of Tualatin for disturbance greater than 500 square feet plus*
- *A National Pollution Discharge Elimination System (NPDES) 1200-CN Construction Erosion Control permit from Clean Water Service for over 1 acre up to 5 acres of disturbance or A National Pollution Discharge Elimination System (NPDES) 1200-C Construction Erosion Control permit from Oregon DEQ for over 5 acres.*

The development site must be graded to minimize the impact of stormwater runoff onto adjacent properties and to allow adjacent properties to drain as they did before the new development. A development applicant must submit a grading plan showing that all lots in all portions of the development will be served by gravity drainage from the building crawl spaces; and that this development will not affect the drainage on adjacent properties. There will be no crawl spaces under the proposed building. The proposed grading plan is shown to minimize the impact of stormwater runoff to adjacent properties and allows adjacent properties to drain as they did before the development.

The entire site is within and drains into the Basalt Creek Subbasin. Stormwater from all impervious areas are conveyed to private treatment and detention facilities then released to the public stormwater system which discharges into Basalt Creek. Prior to issuance of permits for construction activities, the applicant must submit final plans:

1. *Minimizing impact from stormwater runoff to adjacent properties,*
2. *Allowing adjacent properties to drain as they did before the new development, and*
3. *Providing gravity drainage from this development to an approved public system.*

With recommended Conditions of Approval, these criteria are met.

[...]

Streets

TDC 74.210 Minimum Street Right-of-Way Widths.

The width of streets in feet shall not be less than the width required to accommodate a street improvement needed to mitigate the impact of a proposed development. In cases where a street is required to be improved according to the standards of the TDC, the width of the right-of-way shall not be less than the minimums indicated in TDC Chapter 74, Public Improvement Requirements, Figures 74-2A through 74-2G.

[...]

(2) For development applications other than subdivisions and partitions, wherever existing or future streets adjacent to property proposed for development are of inadequate right-of-way

width, the additional right-of-way necessary to comply with TDC Chapter 74, Public Improvement Requirements, Figures 74-2A through 74-2G of the Tualatin Community Plan must be dedicated to the City for use by the public prior to issuance of any building permit for the proposed development. This right-of-way dedication must be for the full width of the property abutting the roadway and, if required by the City Manager, additional dedications must be provided for slope and utility easements if deemed necessary.

TDC 74.330. - Utility Easements.

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

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

(5) The width of the public utility easement must meet the requirements of the Public Works Construction Code. All subdivisions and partitions must have a 6-foot public utility easement adjacent to the street and a 5-foot public utility easement adjacent to all side and rear lot lines. Other easements may be required as determined by the City Manager.

[...]

TDC 74.420 Street Improvements.

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

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

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

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

[...]

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

[...]

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

[...]

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

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

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

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

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

[...]

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

[...]

TDC 74.470 Street Lights.

(1) Street light poles and luminaries must be installed in accordance with the Public Works Construction Code.

(2) The applicant must submit a street lighting plan for all interior and exterior streets on the proposed development site prior to issuance of a Public Works Permit.

[...]

TDC 74.485. - Street Trees.

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

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

(3) The Street Tree Ordinance specifies the species of tree which is to be planted and the spacing between trees.

[...]

TDC 74.660 Underground.

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

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

[...]

TDC 74.765. - Street Tree Species and Planting Locations.

All trees, plants or shrubs planted in the right-of-way of the City must conform in species and location and in accordance with the street tree plan and City standards, including Table 74-1. If the City Manager determines that none of the species in City standards, including Table 74-1

is appropriate or finds appropriate a species not listed, the City Manager may substitute an unlisted species.

Table 74-1 Street Tree Species					
Species Common Names	Planting Strip Width (feet)			Power line compatible	Spacing on center (feet)
	4	5	6+		
Amur Maackia	•	•	•	•	30
Amur Maple	•	•	•	•	30
Armstrong Maple	•	•	•		30
Autumn Applause Ash		•	•		30
Black Tupelo	•	•	•		30
Capital Flowering Pear	•	•	•		30
Cascara	•	•	•	•	30
Crimson King Maple		•	•		30
Crimson Sentry Maple	•	•	•	•	30
Eastern Redbud	•	•	•		30
European Hornbeam	•	•	•	•	30
Frontier Elm			•		60
Ginko		•	•		30
Globe Sugar Maple			•		60
Golden Desert Ash	•	•	•	•	30
Goldenrain	•	•	•		30
Greenspire Linden		•	•		30
Ivory Japanese Lilac	•	•	•	•	30
Leprechaun Ash	•	•	•		30
Persain Parrotia	•	•	•		30
Purple Beech	•	•	•		30
Raywood Ash		•	•	•	30
Katsura	•	•	•		30
Red Oak			•		60
Red Sunset Maple			•		60
Scanlon/Bowhall Maple	•	•	•		30
Scarlet Oak			•		60
Shademaster Honey Locust		•	•		30
Skyrocket English Oak	•	•	•		30
Japanese snowbell	•	•	•	•	30
Sourwood	•	•	•	•	30
Tall Stewartia	•	•	•	•	30
Chinese Fringetree	•	•	•	•	30
Tri-Color Beech			•		60
Trident Maple	•	•	•	•	30
Urbanite Ash		•	•		30
Yellowwood	•	•	•		30
Zelkova Musashino	•	•	•		30

[...]

Chapter 75 Access Management

[...]

TDC 75.020. - Permit for New Driveway Approach

- (1) Applicability.** A driveway approach permit must be obtained prior to constructing, relocating, reconstructing, enlarging, or altering any driveway approach.
- (3) Procedure Type.** A Driveway Approach Permit is processed as a Type II procedure under TDC 32.220 (Type II).
- (4) Submittal Requirements.** In addition to the application materials required by TDC 32.140 (Application Submittal), the following application materials are also required:
 - a. A site plan, of a size and form and in the number of copies meeting the standards established by the City Manager, containing the following information:
 - (i)The location and dimensions of the proposed driveway approach;
 - (ii)The relationship to nearest street intersection and adjacent driveway approaches;
 - (iii)Topographic conditions;
 - (iv)The location of all utilities;
 - (v)The location of any existing or proposed buildings, structures, or vehicular use areas;
 - (vi)The location of any trees and vegetation adjacent to the location of the proposed driveway approach that are required to be protected pursuant to TDC Chapter 73B or 73C; and
 - (vii)The location of any street trees adjacent to the location of the proposed driveway approach.
 - b. Identification of the uses or activities served, or proposed to be served, by the driveway approach; and
 - c. Any other information, as determined by the City Manager, which may be required to adequately review and analyze the proposed driveway approach for conformance with the applicable criteria.
- (5) Criteria.** A Driveway Approach Permit must be granted if:
 - a. The proposed driveway approach meets the standards of this Chapter and the Public Works Construction Code;
 - b. No site conditions prevent placing the driveway approach in the required location;
 - c. The number of driveway approaches onto an arterial are minimized;
 - d. The proposed driveway approach, where possible:
 - (i)Is shared with an adjacent property; or
 - (ii)Takes access from the lowest classification of street abutting the property;
 - e. The proposed driveway approach meets vision clearance standards;
 - f. The proposed driveway approach does not create traffic hazards and provides for safe turning movements and access;
 - g. The proposed driveway approach does not result in significant adverse impacts to the vicinity;
 - h. The proposed driveway approach minimizes impact to the functionality of adjacent streets and intersections; and
 - (i)The proposed driveway approach balances the adverse impacts to residentially zoned property and the functionality of adjacent streets.

TDC 75.030. - Driveway Approach Closure

- (1) The City Manager may require the closure of a driveway approach where:**
 - (a) The driveway approach is not constructed in conformance with this Chapter and the Public Works Construction Code;**
 - (b) The driveway approach is not maintained in a safe manner;**

- (c) A public street improvement project is being constructed, and closure of the driveway approach will more closely conform to the current driveway approach standards;
- (d) A new building or driveway is constructed on the property;
- (e) A plan text amendment or zone change is proposed for the property served by the driveway;
- (f) A change of use or activity in an existing building increases the amount of required parking;
- (g) The driveway approach has been abandoned; or
- (h) There is a demonstrated safety issue.

TDC 75.040. - Driveway Approach Requirements

(2) Owners of two or more uses, structures, or parcels of land may agree to utilize jointly the same driveway approach when the combined driveway approach of both uses, structures, or parcels of land satisfies their combined requirements as designated in this code; provided that satisfactory legal evidence is presented to the City Attorney in the form of deeds, easements, leases or contracts to establish joint use. Copies of said deeds, easements, leases or contracts must be placed on permanent file with the City Recorder.

(3) Joint and Cross Access.

(a) Adjacent commercial uses may be required to provide cross access drive and pedestrian access to allow circulation between sites.

(b) A system of joint use driveways and cross access easements may be required and may incorporate the following:

(i) A continuous service drive or cross access corridor extending the entire length of each block served to provide for driveway separation consistent with the access management classification system and standards;

(ii) A design speed of ten mph and a maximum width of 24 feet to accommodate two-way travel aisles designated to accommodate automobiles, service vehicles, and loading vehicles;

(iii) Stub-outs and other design features to make it visually obvious that the abutting properties may be tied in to provide cross access via a service drive; and

(iv) An unified access and circulation system plan for coordinated or shared parking areas.

(c) Pursuant to this section, property owners may be required to:

(i) Record an easement with the deed allowing cross access to and from other properties served by the joint use driveways and cross access or service drive;

(ii) Record an agreement with the deed that remaining access rights along the roadway will be dedicated to the city and pre-existing driveways will be closed and eliminated after construction of the joint-use driveway;

(iii) Record a joint maintenance agreement with the deed defining maintenance responsibilities of property owners; and (iv) If subsection (i) through (iii) above involve access to the state highway system or county road system, ODOT or the county must be contacted and must approve changes to subsection (i) through (iii) above prior to any changes.

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

(a) To promote unified access and circulation systems, lots and parcels under the same ownership or consolidated for the purposes of development and comprised of more than one building site must be reviewed as one unit in relation to the access standards. The number of access points permitted must be the minimum number necessary to provide reasonable access to these properties, not the maximum available for that frontage. All necessary easements, agreements, and stipulations must be met. This must also apply to phased development plans. The owner and all lessees within the affected area must comply with the access requirements.

(b) All access must be internalized using the shared circulation system of the principal commercial development or retail center. Driveways should be designed to avoid queuing across surrounding parking and driving aisles.

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

(6) Except as provided in TDC 53.100, all driveway approach must connect directly with public streets.

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

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

(9) Minimum driveway approach width for uses are as provided in Table 75-1 (Driveway Approach Width):

TABLE 75-1 Driveway Approach Width		
Use	Minimum Driveway Approach Width	Maximum Driveway Approach Width
Single-Family Residential, townhouses, and duplexes	10 feet	26 feet for one or two care garages 37 feet for three or more garages
Multi-family	2 Units = 16 feet 3-49 Units = 24 feet 50-499 = 32 feet Over 500 = as required by the City Manager	May provide two 16 foot one-way driveways instead of one 24-foot driveway May provide two 24-foot one-way driveways instead of one 32-foot driveway
Commercial	1-99 Parking Spaces = 32 feet 100-249 Parking Spaces = two approaches each 32 feet	Over 250 Parking Spaces = As Required by the City Manager, but not exceeding 40 feet
Industrial	36 feet	Over 250 Parking Spaces = As Required by the City Manager, but not exceeding 40 feet
Institutional	1-99 Parking Spaces = 32 feet 100-249 Parking Spaces = two approaches each 32 feet	Over 250 Parking Spaces = As Required by the City Manager, but not exceeding 40 feet

[...]

(11) Distance between Driveways and Intersections. Except for single-family dwellings, the minimum distance between driveways and intersections must be as provided below. Distances listed must be measured from the stop bar at the intersection.

- (a) At the intersection of collector or arterial streets, driveways must be located a minimum of 150 feet from the intersection.
- (b) At the intersection of two local streets, driveways must be located a minimum of 30 feet from the intersection.
- (c) If the subject property is not of sufficient width to allow for the separation between driveway and intersection as provided, the driveway must be constructed as far from the intersection as possible, while still maintaining the 5-foot setback between the driveway and property line.
- (d) When considering a driveway approach permit, the City Manager may approve the location of a driveway closer than 150 feet from the intersection of collector or arterial streets, based on written findings of fact in support of the decision.

(12) Vision Clearance Area.

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

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

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

TDC 75.050. - Access Limited Roadways

(2) The following Freeways and Arterials are access limited roadways: ...

(h) Boones Ferry Road at all points located within the City of Tualatin Planning Area; ...

[...]

TDC 75.070. - Existing Driveways and Street Intersections.

(1) Existing driveways with access onto arterials on the date this chapter was originally adopted are allowed to remain. If additional development occurs on properties with existing driveways with access onto arterials then this Chapter applies and the entire site must be made to conform with the requirements of this chapter.

(2) The City Manager may restrict existing driveways and street intersections to right-in and right-out by construction of raised median barriers or other means.

[...]

TDC 75.100. - Spacing Standards for New Intersections.

Except as shown in TDC Chapter 11, Transportation, (Figures 11-1 and 11-3), all new intersections with arterials must have a minimum spacing of one-half mile between intersections.

TDC 75.110. - Joint Access Standards.

When the City Manager determines that joint accesses are required by properties undergoing development or redevelopment, an overall access plan shall be prescribed by the City Manager and all properties shall adhere to this. Interim accesses may be allowed in

accordance with TDC 75.060 of this chapter to provide for the eventual implementation of the overall access plan.

TDC 75.130. - New Streets Access Standards.

(1) New streets designed to serve as alternatives to direct, parcel by parcel, access onto arterials are shown in TDC Chapter 11, Transportation, (Figures 11-1 and 11-3). These streets are shown as corridors with the exact location determined through the partition, subdivision, public works permit or Architectural Review process. Unless modified by the City Council by the procedure set out below, these streets will be the only new intersections with arterials in the City. See map for changes.

(2) Specific alignment of a new street may be altered by the City Manager upon finding that the street, in the proposed alignment, will carry out the objectives of this chapter to the same, or a greater degree as the described alignment, that access to adjacent and nearby properties is as adequately maintained and that the revised alignment will result in a segment of the Tualatin road system which is reasonable and logical.

(3) The City Council may include additional streets in TDC Chapter 11, Transportation, (Figures 11-1 and 11-3), through the plan amendment procedure. In addition to other required findings, the City Council must find that the addition is necessary to implement the objectives of this chapter.

[...]

Finding:

A Traffic Study by Charbonneau Engineering dated February 2022 was submitted. Plans show removal of existing driveway, addition of an emergency vehicle access to SW Boones Ferry Road restricted by bollards, and construction of a public access within a public access easement south then west to SW Boones Ferry road across adjacent and nearby lots. The location for the public access easement and right-of-way dedication was approved within SB21-0001, Autumn Sunrise Subdivision with the proposed public access easement serving this development and the adjacent lot. Washington County submitted a letter dated May 19, 2022 stating conditions of approval for the proposed site development and those for obtaining interim access approval if requested.

The applicant must provide proof of recorded public access easements, right-of-way dedication with associated construction permits, and Washington County permitted approval to construct the proposed connections. The applicant may obtain interim approved access direct to SW Boones Ferry Road from Washington County that meets City of Tualatin code standards.

In order to enable the proposed permanent access to SW Boones Ferry Road via the proposed public access to the south over private lots must be within recorded public access and utility easements. Construction within the public easements must include 24 feet wide two-way travel, with curbs and gutters, and a 5-foot wide sidewalk on the west side. Additionally, SW "H" (Mahogany) Street as approved within SB21-0001, Autumn Sunrise Subdivision must be dedicated, constructed, and signalized as needed prior to occupancy.

Final plans must include a half-street improvement for SW Boones Ferry Road meeting the requirements of Washington County and the City of Tualatin. The preferred cross-section of a Tualatin Major Arterial must be modified as directed by the City Engineer. Street lights and Portland General Electric support

poles in SW Boones Ferry Road right-of-way must be relocated as required. The applicant must obtain permits and construct a half street for SW Boones Ferry Road as indicated below or as otherwise approved by the City Engineer and Washington County including:

- *A 12-foot wide multi-use path,*
- *A 4-foot wide planter (not including curb width),*
- *Relocation of street lights and PGE poles as required,*
- *Approvable street trees and planting locations with irrigation, and*
- *A 6 to 8-foot wide public utility easement adjacent to right-of-way for water, sanitary sewer, and storm drainage facilities, telephone, television cable, gas, electric lines, and other public utilities must be granted to the City. Additional width of the public utility easement must be recorded to accommodate infrastructure approved within the final plans.*

Maintenance easements must be provided as required to access public infrastructure.

With recommended Conditions of Approval, these criteria are met.

Technical Memorandum

Date: November 2, 2021

Project: 20-2737.0409

To: Mr. Tony Doran, Engineering Associate
City of Tualatin

From: Claire DeVoe, PE

Reviewed By: Brian Ginter, PE

Re: Water System Capacity Analysis – Plambeck Gardens (CPAH)



Introduction

As requested, this memorandum has been prepared to present the findings of our analysis for the water service to the proposed 116 Unit Plambeck Gardens located at 23500 & 23550 SW Boones Ferry Road. This development is also known as CPAH, Community Partners for Affordable Housing. Work for this analysis was partially completed during the Water System Master Plan (WSMP) update. This memorandum assumes that CPAH is developed prior to completion of the Autumn Sunrise development located to the south and east, thus limiting hydraulic looping, as illustrated in Figure 1. This memorandum presents the findings of this analysis for the City's use in determining the water system improvements necessary to meet fire flow and pressure requirements.

Background

The City's water system hydraulic model was used to perform a hydraulic analysis of pressure and fire flow performance in the City's water system under maximum day demand conditions with fire flow events evaluated at the site boundary along SW Boones Ferry Road. The hydraulic model was updated to include a proposed 12-inch line along SW Boones Ferry Road connecting to the existing 12-inch along SW Norwood Road. The proposed development is zoned as multifamily, as shown in the design drawings by Carlton Hart Architecture (CHA) dated September 9, 2021. The proposed development is located within the City's existing Pressure Zone C, served by the C level reservoirs at a nominal hydraulic grade (HGL) of 507.5 feet above mean sea level (msl), and the C Level Pump Station. Figure 1 illustrates the development site and adjacent water system infrastructure.

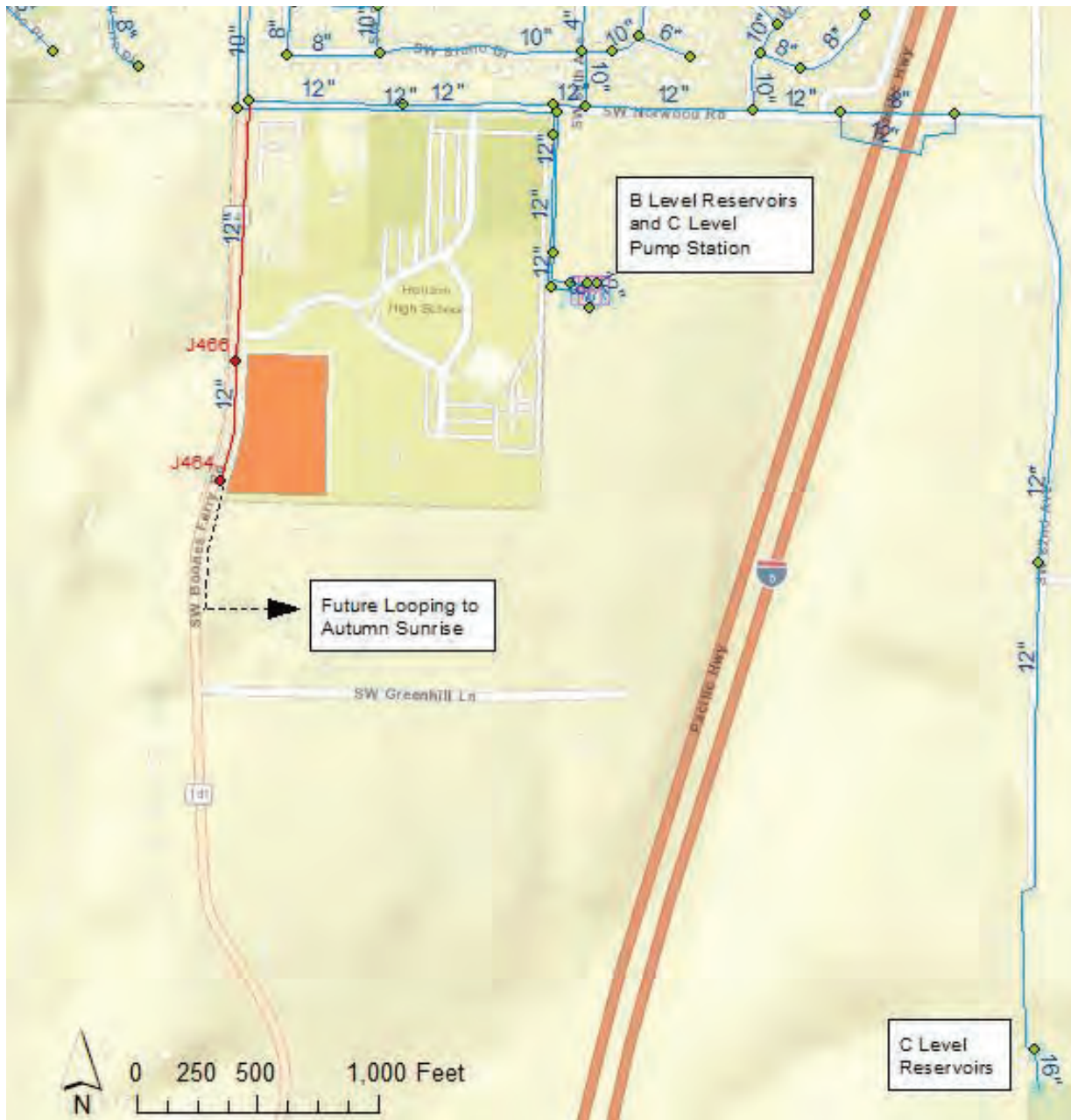


Figure 1. Proposed Development Site and Existing Water System Infrastructure

Site Demands

Site demands were calculated based on design drawings from CHA and demands developed in the WSMP. Fire flow demands were calculated based on the 2019 Oregon Fire Code and building type and material listed in the design drawings. All buildings in the development are anticipated to have fire suppression sprinkler systems. No sprinkler demand was available at the time of this memorandum and so a demand of 250 gpm was assumed. Domestic demands were calculated based on proposed unit count and demand factors developed in the WSMP. Table 1 presents these demands.

Table 1 – Site Demands

Demand Type	Demand	Description	Source
Fire Flow	1,500	Minimum of 25% of 4,500 gpm (60,000 sf, Type V-A building) or 1,500 gpm	2019 Oregon Fire Code, Appendix B, Table B105.1(2) and Table B105.2 footnote 2
Sprinkler	250 gpm	Assumed	Murraysmith
MDD Domestic	27 gpm	(116 units) x (0.75 Multifamily Units/ERU) x (231 gpd/ERU) x (1.9 MDD:ADD)	2021 WSMP Draft
Total	1,800 gpm		

Analysis and Findings

The hydraulic model was updated as described above and fire flow performance tested.

A summary of specific model conditions for this analysis is presented below. The C Level is relatively isolated from the A and B Levels, therefore only C Level settings are shown.

System Demand Conditions: 2040 Maximum Day Demand

Site Demand (including Fire Flow): 1,800 gpm

Reservoir Levels: Operational, Equalization, and Fire Storage depleted (C Level Reservoirs at 20 ft, 478.5 ft HGL)

Portland Supply Valves: Do not impact C Level, assume sufficient MDD supply to A and B Levels

C Level Pump Station: Tested at both 1 pump active and off

Physical Condition: Existing facilities plus proposed connections

The model nodes representing the proposed connections, the fire flow capacity tested, and the calculated minimum pressure within the area influenced by the fire flow in Pressure Zone C are summarized in Table 2 below:

Table 2
Fire Flow Analysis Results

Model Node ID	Location	Elevation (ft)	Fire Flow Rate (gpm)	C Level Pump Station OFF		C Level Pump Station ON	
				Static Pressure (psi)	Residual Pressure (psi)	Static Pressure (psi)	Residual Pressure (psi)
J466	SW Boones Ferry Rd, North entrance	325	1,800	60	2	74	53
J464	SW Boones Ferry Rd, South entrance	332	1,800	57	-2	71	49

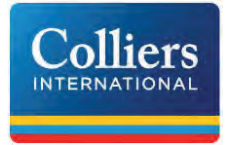
Based on the findings of this analysis and a review of overall system improvement needs presented in the WSMP, C Level Pump Station upgrades including a trigger for at least one pump when pressures in the C Level drop below 35 psi must be completed prior to development of Plambeck Gardens to adequately provide domestic and fire service. A 12-inch diameter main along SW Boones Ferry Road is adequate assuming these upgrades at the pump station. Connecting the proposed 12-inch diameter main on SW Boones Ferry to the proposed Autumn Sunrise development will improve local pressures during fire flow events but without additional upsizing and looping along the C Level transmission between the Norwood Site and the C Level Reservoirs, C Level Pumping is still required for adequate pressure during fire flow events.

It is the developer’s responsibility to size internal (private) fire and domestic mains for adequate service pressure, private hydrants, and fire suppression sprinkler systems as these facilities are outside the scope of this analysis.

Please do not hesitate to contact us if you have any questions or comments in this regard. We would be happy to meet with you personally to discuss the findings presented in this memorandum.

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FAX +1 503 227 2447
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November 10, 2021

Pastor Stan Russell
Horizon Community Church
c/o Ken Allen
The Heitman Allen Group

RE: LETTER OF INTENT TO ENTER INTO UTILITY AND ACCESS EASEMENT AGREEMENT

Dear Pastor Stan,

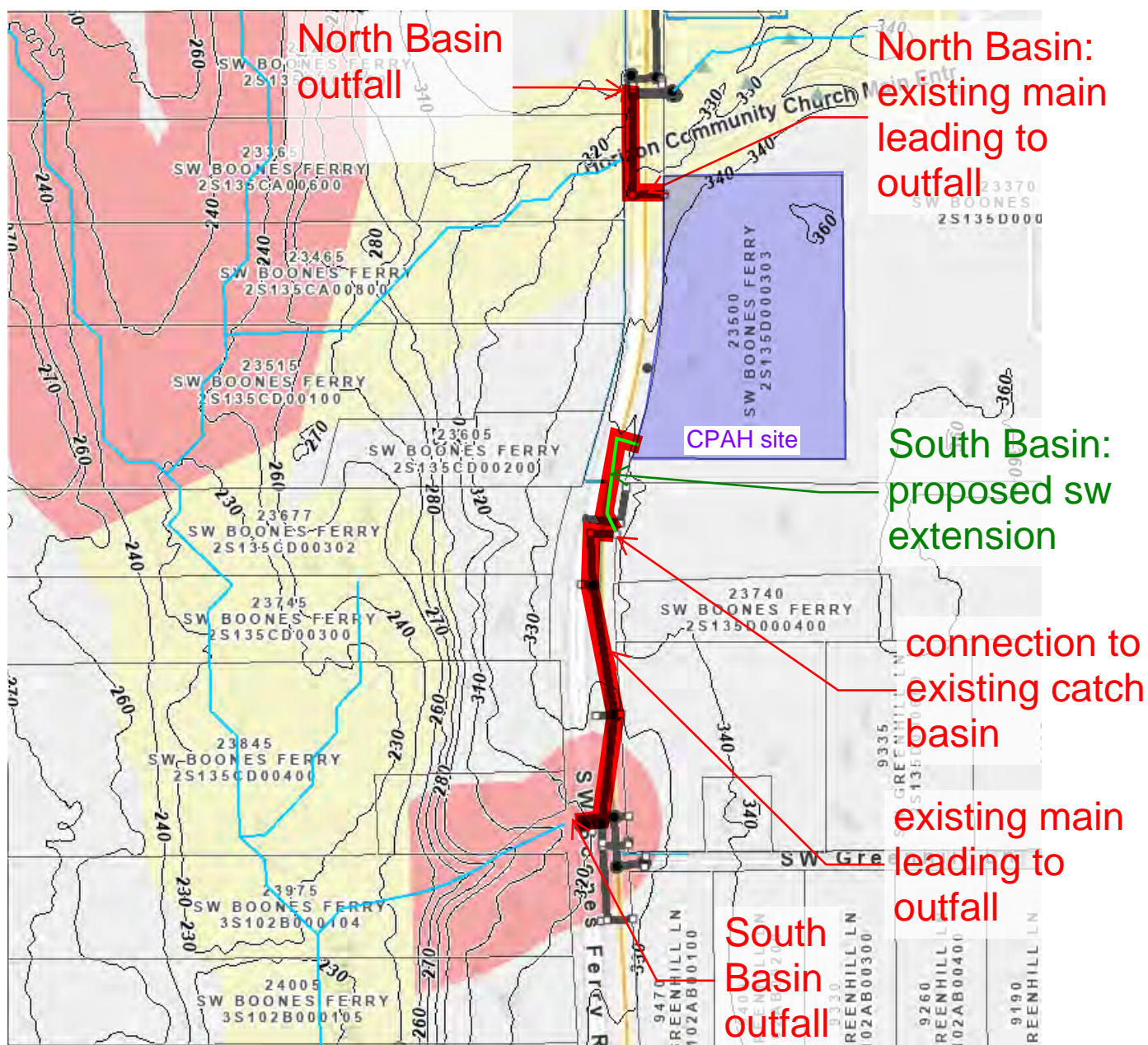
Community Partners for Affordable Housing (Grantee) presents this offer and letter of intent to acquire a utility and access easement agreement across the real property owned by the Horizon Community Church (Grantor) commonly referred to the Horizon Community Church property located at 23370 SW Boones Ferry Road. Tualatin Oregon 97062 as depicted on attached Exhibit A including parcel number/s 2S135DO-00106.

This is not a binding agreement for either party; only a fully executed Easement Agreement will legally bind the parties involved.

- 1. Property:** The "Property" is the land referenced above and on Exhibit A, and includes all plans, specifications, and surveys of the land, permits, approvals and all of the rights, titles, interest, privileges and appurtenances which are related to or used in connections with the land.
- 2. Consideration:** The consideration for the Easement shall be Two Hundred Fifty Thousand dollars (\$250,000.00) to be paid concurrently with recording of the completed Easement Agreement. In addition, Grantee will be responsible for any, and all costs associated with the creation of the Easement Area and Easement Agreement including but not limited to engineering, legal expense, platting, and recording.
- 3. Easement Area:** The Easement Area will be approximately sixty feet wide and fifty across. And aligned with the to be created Tract on the to be determined by Survey approximately as depicted in Exhibit B.

Stormwater Connections to the Public System and Corresponding Points of Discharge at Existing Outfalls to Drainageways

-AW, Vega 6-6-2022



From: [Melissa Soots](#)
To: [Erin Engman](#); [Kayla Zander](#)
Cc: [Steve Koper](#); [Heidi Springer](#); [Tony Doran](#)
Subject: RE: Request for Information and Clarification RE: Tualatin AR 22-0001 CPAH Arch Review- for Public Record
Date: Friday, May 27, 2022 11:54:10 AM
Attachments: [image001.png](#)
[ESA_NE_Guidance_for_OR.pdf](#)
[C6.01_Civil_Details_AR_11x17.pdf](#)
[C6.00_Civil_Details_AR_11x17.pdf](#)

Erin,

Below is information in response to the request for additional information you received from Grace and John Lucini. Please add sheets C6.00 and C6.01 to the record.

Item #1: Requested information from Dave LaLiberte:

1. Request #1: Please refer to the Preliminary Drainage Report, revised 5/2/22
2. Request #2: Information has been provided in the table below:

Table 1, Missing Info for New CPAH Outfall

Engineering Parameter	ft	
Outfall crown-of- pipe (COP) elevation	331.82	
Outlet Orientation	South	
Size of Outlet	1.0	
Outlet Armoring type and configuration	N/A	
Outfall Invert Elevation	330.82	From CPAH Drawing C3.01

3. Request #3: The public works permit has not been approved at this time.
4. Request #4: Please see attached sheet C6.00 and sheet C6.01
5. Request #5: Please refer to the Preliminary Drainage Report, revised 5/2/22
6. Request #6: Please refer to the Preliminary Drainage Report, revised 5/2/22
7. Request #7: All required CWS storm events are being managed per code for proposed water quantity discharge rates. The North and South basins of the site represent 2.9% and 1.2% of the total tributary drainage flows during the 25-year storm event, respectively, prior to discharging to the unnamed drainageways. Please refer to the Preliminary Drainage Report, revised 5/2/22.

Item #2: Timing of implementation of the proposed Stormwater Plan is dependent on City of Tualatin approval processes. Design and construction will meet required jurisdictional codes including Clean Water Services requirements and the requirements for a DEQ 1200-C permit.

Item #3: Please see the attached document, "Endangered Species Act Guidance for Oregon" for the referenced requirements.

melissa soots, NCARB | associate | project manager

pronouns: she/her/hers

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From: Erin Engman <eengman@tualatin.gov>
Sent: Wednesday, May 25, 2022 10:47 AM
To: Kayla Zander <kayla.zander@carletonhart.com>; Melissa Soots <melissa.soots@carletonhart.com>
Cc: Steve Koper <skoper@tualatin.gov>; Heidi Springer <hspringer@tualatin.gov>; Tony Doran <TDORAN@tualatin.gov>
Subject: FW: Request for Information and Clarification RE: Tualatin AR 22-0001 CPAH Arch Review- for Public Record

Good morning Kayla and Melissa-
I'm sharing a public comment that was received in response to the notice of public hearing sent for your project. The Lucini's are requesting additional documentation, and I would encourage you to respond to any items that may impact pertinent Architectural Review approval criteria, specifically [TDC 74.630](#) and in turn, TMC 3-5-210. If you do send a response, I ask that you please copy me on the correspondence for the record.

Erin Engman

Senior Planner
City of Tualatin | Planning Division
503.691.3024 | www.tualatinoregon.gov

From: G Lucini <grluci@gmail.com>
Sent: Wednesday, May 25, 2022 8:48 AM
To: Erin Engman <eengman@tualatin.gov>
Cc: John Lucini <jwluci@gmail.com>
Subject: Request for Information and Clarification RE: Tualatin AR 22-0001 CPAH Arch Review- for Public Record

Good Morning Erin,
Please accept this request for additional information and clarification of information on the City's Architectural Review of the CPAH Plambeck Gardens submissions AR 22-0001-scheduled to be heard by the Architectural Review Board on June 8th.

We are submitting this information request at this time, and requesting that we receive an informative reply (prior to the end of the work day on Monday May 30th)-- to the questions presented and receive access to the documents various documents clearly identified in the 5-23-2022 Attachment titled "Missing Information Request- CPAH Plambeck Gardens by Liberte Environmental Associates Inc".

We request that you or a City of Tualatin staff member- upon receipt of this correspondence-forward this submission
- to all members of the Tualatin Architectural Review Board and
- to all members of the City of Tualatin Planning Commission- as CCI for Citizen Involvement for the City of Tualatin, and who fulfill the State of Oregon Land Use Planning Goal #1 for Citizen Involvement.

Thank you in advance for your assistance.
Grace and John Lucini



CARLETON HART ARCHITECTURE P.C.
830 SW 10th Avenue #200 Portland, Oregon 97205
503.243.2262 | www.carletonhart.com



VEGA
CIVIL ENGINEERING LLC
503.662.9101 | www.vegacivil.com

PLAMBECK GARDENS
COMMUNITY PARTNERS FOR AFFORDABLE HOUSING
23500 & 23550 SW Boones Ferry Road
Tualatin, Oregon 97062
LAND USE: ARCHITECTURAL REVIEW

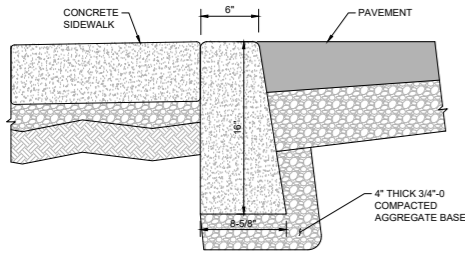
CIVIL DETAILS

PROJECT NO.
#19031

03.04.2022

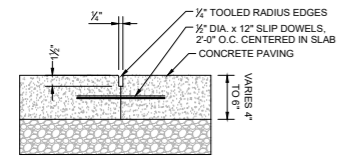
REVISIONS:

C6.00



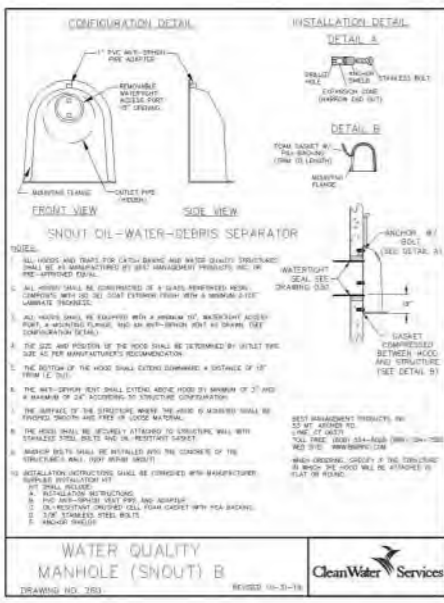
15 FLUSH CONCRETE CURB
NTS

- NOTES:
1. SET ADJACENT SURFACES FLUSH WITH CURB.

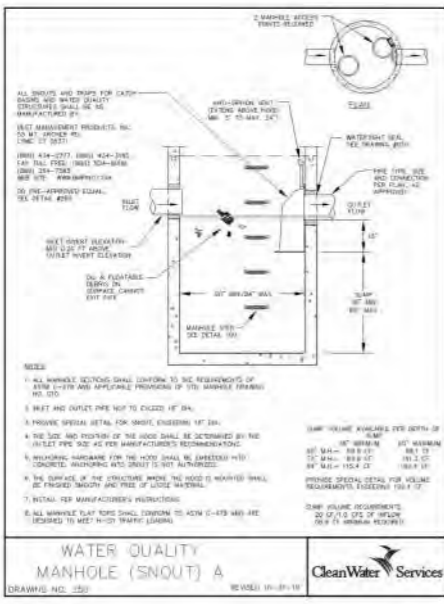


- NOTE:
1. INSTALL CONSTRUCTION JOINTS 2'-0" O.C. WHERE EXISTING CONC. PAVING ABUTS PROPOSED CONC. PAVING.

14 CONSTRUCTION JOINT
NTS

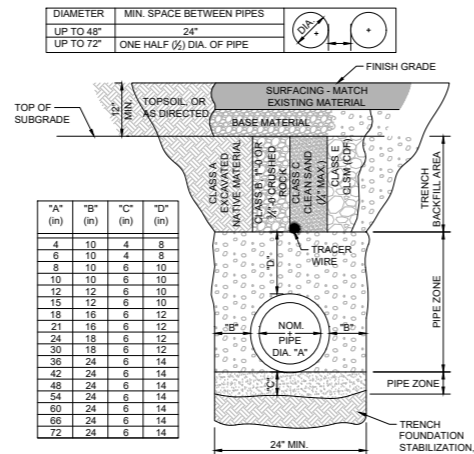


WATER QUALITY MANHOLE (SNOUT) B
DRAWING NO. 7853
REVISED 10-13-18
CleanWater Services



WATER QUALITY MANHOLE (SNOUT) A
DRAWING NO. 7850
REVISED 10-13-18
CleanWater Services

13 WATER QUALITY MANHOLE
NTS

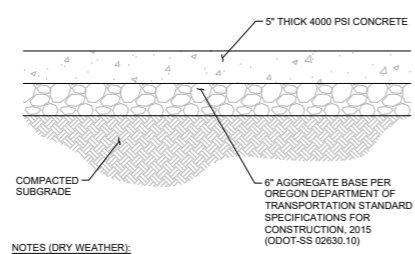


12 TRENCH BACKFILL
NTS



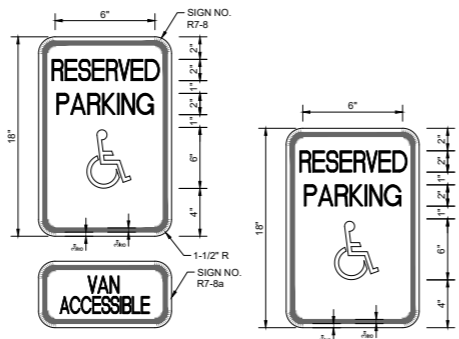
- NOTES:
1. MANUFACTURED BY ALMETEK INDUSTRIES, INC. OR APPROVED EQUAL.
2. USE NONCORROSIVE AND NONREACTIVE METAL FASTENER FOR INSTALLATION INTO CONCRETE CURB. CONCRETE MUST CURE FOR NO LESS THAN 28 DAYS PRIOR TO INSTALLATION.
3. WHEN APPLICABLE DRAINAGE STRUCTURE IS NOT DIRECTLY ADJACENT TO CONCRETE CURB, USE CARTRIDGE BOLT WASHER, NUT & FORGED STEEL BACKING PLATE FOR AFFIXING TO CATCH BASIN/AREA DRAIN GRATES.

11 NO DUMPING STORM DRAIN MARKER
NTS



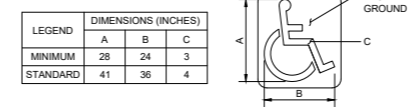
- NOTES (DRY WEATHER):
1. AGGREGATE BASE PARTICLE SIZE NOT TO EXCEED 1 1/2". BASE COURSE TO BE COMPACTED TO AT LEAST 96% OF ASTM D 1557.
2. NATIVE SOIL SUBGRADE SHALL BE COMPACTED TO NOT LESS THAN 92% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D 1557.
3. REFERENCE GEOTECHNICAL MEMO, PREPARED BY EARTH ENGINEERS, INC., DATED DECEMBER 28, 2021.

10 CONCRETE PAVEMENT
NTS



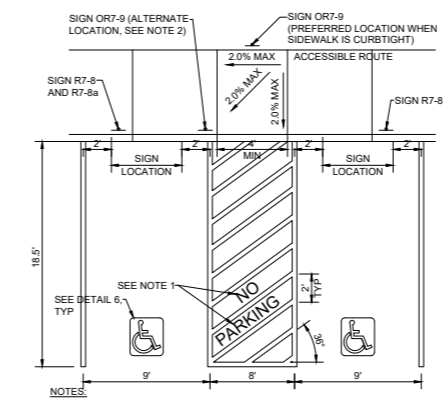
- NOTES:
1. SIGN BACKGROUND: WHITE, RETROREFLECTIVE SHEETING
2. SIGN LEGEND: GREEN, RETROREFLECTIVE SHEETING
3. SIGN SYMBOL (R7-8 ONLY): WHITE ON BLUE, RETROREFLECTIVE SHEETING

9 ACCESSIBLE PARKING SIGNS
NTS



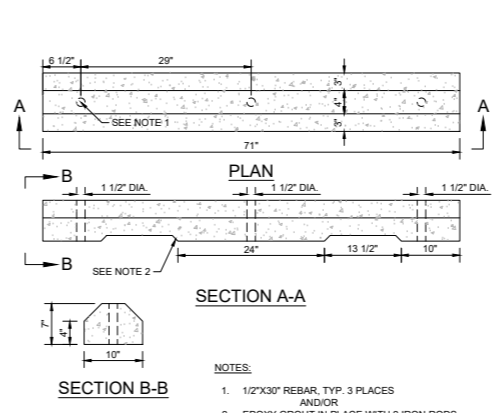
- LEGEND DIMENSIONS (INCHES)
MINIMUM 28 24 3
STANDARD 41 36 4
- NOTES:
1. PAVEMENT MARKING BACKGROUND: OPTIONAL: BLUE, RETROREFLECTIVE
2. PAVEMENT MARKING STENCIL: WHITE, RETROREFLECTIVE

8 ACCESSIBLE PARKING EMBLEM
NTS



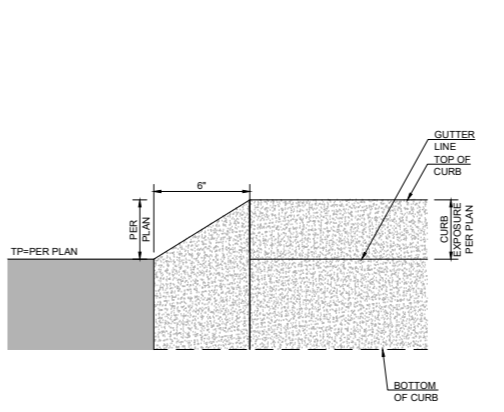
- NOTES:
1. PAVEMENT MARKING: WHITE RETROREFLECTIVE. "NO" SHALL BE 18" X 12", AND "PARKING" SHALL BE 60" X 12".
2. IF ALTERNATE LOCATION IS USED, ALSO INSTALL SIGN OR7-9a.

7 DOUBLE-ACCESSIBLE PARKING SPACE
NTS

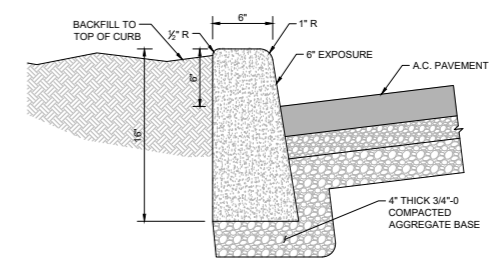


- NOTES:
1. 1/2" X 30" REBAR, TYP. 3 PLACES AND/OR
2. EPOXY GROUT IN PLACE WITH 2 IRON RODS.

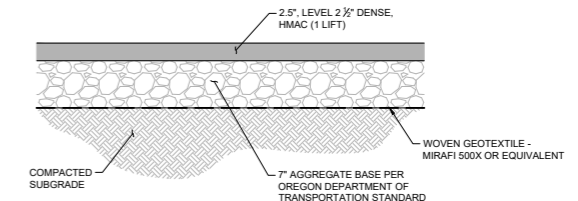
6 PRECAST CONCRETE WHEELSTOP
NTS



5 CURB TAPER
NTS

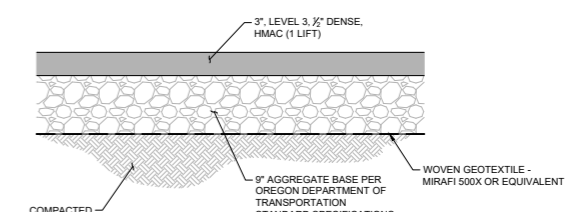


4 STANDARD CONCRETE CURB
NTS



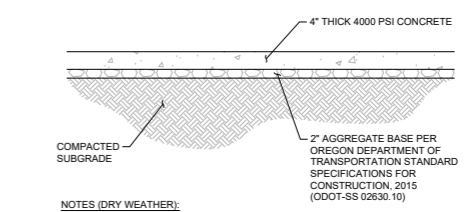
- NOTES (DRY WEATHER):
1. AGGREGATE BASE PARTICLE SIZE TO BE WELL GRADED 1-1/2" OR 2-MINUS CRUSHED ROCK, HAVING LESS THAN 5 PERCENT OF MATERIAL PASSING THE NO. 200 SIEVE.
2. AC PAVEMENT SHALL BE COMPACTED TO 91% OF RICE DENSITY OF THE MIX, AS DETERMINED BY ASTM D 2041.
3. NATIVE SOIL SUBGRADE SHALL BE COMPACTED TO NOT LESS THAN 92% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D 1557. IMPORTED STRUCTURAL FILLS SHALL BE PREPARED PER GEOTECHNICAL INVESTIGATION REPORT, PREPARED BY EARTH ENGINEERS, INC., REV. OCTOBER 25, 2021.

3 PAVEMENT SECTION - PARKING STALLS
NTS



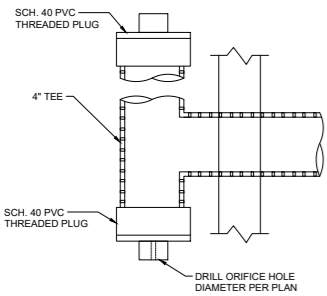
- NOTES (DRY WEATHER):
1. AGGREGATE BASE PARTICLE SIZE TO BE WELL GRADED 1-1/2" OR 2-MINUS CRUSHED ROCK, HAVING LESS THAN 5 PERCENT OF MATERIAL PASSING THE NO. 200 SIEVE.
2. AC PAVEMENT SHALL BE COMPACTED TO 91% OF RICE DENSITY OF THE MIX, AS DETERMINED BY ASTM D 2041.
3. NATIVE SOIL SUBGRADE SHALL BE COMPACTED TO NOT LESS THAN 92% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D 1557. IMPORTED STRUCTURAL FILLS SHALL BE PREPARED PER GEOTECHNICAL INVESTIGATION REPORT, PREPARED BY EARTH ENGINEERS, INC., REV. OCTOBER 25, 2021.

2 PAVEMENT SECTION - DRIVE AISLE
NTS

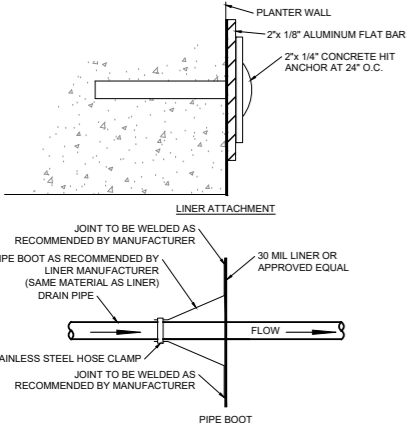


- NOTES (DRY WEATHER):
1. AGGREGATE BASE PARTICLE SIZE NOT TO EXCEED 1 1/2".
2. NATIVE SOIL SUBGRADE SHALL BE COMPACTED TO NOT LESS THAN 92% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D 1557.
3. REFERENCE GEOTECHNICAL MEMO, PREPARED BY EARTH ENGINEERS, INC., DATED DECEMBER 28, 2021.

1 CONCRETE SIDEWALK
NTS

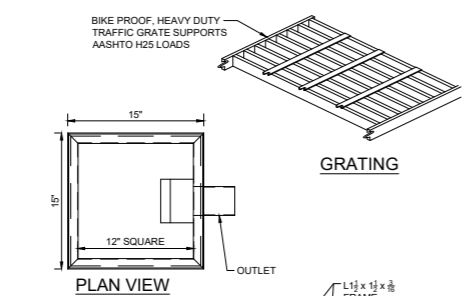


13 CWS OVERFLOW ORIFICE DETAIL
NTS

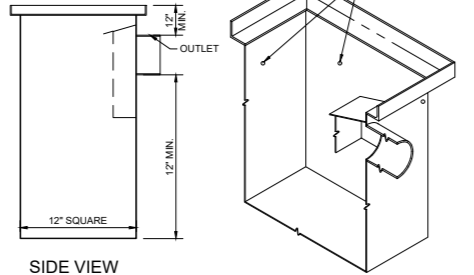


12 LINER ATTACHMENT
NTS

- CONSTRUCTION NOTES:
1. ADHERE LINER TO CONCRETE W/ SEALANT RECOMMENDED BY LINER MANUFACTURER.
 2. SECURE LINER TO CONCRETE WITH 2" ALUMINUM FLAT BAR, PLACED AS DIRECTED (CURB SIDE OR ENTIRE FACILITY).
 3. ATTACH FLAT BAR WITH CONCRETE HIT ANCHORS, 24" O.C.
 4. TRIM EXCESS LINER TO THE TOP OF THE FLAT BAR.
 5. ON CLEAN CONCRETE SURFACE, ADD SILICONE SEALER TO TOP 1/2" OF LINER.
 6. START ATTACHING LINER IN THE MIDDLE OF THE FACILITY FIRST, WORKING TOWARD THE ENDS TO MINIMIZE WRINKLES. CORNERS SHOULD BE CUT TO FIT WITHOUT WRINKLES.

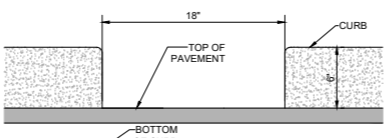


GRATING
PLAN VIEW

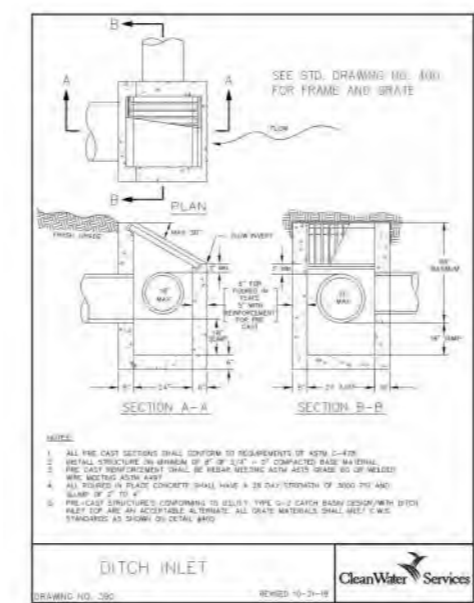


11 12" LYNCH SANITARY DRAIN
NTS

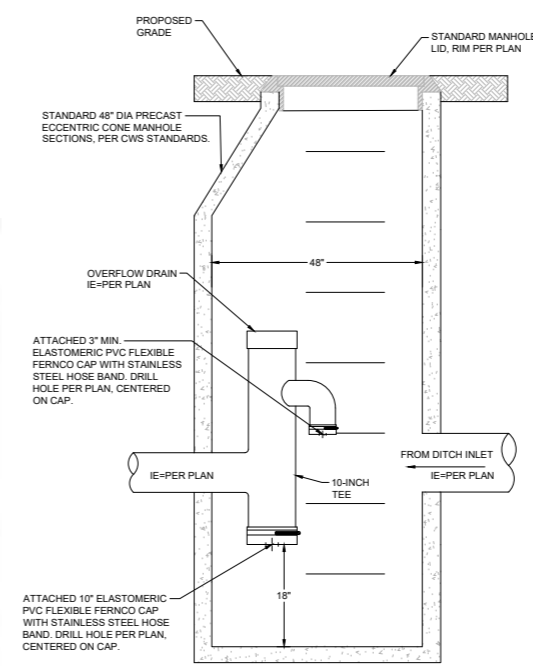
- NOTES:
1. BOX FABRICATED FROM 10 GA. MATERIAL



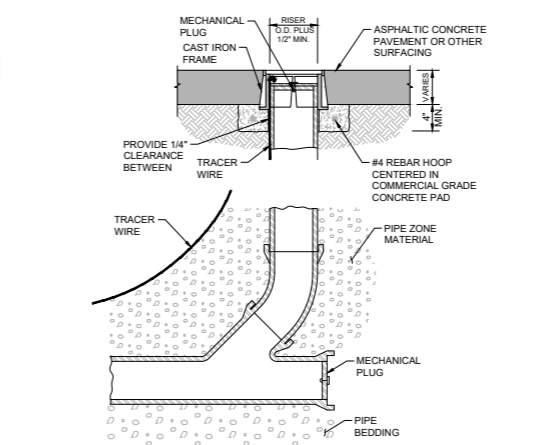
10 CURB SCUPPER
NTS



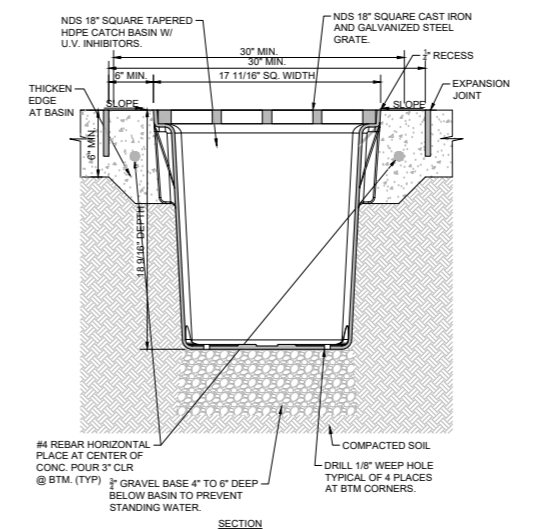
9 DITCH INLET
NTS



6 ORIFICE FLOW-CONTROL STRUCTURE
NTS

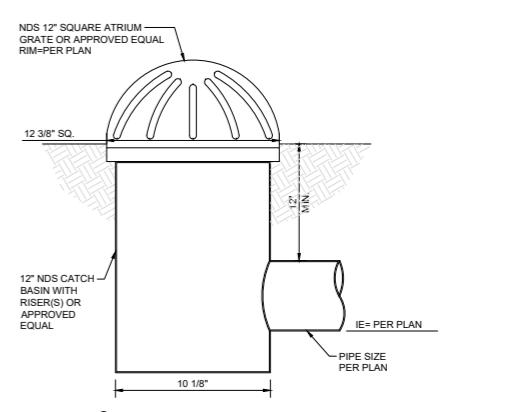


5 SANITARY/STORMWATER CLEANOUT
NTS

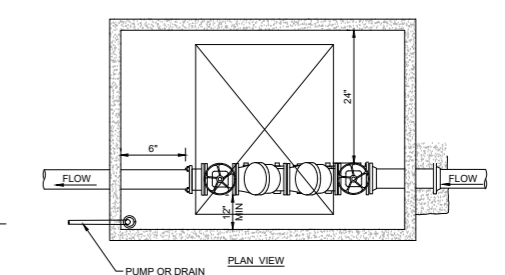


4 18" SQUARE TRAFFIC RATED CATCH BASIN
NTS

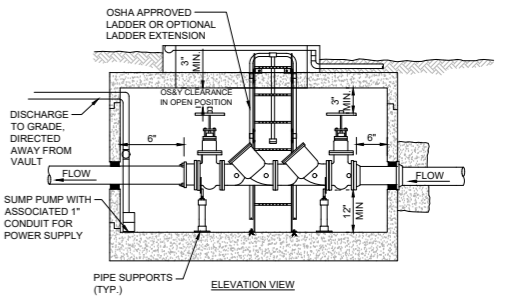
- NOTES:
1. GRATE TO BE ATTACHED TO CATCH BASIN WITH SCREW PROVIDED AT TIME OF INSTALLATION.
 2. INSTALLATION TO BE COMPLETED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
 3. DO NOT SCALE DRAWING.
 4. THIS DRAWING IS INTENDED FOR USE BY ARCHITECTS, ENGINEERS, CONTRACTORS, CONSULTANTS AND DESIGN PROFESSIONALS FOR PLANNING PURPOSES ONLY.
 5. ALL INFORMATION CONTAINED HEREIN WAS CURRENT AT THE TIME OF DEVELOPMENT BUT MUST BE REVIEWED AND APPROVED BY THE PRODUCT MANUFACTURER TO BE CONSIDERED ACCURATE.
 6. CONTRACTOR'S NOTE FOR PRODUCT AND COMPANY INFORMATION VISIT www.caddetails.com/info AND ENTER
 7. REFERENCE NUMBER 558-195.



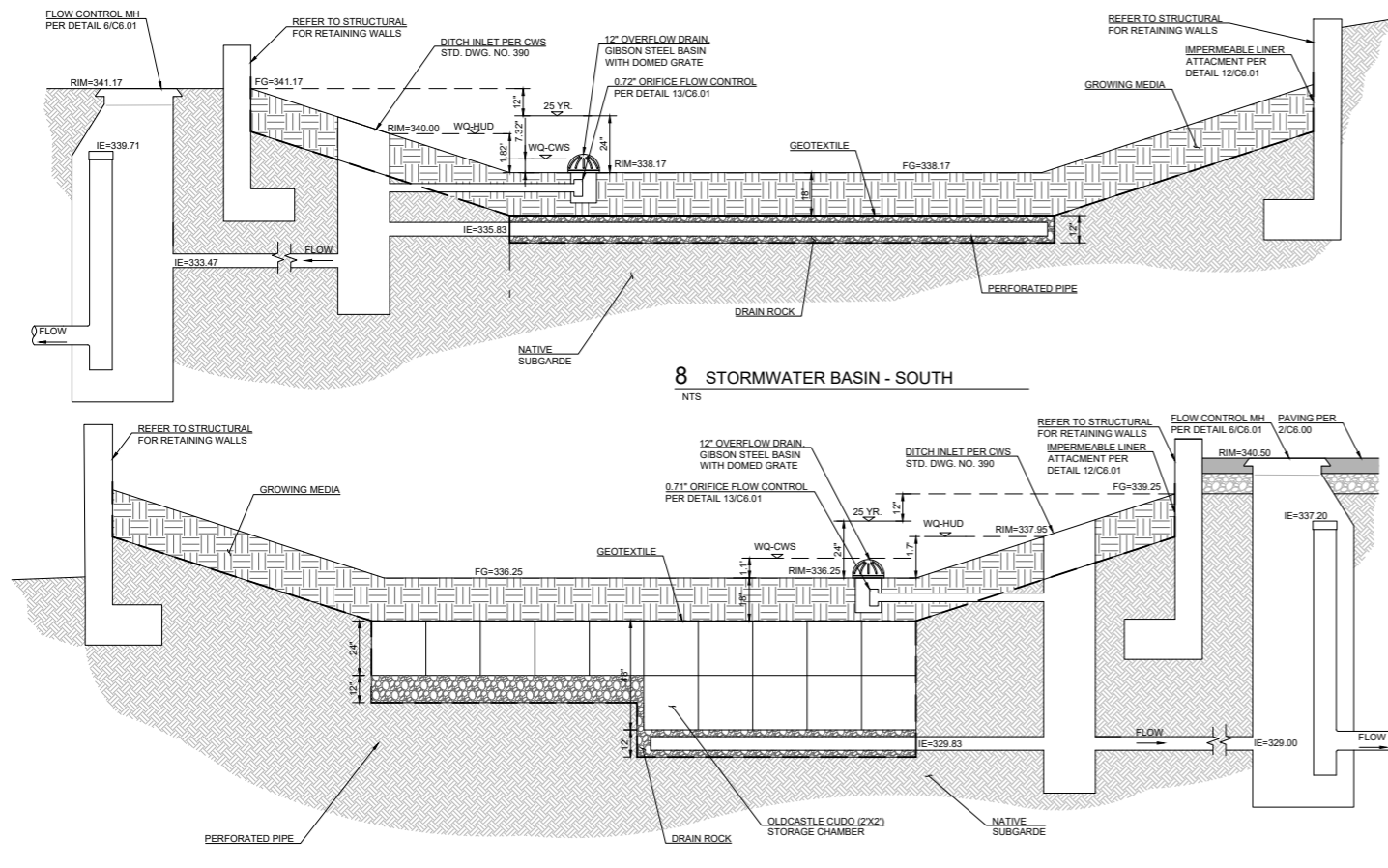
3 12" AREA DRAIN
NTS



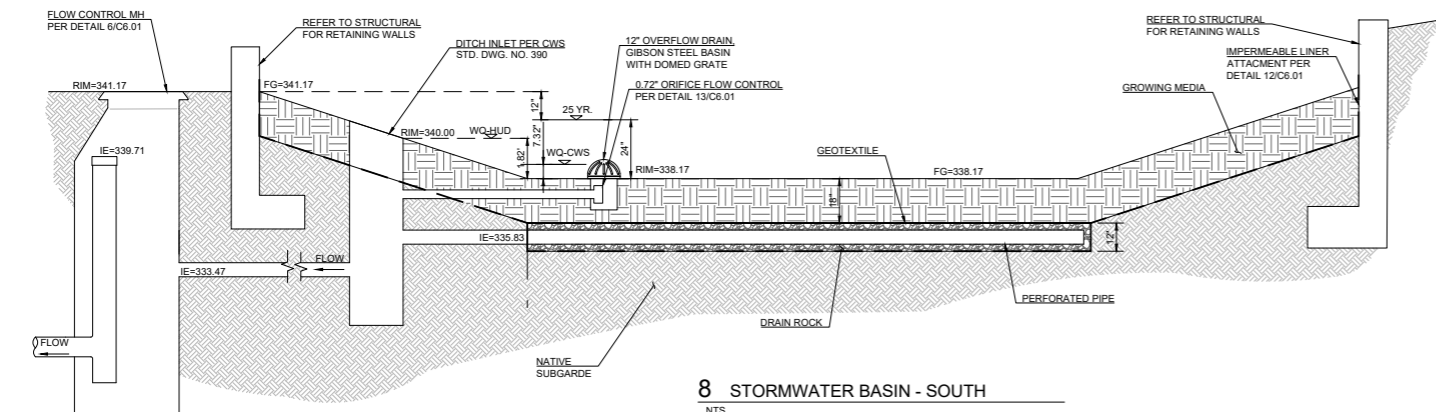
2 WATER BACKFLOW VAULT
NTS



1 FIRE BACKFLOW VAULT
NTS



7 STORMWATER BASIN - NORTH
NTS



8 STORMWATER BASIN - SOUTH
NTS

Endangered Species Act Guidance for Oregon

Prepared in collaboration with the US Fish and Wildlife Service and NOAA Fisheries Service
Applies in Oregon only

General requirements	ESA Legislation	HUD Regulations
Section 7(a)(2) of the Endangered Species Act mandates that actions that are authorized, funded, or carried out by Federal agencies do not jeopardize the continued existence of plants and animals that are listed, or result in the adverse modification or destruction of designated critical habitat.	The Endangered Species Act of 1973; 16 U.S.C. 1531 et seq.	24 CFR 58.5(e) 24 CFR 50.4(e)

Purpose

The purpose of this guidance is to assist the U.S. Department of Housing and Urban Development (HUD) and their designated responsible entities who have assumed responsibility for environmental compliance to meet their duty to consult with the US Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration (NOAA) Fisheries Service (NOAA Fisheries) under Section 7(a)(2) of the Endangered Species Act (ESA). Users will be able to determine whether their development projects are likely to have “no effect” on ESA-listed species and critical habitats, and thus do not require any further coordination with, or approval from, the USFWS or NOAA Fisheries.

If you make a “no effect” decision for your project, please document the circumstances and reason for your decision in a memo to file for use if the decision is ever reviewed by another party. If you find that your action “may affect” an ESA-listed species or critical habitat, including a result of post-construction runoff, then you must contact USFWS, NOAA Fisheries, or both to determine whether the project can be modified to eliminate the possibility of an adverse effect. If the adverse effect cannot be eliminated, further consultation with USFWS and/or NOAA Fisheries will be required.

This guidance also includes links to additional resources that describe low-impact development (LID) practices, including many actions that HUD and responsible entities can use to avoid or minimize the adverse impacts of post-construction runoff. HUD or a responsible entity may still choose to complete an individual consultation when warranted by project-specific facts.

Definitions

- **Action Area** is all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action.
- **Built environment** means roofs and paved areas like parking, patios, trails, retaining walls, sidewalks, streets, and amenities that prevent infiltration of rainwater into the water table.
- **Candidate Species** are plant and animal taxa considered for possible addition to the List of Endangered and Threatened Species. These are taxa for which the USFWS and NOAA Fisheries have sufficient information on biological vulnerability and threat(s) to support issuance of a proposal to list, but issuance of a proposed rule is currently precluded by higher priority listing actions.
- **Critical Habitat** means those specific areas that have been designated by USFWS or NOAA Fisheries (in a rule-making in the *Federal Register*) as essential to the conservation of a listed species.
- **Impervious area** means artificial structures such as rooftops and pavements (e.g., driveways, parking lots, roads, sidewalks, trails) that are covered by impervious material like asphalt, brick, compacted soil, concrete, or stone.
- **Listed Species** means any species of fish, wildlife or plant that has been determined to be endangered or threatened under section 4 of the Endangered Species Act.

- **Low impact development (LID)** means management principles and practices that reduce post-construction runoff by infiltrating rainfall into the water table, evaporating rainwater back into the atmosphere after a storm, or finding beneficial uses for rainwater instead of exporting it from the site as a waste product.
- **Nexus** means any action that is funded, authorized or carried out by a Federal agency that may affect ESA-listed species or habitats.
- **Post-construction runoff** means runoff from the built environment that extends off-site after a project's construction is complete.
- **Proposed Species** any species of fish, wildlife or plant that has been proposed by USFWS or NOAA Fisheries in the *Federal Register* to be listed under section 4 of the Endangered Species Act.
- **Proximity** means areas or effects that occur near ESA-listed species or habitats in space or time, including areas where species roost, feed, nest, rear, overwinter, or migrate. NOAA Fisheries considers projects that discharge post-construction stormwater to be in proximity with ESA-listed species or habitats that occur downstream of the discharge site.
- **Responsible entity** means the party authorized by HUD under 24 CFR Part 58 to complete any environmental review necessary for HUD to obligate funds.
- **Riparian area** means vegetation, habitats, or ecosystems that are associated with bodies of water, typically within 150-feet of a stream bank or the shoreline of a standing body of water.
- **Take** under the ESA is defined as actions that may harass, harm, pursue, hunt, shoot, wound, kill trap, capture, or collect, or to attempt to engage in any such conduct. The ESA also protects against interfering in vital breeding and behavioral activities or degrading critical habitat.

Endangered Species Act Effects Determinations

Section 7 of the ESA requires all Federal agencies to insure that any action authorized, funded or carried out by the agency is not likely to jeopardize the continued existence of a listed species or destroy or adversely modify designated critical habitat. To this end, every project with a Federal nexus must be evaluated to determine its likely effect on listed and proposed species and designated critical habitat. HUD funding for a project serves as a Federal nexus triggering the requirement for environmental review under the ESA. HUD and Responsible Entities are also encouraged to consider candidate species in their evaluations.

- **No effect** means the proposed action will not have any direct or indirect effect on listed species or designated critical habitat.

No effect is the appropriate conclusion when the action agency determines its proposed action will not affect listed species or critical habitat. A determination of '*no effect*' must be supported in the environmental review record but does not require consultation with NOAA Fisheries or USFWS.

- **May affect** means the proposed action may have a direct or indirect effect on an ESA-listed species or critical habitat, including any habitat modification that alters water quality, physical habitat features, or other conditions that contribute to habitat value.

May affect, not likely to adversely affect is the appropriate conclusion when effects on listed species are expected to be *discountable*, or *insignificant*, or completely *beneficial*.

- **Beneficial effects** are contemporaneous positive effects without any adverse effects to the species.
- **Insignificant effects** relate to the size of the impact and should never reach the scale where take occurs. Based on best judgment, a person would not be able to meaningfully measure, detect, or evaluate insignificant effects.
- **Discountable effects** are those extremely unlikely to occur. Based on best judgment, a person would not expect discountable effects to occur.

A determination of *'not likely to adversely affect'* requires informal consultation with NOAA Fisheries or USFWS (or both); informal consultation results in a Letter of Concurrence from NOAA Fisheries or USFWS.

May affect, likely to adversely affect is the appropriate conclusion if any adverse effect to listed species may occur as a direct or indirect result of the proposed action or its interrelated or interdependent actions, and the effect is not discountable, insignificant, or beneficial. A determination of *'likely to adversely affect'* requires formal consultation under section 7 of the ESA; formal consultation results in a Biological Opinion from NOAA Fisheries or USFWS.

Background

An ESA effects analysis must consider both the direct and indirect effects of the action. Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur. Few HUD actions occur within designated critical habitat, where direct injury or harm to ESA-listed species or critical habitat is easy to discern. But many HUD actions increase the area of the built environment, and thereby release post-construction runoff to the off-site environment. The indirect effects of post-construction runoff on the aquatic environment are the primary interaction between HUD actions and ESA-listed species and habitats.

One important indirect effect of post-construction runoff occurs when sediment and chemicals like oil, pesticides, and heavy metals accumulate on the built environment where they can be picked up by rainwater and transported into wetlands, lakes, and streams. Once there, those pollutants cause harm when they enter the food chain or otherwise degrade aquatic habitats. Other indirect effects occur when the built environment interrupts the natural cycle of rainwater infiltration into soil by diverting large volumes of post-construction runoff into drainage systems that quickly discharge into the nearest water body, where the effluent can cause erosion or downstream flooding that also harms ESA-listed species and habitats.

This guidance is based on the use of LID practices and principles that are simple, flexible, and economical to use, even in redevelopment situations. LID is highly effective for controlling stormwater impacts. Examples include use of permeable pavers, rain gardens, soil amendments, and tree retention to retain or recreate natural landscape features, reduce impervious cover, and increase on-site detention and infiltration.

Working Towards Recovery

The ESA requires all federal agencies to use their authorities to help conserve listed species. Therefore, as HUD-designated responsible entities, you are encouraged to minimize the effects of your actions on listed species, designated critical habitat and habitat identified in endangered species recovery plans. For your activities, you are especially encouraged to minimize your action's contribution to water quality degradation from point and non-point discharges, and water quantity alteration due to increased impervious surfaces.

DISCLAIMER: This document is intended as a tool to help grantees and HUD staff complete NEPA requirements. This document is subject to change. This is not a policy statement, and the Endangered Species Act and associated regulations take precedence over any information found in this document.

Questions concerning environmental requirements related to HUD programs can be addressed to Deborah Peavler-Stewart (206) 220-5414 or Sara Jensen (206) 220-5226.

Procedure for Section 7 Determination

You may use the guidance below to document compliance with the Endangered Species Act.

Part A: Consultation with NOAA Fisheries Service

Step 1: Obtain Species List & Determine Critical Habitat

For NOAA Fisheries species and designated or proposed critical habitat go to:

http://www.westcoast.fisheries.noaa.gov/maps_data/endangered_species_act_critical_habitat.html

http://www.nwr.noaa.gov/maps_data/species_population_boundaries.html

With a few exceptions on the Oregon Coast, most watersheds in the land area affected by ESA-listings of salmon and steelhead are within or upstream of a watershed occupied by an ESA-listed species or habitat.¹ NOAA Fisheries considers projects that discharge post-construction stormwater to be in proximity with ESA-listed species or habitats that occur downstream of the discharge site.

However, detailed distribution maps are available from recovery planning and implementation documents and the Salmon Population Summary (SPS) Database.² If you need to confirm whether your action is in proximity to ESA-listed salmon or steelhead, contact the appropriate office for NOAA Fisheries.³

Step 2: Determine Effect

Question 1: Would the project effects overlap with federally listed or proposed species and designated or proposed critical habitat covered by NOAA Fisheries?

Note that project effects include those that extend beyond the project site itself, such as noise, water quality, stormwater discharge, visual disturbance; habitat assessment must include consideration for feeding, spawning, rearing, overwintering sites, and migratory corridors.

- NO, the project and all effects are outside the range of listed species and critical habitat covered by NOAA Fisheries.**
- Record your determination of *No Effect* on species or habitats covered by NOAA Fisheries.
 - Maintain documentation in your Environmental Review Record. For example, a map showing that your project is not in or upstream of a watershed of a listed species.
 - Section 7 Consultation with USFWS may still be necessary. CONTINUE TO Part B.
- YES, project effects may overlap with ESA-listed species or designated critical habitat covered by NOAA Fisheries.**
- Continue to Question 2.

¹ http://www.westcoast.fisheries.noaa.gov/publications/protected_species/salmon_steelhead/status_of_esa_salmon_listings_and_ch_designations_map.pdf

² <https://www.webapps.nwfsc.noaa.gov/apex/f?p=261:1:1530350968904#>

³ http://www.westcoast.fisheries.noaa.gov/about_us/our_locations.html

Question 2: Is the project activity listed in Table A (see next page) and does it meet all of the required parameters?

- YES, the activity is listed in Table A and meets all of the required parameters.** Therefore, the project will have *No Effect* on ESA-listed species and/or designated critical habitat.
 - Record your determination of *No Effect* and maintain this documentation, including a species list and map of your project location, in your Environmental Review Record.
 - Attach a statement to your determination explaining how your project meets the required parameters in Table A.
 - Section 7 Consultation with USFWS may still be necessary. CONTINUE TO Part B.

- NO, the project description does not match a project description in Table A and all of the specified parameters.**
 - Continue to Question 3.

Question 3: Do you have some other basis for a *No Effect* determination, for example a biological assessment or other documentation from a qualified professional?

- YES, the project has professional documentation for *No Effect* determination.**
 - Record your determination of *No Effect* and maintain this documentation, including a species list and map of your project location, in your Environmental Review Record.
 - Attach the biological assessment or other professional documentation.
 - Section 7 Consultation with USFWS may still be necessary. CONTINUE TO Part B.

- NO, the project does not have professional documentation supporting a *No Effect* determination.**
 - YOU MUST INITIATE SECTION 7 CONSULTATION WITH NOAA Fisheries. Contact information on Page 8.
 - Consultation with USFWS may also be necessary. CONTINUE TO PART B.

TABLE A.

Potential “No Effect” Activity	Required Parameters
Purchase building	<ul style="list-style-type: none"> No change to existing structures
Landscape repair, including adding sprinkler systems	<ul style="list-style-type: none"> Does not remove trees or streamside vegetation
Interior rehabilitation	<ul style="list-style-type: none"> For existing structures Waste materials are recycled or otherwise disposed of in an EPA approved sanitary or hazardous waste disposal site
Any exterior repair or improvement that will not increase post-construction runoff, e.g. <ul style="list-style-type: none"> Replace exterior paint or siding Build a fence Replace/repair roof without using bituminous waterproofing Replace/repair a roof or siding without using galvanized metal Reconstruct/repair existing curbs, sidewalks or other concrete structures Repair existing parking lots (pot holes, repainting lines, etc.) 	<ul style="list-style-type: none"> Does not increase amount of impervious surface Waste materials are recycled or otherwise disposed of in an EPA approved sanitary or hazardous waste disposal site
Special projects directed to the removal of material or architectural barriers that restrict the mobility of and accessibility to elderly and persons with disabilities, e.g. <ul style="list-style-type: none"> Curb cuts Wheelchair ramps 	Meets <u>all</u> of the following: <ul style="list-style-type: none"> Will not impact an area of natural habitat, a wetland, or riparian area; and Complies with all state and local building codes and stormwater regulations
Install LID practices	<ul style="list-style-type: none"> For existing structures
New construction or addition on previously developed site (for example a building over an existing parking lot)	Meets <u>all</u> of the following <ul style="list-style-type: none"> not increase amount of impervious surface Waste materials are recycled or otherwise disposed of in an EPA approved sanitary or hazardous waste disposal site Stormwater meets NOAA Fisheries standards.⁴
Project that will add new impervious surface that will increase post-construction runoff, including new construction.	Meets <u>all</u> of the following: <ul style="list-style-type: none"> All post-construction runoff will be completely infiltrated or used on-site; and Will not impact an area of natural habitat, a wetland, or riparian area; and Complies with all state and local building codes and stormwater regulations

⁴ Refer to HUD Programmatic Opinion or contact NOAA Fisheries.

Part B: Consultation with U.S. Fish and Wildlife Service

Step 1: Obtain Species List & Determine Critical Habitat

You must obtain a species list for the entire action area of your project. The action area encompasses all of the effects of the project, not just those that occur within the construction footprint. Note that project effects include those that extend beyond the project site itself, such as noise, air pollution, water quality, stormwater discharge, visual disturbance; effects to habitat must be considered, including the project's effects on roosting, feeding, nesting, spawning and rearing habitat, overwintering sites, and migratory corridors.

Go to <http://ecos.fws.gov/ipac/> for a list of species by project area. Please note that this list includes listed, proposed *and* candidate species; consideration of project effects on candidate species is optional, unless effects are very large (contact the local USFWS field office in this case). However, candidate species may become listed as endangered or threatened species during the period of construction. If you have questions, contact the appropriate USFWS field office⁵ to discuss the species list for your area.

Step 2: Determine Effect

Question 1: Would the project effects overlap with federally-listed or proposed species or designated or proposed critical habitat covered by USFWS?

Consider all effects of the project within the action area. The action area encompasses all the effects of the project, including those that occur beyond the boundaries of the property (such as noise, air pollution, water quality, stormwater discharge, visual disturbance)

- NO, the project and all effects are outside the range of listed or proposed species and designated critical habitat covered by USFWS.** Therefore, the project will have *No Effect* on ESA-listed or proposed species or designated critical habitat.
- Record your determination of *No Effect* on species or habitats covered by USFWS, and maintain this documentation in your Environmental Review Record.
 - Attach a statement explaining how you determined that your project's effects do not overlap with species or habitat covered by USFWS.
- YES, project effects may overlap with ESA-listed or proposed species or designated critical habitat covered by USFWS.** Therefore, your project could affect species and habitat.
- Continue to Question 2.

Question 2: Will the project occur on a previously developed site?

- YES, the project will have *No Effect* on ESA-listed species or designated critical habitat.**
- Record your determination of *No Effect* on species or habitats covered by USFWS, and maintain this documentation in your Environmental Review Record.

⁵ <http://www.fws.gov/oregonfwo/Administration/ContactUs/>

- Attach a statement explaining how you determined that your project's effects do not impact species or habitat covered by USFWS.
- NO.**
 - Continue to Question 3.

Question 3: Is the project activity listed in Table A and does it meet all of the required parameters?

- YES, the activity is listed in Table A and meets all of the required parameters.** Therefore, the project will have *No Effect* on ESA-listed species and/or designated critical habitat.
 - Record your determination of *No Effect* and maintain this documentation, including the official species list and map of your project location, in your Environmental Review Record.
 - Attach a statement to your determination explaining how your project met the required parameters in Table A.
- NO, the project description does not match a project description in Table A and all of the specified parameters.**
 - Continue to Question 4.

Question 4: Do you have some other basis for a *No Effect* determination, for example a biological assessment or other documentation from a qualified professional?

- YES, the project has professional documentation for *No Effect* determination.**
 - Record your determination of *No Effect* and maintain this documentation, including the official species list and map of your project location, in your Environmental Review Record.
 - Attach the biological assessment or other professional documentation.
- NO, the project does not have professional documentation for a *No Effect* determination and *may affect* a listed species.**
 - The project *may affect* listed or proposed species, or designated or proposed critical habitat. Consultation with the USFWS may be required. CONTACT THE USFWS TO DETERMINE THE APPROPRIATE EFFECTS DETERMINATION AND LEVEL OF CONSULTATION REQUIRED. Contact information on Page 9.

Initiating Section 7 Consultation

If the effects of the action are insignificant, discountable, or entirely beneficial, it is *not likely to adversely affect* listed or proposed species or designated critical habitats, and the section 7 consultation for the project may remain informal and relatively simple. A *May Affect, Not Likely to Adversely Affect* determination is the most common outcome of consultation for HUD-funded projects with USFWS.

However, if the effects of the action on listed or proposed species and/or critical habitat are not discountable, insignificant, or entirely beneficial, (i.e., *likely to adversely affect*), formal consultation must be initiated. In such cases, a formal consultation must be initiated prior to committing resources to the project, by which the USFWS and/or NOAA Fisheries assess the action's potential to jeopardize the listed species, to result in the destruction or adverse modification of critical habitat, or to result in incidental take of a listed species. Formal consultation will result in the USFWS and/or NOAA Fisheries issuing a Biological Opinion for the project, including an incidental take statement for project actions, if appropriate. The Biological Opinion will also include non-discretionary terms and conditions to further minimize and/or avoid project impacts to ESA-listed species. Because the constituents of stormwater runoff are particularly harmful to aquatic species, a *May Affect, Likely to Adversely Affect* determination is the most common outcome of consultation for HUD-funded projects with NOAA Fisheries.

At any stage in making your determination, you may wish to contact the appropriate USFWS and NOAA Fisheries field offices for technical assistance. Contact information is available at:

NOAA Fisheries Service
Portland Regional Office
1201 Northeast Lyon Blvd, Suite 1100
Portland, OR 97232
503-230-5400
<http://www.westcoast.fisheries.noaa.gov/index.html>

U.S. Fish and Wildlife Service
Oregon Fish and Wildlife Office
2600 SE 98th Ave, Suite 100
Portland, OR 97266
503-231-6179
<http://www.fws.gov/oregonfwo/>

For projects located in the Klamath River Basin, you must contact NOAA's Northern California Office at:

NOAA Fisheries Service
Arcata Office
1655 Heindon Road
Arcata, CA 95521
707-825-5171

For a map of the Klamath River Basin, please visit:

http://www.westcoast.fisheries.noaa.gov/publications/gis_maps/maps/salmon_steelhead/esa/chinook/w eb_pdfs_uktr_chinook.pdf

Links to Section 7 Handbook and additional Section 7 resources:

- Section 7 Handbook: http://www.nmfs.noaa.gov/pr/pdfs/laws/esa_section7_handbook.pdf
- Overview of the Section 7 Process: <http://www.fws.gov/Midwest/endangered/section7/index.html>

Additional Resources for LID

- American Rivers, 2012, Banking on Green Report: Economic Benefits of Green Infrastructure Practices
- Clean Water Services, 2009, Low Impact Development Approaches (LIDA) Handbook
- ECONorthwest, 2009, LID at the Local Level - Developers' Experiences and City and County Support
- EPA, 2005, Low Impact Development for Big Box Retailers
- Herrera, 2013, Guidance Document: Western Washington LID Operation and Maintenance
- NCHRP, 2006, Evaluation of BMPs for Highway Runoff Control – LID Design Manual
- Prince George County, Maryland, 1999, Low-Impact Development Design Strategies
- Puget Sound Partnership, 2012, Low Impact Development: Technical Guidance Manual for Puget Sound
- US EPA, 2013, Stormwater to Street Trees: Engineering Urban Forests for Stormwater Management