Land Use Application for Site Design Review Meadow Creek Apartments

Date: March 2018

Submitted to:
City of Newberg
Planning Department
414 E 1st Street
Newberg, OR 97132

Applicant:
MJG Development
901 Brutscher Street, Suite 206
Newberg, OR 97132

AKS ENGINEERING & FORESTRY
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Exhibits

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Applicant/Owner:	MJG Development, Inc. 901 Brutscher Street, Suite 206 Newberg, OR 97132
Applicant's Consultant:	AKS Engineering & Forestry, LLC 12965 SW Herman Road, Suite 100 Tualatin, OR 97062 Contact(s): Mimi Doukas, AICP, RLA Email: mimid@aks-eng.com Phone: (503) 563-6151
Site Location:	1306 N Springbrook Road
Assessor's Map:	Yamhill County Assessor's Map 3216CB Adjusted Tax Lot 200.
Site Size:	±3.18 (adjusted per separate Property Line Adjustment Application)
Land Use Districts:	R-2 medium density residential district

I. Executive Summary

MJG Development, Inc. is submitting this application for Type II site design review for the first phase of a 42-unit apartment complex at 1306 North Springbrook Road in Newberg, Tax Map # R3216CB 00200. The property is part of a recent property line adjustment with the neighboring Tax Lot 00100 to the east, also owned by the applicant. A stream corridor lies east of the project site and the property line adjustment places the improvement on the west side of the stream. After the property line adjustment, the subject property will be ±3.18 acres. The planned apartments will be oriented in two groups facing North Springbrook Road with parking between the buildings and the street. Access is planned from two points along North Springbrook Road. Open space, landscaping, outdoor living and recreation areas will meet the requirements of the City of Newberg Municipal Code (NMC).

This application includes the City application forms, written materials, and preliminary plans necessary for City Staff to review and determine compliance with the applicable approval criteria. The evidence is substantial and supports the City's approval of the application.

II. Site Description/Setting

The subject property (after adjustment) is an irregularly-shaped ±3.18-acre parcel with generally flat topography gently sloping east toward the creek. A grouping of mature trees is located in the northwest corner of the site adjacent to the road. The property is primarily zoned R-2 (Medium Density Residential District) with a small area of SC Overly (Stream Corridor) and has a comprehensive plan designation of MDR (Medium Density Residential). The adjacent Tax Lot 00100 to the east is vacant and partially wooded. The north Springbrook neighborhood is comprised of a mix of single family and multifamily dwellings and a variety of commercial uses. East of Tax Lot 00100 is a single-family subdivision. To the north are single family dwellings along Aquarius Boulevard and the Victoria Square Apartments. South of the site is a commercial/retail complex anchored by a Rite Aid and Safeway. North Springbrook Road is adjacent west, with an assisted living facility, mobile home village, and additional apartments on the west side of North Springbrook Road. Improvement of the subject property with multifamily residential use will be consistent with the overall character of the neighborhood.

III. Applicable Review Criteria

CITY OF NEWBERG DEVELOPMENT CODE

Chapter 15.100 LAND USE PROCESSES AND PROCEDURES

15.100.030 Type II procedure.

A. Type II development actions shall be decided by the director.

B. Type II actions include, but are not limited to:

1. Site design review.
2. Variances.
3. Manufactured dwelling parks and mobile home parks.
4. Partitions.
5. Subdivisions, except for subdivisions with certain conditions requiring them to be processed using the Type III process, pursuant to NMC 15.235.030(A).

C. The applicant shall provide notice pursuant to the requirements of NMC 15.100.200 et seq.

D. The director shall make a decision based on the information presented and shall issue a development permit if the applicant has complied with all of the relevant requirements of this code. The director may add conditions to the permit to ensure compliance with all requirements of this code.

E. Appeals may be made by an affected party, Type II, in accordance with NMC 15.100.160 et seq. All Type II development action appeals shall be heard and decided by the planning commission.

F. If the director's decision is appealed as provided in subsection (E) of this section, the hearing shall be conducted pursuant to the Type III quasi-judicial hearing procedures as identified in NMC 15.100.050.

G. The decision of the planning commission on any appeal may be further appealed to the city council by an affected party, Type III, in accordance with NMC 15.100.160 et seq. and shall be a review of the record supplemented by written or oral arguments relevant to the record presented by the parties.

H. An applicant shall have the option to request at the time the development permit application is submitted that the proposal be reviewed under the Type III procedure.

Response: This application is for a site design review and is therefore a Type II action. It is understood the requirements and procedures listed in this section apply to this application.

15.100.140 Permit decision – Type II.

A. The director shall approve or deny the development permit for a Type II action within 60 days of accepting a complete permit application, unless it is a subdivision which has been converted to a Type III process pursuant to NMC 15.235.030(A).

B. The applicant shall provide notice pursuant to NMC 15.100.200 et seq. together with a 14-day comment period for the submission of written comments prior to the decision.

C. The decision of the director shall be based upon the application, the evidence, comments from referral agencies, and approvals required by others.

D. The director shall notify the applicant and others entitled to notice of the disposition of the application. The notice shall indicate the date that the decision will take effect and describe the right of appeal pursuant to NMC 15.100.160 et seq. A decision on a Type II development shall take effect on the fifteenth day following the notice of a decision unless an appeal is filed pursuant to NMC 15.100.160 et seq.

E. Approval or denial of a Type II development permit application shall be accompanied by written findings that explain the criteria, facts and justification for the decision.

F. The director shall approve a permit application if applicable approvals by others have been granted and the proposed development or land use request otherwise conforms to the requirements of this code. The director may add conditions to the permit to ensure compliance with all requirements of this code.

G. The director shall deny the permit application if required approvals are not obtained or the application otherwise fails to comply with code requirements.

H. Notice of approval or denial of a Type II decision shall be provided to the applicant, parties providing written testimony, or anyone requesting such notice. Notice shall include a description of the item, the decision, conditions that may have been added, and the rights of appeal.

I. Type II applications are required to be reviewed under the Type III procedures at the request of the applicant, or the application is a subdivision which has been converted to a Type III process pursuant to NMC 15.235.030(A), or through an appeal of the director's decision. Type II development permit applications that require a Type III procedure must conclude the hearing procedure before a land use or construction permit application can be considered to be complete by the director. Upon receiving a final decision by the hearing body on a Type III application, the subsequent review of a permit application may be reviewed by the director as a Type I process.

5.100.160 Appeal procedures.

A. Type I. An appeal of a Type I decision by the director may be appealed within 14 calendar days of the date of the decision by the director. Appeals may be made only by an affected party, Type I (the person or party submitting the application). Appeals of a Type I application are processed as a Type III procedure and proceed to the planning commission.

B. Type II. An appeal of a Type II decision by the director may be appealed within 14 calendar days of the date of the decision. Appeals may be made only by an affected party, Type II (the applicant, any party entitled to receive notice of the decision, or anyone providing written comments within 14 calendar days prior to the date of the decision). Appeals of a Type II application are processed as a Type III procedure and proceed to the planning commission.

5.100.170 Notice of appeal – Type I, II and III.

A. An appeal for Type I, II, and III decisions shall include an identification of the decision sought to be reviewed, the date of the decision and shall be accompanied by a notice of appeal form provided by the planning and building department. The notice of appeal shall be completed by the applicant and shall contain:

1. An identification of the decision sought to be reviewed, including the date of the decision.
2. A statement of the interest of the person seeking review and that they were a party to the initial proceedings.
3. A detailed statement of the specific grounds on which the appeal is filed.

B. Notice shall be filed with the community development department together with the filing fee and deposit for transcript costs.

Response: This application is for a Type II site design review. It is understood the permit decision and appeal procedures of the above-listed sections apply to this application.

15.100.200 Compliance required.

Notice on all Type I through Type IV actions, including appeals, shall be conducted in accordance with this article.

15.100.210 Mailed notice.

Mailed notice shall be provided as follows:

A. Type I Actions. No public notice is required.

B. Type II and Type III Actions. The applicant shall provide public notice to:

1. The owner of the site for which the application is made; and
2. Owners of property within 500 feet of the entire site for which the application is made. The list shall be compiled from the most recent property tax assessment roll. For purposes of review, this requirement shall be deemed met when the applicant can provide an affidavit or other certification that such notice was deposited in the mail or personally delivered.
3. To the owner of a public use airport, subject to the provisions of ORS 215.416 or 227.175.

C. The director may request that the applicant provide notice to people other than those required in this section if the director believes they are affected or otherwise represent an interest that may be affected by the proposed development. This includes, but is not limited to, neighborhood associations, other governmental agencies, or other parties the director believes may be affected by the decision.

D. The director shall provide the applicant with the following information regarding the mailing of notice:

1. The latest date by which the notice must be mailed;
2. An affidavit of mailing (to be signed and returned) certifying that the notice was mailed, acknowledging that a failure to

mail the notice in a timely manner constitutes an agreement by the applicant to defer the 120-day process limit and acknowledging that failure to mail will result in the automatic postponement of a decision on the application; and

3. A sample notice.

Response: The applicant will provide public notice as required by NMC 15.100.210. A mailing list, sample notice, and a site notice sign are included in Exhibit D. The criteria are met or will be met when applicable.

E. The notice of a Type II and Type III development application shall be reasonably calculated to give actual notice and shall:

1. Set forth the street address or other easily understood geographical reference to the subject property;

2. List, by commonly used citation, the applicable criteria for the decision;

3. Include the name and phone number of a local government contact person, the telephone number where additional information may be obtained and where information may be examined;

4. Explain the nature of the application and the proposed use or uses which could be authorized;

5. State that a copy of the application, all documents and evidence relied upon by the applicant and applicable criteria are available for inspection at no cost and will be provided at a reasonable cost.

F. Prior to mailing or posting any notice required by this code, the applicant shall submit a copy of the notice to the director.

G. The applicant shall mail the notice for Type II actions at least 14 days before a decision is rendered. The applicant shall file with the director an affidavit of mailing as identified in subsection (D) of this section within two business days after notice is mailed.

H. The applicant shall mail the notice for Type III actions at least 20 days before the first new hearing, or if two or more new hearings are allowed, 10 days before the first new hearing. The applicant shall file with the director an affidavit of mailing as identified in subsection (D) of this section within two business days after notice is mailed.

I. All public notices shall be deemed to have been provided or received upon the date the notice is deposited in the mail or personally delivered, whichever occurs first. The failure of a property owner to receive notice shall not invalidate an action if a good faith attempt was made to notify all persons entitled to notice. An affidavit of mailing issued by the person conducting the mailing shall be conclusive evidence of a good faith attempt to contact all persons listed in the affidavit.

J. Failure to mail the notice and affirm that the mailing was completed in conformance with the code shall result in:

1. Postponement of a decision until the mailing requirements have been met; or

2. Postponement of the hearing to the next regularly scheduled meeting or to such other meeting as may be available for the hearing; or

3. The entire process being invalidated; or

4. Denial of the application.

15.100.220 Additional notice procedures of Type II development applications.

In addition to the requirements of NMC 15.100.210, mailed notice for development actions shall also contain the following:

A. Provide a 14-day period from the date of mailing for the submission of written comments prior to the decision;

B. State that issues that may provide a basis for appeal must be raised in writing during the comment period;

C. State that issues must be raised with sufficient specificity to enable the local government to respond to the issue;

D. State the place, date and time that comments are due;

E. State that notice of the decision, including an explanation of appeal rights, will be provided to any person who submits comments under subsection (A) of this section;

F. Briefly summarize the local decision-making process.

G. Type II notice for subdivisions shall also include a description of how an interested party may request a public hearing before the planning commission.

Response: Exhibit D includes draft notice materials meeting the requirements of this section. As stated above, the applicant will provide notice as required, including the required affidavit. The criteria are met.

15.100.260 Procedure for posted notice for Type II and III procedures.

A. Posted Notice Required. Posted notice is required for all Type II and III procedures. The notice shall be posted on the subject property by the applicant.

B. Notice Information Provided by City. The director shall provide the applicant with the following information regarding the posting of notice:

1. The number of notices required;

2. The latest date by which the notice must be posted;

3. An affidavit of posting (to be signed and returned) certifying that the notice was posted on site, acknowledging that a failure to post the notice in a timely manner constitutes an agreement by the applicant to defer the 120-day process limit and acknowledging that failure to post will result in the automatic postponement of a decision on the application; and

4. A sample notice.

C. Submission of Notice. Prior to posting any notice required by this section, the applicant shall submit a copy of the notice to the director for review.

D. Size, Number and Location Requirements. A waterproof notice which measures a minimum of two feet by three feet shall be placed on each frontage of the site. If a frontage is over 600 feet long, a notice is required for each 600 feet, or fraction of 600 feet. If possible, notices shall be posted within 10 feet of a street lot line and shall be visible to pedestrians and motorists in clear view from a public right-of-way. Notices shall not be posted in a public right-of-way or on trees.

E. Contents of Notice. The posted notice shall only contain the following information: planning action number, brief description of the proposal, phone number and address for contact at the Newberg planning and building department.

F. Standards and Timing, Type II Actions. The applicant shall post the notice at least 14 days before a decision is rendered. The applicant shall file with the director an affidavit of posting as identified in subsection (B) of this section within two business days after notice is posted.

G. Standards and Timing, Type III Actions. The applicant shall post the notice at least 10 days before the first scheduled hearing. The applicant shall file with the director an affidavit of posting as identified in subsection (B) of this section within two business days after notice is posted.

H. Removal of Notice. The applicant shall not remove the notice before the final decision. All posted notice shall be removed by the applicant within 10 days following the date of the final decision on the request.

I. Failure to Post Notice. The failure of the posted notice to remain on the property shall not invalidate the proceedings. Failure by the applicant to post a notice and affirm that the posting was completed in conformance with the code shall result in:

1. Postponement of a decision until the mailing requirements have been met; or

2. Postponement of the hearing to the next regularly scheduled meeting or to such other meeting as may be available for the hearing; or

3. The entire process being invalidated; or

4. Denial of the application.

Response: This application is for a site design review and is therefore a Type II action. Therefore, the posted notice requirements for Type II procedures listed in this section apply to this application. Notice will be posted and documented as required.

Division 15.200 Land Use Applications

Chapter 15.220 SITE DESIGN REVIEW

15.220.020 Site design review applicability.

A. Applicability of Requirements. Site design review shall be required prior to issuance of building permits or commencement of work for

all improvements noted below. Site design review permits shall be processed as either Type I or Type II, as noted below.

1. Type I….
   a. Single-family dwellings;
   b. Duplexes;
   c. Institutional, commercial or industrial additions which do not exceed 1,000 square feet in gross floor area;
   d. Multifamily additions which do not exceed 1,000 square feet in gross floor area and do not add any new units, or new construction incidental to the main use on an existing developed site which do not exceed 1,000 square feet in gross floor area and do not add any new units;
   e. Institutional, commercial or industrial interior remodels which do not exceed 25 percent of the assessed valuation of the existing structure;
   f. Multifamily remodels which do not exceed 25 percent of the assessed valuation of the existing structure and do not add any new units;
   g. Signs which are not installed in conjunction with a new development or remodel;
   h. Modifications, paving, landscaping, restriping, or regrading of an existing duplex, multifamily, institutional, commercial or industrial parking lot;
   i. Fences and trash enclosures.
2. Type II.
   a. Any new development or remodel which is not specifically identified within subsection (A)(1) of this section.
   b. Telecommunications facilities.
   c. Accessory dwelling units.

Response: The planned improvement is not listed as a Type I review use. Therefore, Type II site design review is applicable to this application.

C. Site Design Review Time Limit. An approved site design review plan intended to be constructed in a single phase shall be valid for one year from the date of the notice of final decision. A building permit must be acquired within this time period or the design review approval shall terminate. The director under a Type I procedure may grant an extension for up to six months if the applicant files a request in writing prior to the expiration of the approval and demonstrates compliance with the following:

1. The land use designation of the property has not been changed since the initial design review approval; and

2. The applicable standards in this code which applied to the project have not changed.

Response: The time limits of this section apply to this application.

15.220.030 Site design review requirements.

B. Type II. The following information is required to be submitted with all Type II applications for site design review:

1. Site Development Plan. A site development plan shall be to scale and shall indicate the following as appropriate to the nature of the use:

a. Access to site from adjacent right-of-way, streets and arterials;

b. Parking and circulation areas;

c. Location and design of buildings and signs;

d. Orientation of windows and doors;

e. Entrances and exits;

f. Private and shared outdoor recreation spaces;

g. Pedestrian circulation;

h. Outdoor play areas;

i. Service areas for uses such as mail delivery, trash disposal, above-ground utilities, loading and delivery;

j. Areas to be landscaped;

k. Exterior lighting;

l. Special provisions for handicapped persons;

m. Other site elements and spaces which will assist in the evaluation of site development;

n. Proposed grading, slopes, and proposed drainage;

o. Location and access to utilities including hydrant locations; and

p. Streets, driveways, and sidewalks.

Response: The preliminary development plans (Exhibit A) show the information required for a site development plan per the requirements of this section. The criteria are met.

2. Site Analysis Diagram. A site analysis diagram shall be to scale and shall indicate the following characteristics on the site and within 100 feet of the site:

a. Relationship of adjacent lands;

b. Location of species of trees greater than four inches in diameter at four feet above ground level;

c. Existing and proposed topography;

d. Natural drainage and proposed drainage and grading;

e. Natural features and structures having a visual or other significant relationship with the site.

Response: The existing conditions plan and preliminary grading plan (Exhibit A) show the information required for a site analysis diagram per the requirements of this section. The criteria are met.

3. Architectural Drawings. Architectural drawings shall be prepared which identify floor plans and elevations.

Response: Architectural drawings are included with the preliminary development plans (Exhibit A). The criteria are met.

4. Landscape Plan. The landscape plan shall indicate:

a. The size, species and approximate locations of plant materials to be retained or placed on the site together with a statement which indicates the mature size and canopy shape of all plant materials;

b. Proposed site contouring; and

c. A calculation of the percentage of the site to be landscaped.

Response: The preliminary development plans (Exhibit A) include a landscape plan meeting the requirements of this section. The criteria are met.

5. Special Needs for Handicapped. Where appropriate, the design review plan shall indicate compliance with handicapped accessibility requirements including, but not limited to, the location of handicapped parking spaces, the location of accessible routes from the entrance to the public way, and ramps for wheelchairs.

6. Existing Features and Natural Landscape. The plans shall indicate existing landscaping and existing grades. Existing trees or other features intended to be preserved or removed shall be indicated on the plans.

7. Drives, Parking and Circulation. Proposed vehicular and pedestrian circulation, parking spaces, parking aisles, and the location and number of access points shall be indicated on the plans. Dimensions shall be provided on the plans for parking aisles, back-up areas, and other items as appropriate.

8. Drainage. The direction and location of on- and off-site drainage shall be indicated on the plans. This shall include, but not be limited to, site drainage, parking lot drainage, size and location of storm drain lines, and any retention or detention facilities necessary for the project.

9. Buffering and Screening. Buffering and screening of areas, structures and facilities for storage, machinery and equipment, services (mail, refuse, utility wires, and the like),

loading and parking and similar accessory areas and structures shall be shown on the plans.

10. Signs and Graphics. The location, colors, materials, and lighting of all exterior signs, graphics or other informational or directional features shall be shown on the plans.

11. Exterior Lighting. Exterior lighting within the design review plan shall be indicated on the plans. The direction of the lighting, size and type of fixtures, and an indication of the amount of lighting shall be shown on the plans.

12. Trash and Refuse Storage. All trash or refuse storage areas, along with appropriate screening, shall be indicated on the plans. Refuse storage areas must be constructed of brick, concrete block or other similar products as approved by the director.

13. Roadways and Utilities. The proposed plans shall indicate any public improvements that will be constructed as part of the project, including, but not limited to, roadway and utility improvements.

Response: The preliminary development plans (Exhibit A) include the information required by NMC 15.220.030, B (5) – (13), including handicapped accessibility features, existing conditions, parking and circulation, drainage and erosion control, buffers and screening, exterior lighting, trash and recycling areas, and planned roadway and utilities improvements. The criteria are met.

14. Traffic Study. A traffic study shall be submitted for any project that generates in excess of 40 trips per p.m. peak hour. This requirement may be waived by the director when a determination is made that a previous traffic study adequately addresses the proposal and/or when off-site and frontage improvements have already been completed which adequately mitigate any traffic impacts and/or the proposed use is not in a location which is adjacent to an intersection which is functioning at a poor level of service. A traffic study may be required by the director for projects below 40 trips per p.m. peak hour where the use is located immediately adjacent to an intersection functioning at a poor level of service. The traffic study shall be conducted according to the City of Newberg design standards.

Response: The ITE Trip Generation Handbook, Trip Generation Rates – 9th Edition indicates 42 units "Apartment 220" are estimated to generate 26 PM Hour trips. This rate is below the "40 trips per p.m. peak hour" threshold to require a traffic study. Thus, a traffic study is not provided with this application. The criterion is met.

Division 15.300 Zoning Districts

Chapter 15.302 DISTRICTS AND THEIR AMENDMENT

15.302.010 Establishment and designation of use districts and subdistricts.

In order to classify, regulate, restrict and segregate the uses of lands and buildings, to regulate and restrict the height and size of buildings, to regulate the area of yards and other open spaces about

buildings, and to regulate the density of population, the following classes of use districts and subdistricts are established:

A. Use Districts.

2. R-2 medium density residential district.

15.302.032 Purposes of each zoning district.

B. R-2 Medium Density Residential District.

1. The purpose of this land use designation is to provide a wide range of dwelling types and styles at an average overall density of nine units per gross buildable acre in the district.

2. Typical housing types will include single-family dwellings on small lots, attached single-family, duplex or multifamily dwellings, and manufactured dwelling parks. The district also is intended to allow low intensity institutional uses that operate consistent with peaceful enjoyment of residential neighborhoods. The R-2 district is intended to be consistent with the medium density residential (MDR) designation of the comprehensive plan.

Response: The subject property is located in the R-2 district. This application is for a 42-unit multifamily apartment complex. Multifamily is defined as three or more attached independent dwelling units. This use is consistent with surrounding uses in the MDR comprehensive plan designation. Therefore, the planned use is allowed by the R-2 district. The criteria are met.

15.220.050 Criteria for design review (Type II process).

B. Type II. The following criteria are required to be met in order to approve a Type II design review request:

1. Design Compatibility. The proposed design review request incorporates an architectural design which is compatible with and/or superior to existing or proposed uses and structures in the surrounding area. This shall include, but not be limited to, building architecture, materials, colors, roof design, landscape design, and signage.

Response: Architectural drawings are included with the development plans (Exhibit A). The drawings show three-story multi-unit apartment structures designed in a clean, modern style. The surrounding uses were built over many years and incorporate a variety of architectural styles. The planned structures are harmonious with the street-level location and are intended to be compatible with current and future surrounding uses. The criterion is met.

2. Parking and On-Site Circulation. Parking areas shall meet the requirements of NMC 15.440.010. Parking studies may be required to determine if adequate parking and circulation are provided for uses not specifically identified in NMC 15.440.010. Provisions shall be made to provide efficient and adequate on-site circulation without using the public streets as part of the parking lot circulation pattern. Parking areas shall be designed so that vehicles can efficiently enter and exit the public streets with a minimum impact on the functioning of the public street.

Response: As discussed elsewhere in this narrative, the preliminary development plans (Exhibit A) show the planned improvements meet the requirements of NMC 15.440.010. The criteria are met.

> 3. Setbacks and General Requirements. The proposal shall comply with NMC 15.415.010 through 15.415.060 dealing with height restrictions and public access; and NMC 15.405.010 through 15.405.040 and 15.410.010 through 15.410.070 dealing with setbacks, coverage, vision clearance, and yard requirements.

Response: As discussed elsewhere in this narrative, the preliminary development plans (Exhibit A) show the planned improvements comply with the applicable standards for setbacks, height, access, and other requirements listed in this sub-section. The criteria are met.

> 4. Landscaping Requirements. The proposal shall comply with NMC 15.420.010 dealing with landscape requirements and landscape screening.

Response: The preliminary development plans (Exhibit A) show landscaping associated with this project meets the requirements of NMC 15.420.010. The criteria are met.

> 5. Signs. Signs shall comply with NMC 15.435.010 et seq. dealing with signs.

Response: Signs associated with this project will comply with NMC 15.435.010 et seq. The criteria are met.

> 6. Manufactured Dwelling, Mobile Home and RV Parks. Manufactured dwelling and mobile home parks shall also comply with the standards listed in NMC 15.445.075 through 15.445.100 in addition to the other clear and objective criteria listed in this section. RV parks also shall comply with NMC 15.445.170 in addition to the other criteria listed in this section.

Response: This application is for multifamily apartments. The criterion is inapplicable.

> 7. Zoning District Compliance. The proposed use shall be listed as a permitted or conditionally permitted use in the zoning district in which it is located as found in NMC 15.305.010 through 15.336.020. Through this site review process, the director may make a determination that a use is determined to be similar to those listed in the applicable zoning district, if it is not already specifically listed. In this case, the director shall make a finding that the use shall not have any different or more detrimental effects upon the adjoining neighborhood area than those specifically listed.

Response: This application is for a 42-unit multifamily apartment complex. Per the NMC 15.305.020 Zoning use table – Use districts, "Dwelling, multifamily" is a permitted use in the R-2 district. The criterion is met.

8. Subdistrict Compliance. Properties located within subdistricts shall comply with the provisions of those subdistricts located in NMC 15.340.010 through 15.348.060.

Response: The only known overlay district near the property is the stream corridor overlay (SC) sub-district. The SC covers the creek adjacent east of the subject property. The preliminary development plans (Exhibit A) show that all the Phase 1 planned improvements are outside the SC overlay. Phase 2 will propose encroachment into the SC Overlay district but outside the wetland boundaries. Phase 2 will require approval of a separate Site Design Review application and a Variance application that will be submitted separately. Phase 1 is in compliance with the SC overlay.

9. Alternative Circulation, Roadway Frontage Improvements and Utility Improvements. Where applicable, new developments shall provide for access for vehicles and pedestrians to adjacent properties which are currently developed or will be developed in the future. This may be accomplished through the provision of local public streets or private access and utility easements. At the time of development of a parcel, provisions shall be made to develop the adjacent street frontage in accordance with city street standards and the standards contained in the transportation plan. At the discretion of the city, these improvements may be deferred through use of a deferred improvement agreement or other form of security.

Response: The preliminary development plans (Exhibit A) show planned frontage improvements for the project. Sidewalks, planter strips, and other required circulation and utility improvements are shown to meet City standards. The criteria, as applicable, are met.

10. Traffic Study Improvements. If a traffic study is required, improvements identified in the traffic study shall be implemented as required by the director.

Response: As discussed above for NMC 15.220.030.B(14), a traffic study is not required for this application.

Division 15.400 Development Standards

Chapter 15.405 LOT REQUIREMENTS

15.405.010 Lot area – Lot areas per dwelling unit.

A. In the following districts, each lot or development site shall have an area as shown below except as otherwise permitted by this code:

2. In the R-2, R-3, and RP districts, each lot or development site shall have a minimum area of 3,000 square feet or as may be established by a subdistrict. In the R-2 and R-P districts, the average size of lots in a subdivision intended for single-family development shall not exceed 5,000 square feet.

B. Lot or Development Site Area per Dwelling Unit

2. In the R-2, AR, and R-P districts, there shall be a minimum of 3,000 square feet of lot or development site area per dwelling unit. In the R-2 and R-P districts, lots or development sites in excess of 15,000 square feet used for

multiple single-family, duplex or multifamily dwellings shall be developed at a minimum of one dwelling per 5,000 square feet lot area.

Response: The total site area for Phase 1 of the project is ±138,520 sf (±3.18 acres). The area in the sidewalk easement is ±2,700 sf. The area in the stream corridor is ±4,520 sf. The area outside of the stream corridor and sidewalk easement is ±131,300 sf. The expected maximum density is 46 units (138,520/3,000 = 46.17 units). Utilizing the stream corridor overlay density transfer formula found in NMC 15.342.120, the density outside of the stream corridor is 43 units (131,300/3000 = 43.77 units). The maximum density increase outside of the stream corridor per 15.342.120.B.3 is 20%. A 20% increase in density outside the stream corridor for this site is 52 units (43.77 * 1.2 = 52.52 units). Phase 2 of this project, if approved, will add three dwelling units which is also within the allowed density. Thus, the proposed Phase 1 density of 42 units falls below the maximum density. The criterion is met.

15.405.030 Lot dimensions and frontage.

A. Width. Widths of lots shall conform to the standards of this code.

B. Depth to Width Ratio. Each lot and parcel shall have an average depth between the front and rear lines of not more than two and one-half times the average width between the side lines. Depths of lots shall conform to the standards of this code. Development of lots under 15,000 square feet are exempt from the lot depth to width ratio requirement.

C. Area. Lot sizes shall conform to standards set forth in this code. Lot area calculations shall not include area contained in public or private streets as defined by this code.

D. Frontage.

1. No lot or development site shall have less than the following lot frontage standards:

a. Each lot or development site shall have either frontage on a public street for a distance of at least 25 feet or have access to a public street through an easement that is at least 25 feet wide. No new private streets, as defined in NMC 15.05.030, shall be created to provide frontage or access.

b. Each lot in an R-2 and R-3 zone shall have a minimum width of 30 feet at the front building line.

Response: The subject property is subject to a recent boundary line adjustment in which conformance with the lot dimensions and frontage was established. The criteria are met.

15.405.040 Lot coverage and parking coverage requirements.

B. Residential uses in residential zones shall meet the following maximum lot coverage and parking coverage standards. See the definitions in NMC 15.05.030 and Appendix A, Figure 4.

1. Maximum Lot Coverage.

a. R-1: 30 percent, or 40 percent if all structures on the lot are one-story.

b. R-2 and RP: 50 percent.

c. AR and R-3: 50 percent.

2. Maximum Parking Coverage. R-1, R-2, R-3, and RP: 30 percent.

3. Combined Maximum Lot and Parking Coverage.

a. R-1, R-2 and RP: 60 percent.

b. R-3: 70 percent.

Response: The preliminary development plans (Exhibit A) show lot coverage for structures, parking, and combined coverage fall below the maximum coverage thresholds for the R-2 district. The criteria are met.

Chapter 15.410 YARD SETBACK REQUIREMENTS

15.410.020 Front yard setback.

A. Residential (see Appendix A, Figure 10).

1. AR, R-1 and R-2 districts shall have a front yard of not less than 15 feet. Said yard shall be landscaped and maintained.

2. R-3 and RP districts shall have a front yard of not less than 12 feet. Said yard shall be landscaped and maintained.

3. The entrance to a garage or carport, whether or not attached to a dwelling, shall be set back at least 20 feet from the nearest property line of the street to which access will be provided. However, the foregoing setback requirement shall not apply where the garage or carport will be provided with access to an alley only.

Response: The preliminary development plans (Exhibit A) show the proposed building locations and compliance with the minimum front yard setback standards for the R-2 district. The criteria are met.

15.410.030 Interior yard setback.

A. Residential.

1. All lots or development sites in the AR, R-1, R-2 and R-3 districts shall have interior yards of not less than five feet, except that where a utility easement is recorded adjacent to a side lot line, there shall be a side yard no less than the width of the easement.

2. All lots or development sites in the RP district shall have interior yards of not less than eight feet.

Response: The preliminary development plans (Exhibit A) show the proposed building locations and compliance with the minimum interior setback standards for R-2 district. The criteria are met.

15.410.060 Vision clearance setback.

The following vision clearance standards shall apply in all zones (see Appendix A, Figure 9).

A. At the intersection of two streets, including private streets, a triangle formed by the intersection of the curb lines, each leg of the vision clearance triangle shall be a minimum of 50 feet in length.

B. At the intersection of a private drive and a street, a triangle formed by the intersection of the curb lines, each leg of the vision clearance triangle shall be a minimum of 25 feet in length.

C. Vision clearance triangles shall be kept free of all visual obstructions from two and one-half feet to nine feet above the curb line. Where curbs are absent, the edge of the asphalt or future curb location shall be used as a guide, whichever provides the greatest amount of vision clearance.

D. There is no vision clearance requirement within the commercial zoning district(s) located within the riverfront (RF) overlay subdistrict.

Response: The subject property is not located at the intersection of two streets. The preliminary development plans (Exhibit A) vision clearance triangles at the intersection of the private drive entrances and North Springbrook Road meeting the requirements of this section. The criteria are met.

15.410.070 Yard exceptions and permitted intrusions into required yard setbacks.

The following intrusions may project into required yards to the extent and under the conditions and limitations indicated:

A. Depressed Areas. In any district, open work fences, hedges, guard railings or other landscaping or architectural devices for safety protection around depressed ramps, stairs or retaining walls may be located in required yards; provided, that such devices are not more than three and one-half feet in height.

B. Accessory Buildings. In front yards on through lots, where a through lot has a depth of not more than 140 feet, accessory buildings may be located in one of the required front yards; provided, that every portion of such accessory building is not less than 10 feet from the nearest street line.

C. Projecting Building Features. The following building features may project into the required front yard no more than five feet and into the required interior yards no more than two feet; provided, that such projections are no closer than three feet to any interior lot line:

1. Eaves, cornices, belt courses, sills, awnings, buttresses or other similar features.

2. Chimneys and fireplaces, provided they do not exceed eight feet in width.

3. Porches, platforms or landings which do not extend above the level of the first floor of the building.

4. Mechanical structures (heat pumps, air conditioners, emergency generators and pumps).

D. Fences and Walls.

1. In the residential district, a fence or wall shall be permitted to be placed at the property line or within a yard setback as follows:

   a. Not to exceed six feet in height. Located or maintained within the required interior yards. For purposes of fencing only, lots that are corner lots or through lots may select one of the street frontages as a front yard and all other yards shall be considered as interior yards, allowing the placement of a six-foot fence on the property line. In no case may a fence extend into the clear vision zone as defined in NMC 15.410.060.

   b. Not to exceed four feet in height. Located or maintained within all other front yards.

2. In any commercial or industrial district, a fence or wall shall be permitted to be placed at the property line or within a yard setback as follows:

   a. Not to exceed eight feet in height. Located or maintained in any interior yard except where the requirements of vision clearance apply. For purposes of fencing only, lots that are corner lots or through lots may select one of the street frontages as a front yard and all other yards shall be considered as interior yards, allowing the placement of an eight-foot fence on the property line.

   b. Not to exceed four feet in height. Located or maintained within all other front yards.

3. If chain link (wire-woven) fences are used, they are manufactured of corrosion-proof materials of at least 11-1/2 gauge.

4. The requirements of vision clearance shall apply to the placement of fences.

E. Parking and Service Drives (Also Refer to NMC 15.440.010 through 15.440.080).

1. In any district, service drives or accessways providing ingress and egress shall be permitted, together with any appropriate traffic control devices in any required yard.

2. In any residential district, public or private parking areas and parking spaces shall not be permitted in any required yard except as provided herein:

   a. Required parking spaces shall be permitted on service drives in the required front yard in conjunction with any single-family or two-family dwelling on a single lot.

   b. Recreational vehicles, boat trailers, camperettes and all other vehicles not in daily use are restricted to parking in the front yard setback for not more than 48 hours; and recreational vehicles, boat trailers, camperettes and all other vehicles not in

daily use are permitted to be located in the required interior yards.

c. Public or private parking areas, parking spaces or any building or portion of any building intended for parking which have been identified as a use permitted in any residential district shall be permitted in any interior yard that abuts an alley, provided said parking areas, structures or spaces shall comply with NMC 15.440.070, Parking tables and diagrams (Diagrams 1 through 3).

d. Public or private parking areas, service drives or parking spaces which have been identified as a use permitted in any residential district shall be permitted in interior yards; provided, that said parking areas, service drives or parking spaces shall comply with other requirements of this code.

3. In any commercial or industrial district, except C-1, C-4 and M-1, public or private parking areas or parking spaces shall be permitted in any required yard (see NMC 15.410.030). Parking requirements in the C-4 district are described in NMC 15.352.040(H).

4. In the I district, public or private parking areas or parking spaces may be no closer to a front property line than 20 feet, and no closer to an interior property line than five feet.

F. Public Telephone Booths and Public Transit Shelters. Public telephone booths and public transit shelters shall be permitted; provided, that vision clearance is maintained for vehicle requirements for vision clearance.

G. Hangars within the AR airport residential district may be constructed with no yard setbacks to property lines adjacent to other properties within the airport residential or airport industrial districts.

Response: At this time the above-listed exceptions and intrusions into yard setbacks not planned as necessary. The criteria are not applicable.

Chapter 15.415 BUILDING AND SITE DESIGN STANDARDS

15.415.010 Main buildings and uses as accessory buildings.

A. Hereinafter, any building which is the only building on a lot is a main building.

B. In any residential district except RP, there shall be only one main use per lot or development site; provided, that home occupations shall be allowed where permitted.

C. In any residential district, there shall be no more than two accessory buildings on any lot or development site.

15.415.020 Building height limitation.

A. Residential.

1. In the R-1, R-2, AR, and RP districts, no main building shall exceed 30 feet in height. Accessory buildings in the R-1, R-

2, R-3, AR, and RP districts are limited to 16 feet in height, except as follows:

a. Up to 800 square feet of an accessory building may have a height of up to 24 feet.

b. Aircraft hangars in the AR district may be the same height as the main building.

E. Alternative Building Height Standard. As an alternative to the building height standards above, any project may elect to use the following standard (see Figure 24 in Appendix A). To meet this standard:

1. Each point on the building must be no more than 20 feet higher than the ground level at all points on the property lines, plus one vertical foot for each horizontal foot of distance from that property line; and

2. Each point on the building must be no more than 20 feet higher than the ground level at a point directly north on a property line, plus one vertical foot for each two horizontal feet of distance between those points. This second limit does not apply if the property directly to the north is a right-of-way, parking lot, protected natural resource, or similar unbuildable property.

F. Buildings within the airport overlay subdistrict are subject to the height limits of that subdistrict.

Response: The preliminary development plans (Exhibit A) contain architectural drawings of the planned elevations of the structures for this project. The elevation drawings show the structures to be in compliance with the alternative building height standard of this section. The criteria are met.

Chapter 15.420 LANDSCAPING AND OUTDOOR AREAS

15.420.010 Required minimum standards.

A. Private and Shared Outdoor Recreation Areas in Residential Developments.

1. Private Areas. Each ground-level living unit in a residential development subject to a design review plan approval shall have an accessible outdoor private space of not less than 48 square feet in area. The area shall be enclosed, screened or otherwise designed to provide increased privacy for unit residents, their guests and neighbors.

2. Individual and Shared Areas. Usable outdoor recreation space shall be provided for the individual and/or shared use of residents and their guests in any duplex or multifamily residential development, as follows:

a. One- or two-bedroom units: 200 square feet per unit.

b. Three- or more bedroom units: 300 square feet per unit.

c. Storage areas are required in residential developments. Convenient areas shall be provided

in residential developments for the storage of articles such as bicycles, barbecues, luggage, outdoor furniture, and the like. These shall be entirely enclosed.

Response: This is a multifamily project. The preliminary development plans (Exhibit A) and architectural drawings show each residential unit has individual outdoor private space not less than 48 sf and the complex as a whole to have not less than 200 sf of either individual or shared usable outdoor recreation space per unit. Each unit has a balcony or patio that is 6 feet by 16 feet or 96 square feet in size. Each unit also has an enclosed storage area that is 6 feet by 8 feet or 48 square feet in size. The applicable criteria are met.

B. Required Landscaped Area. The following landscape requirements are established for all developments except single-family dwellings:

1. A minimum of 15 percent of the lot area shall be landscaped; provided, however, that computation of this minimum may include areas landscaped under subsection (B)(3) of this section. Development in the C-3 (central business district) zoning district and M-4 (large lot industrial) zoning district is exempt from the 15 percent landscape area requirement of this section. Additional landscaping requirements in the C-4 district are described in NMC 15.352.040(K). In the AI airport industrial district, only a five percent landscaping standard is required with the goal of "softening" the buildings and making the development "green" with plants, where possible. The existence of the runway, taxiway, and approach open areas already provide generally for the 15 percent requirement. Developments in the AI airport industrial district with a public street frontage shall have said minimum landscaping between the front property line and the front of the building.

Response: The preliminary development plans (Exhibit A) show a minimum of 15 percent of the subject lot area is planned to be landscaped per the requirements of this sub-section. The criteria are met.

2. All areas subject to the final design review plan and not otherwise improved shall be landscaped.

Response: All areas that are not proposed for improvement will be landscaped. The criteria are met.

3. The following landscape requirements shall apply to the parking and loading areas:

a. A parking or loading area providing 10 or more spaces shall be improved with defined landscaped areas totaling no less than 25 square feet per parking space.

b. A parking, loading area, or drive aisle which runs adjacent to a property line shall be separate from any lot line adjacent to a street by a landscaped strip at least 10 feet in interior width or the width of the required yard, whichever is greater, and any other lot line by a landscaped strip of at least five feet in interior width. See subsections (B)(3)(c) and (d) of

this section for material to plant within landscape strips.

c. A landscaped strip separating a parking area, loading area, or drive aisle from a street shall contain street trees spaced as appropriate to the species, not to exceed 50 feet apart on average, and a combination of shrubs and ground cover, or lawn. This landscaping shall provide partial screening of these areas from the street.

d. A landscaped strip separating a parking area, loading area, or drive aisle from an interior lot line shall contain any combination of trees, shrubs, ground cover or lawn. Plant material shall be selected from at least two different plant material groups (example: trees and shrubs, or lawn and shrubs, or lawn and trees and shrubs).

e. Landscaping in a parking or loading area shall be located in defined landscaped areas which are uniformly distributed throughout the parking or loading area.

f. Landscaping areas in a parking lot, service drive or loading area shall have an interior width of not less than five feet.

g. All multifamily, institutional, commercial, or industrial parking areas, service drives, or loading zones which abut a residential district shall be enclosed with a 75 percent opaque, site-obscuring fence, wall or evergreen hedge along and immediately adjacent to any interior property line which abuts the residential district. Landscape plantings must be large enough to provide the required minimum screening requirement within 12 months after initial installation. Adequate provisions shall be maintained to protect walls, fences or plant materials from being damaged by vehicles using said parking areas.

h. An island of landscaped area shall be located to separate blocks of parking spaces. At a minimum, one deciduous shade tree per seven parking spaces shall be planted to create a partial tree canopy over and around the parking area. No more than seven parking spaces may be grouped together without an island separation unless otherwise approved by the director based on the following alternative standards:

   i. Provision of a continuous landscaped strip, with a five-foot minimum width, which runs perpendicular to the row of parking spaces (see Appendix A, Figure 13).

   ii. Provision of tree planting landscape islands, each of which is at least 16 square feet in size, and spaced no more than 50

feet apart on average, within areas proposed for back-to-back parking (see Appendix A, Figure 14).

Response: The preliminary development plans (Exhibit A) show planned landscaping for parking and loading areas included with this project is in conformance with the requirements of this sub-section, including islands, blocking, and screening. The criteria are met.

4. Trees, Shrubs and Ground Covers. The species of street trees required under this section shall conform to those authorized by the city council through resolution. The director shall have the responsibility for preparing and updating the street tree species list which shall be adopted in resolution form by the city council.

   a. Arterial and minor arterial street trees shall have spacing of approximately 50 feet on center. These trees shall have a minimum two-inch caliper tree trunk or stalk at a measurement of two feet up from the base and shall be balled and burlapped or boxed.

   b. Collector and local street trees shall be spaced approximately 35 to 40 feet on center. These trees shall have a minimum of a one and one-half or one and three-fourths inch tree trunk or stalk and shall be balled and burlapped or boxed.

   c. Accent Trees. Accent trees are trees such as flowering cherry, flowering plum, crab-apple, Hawthorne and the like. These trees shall have a minimum one and one-half inch caliper tree trunk or stalk and shall be at least eight to 10 feet in height. These trees may be planted bare root or balled and burlapped. The spacing of these trees should be approximately 25 to 30 feet on center.

   d. All broad-leafed evergreen shrubs and deciduous shrubs shall have a minimum height of 12 to 15 inches and shall be balled and burlapped or come from a two-gallon can. Gallon-can size shrubs will not be allowed except in ground covers. Larger sizes of shrubs may be required in special areas and locations as specified by the design review board. Spacing of these shrubs shall be typical for the variety, three to eight feet, and shall be identified on the landscape planting plan.

   e. Ground Cover Plant Material. Ground cover plant material such as greening juniper, cotoneaster, minor Bowles, English ivy, hypericum and the like shall be one of the following sizes in specified spacing for that size:

Ground Cover Plant Material	
Gallon cans	3 feet on center
4" containers	2 feet on center

2-1/4" containers	18" on center
Rooted cuttings	12" on center

Response: The preliminary development plans (Exhibit A) show the location and types of trees and groundcover planned for installation with this project meet the standards of this section. The criteria are met.

> 5. Automatic, underground irrigation systems shall be provided for all areas required to be planted by this section. The director shall retain the flexibility to allow a combination of irrigated and nonirrigated areas. Landscaping material used within nonirrigated areas must consist of drought- resistant varieties. Provision must be made for alternative irrigation during the first year after initial installation to provide sufficient moisture for plant establishment.
>
> 6. Required landscaping shall be continuously maintained.
>
> 7. Maximum height of tree species shall be considered when planting under overhead utility lines.
>
> 8. Landscaping requirements and standards for parking and loading areas (subsection (B)(3) of this section) will apply to development proposals unless the institution has addressed the requirements and standards by an approved site development master plan. With an approved site development master plan, the landscape requirements will be reviewed through an administrative Type I review process.
>
> 9. In the M-4 zone, landscaping requirements and standards for parking and loading areas (subsection (B)(3) of this section) do not apply unless within 50 feet of a residential district.

Response: The installation, irrigation, and maintenance requirements of NMC 15.42.010 apply to this project. The preliminary plans, show planned landscape features in conformance with the sub-sections above. The criteria are met or can be met through future action.

> C. Installation of Landscaping. All landscaping required by these provisions shall be installed prior to the issuance of occupancy permits, unless security equal to 110 percent of the cost of the landscaping as determined by the director is filed with the city, insuring such installation within six months of occupancy. A security – cash, certified check, time certificates of deposit, assignment of a savings account, bond or such other assurance of completion as shall meet with the approval of the city attorney – shall satisfy the security requirements. If the installation of the landscaping is not completed within the six-month period, or within an extension of time authorized by the director, the security may be used by the city to complete the installation. Upon completion of the installation, any portion of the remaining security deposited with the city shall be returned to the applicant.

Response: Landscaping required by this Chapter will be installed prior to final occupancy permits or the appropriate security must be provided per this sub-section. The criteria are met.

15.420.020 Landscaping and amenities in public rights-of-way.

The following standards are intended to create attractive streetscapes and inviting pedestrian spaces. A review body may require any of the following landscaping and amenities to be placed in abutting public rights-of-way as part of multifamily, commercial, industrial, or institutional design reviews, or for subdivisions and planned unit developments. In addition, any entity improving existing rights-of-way should consider including these elements in the project. A decision to include any amenity shall be based on comprehensive plan guidelines, pedestrian volumes in the area, and the nature of surrounding development.

A. Pedestrian Space Landscaping. Pedestrian spaces shall include all sidewalks and medians used for pedestrian refuge. Spaces near sidewalks shall provide plant material for cooling and dust control, and street furniture for comfort and safety, such as benches, waste receptacles and pedestrian-scale lighting. These spaces should be designed for short-term as well as long-term use. Elements of pedestrian spaces shall not obstruct sightlines and shall adhere to any other required city safety measures. Medians used for pedestrian refuge shall be designed for short-term use only with plant material for cooling and dust control, and pedestrian-scale lighting. The design of these spaces shall facilitate safe pedestrian crossing with lighting and accent paving to delineate a safe crossing zone visually clear to motorists and pedestrians alike.

1. Street trees planted in pedestrian spaces shall be planted according to NMC 15.420.010(B)(4).

2. Pedestrian spaces shall have low (two and one-half feet) shrubs and ground covers for safety purposes, enhancing visibility and discouraging criminal activity.

a. Plantings shall be 90 percent evergreen year-round, provide seasonal interest with fall color or blooms, and at maturity maintain growth within the planting area (refer to plant material matrix below).

b. Plant placement shall also adhere to clear sight line requirements as well as any other relevant city safety measures.

3. Pedestrian-scale lighting shall be installed along sidewalks and in medians used for pedestrian refuge.

a. Pole lights as well as bollard lighting may be specified; however, the amount and type of pedestrian activity during evening hours, e.g., transit stops, nighttime service districts, shall ultimately determine the type of fixture chosen.

b. Luminaire styles shall match the area/district theme of existing luminaires and shall not conflict with existing building or roadway lights causing glare.

c. Lighting heights and styles shall be chosen to prevent glare and to designate a clear and safe path and limit opportunities for vandalism (see

Appendix A, Figure 17, Typical Pedestrian Space Layouts).

d. Lighting shall be placed near the curb to provide maximum illumination for spaces furthest from building illumination. Spacing shall correspond to that of the street trees to prevent tree foliage from blocking light.

4. Street furniture such as benches and waste receptacles shall be provided for spaces near sidewalks only.

a. Furniture should be sited in areas with the heaviest pedestrian activity, such as downtown, shopping districts, and shopping centers.

b. Benches should be arranged to facilitate conversation between individuals with L-shaped arrangements and should face the area focal point, such as shops, fountains, plazas, and should divert attention away from nearby traffic.

Response: The preliminary development plans (Exhibit A) show pedestrian paths, street trees and varying-width sidewalks included along the public improvements for North Springbrook Road. The design considers the preservation of the grove of trees in the northwest corner of the site to the extent possible. The improvements meet the minimum requirements of the City Code and Public Works engineering standards. It is understood the review body may impose reasonable conditions upon landscaping and amenities in the public right of way as indicated in this section. The criteria are met.

5. Paving and curb cuts shall facilitate safe pedestrian crossing and meet all ADA requirements for accessibility.

B. Planting Strip Landscaping. All planting strips shall be landscaped. Planting strips provide a physical and psychological buffer for pedestrians from traffic with plant material that reduces heat and dust, creating a more comfortable pedestrian environment. Planting strips shall have different arrangements and combinations of plant materials according to the frequency of on-street parking (see Appendix A, Figures 18 and 19).

1. Planting strips which do not have adjacent parking shall have a combination of ground covers, low (two and one-half feet) shrubs and trees. Planting strips adjacent to frequently used on-street parking, as defined by city staff, shall only have trees protected by tree grates, and planting strips adjacent to infrequently used on-street parking shall be planted with ground cover as well as trees (see Appendix A, Figures 18 and 19, Typical Planting Strip Layouts). District themes or corridor themes linking individual districts should be followed utilizing a unifying plant characteristic, e.g., bloom color, habit, or fall color. When specifying thematic plant material, monocultures should be avoided, particularly those species susceptible to disease.

2. Street trees shall be provided in all planting strips as provided in NMC 15.420.010(B)(4).

a. Planting strips without adjacent parking or with infrequent adjacent parking shall have street trees in conjunction with ground covers and/or shrubs.

b. Planting strips with adjacent parking used frequently shall have only street trees protected by tree grates.

3. Shrubs and ground covers shall be provided in planting strips without adjacent parking with low (two and one-half feet) planting masses to enhance visibility, discourage criminal activity, and provide a physical as well as psychological buffer from passing traffic.

a. Plantings shall be 90 percent evergreen year-round, provide seasonal interest with fall color or blooms and at maturity maintain growth within the planting area.

b. Ground cover able to endure infrequent foot traffic shall be used in combination with street trees for planting strips with adjacent occasional parking (refer to plant material matrix below).

c. All plant placement shall adhere to clear sight line requirements as well as any other relevant city safety measures.

Response: The preliminary development plans (Exhibit A) show planting strip landscaping, including street trees, in conformance with the requirements of this section. The criteria are met.

C. Maintenance. All landscapes shall be maintained for the duration of the planting to encourage health of plant material as well as public health and safety. All street trees and shrubs shall be pruned to maintain health and structure of the plant material for public safety purposes.

Response: Required landscaping installed as part of this project will be maintained and pruned, including street trees for public safety. The criterion is met.

Chapter 15.425 EXTERIOR LIGHTING

15.425.020 Applicability and exemptions.

A. Applicability. Outdoor lighting shall be required for safety and personal security in areas of assembly, parking, and traverse, as part of multifamily residential, commercial, industrial, public, recreational and institutional uses. The applicant for any Type I or Type II development permit shall submit, as part of the site plan, evidence that the proposed outdoor lighting plan will comply with this section. This information shall contain but not be limited to the following:

1. The location, height, make, model, lamp type, wattage, and proposed cutoff angle of each outdoor lighting fixture.

2. Additional information the director may determine is necessary, including but not limited to illuminance level profiles, hours of business operation, and percentage of site dedicated to parking and access.

3. If any portion of the site is used after dark for outdoor parking, assembly or traverse, an illumination plan for these areas is required. The plan must address safety and personal security.

Response: The preliminary development plans (Exhibit A) contain the information required per NMC 15.425.020 to satisfy the requirements of an outdoor "lighting plan." The criteria are met.

15.425.030 Alternative materials and methods of construction, installation, or operation.

The provisions of this section are not intended to prevent the use of any design, material, or methods of installation or operation not specifically prescribed by this section, provided any such alternate has been approved by the director. Alternatives must be an approximate equivalent to the applicable specific requirement of this section and must comply with all other applicable standards in this section.

15.425.040 Requirements.

A. General Requirements – All Zoning Districts.

1. Low-level light fixtures include exterior lights which are installed between ground level and six feet tall. Low-level light fixtures are considered nonintrusive and are unrestricted by this code.

2. Medium-level light fixtures include exterior lights which are installed between six feet and 15 feet above ground level. Medium-level light fixtures must either comply with the shielding requirements of subsection (B) of this section, or the applicant shall show that light trespass from a property has been designed not to exceed one-half foot-candle at the property line.

3. High-level light fixtures include exterior lights which are installed 15 feet or more above ground level. High-level light fixtures must comply with the shielding requirements of subsection (B) of this section, and light trespass from a property may not exceed one-half foot-candle at the property line.

B. Table of Shielding Requirements.

Table of Shielding Requirements	
Fixture Lamp Type	Shielded
Low/high pressure sodium, mercury vapor, metal halide and fluorescent over 50 watts	Fully
Incandescent over 160 watts	Fully
Incandescent 160 watts or less	None
Fossil fuel	None
Any light source of 50 watts or less	None
Other sources	As approved by NMC 15.425.030
Note: "Incandescent" includes tungsten-halogen (quartz) lamps.	

Response: The preliminary development plans (Exhibit A) contain the information required per NMC 15.425.020 to satisfy the requirements of an outdoor "lighting plan." Required lighting will meet 15.425.030–040 for the installation of outdoor lighting. The criteria are met.

Chapter 15.430 UNDERGROUND UTILITY INSTALLATION

15.430.010 Underground utility installation.

A. All new utility lines, including but not limited to electric, communication, natural gas, and cable television transmission lines, shall be placed underground. This does not include surface-mounted transformers, connections boxes, meter cabinets, service cabinets, temporary facilities during construction, and high-capacity electric lines operating at 50,000 volts or above.

B. Existing utility lines shall be placed underground when they are relocated, or when an addition or remodel requiring a Type II design review is proposed, or when a developed area is annexed to the city.

C. The director may make exceptions to the requirement to underground utilities based on one or more of the following criteria:

1. The cost of undergrounding the utility is extraordinarily expensive.

2. here are physical factors that make undergrounding extraordinarily difficult.

3. Existing utility facilities in the area are primarily overhead and are unlikely to be changed.

Response: New utilities included with this project will be installed underground where required by this chapter. The preliminary development plans (Exhibit A) show planned utilities meeting these standards. The criteria are met.

Chapter 15.435 SIGNS

Response: As a permanent multifamily residential use, this project is anticipated to have modest signage sufficient to identify the permanent use, including monument entrance signs. Final sign design and location are not available at the time of application because it will be contingent on final architectural design and site plan approval. However, non-public signs coved by this chapter will be reviewed and permitted prior to installation. The criteria, as applicable, are met.

Chapter 15.440 OFF-STREET PARKING, BICYCLE PARKING, AND PRIVATE WALKWAYS

Article I. Off-Street Parking Requirements

15.440.010 Required off-street parking.

A. Off-street parking shall be provided on the development site for all R-1, C-1, M-1, M-2 and M-3 zones. In all other zones, the required parking shall be on the development site or within 400 feet of the development site which the parking is required to serve. All required parking must be under the same ownership as the development site served except through special covenant agreements as approved by the city attorney, which bind the parking to the development site.

Response: All proposed parking is located on-site as required by this section. The criterion is met.

15.440.020 Parking area and service drive design.

A. All public or private parking areas, parking spaces, or garages shall be designed, laid out and constructed in accordance with the minimum standards as set forth in NMC 15.440.070.

B. Groups of three or more parking spaces, except those in conjunction with single-family or two-family dwellings on a single lot, shall be served by a service drive so that no backward movement or other maneuvering of a vehicle within a street, other than an alley, will be required. Service drives shall be designed and constructed to facilitate the flow of traffic, provide maximum safety in traffic access and egress and maximum safety of pedestrian and vehicular traffic on the site, but in no case shall two-way and one-way service drives be less than 20 feet and 12 feet, respectively. Service drives shall be improved in accordance with the minimum standards as set forth in NMC 15.440.060.

Response: The preliminary development plans (Exhibit A) show 80 dedicated parking spaces. As shown on the plans, the space and drive aisle layout meet the minimum standards of this section for safety, traffic flow, etc. The criteria are met.

C. Gates. A private drive or private street serving as primary access to more than one dwelling unit shall not be gated to limit access, except as approved by variance.

Response: The site is not planned to be gated at this time. This criterion is not applicable.

15.440.030 Parking spaces required.

Parking Spaces Required	
Use	**Minimum Parking Spaces Required**
Dwelling, multifamily and multiple single-family dwellings on a single lot	
Studio or one-bedroom unit	1 per dwelling unit
Two-bedroom unit	1.5 per dwelling unit
Three- and four-bedroom unit	2 per dwelling unit
Five- or more bedroom unit	0.75 spaces per bedroom
*Unassigned spaces	If a development is required to have more than 10 spaces on a lot, then it must provide some unassigned spaces. At least 15 percent of the total required parking spaces must be unassigned and be located for convenient use by all occupants of the development. The location shall be approved by the director.
*Visitor spaces	If a development is required to have more than 10 spaces on a lot, then it must provide at least 0.2 visitor spaces per dwelling unit.
*On-street parking credit	On-street parking spaces may be counted toward the minimum number of required spaces for developments required to have more than 10 spaces on a lot. The on-street spaces must be directly adjoining and on the same side of the street as the subject property, must be legal spaces that meet all city standards, and cannot be counted if they could be removed by planned future street widening or a bike lane on the street.
*Available transit service	At the review body's discretion, affordable housing projects may reduce the required off-street parking by 10

	percent if there is an adequate continuous pedestrian route no more than 1,500 feet in length from the development to transit service with an average of less than one hour regular service intervals during commuting periods or where the development provides its own transit. A developer may qualify for this parking reduction if improvements on a proposed pedestrian route are made by the developer, thereby rendering it an adequate continuous route.

Response: This application is for a multifamily apartment complex composed of 41 two-bedroom units and a single one-bedroom unit. Per the minimum space requirements above at least 63 spaces must be provided. The preliminary development plans (Exhibit A) show 80 total parking spaces leaving a remainder of 27 spaces. Unassigned spaces minimum requirement is 12 (15% of 80 = 12) and 9 visitor spaces (80*.2 = 8.4). Thus, the plans show adequate dedicated, unassigned, and visitor spaces. The criteria are met.

15.440.070 Parking tables and diagrams.

The following tables provide the minimum dimensions of public or private parking areas

Table of Dimensions (in feet)					
Basic Stall			Back to Back	Aisles	
Angle- °	A	B	C	D (one-way)	E (two-way)
30°	18	16.8	25.8	12	20
38°	14.6	18.2	29.3	12	20
45°	12.7	19.1	31.8	12	20
52°	11.4	19.7	33.9	13	20
55°	11	19.9	34.6	14	20
60°	10.4	20.1	35.7	15	20
70°	9.6	20	36.9	18	20
80°	9.1	19.3.3	37	20	20

Notes:
1. Bumpers must be installed where paved areas abut street right-of-way (except at driveways).
2. No stalls shall be such that cars must back over the property line to enter or leave stall.
3. Stalls must be clearly marked and the markings must be maintained in good condition.
4. The sketches show typical situations to illustrate the required standards. For further information or advice, contact the community development department at 537-1210

Stall Width with Corresponding Table of dimensions (in feet)						
Stall Width = X	9	9.5	10	10.5	11	12
Aisle Width = Y	24	24	22	22	20	20

Notes:
1. Bumpers must be installed where paved areas abut street right-of-way (except at driveways).
2. No stalls shall be such that cars must back over the property line to enter or leave stall.
3. Stalls must be clearly marked and the markings must be maintained in good condition.
4. The sketches show typical situations to illustrate the required standards. For further information or advice, contact the planning department.

Response: The preliminary development plans (Exhibit A) show 80 dedicated parking spaces. As shown on the plans, the space and drive aisle layout meet the minimum standards of this section. The criteria are met.

Article II. Bicycle Parking

15.440.100 Facility requirements.

Bicycle parking facilities shall be provided for the uses shown in the following table. Fractional space requirements shall be rounded up to the next whole number.

Bicycle Parking Requirements	
Use	Minimum Number of Bicycle Parking Spaces Required
New multiple dwellings, including additions creating additional dwelling units	One bicycle parking space for every four dwelling units

15.440.110 Design.

A. Bicycle parking facilities shall consist of one or more of the following:

1. A firmly secured loop, bar, rack, or similar facility that accommodates locking the bicycle frame and both wheels using a cable or U-shaped lock.
2. An enclosed locker.
3. A designated area within the ground floor of a building, garage, or storage area. Such area shall be clearly designated for bicycle parking.
4. Other facility designs approved by the director.

B. All bicycle parking spaces shall be at least six feet long and two and one-half feet wide. Spaces shall not obstruct pedestrian travel.

C. All spaces shall be located within 50 feet of a building entrance of the development.

D. Required bicycle parking facilities may be located in the public right-of-way adjacent to a development subject to approval of the authority responsible for maintenance of that right-of-way.

Response: This application is for a 42-unit apartment complex. Per the bicycle space requirements above, a minimum of 11 bicycle spaces are required. The preliminary development plans (Exhibit A) show bicycle spaces meeting the size and location requirements of this section with 14 total spaces provided (two per stairwell). The criteria are met.

Article III. Private Walkways

15.440.140 Private walkway design.

A. All required private walkways shall meet the applicable building code and Americans with Disabilities Act requirements.

B. Required private walkways shall be a minimum of four feet wide.

C. Required private walkways shall be constructed of portland cement concrete or brick.

D. Crosswalks crossing service drives shall, at a minimum, be painted on the asphalt or clearly marked with contrasting paving materials or humps/raised crossings. If painted striping is used, it should consist of thermoplastic striping or similar type of durable application.

E. At a minimum, required private walkways shall connect each main pedestrian building entrance to each abutting public street and to each other.

F. The review body may require on-site walks to connect to development on adjoining sites.

G. The review body may modify these requirements where, in its opinion, the development provides adequate on-site pedestrian circulation, or where lot dimensions, existing building layout, or topography preclude compliance with these standards.

Response: The preliminary development plans (Exhibit A) show several sections of private walkways within the project area. They are designed with a minimum width of 4 feet and meet ADA requirements. The exact location and layout of the private walkways is contingent on final design approval by the City. The criteria are met.

Division 15.500 Public Improvement Standards

Chapter 15.505 PUBLIC IMPROVEMENTS STANDARDS

15.505.020 Applicability.

The provision and utilization of public facilities and services within the City of Newberg shall apply to all land developments in accordance with this chapter. No development shall be approved unless the following improvements are provided for prior to occupancy or operation, unless future provision is assured in accordance with NMC 15.505.030(E).

A. Public Works Design and Construction Standards. The design and construction of all improvements within existing and proposed rights-of-way and easements, all improvements to be maintained by the city, and all improvements for which city approval is required shall comply with the requirements of the most recently adopted Newberg public works design and construction standards.

B. Street Improvements. All projects subject to a Type II design review, partition, or subdivision approval must construct street improvements necessary to serve the development.

C. Water. All developments, lots, and parcels within the City of Newberg shall be served by the municipal water system as specified in Chapter 13.15 NMC.

D. Wastewater. All developments, lots, and parcels within the City of Newberg shall be served by the municipal wastewater system as specified in Chapter 13.10 NMC.

E. Stormwater. All developments, lots, and parcels within the City of Newberg shall manage stormwater runoff as specified in Chapters 13.20 and 13.25 NMC.

F. Utility Easements. Utility easements shall be provided as necessary and required by the review body to provide needed facilities for present or future development of the area.

G. City Approval of Public Improvements Required. No building permit may be issued until all required public facility improvements are in place and approved by the director, or are otherwise bonded for in a manner approved by the review authority, in conformance with the provisions of this code and the Newberg Public Works Design and Construction Standards.

Response: Public improvements included with this project meet the standards of this chapter, as discussed with City Staff. The preliminary development plans (Exhibit A) show the improvements, including water, wastewater, stormwater, and associated utility easements are planned to be constructed to City Public Works design and engineering standards. The criteria are met.

15.505.030 Street standards.

B. Applicability. The provisions of this section apply to:

1. The creation, dedication, and/or construction of all public streets, bike facilities, or pedestrian facilities in all subdivisions, partitions, or other developments in the City of Newberg.

2. The extension or widening of existing public street rights-of-way, easements, or street improvements including those which may be proposed by an individual or the city, or which may be required by the city in association with other development approvals.

3. The construction or modification of any utilities, pedestrian facilities, or bike facilities in public rights-of-way or easements.

4. The designation of planter strips. Street trees are required subject to Chapter 15.420 NMC.

5. Developments outside the city that tie into or take access from city streets.

C. Layout of Streets, Alleys, Bikeways, and Walkways. Streets, alleys, bikeways, and walkways shall be laid out and constructed as shown in the Newberg transportation system plan. In areas where the transportation system plan or future street plans do not show specific transportation improvements, roads and streets shall be laid out so as to conform to previously approved subdivisions, partitions, and other developments for adjoining properties, unless it is found in the public interest to modify these patterns. Transportation improvements shall conform to the standards within the Newberg Municipal Code, the Newberg public works design and construction standards, the Newberg transportation system plan, and other adopted city plans.

Response: No new streets are anticipated for this project however frontage improvements are required. Springbrook Road is planned for bike lanes, but there are no existing bike lanes to connect to. As an alternative, the Applicant has worked with City Staff to provide a 12 foot detached bikeway/sidewalk with a 5.5 foot easement adjacent to the Springbrook

Road right-of-way. To preserve mature trees on the northern end of the site, the bikeway/sidewalk is shifted to be curb-tight, removing the tree wells and narrowing the path to 9 feet in width.

D. Construction of New Streets. Where new streets are necessary to serve a new development, subdivision, or partition, right-of-way dedication and full street improvements shall be required. Three-quarter streets may be approved in lieu of full street improvements when the city finds it to be practical to require the completion of the other one-quarter street improvement when the adjoining property is developed; in such cases, three-quarter street improvements may be allowed by the city only where all of the following criteria are met:

1. The land abutting the opposite side of the new street is undeveloped and not part of the new development; and

2. The adjoining land abutting the opposite side of the street is within the city limits and the urban growth boundary.

Response: No new streets are anticipated for this project. The standards are not applicable.

E. Improvements to Existing Streets.

1. All projects subject to partition, subdivision, or Type II design review approval shall dedicate right-of-way sufficient to improve the street to the width specified in subsection (G) of this section.

2. All projects subject to partition, subdivision, or Type II design review approval must construct a minimum of a three-quarter street improvement to all existing streets adjacent to, within, or necessary to serve the development. The director may waive or modify this requirement where the applicant demonstrates that the condition of existing streets to serve the development meets city standards and is in satisfactory condition to handle the projected traffic loads from the development. Where a development has frontage on both sides of an existing street, full street improvements are required.

3. In lieu of the street improvement requirements outlined in NMC 15.505.040(B), the review authority may elect to accept from the applicant monies to be placed in a fund dedicated to the future reconstruction of the subject street(s). The amount of money deposited with the city shall be 100 percent of the estimated cost of the required street improvements (including any associated utility improvements), and 10 percent of the estimated cost for inflation. Cost estimates used for this purpose shall be based on preliminary design of the constructed street provided by the applicant's engineer and shall be approved by the director.

Response: Improvements to existing streets will be constructed to the standards of this section. The criteria are met.

F. Improvements Relating to Impacts. Improvements required as a condition of development approval shall be roughly proportional to the impact of the development on public facilities and services. The review body must make findings in the development approval that

indicate how the required improvements are roughly proportional to the impact. Development may not occur until required transportation facilities are in place or guaranteed, in conformance with the provisions of this code. If required transportation facilities cannot be put in place or be guaranteed, then the review body shall deny the requested land use application.

Response: Improvements required as conditions for this project will meet the proportionality and guarantee provisions of this section, as applicable. The criteria are met.

G. Street Width and Design Standards.

1. Design Standards. All streets shall conform with the standards contained in Table 15.505.030(G). Where a range of values is listed, the director shall determine the width based on a consideration of the total street section width needed, existing street widths, and existing development patterns. Preference shall be given to the higher value. Where values may be modified by the director, the overall width shall be determined using the standards under subsections (G)(2) through (10) of this section.

2. Motor Vehicle Travel Lanes. Collector and arterial streets shall have a minimum width of 12 feet.

3. Bike Lanes. Striped bike lanes shall be a minimum of six feet wide. Bike lanes shall be provided where shown in the Newberg transportation system plan.

4. Parking Lanes. Where on-street parking is allowed on collector and arterial streets, the parking lane shall be a minimum of eight feet wide.

5. Center Turn Lanes. Where a center turn lane is provided, it shall be a minimum of 12 feet wide.

6. Limited Residential Streets. Limited residential streets shall be allowed only at the discretion of the review authority, and only in consideration of the following factors:

   a. The requirements of the fire chief shall be followed.

   b. The estimated traffic volume on the street is low, and in no case more than 600 average daily trips.

   c. Use for through streets or looped streets is preferred over cul-de-sac streets.

   d. Use for short blocks (under 400 feet) is preferred over longer blocks.

   e. The total number of residences or other uses accessing the street in that block is small, and in no case more than 30 residences.

   f. On-street parking usage is limited, such as by providing ample off-street parking, or by staggering driveways so there are few areas where parking is allowable on both sides.

7. Sidewalks. Sidewalks shall be provided on both sides of all public streets. Minimum width is five feet.

8. Planter Strips. Except where infeasible, a planter strip shall be provided between the sidewalk and the curb line, with a minimum width of five feet. This strip shall be landscaped in accordance with the standards in NMC 15.420.020. Curb-side sidewalks may be allowed on limited residential streets. Where curb-side sidewalks are allowed, the following shall be provided:

   a. Additional reinforcement is done to the sidewalk section at corners.

   b. Sidewalk width is six feet.

9. Slope Easements. Slope easements shall be provided adjacent to the street where required to maintain the stability of the street.

10. Intersections and Street Design. The street design standards in the Newberg public works design and construction standards shall apply to all public streets, alleys, bike facilities, and sidewalks in the city.

11. The planning commission may approve modifications to street standards for the purpose of ingress or egress to a minimum of three and a maximum of six lots through a conditional use permit.

Response: No new public or private streets are planned for this project, however improvements along the North Springbrook Road frontage are required. The preliminary development plans (Exhibit A) show street improvements, sidewalks, planting strips, parking areas, etc. as described in detail above. The criteria are met.

H. Modification of Street Right-of-Way and Improvement Width. The director, pursuant to the Type II review procedures of Chapter 15.220 NMC, may allow modification to the public street standards of subsection (G) of this section, when the criteria in both subsections (H)(1) and (2) of this section are satisfied:

1. The modification is necessary to provide design flexibility in instances where:

   a. Unusual topographic conditions require a reduced width or grade separation of improved surfaces; or

   b. Lot shape or configuration precludes accessing a proposed development with a street which meets the full standards of this section; or

   c. A modification is necessary to preserve trees or other natural features determined by the city to be significant to the aesthetic character of the area; or

   d. A planned unit development is proposed and the modification of street standards is necessary to provide greater privacy or aesthetic quality to the development.

2. Modification of the standards of this section shall only be approved if the director finds that the specific design proposed provides adequate vehicular access based on anticipated traffic volumes.

I. Temporary Turnarounds.

J. Topography.

K. Future Extension of Streets.

L. Cul-de-Sacs.

M. Street Names and Street Signs.

N. Platting Standards for Alleys.

O. Platting Standards for Blocks.

P. Private Streets. New private streets, as defined in NMC 15.05.030, shall not be created.

Response: No new public streets or extensions, cul-de-sacs, alleys, blocks, or private streets are planned to be included with this project. The criteria are not applicable.

Q. Traffic Calming.

1. The following roadway design features may be required in new street construction where traffic calming needs are anticipated:

   a. Serpentine alignment.

   b. Curb extensions.

   c. Traffic diverters/circles.

   d. Raised medians and landscaping.

   e. Other methods shown effective through engineering studies.

2. Traffic-calming measures such as speed humps should be applied to mitigate traffic operations and/or safety problems on existing streets. They should not be applied with new street constructions.

Response: No new streets or extensions are planned to be included with this project.

R. Vehicular Access Standards.

2. Access Spacing Standards. Public street intersection and driveway spacing shall follow the standards in Table 15.505.R below. The Oregon Department of Transportation (ODOT) has jurisdiction of some roadways within the Newberg city limits, and ODOT access standards will apply on those roadways.

3. Properties with Multiple Frontages. Where a property has frontage on more than one street, access shall be limited to the street with the lesser classification.

4. Driveways. More than one driveway is permitted on a lot accessed from either a minor collector or local street as long as there is at least 40 feet of lot frontage separating each driveway approach. More than one driveway is permitted on a lot accessed from a major collector as long as there is at least 100 feet of lot frontage separating each driveway approach.

Response: Two access points for the parking area from North Springbrook Road are planned. The preliminary development plans (Exhibit A) show the access points are over 100 feet apart. The criteria are met.

5. Alley Access.

Response: No alleys are planned to be included with this project. The criteria are not applicable.

6. Closure of Existing Accesses. Existing accesses that are not used as part of development or redevelopment of a property shall be closed and replaced with curbing, sidewalks, and landscaping, as appropriate.

Response: There is one existing access point (a curb cut and apron) on the north portion of road frontage. If this access point is not used it will be closed. The criterion is met.

7. Shared Driveways.

a. The number of driveways onto arterial streets shall be minimized by the use of shared driveways with adjoining lots where feasible. The city shall require shared driveways as a condition of land division or site design review, as applicable, for traffic safety and access management purposes. Where there is an abutting developable property, a shared driveway shall be provided as appropriate. When shared driveways are required, they shall be stubbed to adjacent developable parcels to indicate future extension. "Stub" means that a driveway temporarily ends at the property line, but may be accessed or extended in the future as the adjacent parcel develops. "Developable" means that a parcel is either vacant or it is likely to receive additional development (i.e., due to infill or redevelopment potential).

b. Access easements (i.e., for the benefit of affected properties) and maintenance agreements shall be recorded for all shared driveways, including pathways, at the time of final plat approval or as a condition of site development approval.

c. No more than four lots may access one shared driveway.

d. Shared driveways shall be posted as no parking fire lanes where required by the fire marshal.

e. Where three lots or three dwellings share one driveway, one additional parking space over those otherwise required shall be provided for each dwelling. Where feasible, this shall be provided as a common use parking space adjacent to the driveway.

Response: This is a multifamily development with a large shared parking area and two primary access points. Shared driveways and access easements are not necessary. The criteria are not applicable.

8. **Frontage Streets and Alleys. The review body for a partition, subdivision, or design review may require construction of a frontage street to provide access to properties fronting an arterial or collector street.**

Response: A frontage street is not necessary.

9. **ODOT or Yamhill County Right-of-Way. Where a property abuts an ODOT or Yamhill County right-of-way, the applicant for any development project shall obtain an access permit from ODOT or Yamhill County.**

Response: The property abuts a city street. The criteria are not applicable.

10. **Exceptions. The director may allow exceptions to the access standards above in any of the following circumstances:**

    a. **Where existing and planned future development patterns or physical constraints, such as topography, parcel configuration, and similar conditions, prevent access in accordance with the above standards.**

    b. **Where the proposal is to relocate an existing access for existing development, where the relocated access is closer to conformance with the standards above and does not increase the type or volume of access.**

    c. **Where the proposed access results in safer access, less congestion, a better level of service, and more functional circulation, both on street and on site, than access otherwise allowed under these standards.**

11. **Where an exception is approved, the access shall be as safe and functional as practical in the particular circumstance. The director may require that the applicant submit a traffic study by a registered engineer to show the proposed access meets these criteria.**

Response: No exceptions are requested.

S. **Public Walkways.**

1. **Projects subject to Type II design review, partition, or subdivision approval may be required to provide public walkways where necessary for public safety and convenience, or where necessary to meet the standards of this code. Public walkways are meant to connect cul-de-sacs to adjacent areas, to pass through oddly shaped or unusually long blocks, to provide for networks of public paths according to adopted plans, or to provide access to schools, parks or other community destinations or public areas. Where practical, public walkway easements and locations may also be used to accommodate public utilities.**

2. **Public walkways shall be located within a public access easement that is a minimum of 15 feet in width.**

3. A walk strip, not less than 10 feet in width, shall be paved in the center of all public walkway easements. Such paving shall conform to specifications in the Newberg public works design and construction standards.

4. Public walkways shall be designed to meet the Americans with Disabilities Act requirements.

5. Public walkways connecting one right-of-way to another shall be designed to provide as short and straight of a route as practical.

6. The developer of the public walkway may be required to provide a homeowners' association or similar entity to maintain the public walkway and associated improvements.

7. Lighting may be required for public walkways in excess of 250 feet in length.

8. The review body may modify these requirements where it finds that topographic, preexisting development, or similar constraints exist.

Response: The preliminary development plans (Exhibit A) show public walkways (sidewalks) along the North Springbrook Road frontage as described in detail above and meeting the criteria in this section. The walkways take into account the landscaping requirements for this development, as well as the preservation of the mature trees in the northwest corner of the site to extent practicable. The criteria are met.

T. Street Trees. Street trees shall be provided for all projects subject to Type II design review, partition, or subdivision. Street trees shall be installed in accordance with the provisions of NMC 15.420.010(B)(4).

Response: As discussed in the landscaping requirements section of this narrative and shown in the preliminary plans (Exhibit A), street trees are planned to be provided per the requirements of NMC 15.420.010(B)(4). The criteria are met.

U. Street Lights. All developments shall include underground electric service, light standards, wiring and lamps for street lights according to the specifications and standards of the Newberg public works design and construction standards. The developer shall install all such facilities and make the necessary arrangements with the serving electric utility as approved by the city. Upon the city's acceptance of the public improvements associated with the development, the street lighting system, exclusive of utility-owned service lines, shall be and become property of the city unless otherwise designated by the city through agreement with a private utility.

Response: As discussed in the public improvements and design standards sections of this narrative, exterior lighting meeting City public works design standards is planned to be installed for this project. The preliminary development plans (Exhibit A) show street lighting. After approval by the City, the lighting will be installed in coordination with City Public Works and the electrical utility. The criteria, as applicable, are met.

V. Transit Improvements. Development proposals for sites that include or are adjacent to existing or planned transit facilities, as shown in the Newberg transportation system plan or adopted local or regional

transit plan, shall be required to provide any of the following, as applicable and required by the review authority:

1. Reasonably direct pedestrian connections between the transit facility and building entrances of the site. For the purpose of this section, "reasonably direct" means a route that does not deviate unnecessarily from a straight line or a route that does not involve a significant amount of out-of-direction travel for users.

2. A transit passenger landing pad accessible to disabled persons.

3. An easement of dedication for a passenger shelter or bench if such facility is in an adopted plan.

4. Lighting at the transit facility.

Response: Pedestrian access to transit is linked to the frontage improvements along North Springbrook Road. ADA accessibility and transit connectivity per the Newberg Transportation System Plan are shown on the preliminary plans. All required transit facilities will be designed to the requirements of this section and City engineering standards. The criteria, as applicable, are met.

15.505.040 Public utility standards.

A. Purpose. The purpose of this section is to provide adequate services and facilities appropriate to the scale and type of development.

B. Applicability. This section applies to all development where installation, extension or improvement of water, wastewater, or private utilities is required to serve the development or use of the subject property.

C. General Standards.

1. The design and construction of all improvements within existing and proposed rights-of-way and easements, all improvements to be maintained by the city, and all improvements for which city approval is required shall conform to the Newberg public works design and construction standards and require a public improvements permit.

2. The location, design, installation and maintenance of all utility lines and facilities shall be carried out with minimum feasible disturbances of soil and site. Installation of all proposed public and private utilities shall be coordinated by the developer and be approved by the city to ensure the orderly extension of such utilities within public right-of-way and easements.

Response: The preliminary development plans (Exhibit A) show the location of utilities included with this project. The design, installation, and maintenance of private and public utilities for this project will meet City of Newberg standards. The criteria are met.

D. Standards for Water Improvements. All development that has a need for water service shall install the facilities pursuant to the requirements of the city and all of the following standards. Installation of such facilities shall be coordinated with the extension

or improvement of necessary wastewater and stormwater facilities, as applicable.

1. **All developments shall be required to be linked to existing water facilities adequately sized to serve their intended area by the construction of water distribution lines, reservoirs and pumping stations which connect to such water service facilities. All necessary easements required for the construction of these facilities shall be obtained by the developer and granted to the city pursuant to the requirements of the city.**

2. **Specific location, size and capacity of such facilities will be subject to the approval of the director with reference to the applicable water master plan. All water facilities shall conform with city pressure zones and shall be looped where necessary to provide adequate pressure and fire flows during peak demand at every point within the system in the development to which the water facilities will be connected. Installation costs shall remain entirely the developer's responsibility.**

3. **The design of the water facilities shall take into account provisions for the future extension beyond the development to serve adjacent properties, which, in the judgment of the city, cannot be feasibly served otherwise.**

4. **Design, construction and material standards shall be as specified by the director for the construction of such public water facilities in the city.**

Response: The preliminary development plans (Exhibit A) show the location and size of water facilities meet the City of Newberg standards. The water improvements are planned to be installed and inspected in coordination with City Public Works. The criteria are met.

E. Standards for Wastewater Improvements. All development that has a need for wastewater services shall install the facilities pursuant to the requirements of the city and all of the following standards. Installation of such facilities shall be coordinated with the extension or improvement of necessary water services and stormwater facilities, as applicable.

1. **All septic tank systems and on-site sewage systems are prohibited. Existing septic systems must be abandoned or removed in accordance with Yamhill County standards.**

2. **All properties shall be provided with gravity service to the city wastewater system, except for lots that have unique topographic or other natural features that make gravity wastewater extension impractical as determined by the director. Where gravity service is impractical, the developer shall provide all necessary pumps/lift stations and other improvements, as determined by the director.**

3. **All developments shall be required to be linked to existing wastewater collection facilities adequately sized to serve their intended area by the construction of wastewater lines which connect to existing adequately sized wastewater facilities. All necessary easements required for the construction of these facilities shall be obtained by the**

developer and granted to the city pursuant to the requirements of the city.

4. Specific location, size and capacity of wastewater facilities will be subject to the approval of the director with reference to the applicable wastewater master plan. All wastewater facilities shall be sized to provide adequate capacity during peak flows from the entire area potentially served by such facilities. Installation costs shall remain entirely the developer's responsibility.

5. Temporary wastewater service facilities, including pumping stations, will be permitted only if the director approves the temporary facilities, and the developer provides for all facilities that are necessary for transition to permanent facilities.

6. The design of the wastewater facilities shall take into account provisions for the future extension beyond the development to serve upstream properties, which, in the judgment of the city, cannot be feasibly served otherwise.

7. Design, construction and material standards shall be as specified by the director for the construction of such wastewater facilities in the city.

Response: The preliminary development plans (Exhibit A) show the location and size of sanitary sewer facilities meeting City of Newberg standards. Laterals to each building are proposed connecting to a new manhole over the existing 12-inch line that bisects the property east-west. The criteria are met.

F. Easements. Easements for public and private utilities shall be provided as deemed necessary by the city, special districts, and utility companies. Easements for special purpose uses shall be of a width deemed appropriate by the responsible agency. Such easements shall be recorded on easement forms approved by the city and designated on the final plat of all subdivisions and partitions. Minimum required easement width and locations are as provided in the Newberg public works design and construction standards.

Response: The preliminary development plans (Exhibit A) show necessary utility easements anticipated as necessary for this project. The width and location of the easements meet the Newberg Public Works design and construction standards. The criteria, as applicable, are met.

15.505.050 Stormwater system standards.

A. Purpose. The purpose of this section is to provide for the drainage of surface water from all development; to minimize erosion; and to reduce degradation of water quality due to sediments and pollutants in stormwater runoff.

B. Applicability. The provisions of this section apply to all developments subject to site development review or land division review and to the reconstruction or expansion of such developments that increases the flow or changes the point of discharge to the city stormwater system. Additionally, the provisions of this section shall apply to all drainage facilities that impact any public storm drain

system, public right-of-way or public easement, including but not limited to off-street parking and loading areas.

C. General Requirement. All stormwater runoff shall be conveyed to a public storm wastewater or natural drainage channel having adequate capacity to carry the flow without overflowing or otherwise causing damage to public and/or private property. The developer shall pay all costs associated with designing and constructing the facilities necessary to meet this requirement.

D. Plan for Stormwater and Erosion Control. No construction of any facilities in a development included in subsection (B) of this section shall be permitted until an engineer registered in the State of Oregon prepares a stormwater report and erosion control plan for the project. This plan shall contain at a minimum:

1. The methods to be used to minimize the amount of runoff, sedimentation, and pollution created from the development both during and after construction.

2. Plans for the construction of stormwater facilities and any other facilities that depict line sizes, profiles, construction specifications, and other such information as is necessary for the city to review the adequacy of the stormwater plans.

3. Design calculations shall be submitted for all drainage facilities. These drainage calculations shall be included in the stormwater report and shall be stamped by a licensed professional engineer in the State of Oregon. Peak design discharges shall be computed based upon the design criteria outlined in the public works design and construction standards for the city.

E. Development Standards. Development subject to this section shall be planned, designed, constructed, and maintained in compliance with the Newberg public works design and construction standards.

Response: The preliminary development plans (Exhibit A) include a preliminary storm drainage plan and preliminary erosion and sediment control plans meeting the design and construction standards of Newberg Public Works. A preliminary stormwater report is included separately. Stormwater will be collected from the rooftops and treated in raingardens/flow through planters and detained in an underground storage facility under the parking lot on the southern end of the site before being released into an existing storm pipe in Springbrook Road. The criteria, as applicable, are met.

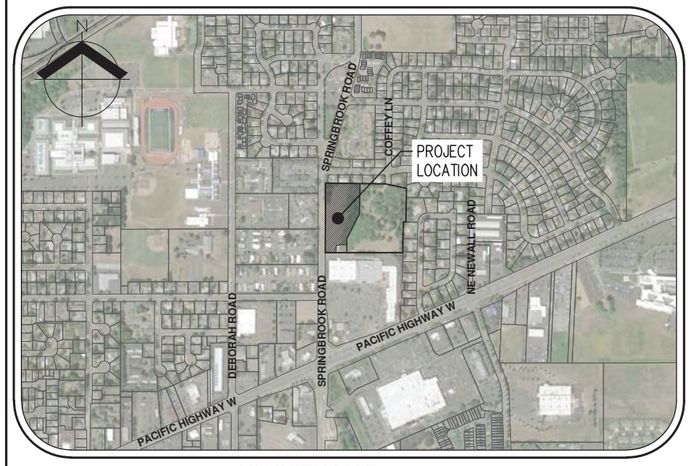
IV. Conclusion

The required findings have been made and this written narrative and accompanying documentation demonstrate the application is consistent with the applicable provisions of the City of Newberg Municipal Code and Public Works engineering standards. The evidence in the record is substantial and supports approval of the application. Therefore, the Applicant respectfully requests the City approve this Type II site design review application.

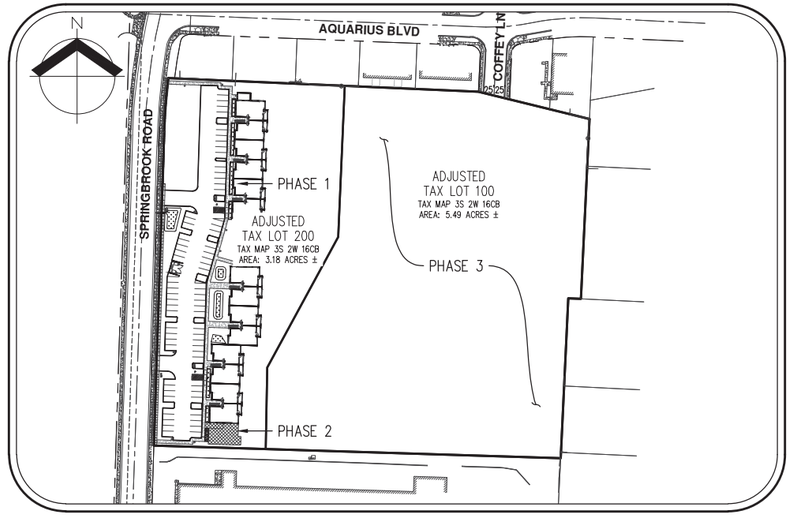
Exhibit A: Development Plans

MEADOW CREEK APARTMENTS

CIVIL ENGINEERING DESIGN REVIEW PLANS (PHASE 1)



VICINITY MAP
NOT TO SCALE



SITE MAP
NOT TO SCALE

LEGEND

	EXISTING	PROPOSED		EXISTING	PROPOSED
DECIDUOUS TREE	⊙	⊙	STORM SEWER CLEAN OUT	○	●
CONIFEROUS TREE	✳	✳	STORM SEWER CATCH BASIN	□	■
FIRE HYDRANT			STORM SEWER MANHOLE	◎	◉
WATER BLOWOFF			GAS METER	⊠	◘
WATER METER	▭	▬	GAS VALVE	⊡	◨
WATER VALVE	⋈	⋈	GUY WIRE ANCHOR	⟵	⟵
DOUBLE CHECK VALVE	⊠	⊟	POWER POLE	-○-	-●-
AIR RELEASE VALVE			POWER VAULT	P	P
SANITARY SEWER CLEAN OUT	○	●	POWER JUNCTION BOX	△	△
SANITARY SEWER MANHOLE	○	●	POWER PEDESTAL	□	■
SIGN	⊸	⊸	COMMUNICATIONS VAULT	C	C
STREET LIGHT	☼	☼	COMMUNICATIONS JUNCTION BOX	△	▲
MAILBOX	MB	MB	COMMUNICATIONS RISER	⬠	⬟
			DOWN SPOUT	•	•

	EXISTING	PROPOSED
RIGHT-OF-WAY LINE		
BOUNDARY LINE		
PROPERTY LINE		
CENTERLINE		
DITCH		
CURB		
EDGE OF PAVEMENT		
EASEMENT		
FENCE LINE		
GRAVEL EDGE		
POWER LINE	PWR	PWR
OVERHEAD WIRE	OHW	OHW
COMMUNICATIONS LINE	COM	COM
FIBER OPTIC LINE	CFO	CFO
GAS LINE	GAS	GAS
STORM SEWER LINE	STM	STM
SANITARY SEWER LINE	SAN	SAN
WATER LINE	WAT	WAT

CIVIL ENGINEERING/ LANDSCAPE ARCHITECTURE AND SURVEYING FIRM:

AKS ENGINEERING & FORESTRY
CONTACT: CHUCK GREGORY, PE
12965 SW HERMAN ROAD
SUITE 100
TUALATIN, OR 97062
PH: 503-563-6151
FAX: 503-563-6152

DEVELOPER/OWNER

MJG DEVELOPMENT
CONTACT: MIKE GOUGLER
1478 NE KILLINGSWORTH STREET
NEWBERG, OR 97132
PH: 503-810-5576
E: GGOUG@YAHOO.COM

PROPERTY DESCRIPTION:

YAMHILL COUNTY TAX MAP 3S 2W 16CB, TAX LOT 100 & 200.

VERTICAL DATUM

VERTICAL DATUM: ELEVATIONS ARE BASED YAMHILL COUNTY DLC NO. 52. LOCATED AT THE NW CORNER OF SPRINGBROOK WAY AND DOUGLAS AVENUE, THE RECORD ELEVATION WAS CONVERTED TO NAVD 88 USING A VERTCON DERIVED CONVERSION FACTOR OF 3.422, RESULTING IN A HELD ELEVATION OF 223.37 (NAVD 88).

SHEET INDEX:

ATTENTION EXCAVATORS:

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 THESE RULES FROM THE CENTER BY CALLING 503-232-1987. IF YOU HAVE ANY QUESTIONS ABOUT THE RULES, YOU MAY CONTACT THE CENTER. YOU MUST NOTIFY THE CENTER AT LEAST TWO BUSINESS DAYS BUT NOT MORE THAN TEN BUSINESS DAYS, BEFORE COMMENCING AN EXCAVATION. CALL 503-246-6699.

AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD STE 100
TUALATIN, OR 97062
P: 503.563.6151
F: 503.563.6152
aks-eng.com

ENGINEERING · SURVEYING · NATURAL RESOURCES
FORESTRY · PLANNING · LANDSCAPE ARCHITECTURE

MEADOW CREEK APARTMENTS
1306 N SPRINGBROOK ROAD
NEWBERG OREGON
TAX LOTS 100 & 200 YAMHILL COUNTY TAX MAP 3S 2W 16CB

COVER SHEET WITH VICINITY MAP, SITE MAP, AND LEGEND

DESIGNED BY:	CAK
DRAWN BY:	AMC
CHECKED BY:	CEG
SCALE:	AS NOTED

DATE: 03/30/2018

REGISTERED PROFESSIONAL ENGINEER — OREGON — JULY 14, 1995 — EDWARD GREGORY — RENEWS: JUNE 30, 2019

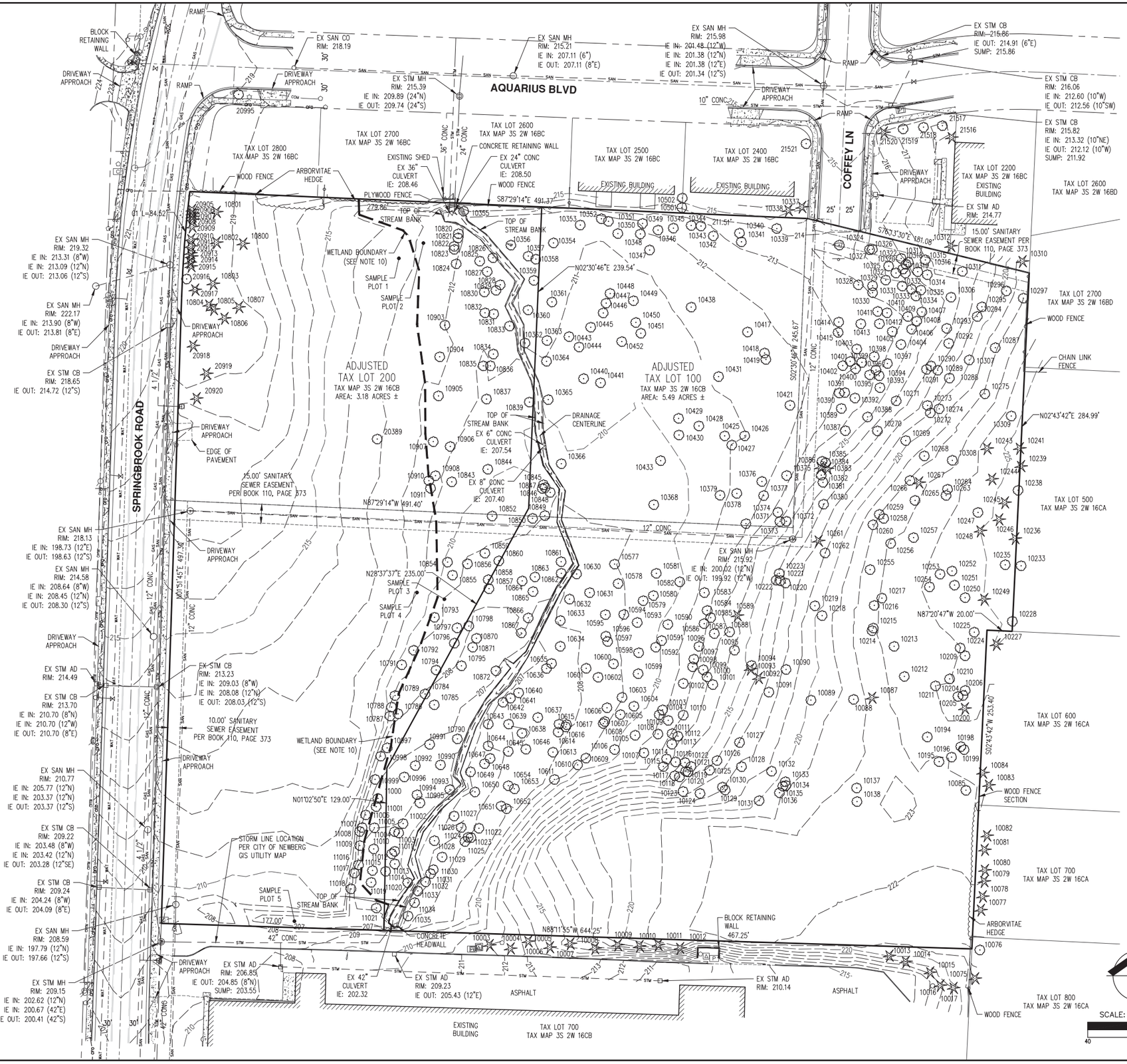
PRELIMINARY NOT FOR CONSTRUCTION

REVISIONS

JOB NUMBER 5797

SHEET C1

AKS DRAWING FILE: 5797 C1 COVER.DWG | LAYOUT: C1



CURVE TABLE				
CURVE	RADIUS	DELTA	LENGTH	CHORD
C1	924.93'	5°14'08"	84.52'	N4°28'54"E 84.49'

NOTES:

1. UTILITIES SHOWN ARE BASED ON UNDERGROUND UTILITY LOCATE MARKINGS AS PROVIDED BY OTHERS, PROVIDED PER UTILITY LOCATE TICKET NUMBER 17058372. THE SURVEYOR MAKES NO GUARANTEE THAT THE UNDERGROUND LOCATES REPRESENT THE ONLY UTILITIES IN THE AREA. CONTRACTORS ARE RESPONSIBLE FOR VERIFYING ALL EXISTING CONDITIONS PRIOR TO BEGINNING CONSTRUCTION.
2. FIELD WORK WAS CONDUCTED MARCH 24–31, 2017.
3. HORIZONTAL DATUM: A LOCAL DATUM PLANE SCALED FROM OREGON STATE PLANE NORTH 3601 NAD83(2011) EPOCH 2010.0000. THE STATE PLANE COORDINATES WERE DERIVED FROM THE TRIMBLE VRS NOW NETWORK.
4. VERTICAL DATUM: ELEVATIONS ARE BASED YAMHILL COUNTY DLC NO. 52,. LOCATED AT THE NW CORNER OF SPRINGBROOK WAY AND DOUGLAS AVENUE, THE RECORD ELEVATION WAS CONVERTED TO NAVD 88 USING A VERTCON DERIVED CONVERSION FACTOR OF 3.422, RESULTING IN A HELD ELEVATION OF 223.37 (NAVD 88).
5. THIS MAP DOES NOT CONSTITUTE A PROPERTY BOUNDARY SURVEY.
6. SURVEY IS ONLY VALID WITH SURVEYOR'S STAMP AND SIGNATURE.
7. BUILDING FOOTPRINTS ARE MEASURED TO SIDING UNLESS NOTED OTHERWISE. CONTACT SURVEYOR WITH QUESTIONS REGARDING BUILDING TIES.
8. CONTOUR INTERVAL IS 1 FOOT.
9. TREES WITH DIAMETER OF 6" AND GREATER ARE SHOWN. TREE DIAMETERS WERE MEASURED UTILIZING A DIAMETER TAPE AT BREAST HEIGHT. TREE INFORMATION IS SUBJECT TO CHANGE UPON ARBORIST INSPECTION.
10. WETLAND BOUNDARIES AND SAMPLE PLOTS SHOWN WERE DELINEATED BY AKS ENGINEERING & FORESTRY, LLC. ON 3/28/2017 AND WERE PROFESSIONALLY SURVEYED BY AKS ON 3/30/2017.

AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD STE 100
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F: 503.563.6152
aks-eng.com

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MEADOW CREEK APARTMENTS
1306 N SPRINGBROOK ROAD
NEWBERG OREGON
TAX LOTS 100 & 200
YAMHILL COUNTY TAX MAP 3S 2W 16CB

EXISTING CONDITIONS PLAN

DESIGNED BY:
DRAWN BY: BRH
CHECKED BY: NSW
SCALE: AS NOTED
DATE: 03/20/2018

REGISTERED PROFESSIONAL LAND SURVEYOR
OREGON JANUARY 9, 2007 NICK WHITE 70652LS
PREPRELIMINARY
RENEWS: 6/30/18

REVISIONS

JOB NUMBER 5797

SHEET C2

AKS DRAWING FILE: 5797 EX COND.DWG | LAYOUT: LAYOUT1

TREE TABLE:

TREE NUMBER	SPECIES	DBH (INCHES)	TREE NUMBER	SPECIES	DBH (INCHES)	TREE NUMBER	SPECIES	DBH (INCHES)	TREE NUMBER	SPECIES	DBH (INCHES)	TREE NUMBER	SPECIES	DBH (INCHES)	TREE NUMBER	SPECIES	DBH (INCHES)	TREE NUMBER	SPECIES	DBH (INCHES)
10003	CONIFEROUS	18	10135	DECIDUOUS	7	10290	DECIDUOUS	8	10378	DECIDUOUS	21	10586	DECIDUOUS	6	10803	CONIFEROUS	16	11006	DECIDUOUS	9, 10
10004	CONIFEROUS	20	10136	DECIDUOUS	11	10291	DECIDUOUS	7	10379	DECIDUOUS	16	10587	DECIDUOUS	8	10804	CONIFEROUS	21	11007	DECIDUOUS	9, 9
10005	CONIFEROUS	22	10137	DECIDUOUS	8, 11	10292	DECIDUOUS	7	10380	DECIDUOUS	16	10588	DECIDUOUS	10	10805	CONIFEROUS	24	11008	DECIDUOUS	10
10006	CONIFEROUS	23	10138	DECIDUOUS	14, 18	10293	DECIDUOUS	10	10381	DECIDUOUS	16	10589	CONIFEROUS	20	10806	CONIFEROUS	10, 12, 16, 24	11009	DECIDUOUS	7, 9
10007	CONIFEROUS	22	10194	DECIDUOUS	14	10294	DECIDUOUS	18	10382	DECIDUOUS	19	10590	DECIDUOUS	11	10807	CONIFEROUS	15	11010	DECIDUOUS	11
10008	CONIFEROUS	18	10195	DECIDUOUS	8	10295	DECIDUOUS	6	10383	CONIFEROUS	12	10591	DECIDUOUS	13	10820	DECIDUOUS	17	11011	DECIDUOUS	10
10009	CONIFEROUS	13, 16, 19	10196	DECIDUOUS	9	10296	DECIDUOUS	13	10384	DECIDUOUS	8	10592	DECIDUOUS	9	10821	DECIDUOUS	15	11012	DECIDUOUS	6
10010	CONIFEROUS	22	10198	DECIDUOUS	8	10297	DECIDUOUS	13	10385	DECIDUOUS	10, 11	10593	DECIDUOUS	8, 18	10822	DECIDUOUS	13	11013	DECIDUOUS	13
10011	CONIFEROUS	11, 13	10199	DECIDUOUS	9	10306	DECIDUOUS	8	10386	CONIFEROUS	23	10594	DECIDUOUS	15	10823	DECIDUOUS	13	11014	DECIDUOUS	14
10012	CONIFEROUS	11, 16, 17	10200	CONIFEROUS	34	10307	DECIDUOUS	8	10387	DECIDUOUS	17	10595	DECIDUOUS	12	10824	DECIDUOUS	10, 15, 18	11015	DECIDUOUS	9
10013	CONIFEROUS	22	10204	DECIDUOUS	21	10308	DECIDUOUS	8	10388	DECIDUOUS	8	10596	DECIDUOUS	7, 11	10825	DECIDUOUS	15	11016	DECIDUOUS	7, 7, 7, 7, 8, 11
10014	CONIFEROUS	20	10205	DECIDUOUS	14	10309	DECIDUOUS	8	10389	DECIDUOUS	8, 17	10597	DECIDUOUS	23	10826	DECIDUOUS	10	11017	DECIDUOUS	6
10015	CONIFEROUS	21	10206	DECIDUOUS	7	10310	CONIFEROUS	32	10390	DECIDUOUS	14	10598	DECIDUOUS	12	10827	DECIDUOUS	13, 16	11018	DECIDUOUS	11, 16
10016	CONIFEROUS	12	10209	DECIDUOUS	12	10311	DECIDUOUS	54	10391	DECIDUOUS	12	10599	DECIDUOUS	18	10828	DECIDUOUS	13	11019	DECIDUOUS	8, 9
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10084	CONIFEROUS	30	10220	DECIDUOUS	11	10324	DECIDUOUS	10	10402	DECIDUOUS	15	10610	DECIDUOUS	20	10843	DECIDUOUS	21	11030	DECIDUOUS	18
10085	DECIDUOUS	17	10221	DECIDUOUS	13	10325	DECIDUOUS	8, 9	10403	DECIDUOUS	7, 9	10611	DECIDUOUS	10, 16	10844	DECIDUOUS	16, 21	11031	DECIDUOUS	8
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10097	DECIDUOUS	6	10239	CONIFEROUS	16	10337	CONIFEROUS	21	10414	DECIDUOUS	12, 10	10635	DECIDUOUS	6, 13	10857	DECIDUOUS	6, 7, 9	20910	CONIFEROUS	12
10098	DECIDUOUS	7	10241	CONIFEROUS	21	10338	CONIFEROUS	16	10415	DECIDUOUS	9, 9, 10, 10	10636	DECIDUOUS	8, 8	10858	DECIDUOUS	7	20911	CONIFEROUS	7
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10108	DECIDUOUS	14	10252	DECIDUOUS	14	10348	DECIDUOUS	9	10430	DECIDUOUS	7, 8, 8, 8, 9, 10	10646	DECIDUOUS	9	10870	DECIDUOUS	7, 7	20995	DECIDUOUS	8, 7, 6
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10110	DECIDUOUS	14	10254	DECIDUOUS	11, 13	10350	DECIDUOUS	9	10433	DECIDUOUS	8	10648	DECIDUOUS	16	10872	DECIDUOUS	9	21517	DECIDUOUS	16
10111	DECIDUOUS	11	10255	DECIDUOUS	23	10351	DECIDUOUS	24	10438	DECIDUOUS	21	10649	DECIDUOUS	9	10903	DECIDUOUS	25	21518	DECIDUOUS	12
10112	DECIDUOUS	6, 9	10256	DECIDUOUS	10	10352	DECIDUOUS	12	10440	DECIDUOUS	18	10650	DECIDUOUS	9	10904	DECIDUOUS	23	21519	DECIDUOUS	12
10113	DECIDUOUS	8	10257	DECIDUOUS	9	10353	DECIDUOUS	21	10441	DECIDUOUS	9, 10	10651	DECIDUOUS	11	10905	DECIDUOUS	14, 15, 17	21520	CONIFEROUS	16
10114	DECIDUOUS	11	10258	DECIDUOUS	7	10354	DECIDUOUS	26	10443	DECIDUOUS	17	10652	DECIDUOUS	9, 9, 18	10906	DECIDUOUS	21, 21	21521	DECIDUOUS	24
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10116	DECIDUOUS	11	10260	DECIDUOUS	17	10356	DECIDUOUS	25	10445	DECIDUOUS	20	10654	DECIDUOUS	6, 11	10908	DECIDUOUS	10			
10117	DECIDUOUS	7, 8, 11	10261	CONIFEROUS	13, 20	10357	DECIDUOUS	6, 13	10446	DECIDUOUS	12	10784	DECIDUOUS	10	10910	DECIDUOUS	19, 22			
10118	DECIDUOUS	13	10262	DECIDUOUS	8	10358	DECIDUOUS	13	10447	DECIDUOUS	14	10785	DECIDUOUS	6, 16	10911	DECIDUOUS	15			
10119	DECIDUOUS	9	10263	DECIDUOUS	10	10359	DECIDUOUS	19	10448	DECIDUOUS	16	10786	DECIDUOUS	8	10990	DECIDUOUS	6, 7			
10120	DECIDUOUS	11	10264	DECIDUOUS	11	10360	DECIDUOUS	20	10449	DECIDUOUS	6, 9	10787	DECIDUOUS	12	10991	DECIDUOUS	7, 11			
10121	DECIDUOUS	8	10265	DECIDUOUS	11	10361	DECIDUOUS	20	10450	DECIDUOUS	10, 11	10788	DECIDUOUS	6, 7	10992	DECIDUOUS	10, 11			
10122	DECIDUOUS	11	10266	DECIDUOUS	10	10362	DECIDUOUS	17	10451	DECIDUOUS	7, 8, 15	10789	DECIDUOUS	20	10993	DECIDUOUS	6, 11			
10123	DECIDUOUS	8, 9, 12	10267	CONIFEROUS	26	10363	DECIDUOUS	13	10452	DECIDUOUS	6, 6, 9, 20, 21	10790	DECIDUOUS	6, 9, 10, 13	10994	DECIDUOUS	6, 6, 7, 11			
10124	DECIDUOUS	13	10268	DECIDUOUS	17	10364	DECIDUOUS	10, 20	10501	DECIDUOUS	6	10791	DECIDUOUS	16, 16	10995	DECIDUOUS	9			
10125	DECIDUOUS	10	10269	DECIDUOUS	16	10365	DECIDUOUS	8, 9	10502	DECIDUOUS	6, 6	10792	DECIDUOUS	10, 12	10996	DECIDUOUS	6, 7			
10126	DECIDUOUS	9	10270	DECIDUOUS	12	10366	DECIDUOUS	10, 12	10577	DECIDUOUS	6, 7, 8, 8	10793	DECIDUOUS	7, 7, 13	10997	DECIDUOUS	9, 12			
10127	DECIDUOUS	11	10271	DECIDUOUS	16	10368	DECIDUOUS	9	10578	DECIDUOUS	13	10794	DECIDUOUS	9, 25	10998	DECIDUOUS	10, 12, 12, 17			
10128	DECIDUOUS	7, 8, 9	10272	DECIDUOUS	7, 9, 9	10371	DECIDUOUS	6, 9	10579	DECIDUOUS	8	10795	DECIDUOUS	8, 14	10999	DECIDUOUS	10, 11			
10129	DECIDUOUS	10	10273	DECIDUOUS	6, 8, 9	10372	DECIDUOUS	7, 11	10580	DECIDUOUS	12, 12	10796	DECIDUOUS	7	11000	DECIDUOUS	9, 11, 11			
10130	DECIDUOUS	13	10274	DECIDUOUS	9	10373	DECIDUOUS	11	10581	DECIDUOUS	25	10797	DECIDUOUS	26	11001	DECIDUOUS	9, 14			
10131	DECIDUOUS	7	10275	DECIDUOUS	18	10374	DECIDUOUS	14	10582	DECIDUOUS	12, 12	10798	DECIDUOUS	19	11002	DECIDUOUS	10			
10132	DECIDUOUS	8	10287	DECIDUOUS	23	10375	DECIDUOUS	7, 9	10583	DECIDUOUS	9	10800	CONIFEROUS	20	11003	DECIDUOUS	7			
10133	DECIDUOUS	10	10288	DECIDUOUS	6, 9	10376	DECIDUOUS	17	10584	DECIDUOUS	7	10801	CONIFEROUS	25	11004	DECIDUOUS	7			
10134	DECIDUOUS	6, 7, 9	10289	DECIDUOUS	8	10377	DECIDUOUS	10	10585	DECIDUOUS	6	10802	CONIFEROUS	62	11005	DECIDUOUS	6, 9			

NOTES:

1. UTILITIES SHOWN ARE BASED ON UNDERGROUND UTILITY LOCATE MARKINGS AS PROVIDED BY OTHERS, PROVIDED PER UTILITY LOCATE TICKET NUMBER 17058372. THE SURVEYOR MAKES NO GUARANTEE THAT THE UNDERGROUND LOCATES REPRESENT THE ONLY UTILITIES IN THE AREA. CONTRACTORS ARE RESPONSIBLE FOR VERIFYING ALL EXISTING CONDITIONS PRIOR TO BEGINNING CONSTRUCTION.
2. FIELD WORK WAS CONDUCTED MARCH 24–31, 2017.
3. HORIZONTAL DATUM: A LOCAL DATUM PLANE SCALED FROM OREGON STATE PLANE NORTH 3601 NAD83(2011) EPOCH 2010.0000. THE STATE PLANE COORDINATES WERE DERIVED FROM THE TRIMBLE VRS NOW NETWORK.
4. VERTICAL DATUM: ELEVATIONS ARE BASED YAMHILL COUNTY DLC NO. 52,. LOCATED AT THE NW CORNER OF SPRINGBROOK WAY AND DOUGLAS AVENUE, THE RECORD ELEVATION WAS CONVERTED TO NAVD 88 USING A VERTCON DERIVED CONVERSION FACTOR OF 3.422, RESULTING IN A HELD ELEVATION OF 223.37 (NAVD 88).
5. THIS MAP DOES NOT CONSTITUTE A PROPERTY BOUNDARY SURVEY.
6. SURVEY IS ONLY VALID WITH SURVEYOR'S STAMP AND SIGNATURE.
7. BUILDING FOOTPRINTS ARE MEASURED TO SIDING UNLESS NOTED OTHERWISE. CONTACT SURVEYOR WITH QUESTIONS REGARDING BUILDING TIES.
8. CONTOUR INTERVAL IS 1 FOOT.
9. TREES WITH DIAMETER OF 6" AND GREATER ARE SHOWN. TREE DIAMETERS WERE MEASURED UTILIZING A DIAMETER TAPE AT BREAST HEIGHT. TREE INFORMATION IS SUBJECT TO CHANGE UPON ARBORIST INSPECTION.
10. WETLAND BOUNDARIES AND SAMPLE PLOTS SHOWN WERE DELINEATED BY AKS ENGINEERING & FORESTRY, LLC. ON 3/28/2017 AND WERE PROFESSIONALLY SURVEYED BY AKS ON 3/30/2017.

AKS ENGINEERING & FORESTRY, LLC
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MEADOW CREEK APARTMENTS
1306 N SPRINGBROOK ROAD
NEWBERG OREGON
TAX LOTS 100 & 200
YAMHILL COUNTY TAX MAP 3S 2W 16CB

EXISTING CONDITIONS PLAN

DESIGNED BY:
DRAWN BY: BRH
CHECKED BY: NSW
SCALE: AS NOTED
DATE: 04/28/2017

REGISTERED PROFESSIONAL LAND SURVEYOR
OREGON
JANUARY 9, 2007
NICK WHITE
70652LS
RENEWS: 6/30/18

REVISIONS

JOB NUMBER 5797

SHEET C3

AKS DRAWING FILE: 5797 EX COND.DWG | LAYOUT: EXISTING CONDITIONS PLAN

LEGEND

- EROSION CONTROL FENCE
- INLET PROTECTION
- CONSTRUCTION ENTRANCE
- DISTURBANCE AREA
- EXISTING TREE TO BE REMOVED
- EXISTING TREE TO REMAIN
- TREE PROTECTION FENCING
- DRAINAGE FLOW DIRECTION

PRE-CONSTRUCTION, CLEARING, AND DEMOLITION NOTES:

1. ALL BASE ESC MEASURES (INLET PROTECTION, PERIMETER SEDIMENT CONTROL, GRAVEL CONSTRUCTION ENTRANCES, ETC.) MUST BE IN PLACE, FUNCTIONAL, AND APPROVED IN AN INITIAL INSPECTION, PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES.
2. SEDIMENT BARRIERS APPROVED FOR USE INCLUDE SEDIMENT FENCE, BERMS CONSTRUCTED OUT OF MULCH, CHIPPINGS, OR OTHER SUITABLE MATERIAL, STRAW WATTLES, OR OTHER APPROVED MATERIALS.
3. SENSITIVE RESOURCES INCLUDING, BUT NOT LIMITED TO, TREES, WETLANDS, AND RIPARIAN PROTECTION AREAS SHALL BE CLEARLY DELINEATED WITH ORANGE CONSTRUCTION FENCING OR CHAIN LINK FENCING IN A MANNER THAT IS CLEARLY VISIBLE TO ANYONE IN THE AREA. NO ACTIVITIES ARE PERMITTED TO OCCUR BEYOND THE CONSTRUCTION BARRIER.
4. CONSTRUCTION ENTRANCES SHALL BE INSTALLED AT THE BEGINNING OF CONSTRUCTION AND MAINTAINED FOR THE DURATION OF THE PROJECT. ADDITIONAL MEASURES INCLUDING, BUT NOT LIMITED TO, STREET SWEEPING, AND VACUUMING, MAY BE REQUIRED TO INSURE THAT ALL PAVED AREAS ARE KEPT CLEAN FOR THE DURATION OF THE PROJECT.
5. RUN-ON AND RUN-OFF CONTROLS SHALL BE IN PLACE AND FUNCTIONING PRIOR TO BEGINNING SUBSTANTIAL CONSTRUCTION ACTIVITIES. RUN-ON AND RUN-OFF CONTROL MEASURES INCLUDE: SLOPE DRAINS (WITH OUTLET PROTECTION), CHECK DAMS, SURFACE ROUGHENING, AND BANK STABILIZATION.
6. THESE EROSION AND SEDIMENT CONTROL PLANS ASSUME "DRY WEATHER" CONSTRUCTION. "WET WEATHER" CONSTRUCTION MEASURES NEED TO BE APPLIED BETWEEN OCTOBER 1ST AND MAY 31ST.

N

SCALE: 1" = 40 FEET

40 0 16 24 32 40

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MEADOW CREEK APARTMENTS
1306 N SPRINGBROOK ROAD
NEWBERG OREGON
TAX LOTS 100 & 200
YAMHILL COUNTY TAX MAP 3S 2W 16CB

PRELIMINARY DEMOLITION & EROSION & SEDIMENT CONTROL PLAN

DESIGNED BY:	CAK
DRAWN BY:	AMC
CHECKED BY:	CEG
SCALE:	AS NOTED

DATE: 03/30/2018

REGISTERED PROFESSIONAL ENGINEER
OREGON
JANUARY 14, 1983
CHARLES E. GREGG
EDWARD GREGORY
PRELIMINARY NOT FOR CONSTRUCTION
RENEWS: JUNE 30, 2019

REVISIONS

JOB NUMBER
5797

SHEET
C4

AKS DRAWING FILE: 5797 C4 ESC.DWG | LAYOUT: C4

LEGEND

ASPHALT CONCRETE	AC: 100.00
TOP OF CURB	TC: 100.00
RIM ELEVATION	RIM: 100.00
FINISHED FLOOR ELEVATION	FFE: 100.00
FINISHED GRADE	FG: 100.00
EXISTING GRADE	(EG: 100.00)

SCALE: 1"= 40 FEET

40 0 16 24 32 40

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MEADOW CREEK APARTMENTS
1306 N SPRINGBROOK ROAD
NEWBERG OREGON
TAX LOTS 100 & 200 — YAMHILL COUNTY TAX MAP 3S 2W 16CB

PRELIMINARY GRADING PLAN

DESIGNED BY:	CAK
DRAWN BY:	AMC
CHECKED BY:	CEG
SCALE:	AS NOTED

DATE: 03/30/2018

REGISTERED PROFESSIONAL ENGINEER — OREGON — JULY 14, 1995 — CHARLES EDWARD GREGORY

PRELIMINARY NOT FOR CONSTRUCTION

RENEWS: JUNE 30, 2019

REVISIONS

JOB NUMBER
5797

SHEET
C5

AKS DRAWING FILE: 5797 C5 GRADING.DWG | LAYOUT: C5

SITE NOTES:

1. PROPOSED 5 FT WIDE SIDEWALK
2. PROPOSED 12 FT WIDE PUBLIC SIDEWALK PER CROSS-SECTION AND SCORING PATTERN WITH 5.5' EASEMENT PER CROSS-SECTION
3. PROPOSED 9 FT WIDE PUBLIC SIDEWALK PER CROSS-SECTION AND SCORING PATTERN WITH 2.5' EASEMENT PER CROSS-SECTION
4. PROPOSED COMMERCIAL DRIVEWAY
5. PROPOSED 6" CURB
6. PROPOSED CONNECTION TO EXISTING SIDEWALK
7. PUBLIC STORMWATER EASEMENT
8. TRENCH DRAIN TO COLLECT PUBLIC RUNOFF
9. PUBLIC STORMWATER PLANTER
10. PRIVATE LIGHT POLE
11. PRIVATE LIGHTED BOLLARD
12. BUILDING MOUNTED LIGHTING
13. BIKE PARKING
14. ADA PARKING STALL WITH SIGN

DENSITY CALCULATION:

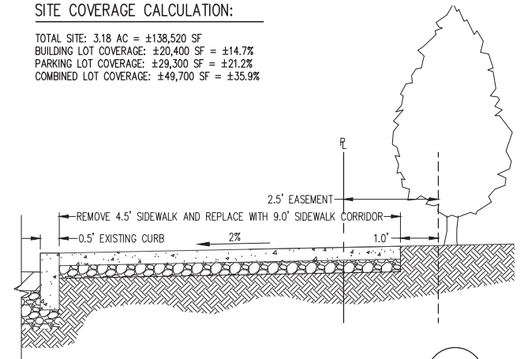
TOTAL SITE: 3.18 AC = ±138,520 SF
AREA IN SIDEWALK EASEMENT: ±2,700 SF
AREA IN STREAM CORRIDOR: ±4,520 SF
AREA OUTSIDE STREAM CORRIDOR AND EASEMENT: ±131,300 SF

EXPECTED MAXIMUM DENSITY: 138,520/3,000 = 46.17 = 46 UNITS
DENSITY OUTSIDE OF STREAM CORRIDOR AND EASEMENT: 131,300/3,000 = 43.77 = 43 UNITS
MAXIMUM ALLOWED INCREASE IN DENSITY (15.342.120.B.3): 20%, 43.77 * 1.2 = 52.52

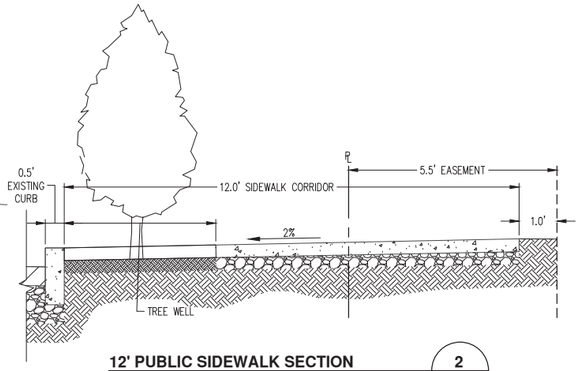
MAXIMUM ALLOWED DENSITY: 52 UNITS
PROPOSED UNITS: 42 (PHASE 1)

SITE COVERAGE CALCULATION:

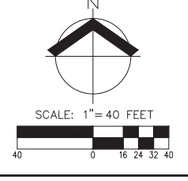
TOTAL SITE: 3.18 AC = ±138,520 SF
BUILDING LOT COVERAGE: ±20,400 SF = ±14.7%
PARKING LOT COVERAGE: ±29,300 SF = ±21.2%
COMBINED LOT COVERAGE: ±49,700 SF = ±35.9%



9' PUBLIC SIDEWALK SECTION — 1 C6
SCALE: NTS



12' PUBLIC SIDEWALK SECTION — 2 C6
SCALE: NTS



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MEADOW CREEK APARTMENTS
1306 N SPRINGBROOK ROAD
NEWBERG OREGON
TAX LOTS 100 & 200 — YAMHILL COUNTY TAX MAP 3S 2W 16CB

PRELIMINARY SITE PLAN

DESIGNED BY:	CAK
DRAWN BY:	AMC
CHECKED BY:	CEG
SCALE:	AS NOTED
DATE:	03/30/2018

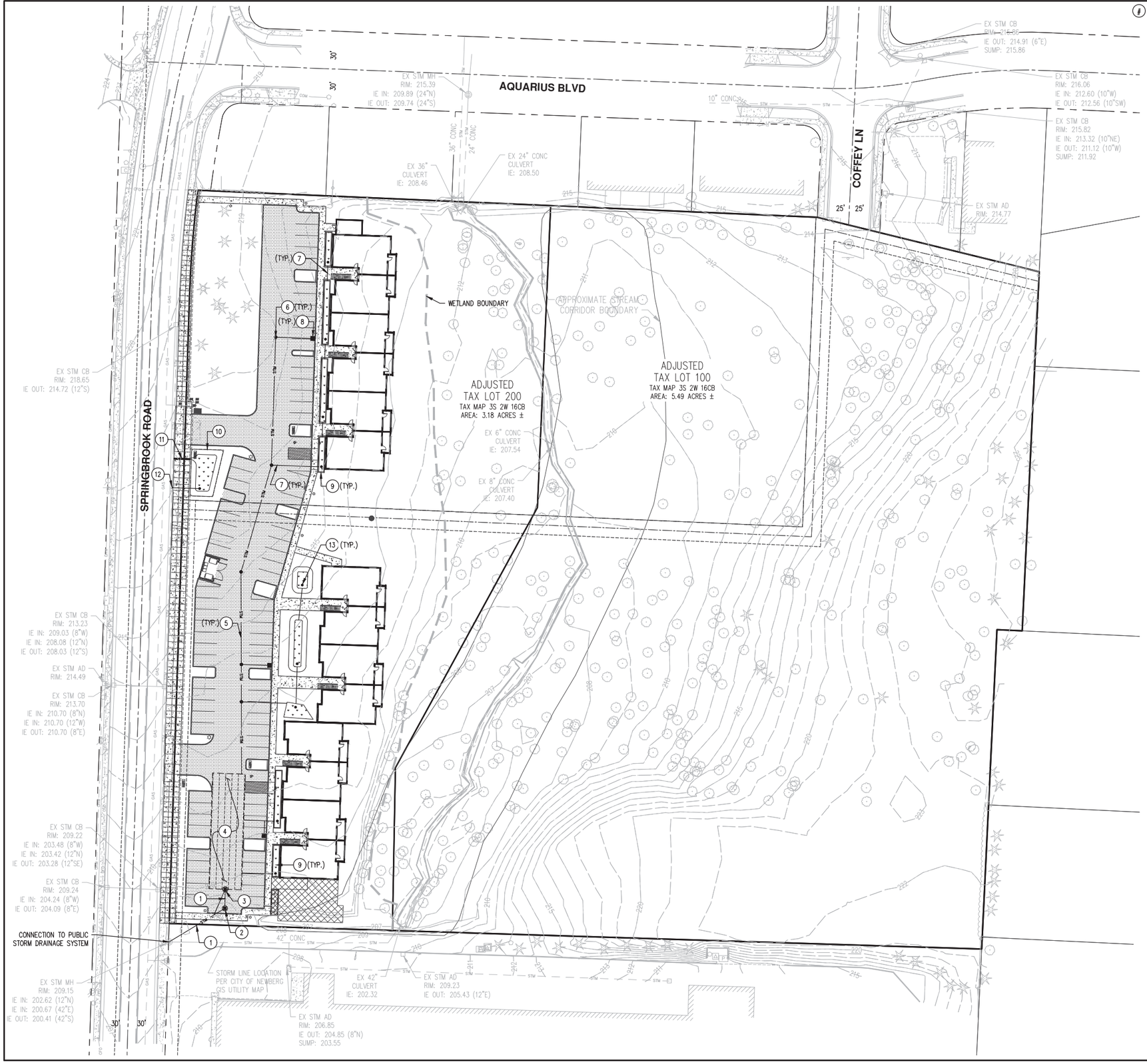
REGISTERED PROFESSIONAL ENGINEER — OREGON — JULY 14, 1995 — CHARLES EDWARD GREGORY
PRELIMINARY NOT FOR CONSTRUCTION
RENEWS: JUNE 30, 2019

REVISIONS

JOB NUMBER 5797

SHEET C6

AKS DRAWING FILE: 5797 C6 SITE.DWG | LAYOUT: C6



STORMWATER NOTES:

1. PROPOSED 10" PVC STORM DRAIN
2. PROPOSED 72" STORMFILTER MANHOLE
3. PROPOSED FLOW-SPLITTER MANHOLE
4. PROPOSED DETENTION CHAMBERS
5. PROPOSED 8" PVC STORM DRAIN
6. PROPOSED STORM CLEANOUT
7. PROPOSED 6" PVC STORM DRAIN
8. PROPOSED STORM CATCH BASIN
9. PROPOSED FLOW THROUGH PLANTER; COLLECTS ROOF AND SIDEWALK RUNOFF
10. PROPOSED PUBLIC RAIN GARDEN
11. PROPOSED TRENCH DRAIN
12. PROPOSED OVERFLOW TO WEEP HOLE
13. PROPOSED OVERFLOW STRUCTURE

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MEADOW CREEK APARTMENTS
1306 N SPRINGBROOK ROAD
NEWBERG OREGON
TAX LOTS 100 & 200 — YAMHILL COUNTY TAX MAP 3S 2W 16CB

PRELIMINARY STORM DRAINAGE PLAN

DESIGNED BY:	CAK
DRAWN BY:	AMC
CHECKED BY:	CEG
SCALE:	AS NOTED

DATE: 03/30/2018

REGISTERED PROFESSIONAL ENGINEER — OREGON — JULY 14, 1989 — EDWARD GREGORY
PRELIMINARY NOT FOR CONSTRUCTION
RENEWS: JUNE 30, 2019

REVISIONS

JOB NUMBER
5797

SHEET
C7

AKS DRAWING FILE: 5797 C7 STM.DWG | LAYOUT: C7

AQUARIUS BLVD

COFFEY LN

SPRINGBROOK ROAD

EX SAN MH
RIM: 215.21
IE IN: 207.11 (6")
IE OUT: 207.11 (8"E)

EX SAN MH
RIM: 215.98
IE IN: 201.48 (12"W)
IE IN: 201.38 (12"N)
IE IN: 201.38 (12"E)
IE OUT: 201.34 (12"S)

EX SAN MH
RIM: 219.32
IE IN: 213.31 (8"W)
IE IN: 213.09 (12"N)
IE OUT: 213.06 (12"S)

EX SAN MH
RIM: 222.17
IE IN: 213.90 (8"W)
IE OUT: 213.81 (8"E)

EX SAN MH
RIM: 218.13
IE IN: 198.73 (12"E)
IE OUT: 198.63 (12"S)

EX SAN MH
RIM: 214.58
IE IN: 208.64 (8"W)
IE IN: 208.45 (12"N)
IE OUT: 208.30 (12"S)

EX SAN MH
RIM: 210.77
IE IN: 205.77 (12"N)
IE IN: 203.37 (12"N)
IE OUT: 203.37 (12"S)

EX SAN MH
RIM: 208.59
IE IN: 197.79 (12"N)
IE OUT: 197.66 (12"S)

EX SAN MH
RIM: 215.92
IE IN: 200.02 (12"N)
IE OUT: 199.92 (12"W)

WETLAND BOUNDARY

APPROXIMATE STREAM CORRIDOR BOUNDARY

ADJUSTED TAX LOT 100
TAX MAP 3S 2W 16CB
AREA: 5.49 ACRES ±

ADJUSTED TAX LOT 200
TAX MAP 3S 2W 16CB
AREA: 3.18 ACRES ±

15.00' SANITARY SEWER EASEMENT PER BOOK 110, PAGE 373

12" CONC

30' 30' 25' 25'

(#) SANITARY NOTES:

1. PROPOSED SANITARY MANHOLE
2. PROPOSED CONNECTION TO BUILDING; SERVICE LINES TO RUN UNDERNEATH BUILDINGS

[#] WATER NOTES:

1. PROPOSED DOMESTIC WATER METER
2. PROPOSED DOMESTIC DOUBLE CHECK VALVE
3. PROPOSED IRRIGATION DOUBLE CHECK VALVE
4. PROPOSED DOMESTIC CONNECTION TO BUILDING
5. PROPOSED FIRE WATER DOUBLE CHECK DETECTOR ASSEMBLY
6. PROPOSED FIRE DEPARTMENT CONNECTION (FDC)
7. PROPOSED FIRE WATER SERVICE TO BUILDING
8. PROPOSED FIRE HYDRANT

N

SCALE: 1"= 40 FEET

40 0 16 24 32 40

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MEADOW CREEK APARTMENTS
1306 N SPRINGBROOK ROAD
NEWBERG OREGON
TAX LOTS 100 & 200
YAMHILL COUNTY TAX MAP 3S 2W 16CB

PRELIMINARY SANITARY SEWER & WATER PLAN

DESIGNED BY:	CAK
DRAWN BY:	AMC
CHECKED BY:	CEG
SCALE:	AS NOTED

DATE: 03/30/2018

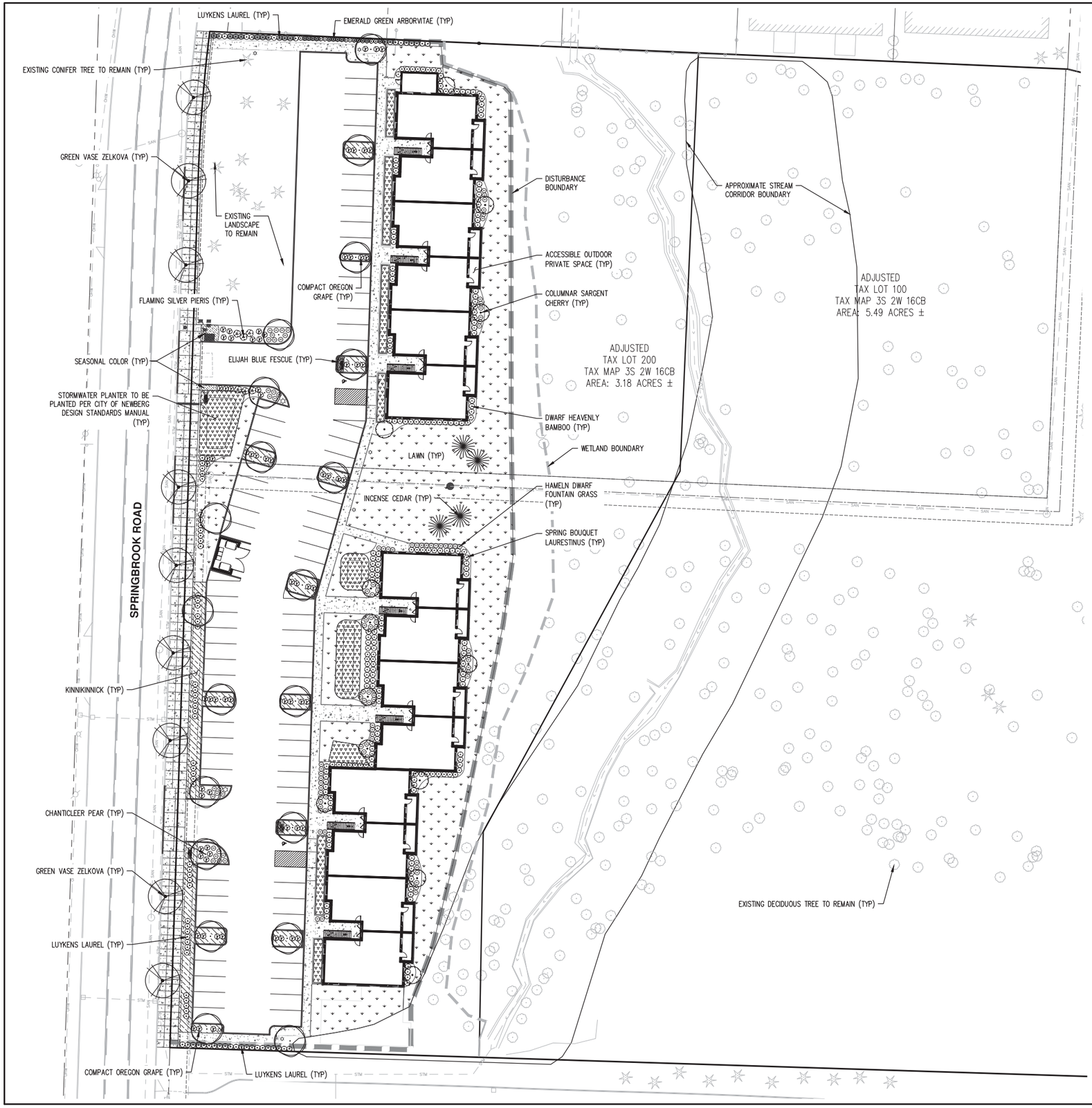
REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 14, 1989
EDWARD GREGORY
PRELIMINARY NOT FOR CONSTRUCTION
RENEWS: JUNE 30, 2019

REVISIONS

JOB NUMBER
5797

SHEET
C8

AKS DRAWING FILE: 5797 C8 SAN & WAT.DWG | LAYOUT: C8



CONCEPTUAL PLANT SCHEDULE

TREES	BOTANICAL NAME	COMMON NAME	SIZE/CONTAINER	SPACING
	CALOCEDRUS DECURRENS	INCENSE CEDAR	6' HT. B&B	AS SHOWN
	PRUNUS SARGENTII 'COLUMNARIS'	COLUMNAR SARGENT CHERRY	2" CAL. B&B	AS SHOWN
	PYRUS CALLERYANA 'CHANTICLEER'	CHANTICLEER PEAR	2" CAL. B&B	AS SHOWN
	ZELKOVA SERRATA 'GREEN VASE'	GREEN VASE ZELKOVA	2" CAL. B&B	AS SHOWN

SHRUBS	BOTANICAL NAME	COMMON NAME	SIZE/CONTAINER	SPACING
	FESTUCA GLAUCA 'ELIJAH BLUE'	BLUE FESCUE	1 GAL CONT.	24" o.c.
	MAHONIA AQUIFOLIUM 'COMPACTA'	COMPACT OREGON GRAPE	2 GAL CONT.	36" o.c.
	NANDINA DOMESTICA 'COMPACTA'	DWARF HEAVENLY BAMBOO	2 GAL CONT.	36" o.c.
	PENNISETUM ALOPECUROIDES 'HAMELN'	HAMELN DWARF FOUNTAIN GRASS	1 GAL CONT.	30" o.c.
	PIERIS JAPONICA 'FLAMING SILVER'	FLAMING SILVER PIERIS	2 GAL CONT.	48" o.c.
	PRUNUS LAUROCERASUS 'OTTO LUYKEN'	LUYKENS LAUREL	2 GAL CONT.	36" o.c.
	THUJA OCCIDENTALIS 'SMARAGD'	EMERALD GREEN ARBORVITAE	5'-6' HT. CONT.	30" o.c.
	VIBURNUM TINUS 'SPRING BOUQUET'	SPRING BOUQUET LAURESTINUS	2 GAL CONT.	36" o.c.

GROUND COVERS	BOTANICAL NAME	COMMON NAME	SIZE/CONTAINER	SPACING
	ARCTOSTAPHYLOS UVA-URSI	KINNIKINNICK	1 GAL. CONT.	30" o.c.

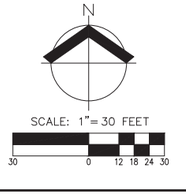
LAWN: NORTHWEST SUPREME LAWN MIX – SUNMARK SEEDS (OR APPROVED EQUAL)
CUTTER II PERENNIAL RYEGRASS 35%; DASHER III PERENNIAL RYEGRASS 35%; GARNET CREEPING RED FESCUE 15%; WINDWARD CHEWINGS FESCUE 15%. APPLY AT A RATE OF 8 LBS./1,000 SF OR AS RECOMMENDED BY SUPPLIER. (SOD OF SIMILAR SPECIES COMPOSITION ACCEPTABLE AT OWNERS OPTION)

STORMWATER

STORMWATER PLANTERS – TO BE PLANTED PER CITY OF NEWBERG DESIGN STANDARDS MANUAL

GENERAL NOTES:

1. LANDSCAPE PLAN IS INTENDED TO PORTRAY CONCEPTUAL DESIGN INTENT. REVISIONS, INCLUDING CHANGES TO PLANT LOCATION, LAYOUT, SPECIES, SIZES, SPACING, QUANTITIES, CONDITION, ETC. MAY BE MADE WHERE ALLOWED BY CITY OF NEWBERG DESIGN STANDARDS.
2. ALL PLANTS AND PLANTINGS SHALL CONFORM TO CITY OF NEWBERG LANDSCAPE DESIGN STANDARDS AND TO AMERICAN NURSERY STANDARDS ASN 1260.1. PLANT IN ACCORDANCE WITH BEST-PRACTICE INDUSTRY STANDARDS, SUCH AS THOSE ADOPTED BY THE OREGON LANDSCAPE CONTRACTOR'S BOARD (OLCB).
3. DISTURBED LAWN AREAS TO BE RESTORED TO PRE-CONSTRUCTION CONDITIONS.
4. IRRIGATION: WATER EFFICIENT, BELOW GROUND IRRIGATION SHALL BE PROVIDED IN ALL NEW LANDSCAPE AREAS.
5. MAINTENANCE: ALL LANDSCAPES SHALL BE MAINTAINED FOR THE DURATION OF THE PLANTING TO ENCOURAGE HEALTH OF PLANT MATERIAL AS WELL AS PUBLIC HEALTH AND SAFETY. ALL STREET TREES AND SHRUBS SHALL BE PRUNED TO MAINTAIN HEALTH AND STRUCTURE OF THE PLANT MATERIAL FOR PUBLIC SAFETY PURPOSES.



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MEADOW CREEK APARTMENTS
1306 N SPRINGBROOK ROAD
NEWBERG OREGON
TAX LOTS 100 & 200 — YAMHILL COUNTY TAX MAP 3S 2W 16CB

PRELIMINARY LANDSCAPE PLAN

DESIGNED BY:	TEB
DRAWN BY:	TEB
CHECKED BY:	KAH
SCALE:	AS NOTED
DATE:	03/30/2018

REGISTERED LANDSCAPE ARCHITECT — PRELIMINARY NOT FOR CONSTRUCTION — KRISTOPHER A. HAUSKINS — OREGON — 03/06/13

REVISIONS

JOB NUMBER
5797

SHEET
L1

AKS DRAWING FILE: 5797 L1 LANDSCAPE.DWG | LAYOUT: PRELIMINARY LANDSCAPE PLAN

SITE DESIGN REVIEW

03/30/18

MEADOW CREEK APARTMENTS

1306 N. SPRINGBROOK ROAD
NEWBERG, OR 97132

NOT FOR CONSTRUCTION

S|E A
SCOTT | EDWARDS ARCHITECTURE LLP.
2525 E Burnside Street, Portland, OR 97214
phone (503) 223-1177 www.seallp.com

FILE PATH: C:\Rev_Local\17021_Springbrook Phase 1_mbokarvt

GENERAL PROJECT NOTES

1. THE CONTRACTOR SHALL FIELD VERIFY ALL CONDITIONS AND DIMENSIONS PRIOR TO ANY WORK AND SHALL BE RESPONSIBLE FOR ALL WORK AND MATERIALS INCLUDING THOSE FURNISHED BY SUBCONTRACTORS.
2. DIMENSIONS TAKE PRECEDENCE OVER DRAWINGS. DO NOT SCALE DRAWINGS TO DETERMINE ANY LOCATIONS. THE ARCHITECT SHALL BE NOTIFIED OF ANY DISCREPANCY PRIOR TO CONTINUING WITH WORK.
3. GENERAL CONTRACTOR SHALL KEEP THE CONSTRUCTION SITE IN A BROOM CLEAN CONDITION AT ALL TIMES DURING THE PROJECT.
4. THE CONTRACTOR SHALL REPORT TO THE ARCHITECT ANY ERRORS, INCONSISTENCIES OR OMISSIONS HE OR SHE MAY DISCOVER. THE CONTRACTOR IS RESPONSIBLE FOR CORRECTING ANY ERROR AFTER THE START OF CONSTRUCTION WHEN HAS NOT BEEN BROUGHT TO THE ATTENTION OF THE ARCHITECT. BRING UNFORESEEN CONDITIONS TO ATTENTION OF ARCHITECT UPON DISCOVERY AT ANY POINT. THE MEANS OF CORRECTING ANY ERROR OR UNFORESEEN CONDITION SHALL FIRST BE APPROVED BY THE ARCHITECT.
5. ALL REQUIRED CITY AND/OR COUNTY LICENSE SHALL BE ACQUIRED AND PAID FOR BY THE INDIVIDUAL TRADE.
6. THE ARCHITECT WILL REVIEW SHOP DRAWINGS AND SAMPLES FOR CONFORMANCE WITH THE DESIGN CONCEPT OF THE PROJECT. THE ARCHITECT'S REVIEW OF A SEPARATE ITEM SHALL NOT INDICATE APPROVAL OF AN ASSEMBLY IN WHICH THE ITEM FUNCTIONS.
7. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY LOCATION OF ALL EXISTING UTILITIES WHETHER SHOWN HEREIN OR NOT AND TO PROTECT THEM FROM DAMAGE. THE CONTRACTOR SHALL BEAR ALL EXPENSES OF REPAIR OR REPLACEMENT OF UTILITIES OR OTHER PROPERTY DAMAGED BY OPERATIONS IN CONJUNCTION WITH THE EXECUTION OF THE WORK.
8. CITY APPROVED PLANS SHALL BE KEPT IN A SECURE PLACE AND SHALL NOT BE USED BY WORKERS. THE CONTRACTOR SHALL BE RESPONSIBLE THAT ALL SUBCONTRACTORS' CONSTRUCTION SETS REFLECT THE SAME INFORMATION. THE CONTRACTOR SHALL ALSO MAINTAIN, IN GOOD CONDITION, ONE COMPLETE SET OF STAMPED CITY APPROVED PLANS WITH ALL REVISIONS, ADDENDUMS, AND CHANGE ORDERS, ON THE PREMISES AT ALL TIMES. THESE ARE TO BE UNDER THE CARE OF THE JOB SUPERINTENDENT AND MUST BE MADE AVAILABLE TO BUILDING AND FIRE INSPECTIONS FOR REFERENCE DURING CONSTRUCTION.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COMPLETE SECURITY OF THE SITE WHILE THE JOB IS IN PROGRESS AND UNTIL JOB COMPLETION.
10. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO ENSURE THE SAFETY OF THE OCCUPANTS AND WORKERS AT ALL TIMES.
11. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS AND METHODS AND SHALL MAINTAIN THE STRUCTURAL INTEGRITY OF ANY CONSTRUCTION UNTIL ALL FINAL LATERAL AND VERTICAL LOAD CARRYING SYSTEMS ARE COMPLETED.
12. THE CONTRACTOR SHALL BE RESPONSIBLE FOR AND SHALL REPLACE OR REMEDY ANY FAULTY, IMPROPER, OR INFERIOR MATERIALS OR WORKMANSHIP WHICH SHALL APPEAR WITHIN ONE (1) YEAR AFTER THE COMPLETION AND ACCEPTANCE OF THE WORK UNDER THIS CONTRACT.
13. CONTRACTOR TO PROVIDE BACKING OR BLOCKING AS REQUIRED FOR MOUNTING ALL WALL MOUNTED SHELVES, EQUIPMENT, ACCESSORIES, CABINETS, ETC.
14. CONTRACTOR TO PROTECT ALL TREES AND ROOTS NOT SUITED FOR REMOVAL DURING CONSTRUCTION.
15. GENERAL CONTRACTOR RESPONSIBLE FOR MAINTENANCE OF STAGING AREA AND TO ENSURE THAT MATERIALS DELIVERY AND STORAGE DOES NOT INTERFERE WITH DAILY OPERATION OF ADJACENT PROPERTIES OR PUBLIC RIGHT OF WAY.
16. GENERAL CONTRACTOR RESPONSIBLE FOR CONSTRUCTION STAKING.

ZONING SUMMARY

DENSITY

PROPOSED 42 UNITS
41 TWO-BEDROOM
1 ONE-BEDROOM

BUILDING HEIGHT

NORTH PL [ALT. BUILDING HEIGHT STANDARD 2] 20' + 15' = 35' ALLOWABLE HEIGHT
SOUTH PL [ALT. BUILDING HEIGHT STANDARD 1] 20' + 39' = 59' ALLOWABLE HEIGHT
35' BUILDING HEIGHT PROPOSED
SEE SHEET A3.01 FOR BUILDING HEIGHT DIAGRAMS

SETBACKS

FRONT 15' MIN.
INTERIOR 5' MIN.

OUTDOOR SPACE

GROUND FLOOR UNITS 48 SF PRIVATE SPACE
1 OR 2-BED UNITS 200 SF PER UNIT SHARED OR PRIVATE

PARKING

MINIMUM
1 PER ST, OR +-BED = 1 SPACE REQUIRED
1.5 PER 2-BED = 62 SPACES REQUIRED
= 63 RESIDENT SPACES REQUIRED
15% UNASSIGNED
VISITOR
0.2 PER UNIT = 9 SPACES REQUIRED
72 TOTAL PARKING SPACES REQUIRED
80 TOTAL PARKING SPACES PROVIDED
[2 ACCESSIBLE STALLS PROVIDED]
BIKE
1 PER 4 UNITS REQUIRED = 11 REQUIRED
= 14 BIKE PARKING STALLS PROVIDED

PROJECT TEAM

OWNER	MJG DEVELOPMENT 901 BRUTSCHER STREET NEWBERG, OREGON 97132 MIKE GOUGLER GGOUG@YAHOO.COM
CONTRACTOR	ASHLEY GENERAL CONTRACTORS DAYTON, OREGON KEITH ASHLEY KEITHASHLEY66@GMAIL.COM
ARCHITECT	SCOTT	EDWARDS ARCHITECTURE, LLP 2525 E. BURNSIDE STREET PORTLAND, OREGON 97214 503.226.3617 BRIAN MARES BRIAN@SEAALLP.COM
CIVIL ENGINEER	AKS ENGINEERING & FORESTRY, LLC 12965 SW HERMAN ROAD, SUITE 100 TUALATIN, OREGON 97062 503.563.6151 CHUCK GREGORY CHUCKG@AKS-ENG.COM
STRUCTURAL ENGINEER	OUELLETTE ENGINEERING INC. 33720 NE KRAMIEN RD. NEWBERG, OREGON 97132 503.925.1469 JAY OUELLETTE JAY@NEWBERG-ENGINEER.COM
MECHANICAL PLUMBING ELECTRICAL ENGINEER	MEP CONSULTING, LLC 9220 SW BARBUR BLVD, #119-324 PORTLAND, OR 97219 503.246.5300 DAVID XEYS DAVID.XEYS@MEPCON.COM

PROJECT SUMMARY

PROJECT DESCRIPTION:	CONSTRUCTION OF 42 RESIDENTIAL UNITS OVER THREE FLOORS ACROSS TWO BUILDINGS. SITE WORK INCLUDES REMOVAL OF EXISTING VEGETATION FOR THE CONSTRUCTION OF THE BUILDINGS, DRIVEWAY, PARKING SPACES, PEDESTRIAN WALKWAYS AND LANDSCAPING. THE EXISTING MATURE TREES IN THE NORTHWEST CORNER OF THE SITE WILL BE PRESERVED TO THE GREATEST EXTENT POSSIBLE. THE OVERALL DEVELOPMENT SITE AREA IS COMPRISED OF TAX LOTS 100 AND 200 WHICH ARE INVOLVED IN A RECENT PROPERTY LINE ADJUSTMENT. PHASE 1 WILL OCCUR ON TAX LOT 200 AS ADJUSTED.
PROJECT ADDRESS:	1306 N. SPRINGBROOK ROAD NEWBERG, OREGON 97132
TAX MAP:	R3216CB 00100 R3216CB 00200
ZONING:	R-2 MEDIUM DENSITY RESIDENTIAL

DEFERRED / BIDDER DESIGN ITEMS

CONTRACTOR SHALL PROVIDE DESIGN, ENGINEERING, FURNISHING AND INSTALLATION OF A COMPLETE, FUNCTIONING SYSTEM(S) BASED ON THE SCHEMATIC LAYOUT SHOWN ON THE ARCHITECTURAL DRAWINGS, DESCRIBED HEREIN AND IN COMPLIANCE WITH PREVAILING CODE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FINAL ORDERING OF ALL DEVICES AND FIXTURES TO ENSURE PROPER OPTIONS, ACCESSORIES AND CONFIGURATIONS. CONTRACTOR SHALL PROVIDE COMPLETE DESIGN AND DOCUMENTATION AS REQUIRED FOR SUBMISSION TO, AND APPROVAL OF ARCHITECT, OWNER, AND GOVERNING BUILDING DEPARTMENT.

UPON COMPLETION OF REVIEW BY THE ARCHITECT OR ENGINEER OF RECORD, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ROUTING DOCUMENTS TO PERMIT AGENCY FOR PLANS REVIEW AND PAYING ANY PLANS CHECK AND PERMIT FEES.

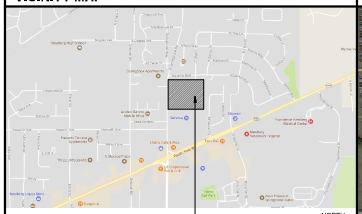
1. FIRE SPRINKLER SYSTEM
2. HANGERS AND SUPPORT FOR HVAC
3. FIRE ALARM SYSTEM
4. VIBRATION AND SEISMIC CONTROLS FOR HVAC
5. PREFABRICATED MANUFACTURED TRUSSES
6. STAIR FRAMING
7. LATERAL BRACING AND ANCHORAGE OF MECHANICAL AND ELECTRICAL EQUIPMENT WEIGHING MORE THAN 75 LBS (EXCEPTIONS PER ASCE 7, SECTION 13.1.4)

ALTERNATES

IN ADDITION TO THE BASE BUILDING BID, THE CONTRACTOR SHALL PROVIDE THE FOLLOWING ALTERNATES:

SEE ARCHITECTURAL DRAWINGS AND PROJECT MANUAL FOR ADDITIONAL SCOPE OF ALTERNATES.

VICINITY MAP



AERIAL IMAGE

SHEET INDEX

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MEADOW CREEK APARTMENTS

Job Number: 17021

1306 N. SPRINGBROOK ROAD
NEWBERG, OR 97132

SITE DESIGN REVIEW	03/30/18
ISSUE	DATE

Drawing:

GENERAL PROJECT INFORMATION

Sheet No:

G0.01

1 SITE PLAN
1" = 30'-0"

GENERAL SHEET NOTES

A. ALL DOOR AND WINDOW DIMENSIONS ARE TO OUTSIDE OF FRAME, TYPICAL.
B. PROVIDE FIRE EXTINGUISHER CABINETS AS SHOWN / SPECIFIED. COORDINATE FINAL LOCATIONS WITH FIRE MARSHALL.
C. ALL INTERIOR WALLS TO BE TYPE XXXX, UNLESS NOTED OTHERWISE.
D. ALL CEILING HEIGHTS ARE FROM FINISH FLOOR ELEVATION.
E. CEILING GRIDS ARE TO BE CENTERED IN ROOMS AS SHOWN OR LOCATED PER INDICATED DIMENSIONS. AVOID LAYOUTS THAT RESULT IN CEILING TILES LESS THAN ONE HALF OF FULL TILE WIDTH.
F. CEILING MOUNTED DEVICES TO BE CENTERED IN CEILING GRIDS AND ALIGNED WITH OTHER DEVICES.
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H. VERIFY ALL SPRINKLER HEAD LOCATIONS WITH FIRE PROTECTION DRAWINGS.
I. CENTER LIGHTS IN ROOMS OR SPACES UNLESS DIMENSIONED OTHERWISE.
J. SEE MECHANICAL DRAWINGS FOR DIFFUSER TYPES. CENTER MECH. DIFFUSERS, GRILLES AND ACCESS PANELS IN GRID, ROOM OR SPACE. ALIGN WITH LIGHT FIXTURES WHERE APPLICABLE.
K. SEE MEHCANICAL AND PLUMBING FOR REQUIRED ACCESS PANEL LOCATIONS. PAINT MATCH ADJCENT CEILING COLOR.
L. BRACE SUSPENDED CEILINGS PER DETAIL XXXX.
M. SEE SHEET XXX FOR TYPICAL SUSPENSED CEILING GRID DETAILS.

KEYNOTES 07-02

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Drawing:
SITE PLAN

Sheet No:
A1.11

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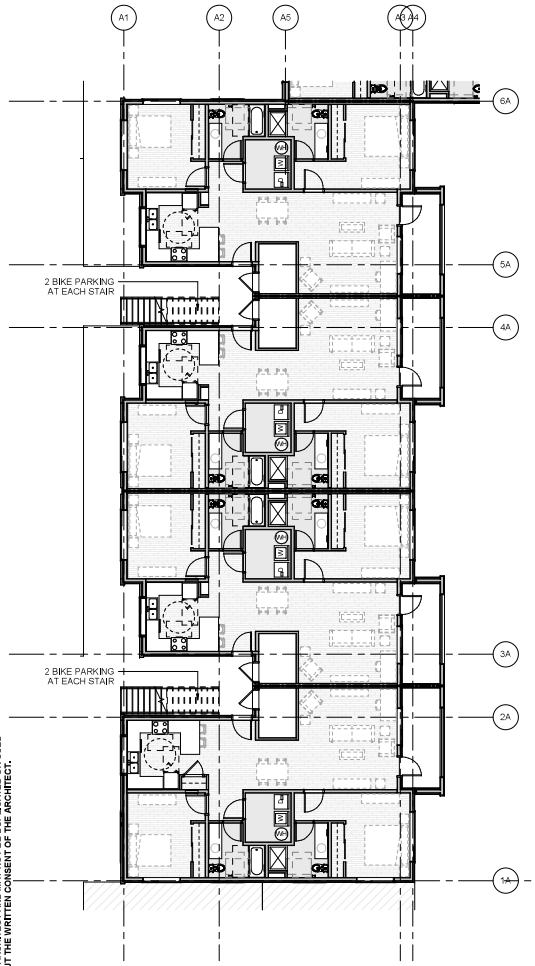
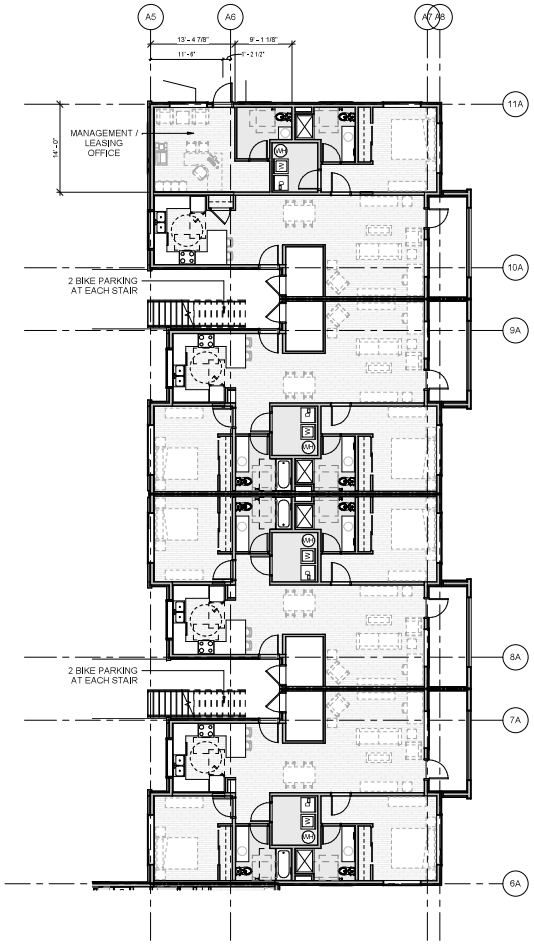
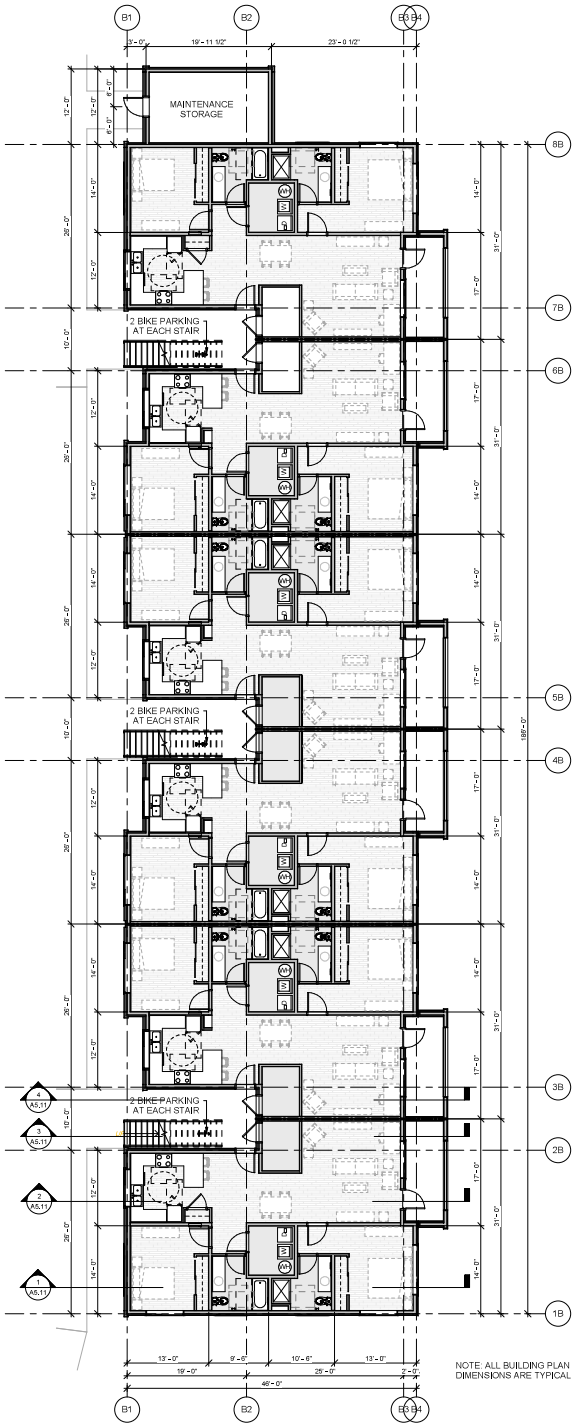


3 LEVEL 1 PLAN - BUILDING A SOUTH
1/8" = 1'-0"



2 LEVEL 1 PLAN - BUILDING A NORTH
1/8" = 1'-0"



1 LEVEL 1 PLAN - BUILDING B
1/8" = 1'-0"

NOTE: ALL BUILDING PLAN DIMENSIONS ARE TYPICAL

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LEGEND

30-MINUTE RATED ASSEMBLY
1 HOUR RATED ASSEMBLY
2 HOUR RATED ASSEMBLY

KEYNOTES 07-02

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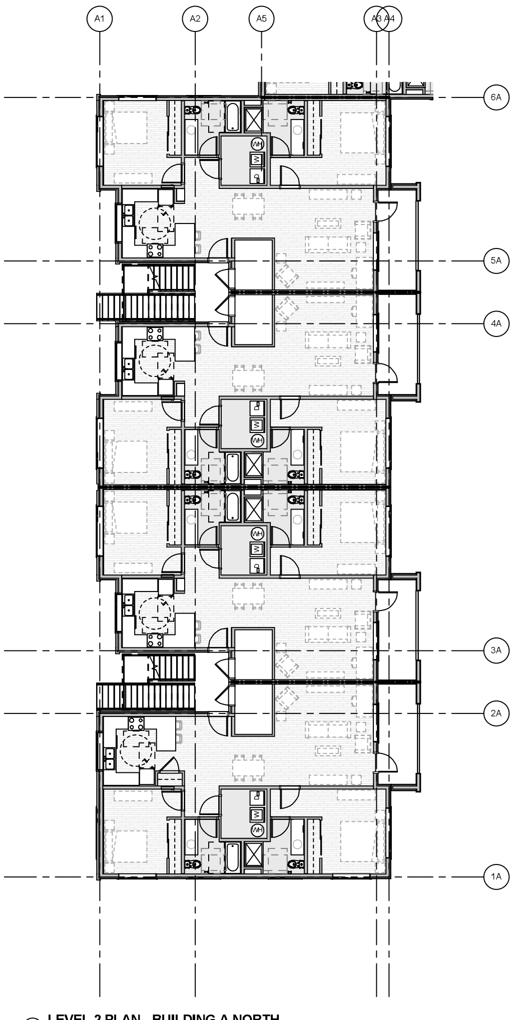
Drawing:

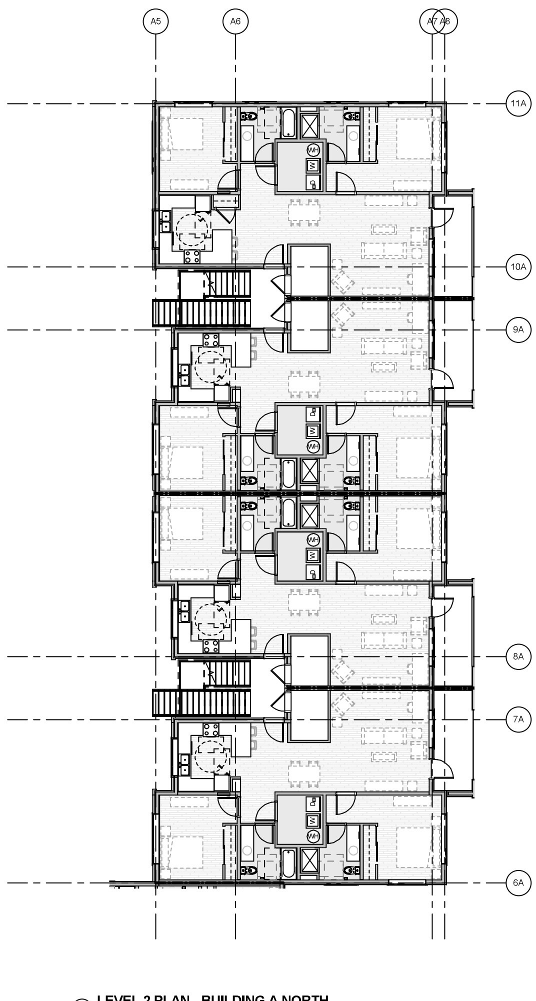
BUILDING PLANS - LEVEL 1

Sheet No:

A2.11



3 **LEVEL 2 PLAN - BUILDING A NORTH**
1/8" = 1'-0"



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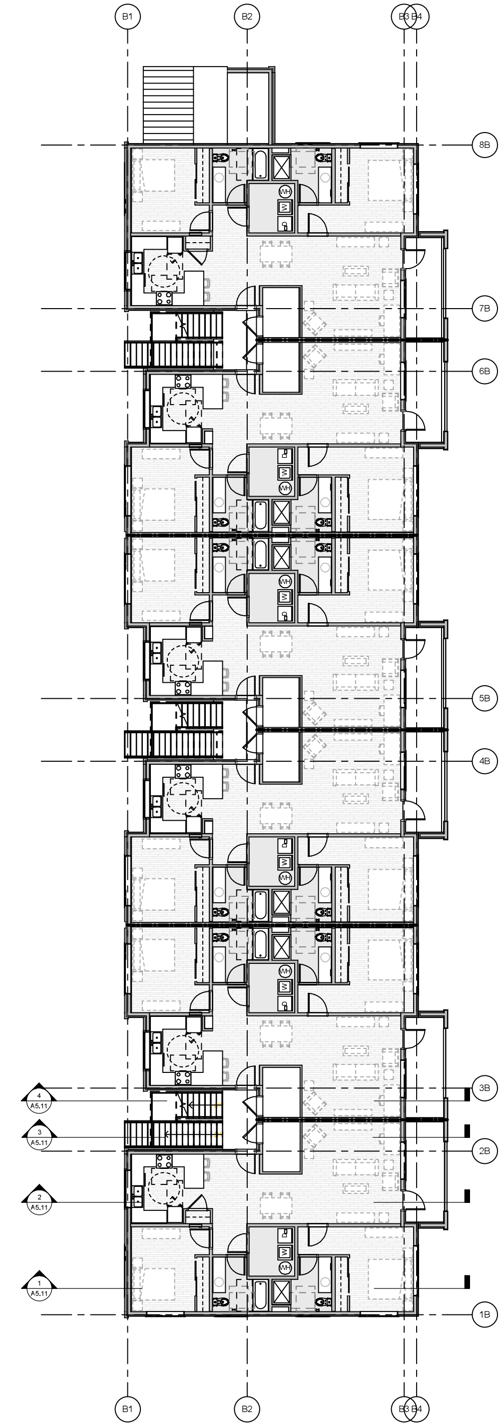

1 **LEVEL 2 PLAN - BUILDING B**
1/8" = 1'-0"

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M. SEE SHEET XXX FOR TYPICAL SUSPENSED CEILING GRID DETAILS.

LEGEND

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1 HOUR RATED ASSEMBLY
2 HOUR RATED ASSEMBLY

KEYNOTES 07-02

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Drawing:
BUILDING PLANS - LEVEL 2

Sheet No:
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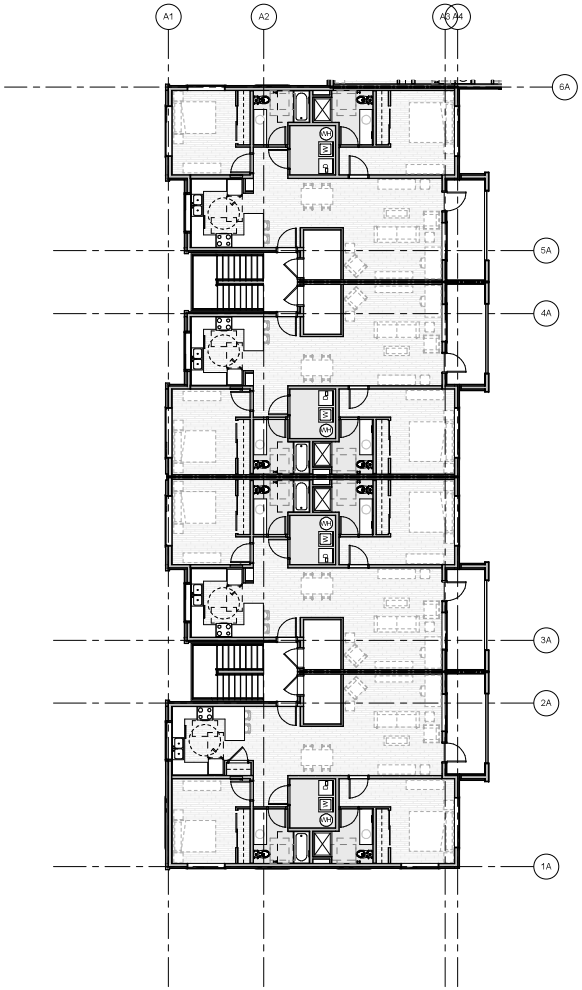
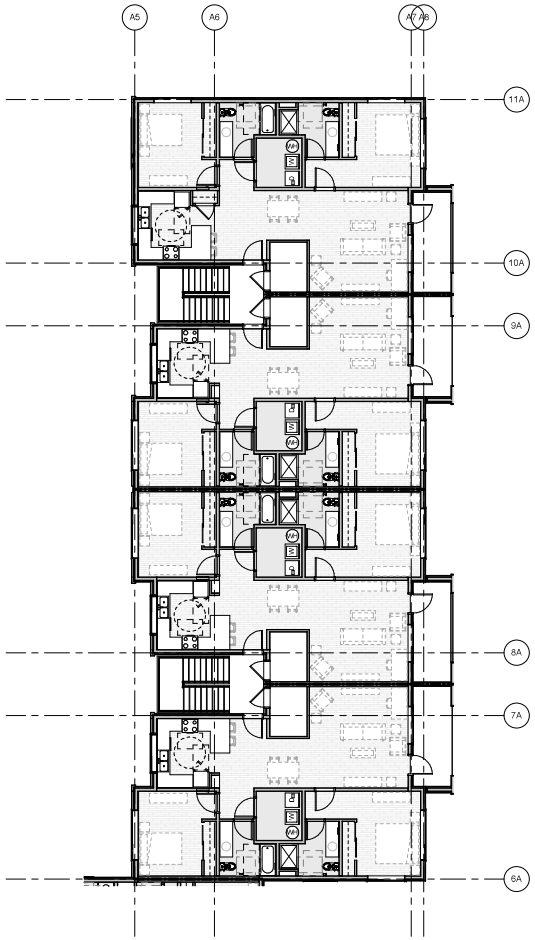


3 LEVEL 3 PLAN - BUILDING A SOUTH
1/8" = 1'-0"



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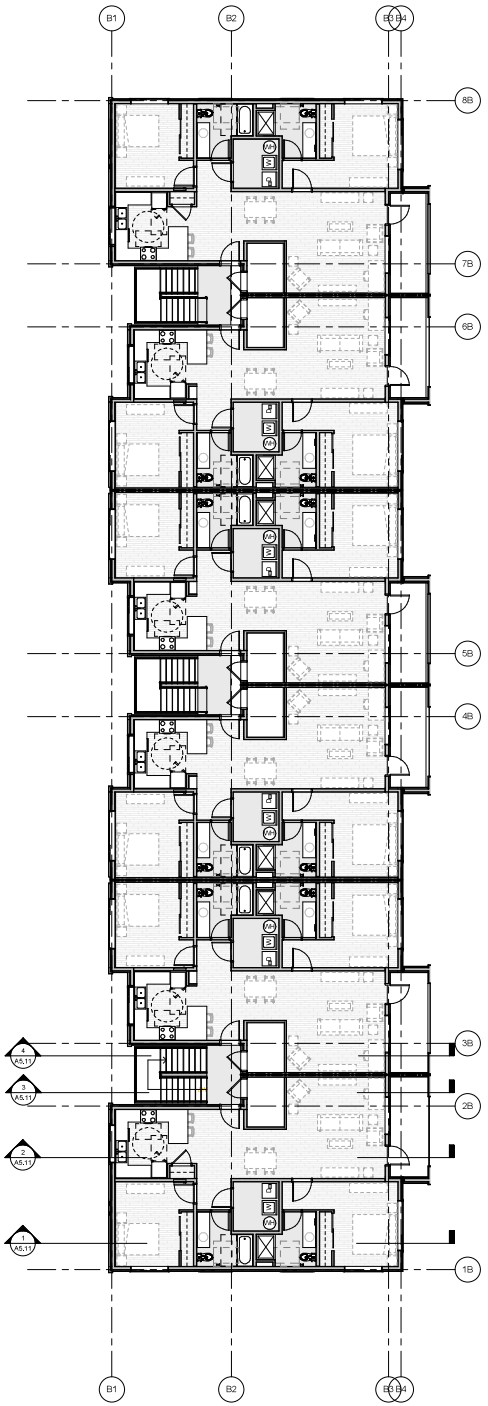

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KEYNOTES 07-020

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Drawing:

BUILDING PLANS - LEVEL 3

Sheet No:

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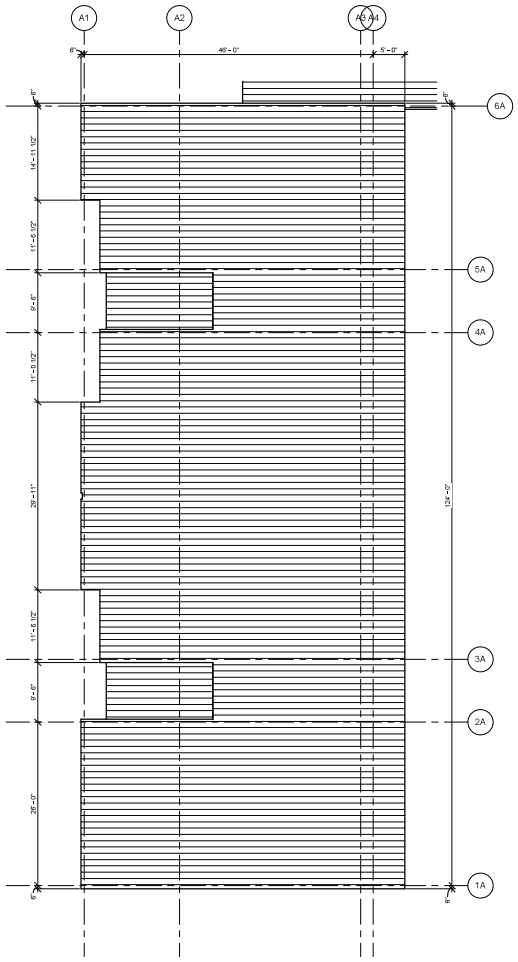
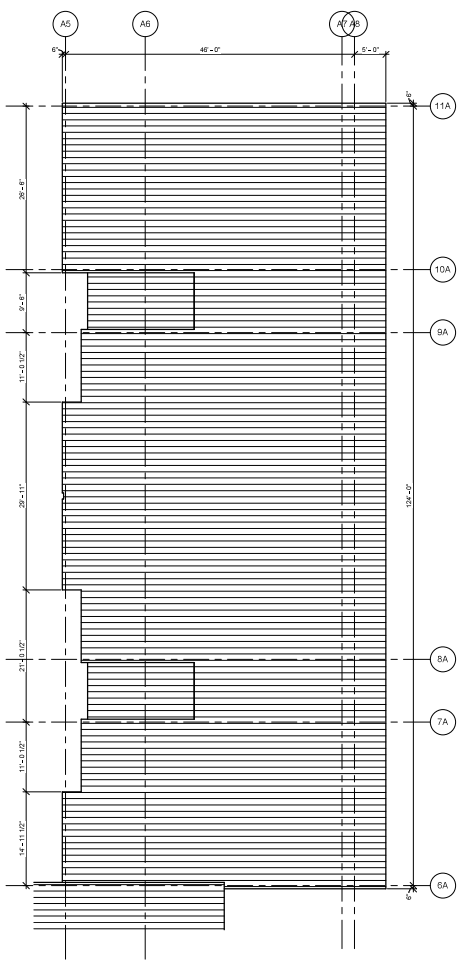


3 ROOF PLAN - BUILDING A NORTH Copy 1
1/8" = 1'-0"



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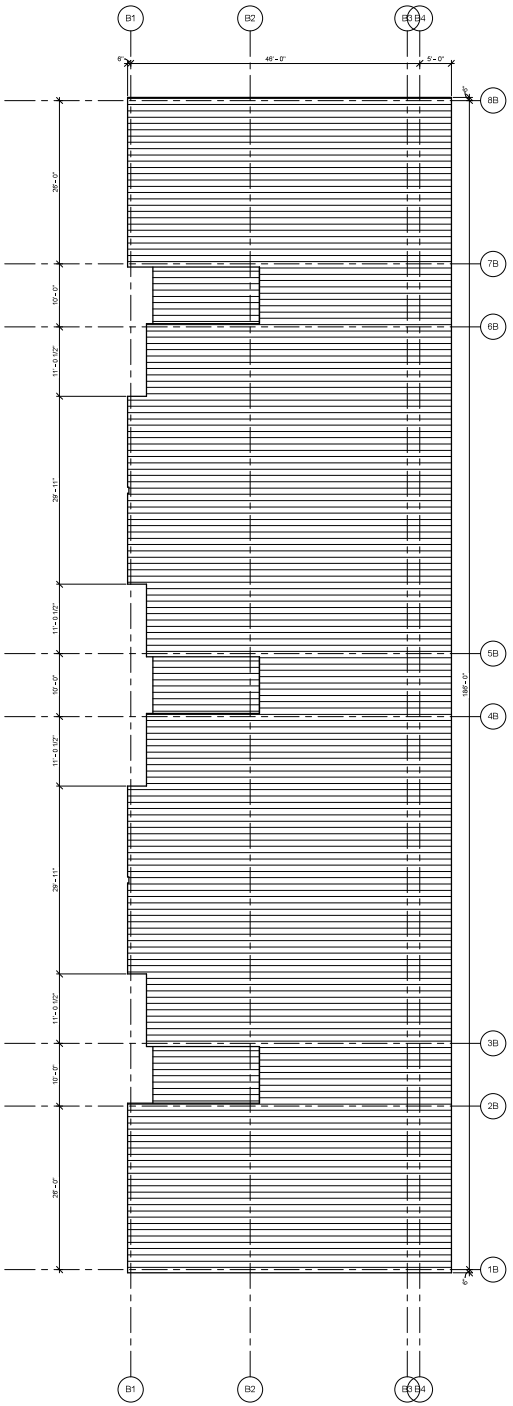

1 ROOF PLAN - BUILDING B
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J. SEE MECHANICAL DRAWINGS FOR DIFFUSER TYPES. CENTER MECH. DIFFUSERS, GRILLES AND ACCESS PANELS IN GRID, ROOM OR SPACE. ALIGN WITH LIGHT FIXTURES WHERE APPLICABLE.
K. SEE MECHANICAL AND PLUMBING FOR REQUIRED ACCESS PANEL LOCATIONS. PAINT MATCH ADJCENT CEILING COLOR.
L. BRACE SUSPENDED CEILINGS PER DETAIL XXXX.
M. SEE SHEET XXX FOR TYPICAL SUSPENSED CEILING GRID DETAILS.

KEYNOTES

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phone: (503) 223-1177 www.scottedwards.com

NOT FOR CONSTRUCTION

MEADOW CREEK APARTMENTS

Job Number: 17021

1306 N. SPRINGBROOK ROAD
NEWBERG, OR 97132

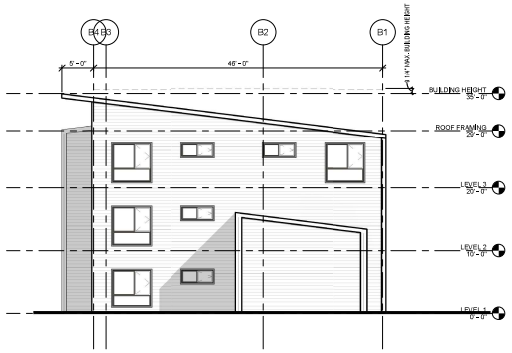
ISSUE	DATE
SITE DESIGN REVIEW	03/30/18

Drawing:

ROOF PLANS

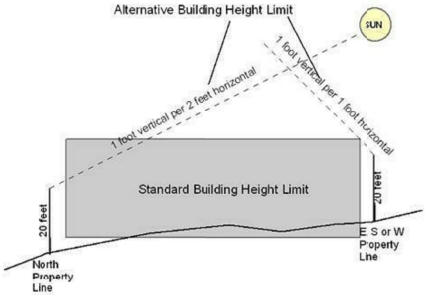
Sheet No:

A2.14

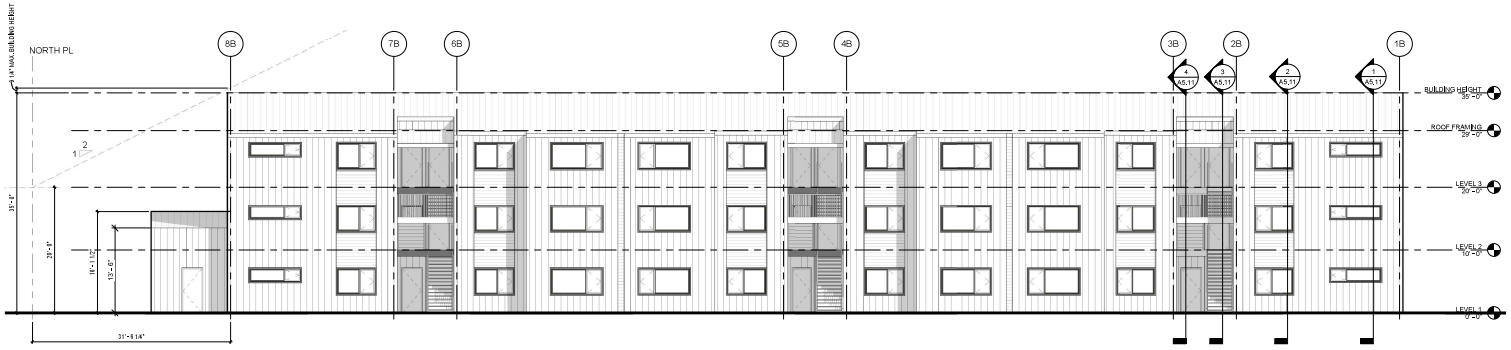


BUILDING B - NORTH ELEVATION - ALTERNATIVE HEIGHT DIAGRAM

4 1/8" = 1'-0"

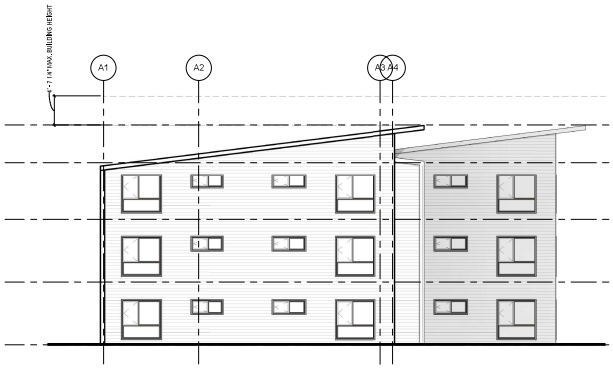


CITY OF NEWBERG ALTERNATIVE BUILDING HEIGHT STANDARD
NMC 15.415.020(E)
DEVELOPMENT CODE APPENDIX A



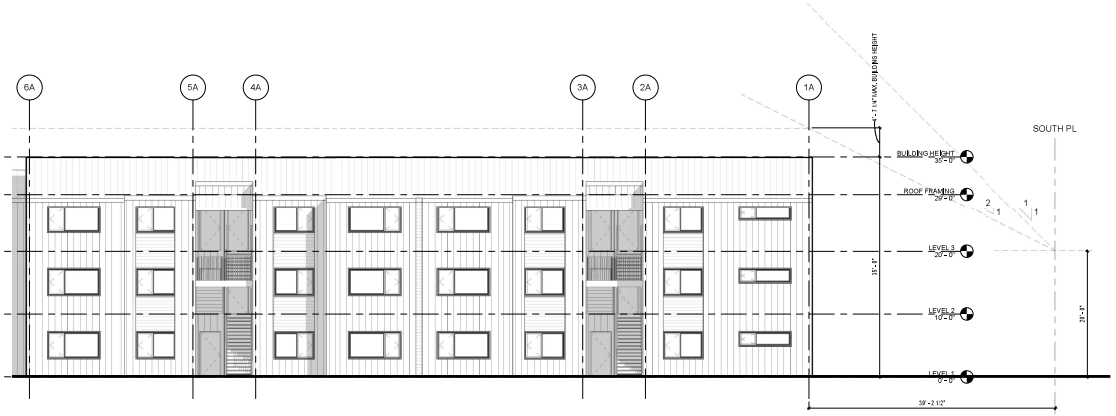
BUILDING B - WEST ELEVATION - ALTERNATIVE HEIGHT DIAGRAM

3 1/8" = 1'-0"



BUILDING A - SOUTH ELEVATION - ALTERNATIVE HEIGHT DIAGRAM

2 1/8" = 1'-0"



BUILDING A SOUTH - WEST ELEVATION - ALTERNATIVE HEIGHT DIAGRAM

1 1/8" = 1'-0"

S|E A
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MEADOW CREEK APARTMENTS

Job Number: 17021

1306 N. SPRINGBROOK ROAD
NEWBERG, OR 97132

ISSUE	DATE
SITE DESIGN REVIEW	03/30/18

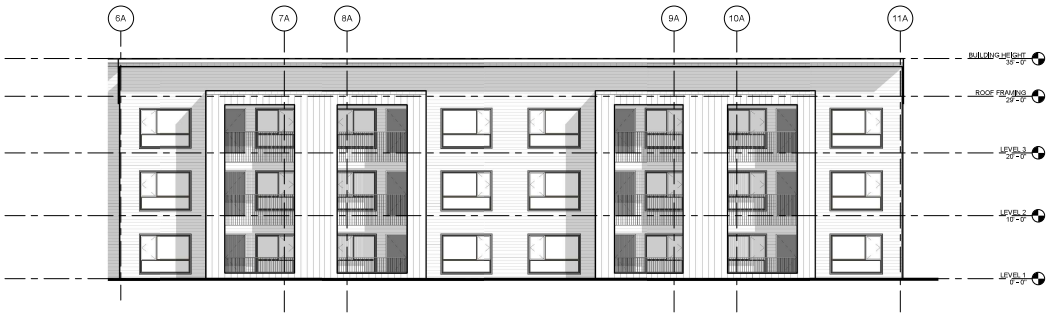
Drawing:

BUILDING HEIGHT DIAGRAMS

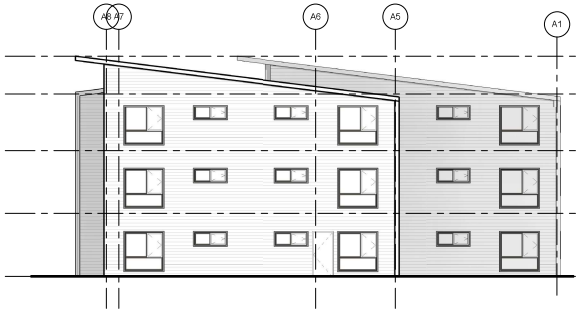
Sheet No:

A3.01

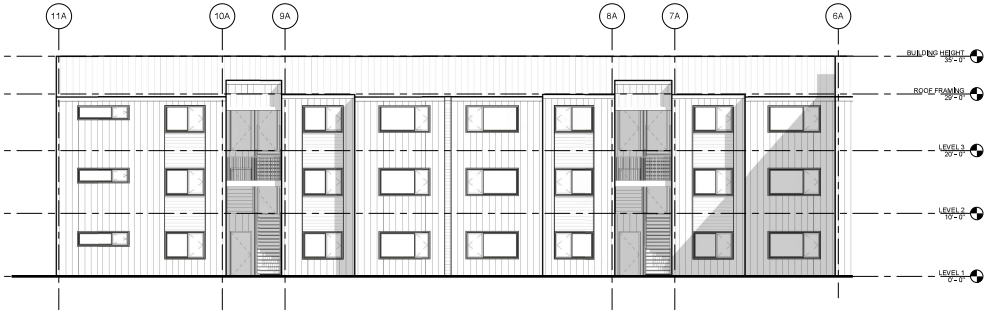
FILE PATH: C:\Revit_Local\17021_Springbrook Phase 1_mbokan.rvt



6 BUILDING A NORTH - EAST ELEVATION
1/8" = 1'-0"

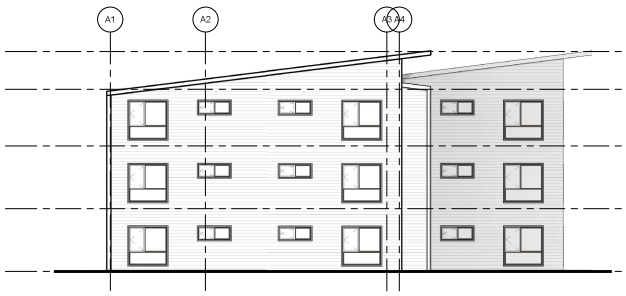


5 BUILDING A NORTH - NORTH ELEVATION
1/8" = 1'-0"



4 BUILDING A NORTH - WEST ELEVATION
1/8" = 1'-0"

3 BUILDING A SOUTH - EAST ELEVATION
1/8" = 1'-0"



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

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

GENERAL SHEET NOTES

A. GENERAL ELEVATION NOTES HERE

KEYNOTES

ELEVATION LEGEND

AEP SPAN METAL PANEL
SELECT SEAM
NARROW BATTEN
FACTORY FINISH

HARDIE CEMENT BOARD
ARTISAN V-GROOVE SIDING
7" EXPOSURE
PAINTED

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MEADOW CREEK APARTMENTS

Job Number: 17021

1306 N. SPRINGBROOK ROAD
NEWBERG, OR 97132

SITE DESIGN REVIEW 03/30/18

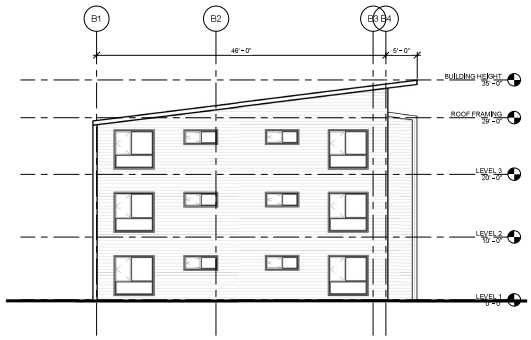
ISSUE DATE

Drawing:

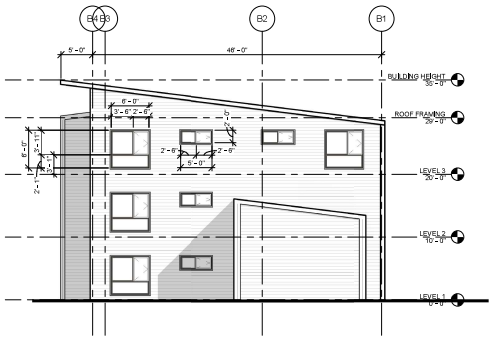
EXTERIOR ELEVATIONS - BUILDING A

Sheet No:

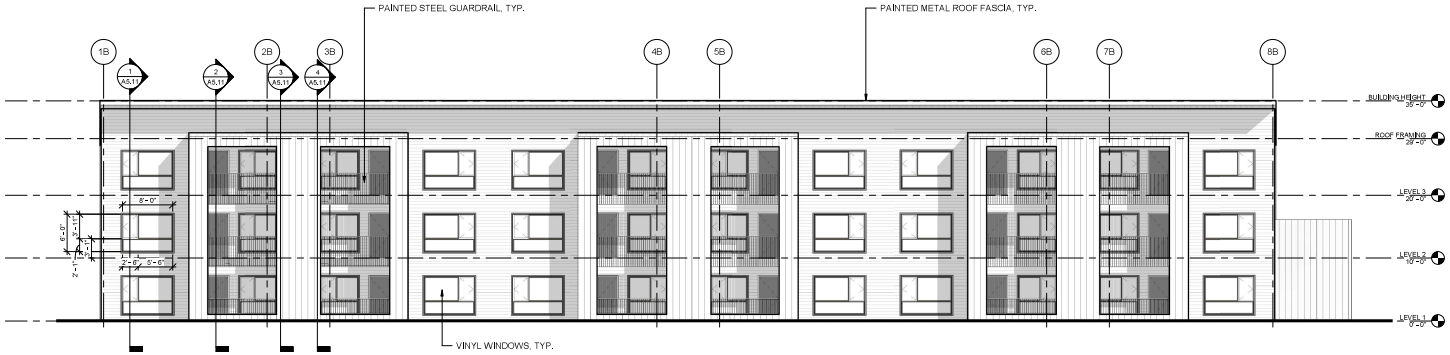
A3.11



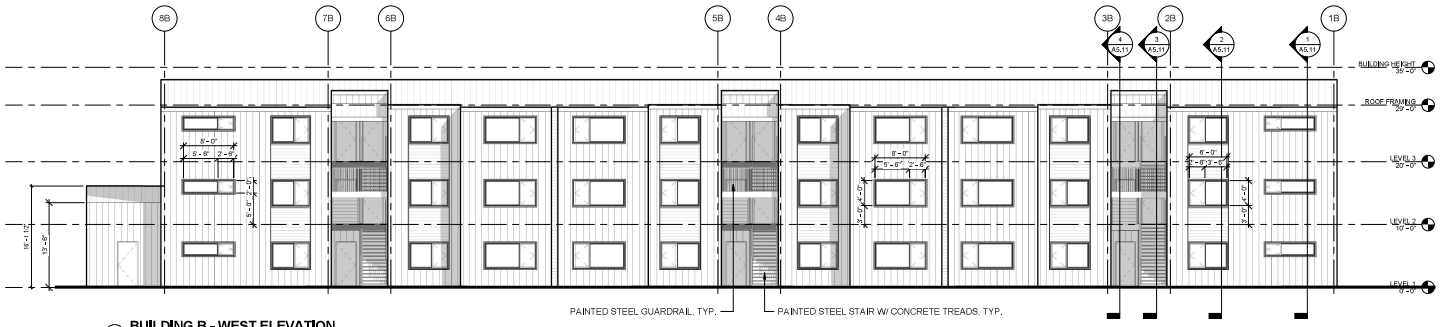
4 BUILDING B - SOUTH ELEVATION
1/8" = 1'-0"



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



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



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

GENERAL SHEET NOTES

A. GENERAL ELEVATION NOTES HERE

KEYNOTES 07-02

ELEVATION LEGEND

AEP SPAN METAL PANEL
SELECT SEAM
NARROW BATTEN
FACTORY FINISH

HARDIE CEMENT BOARD
ARTISAN V-GROOVE SIDING
7" EXPOSURE
PAINTED

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MEADOW CREEK APARTMENTS

Job Number: 17021

1306 N. SPRINGBROOK ROAD
NEWBERG, OR 97132

ISSUE	DATE
SITE DESIGN REVIEW	03/30/18

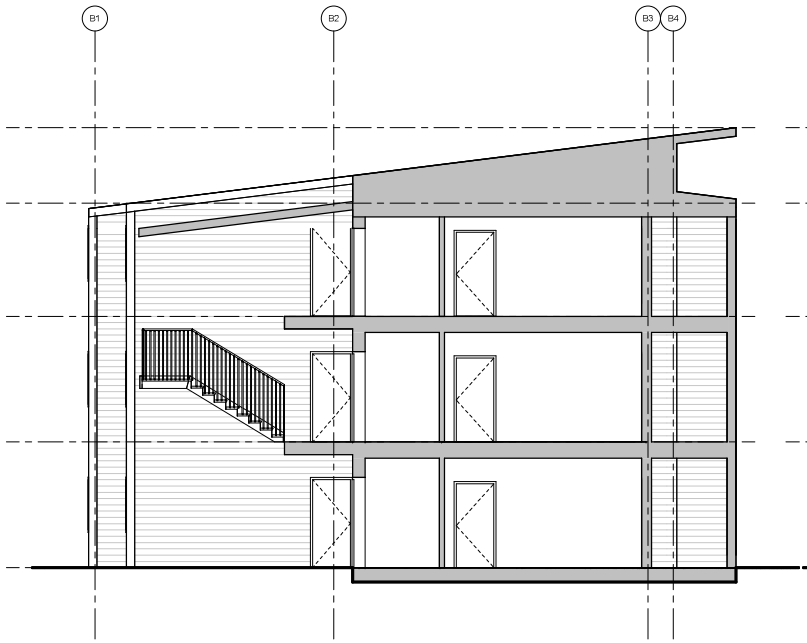
Drawing:

EXTERIOR ELEVATIONS - BUILDING B

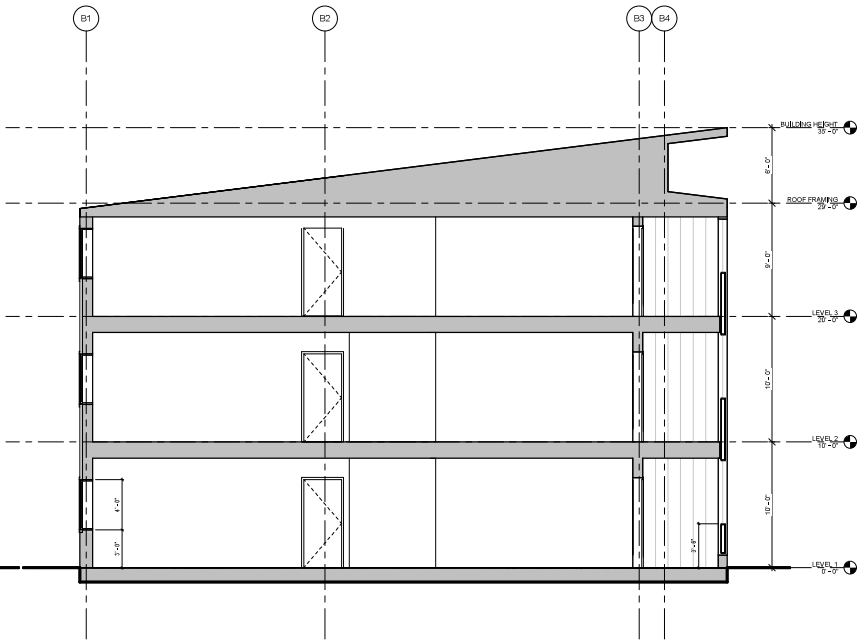
Sheet No:

A3.12

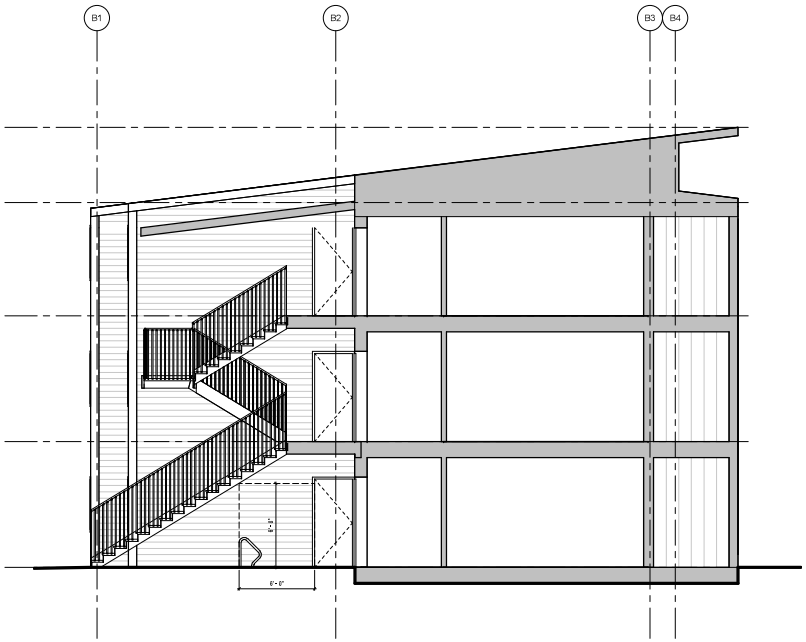
FILE PATH: C:\Revit_Local\17021_Springbrook Phase I_mbokarim.rvt



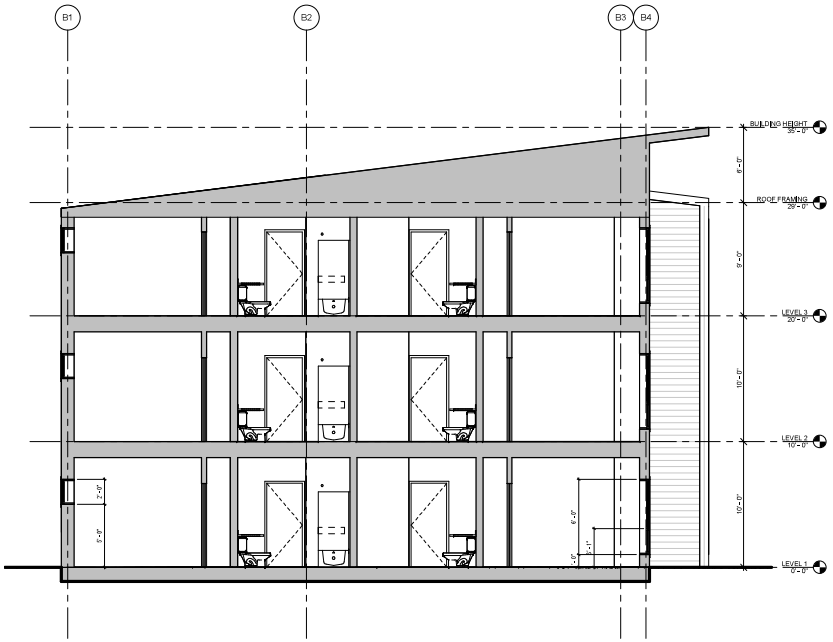
4 TYPICAL SECTION 4
1/4" = 1'-0"



2 TYPICAL SECTION 2
1/4" = 1'-0"



3 TYPICAL SECTION 3
1/4" = 1'-0"



1 TYPICAL SECTION 1
1/4" = 1'-0"

GENERAL SHEET NOTES

A. GENERAL ELEVATION NOTES HERE

KEYNOTES (07-02)

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MEADOW CREEK APARTMENTS

Job Number: 17021

1306 N. SPRINGBROOK ROAD
NEWBERG, OR 97132

ISSUE	DATE
SITE DESIGN REVIEW	03/30/18

Drawing:

BUILDING SECTIONS

Sheet No:

A5.11

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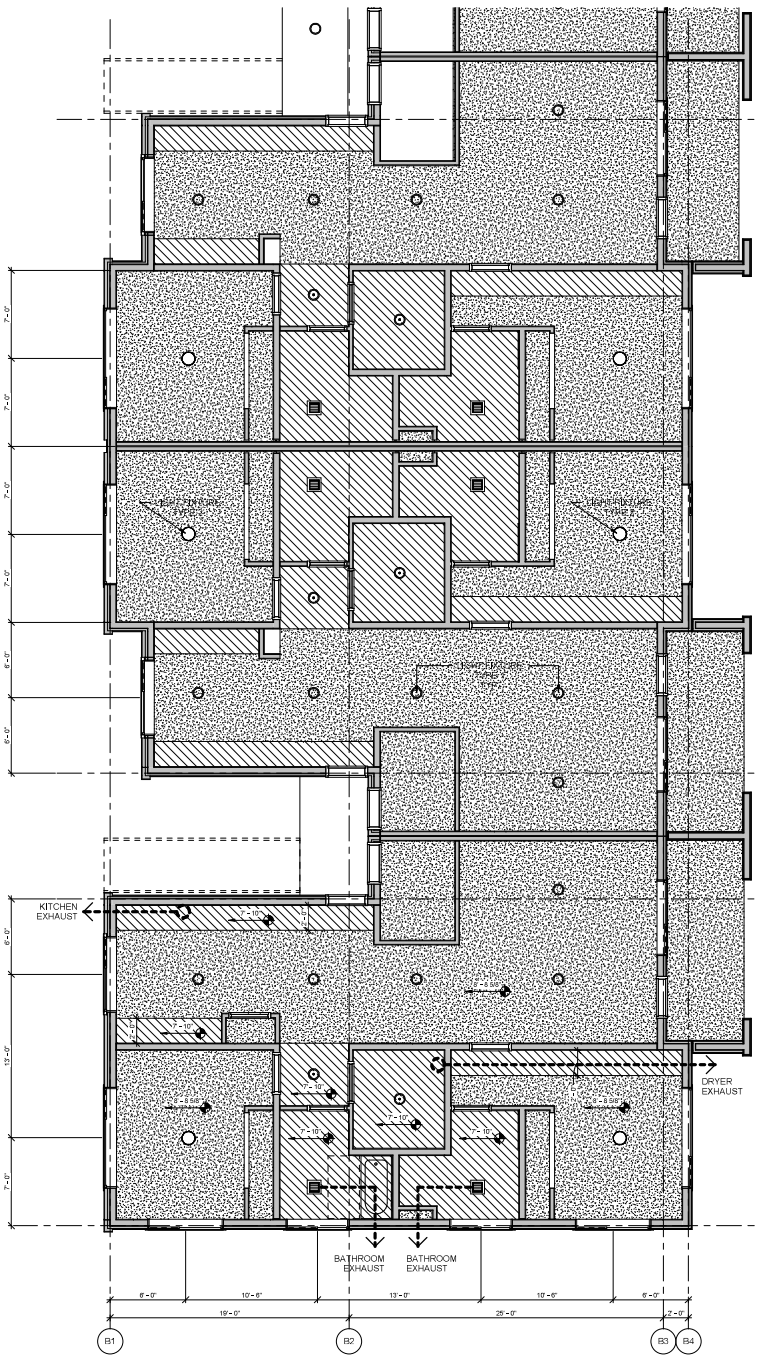
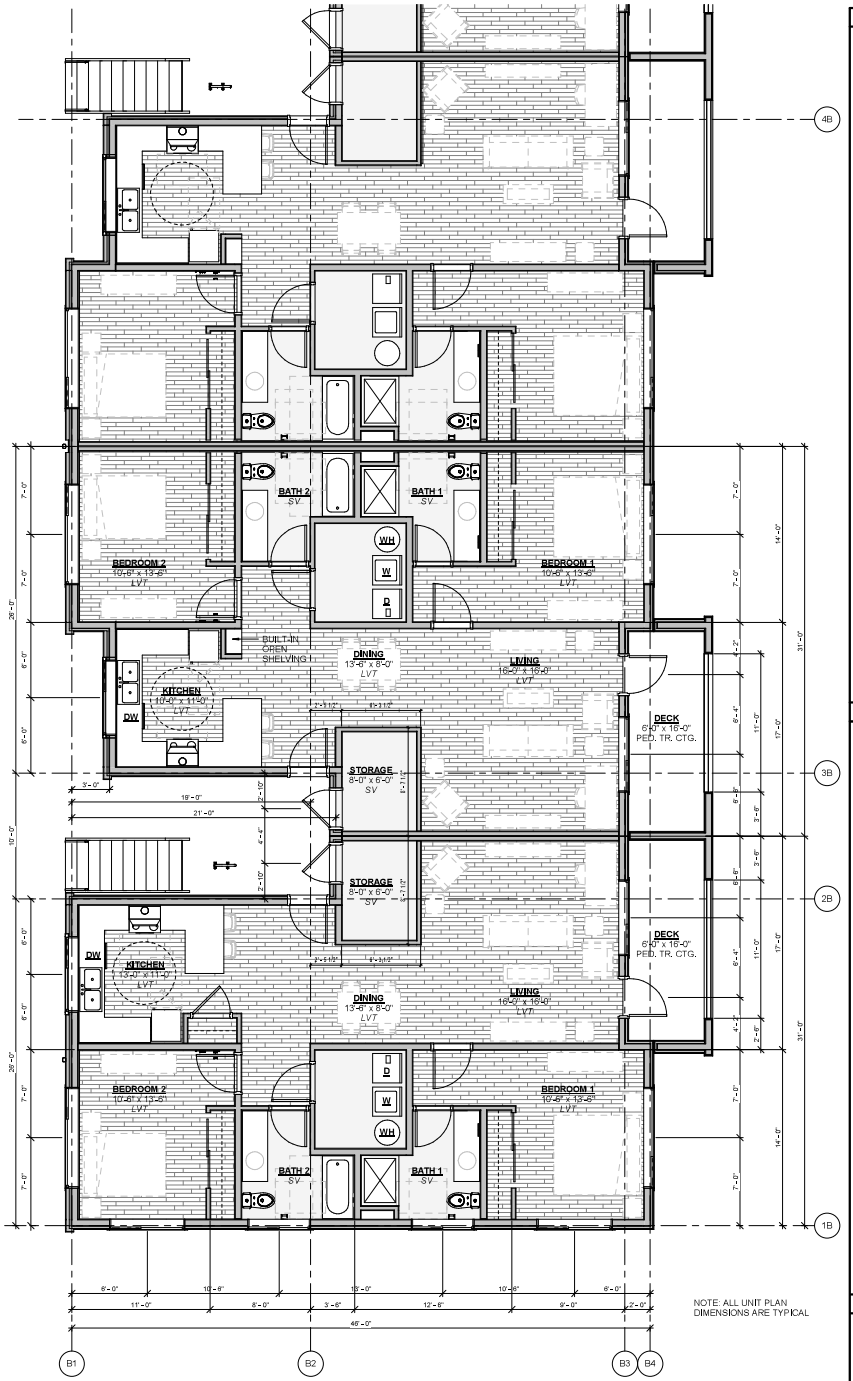


2 FIRST FLOOR REFLECTED CEILING PLAN
1/4" = 1'-0"



NOTE: ALL UNIT PLAN DIMENSIONS ARE TYPICAL

1 ENLARGED UNIT PLANS
1/4" = 1'-0"

GENERAL SHEET NOTES

A. ALL DOOR AND WINDOW DIMENSIONS ARE TO OUTSIDE OF FRAME, TYPICAL.
B. PROVIDE FIRE EXTINGUISHER CABINETS AS SHOWN / SPECIFIED. COORDINATE FINAL LOCATIONS WITH FIRE MARSHALL.
C. ALL INTERIOR WALLS TO BE TYPE XXXX, UNLESS NOTED OTHERWISE.
D. ALL CEILING HEIGHTS ARE FROM FINISH FLOOR ELEVATION.
E. CEILING GRIDS ARE TO BE CENTERED IN ROOMS AS SHOWN OR LOCATED PER INDICATED DIMENSIONS. AVOID LAYOUTS THAT RESULT IN CEILING TILES LESS THAN ONE HALF OF FULL TILE WIDTH.
F. CEILING MOUNTED DEVICES TO BE CENTERED IN CEILING GRIDS AND ALIGNED WITH OTHER DEVICES.
G. FIRE SPRINKLER HEADS AND CEILING MOUNTED DEVICES ARE SHOWN FOR ARCHITECURAL INTENT ONLY IN SELECTED ROOMS. DEVICES NOT SHOWN SHALL NOT BE INTERPRETED AS NOT REQUIRED. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO SATISFY THE REQUIREMENTS OF THE LOCAL JURISDICTION FOR QUANTITY AND LOCATION OF DEVICES THROUGHOUT THE PROJECT. OBTAIN APPROVAL OF THE LAYOUT FROM THE ARCHITECT PRIOR TO INSTALLATION OF ALL SYSTEMS AND DEVICES.
H. VERIFY ALL SPRINKLER HEAD LOCATIONS WITH FIRE PROTECTION DRAWINGS.
I. CENTER LIGHTS IN ROOMS OR SPACES UNLESS DIMENSIONED OTHERWISE.
J. SEE MECHANICAL DRAWINGS FOR DIFFUSER TYPES, CENTER MECH. DIFFUSERS, GRILLES AND ACCESS PANELS IN GRID, ROOM OR SPACE. ALIGN WITH LIGHT FIXTURES WHERE APPLICABLE.
K. SEE MEHCANICAL AND PLUMBING FOR REQUIRED ACCESS PANEL LOCATIONS. PAINT MATCH ADJCENT CEILING COLOR.
L. BRACE SUSPENDED CEILINGS PER DETAIL XXXX.
M. SEE SHEET XXX FOR TYPICAL SUSPENSED CEILING GRID DETAILS.

KEYNOTES

RCP LEGEND

GYPSUM BOARD FLOOR / CEILING ASSEMBLY PAINTED

GYPSUM BOARD DROPPED NON-RATED SOFFITS PAINTED

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MEADOW CREEK APARTMENTS

Job Number: 17021

1306 N. SPRINGBROOK ROAD
NEWBERG, OR 97132

ISSUE	DATE
SITE DESIGN REVIEW	03/30/18

Drawing:

UNIT PLANS

Sheet No:

A6.11

BUILDING B - WEST ELEVATION

Scale : 1/16" = 1'-0"

BUILDING B - EAST ELEVATION

Scale : 1/16" = 1'-0"

BUILDING B - NORTH ELEVATION

Scale : 1/16" = 1'-0"

BUILDING B - SOUTH ELEVATION

Scale : 1/16" = 1'-0"

MEADOW CREEK APARTMENTS

1209 N. Springbrook Road
Newberg, OR 97132
03.30.2018 | Project # 17021

SITE DESIGN REVIEW

Exterior Elevations

0' 4' 8' 16'

S|E A
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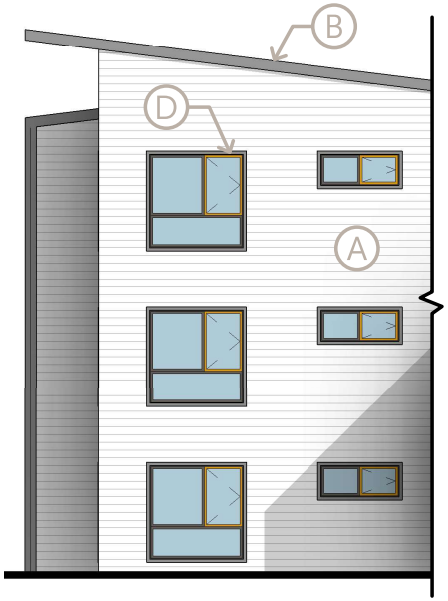
PARTIAL WEST ELEVATION

Scale : 1/8" = 1'-0"

PARTIAL EAST ELEVATION

Scale : 1/8" = 1'-0"

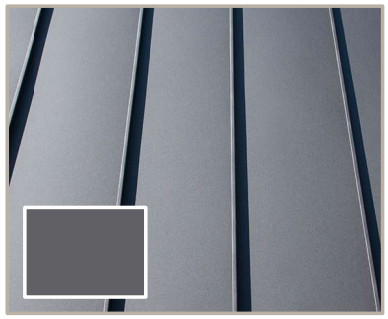


PARTIAL NORTH ELEVATION

Scale : 1/8" = 1'-0"

A Hardie Artisan - V-Groove
Color : Miller Paint 0950 (Ivory Coast)

B AEP Span - Select Seam Narrow
Color : Old Town Gray (Manufacturer)



C Steel Stair w/ Concrete Treads
Color : Miller Paint 0956 (I Love To Boogie)

D VPI Endurance Series - Casement
Color : Dark Bronze w/ MP 0956 Casement

E Steel Guardrail
Color : Miller Paint 0956 (I Love To Boogie)

MEADOW CREEK APARTMENTS

1209 N. Springbrook Road
Newberg, OR 97132
03.30.2018 | Project # 17021

SITE DESIGN REVIEW

Partial Elevations with Material Board

0' 2' 4' 8'

S|E A
SCOTT|EDWARDS ARCHITECTURE LLP

Exhibit B: Land Use Application Forms

TYPE II APPLICATION (LAND USE) -- 2018

File #: _____

TYPES – PLEASE CHECK ONE:

- [X] **Design review**
- [ ] **Tentative Plan for Partition**
- [ ] **Tentative Plan for Subdivision**
- [ ] **Type II Major Modification**
- [ ] **Variance** _____
- [ ] **Other: (Explain)** _____

APPLICANT INFORMATION:

APPLICANT: MJG Development, Inc
ADDRESS: 901 North Brutscher Street, Suite 206, Newberg, OR 97132
EMAIL ADDRESS: _____
PHONE: _____ MOBILE: _____ FAX: _____
OWNER (if different from above): Same PHONE: (503)563-6151
ADDRESS: _____
ENGINEER/SURVEYOR: AKS Engineering and Forestry (~~Chuck Gregory, PE~~ Mimi Doukas - Contact) PHONE: (503)563-6151
ADDRESS: 12965 SW Herman Road, Suite 100, Tualatin, OR 97062

GENERAL INFORMATION:

PROJECT NAME: Meadow Creek Apartments - Phase I PROJECT LOCATION: North Springbrook Road (no address)
PROJECT DESCRIPTION/USE: Site Design Review - Phase I Apartment Complex PROJECT VALUATION: $6,700,000 (est.)
MAP/TAX LOT NO. (i.e.3200AB-400): 3216CB 00200 (adjusted) ZONE: R-2 SITE SIZE: +/-3.18 SQ. FT. ☐ ACRE ☒
COMP PLAN DESIGNATION: MDR TOPOGRAPHY: Flat
CURRENT USE: Vacant Field
SURROUNDING USES:
NORTH: Residential SOUTH: Mixed Commercial
EAST: Open Space/Residential WEST: Springbrook Road/Mixed Residential

SPECIFIC PROJECT CRITERIA AND REQUIREMENTS ARE ATTACHED

General Checklist: ☑ Fees ☑ Public Notice Information ☑ Current Title Report ☑ Written Criteria Response ☑ Owner Signature

For detailed checklists, applicable criteria for the written criteria response, and number of copies per application type, turn to:

The above statements and information herein contained are in all respects true, complete, and correct to the best of my knowledge and belief. Tentative plans must substantially conform to all standards, regulations, and procedures officially adopted by the City of Newberg. All owners must sign the application or submit letters of consent. Incomplete or missing information may delay the approval process.

Carl Goodrich 3/14/18
Applicant Signature Date

Mike Goodrich
Print Name

Carl Goodrich 3/14/18
Owner Signature Date

Mike Goodrich
Print Name

Attachments: General Information, Fee Schedule, Criteria, Checklists

City of Newberg
414 E. First Street
Newberg,OR 97132

INVOICE #
INV-396
Date Due: 4/26/2018

MJG DEVELOPMENT
901 N. Brutscher Rd. PMB #D352
NEWBERG, OR 97132

Meadow Creek Apartments - Phase I

Invoice Date: 3/27/2018

Record #	Record Type	Fee Group	Fee Description	Quantity	Amount
DR218-0003	DESIGN REVIEW - TYPE 2		DESIGN REVIEW	6700000	$40,200.00
			DEVELOPMENT REVIEW	2.18	$828.70
			TECHNOLOGY FEE	0	$2,051.44
					$43,080.14

Invoice Total: $43,080.14

Please send your payment to this address:
City of Newberg Community Development Department
PO Box 970
Newberg, OR 97132

§15.220.050 - TYPE II DESIGN REVIEW CRITERIA

Type II Site Design Review applies to the following activities:

- ·Any new development or remodel which is not specifically identified within Newberg Development Code § 15.220.020(A)(1).
- ·Telecommunication facilities.

The following development activities are exempt from Type II standards:

- ·Replacement of an existing item such as a roof, floor, door, window or siding.
- ·Plumbing and/or mechanical alterations which are completely internal to an existing structure.

Provide a written response that specifies how your project meets the following criteria:

✓ (1) *Design Compatibility. The proposed design review request incorporates an architectural design which is compatible with and/or superior to existing or proposed uses and structures in the surrounding area. This shall include, but not be limited to, building architecture, materials, colors, roof design, landscape design, and signage*.

✓ (2) *Parking and On-Site Circulation. Parking areas shall meet the requirements of NMC 15.440.010. Parking studies may be required to determine if adequate parking and circulation are provided for uses not specifically identified in NMC 15.440.010. Provisions shall be made to provide efficient and adequate on-site circulation without using the public streets as part of the parking lot circulation pattern. Parking areas shall be designed so that vehicles can efficiently enter and exit the public streets with a minimum impact on the functioning of the public street*.

✓ (3) *Setbacks and General Requirements. The proposal shall comply with NMC 15.415.010 through 15.415.060 dealing with height restrictions and public access; and NMC 15.405.010 through 15.405.040 and 15.410.010 through 15.410.070 dealing with setbacks, coverage, vision clearance, and yard requirements*

✓ (4) *Landscaping Requirements. The proposal shall comply with NMC 15.420.010 dealing with landscape requirements and landscape screening.*

✓ (5) *Signs. Signs shall comply with NMC 15.435.010 et seq. dealing with signs.*

NA (6) *Manufactured Dwelling, Mobile Home and RV Parks. Manufactured dwelling and mobile home parks shall also comply with the standards listed in NMC 15.445.075 through 15.445.100 in addition to the other clear and objective criteria listed in this section. RV parks also shall comply with NMC 15.445.170 in addition to the other criteria listed in this section.*

✓ (7) *Zoning District Compliance. The proposed use shall be listed as a permitted or conditionally permitted use in the zoning district in which it is located as found in NMC 15.305.010 through 15.336.020. Through this site review process, the director may make a determination that a use is determined to be similar to those listed in the applicable zoning district, if it is not already specifically listed. In this case, the director shall make a finding that the use shall not have any different or more detrimental effects upon the adjoining neighborhood area than those specifically listed.*

✓ (8) *Sub district Compliance. Properties located within subdistricts shall comply with the provisions of those subdistricts located in NMC 15.340.010 through 15.348.060.*

✓ (9) *Alternative Circulation, Roadway Frontage Improvements and Utility Improvements. Where applicable, new developments shall provide for access for vehicles and pedestrians to adjacent properties which are currently developed or will be developed in the future. This may be accomplished through the provision of local public streets or private access and utility easements. At the time of development of a parcel, provisions shall be made to develop the adjacent street frontage in accordance with city street standards and the standards contained in the transportation plan. At the discretion of the city, these improvements may be deferred through use of a deferred improvement agreement or other form of security.*

✓ (10) *Traffic Study Improvements. If a traffic study is required, improvements identified in the traffic study shall be implemented as required by the director. [Ord. 2763 § 1 (Exh. A § 7), 9-16-13; Ord. 2747 § 1 (Exh. A § 5), 9-6-11; Ord. 2451, 12-2-96. Code 2001 § 151.194.]*

DESIGN REVIEW CHECKLIST

The following items must be submitted with each application. Incomplete applications will not be processed. Incomplete or missing information may delay the review process. Check with the Planning Division regarding additional requirements for your project.

☑ **FEES**

☑ PUBLIC **NOTICE INFORMATION –** Draft of mailer notice and sign; mailing list of all properties within 500'.

☑ **CURRENT TITLE REPORT** (within 60 days old)

NOTE: Site is involved in recent property line adjustment - Current vesting deeds provided.

Submit one original 8 ½″ x 11″ or 11″ x 17″ reproducible document together with 18 copies of the following information. In addition, submit two (2) full size copies of all plans.

☑ **WRITTEN CRITERIA RESPONSE –** Address the criteria listed on page 12.

☑ **SITE DEVELOPMENT PLAN**. Make sure the plans are prepared so that they are at least 8 ½ x 11 inches in size and the scale is standard, being 10, 20, 30, 40, 50, 100 or multiples of 100 to the inch (such as 1":10', 1":20' or other multiples of 10). Include the following information in the plan set (information may be shown on multiple pages):

- ☑ Existing Site Features: Show existing landscaping, grades, slopes, wetlands and structures on the site and for areas within 100' of the site. Indicate items to be preserved and removed.
- ☑ Drainage & Grading: Show the direction and location of on and off-site drainage on the plans. This shall include site drainage, parking lot drainage, size and location of storm drain lines, and any retention or detention facilities necessary for the project. Provide an engineered grading plan if necessary. A preliminary storm water report is required (see Public works Design and Construction standards).
- ☑ Utilities: Show the location of and access to all public and private utilities, including sewer, water, storm water and any overhead utilities.
- ☑ Public Improvements: Indicate any public improvements that will be constructed as part of the project, including sidewalks, roadways, and utilities.
- ☑ Access, Parking, and Circulation: Show proposed vehicular and pedestrian circulation, parking spaces, parking aisles, and the location and number of access points from adjacent streets. Provide dimensions for parking aisles, back-up areas, and other items as appropriate. Indicate where required bicycle parking will be provided on the site along with the dimensions of the parking spaces.
- ☑ Site Features: Indicate the location and design of all on-site buildings and other facilities such as mail delivery, trash disposal, above ground utilities, loading areas, and outdoor recreation areas. Include appropriate buffering and screening as required by the code.
- ☑ Exterior Lighting Plan: Show all exterior lighting, including the direction of the lighting, size and type of fixtures, and an indication of the amount of lighting using foot candles for analysis.
- ☑ Landscape Plan: Include a comprehensive plan that indicates the size, species and locations of all planned landscaping for the site. The landscape plan should have a legend that indicates the common and botanical names of plants, quantity and spacing, size (caliper, height, or container size), planned landscaping materials, and description of the irrigation system. Include a calculation of the percentage of landscaped area.
- ☑ ADA Plan Compliance: Indicate compliance with any applicable ADA provisions, including the location of accessible parking spaces, accessible routes from the entrance to the public way, and ramps for wheelchairs.
- ☑ Architectural Drawings: Provide floor plans and elevations for all planned structures.
- ☑ Signs and Graphics: Show the location, size, colors, materials, and lighting of all exterior signs, graphics or other informational or directional features if applicable.
- □ Other: Show any other site elements which will assist in the evaluation of the site and the project.

☐ **TRAFFIC STUDY** *No traffic study required. Threshold not met. See narrative repsonses.

N/A* A traffic study shall be submitted for any project that generates in excess of forty (40) trips per p.m. peak hour. This requirement may be waived by the Director when a determination is made that a previous traffic study adequately addresses the proposal and/or when off-site and frontage improvements have already been completed which adequately mitigate any traffic impacts and/or the proposed use is not in a location which is adjacent to an intersection which is functioning at a poor level of service. A traffic study may be required by the Director for projects below forty (40) trips per p.m. peak hour where the use is located immediately adjacent to an intersection functioning at a poor level of service.

Exhibit C: Property Title Information

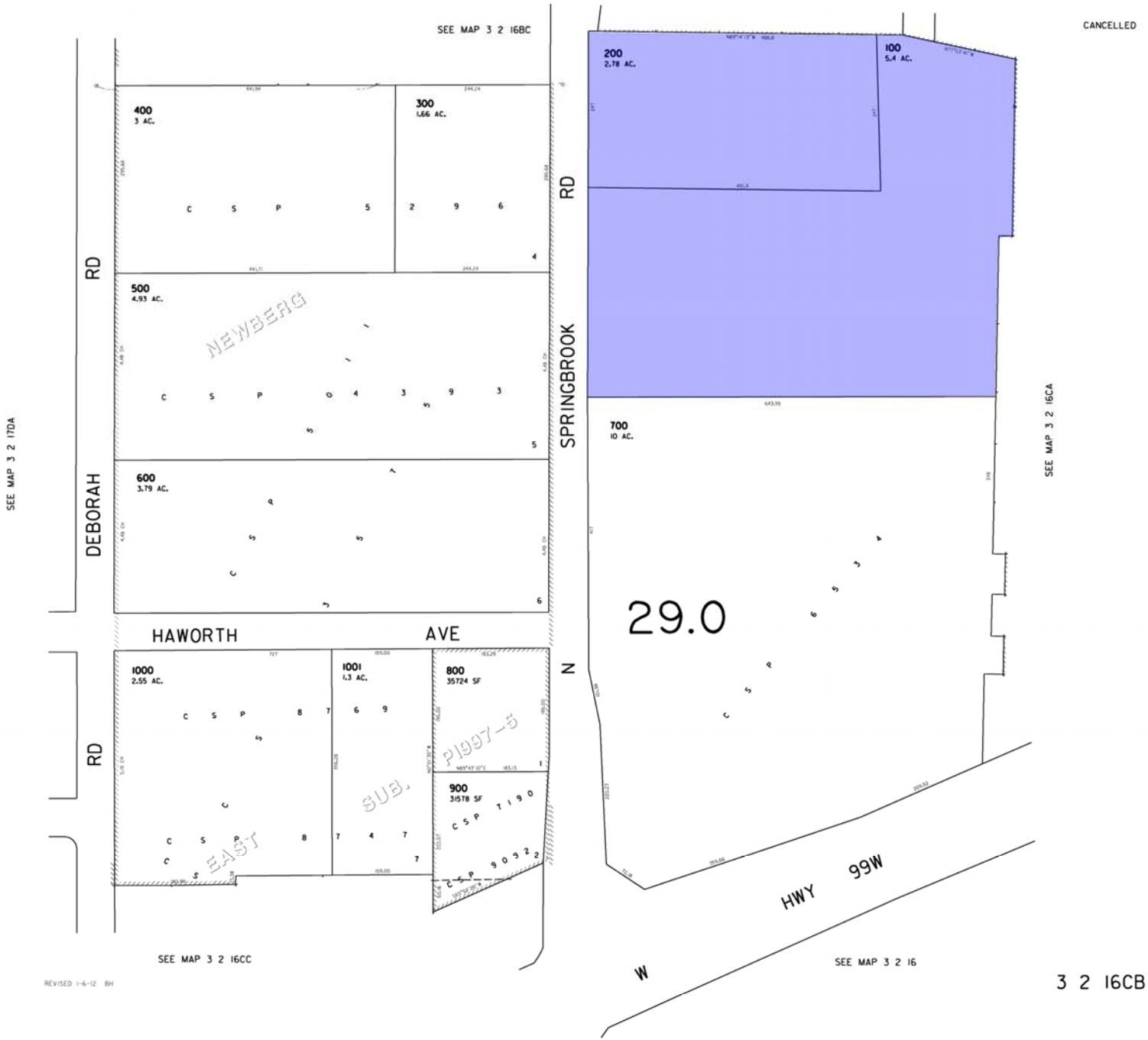
THIS MAP WAS PREPARED FOR ASSESSMENT PURPOSE ONLY

NW 1/4 SW 1/4 SEC 16 T3S R2W W.M.
YAMHILL COUNTY

1" = 100'

3 2 16CB
NEWBERG

CANCELLED



REVISED 1-6-12 BH

3 2 16CB

AFTER RECORDING, RETURN TO:
MJG Development, Inc.
901 N. Brutscher St., Suite 206
Newberg, OR 97132

UNTIL A CHANGE IS REQUESTED, SEND ALL TAX STATEMENTS TO:
MJG Development, Inc.
901 N. Brutscher St., Suite 206
Newberg, OR 97132

FIRST AMERICAN TITLE 28250 17

Yamhill County Official Records **201707290**
DMR-DDMR
Stn=0 SUTTONS **05/04/2017 10:13:00 AM**
4Pgs $20.00 $11.00 $5.00 $20.00 **$56.00**

I, Brian Van Bergen, County Clerk for Yamhill County, Oregon, certify that the instrument identified herein was recorded in the Clerk records.
Brian Van Bergen - County Clerk

SPACE ABOVE THIS LINE FOR RECORDER'S USE

STATUTORY SPECIAL WARRANTY DEED

George Kenneth Austin, Jr., Trustee of the George Kenneth Austin, Jr. Trust and **George K. Austin Jr., Trustee of the Joan D. Austin Share C Trust**, Grantor, conveys and specially warrants to **MJG Development, Inc., an Oregon corporation**, Grantee, the real property described on Exhibit A attached hereto, free of encumbrances created or suffered by Grantor, except as set forth on Exhibit B attached hereto.

The true consideration for this conveyance is Eight Hundred Thousand and no/100 DOLLARS ($800,000.00).

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.

IN WITNESS WHEREOF, Grantor has executed this Statutory Special Warranty Deed this 26th day of April, 2017.

GRANTOR:

George Kenneth Austin J
George Kenneth Austin, Jr., Trustee of the George Kenneth Austin, Jr. Trust

George K. Austin J.
George K. Austin, Jr., Trustee of the Joan D. Austin Share C Trust

STATE OF OREGON)
)ss.
County of YAMHILL)

This record was acknowledged before me on April 26, 2017 by George Kenneth Austin, Jr., Trustee of the George Kenneth Austin, Jr. Trust.

OFFICIAL STAMP
LISA ANNE THOMPSON
NOTARY PUBLIC - OREGON
COMMISSION NO 935112
MY COMMISSION EXPIRES JANUARY 11, 2019

Notary Public for OREGON
My Commission Expires: JAN. 11, 2019

STATE OF OREGON)
)ss.
County of YAMHILL)

This record was acknowledged before me on April 26, 2017 by George K. Austin, Jr., Trustee of the Joan D. Austin Share C Trust.

OFFICIAL STAMP
LISA ANNE THOMPSON
NOTARY PUBLIC - OREGON
COMMISSION NO 935112
MY COMMISSION EXPIRES JANUARY 11, 2019

Notary Public for OREGON
My Commission Expires: JAN. 11, 2019

EXHIBIT A
TO
STATUTORY SPECIAL WARRANTY DEED

Real Property Description

Real property in the County of Yamhill, State of Oregon, described as follows:

Parcel 1: Part of the Sebastian Brutscher Donation Land Claim in Section 16, Township 3 South, Range 2 West of the Willamette Meridian in Yamhill County, Oregon, more particularly described as follows: BEGINNING at an iron pipe 1324.0 feet South and 35.6 feet East of the Northwest corner of Brutscher Donation Land Claim; thence South 89°00' East, 491.4 feet to an iron pipe; thence North 01°00' East 247.0 feet to an iron pipe; thence North 89°00' West, 488.8 feet to an iron pipe set on the Easterly margin of Market Road, the said iron pipe being 42.5 feet East of the West line of said Brutscher Donation Land Claim; thence South along the Easterly margin of said Market Road, 247.0 feet to the place of beginning.

Parcel 2: Part of the Sebastian Brutscher Donation Land Claim in Section 16, Township 3 South, Range 2 West of the Willamette Meridian in Yamhill County, Oregon, more particularly described as follows: BEGINNING at Northwest corner of the Sebastian Brutscher Donation Land Claim No. 51, Township 3 South, Range 2 West of the Willamette Meridian, Yamhill County, Oregon; thence Southerly along the West line of said Claim 1324 feet; thence South 89° East 35.6 feet to the true point of beginning of the property to be described; thence South 89°00' East 491.4 feet; thence North 01° 00' East 247 feet; thence South 78°00' East 181 feet; thence South 01'00' West 285 feet; thence North 89°00' West 20 feet; thence South 01°00' West 244.41 feet; thence North 89°49'39" West 623 feet; thence North 00°10'21" West 238.3 feet to the point of beginning.

NOTE: This legal description was created prior to January 01, 2008

EXHIBIT B
TO
STATUTORY SPECIAL WARRANTY DEED

Permitted Exceptions

1. Zoning ordinances, building restrictions, real property taxes not yet due and payable, and reservations in federal patents and state deeds.

2. Water rights, claims to water or title to water, whether or not such rights are a matter of public record.

3. City liens, if any, of the City of Newberg.

4. The rights of the public in and to that portion of the premises herein described lying within the limits of streets, roads and highways.

5. Easement, including the terms and provisions contained therein:
Recording Information: January 16, 1976 in Film Volume 110, Page 373, Deed and Mortgage Records
In favor of: J. Gregcin Inc.
For: Right of Way

AKS ENGINEERING & FORESTRY, LLC
12965 SW Herman Road, Suite 100, Tualatin, OR 97062
P: (503) 563-6151 F: (503) 563-6152
OFFICES IN: TUALATIN, OR - VANCOUVER, WA - KEIZER, OR - BEND, OR

AKS Job #5797

EXHIBIT A

Adjusted Tax Lot 100

A tract of land located in the Sebastian Brutscher D.L.C. in the Southwest One-Quarter of Section 16, Township 3 South, Range 2 West, Willamette Meridian, City of Newberg, Yamhill County, Oregon, and being more particularly described as follows:

Beginning at the southeasterly corner of Lot 14, Block 10 of the Plat "Spring Meadow Subdivision Stage 1B" being a 5/8" iron rod inside a 2" iron pipe, also being on the westerly line of the Plat "Spring Meadow Subdivision Stage 1A"; thence along said westerly line and the westerly line of the Plat of "Newall's Addition" South 02°43'42" West 284.99 feet to the northerly line of that tract of land described in Document Number 2005-13462; thence along said northerly line North 87°20'47" West 20.00 feet to a point on a line which is parallel with and 20.00 feet westerly of, when measured at right angles to, the westerly line of the plat of "Newall's Addition"; thence along said parallel line South 02°43'42" West 253.40 to the northerly line of that tract of land described in Document Number 2004-19844; thence along said northerly line North 88°11'55" West 467.25 feet to a set 5/8" iron rod with a yellow plastic cap inscribed "AKS ENGR."; thence leaving said northerly line North 01°02'50" East 129.00 feet to a set 5/8" iron rod with a yellow plastic cap inscribed "AKS ENGR."; thence North 28°37'37" East 235.00 feet to a set 5/8" iron rod with a yellow plastic cap inscribed "AKS ENGR."; thence North 02°30'46" East 239.54 feet to a set 5/8" iron rod with a yellow plastic cap inscribed "AKS ENGR." on the southerly line of the Plat "Spring Meadow Subdivision Stage 1B"; thence continuing along said southerly line South 87°29'14" East 211.51 feet to the southeasterly corner of Lot 1, Block 10 of said Plat; thence along said southerly line South 76°13'30" East 181.08 feet to the Point of Beginning.

The above described tract of land contains 5.49 acres, more or less.

2/2/2018

AKS ENGINEERING & FORESTRY, LLC
12965 SW Herman Road, Suite 100, Tualatin, OR 97062
P: (503) 563-6151 F: (503) 563-6152
OFFICES IN: TUALATIN, OR - VANCOUVER, WA - KEIZER, OR - BEND, OR

AKS Job #5797

EXHIBIT B

Adjusted Tax Lot 200

A tract of land located in the Sebastian Brutscher D.L.C. in the Southwest One-Quarter of Section 16, Township 3 South, Range 2 West, Willamette Meridian, City of Newberg, Yamhill County, Oregon, and being more particularly described as follows:

Commencing at the southeasterly corner of Lot 14, Block 10 of the Plat "Spring Meadow Subdivision Stage 1B" being a 5/8" iron rod inside a 2" iron pipe; thence along the southerly line of said Plat North 76°13'30" West 181.08 feet to the southeasterly corner of Lot 1, Block 10 of said Plat; thence continuing along said southerly line North 87°29'14" West 211.51 feet to a set 5/8" iron rod with a yellow plastic cap inscribed "AKS ENGR." being the Point of Beginning; thence South 02°30'46" West 239.54 feet to a set 5/8" iron rod with a yellow plastic cap inscribed "AKS ENGR."; thence South 28°37'37" West 235.00 feet to a set 5/8" iron rod with a yellow plastic cap inscribed "AKS ENGR."; thence South 01°02'50" West 129.00 feet to a set 5/8" iron rod with a yellow plastic cap inscribed "AKS ENGR." on the northerly line of that tract of land described in Document Number 2004-19844; thence along said northerly line North 88°11'55" West 177.00 feet to the easterly right-of-way line of N Springbrook Road (30.00 feet from centerline); thence along said easterly right-of-way line North 01°51'45" East 497.30 feet; thence continuing along said easterly right-of-way line along a curve to the right with a Radius of 924.93 feet, a Delta of 5°14'08" a Length of 84.52 feet and a Chord of North 04°28'49" East 84.49 feet to the westerly projection of the southerly line of the Plat "Spring Meadow Subdivision Stage 1B"; thence along said southerly line South 87°29'14" East 279.87 feet to the Point of Beginning.

The above described tract of land contains 3.18 acres, more or less.

2/2/2018

AKS ENGINEERING & FORESTRY, LLC
12965 SW Herman Road, Suite 100, Tualatin, OR 97062
P: (503) 563-6151 F: (503) 563-6152
OFFICES IN: TUALATIN, OR - VANCOUVER, WA - KEIZER, OR - BEND, OR

AKS Job #5797

EXHIBIT C

Portion of Tax Lot 100
Conveyed to Tax Lot 200

A tract of land located in the Sebastian Brutscher D.L.C. in the Southwest One-Quarter of Section 16, Township 3 South, Range 2 West, Willamette Meridian, City of Newberg, Yamhill County, Oregon and being more particularly described as follows:

Commencing at the southeasterly corner of Lot 14, Block 10 of the Plat "Spring Meadow Subdivision Stage 1B" being a 5/8" iron rod inside a 2" iron pipe; thence along the southerly line of said Plat North 76°13'30" West 181.08 feet to the southeasterly corner of Lot 1, Block 10 of said Plat; thence continuing along said southerly line North 87°29'14" West 211.51 feet to a set 5/8" iron rod with a yellow plastic cap inscribed "AKS ENGR."; thence leaving said southerly line South 02°30'46" West 239.54 feet to a set 5/8" iron rod with a yellow plastic cap inscribed "AKS ENGR."; thence South 28°37'37" West 6.83 feet to the Point of Beginning; thence South 28°37'37" West 228.17 feet to a set 5/8" iron rod with a yellow plastic cap inscribed "AKS ENGR."; thence South 01°02'50" West 129.00 feet to a set 5/8" iron rod with a yellow plastic cap inscribed "AKS ENGR." on the northerly line of Document Number 2004-19844; thence along said northerly line North 88°11'55" West 177.00 feet to the easterly right-of-way line of N Springbrook Road (30.00 feet from centerline); thence along said easterly right-of-way line North 01°51'45" East 336.06 feet to the southerly line of Parcel 1 of Document Number 2017-07290; thence along said southerly line South 87°29'14" East 277.93 feet to the Point of Beginning.

The above described tract of land contains 1.59 acres, more or less.

2/2/2018

AKS ENGINEERING & FORESTRY, LLC
12965 SW Herman Road, Suite 100, Tualatin, OR 97062
P: (503) 563-6151 F: (503) 563-6152
OFFICES IN: TUALATIN, OR - VANCOUVER, WA - KEIZER, OR - BEND, OR

AKS Job #5797

EXHIBIT D

Portion of Tax Lot 200
Conveyed to Tax Lot 100

A tract of land located in the Sebastian Brutscher D.L.C. in the Southwest One-Quarter of Section 16, Township 3 South, Range 2 West, Willamette Meridian, City of Newberg, Yamhill County, Oregon and being more particularly described as follows:

Commencing at the southeasterly corner of Lot 14, Block 10 of the Plat "Spring Meadow Subdivision Stage 1B" being a 5/8" iron rod inside a 2" iron pipe; thence along the southerly line of said Plat North 76°13'30" West 181.08 feet to the southeasterly corner of Lot 1, Block 10 of said Plat; thence continuing along said southerly line North 87°29'14" West 1.04 feet to the westerly line of Parcel 2 of Document Number 2017-07290, also being the Point of Beginning; thence along said westerly line South 02°30'46" West 245.67 feet to the northerly line of said Parcel; thence along said northerly line North 87°29'14" West 213.47 feet; thence leaving said northerly line North 28°37'37" East 6.83 feet to a set 5/8" iron rod with a yellow plastic cap inscribed "AKS ENGR."; thence North 02°30'46" East 239.54 feet to a set 5/8" iron rod with a yellow plastic cap inscribed "AKS ENGR." on the southerly line of the Plat "Spring Meadow Subdivision Stage 1B"; thence along said southerly line South 87°29'14" East 210.47 feet to the Point of Beginning.

The above described tract of land contains 1.18 acres, more or less.

2/2/2018

Exhibit D: Public Notice Information

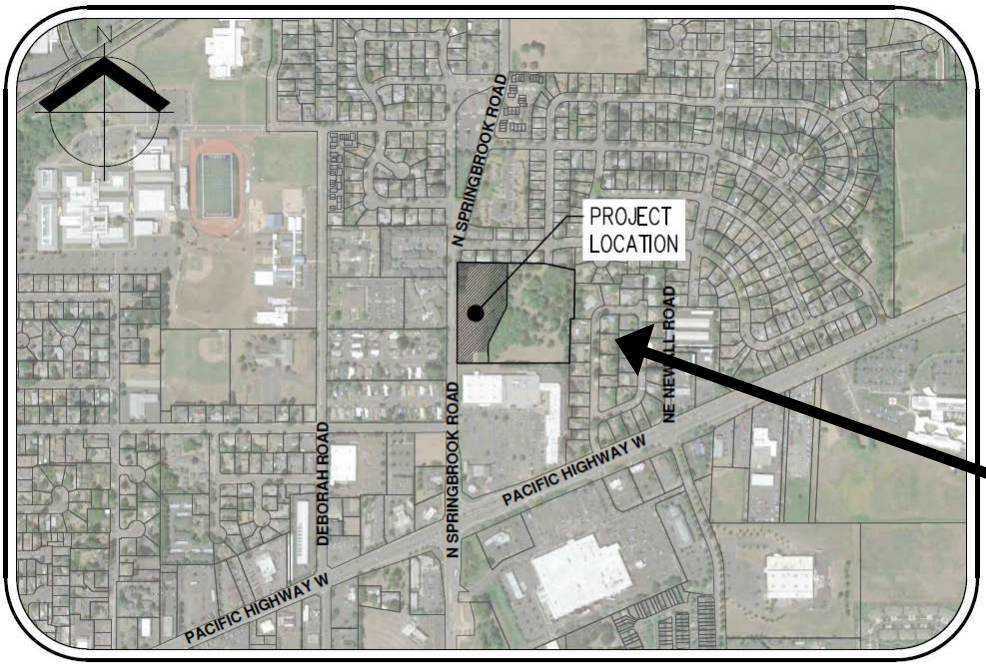
Community Development Department
P.O. Box 970 ▪ 414 E First Street ▪ Newberg, Oregon 97132
503-537-1240. Fax 503-537-1272 www.newbergoregon.gov

Notice of Site Design Review
For a 42 Unit Apartment Complex

A property owner in your neighborhood has submitted an application to the City of Newberg for site design review of a 42-unit apartment complex. The subject property is located at 1306 North Springbrook Road in Newberg. You are invited to take part in the City's review of this project by sending in your written comments. For more details about giving comments, please see the back of this sheet.

The project involves the improvement of a ±3.18-acre parcel of land with a multifamily apartment complex. The complex is planned to have 42 dwelling units. The units are planned to be divided between three primary buildings, with parking and landscaping between the buildings and the street. New public infrastructure is also proposed, including street frontage, sidewalks, utilities, and a stormwater facility.

APPLICANT:	MJG Development, Inc.
APPLICANT'S CONSULTANT:	AKS Engineering & Forestry, LLC—Mimi Doukas, AICP, RLA
TELEPHONE:	(503) 563-6151
EMAIL:	MimiD@aks-eng.com
PROPERTY OWNER:	MJG Development, Inc.
LOCATION:	1306 Springbrook Road, Newberg, OR 97132
TAX LOT NUMBER:	Yamhill County Assessor's Map 3216CB, Tax Lot 00200



VICINITY MAP
NOT TO SCALE

Community Development Department
P.O. Box 970 ▪ 414 E First Street ▪ Newberg, Oregon 97132
503-537-1240. Fax 503-537-1272 www.newbergoregon.gov

We are mailing you information about this project because you own land within 500 feet of the planned project. We invite you to send any written comments for or against the project within 14 days from the date this notice is mailed.

If you mail your comments to the City, please put the following information on the outside of the envelope:

Written Comments: File No. XXXXX
City of Newberg
Community Development
PO Box 970
Newberg, OR 97132

All written comments must be turned in by 4:30 p.m. on _____, 2018. Any issue which might be raised in an appeal of this case to the Land Use Board of Appeals (LUBA) must be submitted to the City in writing before this date. You must include enough detail to enable the decision maker an opportunity to respond. The applicable criteria used to make a decision on this application for preliminary subdivision plan approval are found in Newberg Development Code 15.235.060 and 15.346.050.

You can look over all the information about this project or drop comments off at Newberg City Hall, 414 E. First Street. You can also buy copies of the information for a cost of 25 cents a page. If you have any questions about the project, you can call the Newberg Planning Division at 503-537-1240. A copy of the application is posted at www.newbergoregon.gov/planning.

The Community Development Director will make a decision at the end of a 14-day comment period. If you send in written comments about this project, you will be sent information about any decision made by the City relating to this project.

Date Mailed: _____, 2018

Land Use Notice

FILE #

PROPOSAL: Site Design Review for 42-Unit apartment complex on ± 3.18-acre property in the R-2 district.

FOR FURTHER INFORMATION, CONTACT:

City of Newberg
Community Development Department
414 E First Street
Phone: 503-537-1240

Prepared By:

First American

First American

Date: 3/28/2018

N

0 160

feet

500' Radius
1306 N Springbrook Road

Subject Parcels
Notification Area
Radius
Taxlots

This information is deemed reliable but is not guaranteed.

Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community

R3216CA 00800
Joseph Kuhn
1205 Newall Rd
Newberg, OR 97132-2054

R3216CA 03200
Michael Perez
1205 Hadley Rd
Newberg, OR 97132-2067

R3216CA 02500
Coleen Murphy
1002a N Springbrook Rd #157
Newberg, OR 97132-2058

R3216CA 02600
Rodney Takashige
1208 Newall Rd
Newberg, OR 97132-2055

R3216CA 01600
Samuel Hulse
1100 Hadley Rd
Newberg, OR 97132-2043

R3216CA 01400
Tyna Moreschi
1005 Newall Rd
Newberg, OR 97132-2050

R3216CA 01704
Jerry Sweat
1104 Hadley Rd
Newberg, OR 97132-2069

R3216CB 00600
Azalea Gardens Mobile Home Park LLC
Po Box 17
Guerneville, CA 95446-0017

R3216CB 00400
Church Of Jesus Christ
50 E Noth Temple St
Salt Lake City, UT 84150-0000

R3216BC 01500
Paul Jellum
15925 NE Chehalem Dr
Newberg, OR 97132-6418

R3216CA 01300
Christopher Meade
1009 Newall Rd
Newberg, OR 97132-2050

R3216CA 01000
Diana Gulley
29800 NE Wilsonville Rd
Newberg, OR 97132-7044

R3216CA 03100
Shannon & Geoffrey Barrios
1209 Hadley Rd
Newberg, OR 97132-2067

R3216CA 01703
Jens Fromm
1108 Hadley Rd
Newberg, OR 97132

R3216CA 01200
Marcus Mason
1013 Newall Rd
Newberg, OR 97132-2050

R3216CA 01702
Rodney Roll
1102 Hadley Rd
Newberg, OR 97132-2069

R3216CA 01500
Kevin Taylor
1004 Newall Rd
Newberg, OR 97132-2051

R3216CB 00800
Patrick & Elaine Maveety
15830 SW Bell Rd
Sherwood, OR 97140-9042

R3216BC 01100
Beverly Payton
1609 Springbrook Way
Newberg, OR 97132-1419

R3216BC 02000
Julie Lane
6127 Merriewood Dr
Oakland, CA 94611-2037

R3216CB 00700
Springbrook Plaza LLC
19300 Merridy St
Northridge, CA 91324-1130

R3216CA 03300
Kristofer & Chanelle Blanchard
1113 Hadley Rd
Newberg, OR 97132-2065

R3216CA 02501
Dale Farris
1112 Newall Rd
Newberg, OR 97132-2053

R3216CA 01100
Gary Mehlhoff
1150 NE 17th St
Mcminnville, OR 97128-3410

R3216CA 00900
David Rose
1113 Newall Rd
Newberg, OR 97132-2052

R3216CB 01001
Newberg Professional Building LLC
3275 Dogwood Dr S
Salem, OR 97302-4031

R3216CA 03400
Paul Wong
1109 Hadley Rd
Newberg, OR 97132-2065

R3216BC 02500
Jane Miner
16044 SW Wimbledon Ct
Portland, OR 97224-3044

R3216BC 02600
Darren & Joyce Lee
1115 Forrestal Ln
Foster City, CA 94404-3650

R3216BC 00801
Springbrook Apts LLC
16797 S Kraeft Rd
Oregon City, OR 97045-8001

R3216BC 02100
Ella Gueldner
3887 Oak Meadow Loop
Newberg, OR 97132-7458

R3216BC 02200
Paul Jellum
15925 NE Chehalem Dr
Newberg, OR 97132-6418

R3216CB 00500
Azalea Gardens Mobile Home Park LLC
Po Box 17
Guerneville, CA 95446-0017

R3216BC 02400
Paul Jellum
15925 NE Chehalem Dr
Newberg, OR 97132-6418

R3216CA 02800
Jeff & Leona Reed
1304 NE Newall Rd
Newberg, OR 97132

R3216CA 00300
Brothers Ladd
1321 Newall Rd
Newberg, OR 97132-2056

R3216CA 00500
Thad Dolyniuk
1313 Newall Rd
Newberg, OR 97132-2056

R3216CA 00200
Ronald Manning Jr.
PO Box 605
Newberg, OR 97132

R3216CA 02300
Daniel & Lois Maclean
1400 Hadley Rd
Newberg, OR 97132-2047

R3216CA 00700
Kent & Marilyn Newell
1213 Newall Rd
Newberg, OR 97132-2054

R3216CA 02400
McDonald Family
1408 Hadley Rd
Newberg, OR 97132-2047

R3216CA 02900
Rodger Woolen
1309 Hadley Rd
Newberg, OR 97132-2075

R3216CA 00400
Michelle Turner
1317 Newall Rd
Newberg, OR 97132-2056

R3216CB 00300
Newberg Village Apts Ltd
Po Box 490
Enterprise, OR 97828-0490

R3216CA 00600
Shelly Cate
Po Box 853
Newberg, OR 97132-0853

R3216BC 01700
Paul Mayer
Po Box 23743
Tigard, OR 97281-3743

R3216CA 03000
Duane Fink
1301 Hadley Rd
Newberg, OR 97132-2044

R3216CA 02700
Gary & Marcia Windsor
1216 Newall Rd
Newberg, OR 97132-2055

R3216CB 00100
MJG Development
Po Box 1060
Newberg, OR 97132-8060

R3216BD 02600
David Kelley
3408 Aquarius Blvd
Newberg, OR 97132-2035

R3216BC 01421
Carol Tessman
1505 Coffey Ln
Newberg, OR 97132-1520

R3216BC 02800
Phillip McQueen
23400 NE Hyland Dr
Newberg, OR 97132-7326

R3216BC 02700
James Jr & Joyce Harris
763 Esplanada Way
Stanford, CA 94305-1013

R3216CB 00200
MJG Development
Po Box 1060
Newberg, OR 97132-8060

R3216CA 01701
Patrick Schwisow
1112 Hadley Rd
Newberg, OR 97132-2069

R3216BC 01800
Neal & Iris Fujihara
35960 Gaskell Ct
Fremont, CA 94536-3520

R3216BC 00800
Deborah Court Assoc Or Ltd
Po Box 490
Enterprise, OR 97828-0490

R3216BC 01300
Newberg City
3100 Middlebrook Dr
Newberg, OR 97132-1428

R3216CA 01800
Jephthah Wilcox
1204 Hadley Rd
Newberg, OR 97132-2066

R3216CA 01700
Darren Adamek
1110 Hadley Rd
Newberg, OR 97132-2069

R3216CA 02200
Richard Meredith
1308 Hadley Rd
Newberg, OR 97132-2045

R3216CA 01900
Joah Stewart
1208 Hadley Rd
Newberg, OR 97132-2066

R3216CA 02000
Brian Coleman
1300 Hadley Rd
Newberg, OR 97132-2045

R3216BD 00900
Joseph Tovey
3501 Madrona Dr
Newberg, OR 97132-1555

R3216BC 01217
Lois Walton
2141 5th Ave
Newberg, OR 97132-0000

R3216BC 01415
Susan Crouse
1600 Coffey Ln
Newberg, OR 97132-1523

R3216BC 01416
Shawn Henry
1508 Coffey Ln
Newberg, OR 97132-1521

R3216BC 01215
Bruce Baldwin
1600 Cedar St
Newberg, OR 97132-1402

R3216BD 01200
Miguel Montano
3508 Madrona Dr
Newberg, OR 97132-1556

R3216BC 01900
Nicklous Properties LLC
Po Box 819
Carlton, OR 97111-0819

R3216BD 02400
Susan Lafreniere
3503 Aquarius Blvd
Newberg, OR 97132-2036

R3216BD 00134
James Bush
1505 Gemini St
Newberg, OR 97132-1524

R3216BD 02800
Jefferey Dawson
1400 Gemini Ln
Newberg, OR 97132-2057

R3216BD 02300
Mona Burger
3505 Aquarius Blvd
Newberg, OR 97132-2036

R3216BD 00132
Carolyn Grenfell
1601 Gemini St
Newberg, OR 97132-1526

R3216BC 01428
Housing Authority Of Yamhill County
Po Box 865
Mcminnville, OR 97128-0865

R3216BC 01418
Darlene Foster
1504 Coffey Ln
Newberg, OR 97132-1521

R3216BC 01220
Claudia Garcia
1617 Cedar St
Newberg, OR 97132-1401

R3216BD 03000
Parjit Singh
3504 Aquarius Blvd
Newberg, OR 97132-2037

R3216BC 01425
Debra Lightner
1601 Coffey Ln
Newberg, OR 97132-1522

R3216BC 01422
Travis Salee
1507 Coffey Ln
Newberg, OR 97132-1520

R3216BC 01419
Jeffery Musall
1502 Coffey Ln
Newberg, OR 97132-1521

R3216BD 01100
Hector Pizano
Po Box 1241
Newberg, OR 97132-8241

R3216BD 01300
Jennifer Norman
3512 Madrona Dr
Newberg, OR 97132-1556

R3216BD 03200
David & Sharon Moore
3600 Aquarius Blvd
Newberg, OR 97132-2039

R3216BD 02500
Sarah Lowe
1500 Gemini St
Newberg, OR 97132-1525

R3216BD 03100
Bradley Johnson
3508 Aquarius Blvd
Newberg, OR 97132-2037

R3216BD 02200
Ryan Erickson
3509 Aquarius Blvd
Newberg, OR 97132-2036

R3216BC 01214
Ronald & Amy Nesvold
1606 Cedar St
Newberg, OR 97132-1402

R3216BC 01424
Linda Quinby
1511 Coffey Ln
Newberg, OR 97132-1520

R3216BD 02900
Shelley Boyer
1404 Gemini Ln
Newberg, OR 97132-2057

R3216BC 01417
Janis Fortune
1506 Coffey Ln
Newberg, OR 97132-1521

R3216BC 01218
Charles & Luella Wampler
1609 Cedar St
Newberg, OR 97132-1401

R3216BD 01000
W John & Sandra Fortmeyer
Po Box 974
Newberg, OR 97132-0974

R3216BD 02700
Shannon Lynn
7415 SW East Lake Ct
Wilsonville, OR 97070-8457

R3216BD 02000
Michael Osborne
3605 Aquarius Blvd
Newberg, OR 97132-2038

R3216BC 01423
Brett Laidlaw
1509 Coffey Ln
Newberg, OR 97132-1520

R3216BC 01213
Robert Jamieson
1610 Cedar St
Newberg, OR 97132-1402

R3216BC 01420
Darlene Pankow
14121 Jacobs Way
Oregon City, OR 97045-1198

R3216BD 02100
Linda Coakley
3601 Aquarius Blvd
Newberg, OR 97132-2038

R3216BD 00135
Patricia Good
11865 SW Tualatin Rd #80
Tualatin, OR 97062-7075

R3216BD 00133
Beryle Angelechio
1507 Gemini St
Newberg, OR 97132-1524

R3216BD 03300
Glenn Simpson
3604 Aquarius Blvd
Newberg, OR 97132-2039

R3216BC 01216
Timothy Bodnar
1601 Cedar St
Newberg, OR 97132-1401

R3216BC 01219
James Stephens III
1613 Cedar St
Newberg, OR 97132-1401

R3216BC 01212
Jason Allaway
1614 Cedar St
Newberg, OR 97132-1402

Exhibit E: Preliminary Stormwater Report

Springbrook Apartments
Newberg, Oregon

Preliminary Stormwater Report

Date: March 2018

Client: MJG Development
901 N. Brutscher St, Suite 206
Newberg, OR 97132

Engineering Contact: Chuck Gregory, PE - Associate
ChuckG@aks-eng.com

Engineering Firm: AKS Engineering & Forestry, LLC.

AKS Engineering & Forestry

12965 SW Herman Road, Suite 100
Tualatin, OR 97062
P: (503) 563-6151
www.aks-eng.com

REGISTERED PROFESSIONAL ENGINEER
50644PE
OREGON
CHARLES EDWARD GREGORY
RENEWS: JUNE 30, 20__

PRELIMINARY NOT FOR CONSTRUCTION

Table of Contents

PRELIMINARY STORMWATER REPORT
Springbrook Apartments
Newberg, Oregon

1.0 PURPOSE OF REPORT

The purpose of this report is to analyze the effects of the proposed developments on the existing stormwater conveyance system and to document the criteria, methodology, and informational sources by which the proposed stormwater system is designed.

2.0 PROJECT LOCATION/DESCRIPTION

The apartment complex will be located at 1306 N Springbrook Road within the City of Newberg. The property line adjustment for Tax Lots 100 and 200 is currently under review. The proposed development will reside on Tax Lot 200 which will encompass 3.2 acres (Yamhill County's Tax Map 3s 2w 16CB).

The proposed project includes the construction of three buildings, consisting of 42 units, new parking areas and driving lanes, landscaping, frontage improvements, associated underground utilities, and stormwater management facilities.

Stormwater management is provided primarily through a combination of low impact development approach (LIDA) facilities, underground detention, and a proprietary treatment. A portion of Springbrook Road will be treated by a rain garden to compensate for added impervious area in the public right-of-way. All LIDA facilities were modeled assuming no infiltration. After stormwater passes through the LIDA facilities, it will be conveyed to an underground detention facility which will be designed to release the post-developed peak flows at or below pre-developed rates. Stormwater will be conveyed to a flow control manhole which will be designed to release the post-developed peak flows at or below pre-developed rates to a water quality treatment manhole.

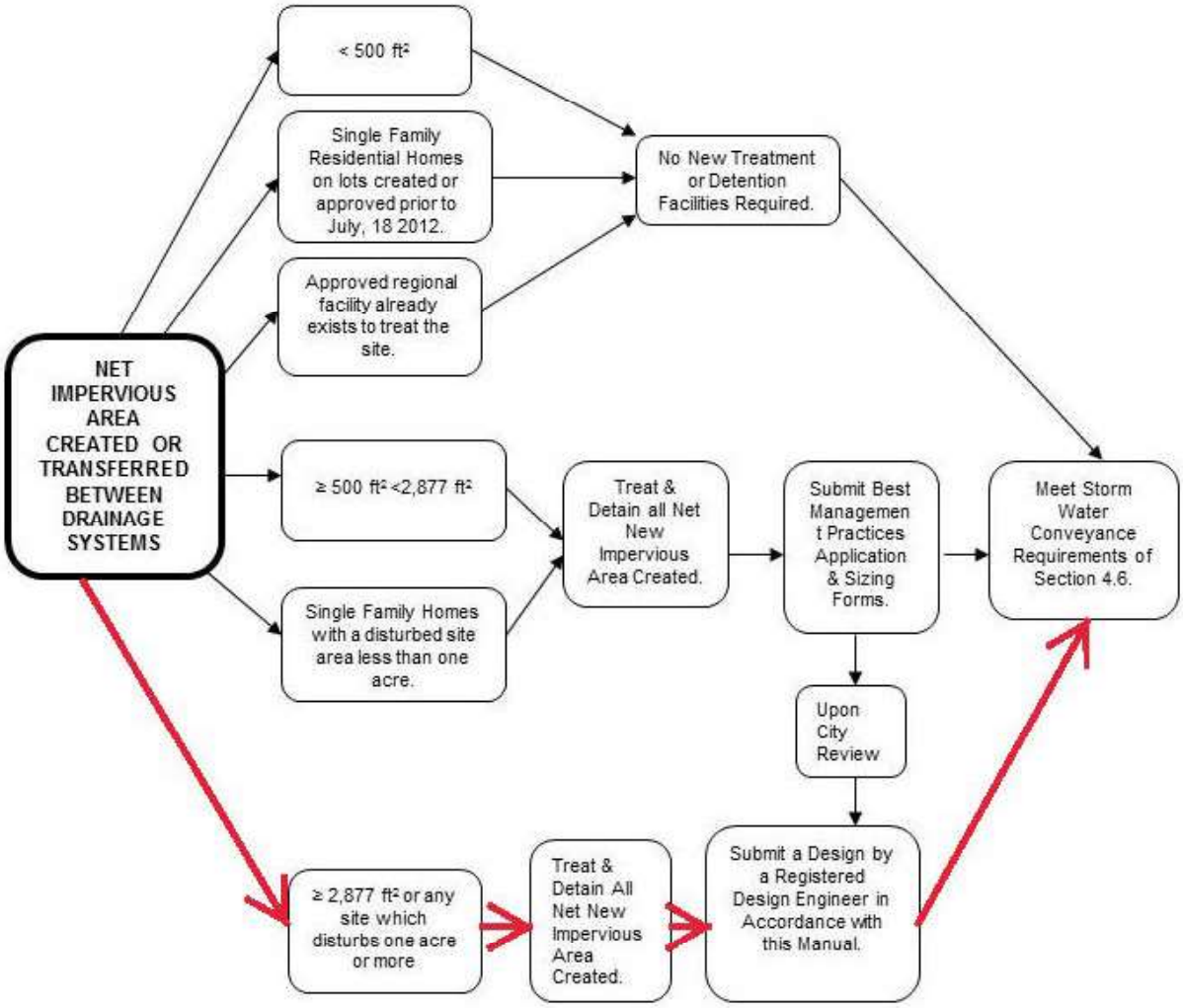
After water quantity control and quality treatment, stormwater from the proposed development is conveyed to an existing stormwater manhole to the southwest of the site that connects to an existing stormwater system in N Springbrook Road. Downstream of the site, the stormwater passes through an existing public stormwater system and eventually discharges into unnamed tributary to the south of the project site.

3.0 REGULATORY DESIGN CRITERIA

Stormwater design criteria is dictated by the City of Newberg *Public Works Design and Construction Standards (August 2015).* Per figure 4.4, the proposed development will create more than 2,877 square feet of impervious area and therefore is required to provide treatment and detention for all net new impervious area created. The proposed design meets the requirements of section 4.6 and is designed by a registered Civil Engineer.

4.6 Water Quantity and Quality Facilities

Figure 4.4 Storm water Quality & Quantity Design Flow Chart



3.1 STORMWATER QUANTITY MANAGEMENT CRITERIA

Section 4.7.I.III of the City of Newberg *Public Works Design and Construction Standards (August 2015)* requires that the post-development runoff rates from the site do not exceed the predevelopment runoff rates. Water quantity design methodology is outlined in section 5.3 of this report.

4.7.1.III Water Quantity Facility Design & Control Standards

Stormwater quantity on-site detention facilities shall be designed to capture runoff so the post-development runoff rates from the site do not exceed the predevelopment runoff rates from the site, based on 24-hour storm events ranging from the ½ of the 2-year return storm to the 25-year return storm. Specifically, the ½ of the 2, 2, 10, and 25-year post-development runoff rates will not exceed their respective ½ of the 2, 2, 10, and 25-year pre-development runoff rates…

3.2 STORMWATER QUALITY

The proposed development is required to construct permanent water quality facilities per Chapter 13.25, Article IV, of the Municipal Code to reduce contaminants entering the storm water system. The storm event used to design the water quality facility is based on the water quality storm as identified in section 4.8.5 of the design and construction standards. Water quality design methodology is outlined in section 5.2 of this report.

> *4.8.5 Water Quality Storm*
>
> *The storm defines both the volume and rate of runoff. The stormwater quality only facilities shall be designed for a dry weather storm event totaling 1.0 inches of precipitation falling in 24 hours…*

4.0 DESIGN PARAMETERS

4.1 DESIGN STORMS

Per City of Newberg requirements, the stormwater analysis utilizes the 24-hour storm for the evaluation and design of the existing and proposed stormwater facilities. The following 24-hour rainfall intensities were utilized as the design storm for each recurrence interval.

Table 4-1: Rainfall Intensities

Recurrence Interval (Years)	Total Precipitation Depth (Inches)
½ of 2	1.25
2	2.50
10	3.50
25	4.00

Stormwater facilities for the site are placed at locations that adequately collect and control the stormwater for the site. The stormwater pipes onsite and off-site are sized using Manning's equation based on peak flows for the 25-year storm.

4.2 PRE-DEVELOPED SITE CONDITIONS

4.2.1 Site Topography

Topography on the site is gently sloping to the south and to the east at an approximate 2-7 percent grade. Topography of the southern portion of the site is gently sloping to the south at an approximate 2-4 percent grade and eventually drains to an existing unnamed creek that runs through the middle of the site. Topography of the northern portion of the site is gently sloping to the east at an approximate 4-7 percent grade and eventually drains to the existing unnamed creek. The site has historically been used as a private residence. The site is currently undeveloped.

4.2.2 Land Use

The existing site is undeveloped. The zoning for the property is R-2 (Medium Density Residential).

4.3 SOIL TYPE

Per Section 4.5.4, *Santa Barbara Urban Hydrograph (SBUH)*, of the City of Newberg *Public Works Design and Construction Standards* (August 2015):

II. Curve numbers shall be derived from the National Resources Conservation Service's (NRCS) runoff curve numbers contained in Technical Release 55 (TR-55)-Urban Hydrology for Small Watersheds.

III. Soil types shall be derived from the NRCS Soil Survey for Yamhill County.

The soils for the site are classified as Verboort Silty Clay Loam (0 to 3% slopes, Hydrologic group D) and Aloha Silt Loam (0 to 3% slopes, Hydrologic group C/D) per the NRCS Soil Survey for Yamhill County. Information for these soils is contained within the appendices of this report. The current existing cover type has been classified as Open Space in good hydrologic condition due to grass covering over 75% of the proposed developed area.

4.4 POST-DEVELOPED SITE CONDITIONS

4.4.1 Site Topography

The onsite slopes will be modified with cuts and fills to accommodate the construction of the parking facilities and the apartment buildings but finished grades will generally follow the existing grades.

4.4.2 Land Use

The site land-use will consist of apartment buildings, landscaping, and associated parking facilities.

4.4.3 Post-Developed Input Parameters

See HydroCAD Analysis for water quantity design and the City of Portland PAC calculator analysis for water quality design in the attached appendices.

5.0 DESIGN METHODOLOGY

The Santa Barbara Urban Hydrograph (SBUH) Method was used to analyze stormwater runoff from the site. This method utilizes the SCS Type 1A 24-hour design storm. HydroCAD 10 computer software aided in the analysis. The HydroCAD model incorporates the LIDA facilities into the overall stormwater system for the site. LIDA facilities were also modeled with the City of Portland PAC calculator for water quality only.

5.1 FACILITY SELECTION

Based on the *City of Newberg Public Works Design and Construction Standards* section 4.6.8, Facility Selection Hierarchy (table 6.2 below), LIDA facilities have been selected as the primary water quality and quantity facility. Because the site is constrained by wetlands/streamwater corridor to the east, a grove of trees that are to be saved in the North West and the minimum parking requirements, sufficient space for a surface pond is not available. Therefore, an underground detention facility was the next highest facility in the Hierarchy and was selected to provide stormwater management along with a stormfilter manhole to treat the parking lot runoff.

Table 5.1 Facility Selection Hierarchy Table	
Detention Facilities	**Water Quality Facilities**
LIDA Facilities/Regional Facility	**LIDA Facilities/Regional Facility**
Surface Pond	Swale
Underground Tank/Pipes	**Proprietary Treatment Systems**
Fee in lieu of construction payment	Fee in lieu of construction payment

A small area of impervious surface will be conveyed from Springbrook Road to a public LIDA facility for water quality treatment and then overflow will be released onto Springbrook Road for collection by existing public storm structures. This public planter will treat area to offset the runoff from the new curb tight sidewalk.

5.2 PROPOSED STORMWATER QUALITY CONTROL FACILTY DESIGN

LIDA facilities have been designed with HydroCAD by running the 1/2 of the 2-year storm event (greater than the quality storm event). The storm completely passes through the LIDA facility soil media without overflowing into the planter standpipe. The design was also cross checked with the City of Portland Presumptive Approach Calculator (PAC) for water quality treatment only.

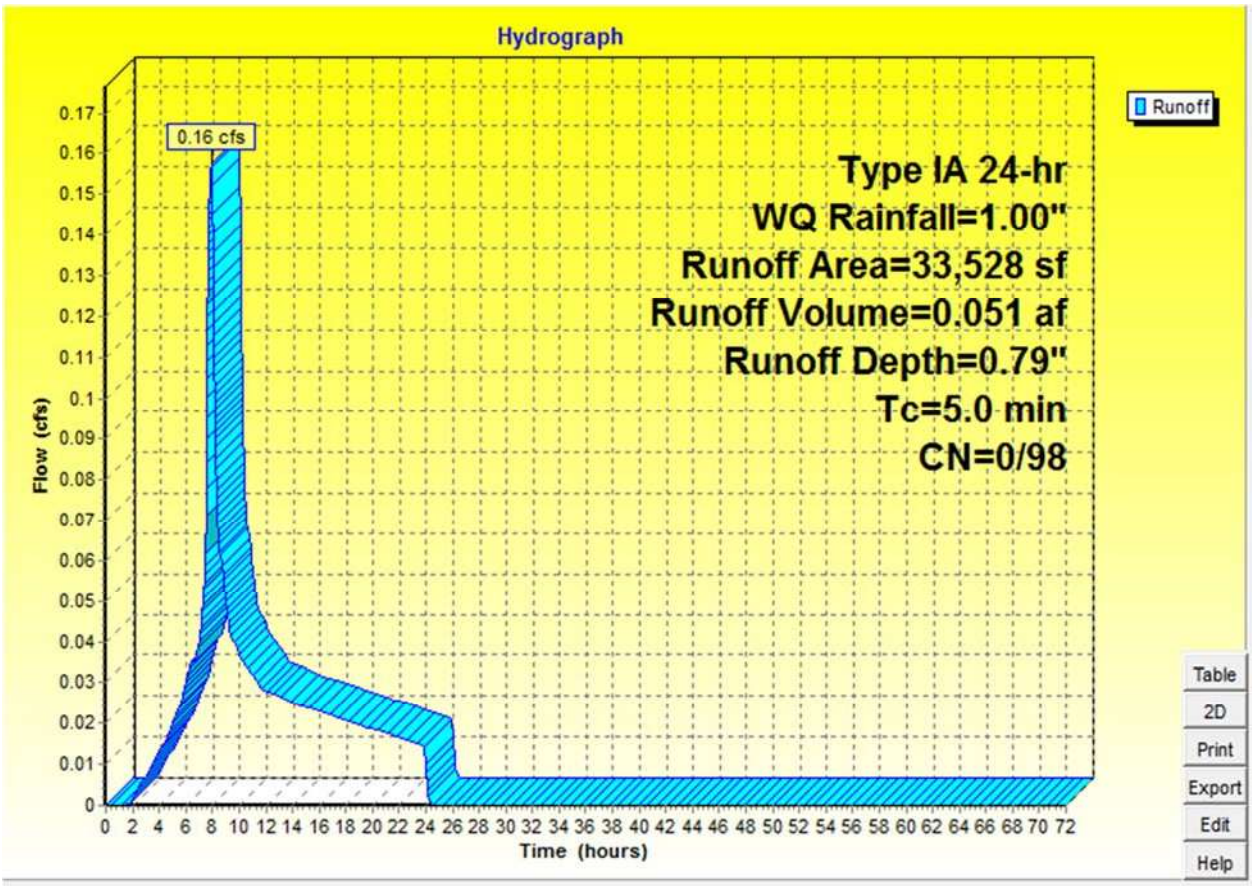
Basins 1S through 9S and 11S have been designed to flow to planters 1P through 9P and 11P. A summary of the results can be seen below. The facilities have been sized to fit between the buildings and the sidewalk and are designed to provide the required water quality treatment required per the PAC. The planters also provide some detention reducing the load on the downstream detention facility.

Table 5.2 PAC Calculator Summary

Planter	Impervious Area Treated (SqFt)	Facility Size – Bottom Area (SqFt)	Facility Sizing Ratio	WQ Only Facility Sizing Required Ratio	Planter Area exceeding WQ Requirement (SqFt)
1P	1,747	106	6.1%	1.8%	75
2P	3,051	200	6.6%	1.8%	145
3P	3,051	200	6.6%	1.8%	145
4P	1,701	110	6.5%	1.8%	79
5P	1,659	103	6.2%	1.8%	73
6P	3,290	221	6.7%	1.8%	162
7P	3,309	209	6.3%	1.8%	149
8P	3,051	203	6.6%	1.8%	148
9P	1,699	123	7.2%	1.8%	92
11P	6,300	388	6.2%	1.8%	275

Basin 10S is designed to be conveyed to a Contech StormFilter water quality manhole and has been designed to treat stormwater runoff produced by the Water Quality stormwater event (1.0 inches of precipitation falling in 24 hours) as shown on the next page.

In addition to the on-site basins (basins 1S-9S), approximately 6,300 square feet of N Springbrook Road (Basin 11S) will be collected and treated by a proposed public rain garden (Planter 11P). This area is being treated by this planter to offset the added runoff to the system by the proposed public sidewalk along the west property line of the site and exceeds the area of runoff being created by the sidewalk.



StormFilter Manhole Sizing

STORMFILTER® DESIGN PARAMETERS

Number of Cartridges Required:

$N=Q_{treat}\,(449_{gpm/cfs} / Q_{cart\ gpm/cart})$

Q_{treat} = Water Quality Volume (WQV)

$Q_{cart\ gpm/cart}$ = Treatment per Cartridge = 15 $_{gpm/cart}$

StormFilter Sizing		
Area Requiring Treatment	33,528 SF	
Water Quality Stormwater Event	1.0 inches falling in 24 hr	
WQF (See Hydrograph)	0.16 CFS	
Cartridge Required	$N=Q_{treat}\,(449_{gpm/cfs} / Q_{cart\ gpm/cart})$	$N=Q_{treat}\,(449_{gpm/cfs} / 15_{cart\ gpm/cart})$
	N= 4.79 cart	5 SINGLE CARTRIDGE STORMFILTER

5.3 PROPOSED STORMWATER QUANTITY CONTROL FACILITY DESIGN

The stormwater quantity control facility has been design based on the *City of Newberg Public Works Design and Construction Standards* section 4.7. The detention system utilizes a combination of LIDA planters and an underground detention and flow control system. The overall system has been designed to release the post-development runoff at or below pre-development runoff rates.

Based on previous projects in the Newberg area, infiltration is expected to be low. Additionally, the proposed on-site planters are within 10 feet of structures. Therefore, the LIDA facilities have been modeled as flow-through planters rather than infiltration planters. A perforated pipe will be installed within the planter to ensure sufficient draw down within the system such that standing water does not remain in the planters beyond 48 hours.

The stormwater collection system under the parking lot will collect stormwater from the parking lot surface and from the planters. This stormwater will be routed to an underground chamber system for detention. A flow control structure will be installed as part of the detention system to ensure that post-developed flow rates are less than or equal to pre-developed flow rates.

The hydraulic analysis of the detention system was modeled utilizing HydroCAD 10 software. A summary of the pre and post-development flow rates are shown below. Complete stormwater quantity calculations are shown in the appendices.

Table 5-3: WATER QUANTITY SUMMARY

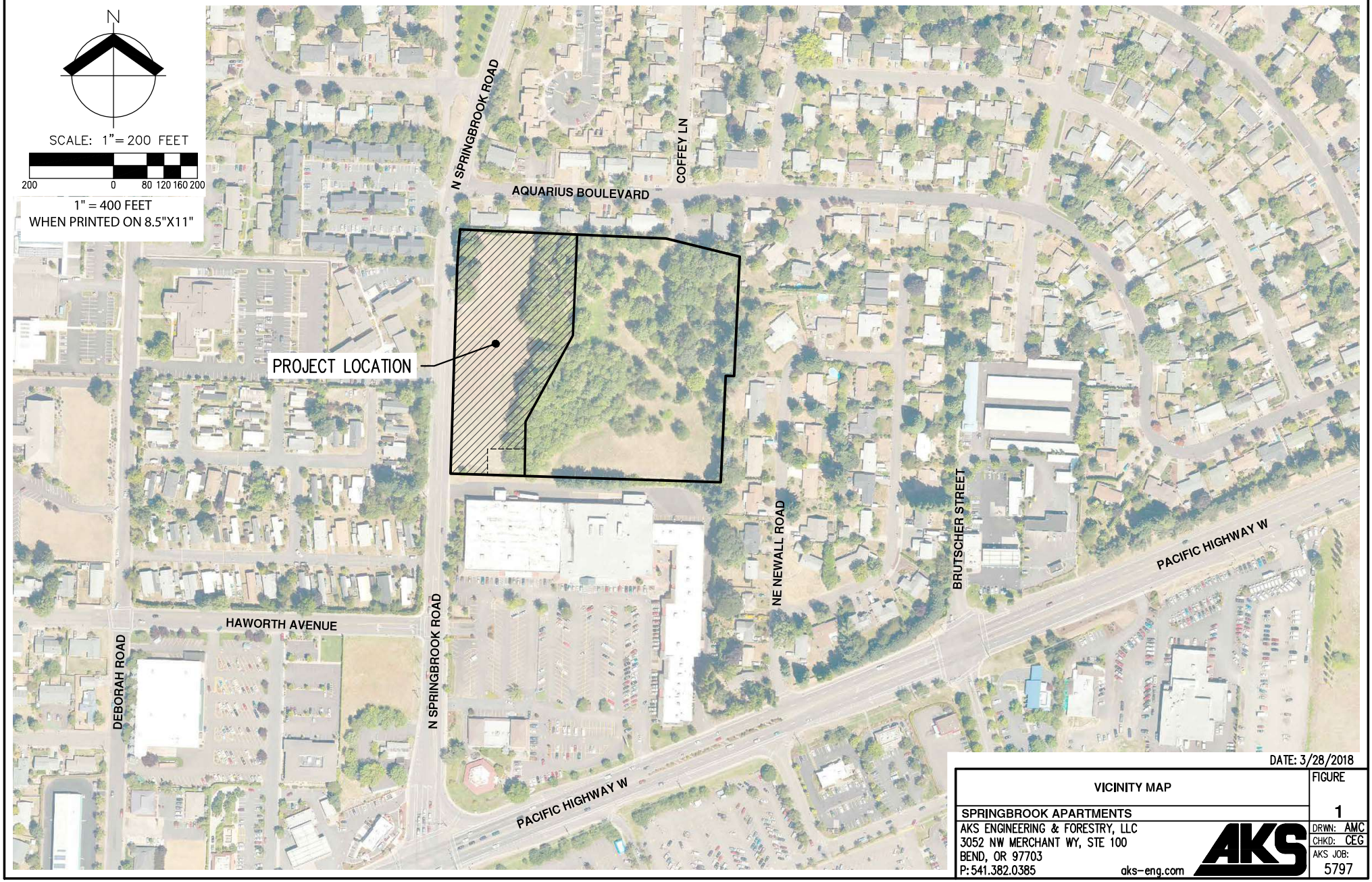
Recurrence Interval Years	Peak Pre-Development Flows (Basins 1E) (cfs)	Peak Post-Development Flows (After LIDA and Detention) (cfs)	Peak Flow Decrease (cfs)
1/2 of 2	0.02	0.02	0.00
2	0.23	0.23	0.00
10	0.51	0.46	0.05
25	0.67	0.65	0.02

As shown on the table above, the detained post-development flows are equal to or less than the pre-development peak flows produced by the overall site (basin 1E shown on the attached pre-development basin delineation map).

5.4 CONCLUSION

The stormwater system for the proposed development has been designed to meet the City of Newberg Municipal Code section 13.25 and complies with the requirements in the City of Newberg Public Works Design and Construction Standards Manual.

APPENDIX A
VICINITY MAP

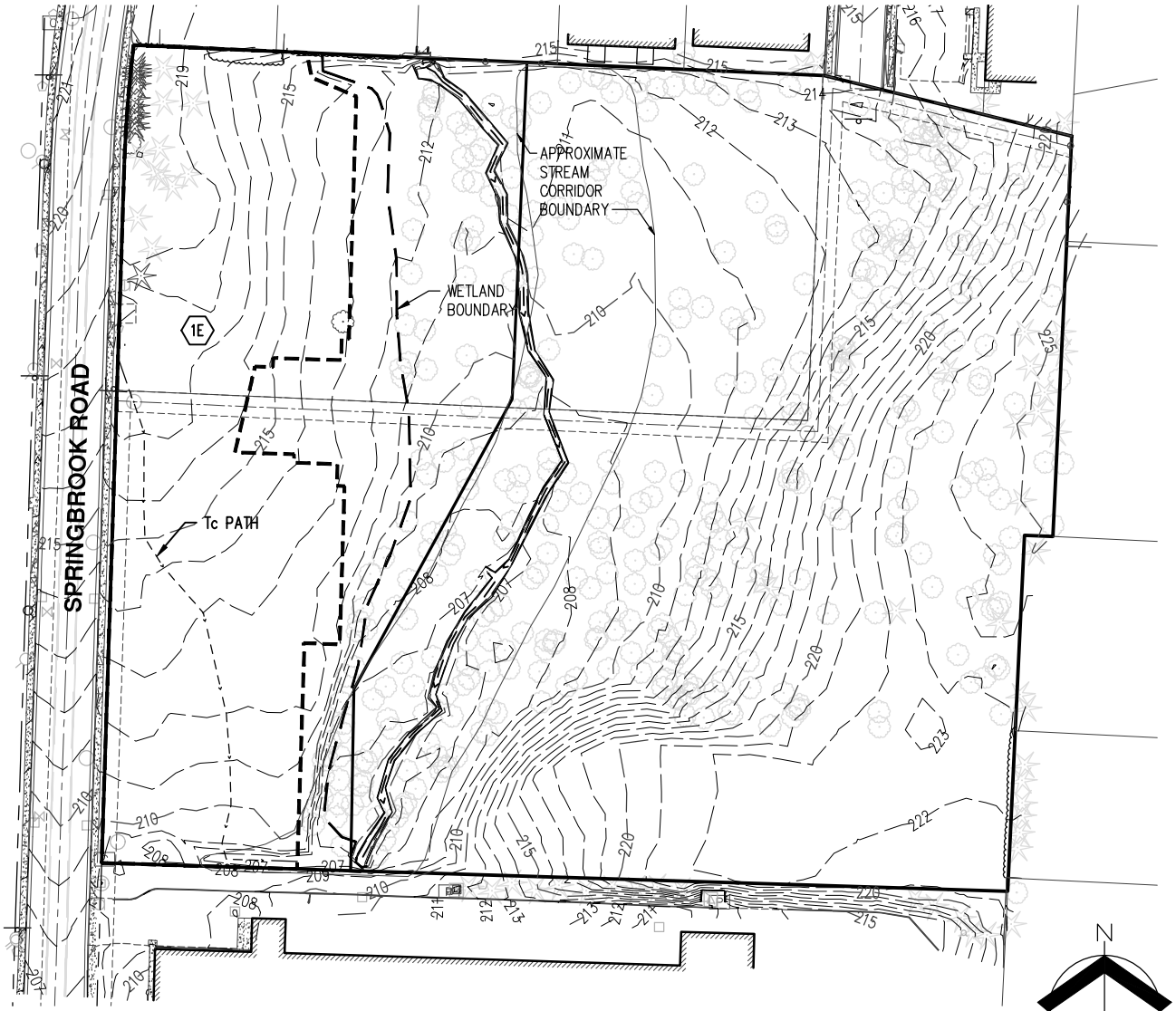


DATE: 3/28/2018

VICINITY MAP	FIGURE 1
SPRINGBROOK APARTMENTS	
AKS ENGINEERING & FORESTRY, LLC 3052 NW MERCHANT WY, STE 100 BEND, OR 97703 P: 541.382.0385 aks-eng.com	DRWN: AMC CHKD: CEG AKS JOB: 5797

DWG: 5797 20180220 VICINITY MAP | VICINITY

APPENDIX B
PRE-DEVELOPED BASIN MAP



1" = 160 FEET
WHEN PRINTED ON 8.5"X11"

SCALE: 1"= 80 FEET

80 0 32 48 64 80

DATE: 3/28/2018

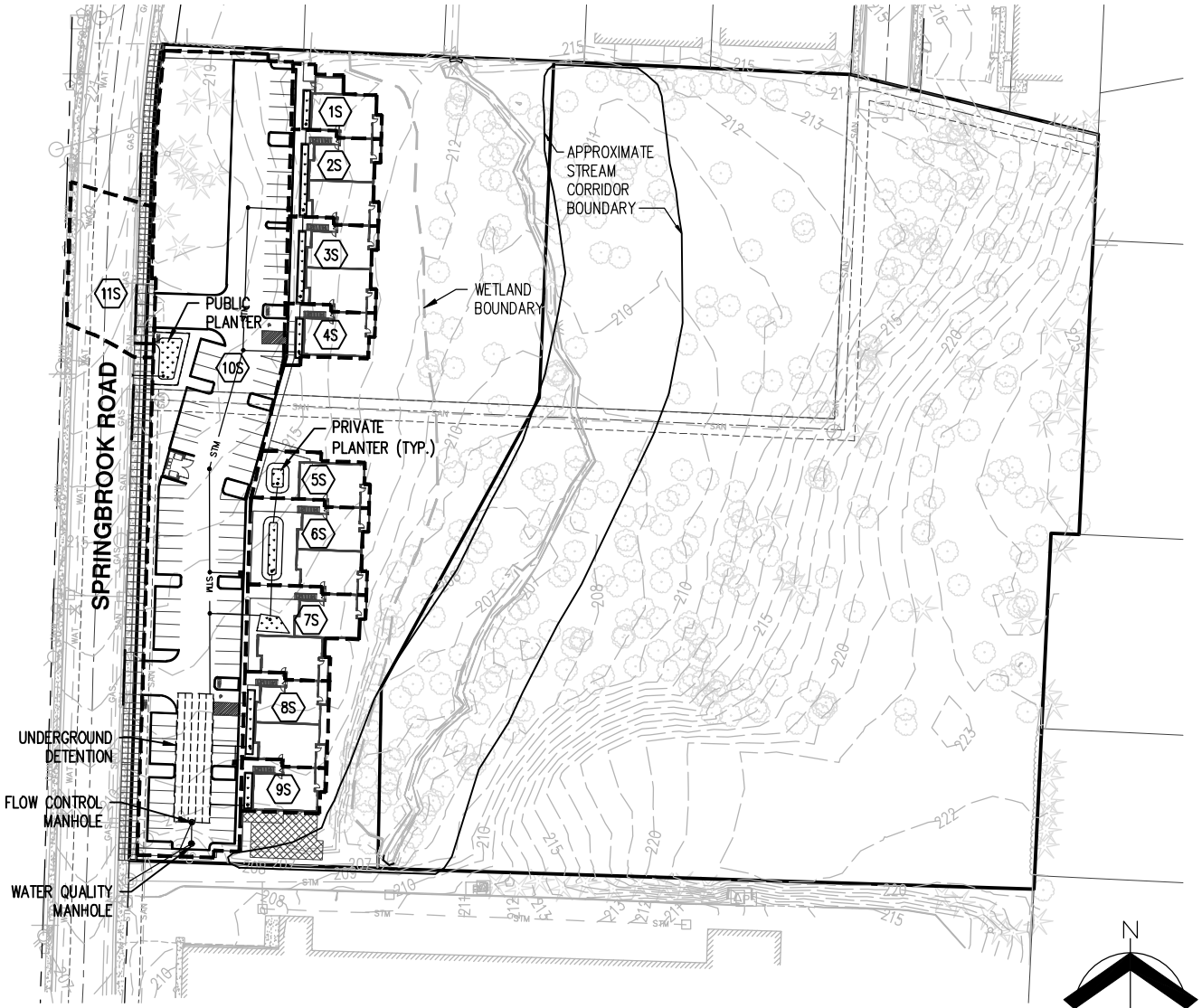
PRE-DEVELOPED BASIN MAP	FIGURE 2
SPRINGBROOK APARTMENTS	

AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD, STE 100
TUALATIN, OR 97062
P: 503.563.6151 F: 503.563.6152 aks-eng.com

DRWN: AMC
CHKD: CEG
AKS JOB: 5797

DWG: 5797 20180328 BASIN MAP | PRE

APPENDIX C
POST-DEVELOPED BASIN MAP



N

SCALE: 1"= 80 FEET

80 0 32 48 64 80

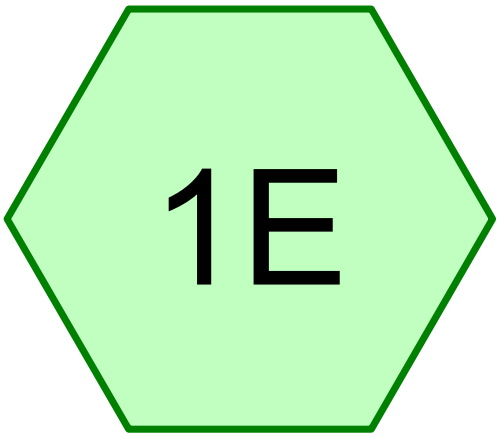
1" = 160 FEET
WHEN PRINTED ON 8.5"X11"

DATE: 3/30/2018

POST-DEVELOPED BASIN MAP	FIGURE 3
SPRINGBROOK APARTMENTS	
AKS ENGINEERING & FORESTRY, LLC 12965 SW HERMAN RD, STE 100 TUALATIN, OR 97062 P: 503.563.6151 F: 503.563.6152 aks-eng.com	DRWN: AMC CHKD: CEG AKS JOB: 5797

DWG: 5797 20180328 BASIN MAP | POST

APPENDIX D
PRE-DEVELOPED SITE STORM EVENTS ANALYSIS



EXISTING

Subcat Reach Pond Link

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.178	80	>75% Grass cover, Good, HSG C (1E)
0.570	84	>75% Grass cover, Good, HSG D (1E)
0.201	73	Woods, Fair, HSG C (1E)
1.949	**80**	**TOTAL AREA**

Summary for Subcatchment 1E: EXISTING

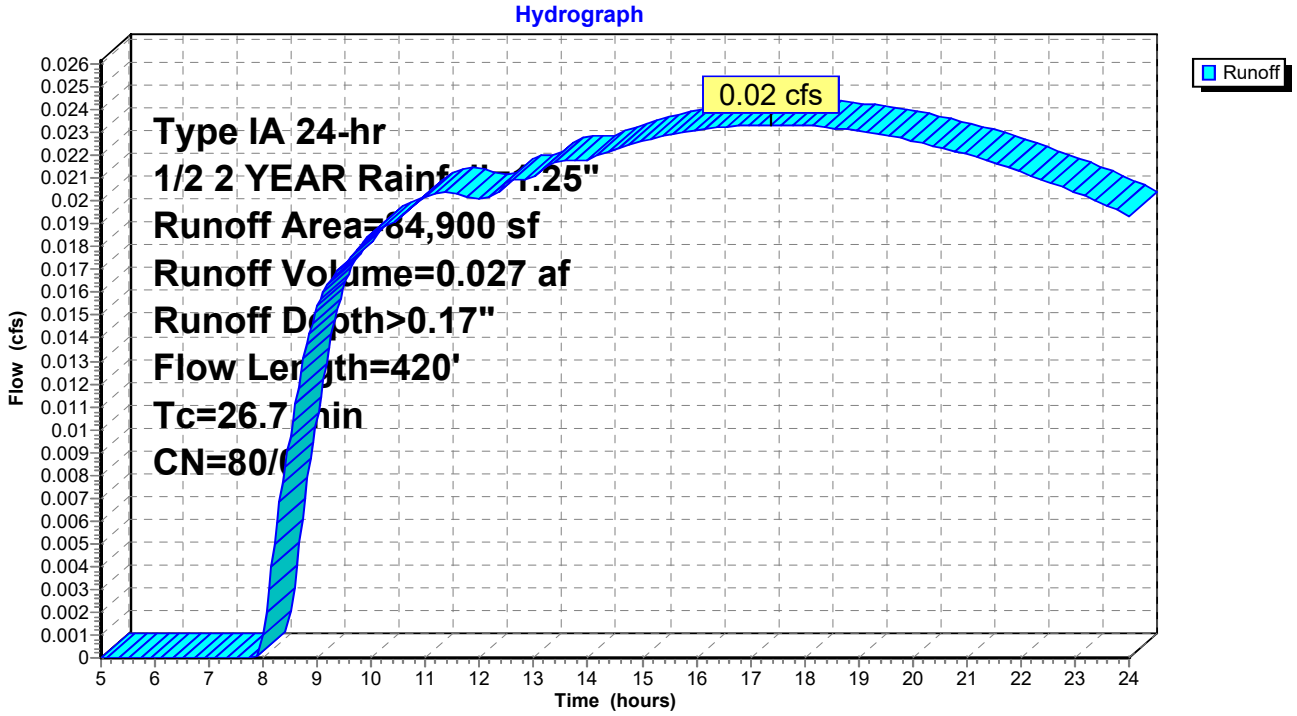
Runoff = 0.02 cfs @ 17.39 hrs, Volume= 0.027 af, Depth> 0.17"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 1/2 2 YEAR Rainfall=1.25"

	Area (sf)	CN	Description
*	24,817	84	>75% Grass cover, Good, HSG D
*	51,326	80	>75% Grass cover, Good, HSG C
	8,757	73	Woods, Fair, HSG C
	84,900	80	Weighted Average
	84,900		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.2	300	0.0230	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.50"
1.5	120	0.0375	1.36		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
26.7	420	Total			

Subcatchment 1E: EXISTING



Summary for Subcatchment 1E: EXISTING

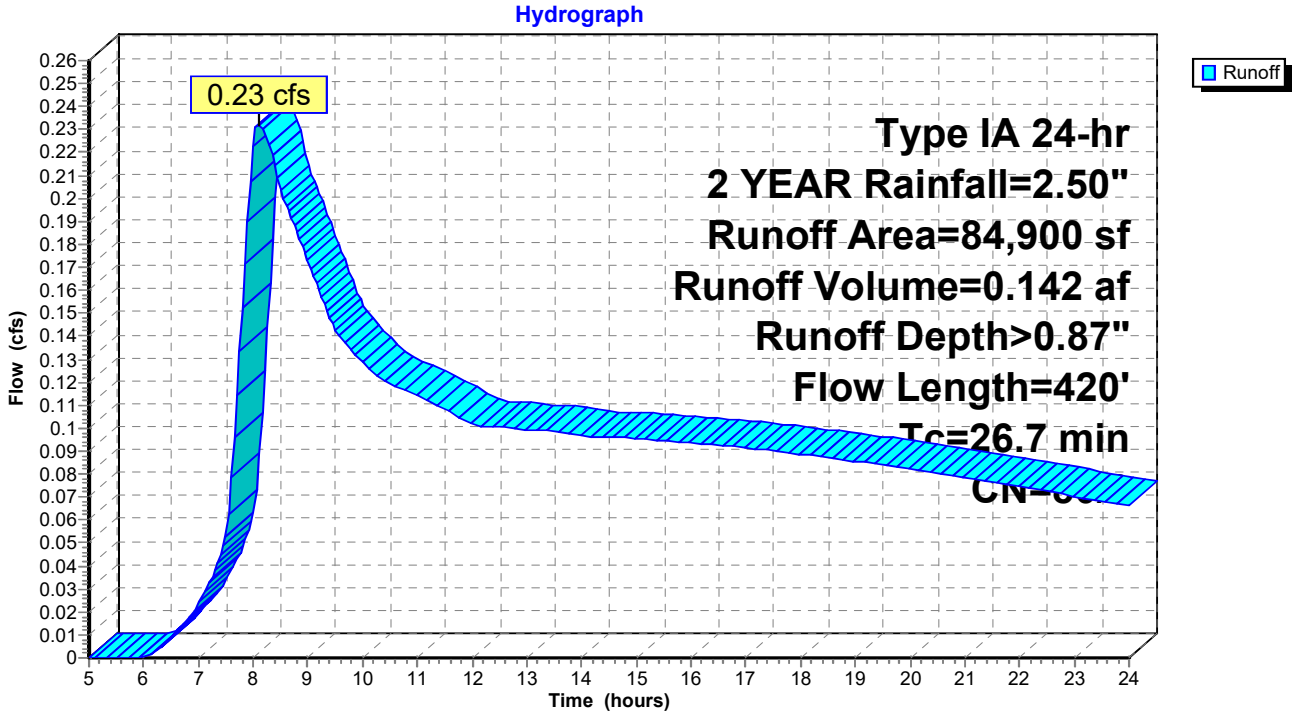
Runoff = 0.23 cfs @ 8.11 hrs, Volume= 0.142 af, Depth> 0.87"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2 YEAR Rainfall=2.50"

	Area (sf)	CN	Description
*	24,817	84	>75% Grass cover, Good, HSG D
*	51,326	80	>75% Grass cover, Good, HSG C
	8,757	73	Woods, Fair, HSG C
	84,900	80	Weighted Average
	84,900		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.2	300	0.0230	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.50"
1.5	120	0.0375	1.36		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
26.7	420	Total			

Subcatchment 1E: EXISTING



Summary for Subcatchment 1E: EXISTING

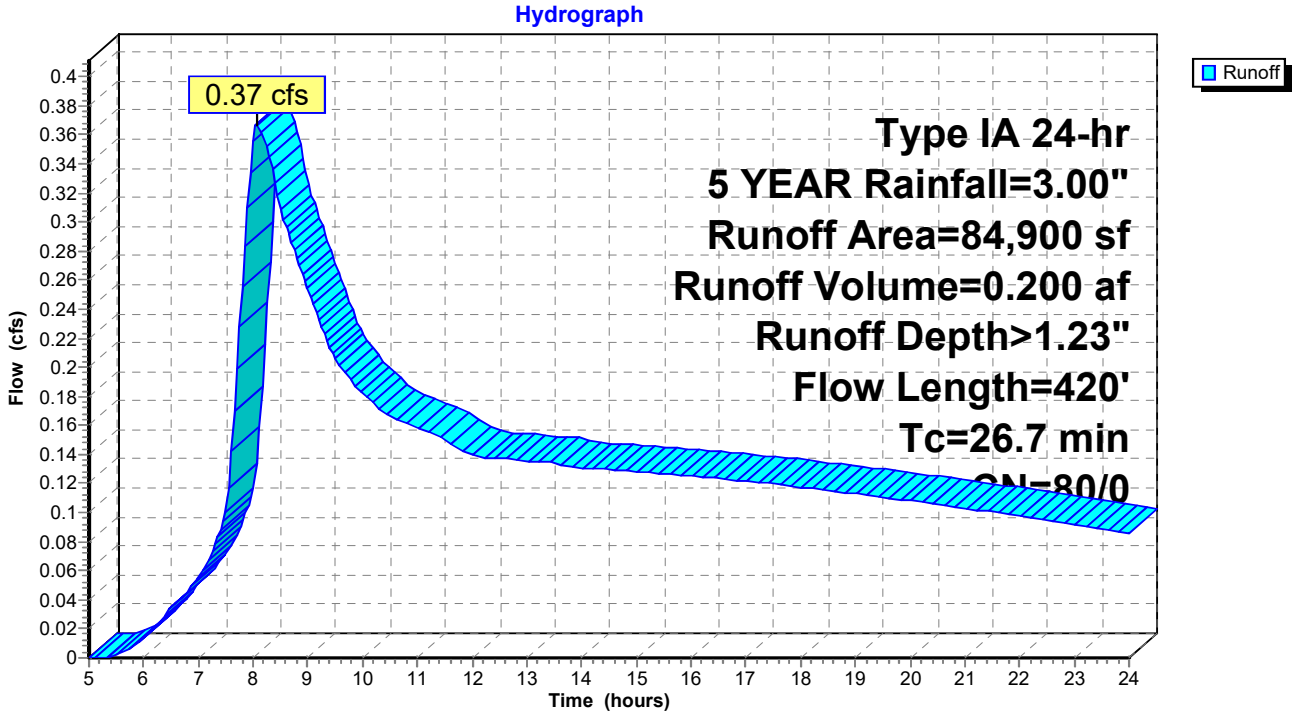
Runoff = 0.37 cfs @ 8.07 hrs, Volume= 0.200 af, Depth> 1.23"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 5 YEAR Rainfall=3.00"

	Area (sf)	CN	Description
*	24,817	84	>75% Grass cover, Good, HSG D
*	51,326	80	>75% Grass cover, Good, HSG C
	8,757	73	Woods, Fair, HSG C
	84,900	80	Weighted Average
	84,900		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.2	300	0.0230	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.50"
1.5	120	0.0375	1.36		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
26.7	420	Total			

Subcatchment 1E: EXISTING



Summary for Subcatchment 1E: EXISTING

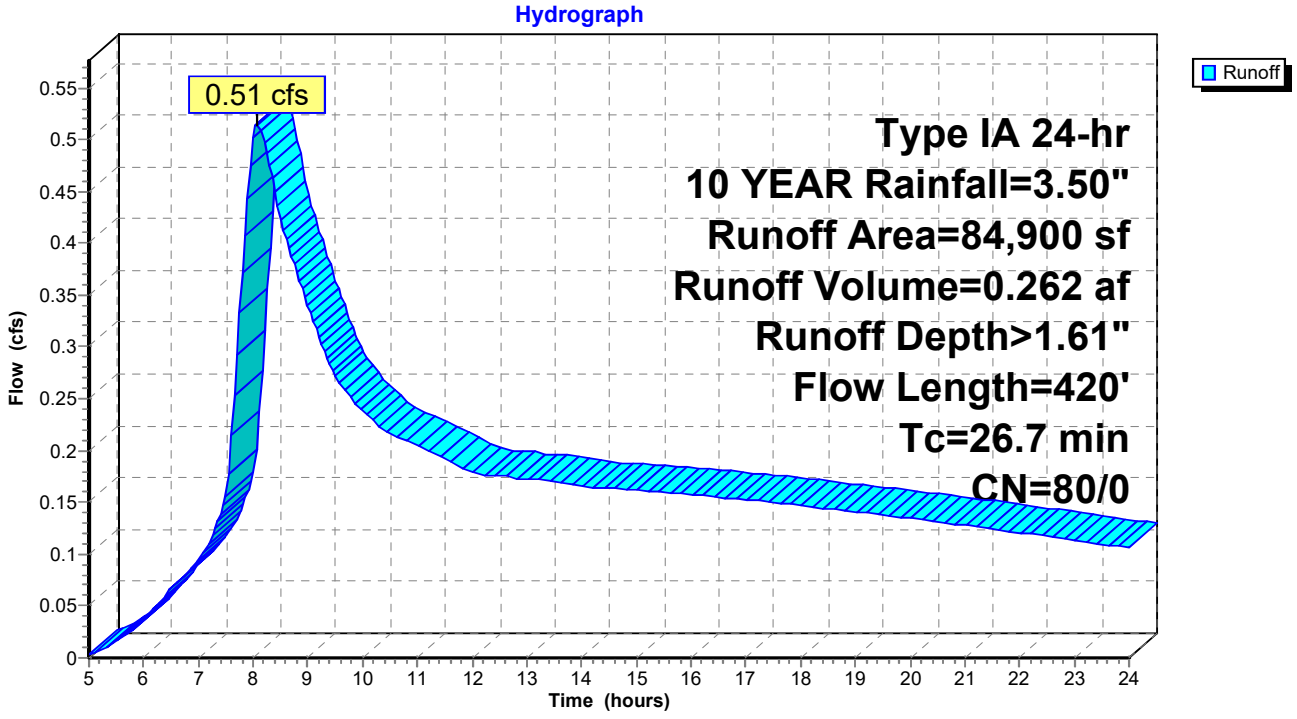
Runoff = 0.51 cfs @ 8.07 hrs, Volume= 0.262 af, Depth> 1.61"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10 YEAR Rainfall=3.50"

	Area (sf)	CN	Description
*	24,817	84	>75% Grass cover, Good, HSG D
*	51,326	80	>75% Grass cover, Good, HSG C
	8,757	73	Woods, Fair, HSG C
	84,900	80	Weighted Average
	84,900		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.2	300	0.0230	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.50"
1.5	120	0.0375	1.36		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
26.7	420	Total			

Subcatchment 1E: EXISTING



Summary for Subcatchment 1E: EXISTING

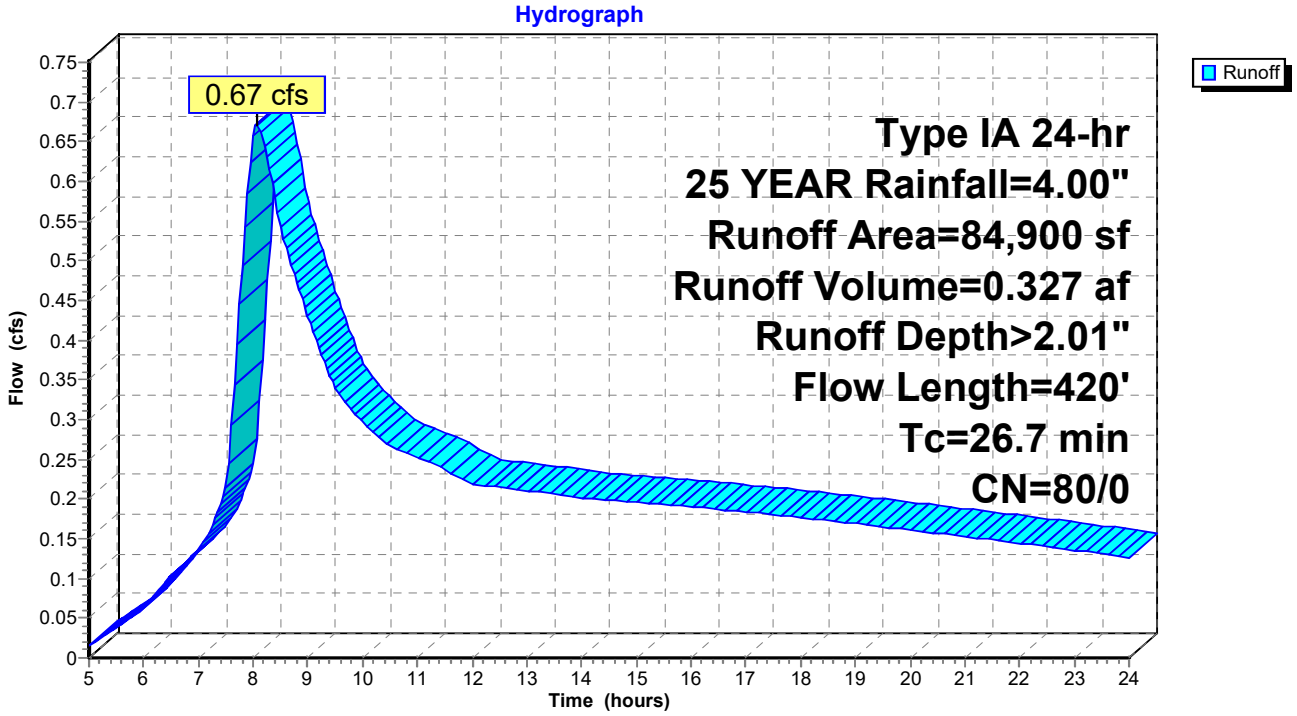
Runoff = 0.67 cfs @ 8.06 hrs, Volume= 0.327 af, Depth> 2.01"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25 YEAR Rainfall=4.00"

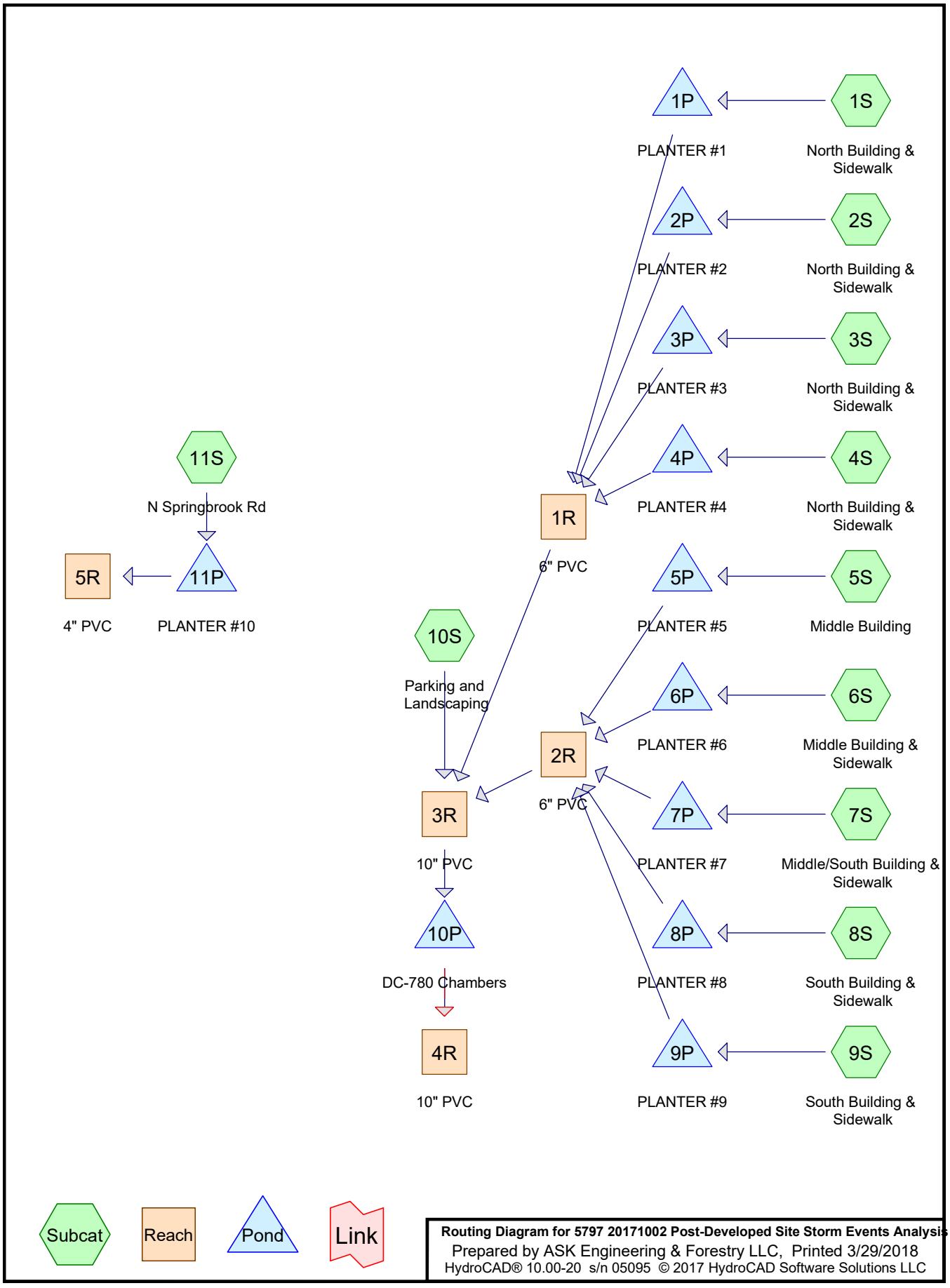
	Area (sf)	CN	Description
*	24,817	84	>75% Grass cover, Good, HSG D
*	51,326	80	>75% Grass cover, Good, HSG C
	8,757	73	Woods, Fair, HSG C
	84,900	80	Weighted Average
	84,900		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.2	300	0.0230	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.50"
1.5	120	0.0375	1.36		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
26.7	420	Total			

Subcatchment 1E: EXISTING



APPENDIX E
POST-DEVELOPED SITE STORM EVENTS ANALYSIS



Routing Diagram for 5797 20171002 Post-Developed Site Storm Events Analysis

Prepared by ASK Engineering & Forestry LLC, Printed 3/29/2018

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.337	84	50-75% Grass cover, Fair, HSG D (10S)
0.143	98	Concrete Sidewalk (1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S)
0.145	98	N Springbrook Rd Section to be treated (11S)
0.725	98	Paved Parking (10S)
0.460	98	Roofs (1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S)
1.810	**95**	**TOTAL AREA**

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment 1S: North Building & Runoff Area=1,748 sf 100.00% Impervious Runoff Depth=1.03"
Tc=5.0 min CN=0/98 Runoff=0.01 cfs 0.003 af

Subcatchment 2S: North Building & Runoff Area=3,051 sf 100.00% Impervious Runoff Depth=1.03"
Tc=5.0 min CN=0/98 Runoff=0.02 cfs 0.006 af

Subcatchment 3S: North Building & Runoff Area=3,051 sf 100.00% Impervious Runoff Depth=1.03"
Tc=5.0 min CN=0/98 Runoff=0.02 cfs 0.006 af

Subcatchment 4S: North Building & Runoff Area=1,700 sf 100.00% Impervious Runoff Depth=1.03"
Tc=5.0 min CN=0/98 Runoff=0.01 cfs 0.003 af

Subcatchment 5S: Middle Building Runoff Area=1,658 sf 100.00% Impervious Runoff Depth=1.03"
Tc=5.0 min CN=0/98 Runoff=0.01 cfs 0.003 af

Subcatchment 6S: Middle Building & Runoff Area=3,291 sf 100.00% Impervious Runoff Depth=1.03"
Tc=5.0 min CN=0/98 Runoff=0.02 cfs 0.007 af

Subcatchment 7S: Middle/South Building Runoff Area=3,309 sf 100.00% Impervious Runoff Depth=1.03"
Tc=5.0 min CN=0/98 Runoff=0.02 cfs 0.007 af

Subcatchment 8S: South Building & Runoff Area=3,051 sf 100.00% Impervious Runoff Depth=1.03"
Tc=5.0 min CN=0/98 Runoff=0.02 cfs 0.006 af

Subcatchment 9S: South Building & Runoff Area=1,699 sf 100.00% Impervious Runoff Depth=1.03"
Tc=5.0 min CN=0/98 Runoff=0.01 cfs 0.003 af

Subcatchment 10S: Parking and Runoff Area=49,998 sf 70.63% Impervious Runoff Depth=0.81"
Tc=5.0 min CN=84/98 Runoff=0.23 cfs 0.078 af

Subcatchment 11S: N Springbrook Rd Runoff Area=6,300 sf 100.00% Impervious Runoff Depth=1.03"
Tc=5.0 min CN=0/98 Runoff=0.04 cfs 0.012 af

Reach 1R: 6" PVC Avg. Flow Depth=0.06' Max Vel=1.91 fps Inflow=0.03 cfs 0.019 af
6.0" Round Pipe n=0.013 L=37.5' S=0.0200 '/' Capacity=0.79 cfs Outflow=0.03 cfs 0.019 af

Reach 2R: 6" PVC Avg. Flow Depth=0.08' Max Vel=2.18 fps Inflow=0.04 cfs 0.026 af
6.0" Round Pipe n=0.013 L=36.1' S=0.0199 '/' Capacity=0.79 cfs Outflow=0.04 cfs 0.026 af

Reach 3R: 10" PVC Avg. Flow Depth=0.21' Max Vel=2.82 fps Inflow=0.30 cfs 0.122 af
10.0" Round Pipe n=0.013 L=57.3' S=0.0101 '/' Capacity=2.20 cfs Outflow=0.30 cfs 0.122 af

Reach 4R: 10" PVC Avg. Flow Depth=0.04' Max Vel=2.71 fps Inflow=0.02 cfs 0.108 af
10.0" Round Pipe n=0.013 L=50.8' S=0.0766 '/' Capacity=6.06 cfs Outflow=0.02 cfs 0.108 af

Reach 5R: 4" PVC Avg. Flow Depth=0.06' Max Vel=2.01 fps Inflow=0.02 cfs 0.012 af
4.0" Round Pipe n=0.013 L=21.2' S=0.0274 '/' Capacity=0.31 cfs Outflow=0.02 cfs 0.012 af

Pond 1P: PLANTER #1 Peak Elev=216.53' Storage=11 cf Inflow=0.01 cfs 0.003 af
Outflow=0.00 cfs 0.003 af

Pond 2P: PLANTER #2 Peak Elev=216.30' Storage=18 cf Inflow=0.02 cfs 0.006 af
Outflow=0.01 cfs 0.006 af

Pond 3P: PLANTER #3 Peak Elev=216.37' Storage=18 cf Inflow=0.02 cfs 0.006 af
Outflow=0.01 cfs 0.006 af

Pond 4P: PLANTER #4 Peak Elev=216.62' Storage=10 cf Inflow=0.01 cfs 0.003 af
Outflow=0.01 cfs 0.003 af

Pond 5P: PLANTER #5 Peak Elev=212.31' Storage=9 cf Inflow=0.01 cfs 0.003 af
Outflow=0.01 cfs 0.003 af

Pond 6P: PLANTER #6 Peak Elev=211.78' Storage=16 cf Inflow=0.02 cfs 0.007 af
Outflow=0.01 cfs 0.007 af

Pond 7P: PLANTER #7 Peak Elev=210.47' Storage=17 cf Inflow=0.02 cfs 0.007 af
Outflow=0.01 cfs 0.007 af

Pond 8P: PLANTER #8 Peak Elev=209.56' Storage=17 cf Inflow=0.02 cfs 0.006 af
Outflow=0.01 cfs 0.006 af

Pond 9P: PLANTER #9 Peak Elev=209.37' Storage=9 cf Inflow=0.01 cfs 0.003 af
Outflow=0.01 cfs 0.003 af

Pond 10P: DC-780 Chambers Peak Elev=206.55' Storage=0.089 af Inflow=0.30 cfs 0.122 af
Primary=0.02 cfs 0.108 af Secondary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.108 af

Pond 11P: PLANTER #10 Peak Elev=217.24' Storage=37 cf Inflow=0.04 cfs 0.012 af
Outflow=0.02 cfs 0.012 af

Total Runoff Area = 1.810 ac Runoff Volume = 0.135 af Average Runoff Depth = 0.89"
18.62% Pervious = 0.337 ac 81.38% Impervious = 1.473 ac

Summary for Subcatchment 1S: North Building & Sidewalk

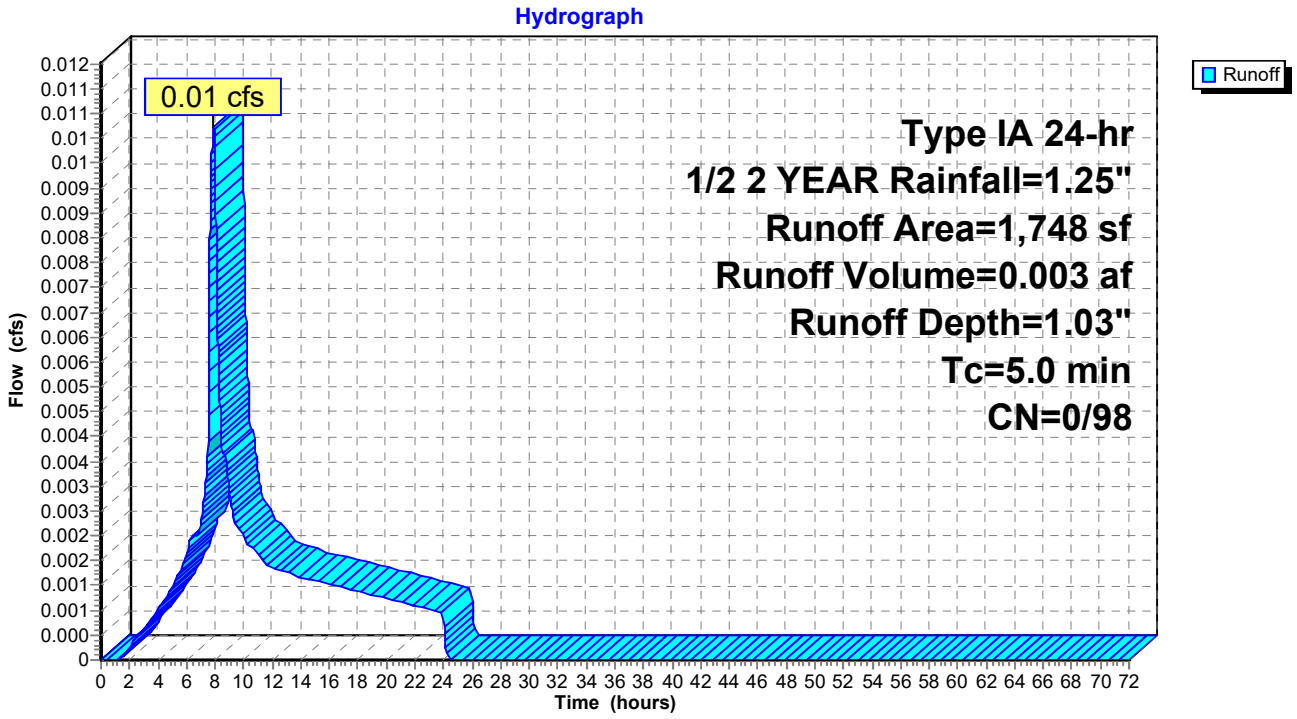
Runoff = 0.01 cfs @ 7.89 hrs, Volume= 0.003 af, Depth= 1.03"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type IA 24-hr 1/2 2 YEAR Rainfall=1.25"

	Area (sf)	CN	Description
*	1,698	98	Roofs
*	50	98	Concrete Sidewalk
	1,748	98	Weighted Average
	1,748		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 1S: North Building & Sidewalk



Summary for Subcatchment 2S: North Building & Sidewalk

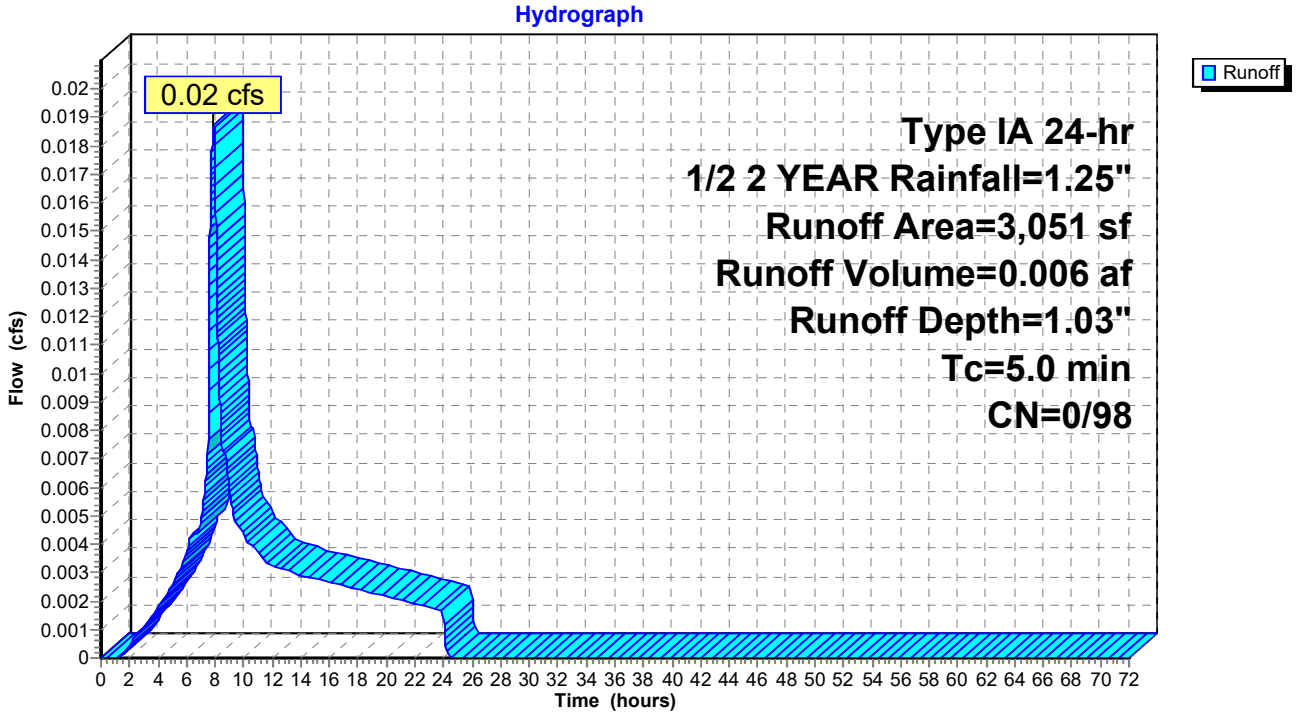
Runoff = 0.02 cfs @ 7.89 hrs, Volume= 0.006 af, Depth= 1.03"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type IA 24-hr 1/2 2 YEAR Rainfall=1.25"

	Area (sf)	CN	Description
*	2,798	98	Roofs
*	253	98	Concrete Sidewalk
	3,051	98	Weighted Average
	3,051		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 2S: North Building & Sidewalk



Summary for Subcatchment 3S: North Building & Sidewalk

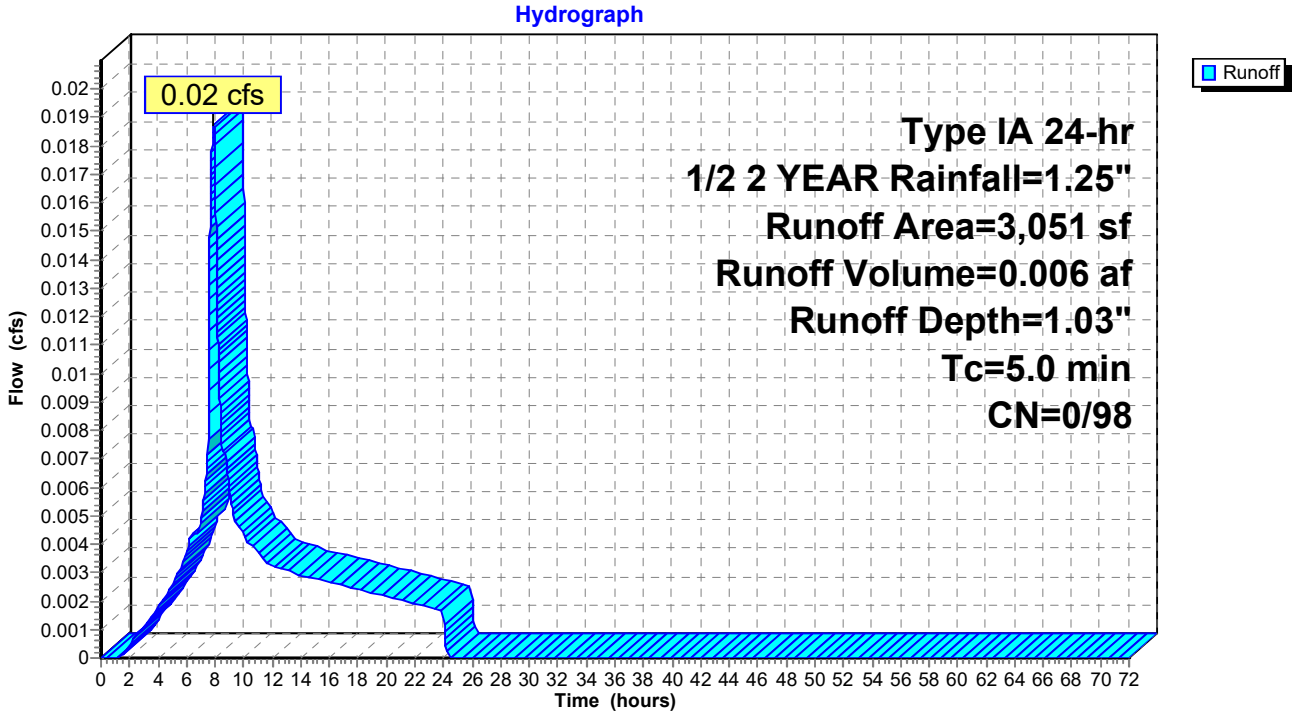
Runoff = 0.02 cfs @ 7.89 hrs, Volume= 0.006 af, Depth= 1.03"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type IA 24-hr 1/2 2 YEAR Rainfall=1.25"

	Area (sf)	CN	Description
*	2,798	98	Roofs
*	253	98	Concrete Sidewalk
	3,051	98	Weighted Average
	3,051		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 3S: North Building & Sidewalk



Summary for Subcatchment 4S: North Building & Sidewalk

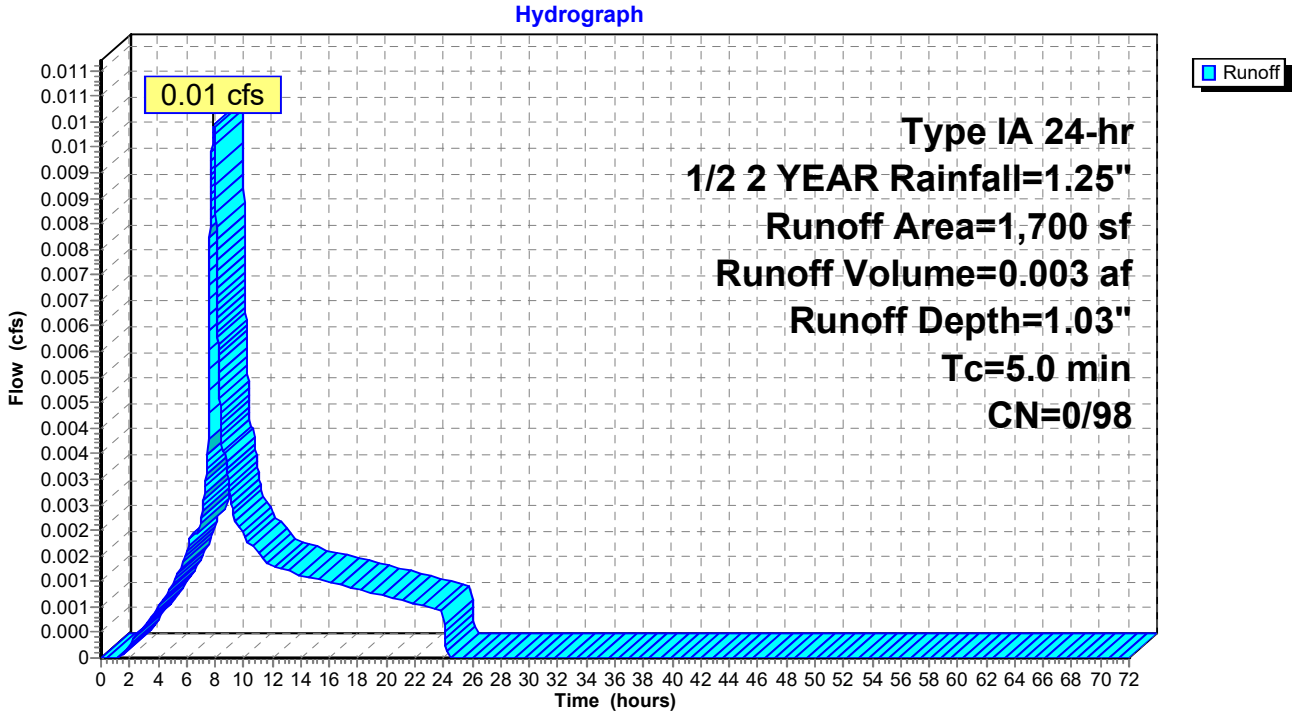
Runoff = 0.01 cfs @ 7.89 hrs, Volume= 0.003 af, Depth= 1.03"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type IA 24-hr 1/2 2 YEAR Rainfall=1.25"

	Area (sf)	CN	Description
*	1,447	98	Roofs
*	253	98	Concrete Sidewalk
	1,700	98	Weighted Average
	1,700		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 4S: North Building & Sidewalk



Summary for Subcatchment 5S: Middle Building

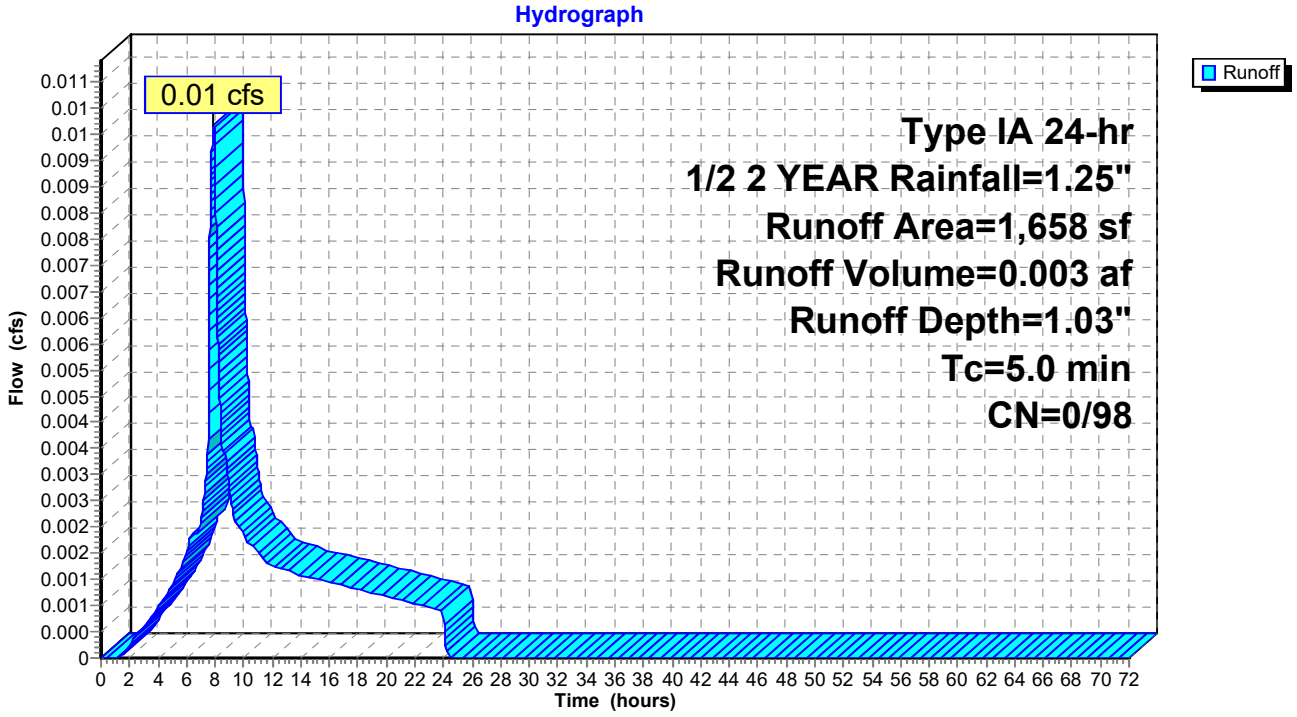
Runoff = 0.01 cfs @ 7.89 hrs, Volume= 0.003 af, Depth= 1.03"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type IA 24-hr 1/2 2 YEAR Rainfall=1.25"

	Area (sf)	CN	Description
*	1,447	98	Roofs
*	211	98	Concrete Sidewalk
	1,658	98	Weighted Average
	1,658		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 5S: Middle Building



Summary for Subcatchment 6S: Middle Building & Sidewalk

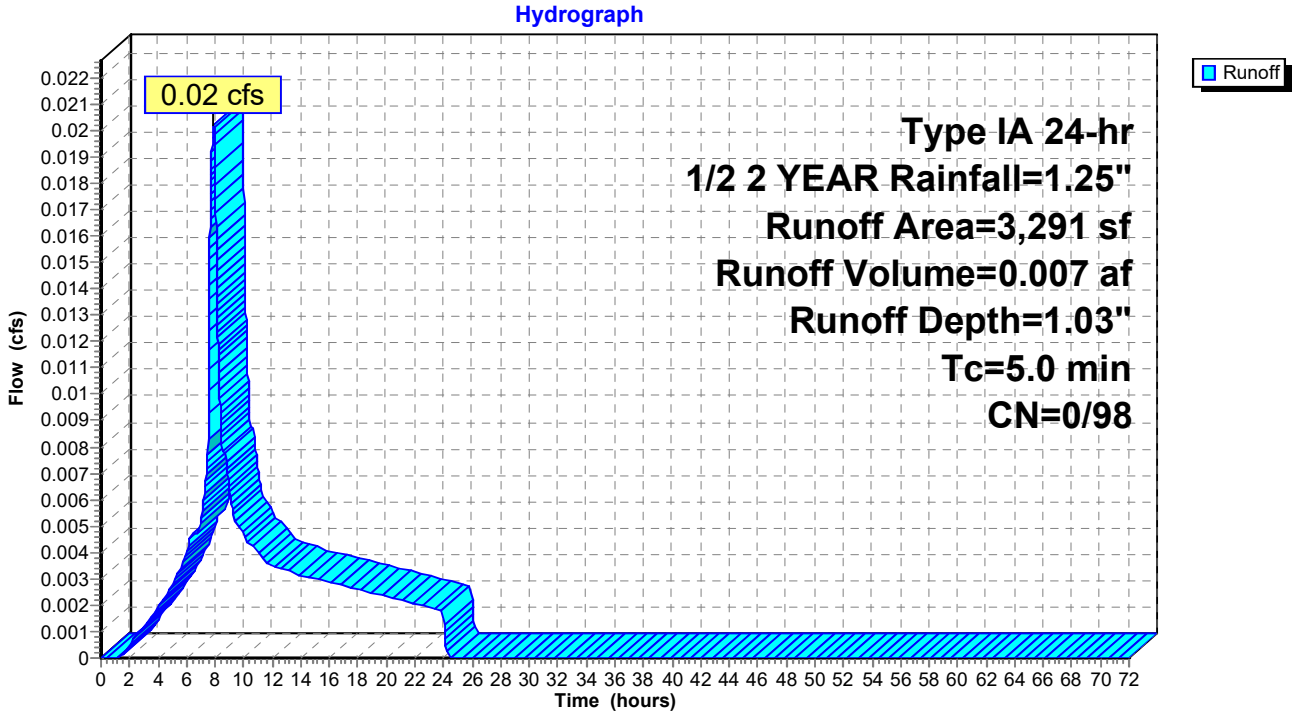
Runoff = 0.02 cfs @ 7.89 hrs, Volume= 0.007 af, Depth= 1.03"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type IA 24-hr 1/2 2 YEAR Rainfall=1.25"

	Area (sf)	CN	Description
*	2,798	98	Roofs
*	493	98	Concrete Sidewalk
	3,291	98	Weighted Average
	3,291		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 6S: Middle Building & Sidewalk



Summary for Subcatchment 7S: Middle/South Building & Sidewalk

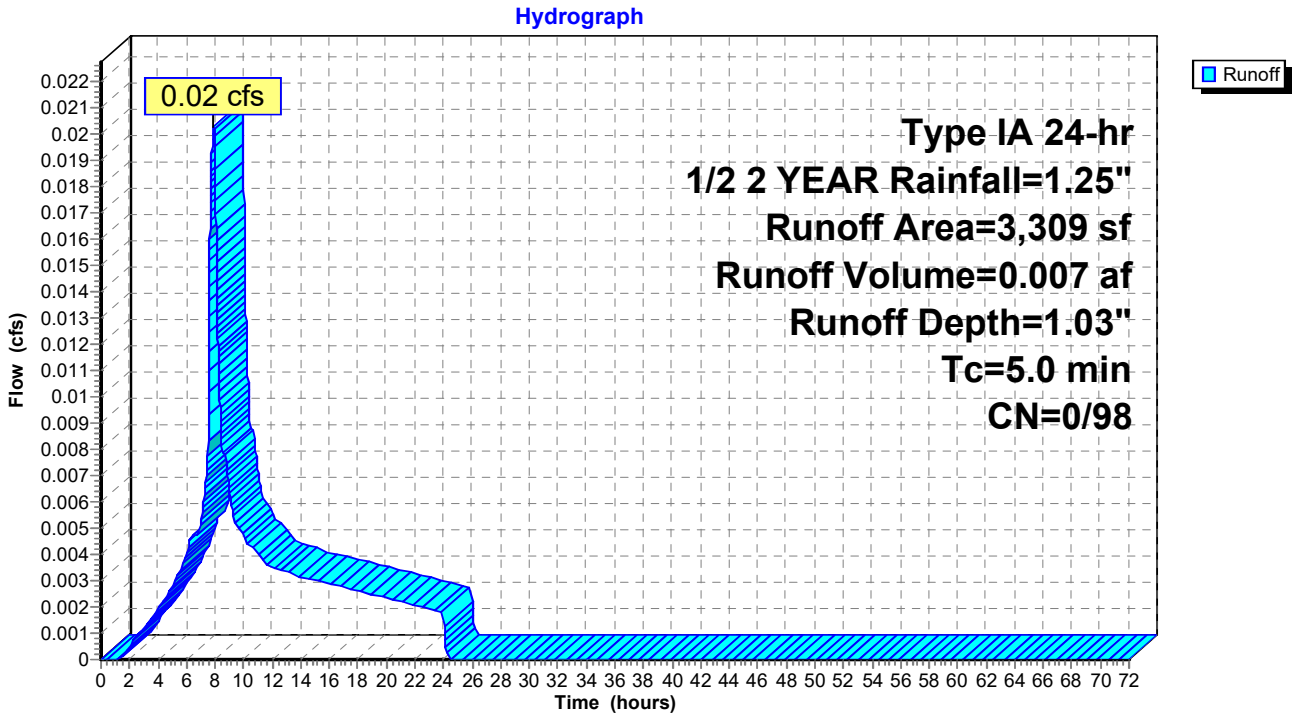
Runoff = 0.02 cfs @ 7.89 hrs, Volume= 0.007 af, Depth= 1.03"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type IA 24-hr 1/2 2 YEAR Rainfall=1.25"

	Area (sf)	CN	Description
*	1,406	98	Roofs
*	1,407	98	Roofs
*	496	98	Concrete Sidewalk
	3,309	98	Weighted Average
	3,309		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 7S: Middle/South Building & Sidewalk



Summary for Subcatchment 8S: South Building & Sidewalk

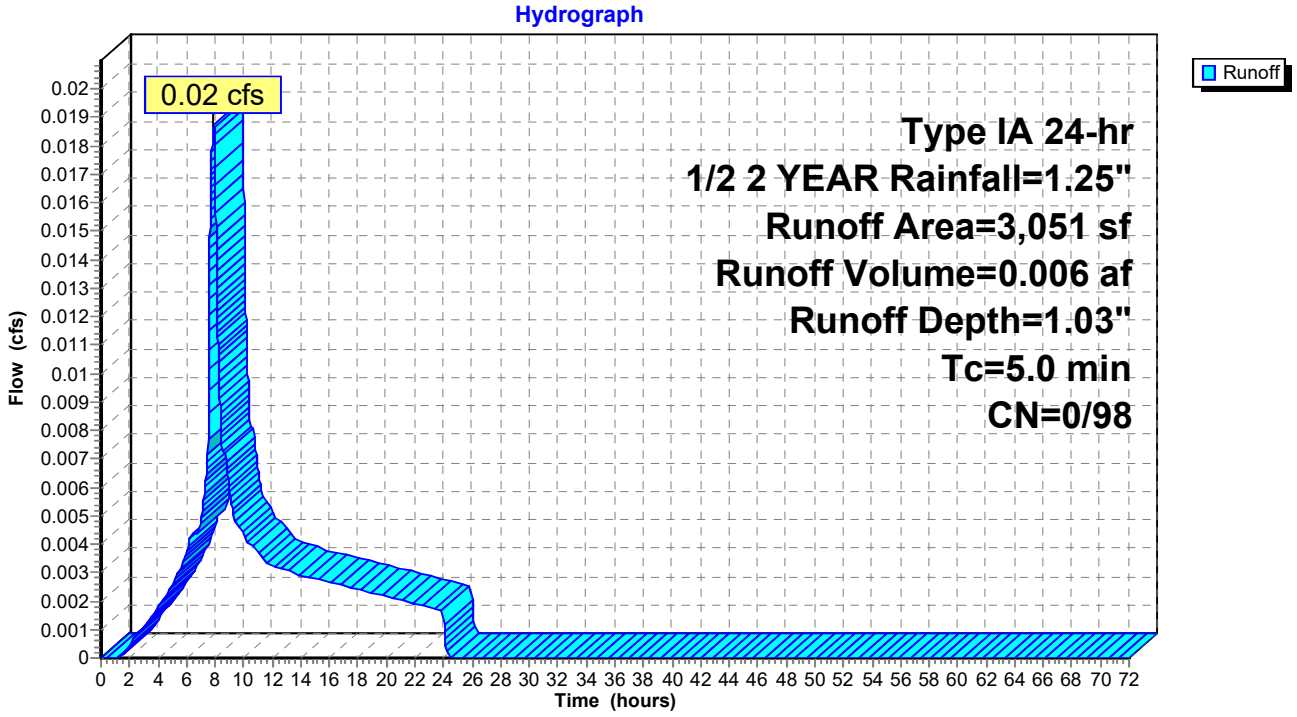
Runoff = 0.02 cfs @ 7.89 hrs, Volume= 0.006 af, Depth= 1.03"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type IA 24-hr 1/2 2 YEAR Rainfall=1.25"

	Area (sf)	CN	Description
*	2,798	98	Roofs
*	253	98	Concrete Sidewalk
	3,051	98	Weighted Average
	3,051		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 8S: South Building & Sidewalk



Summary for Subcatchment 9S: South Building & Sidewalk

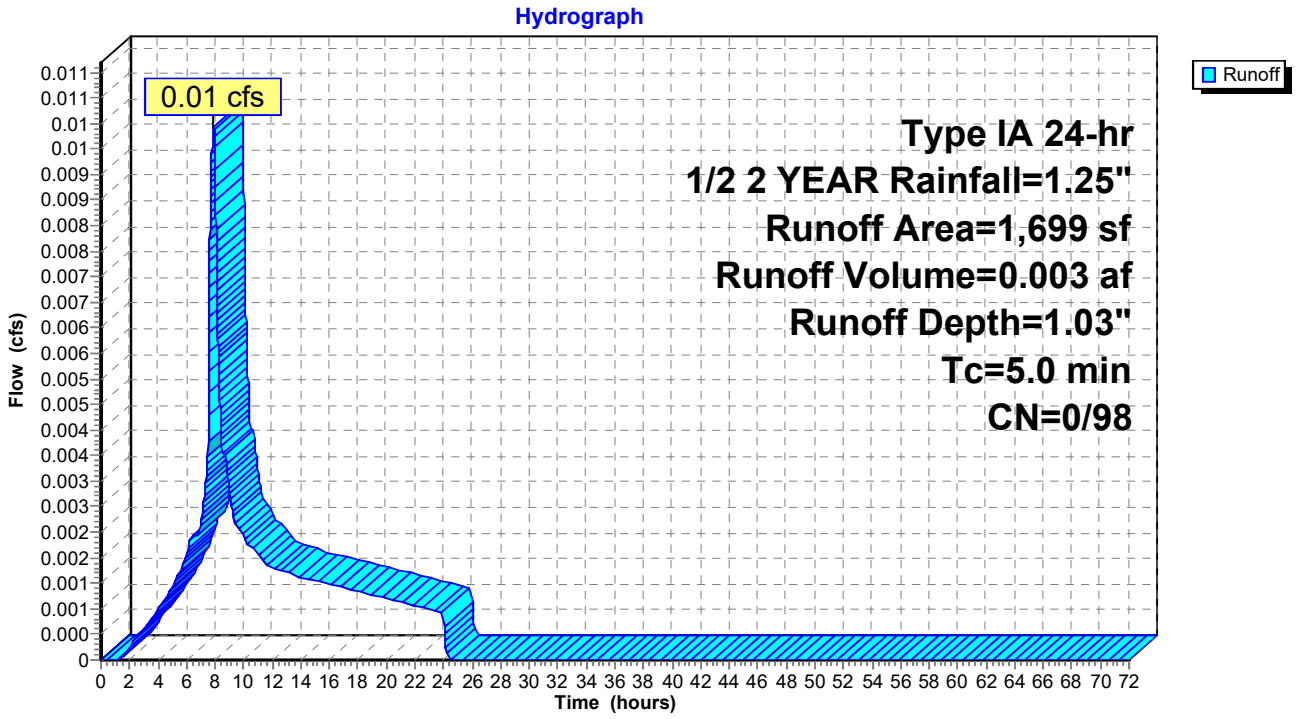
Runoff = 0.01 cfs @ 7.89 hrs, Volume= 0.003 af, Depth= 1.03"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type IA 24-hr 1/2 2 YEAR Rainfall=1.25"

	Area (sf)	CN	Description
*	1,447	98	Roofs
*	252	98	Concrete Sidewalk
	1,699	98	Weighted Average
	1,699		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 9S: South Building & Sidewalk



Summary for Subcatchment 10S: Parking and Landscaping

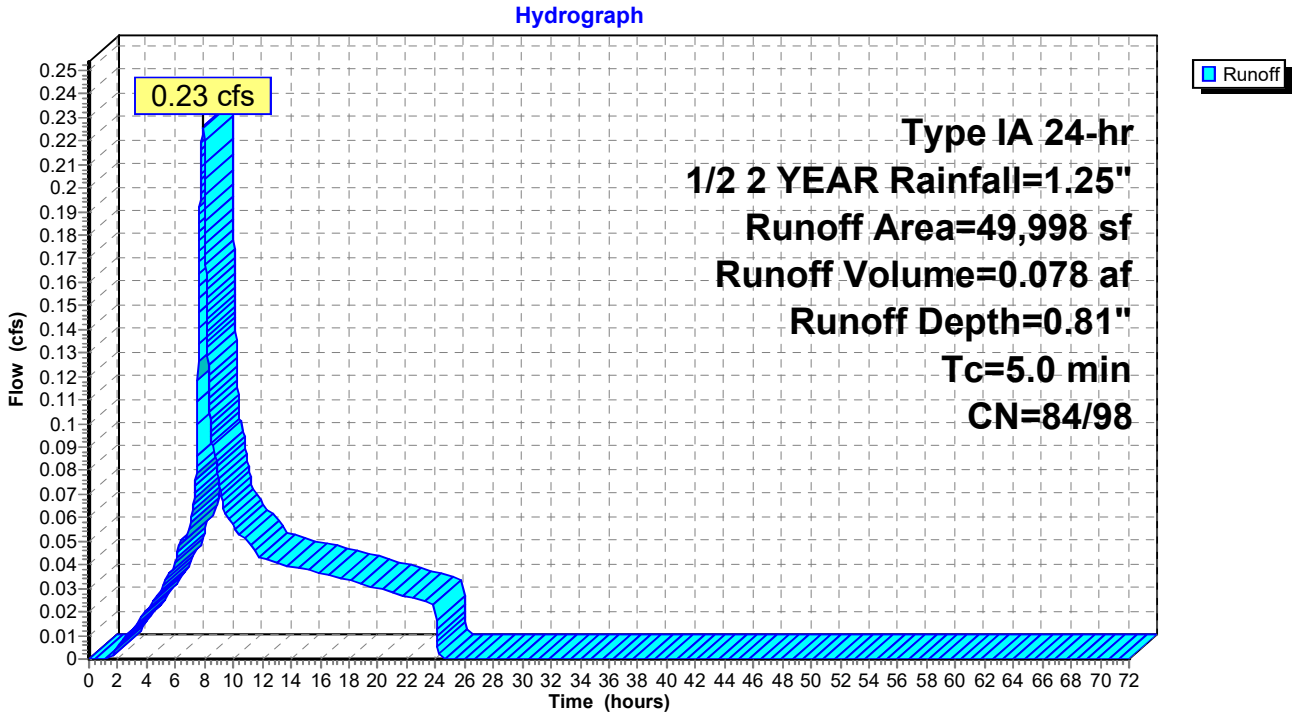
Runoff = 0.23 cfs @ 7.91 hrs, Volume= 0.078 af, Depth= 0.81"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type IA 24-hr 1/2 2 YEAR Rainfall=1.25"

	Area (sf)	CN	Description
	14,686	84	50-75% Grass cover, Fair, HSG D
*	31,601	98	Paved Parking
*	3,711	98	Concrete Sidewalk
	49,998	94	Weighted Average
	14,686		29.37% Pervious Area
	35,312		70.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 10S: Parking and Landscaping



Summary for Subcatchment 11S: N Springbrook Rd

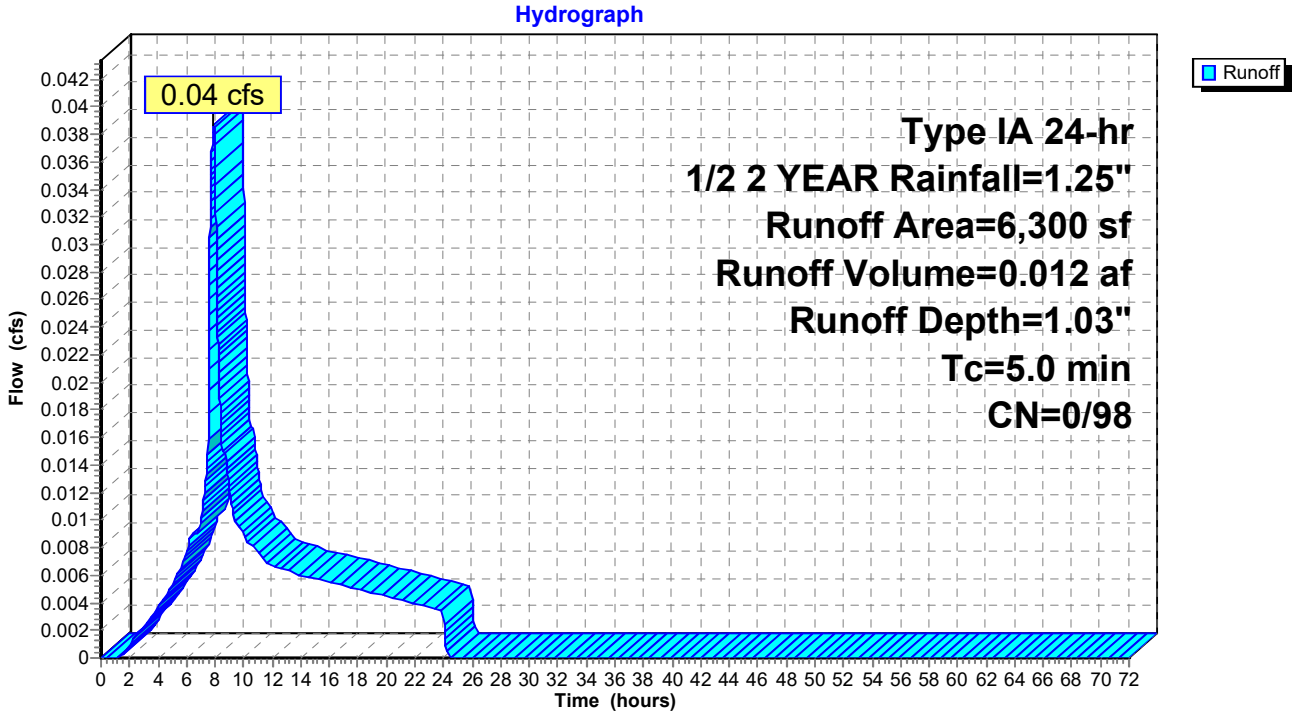
Runoff = 0.04 cfs @ 7.89 hrs, Volume= 0.012 af, Depth= 1.03"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type IA 24-hr 1/2 2 YEAR Rainfall=1.25"

	Area (sf)	CN	Description
*	6,300	98	N Springbrook Rd Section to be treated
	6,300		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 11S: N Springbrook Rd



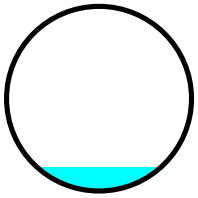
Summary for Reach 1R: 6" PVC

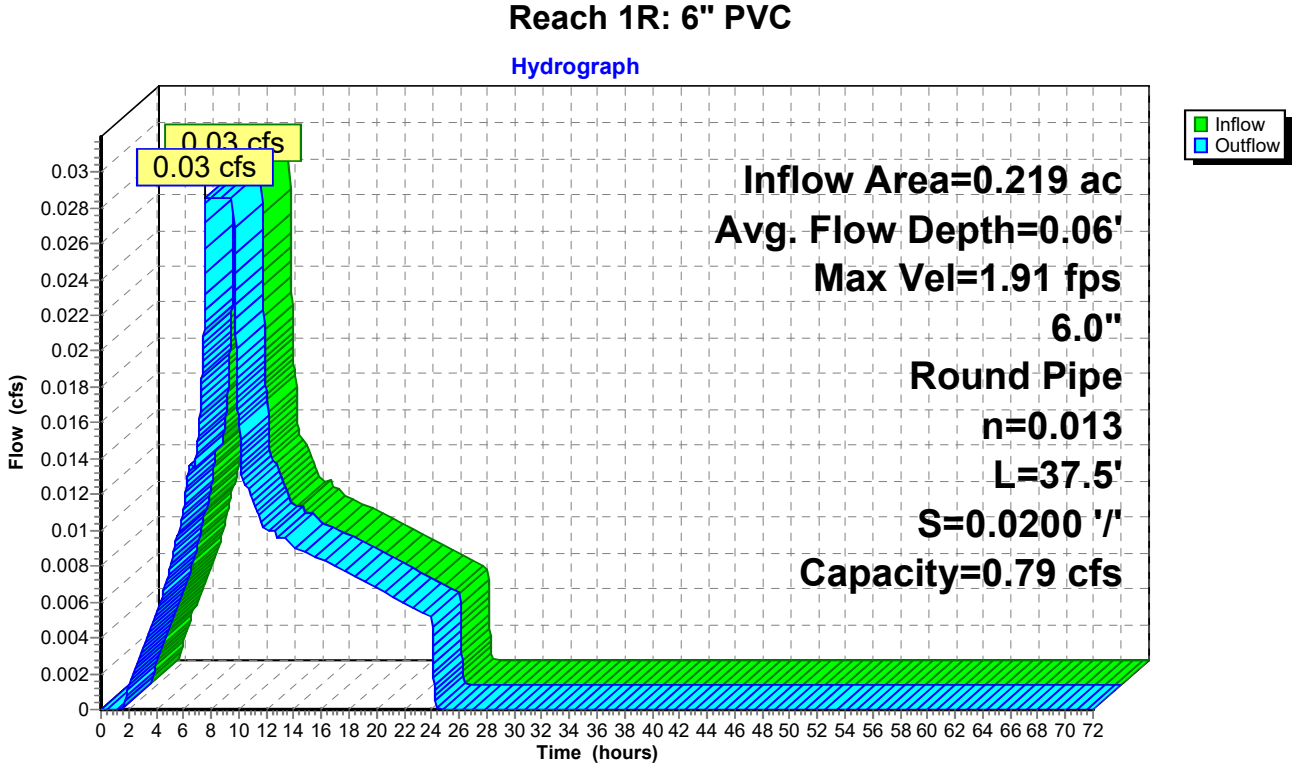
Inflow Area = 0.219 ac,100.00% Impervious, Inflow Depth = 1.03" for 1/2 2 YEAR event
Inflow = 0.03 cfs @ 7.57 hrs, Volume= 0.019 af
Outflow = 0.03 cfs @ 7.58 hrs, Volume= 0.019 af, Atten= 0%, Lag= 0.6 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.91 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.33 fps, Avg. Travel Time= 0.5 min

Peak Storage= 1 cf @ 7.58 hrs
Average Depth at Peak Storage= 0.06'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.79 cfs

6.0" Round Pipe
n= 0.013
Length= 37.5' Slope= 0.0200 '/'
Inlet Invert= 212.29', Outlet Invert= 211.54'





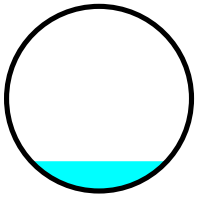
Summary for Reach 2R: 6" PVC

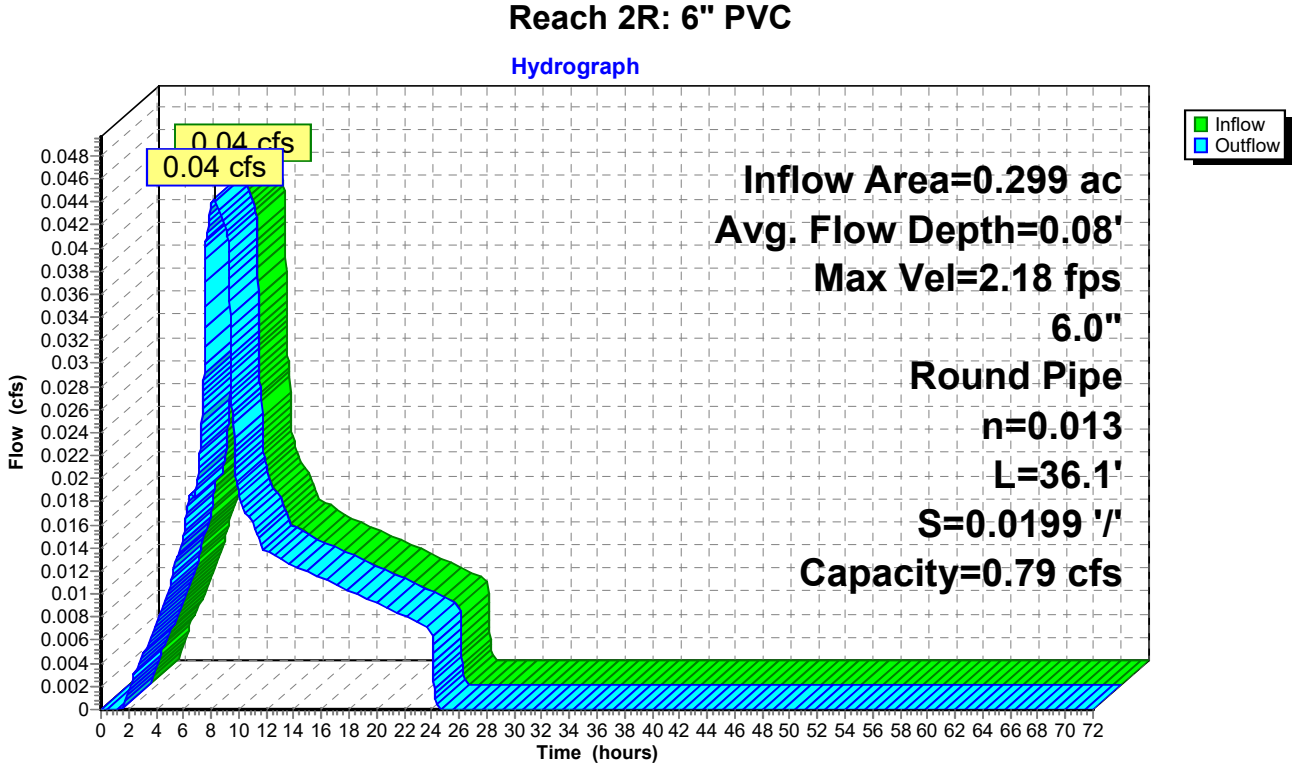
Inflow Area = 0.299 ac,100.00% Impervious, Inflow Depth = 1.03" for 1/2 2 YEAR event
Inflow = 0.04 cfs @ 8.21 hrs, Volume= 0.026 af
Outflow = 0.04 cfs @ 8.21 hrs, Volume= 0.026 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.18 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.45 fps, Avg. Travel Time= 0.4 min

Peak Storage= 1 cf @ 8.21 hrs
Average Depth at Peak Storage= 0.08'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.79 cfs

6.0" Round Pipe
n= 0.013
Length= 36.1' Slope= 0.0199 '/'
Inlet Invert= 208.45', Outlet Invert= 207.73'





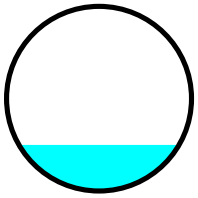
Summary for Reach 3R: 10" PVC

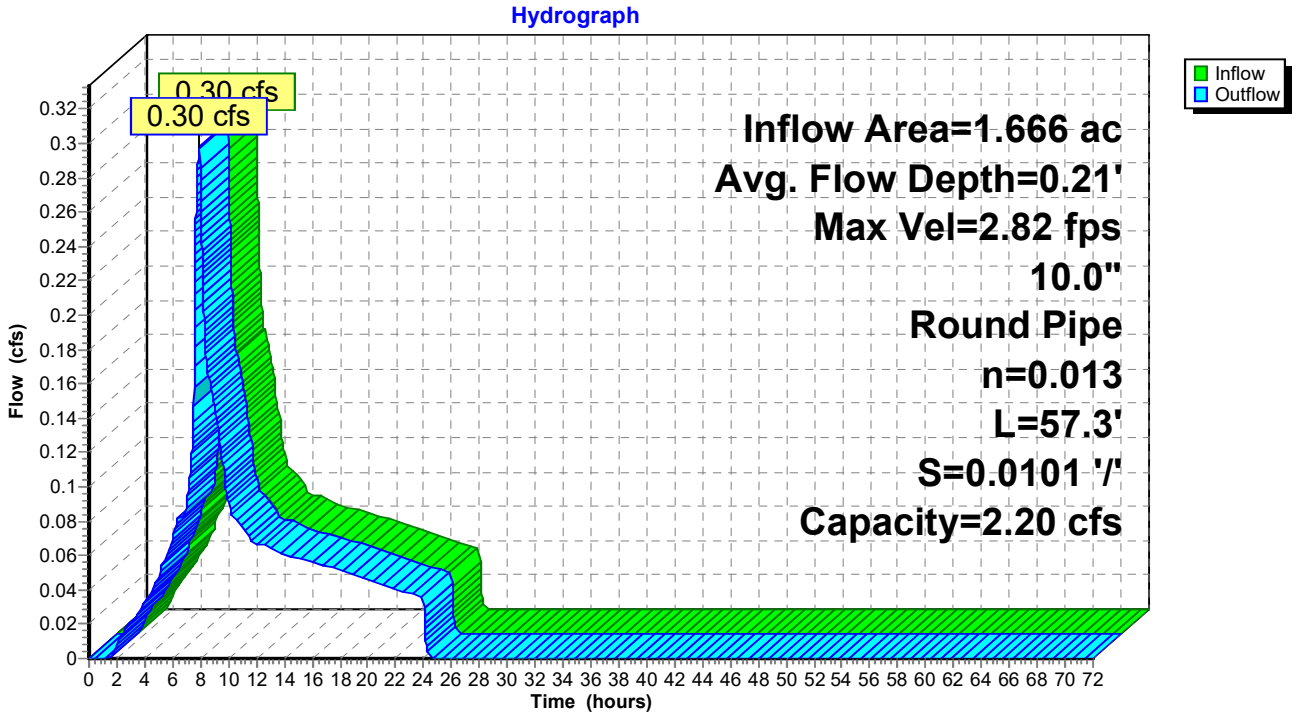
Inflow Area = 1.666 ac, 79.76% Impervious, Inflow Depth = 0.88" for 1/2 2 YEAR event
Inflow = 0.30 cfs @ 7.92 hrs, Volume= 0.122 af
Outflow = 0.30 cfs @ 7.93 hrs, Volume= 0.122 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.82 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.69 fps, Avg. Travel Time= 0.6 min

Peak Storage= 6 cf @ 7.93 hrs
Average Depth at Peak Storage= 0.21'
Bank-Full Depth= 0.83' Flow Area= 0.5 sf, Capacity= 2.20 cfs

10.0" Round Pipe
n= 0.013
Length= 57.3' Slope= 0.0101 '/'
Inlet Invert= 207.73', Outlet Invert= 207.15'





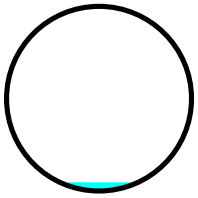
Summary for Reach 4R: 10" PVC

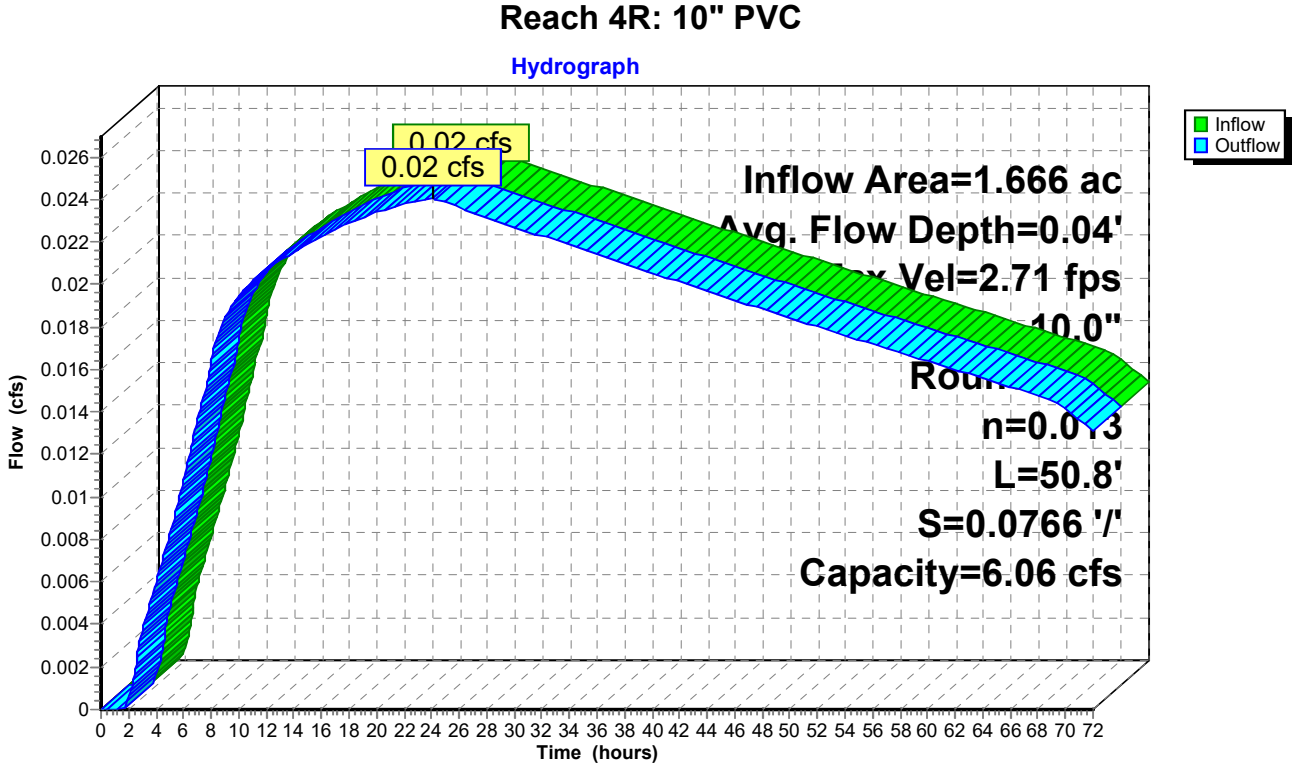
Inflow Area = 1.666 ac, 79.76% Impervious, Inflow Depth > 0.78" for 1/2 2 YEAR event
Inflow = 0.02 cfs @ 24.06 hrs, Volume= 0.108 af
Outflow = 0.02 cfs @ 24.06 hrs, Volume= 0.108 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.71 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 2.48 fps, Avg. Travel Time= 0.3 min

Peak Storage= 0 cf @ 24.06 hrs
Average Depth at Peak Storage= 0.04'
Bank-Full Depth= 0.83' Flow Area= 0.5 sf, Capacity= 6.06 cfs

10.0" Round Pipe
n= 0.013
Length= 50.8' Slope= 0.0766 '/'
Inlet Invert= 206.97', Outlet Invert= 203.08'





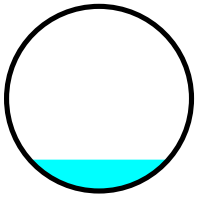
Summary for Reach 5R: 4" PVC

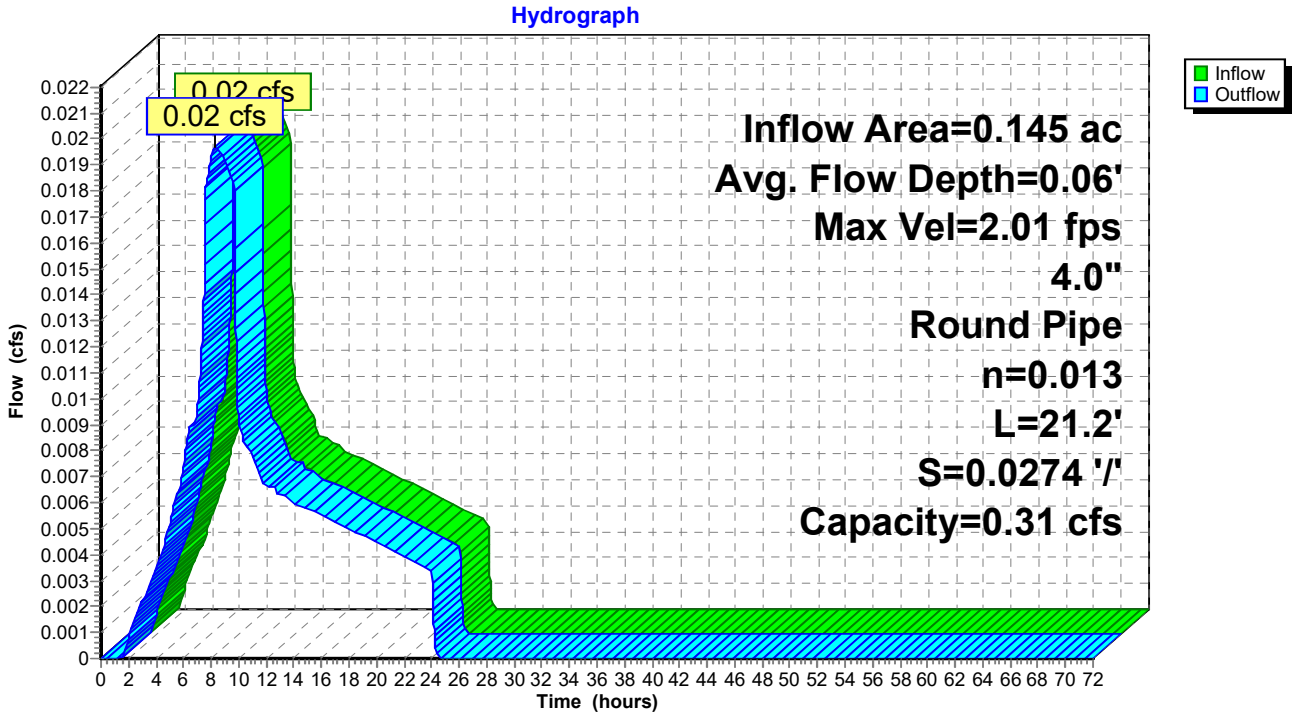
Inflow Area = 0.145 ac,100.00% Impervious, Inflow Depth = 1.03" for 1/2 2 YEAR event
Inflow = 0.02 cfs @ 8.29 hrs, Volume= 0.012 af
Outflow = 0.02 cfs @ 8.29 hrs, Volume= 0.012 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.01 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.38 fps, Avg. Travel Time= 0.3 min

Peak Storage= 0 cf @ 8.29 hrs
Average Depth at Peak Storage= 0.06'
Bank-Full Depth= 0.33' Flow Area= 0.1 sf, Capacity= 0.31 cfs

4.0" Round Pipe
n= 0.013
Length= 21.2' Slope= 0.0274 '/'
Inlet Invert= 217.65', Outlet Invert= 217.07'





Summary for Pond 1P: PLANTER #1

Inflow Area = 0.040 ac,100.00% Impervious, Inflow Depth = 1.03" for 1/2 2 YEAR event
Inflow = 0.01 cfs @ 7.89 hrs, Volume= 0.003 af
Outflow = 0.00 cfs @ 7.56 hrs, Volume= 0.003 af, Atten= 54%, Lag= 0.0 min
Primary = 0.00 cfs @ 7.56 hrs, Volume= 0.003 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 216.53' @ 8.36 hrs Surf.Area= 106 sf Storage= 11 cf

Plug-Flow detention time= 9.3 min calculated for 0.003 af (100% of inflow)
Center-of-Mass det. time= 9.3 min (710.2 - 700.8)

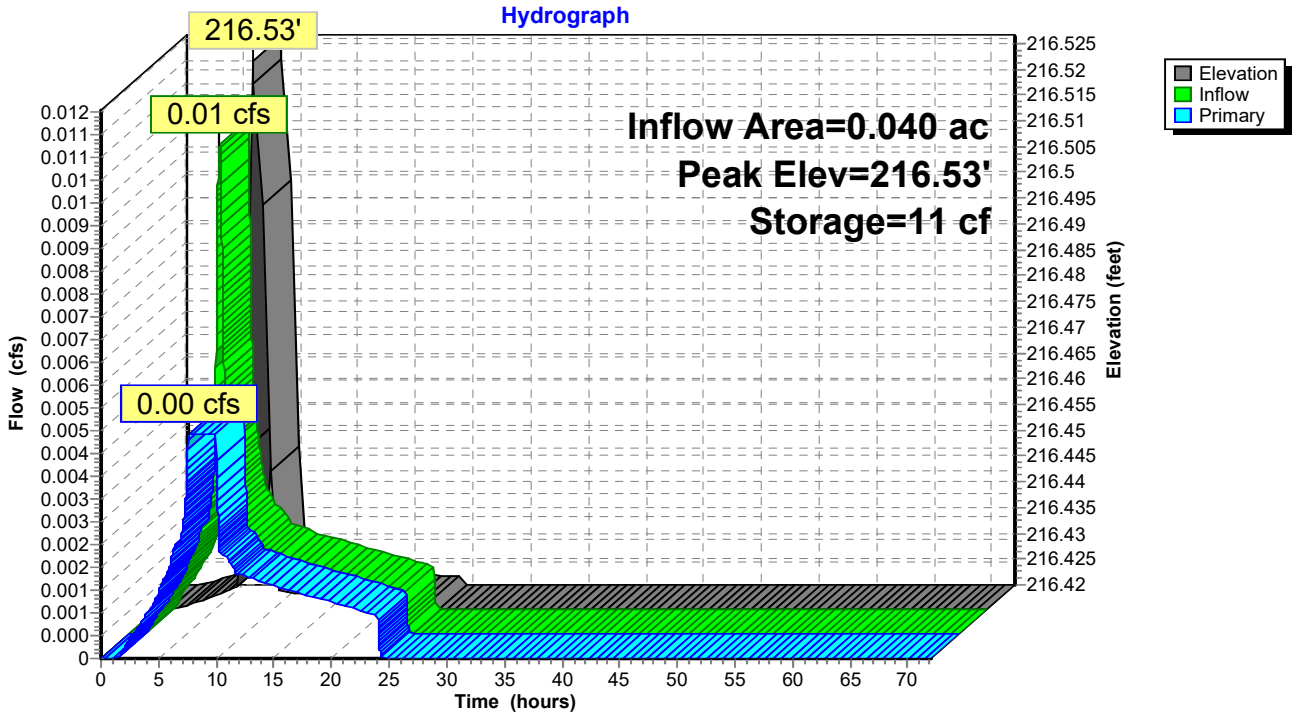
Volume	Invert	Avail.Storage	Storage Description
#1	216.42'	88 cf	**Ponding Depth (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
216.42	106	0	0
217.25	106	88	88

Device	Routing	Invert	Outlet Devices
#1	Primary	213.99'	**6.0" Round Culvert** L= 1.0' Ke= 0.500 Inlet / Outlet Invert= 213.99' / 213.98' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	216.42'	**2.000 in/hr Exfiltration over Surface area**
#3	Device 1	216.92'	**6.0" Horiz. Orifice/Grate** C= 0.610

Primary OutFlow Max=0.00 cfs @ 7.56 hrs HW=216.43' (Free Discharge)
└**1=Culvert** (Passes 0.00 cfs of 1.40 cfs potential flow)
└**2=Exfiltration** (Exfiltration Controls 0.00 cfs)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 1P: PLANTER #1



Summary for Pond 2P: PLANTER #2

Inflow Area = 0.070 ac,100.00% Impervious, Inflow Depth = 1.03" for 1/2 2 YEAR event
Inflow = 0.02 cfs @ 7.89 hrs, Volume= 0.006 af
Outflow = 0.01 cfs @ 7.57 hrs, Volume= 0.006 af, Atten= 51%, Lag= 0.0 min
Primary = 0.01 cfs @ 7.57 hrs, Volume= 0.006 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 216.30' @ 8.31 hrs Surf.Area= 200 sf Storage= 18 cf

Plug-Flow detention time= 7.7 min calculated for 0.006 af (100% of inflow)
Center-of-Mass det. time= 7.7 min (708.6 - 700.8)

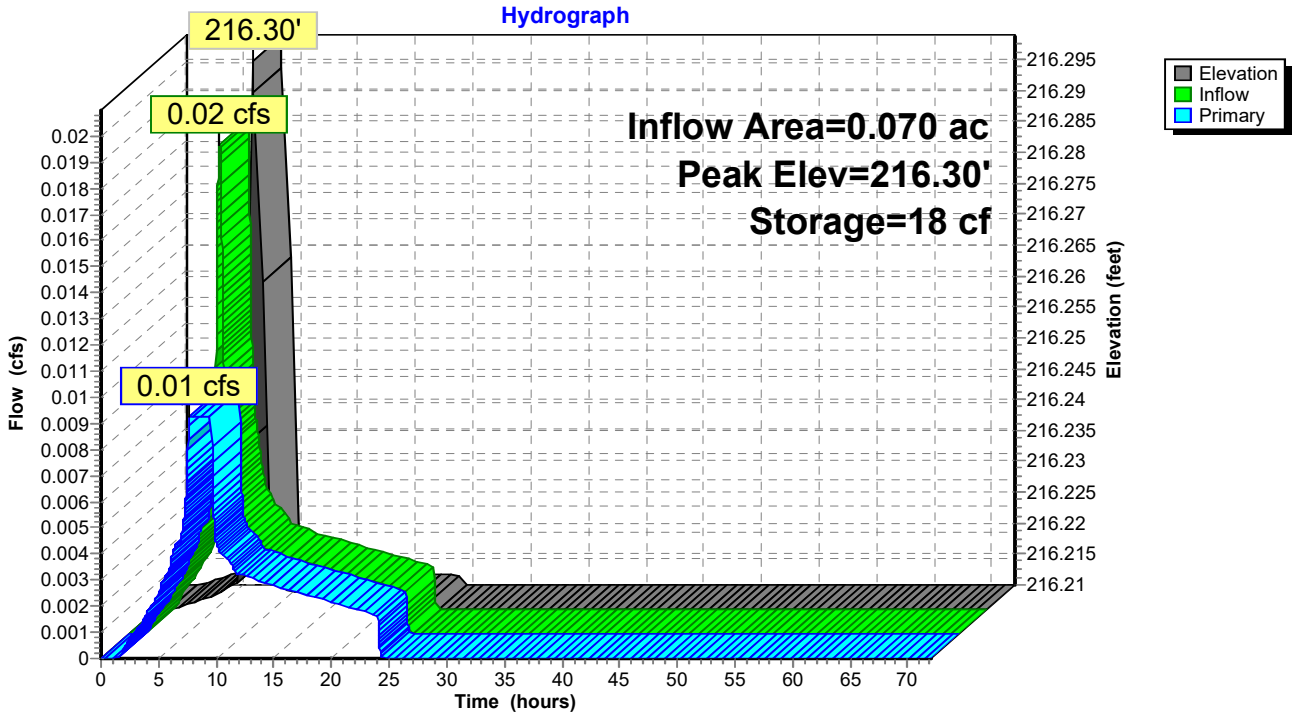
Volume	Invert	Avail.Storage	Storage Description
#1	216.21'	166 cf	**Ponding Depth (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
216.21	200	0	0
217.04	200	166	166

Device	Routing	Invert	Outlet Devices
#1	Primary	213.71'	**6.0" Round Culvert** L= 1.0' Ke= 0.500 Inlet / Outlet Invert= 213.71' / 213.70' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	216.21'	**2.000 in/hr Exfiltration over Surface area**
#3	Device 1	216.71'	**6.0" Horiz. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.01 cfs @ 7.57 hrs HW=216.22' (Free Discharge)
└**1=Culvert** (Passes 0.01 cfs of 1.42 cfs potential flow)
└**2=Exfiltration** (Exfiltration Controls 0.01 cfs)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 2P: PLANTER #2



Summary for Pond 3P: PLANTER #3

Inflow Area = 0.070 ac,100.00% Impervious, Inflow Depth = 1.03" for 1/2 2 YEAR event
Inflow = 0.02 cfs @ 7.89 hrs, Volume= 0.006 af
Outflow = 0.01 cfs @ 7.57 hrs, Volume= 0.006 af, Atten= 51%, Lag= 0.0 min
Primary = 0.01 cfs @ 7.57 hrs, Volume= 0.006 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 216.37' @ 8.31 hrs Surf.Area= 200 sf Storage= 18 cf

Plug-Flow detention time= 7.7 min calculated for 0.006 af (100% of inflow)
Center-of-Mass det. time= 7.7 min (708.6 - 700.8)

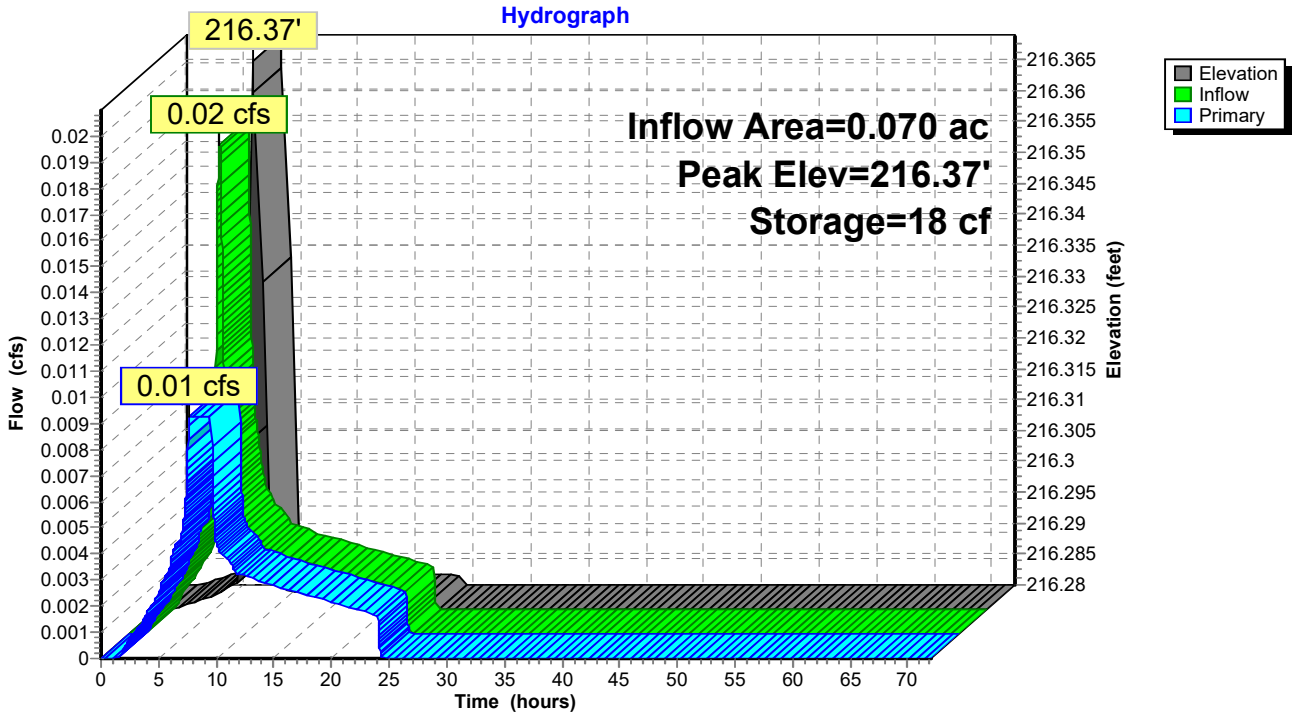
Volume	Invert	Avail.Storage	Storage Description
#1	216.28'	166 cf	**Ponding Depth (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
216.28	200	0	0
217.11	200	166	166

Device	Routing	Invert	Outlet Devices
#1	Primary	213.78'	**6.0" Round Culvert** L= 1.0' Ke= 0.500 Inlet / Outlet Invert= 213.78' / 213.77' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	216.28'	**2.000 in/hr Exfiltration over Surface area**
#3	Device 1	216.78'	**6.0" Horiz. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.01 cfs @ 7.57 hrs HW=216.29' (Free Discharge)
└**1=Culvert** (Passes 0.01 cfs of 1.42 cfs potential flow)
└**2=Exfiltration** (Exfiltration Controls 0.01 cfs)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 3P: PLANTER #3



Summary for Pond 4P: PLANTER #4

Inflow Area = 0.039 ac,100.00% Impervious, Inflow Depth = 1.03" for 1/2 2 YEAR event
Inflow = 0.01 cfs @ 7.89 hrs, Volume= 0.003 af
Outflow = 0.01 cfs @ 7.57 hrs, Volume= 0.003 af, Atten= 51%, Lag= 0.0 min
Primary = 0.01 cfs @ 7.57 hrs, Volume= 0.003 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 216.62' @ 8.31 hrs Surf.Area= 110 sf Storage= 10 cf

Plug-Flow detention time= 8.0 min calculated for 0.003 af (100% of inflow)
Center-of-Mass det. time= 8.0 min (708.8 - 700.8)

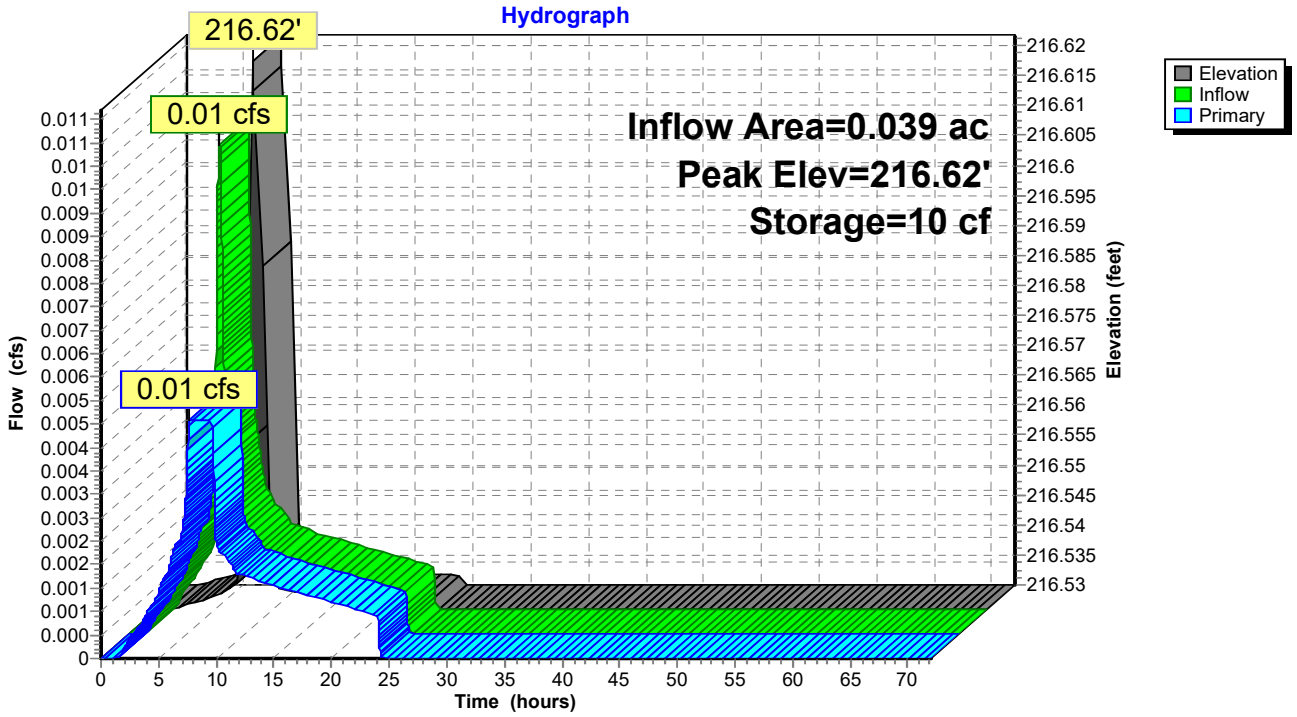
Volume	Invert	Avail.Storage	Storage Description
#1	216.53'	91 cf	**Ponding Depth (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
216.53	110	0	0
217.36	110	91	91

Device	Routing	Invert	Outlet Devices
#1	Primary	214.03'	**6.0" Round Culvert** L= 1.0' Ke= 0.500 Inlet / Outlet Invert= 214.03' / 214.02' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	216.53'	**2.000 in/hr Exfiltration over Surface area**
#3	Device 1	217.03'	**6.0" Horiz. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.01 cfs @ 7.57 hrs HW=216.54' (Free Discharge)
└**1=Culvert** (Passes 0.01 cfs of 1.42 cfs potential flow)
└**2=Exfiltration** (Exfiltration Controls 0.01 cfs)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 4P: PLANTER #4



Summary for Pond 5P: PLANTER #5

Inflow Area = 0.038 ac,100.00% Impervious, Inflow Depth = 1.03" for 1/2 2 YEAR event
Inflow = 0.01 cfs @ 7.89 hrs, Volume= 0.003 af
Outflow = 0.01 cfs @ 8.23 hrs, Volume= 0.003 af, Atten= 44%, Lag= 20.1 min
Primary = 0.01 cfs @ 8.23 hrs, Volume= 0.003 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 212.31' @ 8.23 hrs Surf.Area= 123 sf Storage= 9 cf

Plug-Flow detention time= 6.5 min calculated for 0.003 af (100% of inflow)
Center-of-Mass det. time= 6.5 min (707.3 - 700.8)

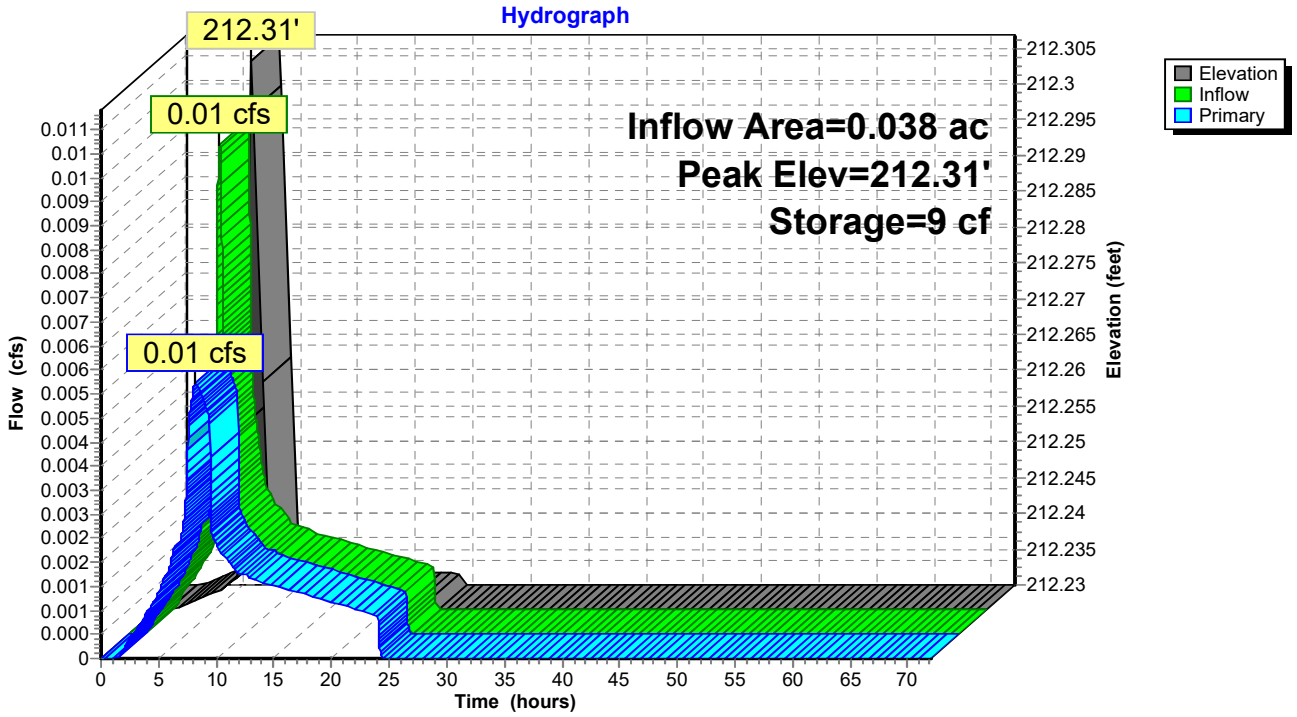
Volume	Invert	Avail.Storage	Storage Description
#1	212.23'	174 cf	**Ponding Depth (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
212.23	104	0	0
213.06	315	174	174

Device	Routing	Invert	Outlet Devices
#1	Primary	209.37'	**6.0" Round Culvert** L= 1.0' Ke= 0.500 Inlet / Outlet Invert= 209.37' / 209.36' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	212.23'	**2.000 in/hr Exfiltration over Surface area**
#3	Device 1	212.73'	**6.0" Horiz. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.01 cfs @ 8.23 hrs HW=212.31' (Free Discharge)
└**1=Culvert** (Passes 0.01 cfs of 1.55 cfs potential flow)
└**2=Exfiltration** (Exfiltration Controls 0.01 cfs)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 5P: PLANTER #5



Summary for Pond 6P: PLANTER #6

Inflow Area = 0.076 ac,100.00% Impervious, Inflow Depth = 1.03" for 1/2 2 YEAR event
Inflow = 0.02 cfs @ 7.89 hrs, Volume= 0.007 af
Outflow = 0.01 cfs @ 8.21 hrs, Volume= 0.007 af, Atten= 42%, Lag= 19.0 min
Primary = 0.01 cfs @ 8.21 hrs, Volume= 0.007 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 211.78' @ 8.21 hrs Surf.Area= 253 sf Storage= 16 cf

Plug-Flow detention time= 5.9 min calculated for 0.007 af (100% of inflow)
Center-of-Mass det. time= 5.9 min (706.7 - 700.8)

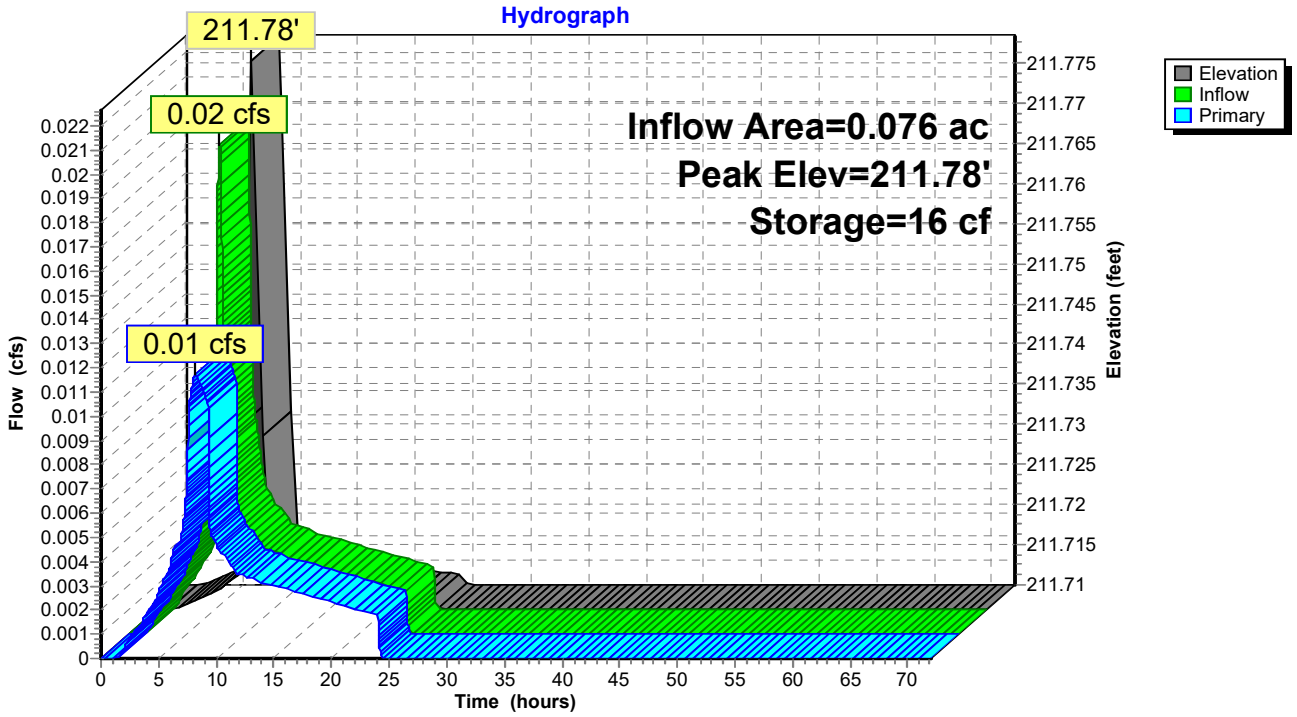
Volume	Invert	Avail.Storage	Storage Description
#1	211.71'	344 cf	**Ponding Depth (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
211.71	221	0	0
212.54	608	344	344

Device	Routing	Invert	Outlet Devices
#1	Primary	209.21'	**6.0" Round Culvert** L= 1.0' Ke= 0.500 Inlet / Outlet Invert= 209.21' / 209.21' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	211.71'	**2.000 in/hr Exfiltration over Surface area**
#3	Device 1	212.21'	**6.0" Horiz. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.01 cfs @ 8.21 hrs HW=211.78' (Free Discharge)
└**1=Culvert** (Passes 0.01 cfs of 1.44 cfs potential flow)
└**2=Exfiltration** (Exfiltration Controls 0.01 cfs)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 6P: PLANTER #6



Summary for Pond 7P: PLANTER #7

Inflow Area = 0.076 ac,100.00% Impervious, Inflow Depth = 1.03" for 1/2 2 YEAR event
Inflow = 0.02 cfs @ 7.89 hrs, Volume= 0.007 af
Outflow = 0.01 cfs @ 8.21 hrs, Volume= 0.007 af, Atten= 42%, Lag= 18.8 min
Primary = 0.01 cfs @ 8.21 hrs, Volume= 0.007 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 210.47' @ 8.21 hrs Surf.Area= 256 sf Storage= 17 cf

Plug-Flow detention time= 6.6 min calculated for 0.007 af (100% of inflow)
Center-of-Mass det. time= 6.6 min (707.5 - 700.8)

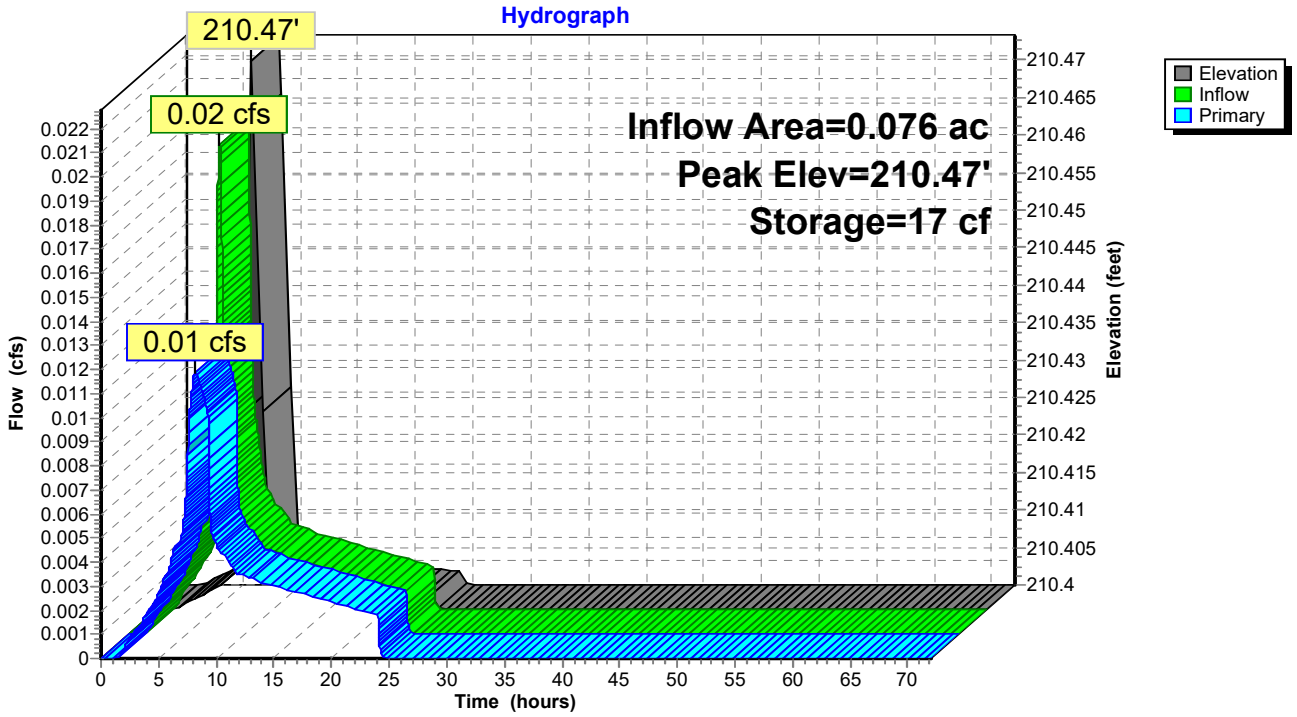
Volume	Invert	Avail.Storage	Storage Description
#1	210.40'	533 cf	**Ponding Depth (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
210.40	208	0	0
211.40	858	533	533

Device	Routing	Invert	Outlet Devices
#1	Primary	207.90'	**6.0" Round Culvert** L= 1.0' Ke= 0.500 Inlet / Outlet Invert= 207.90' / 207.89' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	210.40'	**2.000 in/hr Exfiltration over Surface area**
#3	Device 1	210.90'	**6.0" Horiz. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.01 cfs @ 8.21 hrs HW=210.47' (Free Discharge)
└**1=Culvert** (Passes 0.01 cfs of 1.44 cfs potential flow)
└**2=Exfiltration** (Exfiltration Controls 0.01 cfs)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 7P: PLANTER #7



Summary for Pond 8P: PLANTER #8

Inflow Area = 0.070 ac,100.00% Impervious, Inflow Depth = 1.03" for 1/2 2 YEAR event
Inflow = 0.02 cfs @ 7.89 hrs, Volume= 0.006 af
Outflow = 0.01 cfs @ 7.57 hrs, Volume= 0.006 af, Atten= 50%, Lag= 0.0 min
Primary = 0.01 cfs @ 7.57 hrs, Volume= 0.006 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 209.56' @ 8.30 hrs Surf.Area= 203 sf Storage= 17 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 7.5 min (708.3 - 700.8)

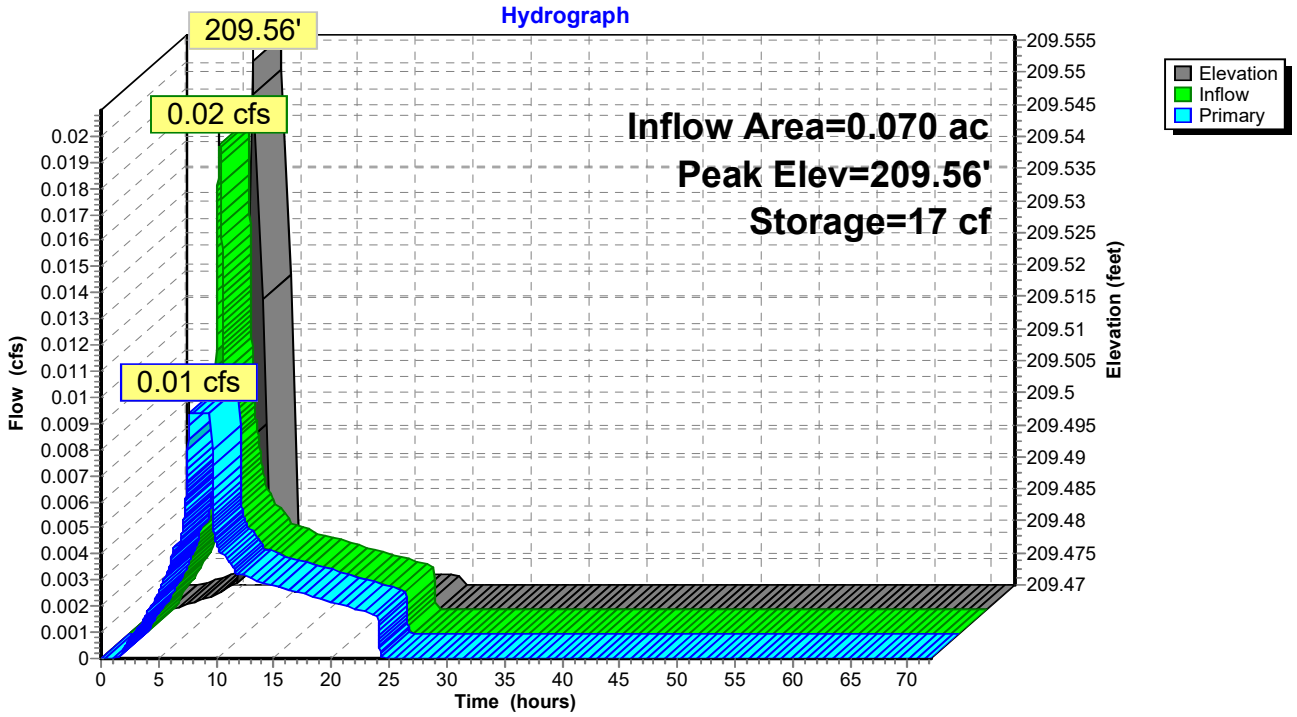
Volume	Invert	Avail.Storage	Storage Description
#1	209.47'	168 cf	**Ponding Depth (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
209.47	203	0	0
210.30	203	168	168

Device	Routing	Invert	Outlet Devices
#1	Primary	206.79'	**6.0" Round Culvert** L= 1.0' Ke= 0.500 Inlet / Outlet Invert= 206.79' / 206.78' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	209.47'	**2.000 in/hr Exfiltration over Surface area**
#3	Device 1	209.97'	**6.0" Horiz. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.01 cfs @ 7.57 hrs HW=209.48' (Free Discharge)
└**1=Culvert** (Passes 0.01 cfs of 1.48 cfs potential flow)
└**2=Exfiltration** (Exfiltration Controls 0.01 cfs)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 8P: PLANTER #8



Summary for Pond 9P: PLANTER #9

Inflow Area = 0.039 ac,100.00% Impervious, Inflow Depth = 1.03" for 1/2 2 YEAR event
Inflow = 0.01 cfs @ 7.89 hrs, Volume= 0.003 af
Outflow = 0.01 cfs @ 7.59 hrs, Volume= 0.003 af, Atten= 45%, Lag= 0.0 min
Primary = 0.01 cfs @ 7.59 hrs, Volume= 0.003 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 209.37' @ 8.24 hrs Surf.Area= 123 sf Storage= 9 cf

Plug-Flow detention time= 6.2 min calculated for 0.003 af (100% of inflow)
Center-of-Mass det. time= 6.2 min (707.0 - 700.8)

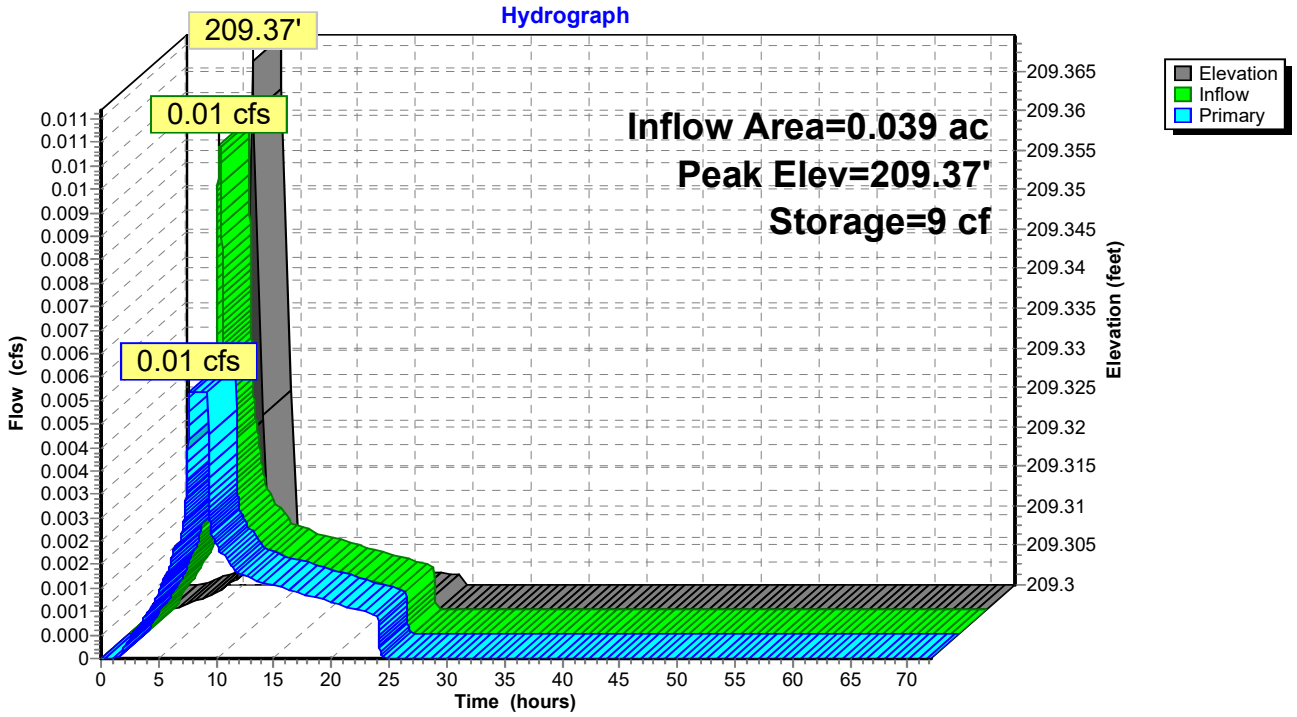
Volume	Invert	Avail.Storage	Storage Description
#1	209.30'	102 cf	**Ponding Depth (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
209.30	123	0	0
210.13	123	102	102

Device	Routing	Invert	Outlet Devices
#1	Primary	206.80'	**6.0" Round Culvert** L= 1.0' Ke= 0.500 Inlet / Outlet Invert= 206.80' / 206.79' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	209.30'	**2.000 in/hr Exfiltration over Surface area**
#3	Device 1	209.80'	**6.0" Horiz. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.01 cfs @ 7.59 hrs HW=209.31' (Free Discharge)
└**1=Culvert** (Passes 0.01 cfs of 1.42 cfs potential flow)
└**2=Exfiltration** (Exfiltration Controls 0.01 cfs)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 9P: PLANTER #9



Summary for Pond 10P: DC-780 Chambers

Inflow Area = 1.666 ac, 79.76% Impervious, Inflow Depth = 0.88" for 1/2 2 YEAR event
Inflow = 0.30 cfs @ 7.93 hrs, Volume= 0.122 af
Outflow = 0.02 cfs @ 24.06 hrs, Volume= 0.108 af, Atten= 92%, Lag= 968.0 min
Primary = 0.02 cfs @ 24.06 hrs, Volume= 0.108 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 206.55' @ 24.06 hrs Surf.Area= 0.071 ac Storage= 0.089 af
Flood Elev= 208.75' Surf.Area= 0.071 ac Storage= 0.148 af

Plug-Flow detention time= 1,545.3 min calculated for 0.108 af (88% of inflow)
Center-of-Mass det. time= 1,466.7 min (2,184.2 - 717.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	204.50'	0.058 af	**34.75'W x 89.06'L x 3.75'H Field A** 0.266 af Overall - 0.089 af Embedded = 0.177 af x 33.0% Voids
#2A	205.25'	0.089 af	**ADS_StormTech DC-780 +Cap** x 84 Inside #1 Effective Size= 45.4"W x 30.0"H => 6.49 sf x 7.12'L = 46.2 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 7 Rows of 12 Chambers
		0.148 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Secondary	204.50'	**10.0" Round Culvert** L= 1.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 204.50' / 204.49' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.55 sf
#2	Primary	204.50'	**0.8" Horiz. 1/2 of 2-YR Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	206.55'	**4.4" Horiz. 2-YR Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	207.26'	**2.5" Horiz. 25-YR Orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	207.60'	**10.0" Horiz. Emergency Overflow** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 24.06 hrs HW=206.55' (Free Discharge)
└**2=1/2 of 2-YR Orifice** (Orifice Controls 0.02 cfs @ 6.89 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=204.50' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)
  ├**3=2-YR Orifice** (Controls 0.00 cfs)
  ├**4=25-YR Orifice** (Controls 0.00 cfs)
  └**5=Emergency Overflow** (Controls 0.00 cfs)

Pond 10P: DC-780 Chambers - Chamber Wizard Field A

Chamber Model = ADS_StormTech DC-780 +Cap (ADS StormTech® DC-780 with cap length)
Effective Size= 45.4"W x 30.0"H => 6.49 sf x 7.12'L = 46.2 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

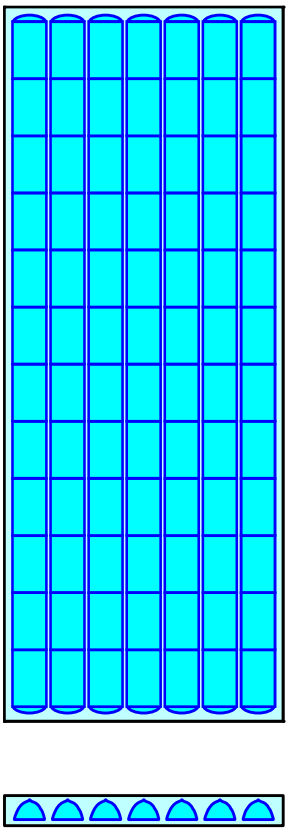
12 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 87.06' Row Length +12.0" End Stone x 2 = 89.06' Base Length
7 Rows x 51.0" Wide + 6.0" Spacing x 6 + 12.0" Side Stone x 2 = 34.75' Base Width
9.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.75' Field Height

84 Chambers x 46.2 cf = 3,884.1 cf Chamber Storage

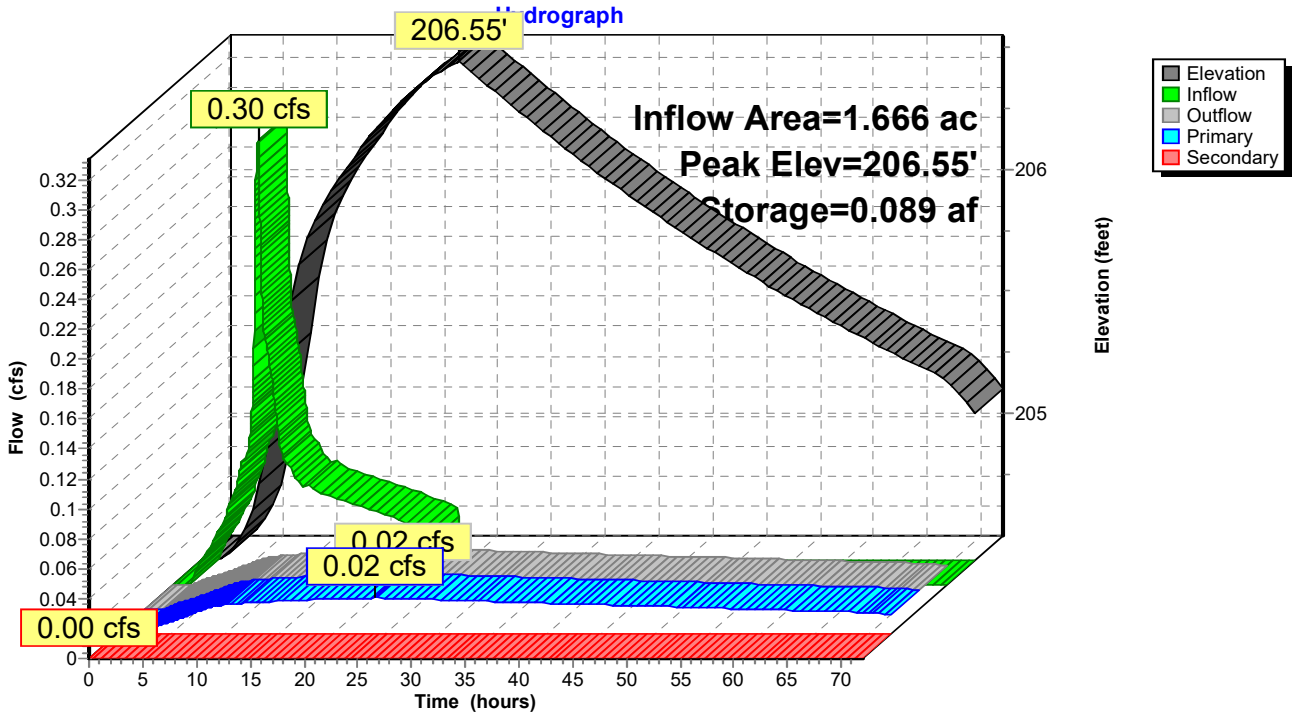
11,605.2 cf Field - 3,884.1 cf Chambers = 7,721.1 cf Stone x 33.0% Voids = 2,548.0 cf Stone Storage

Chamber Storage + Stone Storage = 6,432.0 cf = 0.148 af
Overall Storage Efficiency = 55.4%
Overall System Size = 89.06' x 34.75' x 3.75'

84 Chambers
429.8 cy Field
286.0 cy Stone



Pond 10P: DC-780 Chambers



Summary for Pond 11P: PLANTER #10

Inflow Area = 0.145 ac,100.00% Impervious, Inflow Depth = 1.03" for 1/2 2 YEAR event
Inflow = 0.04 cfs @ 7.89 hrs, Volume= 0.012 af
Outflow = 0.02 cfs @ 8.29 hrs, Volume= 0.012 af, Atten= 49%, Lag= 23.6 min
Primary = 0.02 cfs @ 8.29 hrs, Volume= 0.012 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 217.24' @ 8.29 hrs Surf.Area= 425 sf Storage= 37 cf

Plug-Flow detention time= 8.3 min calculated for 0.012 af (100% of inflow)
Center-of-Mass det. time= 8.3 min (709.1 - 700.8)

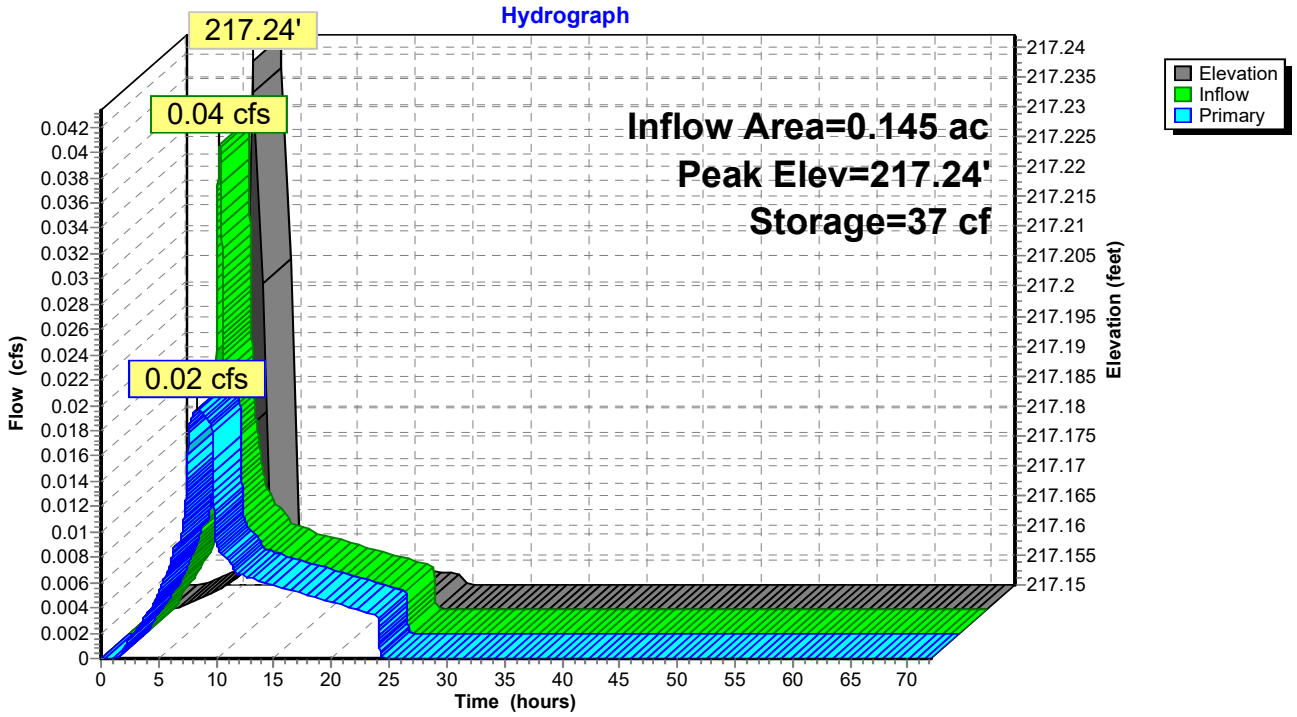
Volume	Invert	Avail.Storage	Storage Description
#1	217.15'	592 cf	**Ponding Depth (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
217.15	388	0	0
218.15	795	592	592

Device	Routing	Invert	Outlet Devices
#1	Primary	217.00'	**4.0" Round Culvert** L= 1.0' Ke= 0.500 Inlet / Outlet Invert= 217.00' / 216.99' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.09 sf
#2	Device 1	217.65'	**4.0" Horiz. Orifice/Grate** C= 0.600
#3	Device 1	217.15'	**2.000 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.02 cfs @ 8.29 hrs HW=217.24' (Free Discharge)
└**1=Culvert** (Passes 0.02 cfs of 0.08 cfs potential flow)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  └**3=Exfiltration** (Exfiltration Controls 0.02 cfs)

Pond 11P: PLANTER #10



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment 1S: North Building & Runoff Area=1,748 sf 100.00% Impervious Runoff Depth=2.27"
Tc=5.0 min CN=0/98 Runoff=0.02 cfs 0.008 af

Subcatchment 2S: North Building & Runoff Area=3,051 sf 100.00% Impervious Runoff Depth=2.27"
Tc=5.0 min CN=0/98 Runoff=0.04 cfs 0.013 af

Subcatchment 3S: North Building & Runoff Area=3,051 sf 100.00% Impervious Runoff Depth=2.27"
Tc=5.0 min CN=0/98 Runoff=0.04 cfs 0.013 af

Subcatchment 4S: North Building & Runoff Area=1,700 sf 100.00% Impervious Runoff Depth=2.27"
Tc=5.0 min CN=0/98 Runoff=0.02 cfs 0.007 af

Subcatchment 5S: Middle Building Runoff Area=1,658 sf 100.00% Impervious Runoff Depth=2.27"
Tc=5.0 min CN=0/98 Runoff=0.02 cfs 0.007 af

Subcatchment 6S: Middle Building & Runoff Area=3,291 sf 100.00% Impervious Runoff Depth=2.27"
Tc=5.0 min CN=0/98 Runoff=0.04 cfs 0.014 af

Subcatchment 7S: Middle/South Building Runoff Area=3,309 sf 100.00% Impervious Runoff Depth=2.27"
Tc=5.0 min CN=0/98 Runoff=0.04 cfs 0.014 af

Subcatchment 8S: South Building & Runoff Area=3,051 sf 100.00% Impervious Runoff Depth=2.27"
Tc=5.0 min CN=0/98 Runoff=0.04 cfs 0.013 af

Subcatchment 9S: South Building & Runoff Area=1,699 sf 100.00% Impervious Runoff Depth=2.27"
Tc=5.0 min CN=0/98 Runoff=0.02 cfs 0.007 af

Subcatchment 10S: Parking and Runoff Area=49,998 sf 70.63% Impervious Runoff Depth=1.93"
Tc=5.0 min CN=84/98 Runoff=0.55 cfs 0.185 af

Subcatchment 11S: N Springbrook Rd Runoff Area=6,300 sf 100.00% Impervious Runoff Depth=2.27"
Tc=5.0 min CN=0/98 Runoff=0.08 cfs 0.027 af

Reach 1R: 6" PVC Avg. Flow Depth=0.07' Max Vel=1.98 fps Inflow=0.03 cfs 0.041 af
6.0" Round Pipe n=0.013 L=37.5' S=0.0200 '/' Capacity=0.79 cfs Outflow=0.03 cfs 0.041 af

Reach 2R: 6" PVC Avg. Flow Depth=0.09' Max Vel=2.33 fps Inflow=0.06 cfs 0.057 af
6.0" Round Pipe n=0.013 L=36.1' S=0.0199 '/' Capacity=0.79 cfs Outflow=0.06 cfs 0.057 af

Reach 3R: 10" PVC Avg. Flow Depth=0.30' Max Vel=3.48 fps Inflow=0.63 cfs 0.283 af
10.0" Round Pipe n=0.013 L=57.3' S=0.0101 '/' Capacity=2.20 cfs Outflow=0.63 cfs 0.283 af

Reach 4R: 10" PVC Avg. Flow Depth=0.11' Max Vel=5.36 fps Inflow=0.23 cfs 0.268 af
10.0" Round Pipe n=0.013 L=50.8' S=0.0766 '/' Capacity=6.06 cfs Outflow=0.23 cfs 0.268 af

Reach 5R: 4" PVC Avg. Flow Depth=0.06' Max Vel=2.15 fps Inflow=0.02 cfs 0.027 af
4.0" Round Pipe n=0.013 L=21.2' S=0.0274 '/' Capacity=0.31 cfs Outflow=0.02 cfs 0.027 af

Pond 1P: PLANTER #1 Peak Elev=216.92' Storage=53 cf Inflow=0.02 cfs 0.008 af
Outflow=0.01 cfs 0.008 af

Pond 2P: PLANTER #2 Peak Elev=216.69' Storage=95 cf Inflow=0.04 cfs 0.013 af
Outflow=0.01 cfs 0.013 af

Pond 3P: PLANTER #3 Peak Elev=216.76' Storage=95 cf Inflow=0.04 cfs 0.013 af
Outflow=0.01 cfs 0.013 af

Pond 4P: PLANTER #4 Peak Elev=217.02' Storage=54 cf Inflow=0.02 cfs 0.007 af
Outflow=0.01 cfs 0.007 af

Pond 5P: PLANTER #5 Peak Elev=212.50' Storage=38 cf Inflow=0.02 cfs 0.007 af
Outflow=0.01 cfs 0.007 af

Pond 6P: PLANTER #6 Peak Elev=211.97' Storage=72 cf Inflow=0.04 cfs 0.014 af
Outflow=0.02 cfs 0.014 af

Pond 7P: PLANTER #7 Peak Elev=210.65' Storage=71 cf Inflow=0.04 cfs 0.014 af
Outflow=0.02 cfs 0.014 af

Pond 8P: PLANTER #8 Peak Elev=209.93' Storage=93 cf Inflow=0.04 cfs 0.013 af
Outflow=0.01 cfs 0.013 af

Pond 9P: PLANTER #9 Peak Elev=209.68' Storage=47 cf Inflow=0.02 cfs 0.007 af
Outflow=0.01 cfs 0.007 af

Pond 10P: DC-780 Chambers Peak Elev=206.72' Storage=0.097 af Inflow=0.63 cfs 0.283 af
Primary=0.03 cfs 0.115 af Secondary=0.21 cfs 0.152 af Outflow=0.23 cfs 0.268 af

Pond 11P: PLANTER #10 Peak Elev=217.52' Storage=171 cf Inflow=0.08 cfs 0.027 af
Outflow=0.02 cfs 0.027 af

Total Runoff Area = 1.810 ac Runoff Volume = 0.310 af Average Runoff Depth = 2.06"
18.62% Pervious = 0.337 ac 81.38% Impervious = 1.473 ac

Summary for Subcatchment 1S: North Building & Sidewalk

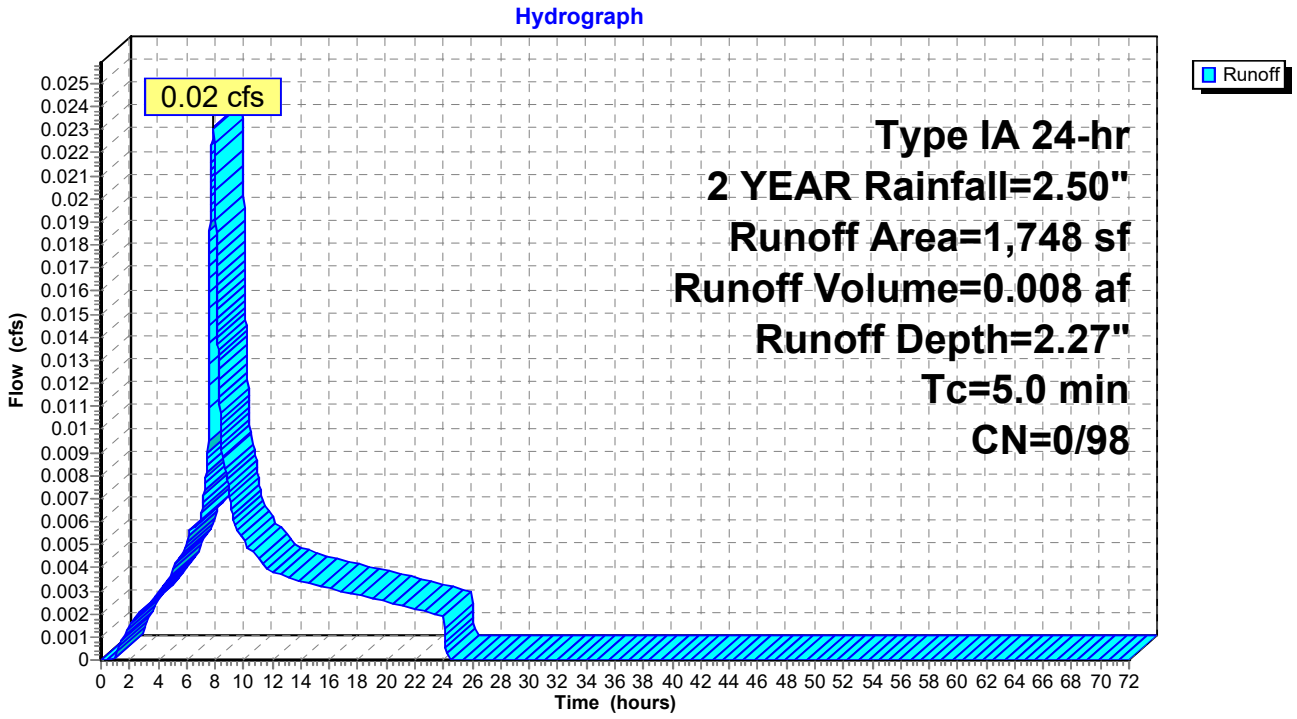
Runoff = 0.02 cfs @ 7.88 hrs, Volume= 0.008 af, Depth= 2.27"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2 YEAR Rainfall=2.50"

	Area (sf)	CN	Description
*	1,698	98	Roofs
*	50	98	Concrete Sidewalk
	1,748	98	Weighted Average
	1,748		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 1S: North Building & Sidewalk



Summary for Subcatchment 2S: North Building & Sidewalk

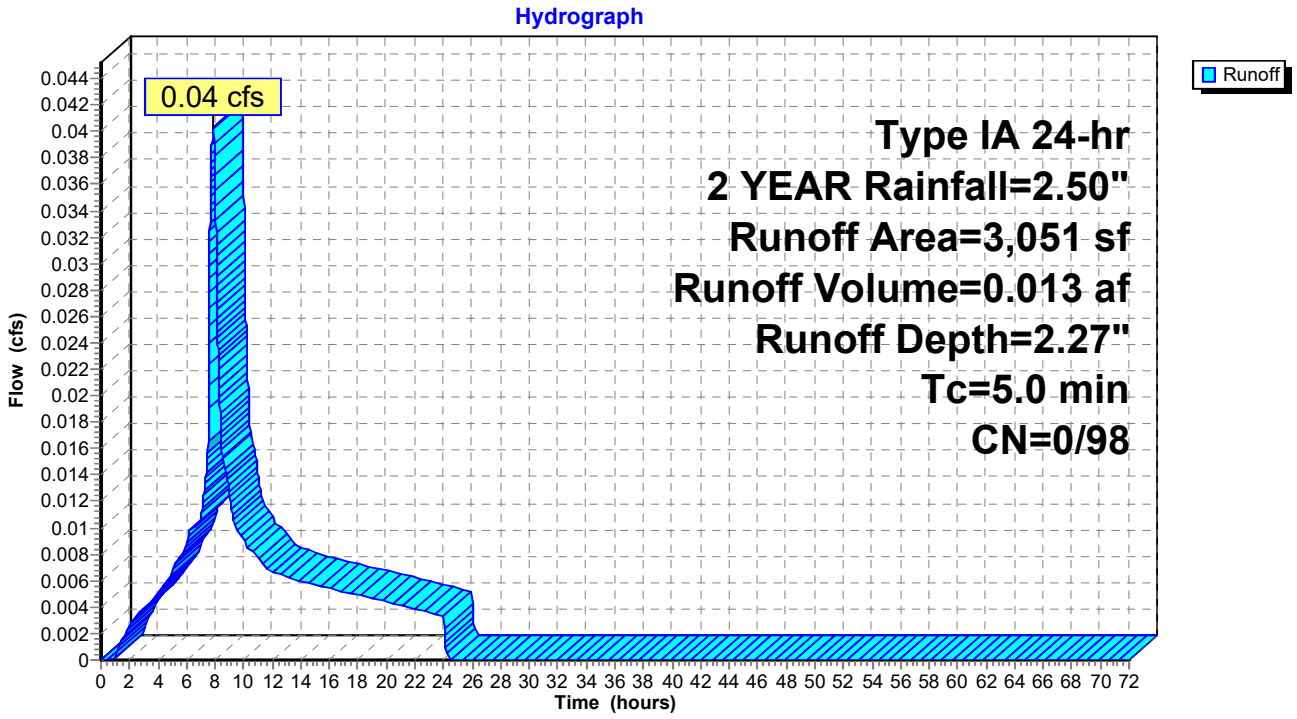
Runoff = 0.04 cfs @ 7.88 hrs, Volume= 0.013 af, Depth= 2.27"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2 YEAR Rainfall=2.50"

	Area (sf)	CN	Description
*	2,798	98	Roofs
*	253	98	Concrete Sidewalk
	3,051	98	Weighted Average
	3,051		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 2S: North Building & Sidewalk



Summary for Subcatchment 3S: North Building & Sidewalk

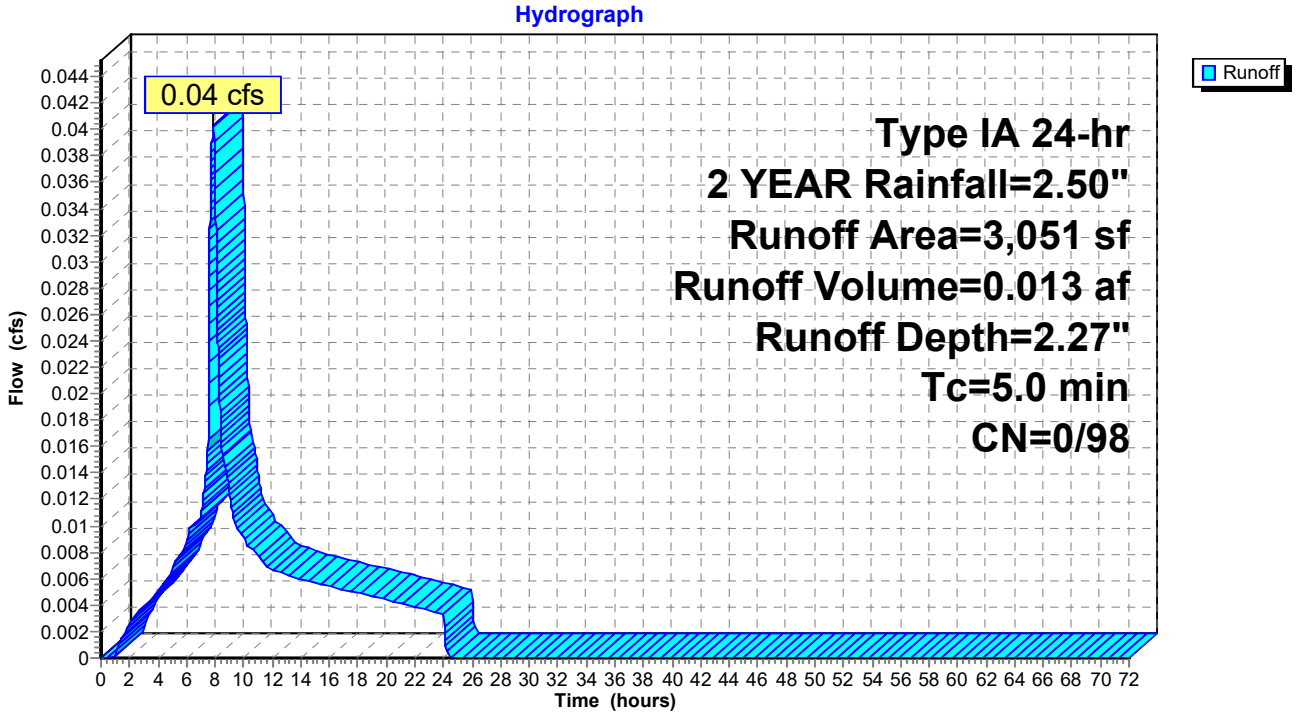
Runoff = 0.04 cfs @ 7.88 hrs, Volume= 0.013 af, Depth= 2.27"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2 YEAR Rainfall=2.50"

	Area (sf)	CN	Description
*	2,798	98	Roofs
*	253	98	Concrete Sidewalk
	3,051	98	Weighted Average
	3,051		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 3S: North Building & Sidewalk



Summary for Subcatchment 4S: North Building & Sidewalk

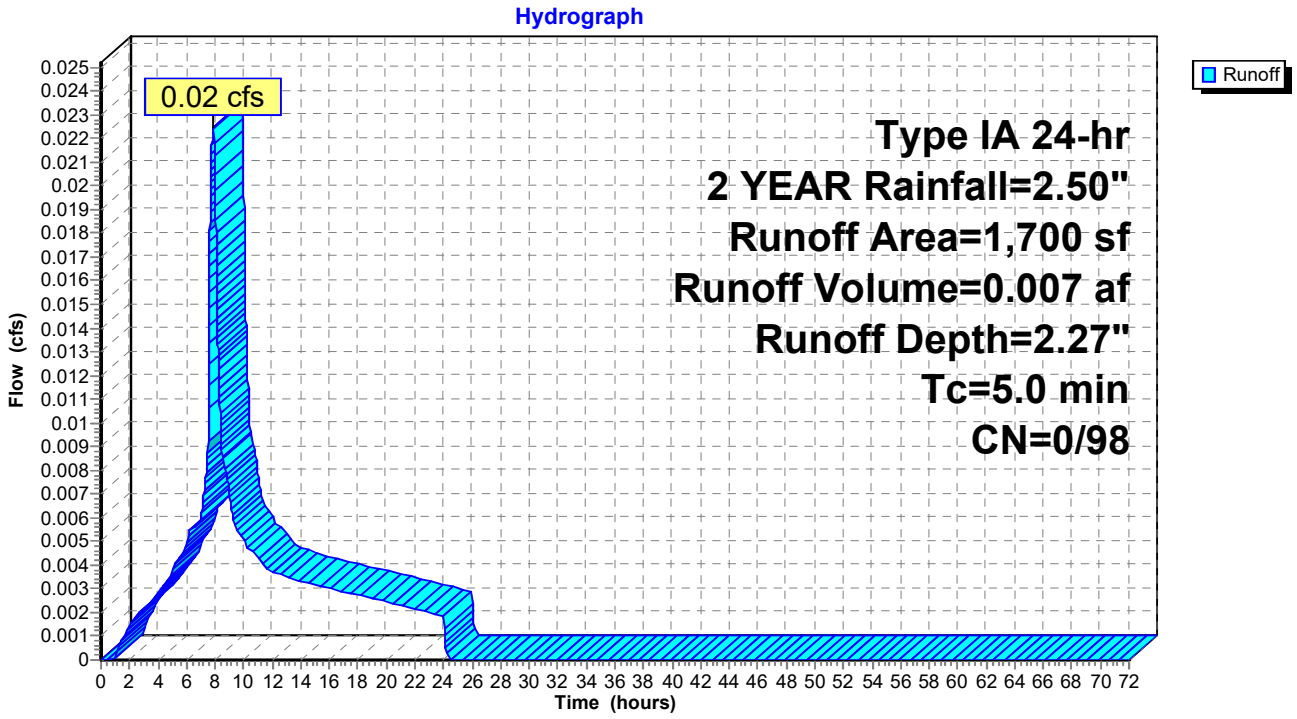
Runoff = 0.02 cfs @ 7.88 hrs, Volume= 0.007 af, Depth= 2.27"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2 YEAR Rainfall=2.50"

	Area (sf)	CN	Description
*	1,447	98	Roofs
*	253	98	Concrete Sidewalk
	1,700	98	Weighted Average
	1,700		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 4S: North Building & Sidewalk



Summary for Subcatchment 5S: Middle Building

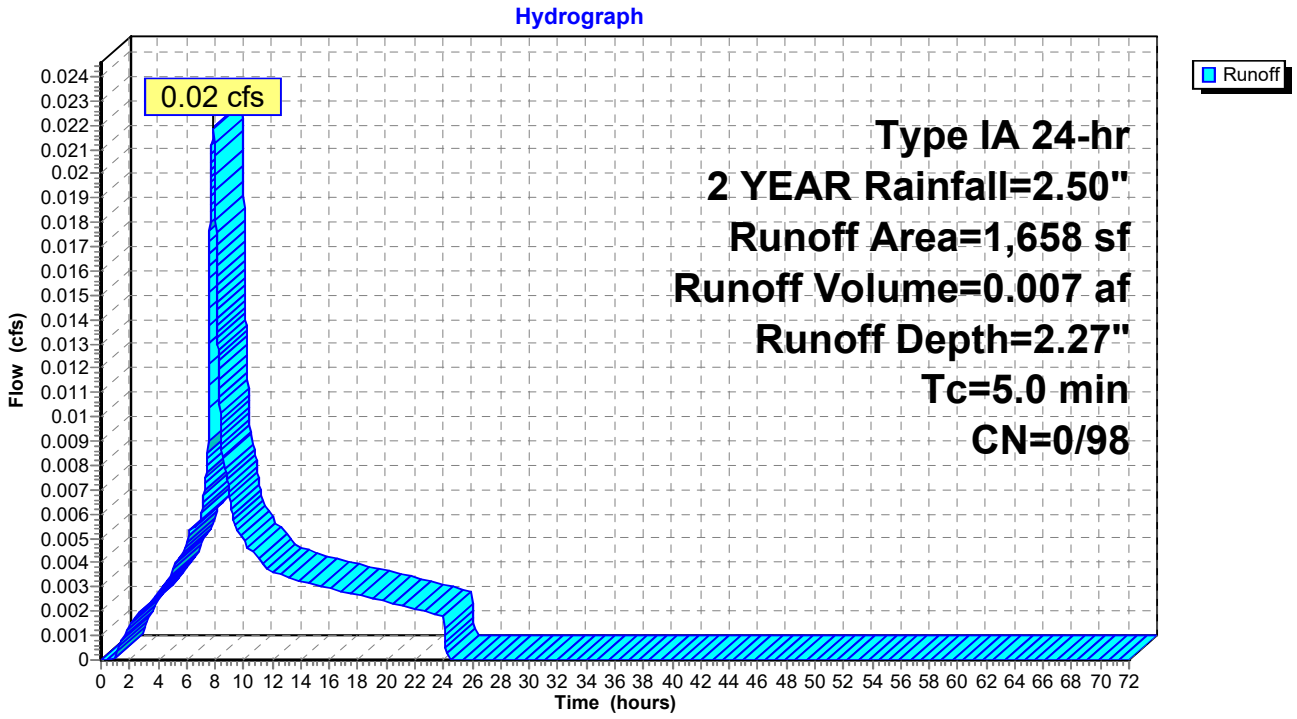
Runoff = 0.02 cfs @ 7.88 hrs, Volume= 0.007 af, Depth= 2.27"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2 YEAR Rainfall=2.50"

	Area (sf)	CN	Description
*	1,447	98	Roofs
*	211	98	Concrete Sidewalk
	1,658	98	Weighted Average
	1,658		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 5S: Middle Building



Summary for Subcatchment 6S: Middle Building & Sidewalk

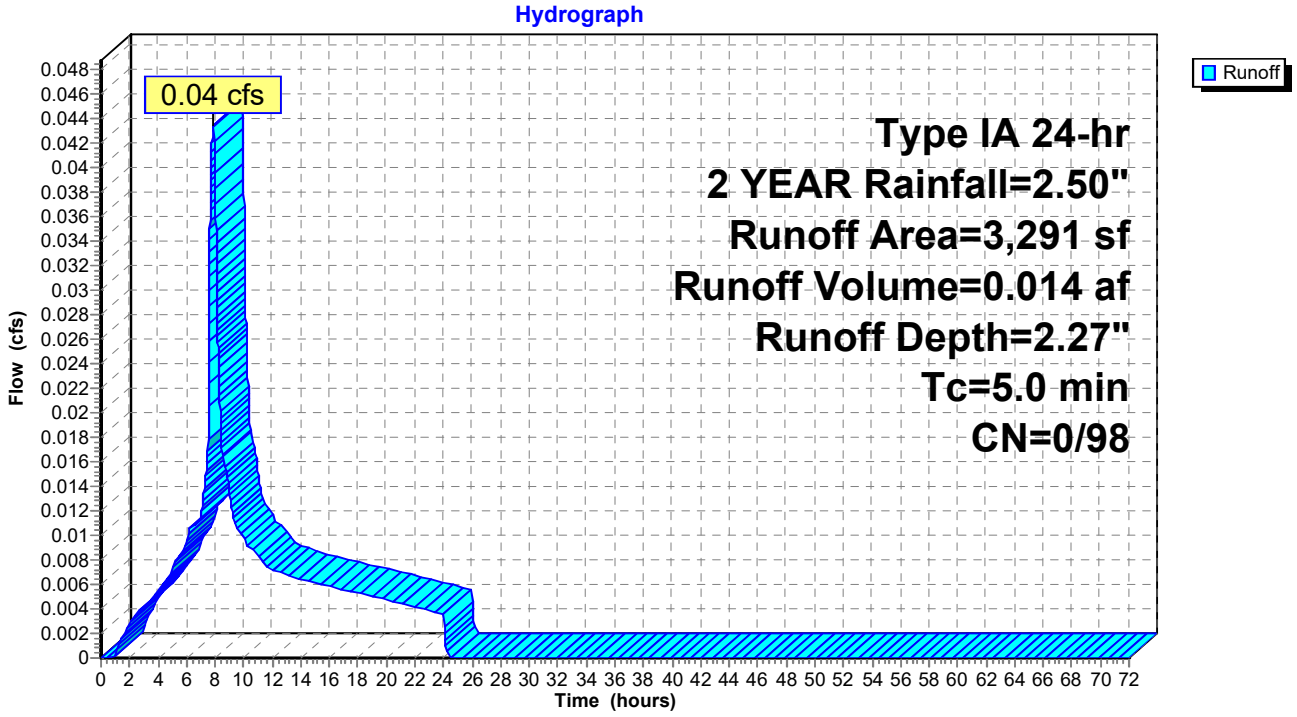
Runoff = 0.04 cfs @ 7.88 hrs, Volume= 0.014 af, Depth= 2.27"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2 YEAR Rainfall=2.50"

	Area (sf)	CN	Description
*	2,798	98	Roofs
*	493	98	Concrete Sidewalk
	3,291	98	Weighted Average
	3,291		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 6S: Middle Building & Sidewalk



Summary for Subcatchment 7S: Middle/South Building & Sidewalk

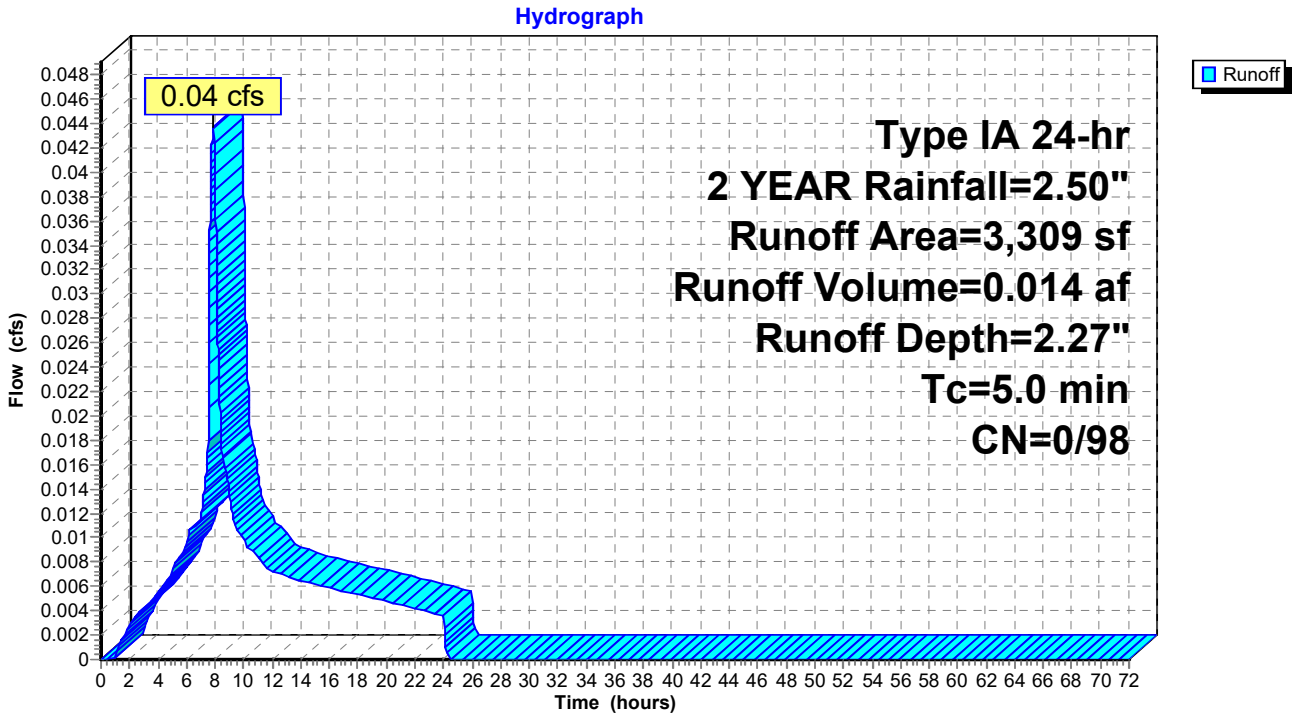
Runoff = 0.04 cfs @ 7.88 hrs, Volume= 0.014 af, Depth= 2.27"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2 YEAR Rainfall=2.50"

	Area (sf)	CN	Description
*	1,406	98	Roofs
*	1,407	98	Roofs
*	496	98	Concrete Sidewalk
	3,309	98	Weighted Average
	3,309		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 7S: Middle/South Building & Sidewalk



Summary for Subcatchment 8S: South Building & Sidewalk

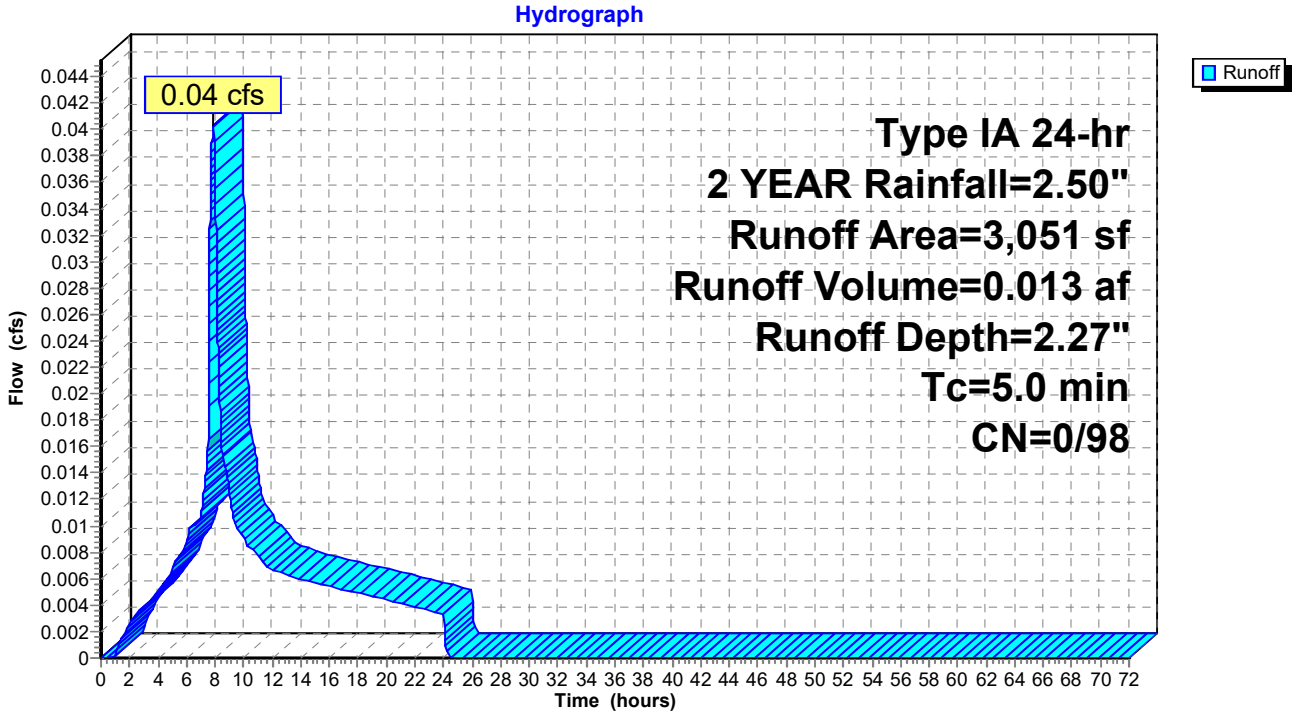
Runoff = 0.04 cfs @ 7.88 hrs, Volume= 0.013 af, Depth= 2.27"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2 YEAR Rainfall=2.50"

	Area (sf)	CN	Description
*	2,798	98	Roofs
*	253	98	Concrete Sidewalk
	3,051	98	Weighted Average
	3,051		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 8S: South Building & Sidewalk



Summary for Subcatchment 9S: South Building & Sidewalk

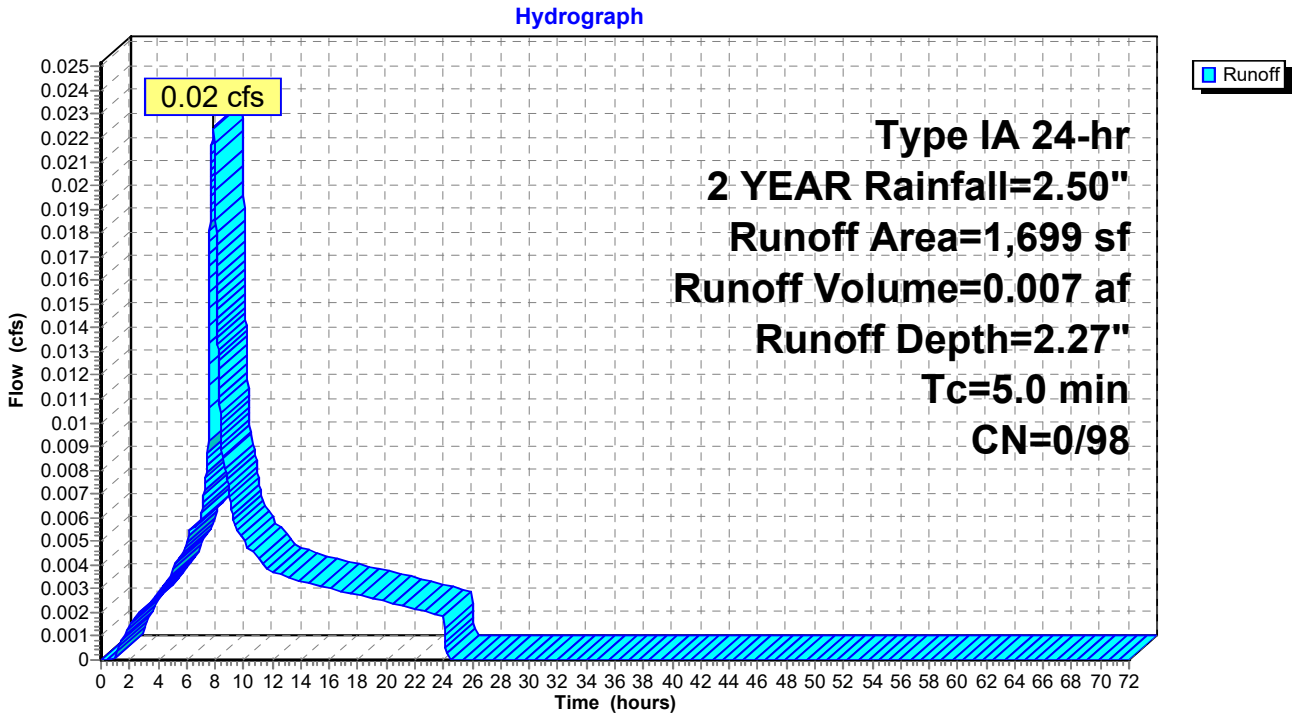
Runoff = 0.02 cfs @ 7.88 hrs, Volume= 0.007 af, Depth= 2.27"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2 YEAR Rainfall=2.50"

	Area (sf)	CN	Description
*	1,447	98	Roofs
*	252	98	Concrete Sidewalk
	1,699	98	Weighted Average
	1,699		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 9S: South Building & Sidewalk



Summary for Subcatchment 10S: Parking and Landscaping

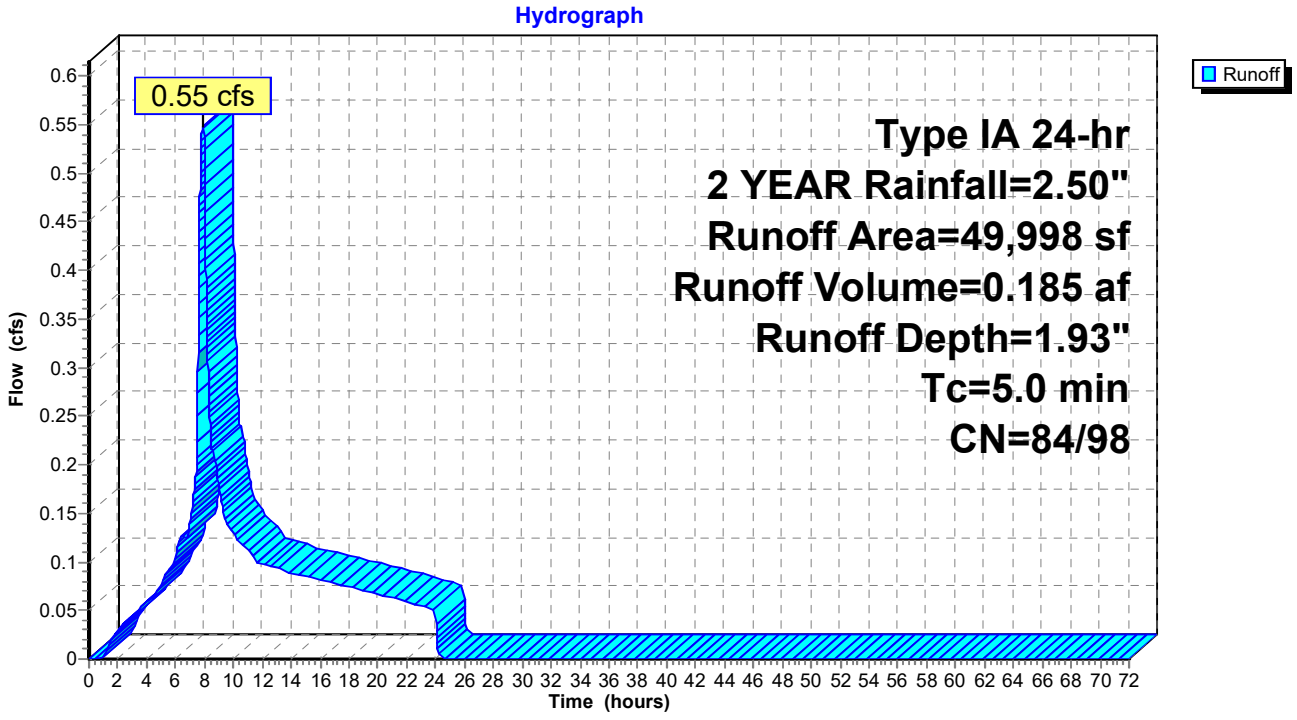
Runoff = 0.55 cfs @ 7.90 hrs, Volume= 0.185 af, Depth= 1.93"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2 YEAR Rainfall=2.50"

	Area (sf)	CN	Description
	14,686	84	50-75% Grass cover, Fair, HSG D
*	31,601	98	Paved Parking
*	3,711	98	Concrete Sidewalk
	49,998	94	Weighted Average
	14,686		29.37% Pervious Area
	35,312		70.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 10S: Parking and Landscaping



Summary for Subcatchment 11S: N Springbrook Rd

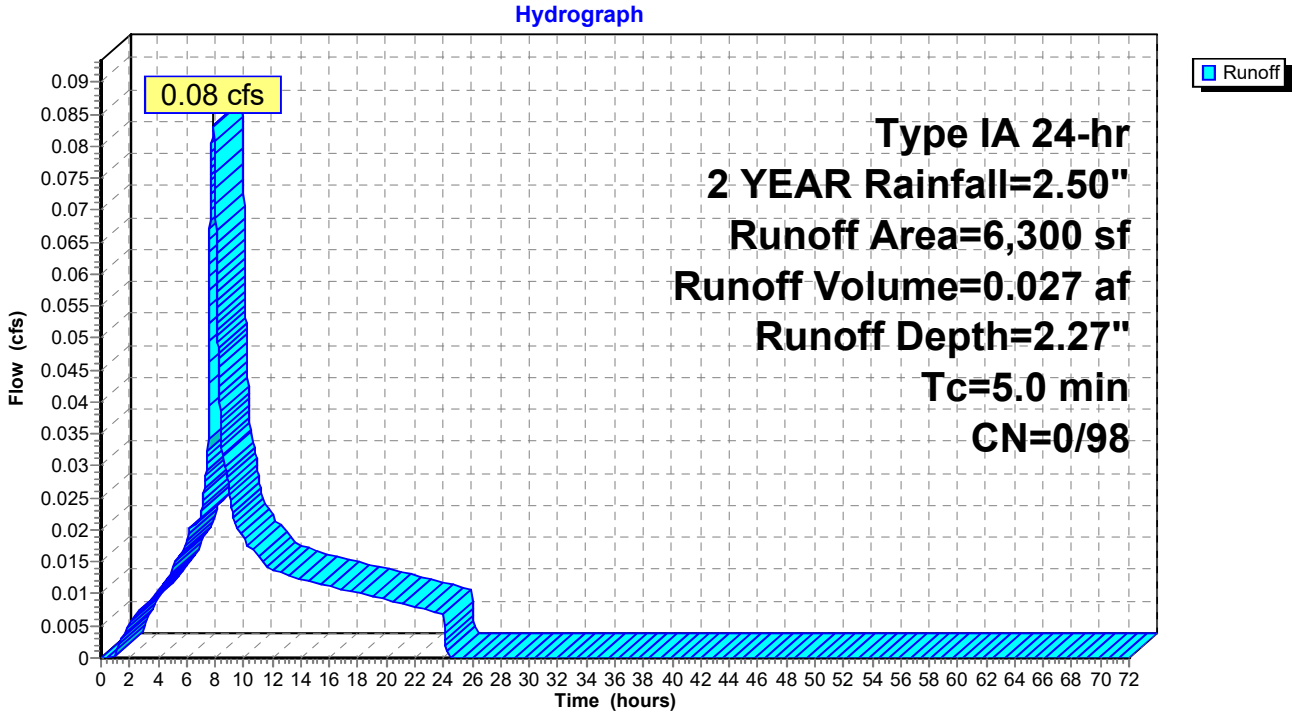
Runoff = 0.08 cfs @ 7.88 hrs, Volume= 0.027 af, Depth= 2.27"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2 YEAR Rainfall=2.50"

	Area (sf)	CN	Description
*	6,300	98	N Springbrook Rd Section to be treated
	6,300		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 11S: N Springbrook Rd



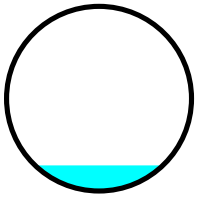
Summary for Reach 1R: 6" PVC

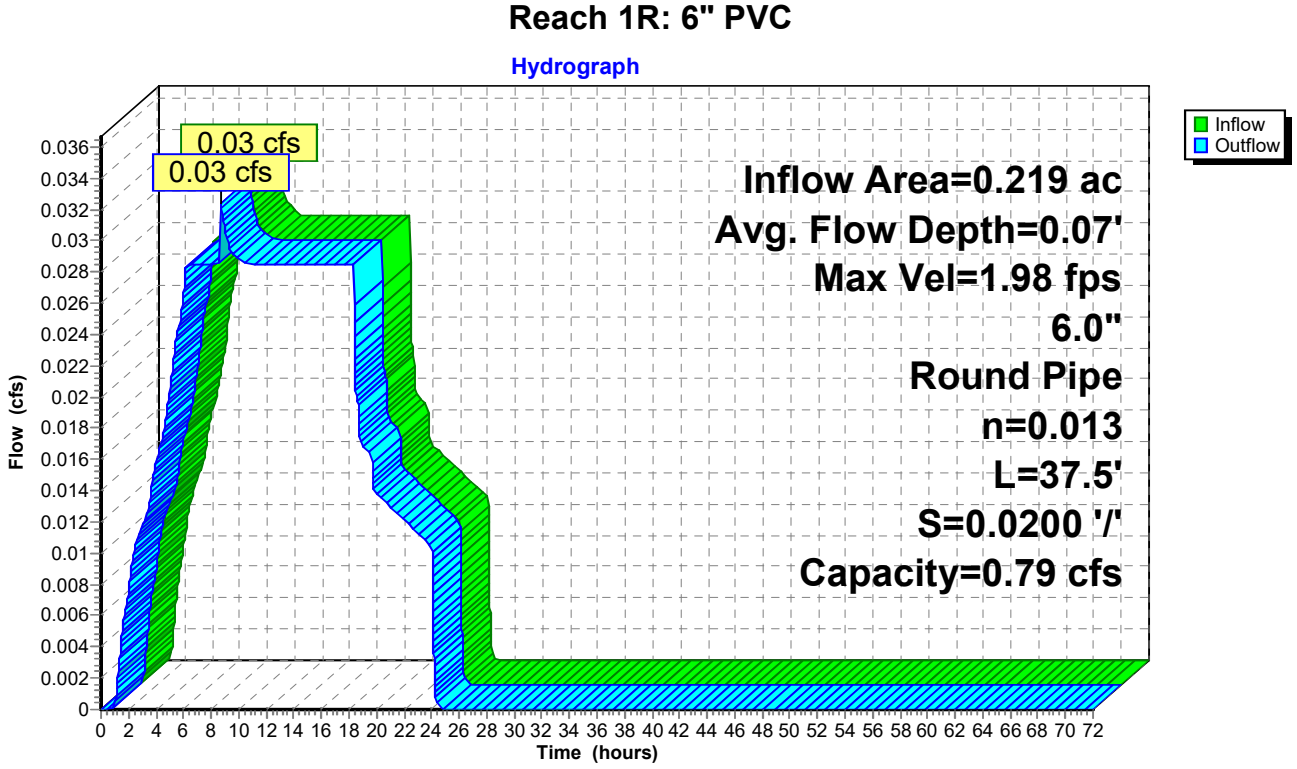
Inflow Area = 0.219 ac,100.00% Impervious, Inflow Depth = 2.27" for 2 YEAR event
Inflow = 0.03 cfs @ 8.67 hrs, Volume= 0.041 af
Outflow = 0.03 cfs @ 8.68 hrs, Volume= 0.041 af, Atten= 1%, Lag= 0.4 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.98 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.70 fps, Avg. Travel Time= 0.4 min

Peak Storage= 1 cf @ 8.68 hrs
Average Depth at Peak Storage= 0.07'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.79 cfs

6.0" Round Pipe
n= 0.013
Length= 37.5' Slope= 0.0200 '/'
Inlet Invert= 212.29', Outlet Invert= 211.54'





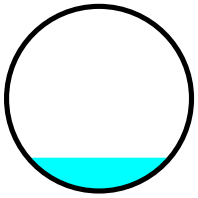
Summary for Reach 2R: 6" PVC

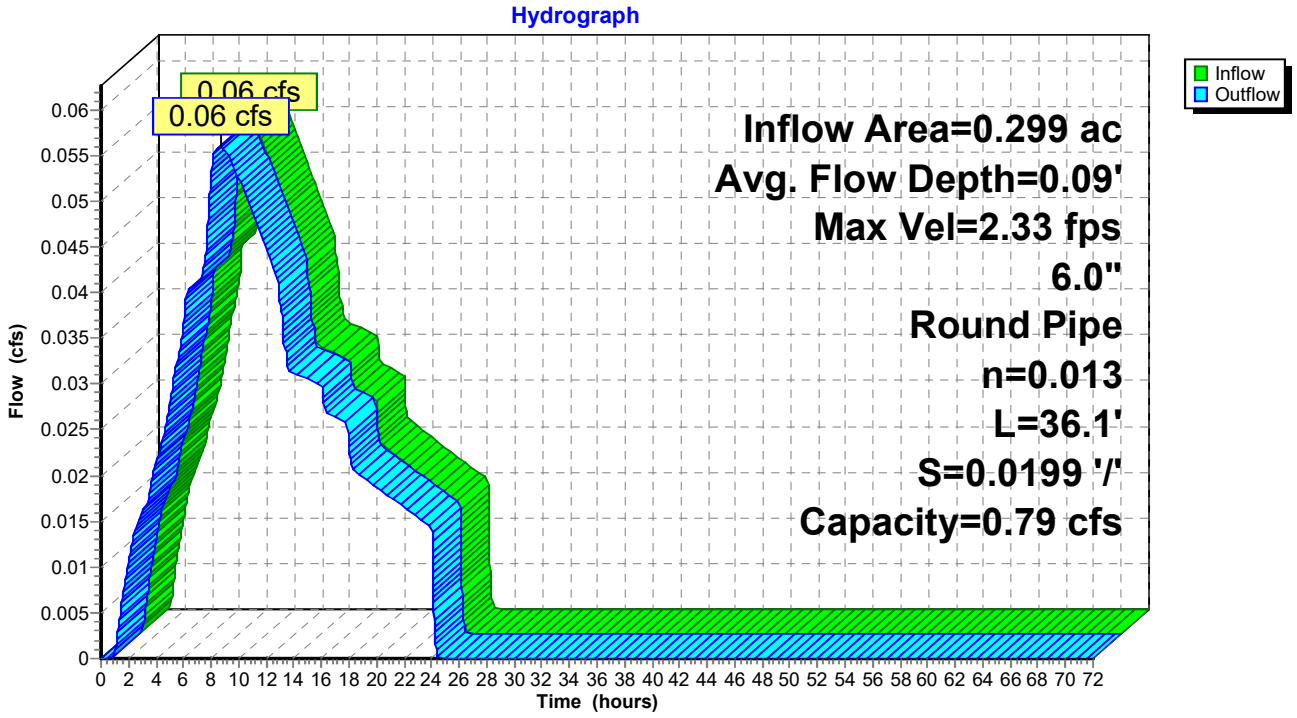
Inflow Area = 0.299 ac,100.00% Impervious, Inflow Depth = 2.27" for 2 YEAR event
Inflow = 0.06 cfs @ 8.66 hrs, Volume= 0.057 af
Outflow = 0.06 cfs @ 8.66 hrs, Volume= 0.057 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.33 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.84 fps, Avg. Travel Time= 0.3 min

Peak Storage= 1 cf @ 8.66 hrs
Average Depth at Peak Storage= 0.09'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.79 cfs

6.0" Round Pipe
n= 0.013
Length= 36.1' Slope= 0.0199 '/'
Inlet Invert= 208.45', Outlet Invert= 207.73'





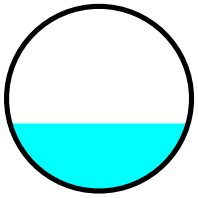
Summary for Reach 3R: 10" PVC

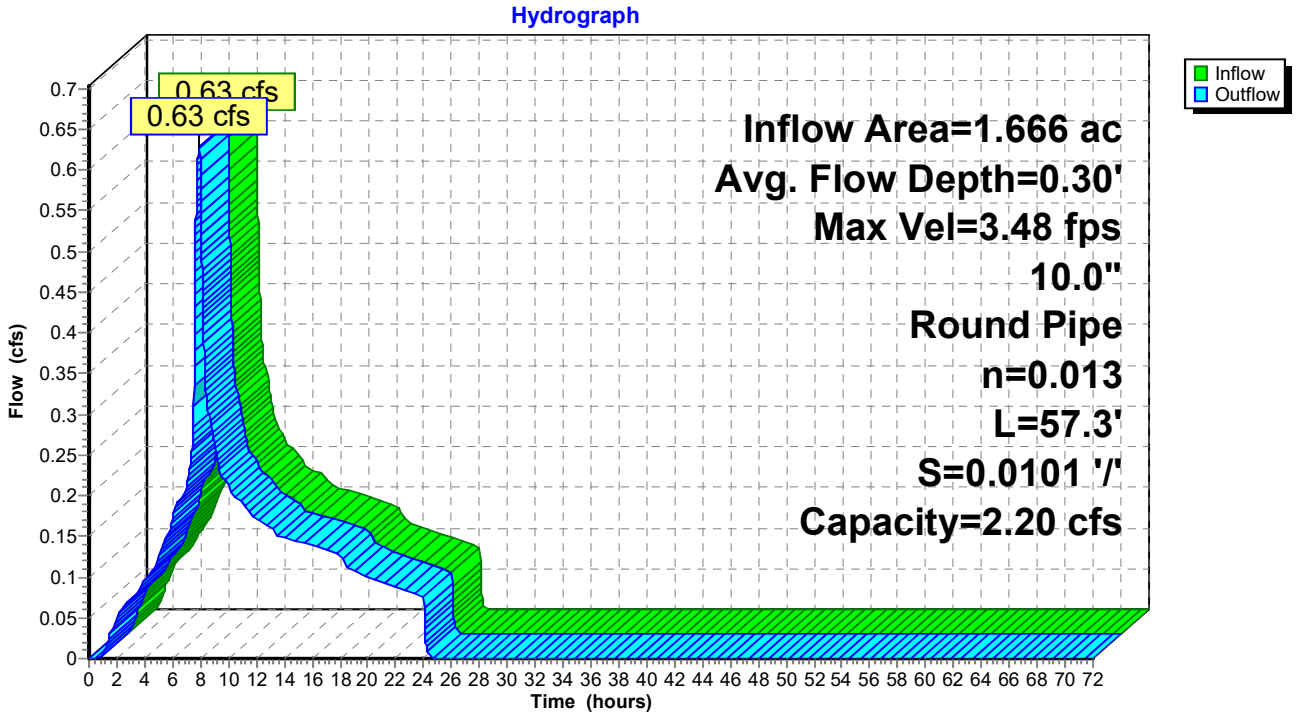
Inflow Area = 1.666 ac, 79.76% Impervious, Inflow Depth = 2.04" for 2 YEAR event
Inflow = 0.63 cfs @ 7.91 hrs, Volume= 0.283 af
Outflow = 0.63 cfs @ 7.91 hrs, Volume= 0.283 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.48 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 2.17 fps, Avg. Travel Time= 0.4 min

Peak Storage= 10 cf @ 7.91 hrs
Average Depth at Peak Storage= 0.30'
Bank-Full Depth= 0.83' Flow Area= 0.5 sf, Capacity= 2.20 cfs

10.0" Round Pipe
n= 0.013
Length= 57.3' Slope= 0.0101 '/'
Inlet Invert= 207.73', Outlet Invert= 207.15'





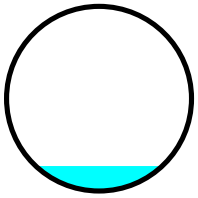
Summary for Reach 4R: 10" PVC

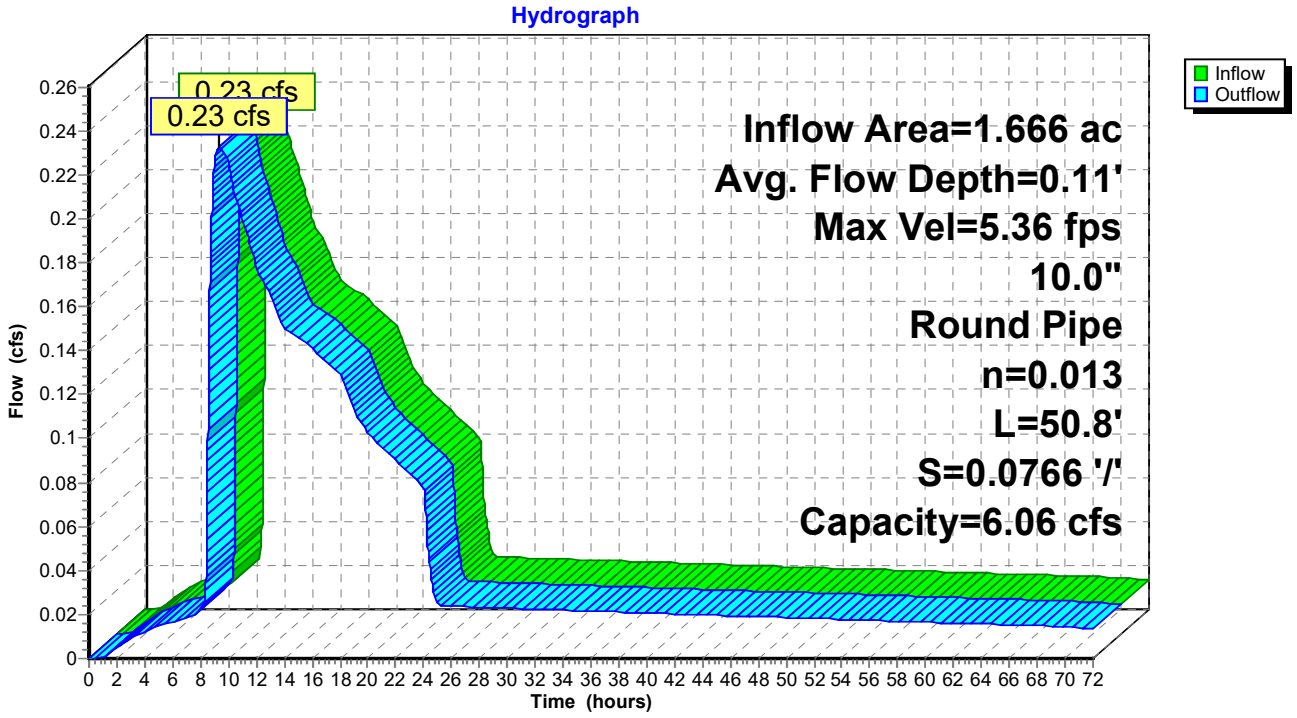
Inflow Area = 1.666 ac, 79.76% Impervious, Inflow Depth > 1.93" for 2 YEAR event
Inflow = 0.23 cfs @ 9.34 hrs, Volume= 0.268 af
Outflow = 0.23 cfs @ 9.34 hrs, Volume= 0.268 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.36 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 2.94 fps, Avg. Travel Time= 0.3 min

Peak Storage= 2 cf @ 9.34 hrs
Average Depth at Peak Storage= 0.11'
Bank-Full Depth= 0.83' Flow Area= 0.5 sf, Capacity= 6.06 cfs

10.0" Round Pipe
n= 0.013
Length= 50.8' Slope= 0.0766 '/'
Inlet Invert= 206.97', Outlet Invert= 203.08'





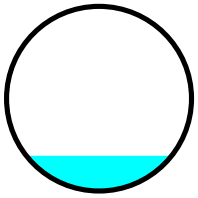
Summary for Reach 5R: 4" PVC

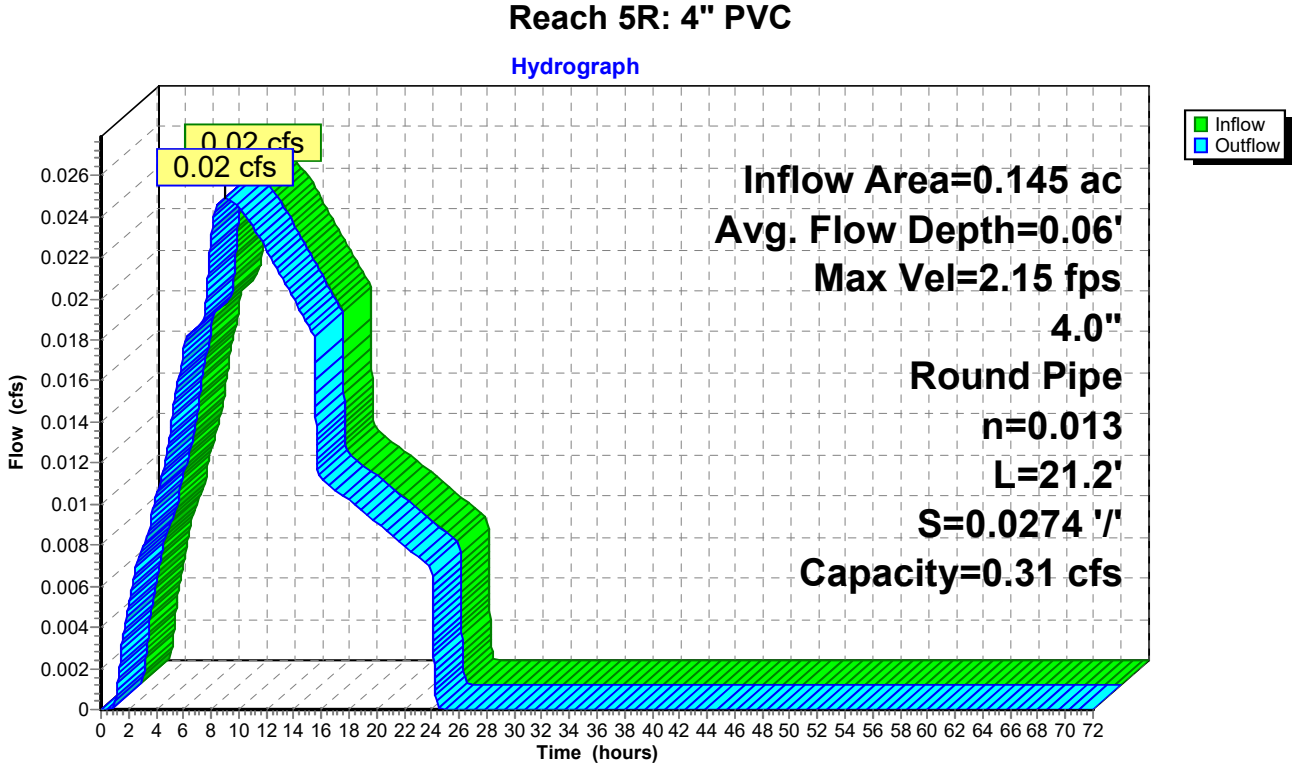
Inflow Area = 0.145 ac,100.00% Impervious, Inflow Depth = 2.27" for 2 YEAR event
Inflow = 0.02 cfs @ 9.05 hrs, Volume= 0.027 af
Outflow = 0.02 cfs @ 9.05 hrs, Volume= 0.027 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.15 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.75 fps, Avg. Travel Time= 0.2 min

Peak Storage= 0 cf @ 9.05 hrs
Average Depth at Peak Storage= 0.06'
Bank-Full Depth= 0.33' Flow Area= 0.1 sf, Capacity= 0.31 cfs

4.0" Round Pipe
n= 0.013
Length= 21.2' Slope= 0.0274 '/'
Inlet Invert= 217.65', Outlet Invert= 217.07'





Summary for Pond 1P: PLANTER #1

Inflow Area = 0.040 ac,100.00% Impervious, Inflow Depth = 2.27" for 2 YEAR event
Inflow = 0.02 cfs @ 7.88 hrs, Volume= 0.008 af
Outflow = 0.01 cfs @ 8.67 hrs, Volume= 0.008 af, Atten= 61%, Lag= 47.5 min
Primary = 0.01 cfs @ 8.67 hrs, Volume= 0.008 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 216.92' @ 8.67 hrs Surf.Area= 106 sf Storage= 53 cf

Plug-Flow detention time= 79.6 min calculated for 0.008 af (100% of inflow)
Center-of-Mass det. time= 79.6 min (752.2 - 672.6)

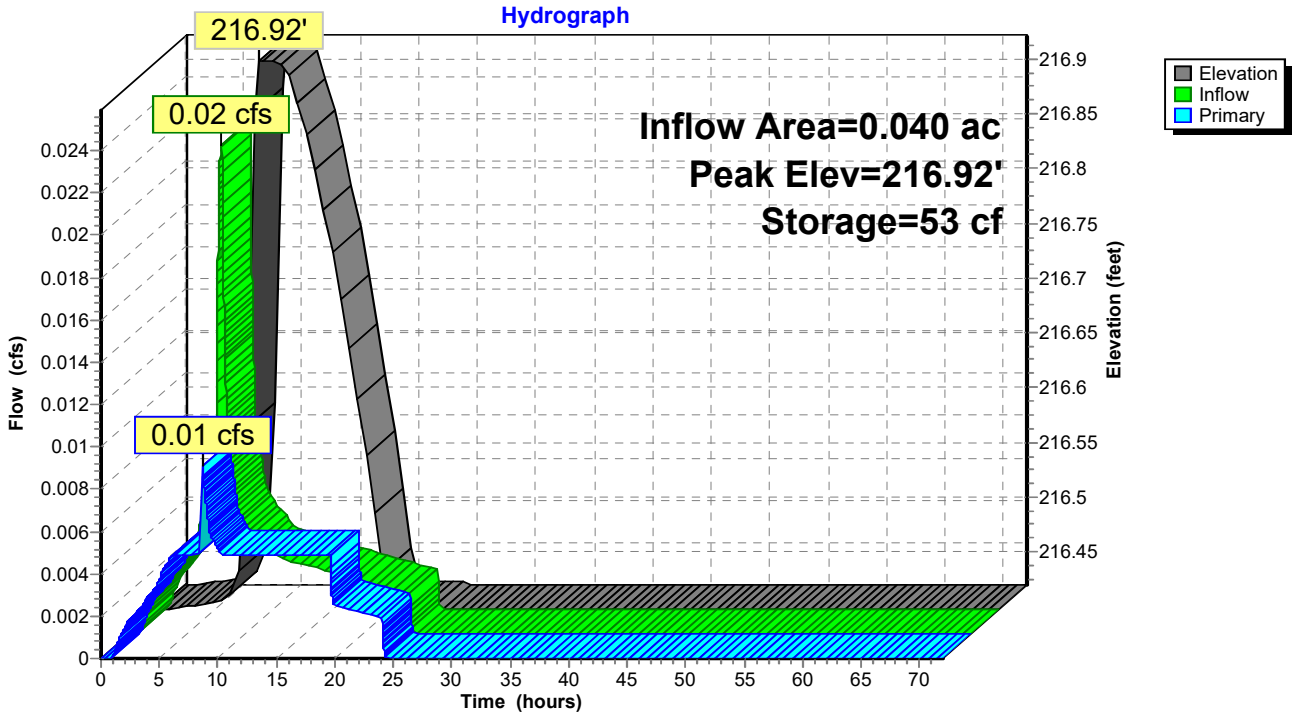
Volume	Invert	Avail.Storage	Storage Description
#1	216.42'	88 cf	**Ponding Depth (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
216.42	106	0	0
217.25	106	88	88

Device	Routing	Invert	Outlet Devices
#1	Primary	213.99'	**6.0" Round Culvert** L= 1.0' Ke= 0.500 Inlet / Outlet Invert= 213.99' / 213.98' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	216.42'	**2.000 in/hr Exfiltration over Surface area**
#3	Device 1	216.92'	**6.0" Horiz. Orifice/Grate** C= 0.610

Primary OutFlow Max=0.02 cfs @ 8.67 hrs HW=216.92' (Free Discharge)
└**1=Culvert** (Passes 0.02 cfs of 1.55 cfs potential flow)
└**2=Exfiltration** (Exfiltration Controls 0.00 cfs)
└**3=Orifice/Grate** (Orifice Controls 0.02 cfs @ 0.09 fps)

Pond 1P: PLANTER #1



Summary for Pond 2P: PLANTER #2

Inflow Area = 0.070 ac,100.00% Impervious, Inflow Depth = 2.27" for 2 YEAR event
Inflow = 0.04 cfs @ 7.88 hrs, Volume= 0.013 af
Outflow = 0.01 cfs @ 6.14 hrs, Volume= 0.013 af, Atten= 77%, Lag= 0.0 min
Primary = 0.01 cfs @ 6.14 hrs, Volume= 0.013 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 216.69' @ 9.89 hrs Surf.Area= 200 sf Storage= 95 cf

Plug-Flow detention time= 70.7 min calculated for 0.013 af (100% of inflow)
Center-of-Mass det. time= 70.7 min (743.3 - 672.6)

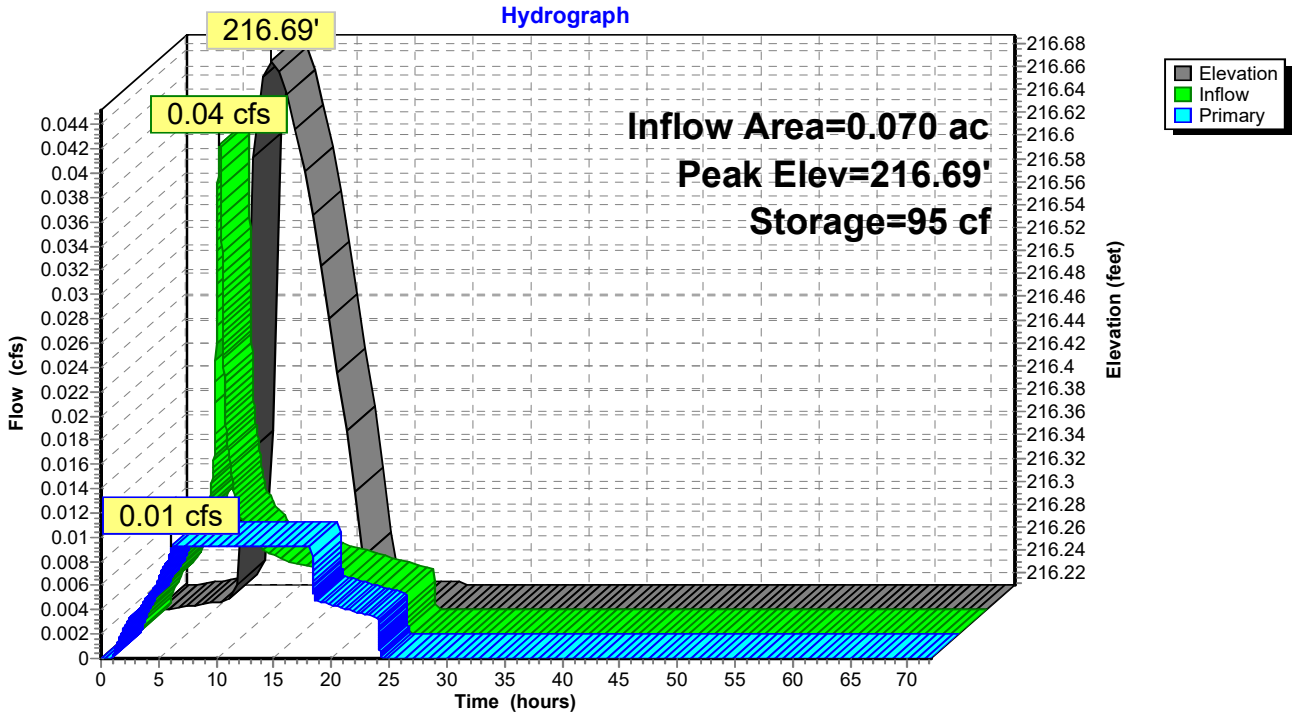
Volume	Invert	Avail.Storage	Storage Description
#1	216.21'	166 cf	**Ponding Depth (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
216.21	200	0	0
217.04	200	166	166

Device	Routing	Invert	Outlet Devices
#1	Primary	213.71'	**6.0" Round Culvert** L= 1.0' Ke= 0.500 Inlet / Outlet Invert= 213.71' / 213.70' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	216.21'	**2.000 in/hr Exfiltration over Surface area**
#3	Device 1	216.71'	**6.0" Horiz. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.01 cfs @ 6.14 hrs HW=216.22' (Free Discharge)
└**1=Culvert** (Passes 0.01 cfs of 1.42 cfs potential flow)
└**2=Exfiltration** (Exfiltration Controls 0.01 cfs)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 2P: PLANTER #2



Summary for Pond 3P: PLANTER #3

Inflow Area = 0.070 ac,100.00% Impervious, Inflow Depth = 2.27" for 2 YEAR event
Inflow = 0.04 cfs @ 7.88 hrs, Volume= 0.013 af
Outflow = 0.01 cfs @ 6.14 hrs, Volume= 0.013 af, Atten= 77%, Lag= 0.0 min
Primary = 0.01 cfs @ 6.14 hrs, Volume= 0.013 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 216.76' @ 9.89 hrs Surf.Area= 200 sf Storage= 95 cf

Plug-Flow detention time= 70.7 min calculated for 0.013 af (100% of inflow)
Center-of-Mass det. time= 70.7 min (743.3 - 672.6)

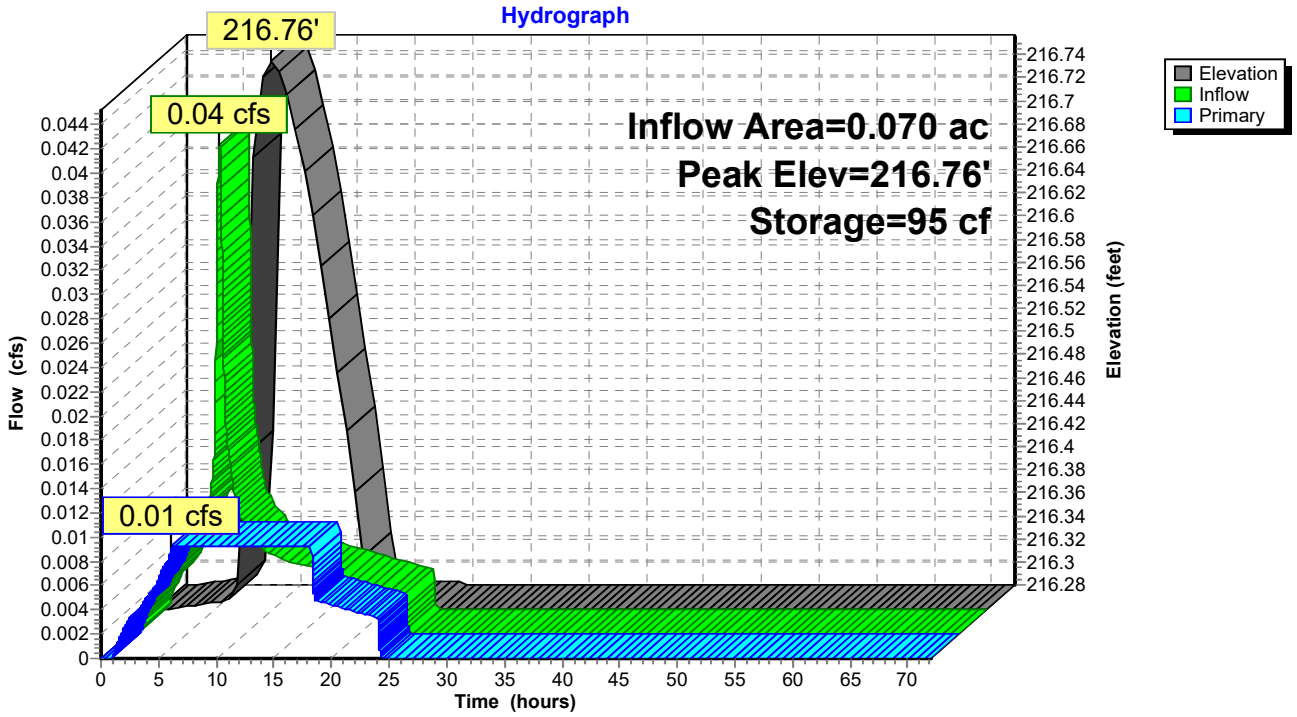
Volume	Invert	Avail.Storage	Storage Description
#1	216.28'	166 cf	**Ponding Depth (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
216.28	200	0	0
217.11	200	166	166

Device	Routing	Invert	Outlet Devices
#1	Primary	213.78'	**6.0" Round Culvert** L= 1.0' Ke= 0.500 Inlet / Outlet Invert= 213.78' / 213.77' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	216.28'	**2.000 in/hr Exfiltration over Surface area**
#3	Device 1	216.78'	**6.0" Horiz. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.01 cfs @ 6.14 hrs HW=216.29' (Free Discharge)
└**1=Culvert** (Passes 0.01 cfs of 1.42 cfs potential flow)
└**2=Exfiltration** (Exfiltration Controls 0.01 cfs)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 3P: PLANTER #3



Summary for Pond 4P: PLANTER #4

Inflow Area = 0.039 ac,100.00% Impervious, Inflow Depth = 2.27" for 2 YEAR event
Inflow = 0.02 cfs @ 7.88 hrs, Volume= 0.007 af
Outflow = 0.01 cfs @ 6.12 hrs, Volume= 0.007 af, Atten= 77%, Lag= 0.0 min
Primary = 0.01 cfs @ 6.12 hrs, Volume= 0.007 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 217.02' @ 9.95 hrs Surf.Area= 110 sf Storage= 54 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 74.2 min (746.8 - 672.6)

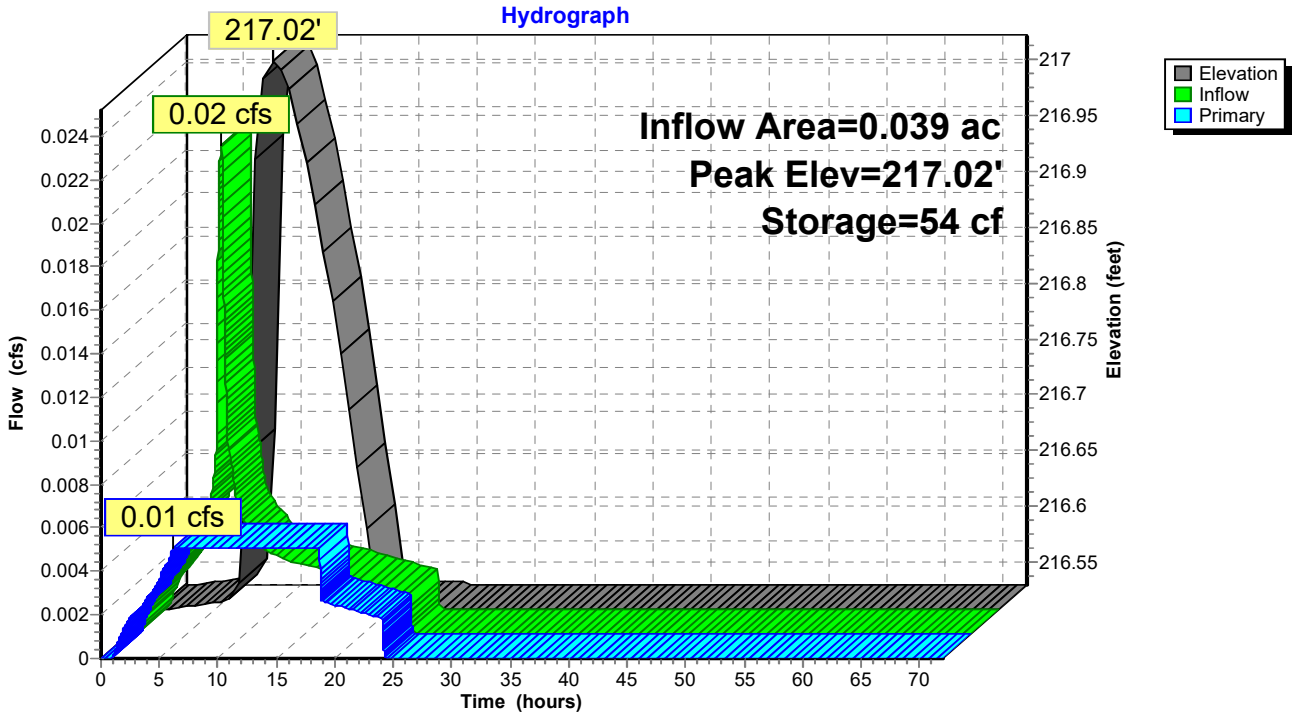
Volume	Invert	Avail.Storage	Storage Description
#1	216.53'	91 cf	**Ponding Depth (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
216.53	110	0	0
217.36	110	91	91

Device	Routing	Invert	Outlet Devices
#1	Primary	214.03'	**6.0" Round Culvert** L= 1.0' Ke= 0.500 Inlet / Outlet Invert= 214.03' / 214.02' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	216.53'	**2.000 in/hr Exfiltration over Surface area**
#3	Device 1	217.03'	**6.0" Horiz. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.01 cfs @ 6.12 hrs HW=216.54' (Free Discharge)
└**1=Culvert** (Passes 0.01 cfs of 1.42 cfs potential flow)
└**2=Exfiltration** (Exfiltration Controls 0.01 cfs)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 4P: PLANTER #4



Summary for Pond 5P: PLANTER #5

Inflow Area = 0.038 ac,100.00% Impervious, Inflow Depth = 2.27" for 2 YEAR event
Inflow = 0.02 cfs @ 7.88 hrs, Volume= 0.007 af
Outflow = 0.01 cfs @ 8.72 hrs, Volume= 0.007 af, Atten= 64%, Lag= 50.1 min
Primary = 0.01 cfs @ 8.72 hrs, Volume= 0.007 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 212.50' @ 8.72 hrs Surf.Area= 173 sf Storage= 38 cf

Plug-Flow detention time= 26.0 min calculated for 0.007 af (100% of inflow)
Center-of-Mass det. time= 26.0 min (698.6 - 672.6)

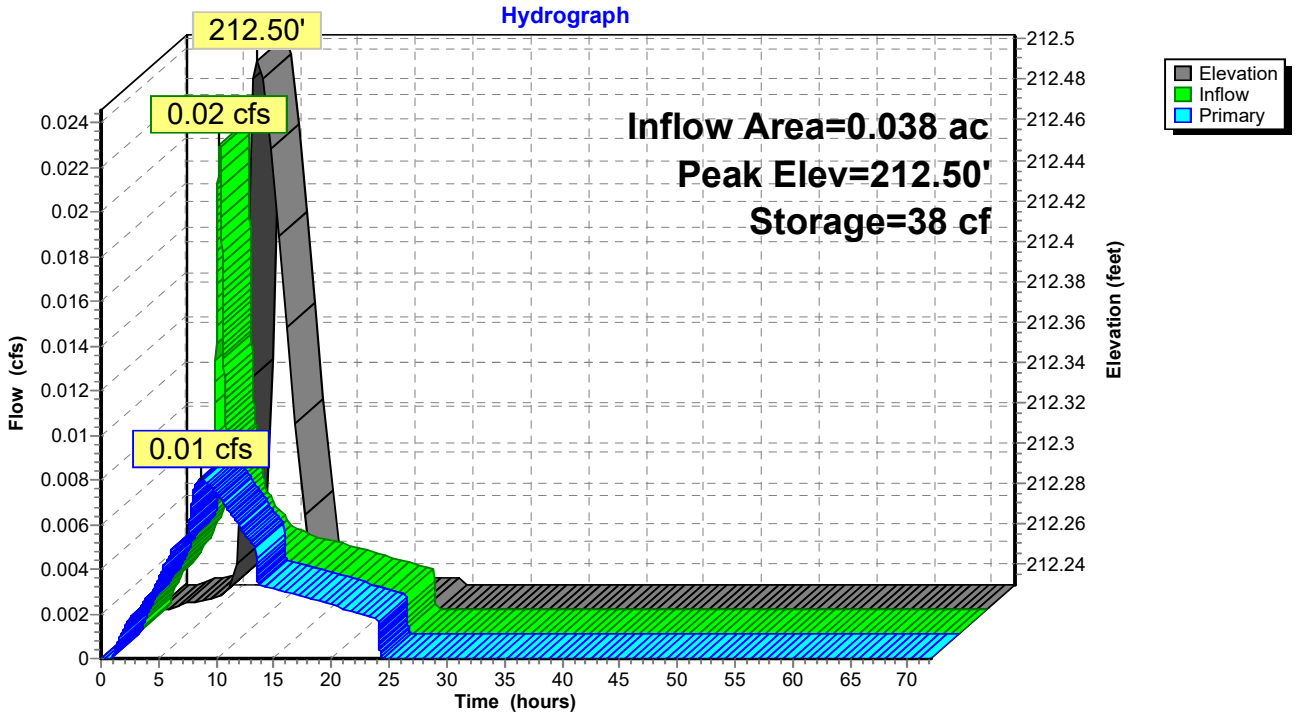
Volume	Invert	Avail.Storage	Storage Description
#1	212.23'	174 cf	**Ponding Depth (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
212.23	104	0	0
213.06	315	174	174

Device	Routing	Invert	Outlet Devices
#1	Primary	209.37'	**6.0" Round Culvert** L= 1.0' Ke= 0.500 Inlet / Outlet Invert= 209.37' / 209.36' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	212.23'	**2.000 in/hr Exfiltration over Surface area**
#3	Device 1	212.73'	**6.0" Horiz. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.01 cfs @ 8.72 hrs HW=212.50' (Free Discharge)
└**1=Culvert** (Passes 0.01 cfs of 1.60 cfs potential flow)
└**2=Exfiltration** (Exfiltration Controls 0.01 cfs)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 5P: PLANTER #5



Summary for Pond 6P: PLANTER #6

Inflow Area = 0.076 ac,100.00% Impervious, Inflow Depth = 2.27" for 2 YEAR event
Inflow = 0.04 cfs @ 7.88 hrs, Volume= 0.014 af
Outflow = 0.02 cfs @ 8.73 hrs, Volume= 0.014 af, Atten= 64%, Lag= 50.9 min
Primary = 0.02 cfs @ 8.73 hrs, Volume= 0.014 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 211.97' @ 8.73 hrs Surf.Area= 341 sf Storage= 72 cf

Plug-Flow detention time= 24.4 min calculated for 0.014 af (100% of inflow)
Center-of-Mass det. time= 24.4 min (697.0 - 672.6)

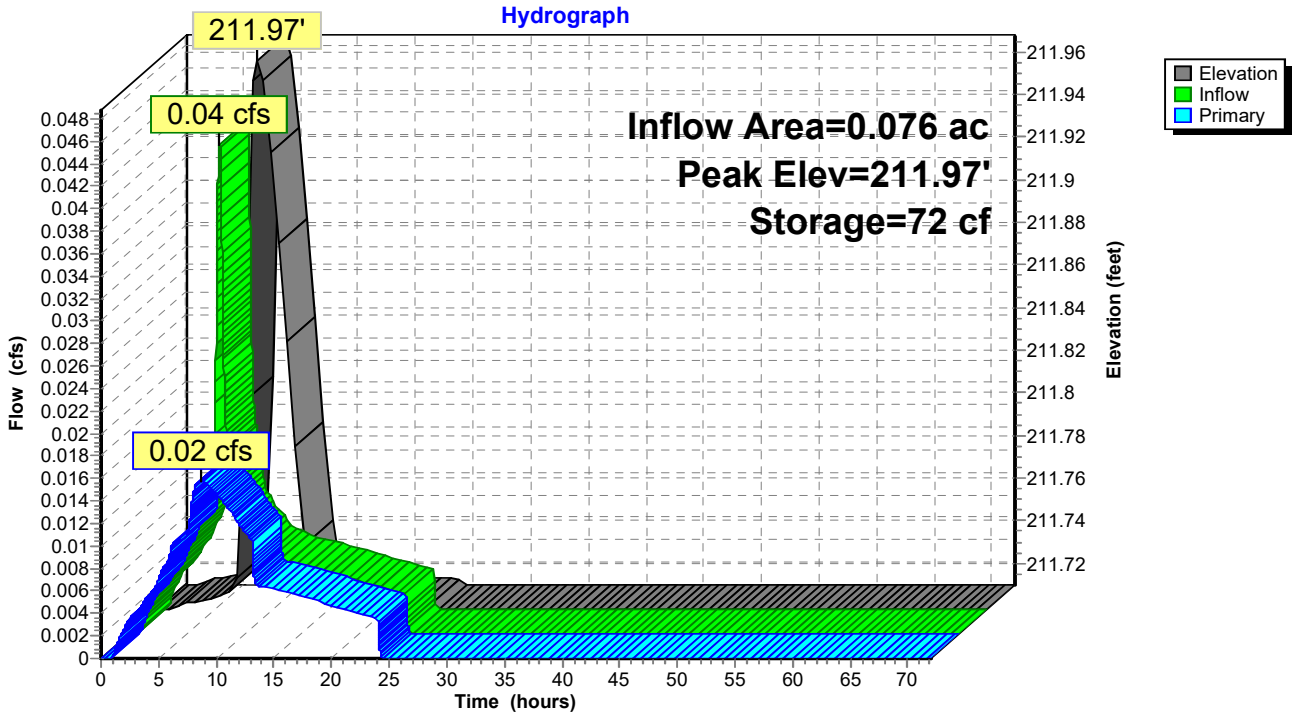
Volume	Invert	Avail.Storage	Storage Description
#1	211.71'	344 cf	**Ponding Depth (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
211.71	221	0	0
212.54	608	344	344

Device	Routing	Invert	Outlet Devices
#1	Primary	209.21'	**6.0" Round Culvert** L= 1.0' Ke= 0.500 Inlet / Outlet Invert= 209.21' / 209.21' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	211.71'	**2.000 in/hr Exfiltration over Surface area**
#3	Device 1	212.21'	**6.0" Horiz. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.02 cfs @ 8.73 hrs HW=211.97' (Free Discharge)
└**1=Culvert** (Passes 0.02 cfs of 1.50 cfs potential flow)
└**2=Exfiltration** (Exfiltration Controls 0.02 cfs)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 6P: PLANTER #6



Summary for Pond 7P: PLANTER #7

Inflow Area = 0.076 ac,100.00% Impervious, Inflow Depth = 2.27" for 2 YEAR event
Inflow = 0.04 cfs @ 7.88 hrs, Volume= 0.014 af
Outflow = 0.02 cfs @ 8.47 hrs, Volume= 0.014 af, Atten= 61%, Lag= 35.4 min
Primary = 0.02 cfs @ 8.47 hrs, Volume= 0.014 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 210.65' @ 8.47 hrs Surf.Area= 368 sf Storage= 71 cf

Plug-Flow detention time= 22.8 min calculated for 0.014 af (100% of inflow)
Center-of-Mass det. time= 22.8 min (695.4 - 672.6)

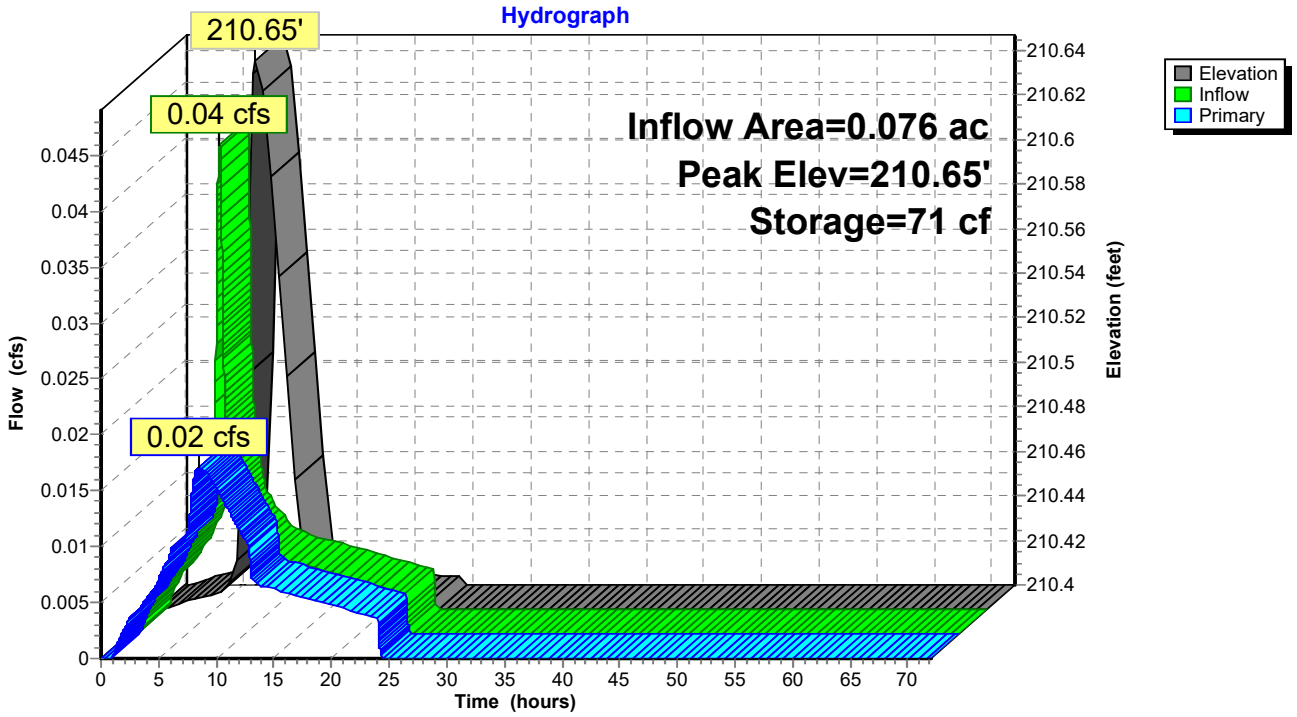
Volume	Invert	Avail.Storage	Storage Description
#1	210.40'	533 cf	**Ponding Depth (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
210.40	208	0	0
211.40	858	533	533

Device	Routing	Invert	Outlet Devices
#1	Primary	207.90'	**6.0" Round Culvert** L= 1.0' Ke= 0.500 Inlet / Outlet Invert= 207.90' / 207.89' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	210.40'	**2.000 in/hr Exfiltration over Surface area**
#3	Device 1	210.90'	**6.0" Horiz. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.02 cfs @ 8.47 hrs HW=210.65' (Free Discharge)
└**1=Culvert** (Passes 0.02 cfs of 1.49 cfs potential flow)
  ├**2=Exfiltration** (Exfiltration Controls 0.02 cfs)
  └**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 7P: PLANTER #7



Summary for Pond 8P: PLANTER #8

Inflow Area = 0.070 ac,100.00% Impervious, Inflow Depth = 2.27" for 2 YEAR event
Inflow = 0.04 cfs @ 7.88 hrs, Volume= 0.013 af
Outflow = 0.01 cfs @ 6.17 hrs, Volume= 0.013 af, Atten= 77%, Lag= 0.0 min
Primary = 0.01 cfs @ 6.17 hrs, Volume= 0.013 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 209.93' @ 9.82 hrs Surf.Area= 203 sf Storage= 93 cf

Plug-Flow detention time= 66.9 min calculated for 0.013 af (100% of inflow)
Center-of-Mass det. time= 66.9 min (739.5 - 672.6)

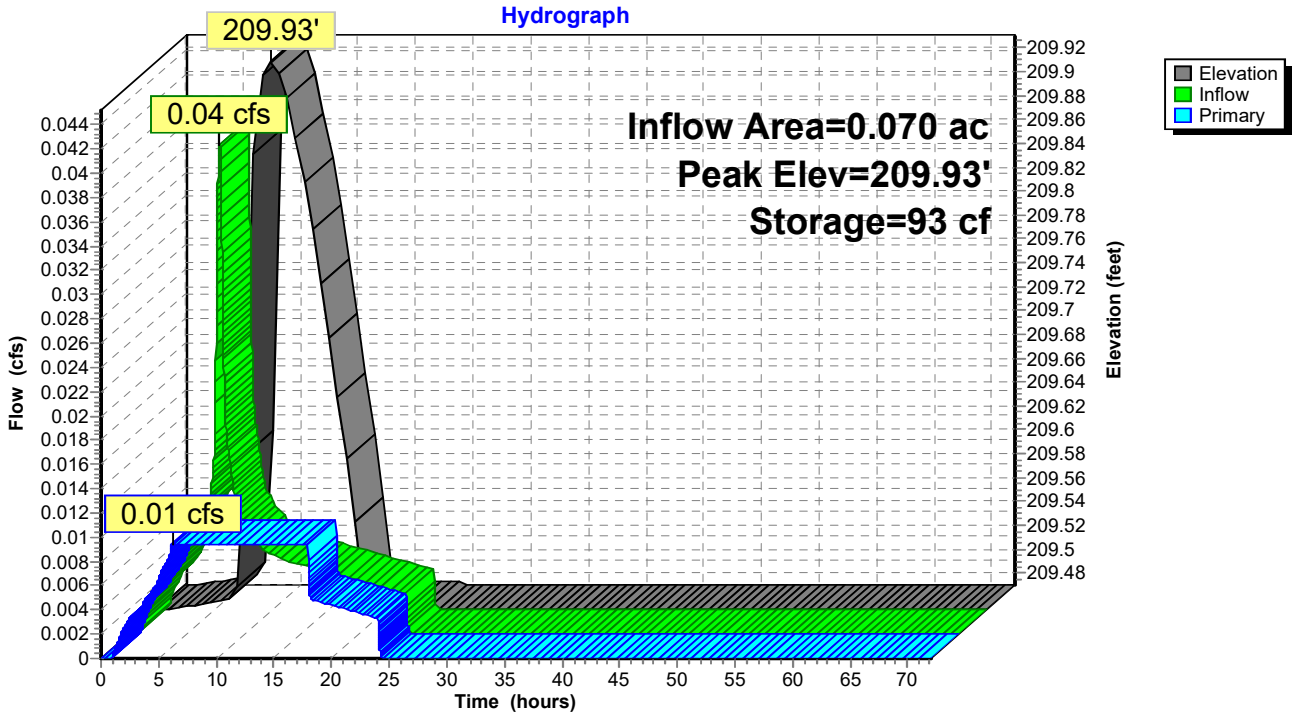
Volume	Invert	Avail.Storage	Storage Description
#1	209.47'	168 cf	**Ponding Depth (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
209.47	203	0	0
210.30	203	168	168

Device	Routing	Invert	Outlet Devices
#1	Primary	206.79'	**6.0" Round Culvert** L= 1.0' Ke= 0.500 Inlet / Outlet Invert= 206.79' / 206.78' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	209.47'	**2.000 in/hr Exfiltration over Surface area**
#3	Device 1	209.97'	**6.0" Horiz. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.01 cfs @ 6.17 hrs HW=209.48' (Free Discharge)
└**1=Culvert** (Passes 0.01 cfs of 1.48 cfs potential flow)
└**2=Exfiltration** (Exfiltration Controls 0.01 cfs)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 8P: PLANTER #8



Summary for Pond 9P: PLANTER #9

Inflow Area = 0.039 ac,100.00% Impervious, Inflow Depth = 2.27" for 2 YEAR event
Inflow = 0.02 cfs @ 7.88 hrs, Volume= 0.007 af
Outflow = 0.01 cfs @ 6.47 hrs, Volume= 0.007 af, Atten= 75%, Lag= 0.0 min
Primary = 0.01 cfs @ 6.47 hrs, Volume= 0.007 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 209.68' @ 9.36 hrs Surf.Area= 123 sf Storage= 47 cf

Plug-Flow detention time= 49.3 min calculated for 0.007 af (100% of inflow)
Center-of-Mass det. time= 49.3 min (721.9 - 672.6)

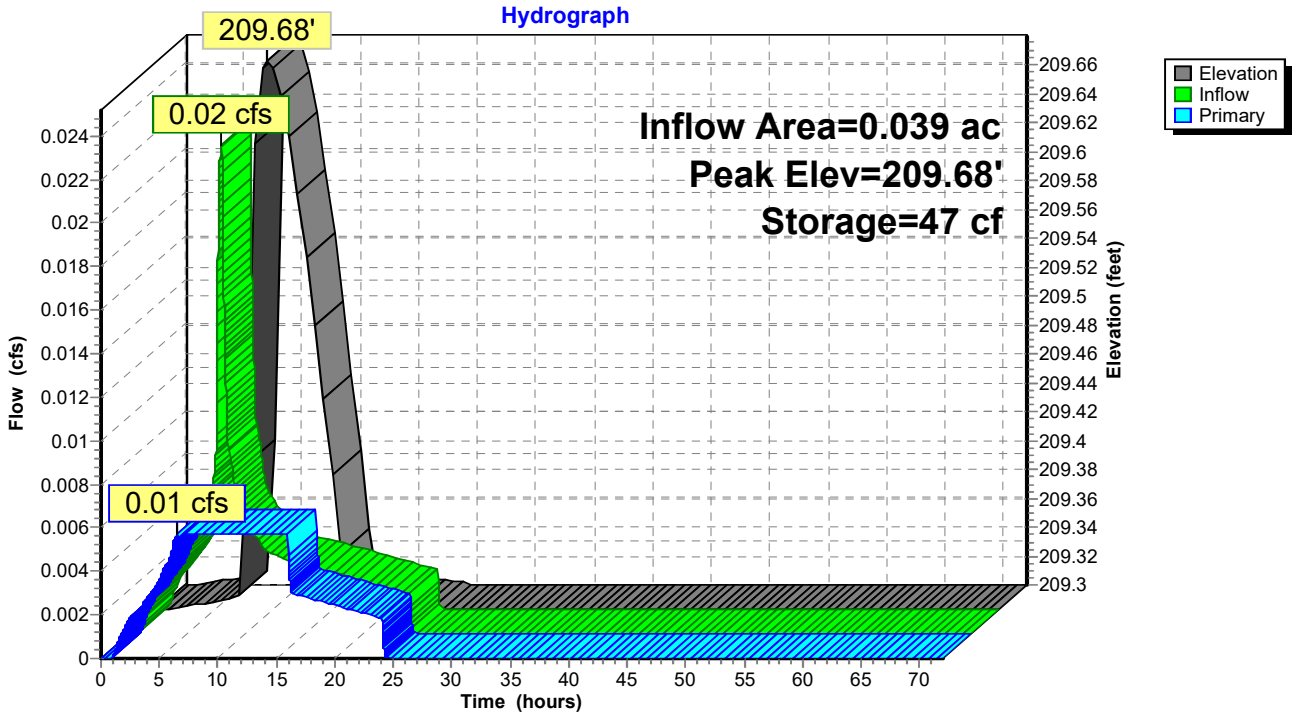
Volume	Invert	Avail.Storage	Storage Description
#1	209.30'	102 cf	**Ponding Depth (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
209.30	123	0	0
210.13	123	102	102

Device	Routing	Invert	Outlet Devices
#1	Primary	206.80'	**6.0" Round Culvert** L= 1.0' Ke= 0.500 Inlet / Outlet Invert= 206.80' / 206.79' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	209.30'	**2.000 in/hr Exfiltration over Surface area**
#3	Device 1	209.80'	**6.0" Horiz. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.01 cfs @ 6.47 hrs HW=209.31' (Free Discharge)
└**1=Culvert** (Passes 0.01 cfs of 1.42 cfs potential flow)
  ├**2=Exfiltration** (Exfiltration Controls 0.01 cfs)
  └**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 9P: PLANTER #9



Summary for Pond 10P: DC-780 Chambers

Inflow Area = 1.666 ac, 79.76% Impervious, Inflow Depth = 2.04" for 2 YEAR event
Inflow = 0.63 cfs @ 7.91 hrs, Volume= 0.283 af
Outflow = 0.23 cfs @ 9.34 hrs, Volume= 0.268 af, Atten= 63%, Lag= 85.5 min
Primary = 0.03 cfs @ 9.34 hrs, Volume= 0.115 af
Secondary = 0.21 cfs @ 9.34 hrs, Volume= 0.152 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 206.72' @ 9.34 hrs Surf.Area= 0.071 ac Storage= 0.097 af
Flood Elev= 208.75' Surf.Area= 0.071 ac Storage= 0.148 af

Plug-Flow detention time= 736.4 min calculated for 0.268 af (95% of inflow)
Center-of-Mass det. time= 698.6 min (1,406.0 - 707.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	204.50'	0.058 af	**34.75'W x 89.06'L x 3.75'H Field A** 0.266 af Overall - 0.089 af Embedded = 0.177 af x 33.0% Voids
#2A	205.25'	0.089 af	**ADS_StormTech DC-780 +Cap** x 84 Inside #1 Effective Size= 45.4"W x 30.0"H => 6.49 sf x 7.12'L = 46.2 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 7 Rows of 12 Chambers
		0.148 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Secondary	204.50'	**10.0" Round Culvert** L= 1.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 204.50' / 204.49' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.55 sf
#2	Primary	204.50'	**0.8" Horiz. 1/2 of 2-YR Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	206.55'	**4.4" Horiz. 2-YR Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	207.26'	**2.5" Horiz. 25-YR Orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	207.60'	**10.0" Horiz. Emergency Overflow** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.03 cfs @ 9.34 hrs HW=206.72' (Free Discharge)
└**2=1/2 of 2-YR Orifice** (Orifice Controls 0.03 cfs @ 7.17 fps)

Secondary OutFlow Max=0.21 cfs @ 9.34 hrs HW=206.72' (Free Discharge)
└**1=Culvert** (Passes 0.21 cfs of 2.78 cfs potential flow)
  ├**3=2-YR Orifice** (Orifice Controls 0.21 cfs @ 1.97 fps)
  ├**4=25-YR Orifice** (Controls 0.00 cfs)
  └**5=Emergency Overflow** (Controls 0.00 cfs)

Pond 10P: DC-780 Chambers - Chamber Wizard Field A

Chamber Model = ADS_StormTech DC-780 +Cap (ADS StormTech® DC-780 with cap length)
Effective Size= 45.4"W x 30.0"H => 6.49 sf x 7.12'L = 46.2 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

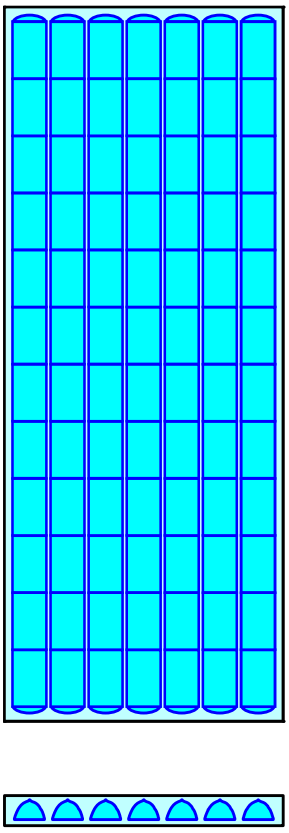
12 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 87.06' Row Length +12.0" End Stone x 2 = 89.06' Base Length
7 Rows x 51.0" Wide + 6.0" Spacing x 6 + 12.0" Side Stone x 2 = 34.75' Base Width
9.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.75' Field Height

84 Chambers x 46.2 cf = 3,884.1 cf Chamber Storage

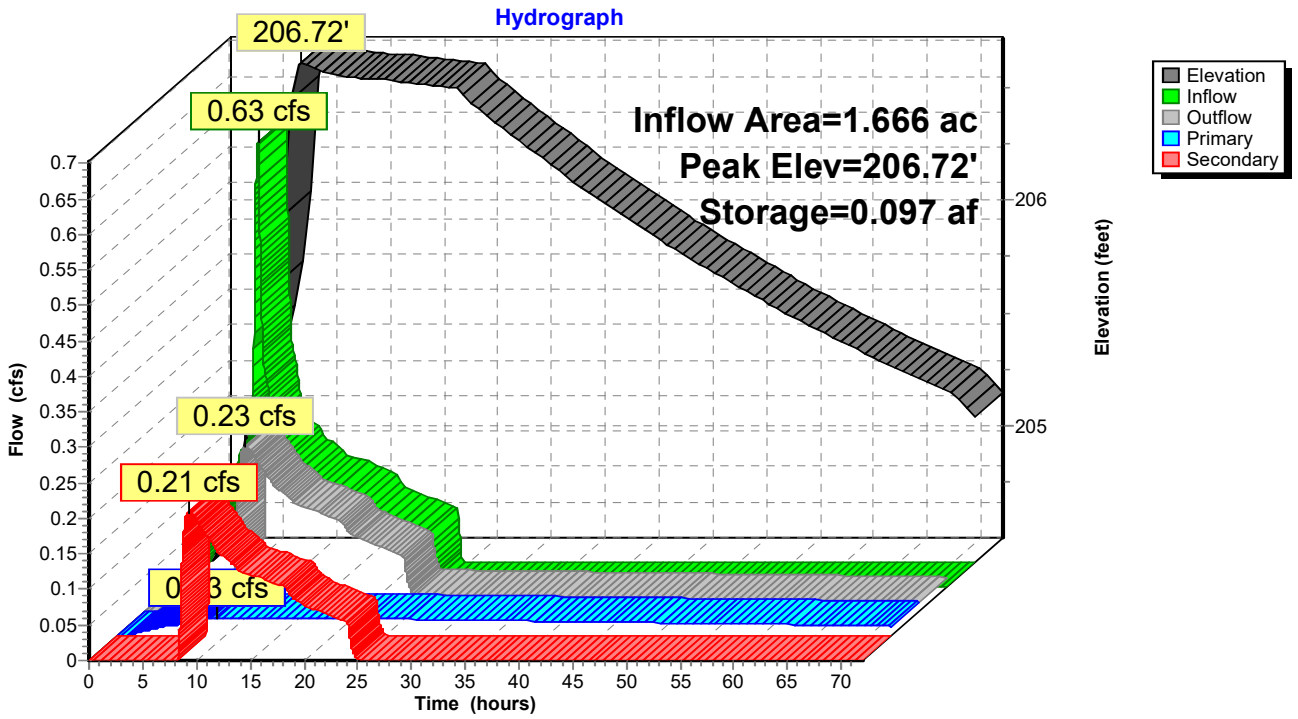
11,605.2 cf Field - 3,884.1 cf Chambers = 7,721.1 cf Stone x 33.0% Voids = 2,548.0 cf Stone Storage

Chamber Storage + Stone Storage = 6,432.0 cf = 0.148 af
Overall Storage Efficiency = 55.4%
Overall System Size = 89.06' x 34.75' x 3.75'

84 Chambers
429.8 cy Field
286.0 cy Stone



Pond 10P: DC-780 Chambers



Summary for Pond 11P: PLANTER #10

Inflow Area = 0.145 ac,100.00% Impervious, Inflow Depth = 2.27" for 2 YEAR event
Inflow = 0.08 cfs @ 7.88 hrs, Volume= 0.027 af
Outflow = 0.02 cfs @ 9.05 hrs, Volume= 0.027 af, Atten= 70%, Lag= 70.2 min
Primary = 0.02 cfs @ 9.05 hrs, Volume= 0.027 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 217.52' @ 9.05 hrs Surf.Area= 538 sf Storage= 171 cf

Plug-Flow detention time= 42.5 min calculated for 0.027 af (100% of inflow)
Center-of-Mass det. time= 42.5 min (715.1 - 672.6)

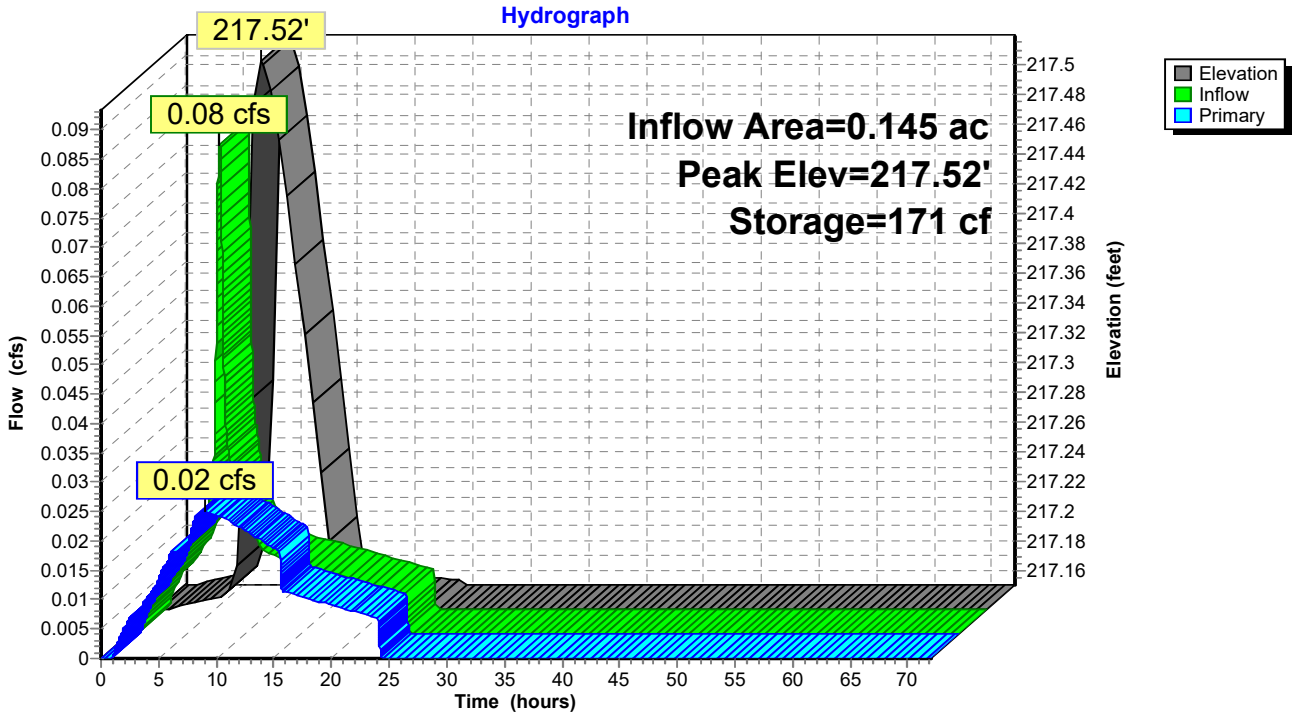
Volume	Invert	Avail.Storage	Storage Description
#1	217.15'	592 cf	**Ponding Depth (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
217.15	388	0	0
218.15	795	592	592

Device	Routing	Invert	Outlet Devices
#1	Primary	217.00'	**4.0" Round Culvert** L= 1.0' Ke= 0.500 Inlet / Outlet Invert= 217.00' / 216.99' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.09 sf
#2	Device 1	217.65'	**4.0" Horiz. Orifice/Grate** C= 0.600
#3	Device 1	217.15'	**2.000 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.02 cfs @ 9.05 hrs HW=217.52' (Free Discharge)
└**1=Culvert** (Passes 0.02 cfs of 0.24 cfs potential flow)
└**2=Orifice/Grate** (Controls 0.00 cfs)
└**3=Exfiltration** (Exfiltration Controls 0.02 cfs)

Pond 11P: PLANTER #10



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment 1S: North Building & Runoff Area=1,748 sf 100.00% Impervious Runoff Depth=3.27"
Tc=5.0 min CN=0/98 Runoff=0.03 cfs 0.011 af

Subcatchment 2S: North Building & Runoff Area=3,051 sf 100.00% Impervious Runoff Depth=3.27"
Tc=5.0 min CN=0/98 Runoff=0.06 cfs 0.019 af

Subcatchment 3S: North Building & Runoff Area=3,051 sf 100.00% Impervious Runoff Depth=3.27"
Tc=5.0 min CN=0/98 Runoff=0.06 cfs 0.019 af

Subcatchment 4S: North Building & Runoff Area=1,700 sf 100.00% Impervious Runoff Depth=3.27"
Tc=5.0 min CN=0/98 Runoff=0.03 cfs 0.011 af

Subcatchment 5S: Middle Building Runoff Area=1,658 sf 100.00% Impervious Runoff Depth=3.27"
Tc=5.0 min CN=0/98 Runoff=0.03 cfs 0.010 af

Subcatchment 6S: Middle Building & Runoff Area=3,291 sf 100.00% Impervious Runoff Depth=3.27"
Tc=5.0 min CN=0/98 Runoff=0.06 cfs 0.021 af

Subcatchment 7S: Middle/South Building Runoff Area=3,309 sf 100.00% Impervious Runoff Depth=3.27"
Tc=5.0 min CN=0/98 Runoff=0.06 cfs 0.021 af

Subcatchment 8S: South Building & Runoff Area=3,051 sf 100.00% Impervious Runoff Depth=3.27"
Tc=5.0 min CN=0/98 Runoff=0.06 cfs 0.019 af

Subcatchment 9S: South Building & Runoff Area=1,699 sf 100.00% Impervious Runoff Depth=3.27"
Tc=5.0 min CN=0/98 Runoff=0.03 cfs 0.011 af

Subcatchment 10S: Parking and Runoff Area=49,998 sf 70.63% Impervious Runoff Depth=2.88"
Tc=5.0 min CN=84/98 Runoff=0.82 cfs 0.275 af

Subcatchment 11S: N Springbrook Rd Runoff Area=6,300 sf 100.00% Impervious Runoff Depth=3.27"
Tc=5.0 min CN=0/98 Runoff=0.12 cfs 0.039 af

Reach 1R: 6" PVC Avg. Flow Depth=0.16' Max Vel=3.28 fps Inflow=0.18 cfs 0.060 af
6.0" Round Pipe n=0.013 L=37.5' S=0.0200 '/' Capacity=0.79 cfs Outflow=0.18 cfs 0.060 af

Reach 2R: 6" PVC Avg. Flow Depth=0.14' Max Vel=2.96 fps Inflow=0.13 cfs 0.081 af
6.0" Round Pipe n=0.013 L=36.1' S=0.0199 '/' Capacity=0.79 cfs Outflow=0.13 cfs 0.081 af

Reach 3R: 10" PVC Avg. Flow Depth=0.42' Max Vel=4.04 fps Inflow=1.11 cfs 0.416 af
10.0" Round Pipe n=0.013 L=57.3' S=0.0101 '/' Capacity=2.20 cfs Outflow=1.10 cfs 0.416 af

Reach 4R: 10" PVC Avg. Flow Depth=0.15' Max Vel=6.54 fps Inflow=0.46 cfs 0.401 af
10.0" Round Pipe n=0.013 L=50.8' S=0.0766 '/' Capacity=6.06 cfs Outflow=0.46 cfs 0.401 af

Reach 5R: 4" PVC Avg. Flow Depth=0.11' Max Vel=2.96 fps Inflow=0.08 cfs 0.039 af
4.0" Round Pipe n=0.013 L=21.2' S=0.0274 '/' Capacity=0.31 cfs Outflow=0.08 cfs 0.039 af

Pond 1P: PLANTER #1 Peak Elev=216.92' Storage=53 cf Inflow=0.03 cfs 0.011 af
Outflow=0.03 cfs 0.011 af

Pond 2P: PLANTER #2 Peak Elev=216.71' Storage=101 cf Inflow=0.06 cfs 0.019 af
Outflow=0.06 cfs 0.019 af

Pond 3P: PLANTER #3 Peak Elev=216.78' Storage=101 cf Inflow=0.06 cfs 0.019 af
Outflow=0.06 cfs 0.019 af

Pond 4P: PLANTER #4 Peak Elev=217.03' Storage=55 cf Inflow=0.03 cfs 0.011 af
Outflow=0.04 cfs 0.011 af

Pond 5P: PLANTER #5 Peak Elev=212.67' Storage=71 cf Inflow=0.03 cfs 0.010 af
Outflow=0.01 cfs 0.010 af

Pond 6P: PLANTER #6 Peak Elev=212.14' Storage=139 cf Inflow=0.06 cfs 0.021 af
Outflow=0.02 cfs 0.021 af

Pond 7P: PLANTER #7 Peak Elev=210.79' Storage=132 cf Inflow=0.06 cfs 0.021 af
Outflow=0.02 cfs 0.021 af

Pond 8P: PLANTER #8 Peak Elev=209.97' Storage=102 cf Inflow=0.06 cfs 0.019 af
Outflow=0.06 cfs 0.019 af

Pond 9P: PLANTER #9 Peak Elev=209.80' Storage=62 cf Inflow=0.03 cfs 0.011 af
Outflow=0.03 cfs 0.011 af

Pond 10P: DC-780 Chambers Peak Elev=207.26' Storage=0.121 af Inflow=1.10 cfs 0.416 af
Primary=0.03 cfs 0.118 af Secondary=0.43 cfs 0.283 af Outflow=0.46 cfs 0.401 af

Pond 11P: PLANTER #10 Peak Elev=217.66' Storage=253 cf Inflow=0.12 cfs 0.039 af
Outflow=0.08 cfs 0.039 af

Total Runoff Area = 1.810 ac Runoff Volume = 0.455 af Average Runoff Depth = 3.02"
18.62% Pervious = 0.337 ac 81.38% Impervious = 1.473 ac

Summary for Subcatchment 1S: North Building & Sidewalk

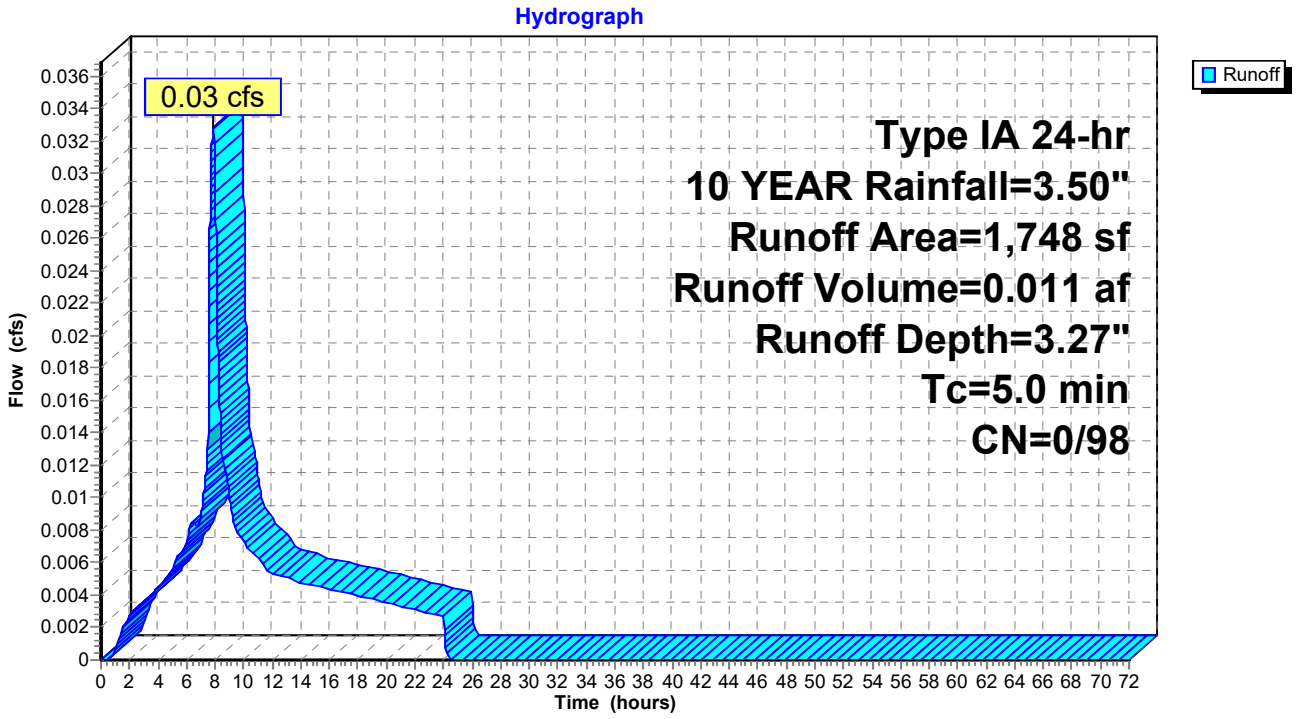
Runoff = 0.03 cfs @ 7.88 hrs, Volume= 0.011 af, Depth= 3.27"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10 YEAR Rainfall=3.50"

	Area (sf)	CN	Description
*	1,698	98	Roofs
*	50	98	Concrete Sidewalk
	1,748	98	Weighted Average
	1,748		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 1S: North Building & Sidewalk



Summary for Subcatchment 2S: North Building & Sidewalk

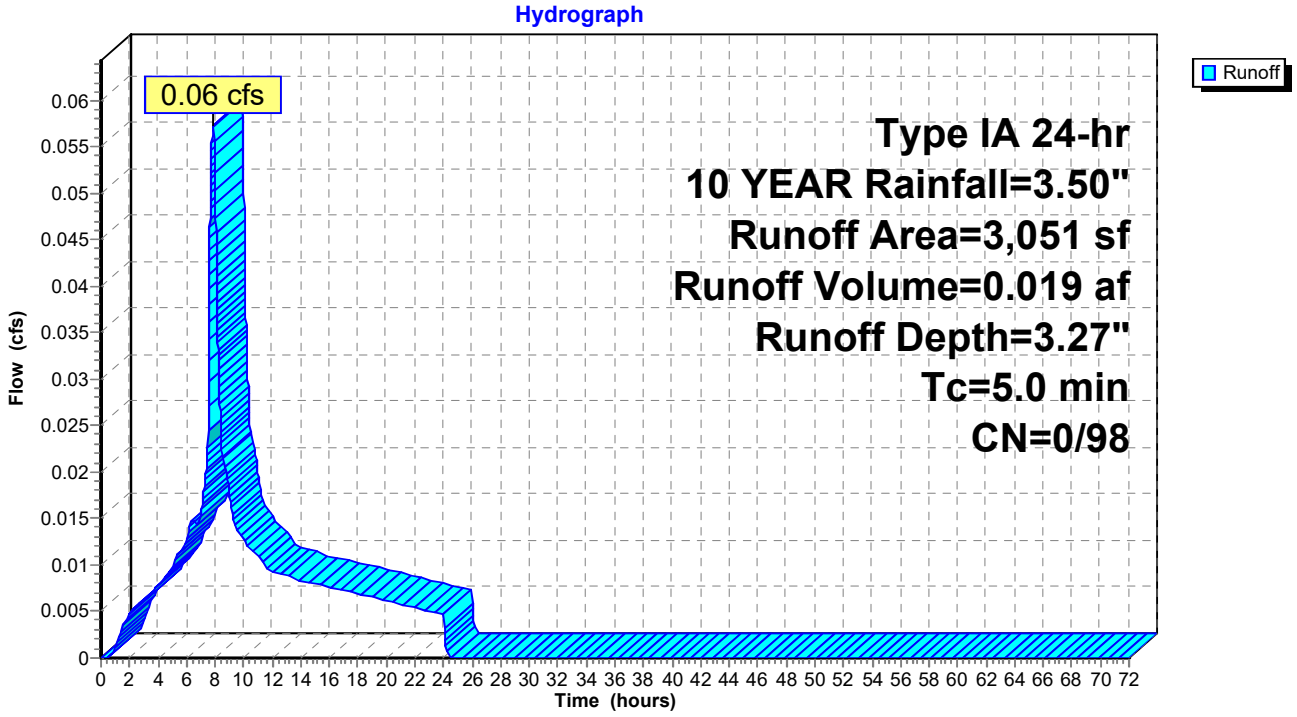
Runoff = 0.06 cfs @ 7.88 hrs, Volume= 0.019 af, Depth= 3.27"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10 YEAR Rainfall=3.50"

	Area (sf)	CN	Description
*	2,798	98	Roofs
*	253	98	Concrete Sidewalk
	3,051	98	Weighted Average
	3,051		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 2S: North Building & Sidewalk



Summary for Subcatchment 3S: North Building & Sidewalk

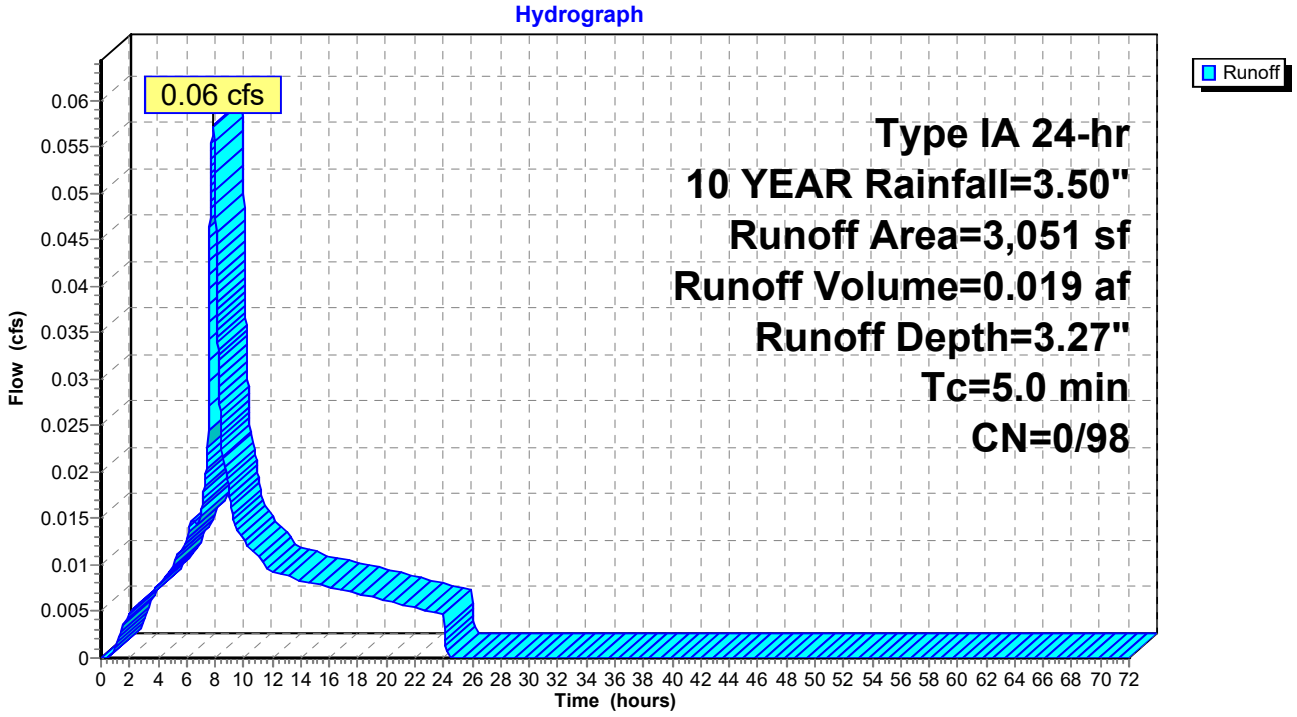
Runoff = 0.06 cfs @ 7.88 hrs, Volume= 0.019 af, Depth= 3.27"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10 YEAR Rainfall=3.50"

	Area (sf)	CN	Description
*	2,798	98	Roofs
*	253	98	Concrete Sidewalk
	3,051	98	Weighted Average
	3,051		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 3S: North Building & Sidewalk



Summary for Subcatchment 4S: North Building & Sidewalk

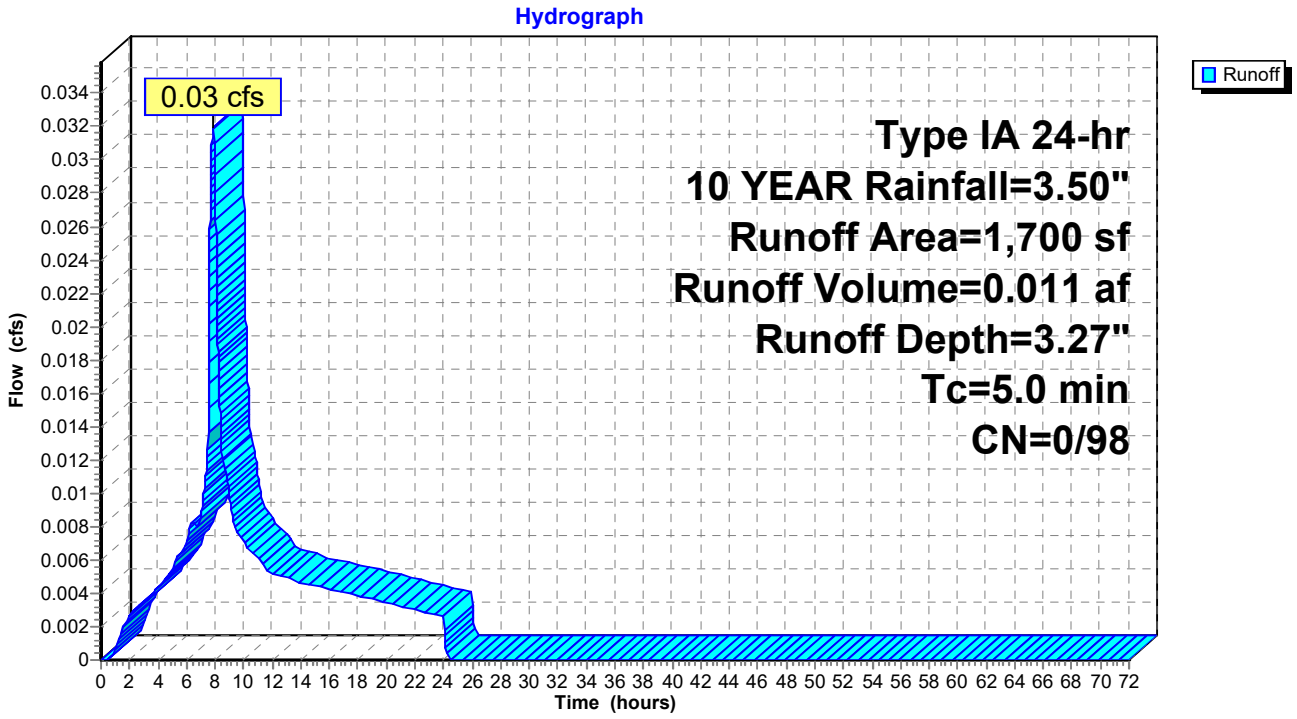
Runoff = 0.03 cfs @ 7.88 hrs, Volume= 0.011 af, Depth= 3.27"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10 YEAR Rainfall=3.50"

	Area (sf)	CN	Description
*	1,447	98	Roofs
*	253	98	Concrete Sidewalk
	1,700	98	Weighted Average
	1,700		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 4S: North Building & Sidewalk



Summary for Subcatchment 5S: Middle Building

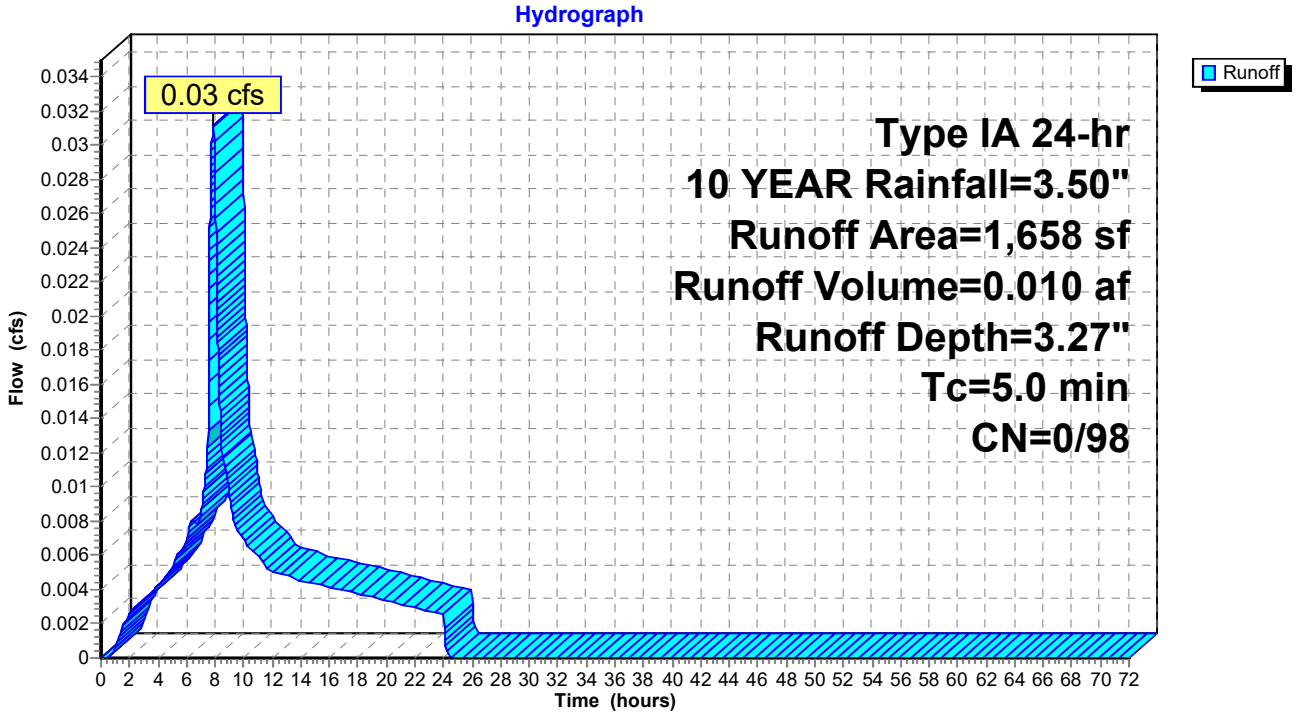
Runoff = 0.03 cfs @ 7.88 hrs, Volume= 0.010 af, Depth= 3.27"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10 YEAR Rainfall=3.50"

	Area (sf)	CN	Description
*	1,447	98	Roofs
*	211	98	Concrete Sidewalk
	1,658	98	Weighted Average
	1,658		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 5S: Middle Building



Summary for Subcatchment 6S: Middle Building & Sidewalk

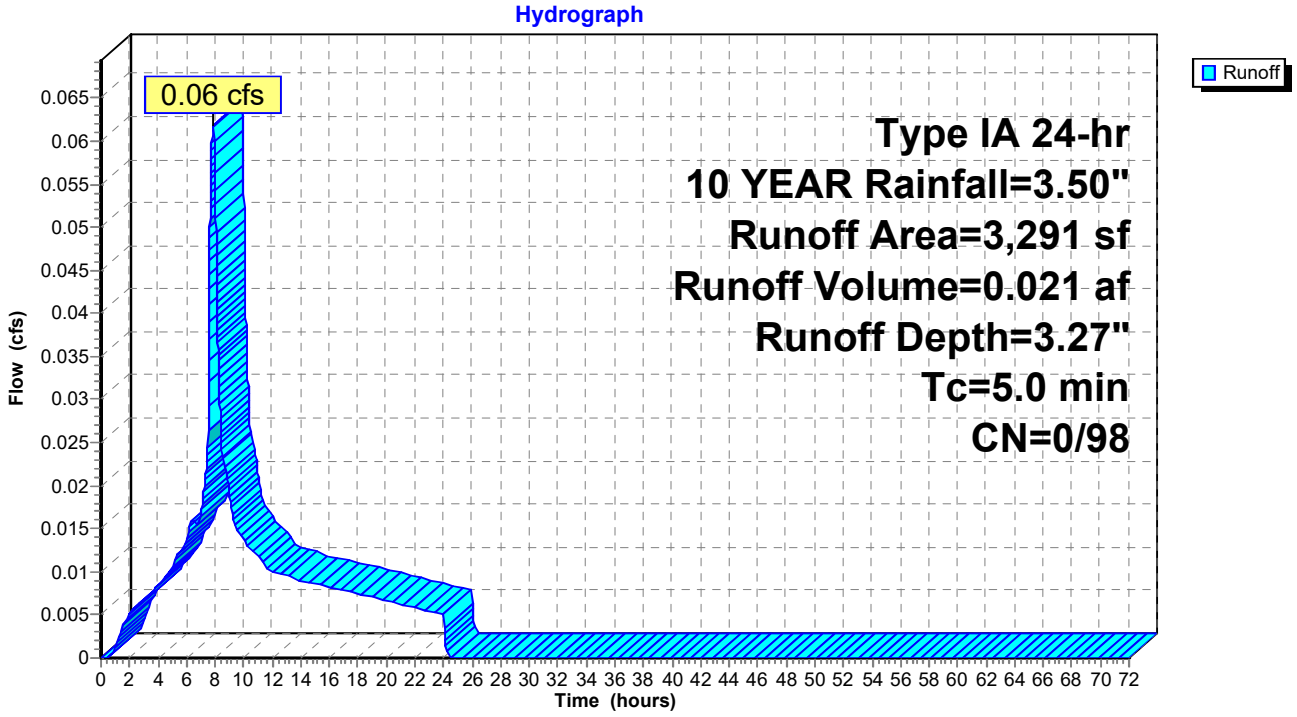
Runoff = 0.06 cfs @ 7.88 hrs, Volume= 0.021 af, Depth= 3.27"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10 YEAR Rainfall=3.50"

	Area (sf)	CN	Description
*	2,798	98	Roofs
*	493	98	Concrete Sidewalk
	3,291	98	Weighted Average
	3,291		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 6S: Middle Building & Sidewalk



Summary for Subcatchment 7S: Middle/South Building & Sidewalk

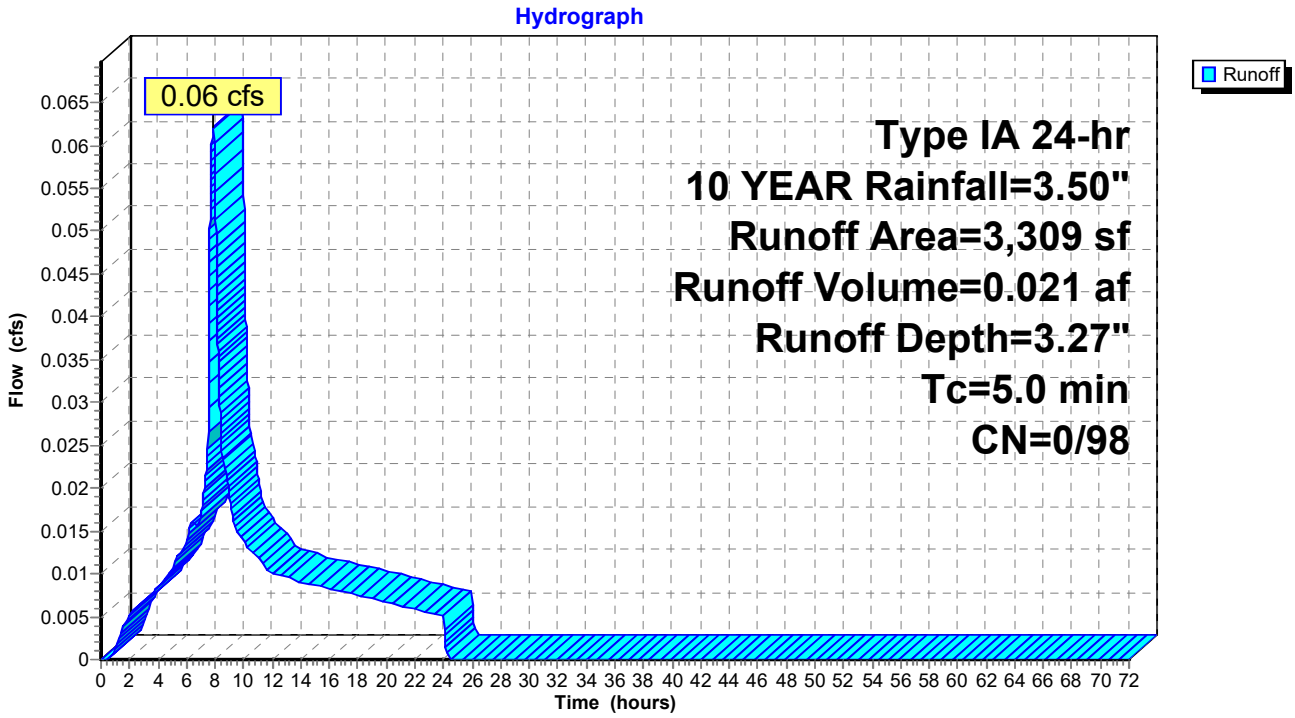
Runoff = 0.06 cfs @ 7.88 hrs, Volume= 0.021 af, Depth= 3.27"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10 YEAR Rainfall=3.50"

	Area (sf)	CN	Description
*	1,406	98	Roofs
*	1,407	98	Roofs
*	496	98	Concrete Sidewalk
	3,309	98	Weighted Average
	3,309		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 7S: Middle/South Building & Sidewalk



Summary for Subcatchment 8S: South Building & Sidewalk

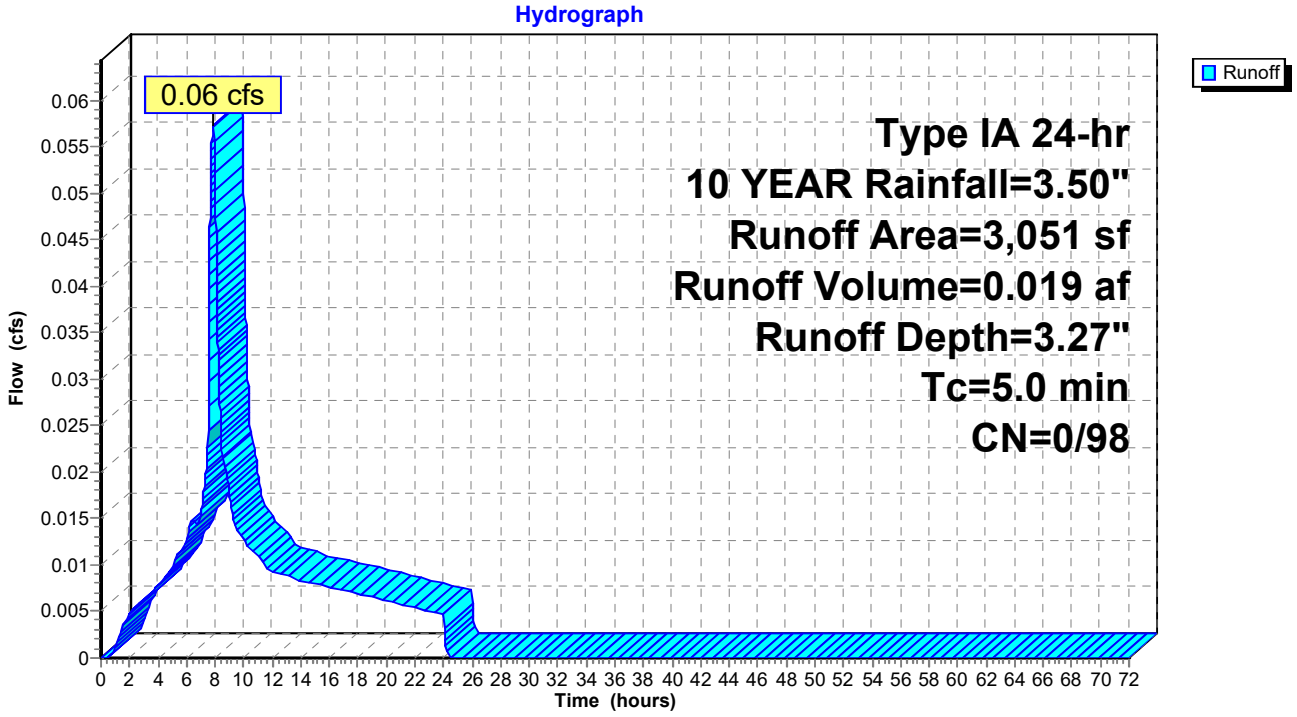
Runoff = 0.06 cfs @ 7.88 hrs, Volume= 0.019 af, Depth= 3.27"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10 YEAR Rainfall=3.50"

	Area (sf)	CN	Description
*	2,798	98	Roofs
*	253	98	Concrete Sidewalk
	3,051	98	Weighted Average
	3,051		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 8S: South Building & Sidewalk



Summary for Subcatchment 9S: South Building & Sidewalk

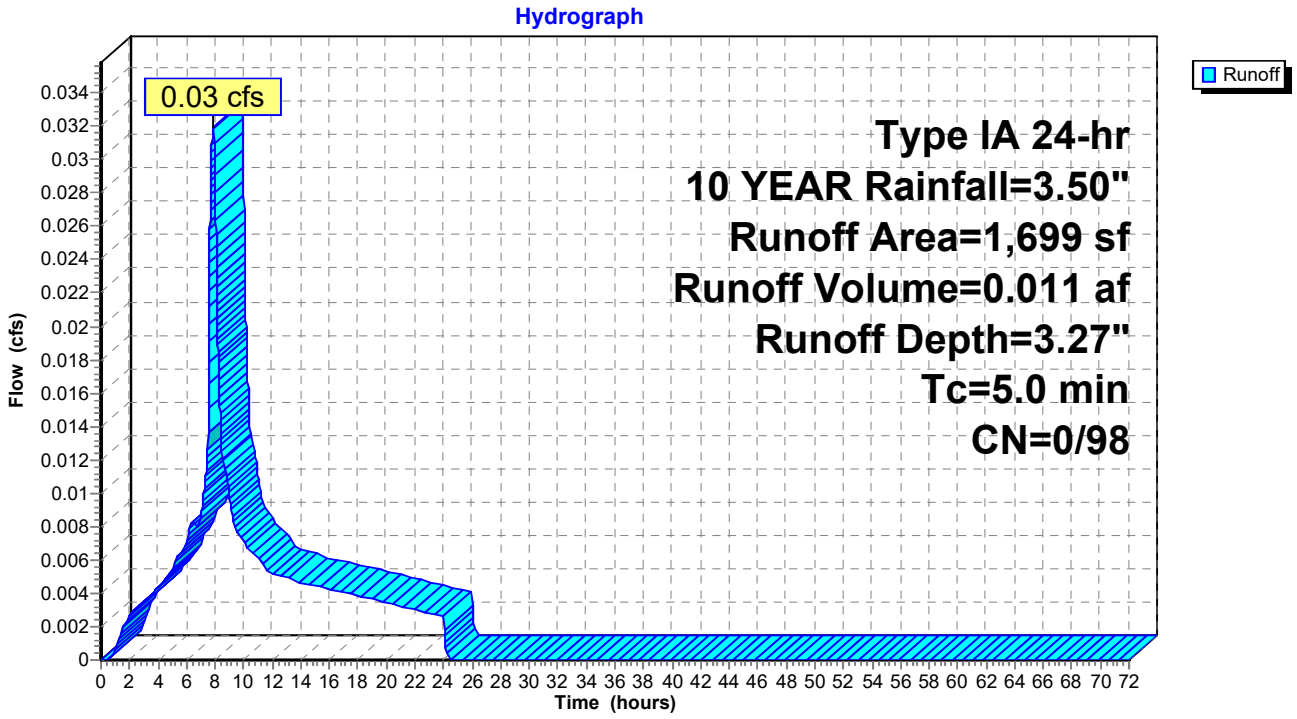
Runoff = 0.03 cfs @ 7.88 hrs, Volume= 0.011 af, Depth= 3.27"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10 YEAR Rainfall=3.50"

	Area (sf)	CN	Description
*	1,447	98	Roofs
*	252	98	Concrete Sidewalk
	1,699	98	Weighted Average
	1,699		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 9S: South Building & Sidewalk



Summary for Subcatchment 10S: Parking and Landscaping

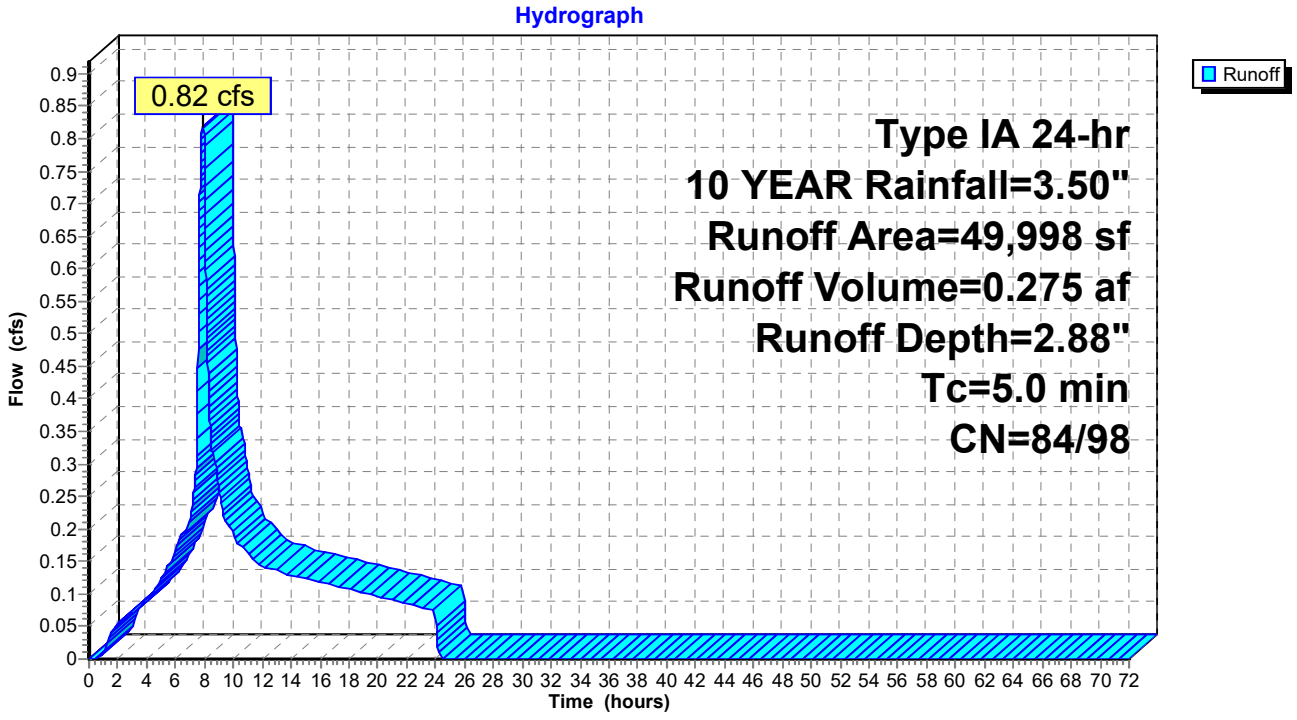
Runoff = 0.82 cfs @ 7.89 hrs, Volume= 0.275 af, Depth= 2.88"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10 YEAR Rainfall=3.50"

	Area (sf)	CN	Description
	14,686	84	50-75% Grass cover, Fair, HSG D
*	31,601	98	Paved Parking
*	3,711	98	Concrete Sidewalk
	49,998	94	Weighted Average
	14,686		29.37% Pervious Area
	35,312		70.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 10S: Parking and Landscaping



Summary for Subcatchment 11S: N Springbrook Rd

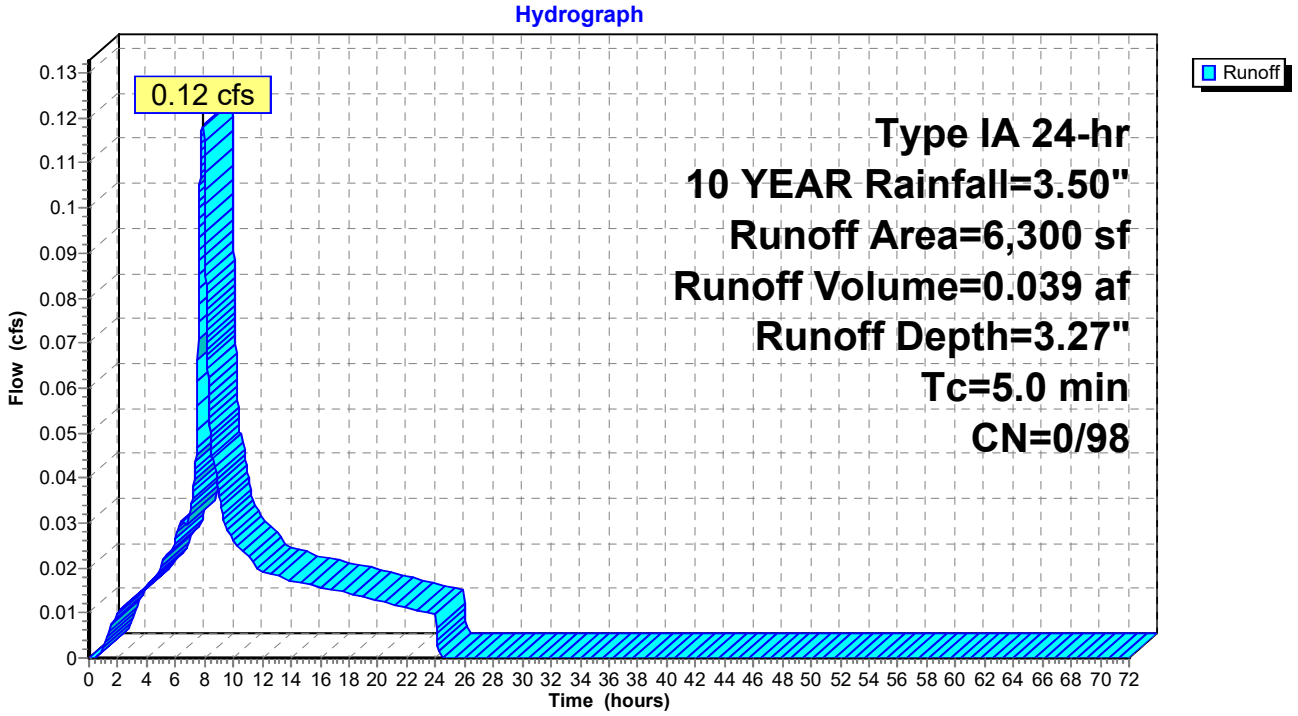
Runoff = 0.12 cfs @ 7.88 hrs, Volume= 0.039 af, Depth= 3.27"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10 YEAR Rainfall=3.50"

	Area (sf)	CN	Description
*	6,300	98	N Springbrook Rd Section to be treated
	6,300		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 11S: N Springbrook Rd



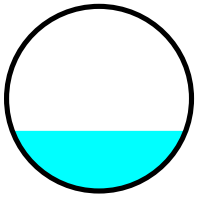
Summary for Reach 1R: 6" PVC

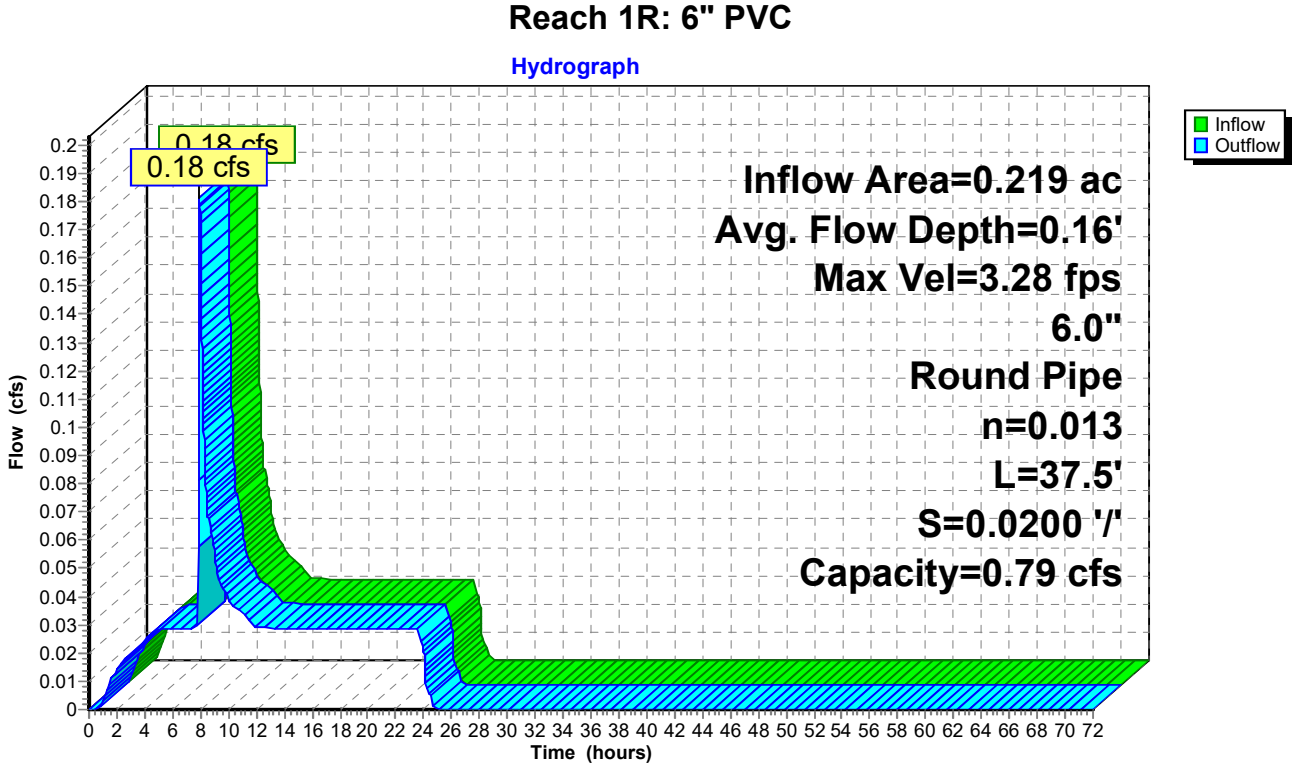
Inflow Area = 0.219 ac,100.00% Impervious, Inflow Depth = 3.27" for 10 YEAR event
Inflow = 0.18 cfs @ 7.91 hrs, Volume= 0.060 af
Outflow = 0.18 cfs @ 7.91 hrs, Volume= 0.060 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.28 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.87 fps, Avg. Travel Time= 0.3 min

Peak Storage= 2 cf @ 7.91 hrs
Average Depth at Peak Storage= 0.16'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.79 cfs

6.0" Round Pipe
n= 0.013
Length= 37.5' Slope= 0.0200 '/'
Inlet Invert= 212.29', Outlet Invert= 211.54'





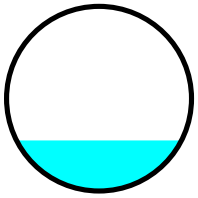
Summary for Reach 2R: 6" PVC

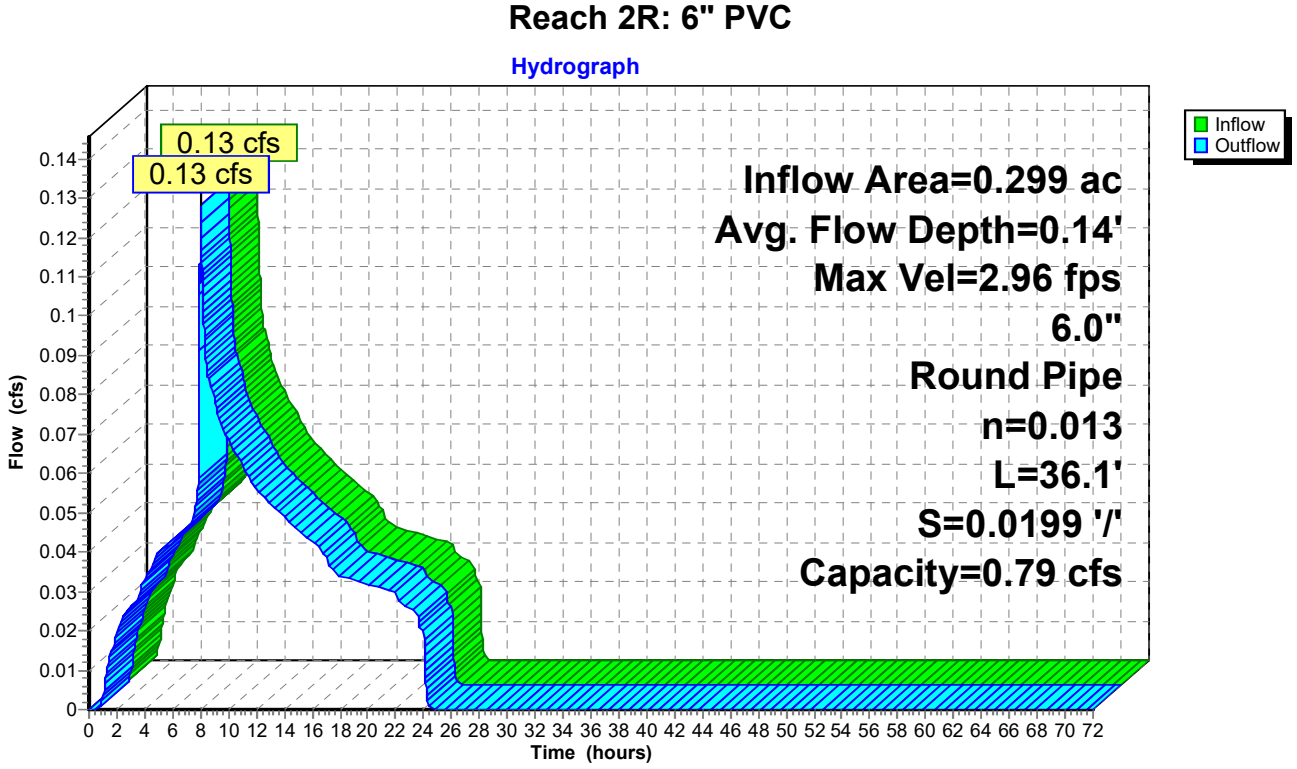
Inflow Area = 0.299 ac,100.00% Impervious, Inflow Depth = 3.27" for 10 YEAR event
Inflow = 0.13 cfs @ 8.03 hrs, Volume= 0.081 af
Outflow = 0.13 cfs @ 8.03 hrs, Volume= 0.081 af, Atten= 1%, Lag= 0.2 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.96 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 2.06 fps, Avg. Travel Time= 0.3 min

Peak Storage= 2 cf @ 8.03 hrs
Average Depth at Peak Storage= 0.14'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.79 cfs

6.0" Round Pipe
n= 0.013
Length= 36.1' Slope= 0.0199 '/'
Inlet Invert= 208.45', Outlet Invert= 207.73'





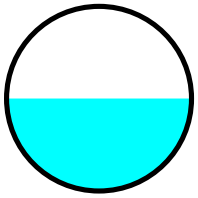
Summary for Reach 3R: 10" PVC

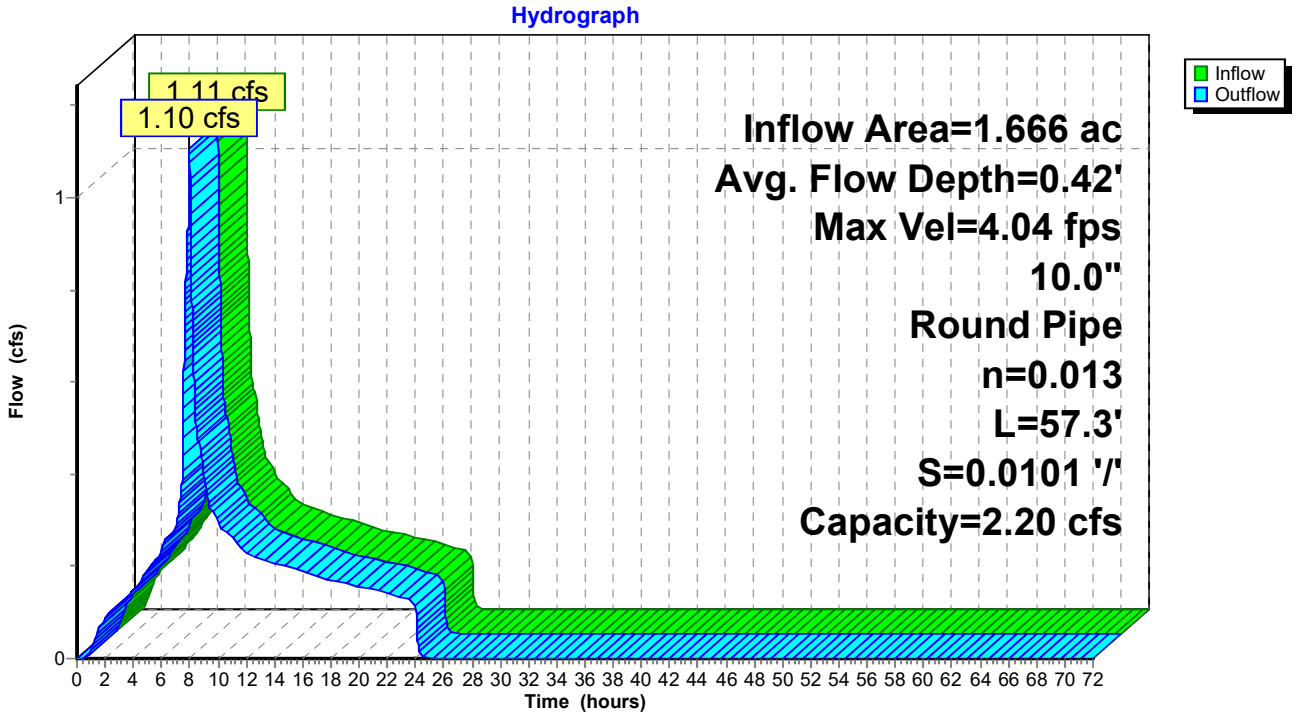
Inflow Area = 1.666 ac, 79.76% Impervious, Inflow Depth = 3.00" for 10 YEAR event
Inflow = 1.11 cfs @ 7.93 hrs, Volume= 0.416 af
Outflow = 1.10 cfs @ 7.94 hrs, Volume= 0.416 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.04 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 2.41 fps, Avg. Travel Time= 0.4 min

Peak Storage= 16 cf @ 7.94 hrs
Average Depth at Peak Storage= 0.42'
Bank-Full Depth= 0.83' Flow Area= 0.5 sf, Capacity= 2.20 cfs

10.0" Round Pipe
n= 0.013
Length= 57.3' Slope= 0.0101 '/'
Inlet Invert= 207.73', Outlet Invert= 207.15'





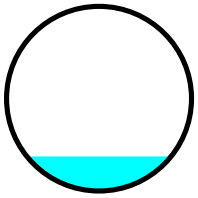
Summary for Reach 4R: 10" PVC

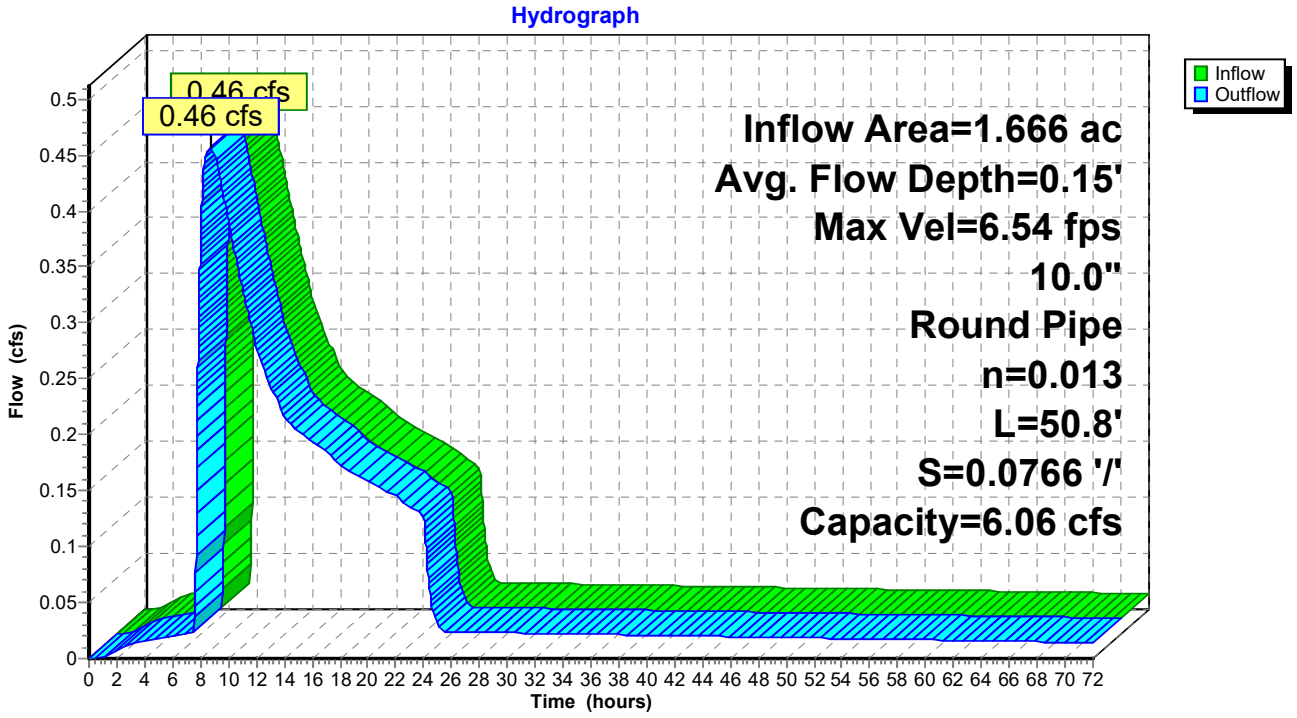
Inflow Area = 1.666 ac, 79.76% Impervious, Inflow Depth > 2.89" for 10 YEAR event
Inflow = 0.46 cfs @ 8.72 hrs, Volume= 0.401 af
Outflow = 0.46 cfs @ 8.72 hrs, Volume= 0.401 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.54 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 3.13 fps, Avg. Travel Time= 0.3 min

Peak Storage= 4 cf @ 8.72 hrs
Average Depth at Peak Storage= 0.15'
Bank-Full Depth= 0.83' Flow Area= 0.5 sf, Capacity= 6.06 cfs

10.0" Round Pipe
n= 0.013
Length= 50.8' Slope= 0.0766 '/'
Inlet Invert= 206.97', Outlet Invert= 203.08'





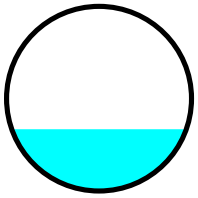
Summary for Reach 5R: 4" PVC

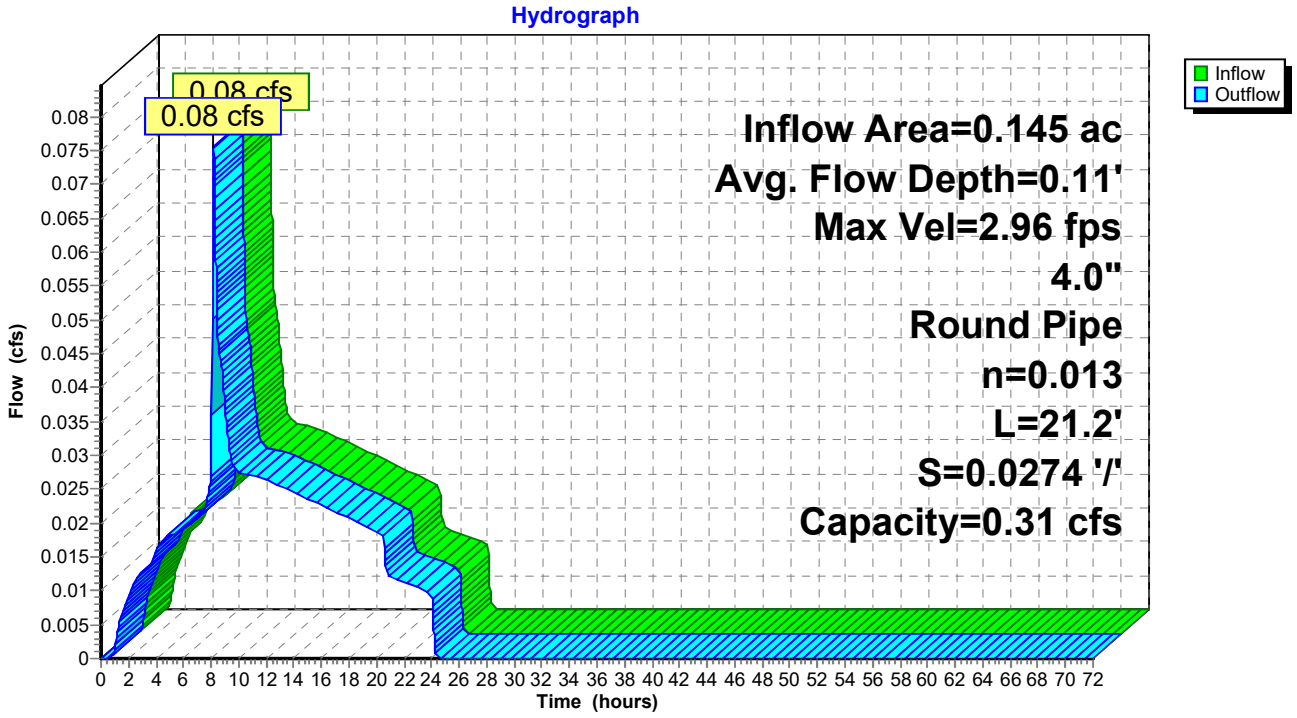
Inflow Area = 0.145 ac,100.00% Impervious, Inflow Depth = 3.27" for 10 YEAR event
Inflow = 0.08 cfs @ 8.15 hrs, Volume= 0.039 af
Outflow = 0.08 cfs @ 8.15 hrs, Volume= 0.039 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.96 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.95 fps, Avg. Travel Time= 0.2 min

Peak Storage= 1 cf @ 8.15 hrs
Average Depth at Peak Storage= 0.11'
Bank-Full Depth= 0.33' Flow Area= 0.1 sf, Capacity= 0.31 cfs

4.0" Round Pipe
n= 0.013
Length= 21.2' Slope= 0.0274 '/'
Inlet Invert= 217.65', Outlet Invert= 217.07'





Summary for Pond 1P: PLANTER #1

Inflow Area = 0.040 ac,100.00% Impervious, Inflow Depth = 3.27" for 10 YEAR event
Inflow = 0.03 cfs @ 7.88 hrs, Volume= 0.011 af
Outflow = 0.03 cfs @ 7.82 hrs, Volume= 0.011 af, Atten= 0%, Lag= 0.0 min
Primary = 0.03 cfs @ 7.82 hrs, Volume= 0.011 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 216.92' @ 7.82 hrs Surf.Area= 106 sf Storage= 53 cf

Plug-Flow detention time= 95.6 min calculated for 0.011 af (100% of inflow)
Center-of-Mass det. time= 95.6 min (758.5 - 662.8)

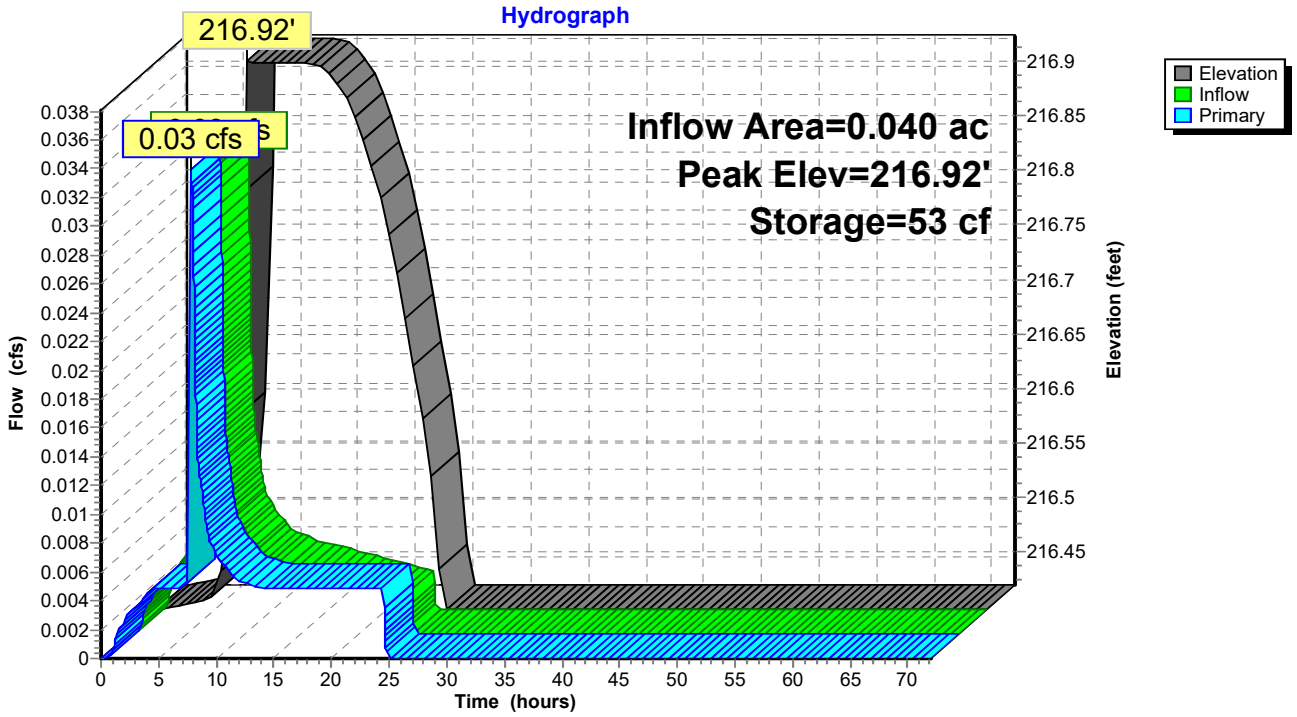
Volume	Invert	Avail.Storage	Storage Description
#1	216.42'	88 cf	**Ponding Depth (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
216.42	106	0	0
217.25	106	88	88

Device	Routing	Invert	Outlet Devices
#1	Primary	213.99'	**6.0" Round Culvert** L= 1.0' Ke= 0.500 Inlet / Outlet Invert= 213.99' / 213.98' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	216.42'	**2.000 in/hr Exfiltration over Surface area**
#3	Device 1	216.92'	**6.0" Horiz. Orifice/Grate** C= 0.610

Primary OutFlow Max=0.05 cfs @ 7.82 hrs HW=216.92' (Free Discharge)
└**1=Culvert** (Passes 0.05 cfs of 1.55 cfs potential flow)
  ├**2=Exfiltration** (Exfiltration Controls 0.00 cfs)
  └**3=Orifice/Grate** (Orifice Controls 0.05 cfs @ 0.24 fps)

Pond 1P: PLANTER #1



Summary for Pond 2P: PLANTER #2

Inflow Area = 0.070 ac,100.00% Impervious, Inflow Depth = 3.27" for 10 YEAR event
Inflow = 0.06 cfs @ 7.88 hrs, Volume= 0.019 af
Outflow = 0.06 cfs @ 7.91 hrs, Volume= 0.019 af, Atten= 0%, Lag= 2.0 min
Primary = 0.06 cfs @ 7.91 hrs, Volume= 0.019 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 216.71' @ 7.91 hrs Surf.Area= 200 sf Storage= 101 cf

Plug-Flow detention time= 92.1 min calculated for 0.019 af (100% of inflow)
Center-of-Mass det. time= 92.1 min (754.9 - 662.8)

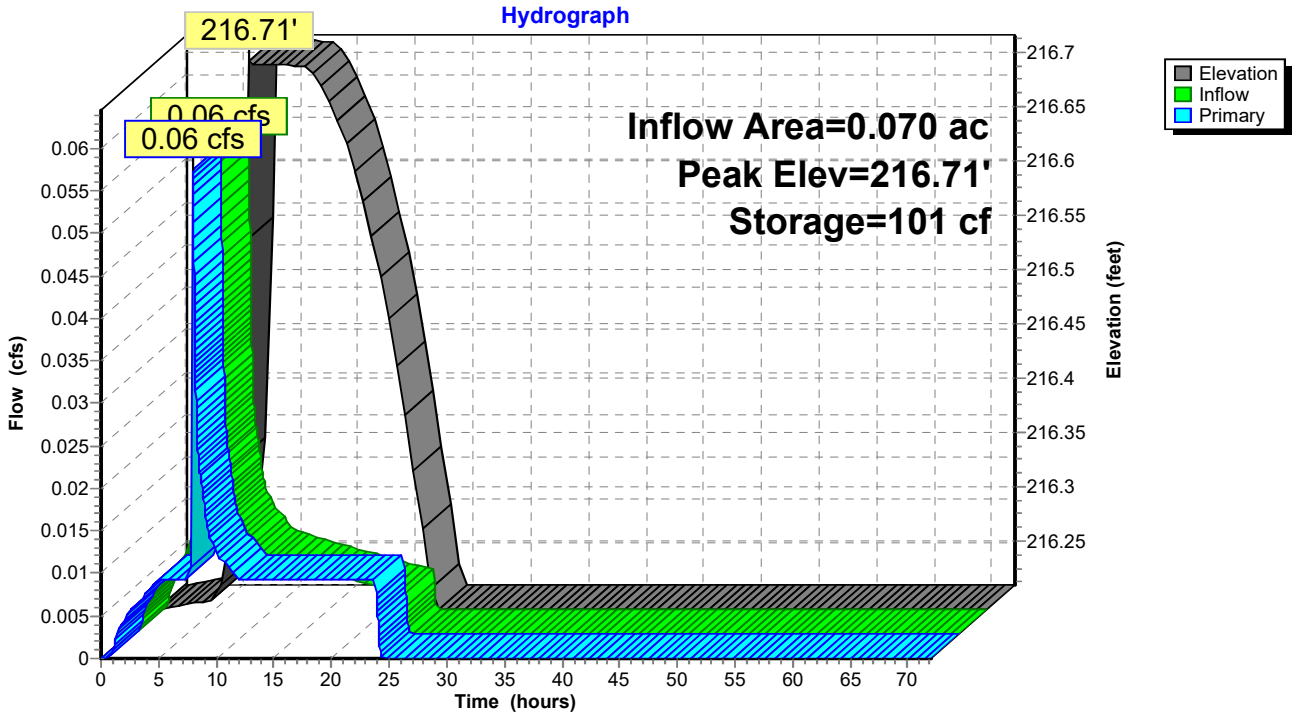
Volume	Invert	Avail.Storage	Storage Description
#1	216.21'	166 cf	**Ponding Depth (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
216.21	200	0	0
217.04	200	166	166

Device	Routing	Invert	Outlet Devices
#1	Primary	213.71'	**6.0" Round Culvert** L= 1.0' Ke= 0.500 Inlet / Outlet Invert= 213.71' / 213.70' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	216.21'	**2.000 in/hr Exfiltration over Surface area**
#3	Device 1	216.71'	**6.0" Horiz. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.07 cfs @ 7.91 hrs HW=216.71' (Free Discharge)
└**1=Culvert** (Passes 0.07 cfs of 1.57 cfs potential flow)
└**2=Exfiltration** (Exfiltration Controls 0.01 cfs)
└**3=Orifice/Grate** (Orifice Controls 0.06 cfs @ 0.31 fps)

Pond 2P: PLANTER #2



Summary for Pond 3P: PLANTER #3

Inflow Area = 0.070 ac,100.00% Impervious, Inflow Depth = 3.27" for 10 YEAR event
Inflow = 0.06 cfs @ 7.88 hrs, Volume= 0.019 af
Outflow = 0.06 cfs @ 7.91 hrs, Volume= 0.019 af, Atten= 0%, Lag= 2.0 min
Primary = 0.06 cfs @ 7.91 hrs, Volume= 0.019 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 216.78' @ 7.91 hrs Surf.Area= 200 sf Storage= 101 cf

Plug-Flow detention time= 92.1 min calculated for 0.019 af (100% of inflow)
Center-of-Mass det. time= 92.1 min (754.9 - 662.8)

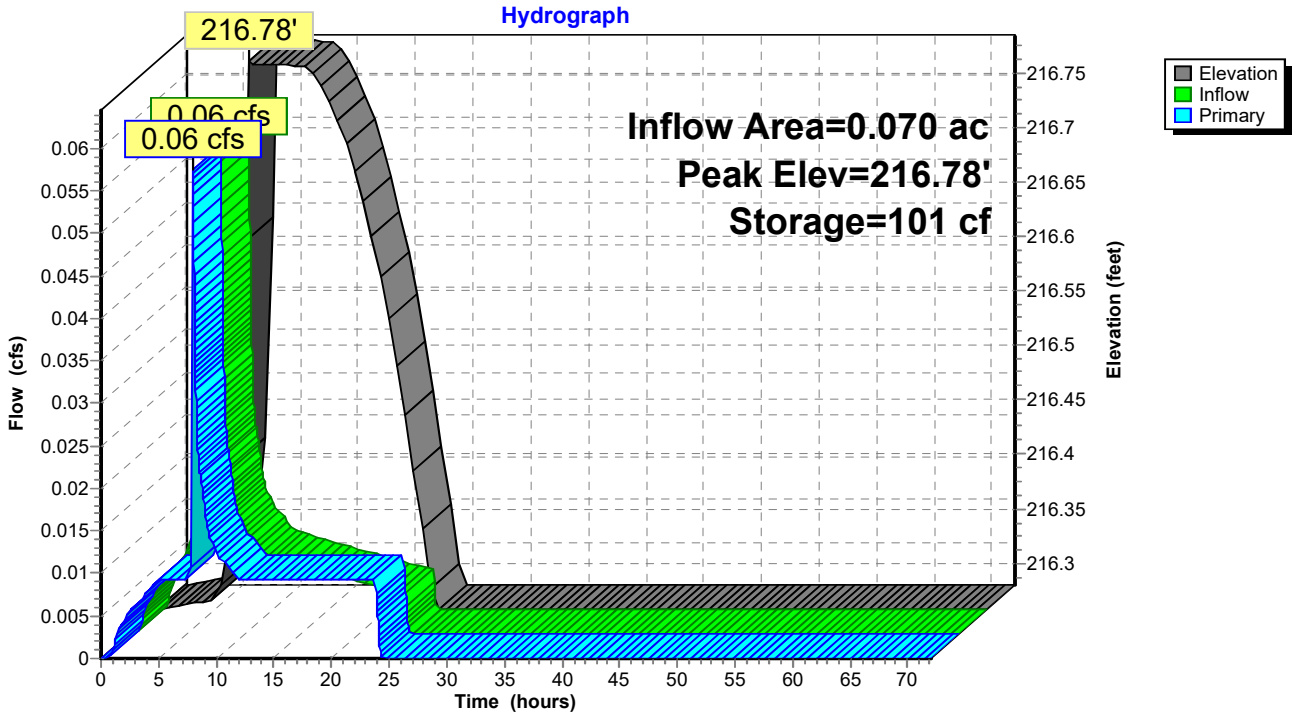
Volume	Invert	Avail.Storage	Storage Description
#1	216.28'	166 cf	**Ponding Depth (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
216.28	200	0	0
217.11	200	166	166

Device	Routing	Invert	Outlet Devices
#1	Primary	213.78'	**6.0" Round Culvert** L= 1.0' Ke= 0.500 Inlet / Outlet Invert= 213.78' / 213.77' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	216.28'	**2.000 in/hr Exfiltration over Surface area**
#3	Device 1	216.78'	**6.0" Horiz. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.07 cfs @ 7.91 hrs HW=216.78' (Free Discharge)
└**1=Culvert** (Passes 0.07 cfs of 1.57 cfs potential flow)
  ├**2=Exfiltration** (Exfiltration Controls 0.01 cfs)
  └**3=Orifice/Grate** (Orifice Controls 0.06 cfs @ 0.31 fps)

Pond 3P: PLANTER #3



Summary for Pond 4P: PLANTER #4

Inflow Area = 0.039 ac,100.00% Impervious, Inflow Depth = 3.27" for 10 YEAR event
Inflow = 0.03 cfs @ 7.88 hrs, Volume= 0.011 af
Outflow = 0.04 cfs @ 7.89 hrs, Volume= 0.011 af, Atten= 0%, Lag= 0.9 min
Primary = 0.04 cfs @ 7.89 hrs, Volume= 0.011 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 217.03' @ 7.89 hrs Surf.Area= 110 sf Storage= 55 cf

Plug-Flow detention time= 92.8 min calculated for 0.011 af (100% of inflow)
Center-of-Mass det. time= 92.8 min (755.6 - 662.8)

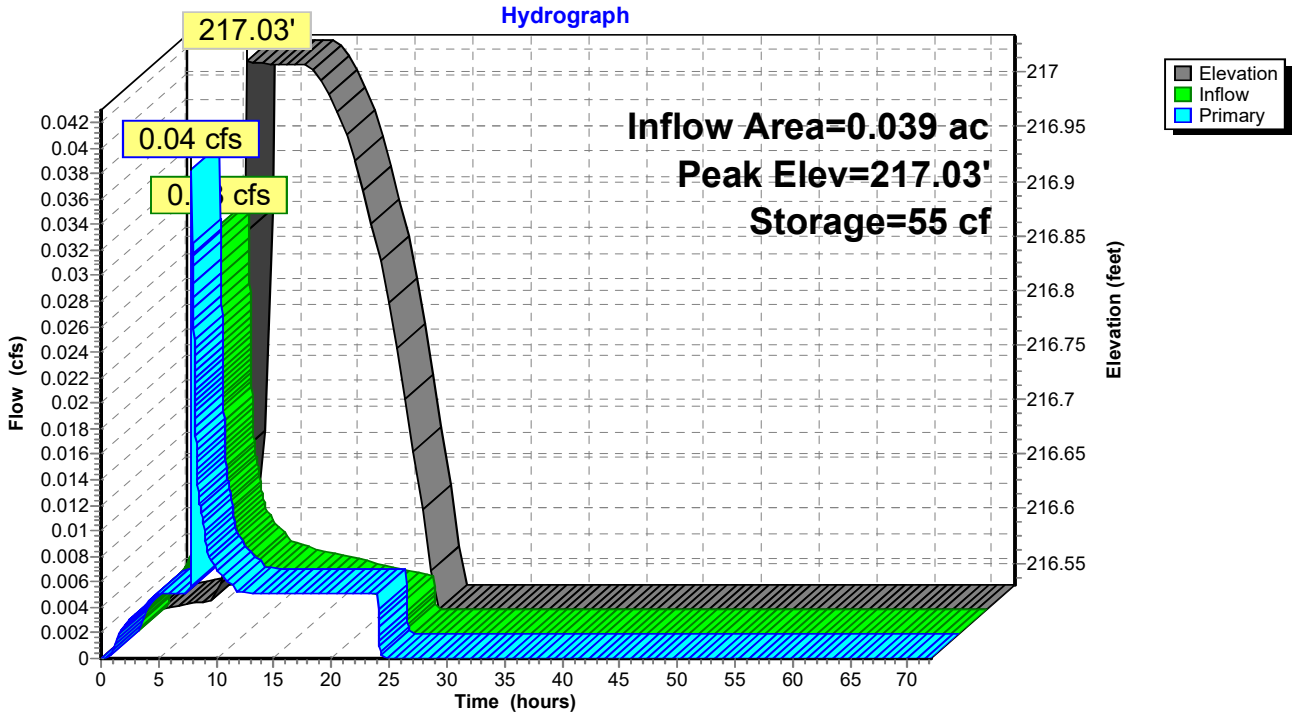
Volume	Invert	Avail.Storage	Storage Description
#1	216.53'	91 cf	**Ponding Depth (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
216.53	110	0	0
217.36	110	91	91

Device	Routing	Invert	Outlet Devices
#1	Primary	214.03'	**6.0" Round Culvert** L= 1.0' Ke= 0.500 Inlet / Outlet Invert= 214.03' / 214.02' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	216.53'	**2.000 in/hr Exfiltration over Surface area**
#3	Device 1	217.03'	**6.0" Horiz. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.05 cfs @ 7.89 hrs HW=217.03' (Free Discharge)
└**1=Culvert** (Passes 0.05 cfs of 1.57 cfs potential flow)
  ├**2=Exfiltration** (Exfiltration Controls 0.01 cfs)
  └**3=Orifice/Grate** (Orifice Controls 0.05 cfs @ 0.24 fps)

Pond 4P: PLANTER #4



Summary for Pond 5P: PLANTER #5

Inflow Area = 0.038 ac,100.00% Impervious, Inflow Depth = 3.27" for 10 YEAR event
Inflow = 0.03 cfs @ 7.88 hrs, Volume= 0.010 af
Outflow = 0.01 cfs @ 8.93 hrs, Volume= 0.010 af, Atten= 68%, Lag= 62.9 min
Primary = 0.01 cfs @ 8.93 hrs, Volume= 0.010 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 212.67' @ 8.93 hrs Surf.Area= 217 sf Storage= 71 cf

Plug-Flow detention time= 50.7 min calculated for 0.010 af (100% of inflow)
Center-of-Mass det. time= 50.7 min (713.5 - 662.8)

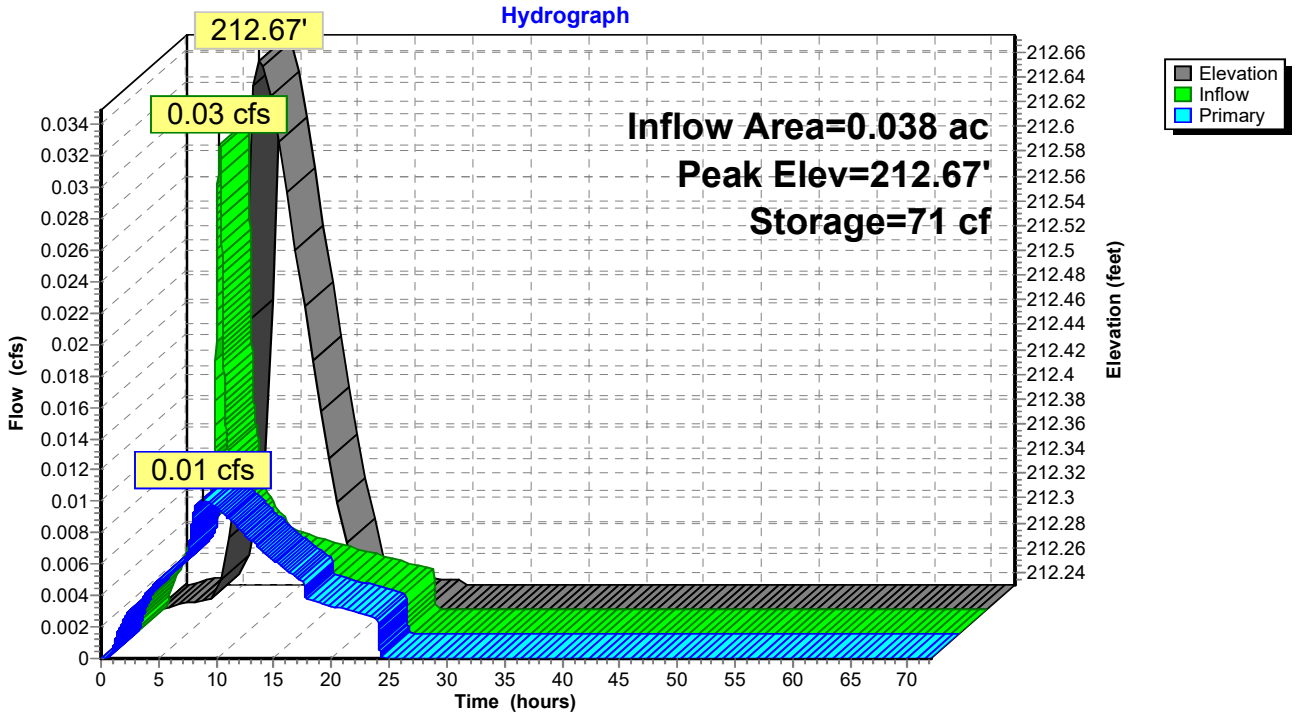
Volume	Invert	Avail.Storage	Storage Description
#1	212.23'	174 cf	**Ponding Depth (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
212.23	104	0	0
213.06	315	174	174

Device	Routing	Invert	Outlet Devices
#1	Primary	209.37'	**6.0" Round Culvert** L= 1.0' Ke= 0.500 Inlet / Outlet Invert= 209.37' / 209.36' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	212.23'	**2.000 in/hr Exfiltration over Surface area**
#3	Device 1	212.73'	**6.0" Horiz. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.01 cfs @ 8.93 hrs HW=212.67' (Free Discharge)
└**1=Culvert** (Passes 0.01 cfs of 1.65 cfs potential flow)
└**2=Exfiltration** (Exfiltration Controls 0.01 cfs)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 5P: PLANTER #5



Summary for Pond 6P: PLANTER #6

Inflow Area = 0.076 ac,100.00% Impervious, Inflow Depth = 3.27" for 10 YEAR event
Inflow = 0.06 cfs @ 7.88 hrs, Volume= 0.021 af
Outflow = 0.02 cfs @ 8.95 hrs, Volume= 0.021 af, Atten= 68%, Lag= 64.6 min
Primary = 0.02 cfs @ 8.95 hrs, Volume= 0.021 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 212.14' @ 8.95 hrs Surf.Area= 423 sf Storage= 139 cf

Plug-Flow detention time= 49.5 min calculated for 0.021 af (100% of inflow)
Center-of-Mass det. time= 49.5 min (712.4 - 662.8)

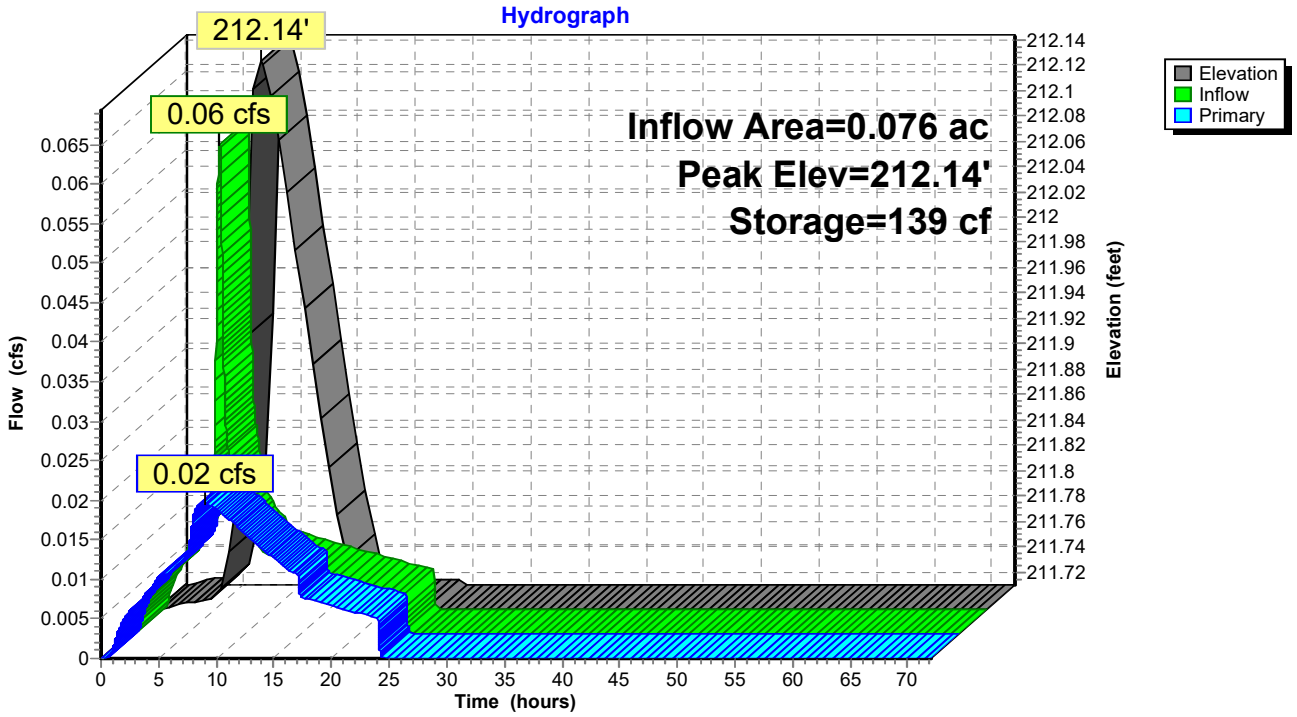
Volume	Invert	Avail.Storage	Storage Description
#1	211.71'	344 cf	**Ponding Depth (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
211.71	221	0	0
212.54	608	344	344

Device	Routing	Invert	Outlet Devices
#1	Primary	209.21'	**6.0" Round Culvert** L= 1.0' Ke= 0.500 Inlet / Outlet Invert= 209.21' / 209.21' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	211.71'	**2.000 in/hr Exfiltration over Surface area**
#3	Device 1	212.21'	**6.0" Horiz. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.02 cfs @ 8.95 hrs HW=212.14' (Free Discharge)
└**1=Culvert** (Passes 0.02 cfs of 1.55 cfs potential flow)
└**2=Exfiltration** (Exfiltration Controls 0.02 cfs)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 6P: PLANTER #6



Summary for Pond 7P: PLANTER #7

Inflow Area = 0.076 ac,100.00% Impervious, Inflow Depth = 3.27" for 10 YEAR event
Inflow = 0.06 cfs @ 7.88 hrs, Volume= 0.021 af
Outflow = 0.02 cfs @ 8.81 hrs, Volume= 0.021 af, Atten= 66%, Lag= 55.8 min
Primary = 0.02 cfs @ 8.81 hrs, Volume= 0.021 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 210.79' @ 8.81 hrs Surf.Area= 464 sf Storage= 132 cf

Plug-Flow detention time= 42.4 min calculated for 0.021 af (100% of inflow)
Center-of-Mass det. time= 42.4 min (705.3 - 662.8)

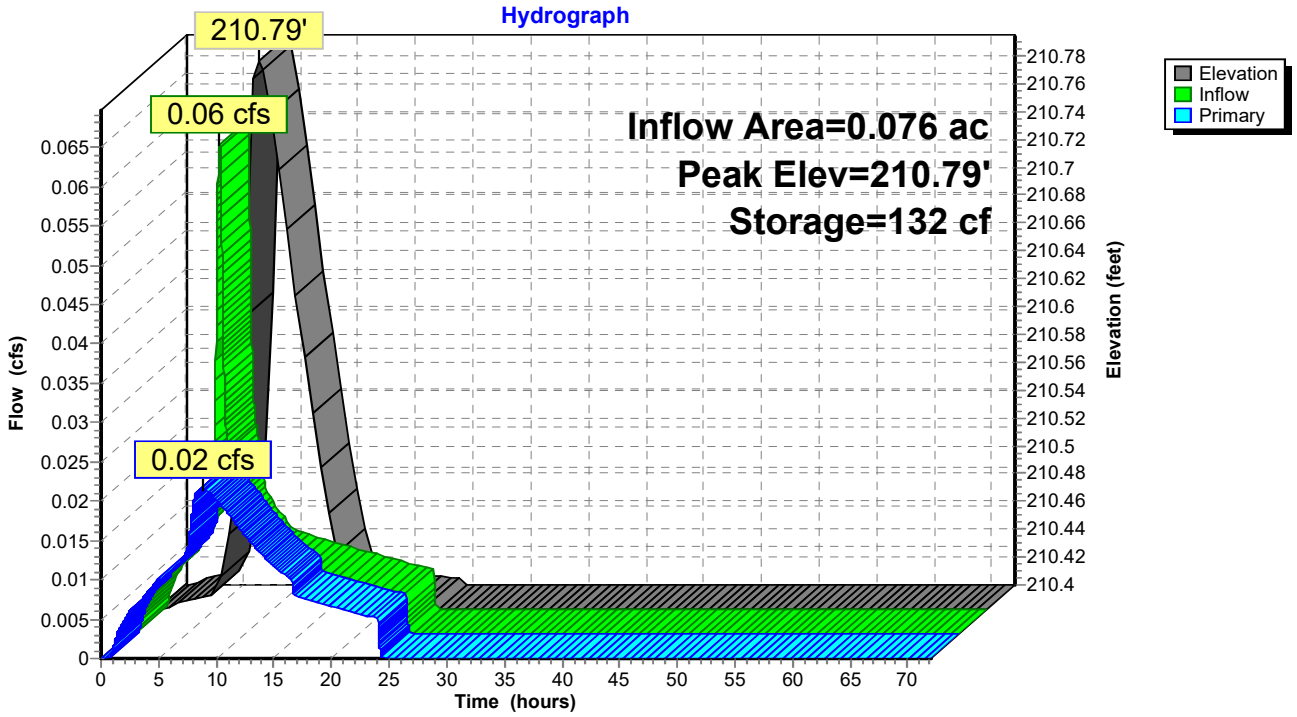
Volume	Invert	Avail.Storage	Storage Description
#1	210.40'	533 cf	**Ponding Depth (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
210.40	208	0	0
211.40	858	533	533

Device	Routing	Invert	Outlet Devices
#1	Primary	207.90'	**6.0" Round Culvert** L= 1.0' Ke= 0.500 Inlet / Outlet Invert= 207.90' / 207.89' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	210.40'	**2.000 in/hr Exfiltration over Surface area**
#3	Device 1	210.90'	**6.0" Horiz. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.02 cfs @ 8.81 hrs HW=210.79' (Free Discharge)
└**1=Culvert** (Passes 0.02 cfs of 1.54 cfs potential flow)
  ├**2=Exfiltration** (Exfiltration Controls 0.02 cfs)
  └**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 7P: PLANTER #7



Summary for Pond 8P: PLANTER #8

Inflow Area = 0.070 ac,100.00% Impervious, Inflow Depth = 3.27" for 10 YEAR event
Inflow = 0.06 cfs @ 7.88 hrs, Volume= 0.019 af
Outflow = 0.06 cfs @ 7.92 hrs, Volume= 0.019 af, Atten= 0%, Lag= 2.6 min
Primary = 0.06 cfs @ 7.92 hrs, Volume= 0.019 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 209.97' @ 7.92 hrs Surf.Area= 203 sf Storage= 102 cf

Plug-Flow detention time= 91.1 min calculated for 0.019 af (100% of inflow)
Center-of-Mass det. time= 91.1 min (753.9 - 662.8)

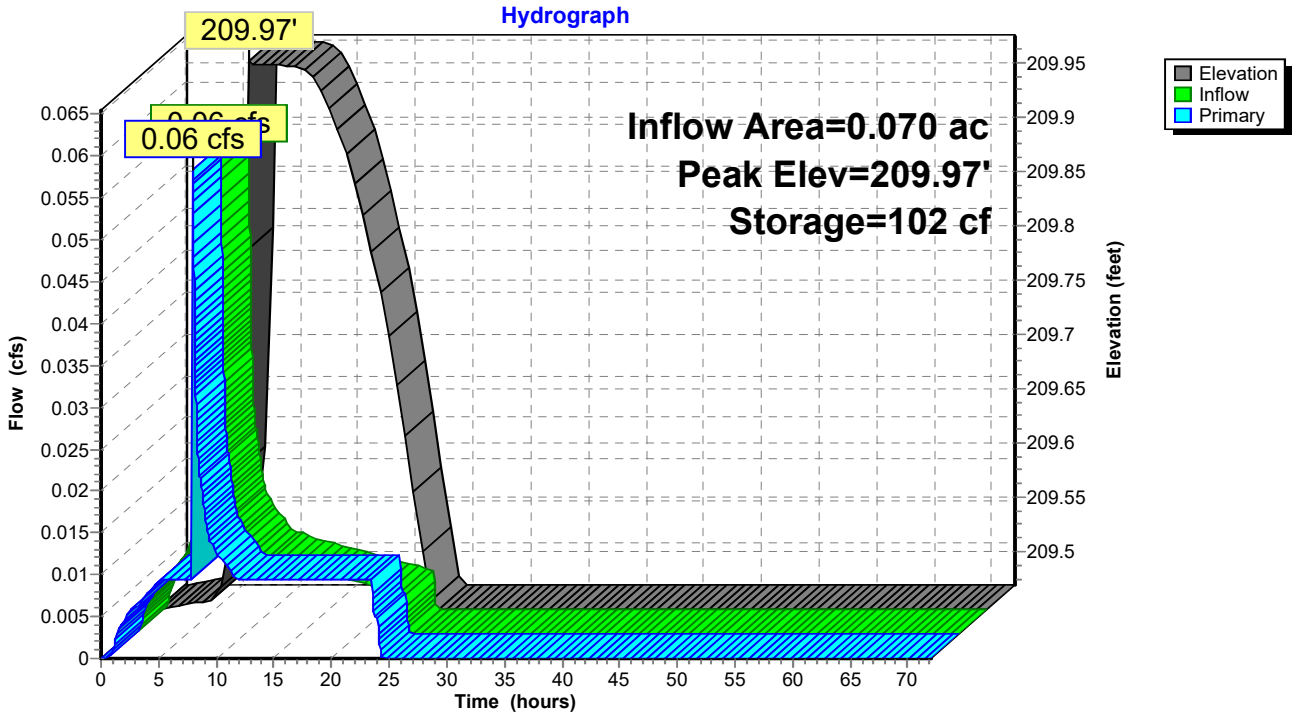
Volume	Invert	Avail.Storage	Storage Description
#1	209.47'	168 cf	**Ponding Depth (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
209.47	203	0	0
210.30	203	168	168

Device	Routing	Invert	Outlet Devices
#1	Primary	206.79'	**6.0" Round Culvert** L= 1.0' Ke= 0.500 Inlet / Outlet Invert= 206.79' / 206.78' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	209.47'	**2.000 in/hr Exfiltration over Surface area**
#3	Device 1	209.97'	**6.0" Horiz. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.07 cfs @ 7.92 hrs HW=209.97' (Free Discharge)
└**1=Culvert** (Passes 0.07 cfs of 1.62 cfs potential flow)
  ├**2=Exfiltration** (Exfiltration Controls 0.01 cfs)
  └**3=Orifice/Grate** (Orifice Controls 0.06 cfs @ 0.31 fps)

Pond 8P: PLANTER #8



Summary for Pond 9P: PLANTER #9

Inflow Area = 0.039 ac,100.00% Impervious, Inflow Depth = 3.27" for 10 YEAR event
Inflow = 0.03 cfs @ 7.88 hrs, Volume= 0.011 af
Outflow = 0.03 cfs @ 8.03 hrs, Volume= 0.011 af, Atten= 0%, Lag= 9.3 min
Primary = 0.03 cfs @ 8.03 hrs, Volume= 0.011 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 209.80' @ 8.03 hrs Surf.Area= 123 sf Storage= 62 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 86.0 min (748.8 - 662.8)

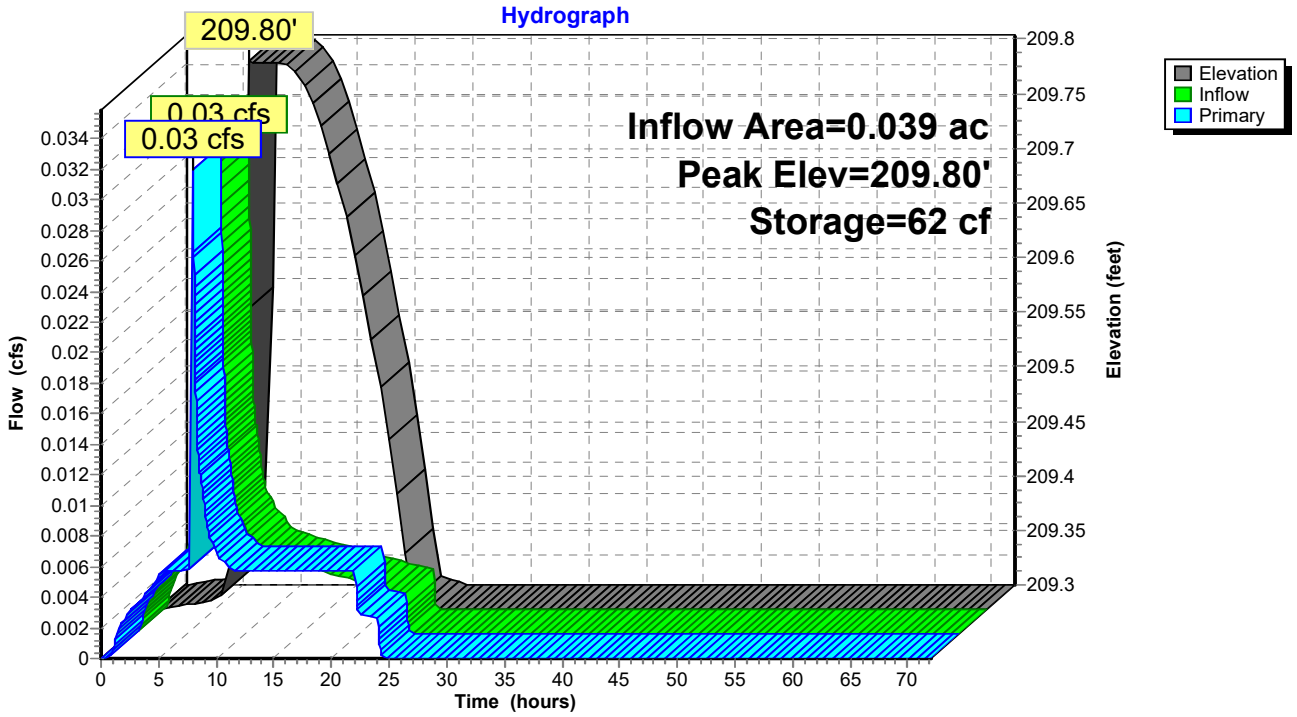
Volume	Invert	Avail.Storage	Storage Description
#1	209.30'	102 cf	**Ponding Depth (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
209.30	123	0	0
210.13	123	102	102

Device	Routing	Invert	Outlet Devices
#1	Primary	206.80'	**6.0" Round Culvert** L= 1.0' Ke= 0.500 Inlet / Outlet Invert= 206.80' / 206.79' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	209.30'	**2.000 in/hr Exfiltration over Surface area**
#3	Device 1	209.80'	**6.0" Horiz. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.05 cfs @ 8.03 hrs HW=209.80' (Free Discharge)
└**1=Culvert** (Passes 0.05 cfs of 1.57 cfs potential flow)
  ├**2=Exfiltration** (Exfiltration Controls 0.01 cfs)
  └**3=Orifice/Grate** (Orifice Controls 0.04 cfs @ 0.22 fps)

Pond 9P: PLANTER #9



Summary for Pond 10P: DC-780 Chambers

Inflow Area = 1.666 ac, 79.76% Impervious, Inflow Depth = 3.00" for 10 YEAR event
Inflow = 1.10 cfs @ 7.94 hrs, Volume= 0.416 af
Outflow = 0.46 cfs @ 8.72 hrs, Volume= 0.401 af, Atten= 59%, Lag= 46.8 min
Primary = 0.03 cfs @ 8.72 hrs, Volume= 0.118 af
Secondary = 0.43 cfs @ 8.72 hrs, Volume= 0.283 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 207.26' @ 8.72 hrs Surf.Area= 0.071 ac Storage= 0.121 af
Flood Elev= 208.75' Surf.Area= 0.071 ac Storage= 0.148 af

Plug-Flow detention time= 521.7 min calculated for 0.401 af (96% of inflow)
Center-of-Mass det. time= 494.9 min (1,199.6 - 704.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	204.50'	0.058 af	**34.75'W x 89.06'L x 3.75'H Field A** 0.266 af Overall - 0.089 af Embedded = 0.177 af x 33.0% Voids
#2A	205.25'	0.089 af	**ADS_StormTech DC-780 +Cap** x 84 Inside #1 Effective Size= 45.4"W x 30.0"H => 6.49 sf x 7.12'L = 46.2 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 7 Rows of 12 Chambers
		0.148 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Secondary	204.50'	**10.0" Round Culvert** L= 1.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 204.50' / 204.49' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.55 sf
#2	Primary	204.50'	**0.8" Horiz. 1/2 of 2-YR Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	206.55'	**4.4" Horiz. 2-YR Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	207.26'	**2.5" Horiz. 25-YR Orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	207.60'	**10.0" Horiz. Emergency Overflow** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.03 cfs @ 8.72 hrs HW=207.26' (Free Discharge)
└**2=1/2 of 2-YR Orifice** (Orifice Controls 0.03 cfs @ 8.00 fps)

Secondary OutFlow Max=0.43 cfs @ 8.72 hrs HW=207.26' (Free Discharge)
└**1=Culvert** (Passes 0.43 cfs of 3.18 cfs potential flow)
  ├**3=2-YR Orifice** (Orifice Controls 0.43 cfs @ 4.06 fps)
  ├**4=25-YR Orifice** (Weir Controls 0.00 cfs @ 0.15 fps)
  └**5=Emergency Overflow** (Controls 0.00 cfs)

Pond 10P: DC-780 Chambers - Chamber Wizard Field A

Chamber Model = ADS_StormTech DC-780 +Cap (ADS StormTech® DC-780 with cap length)
Effective Size= 45.4"W x 30.0"H => 6.49 sf x 7.12'L = 46.2 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

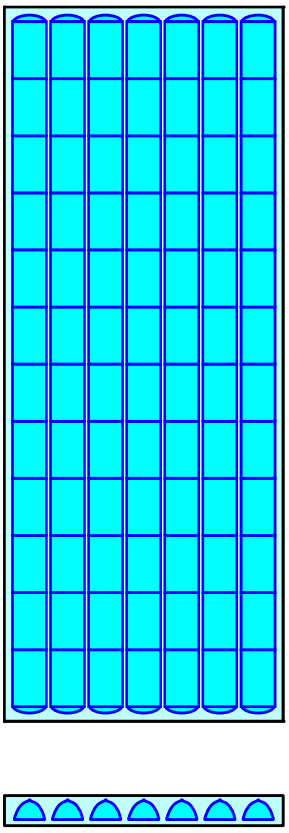
12 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 87.06' Row Length +12.0" End Stone x 2 = 89.06' Base Length
7 Rows x 51.0" Wide + 6.0" Spacing x 6 + 12.0" Side Stone x 2 = 34.75' Base Width
9.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.75' Field Height

84 Chambers x 46.2 cf = 3,884.1 cf Chamber Storage

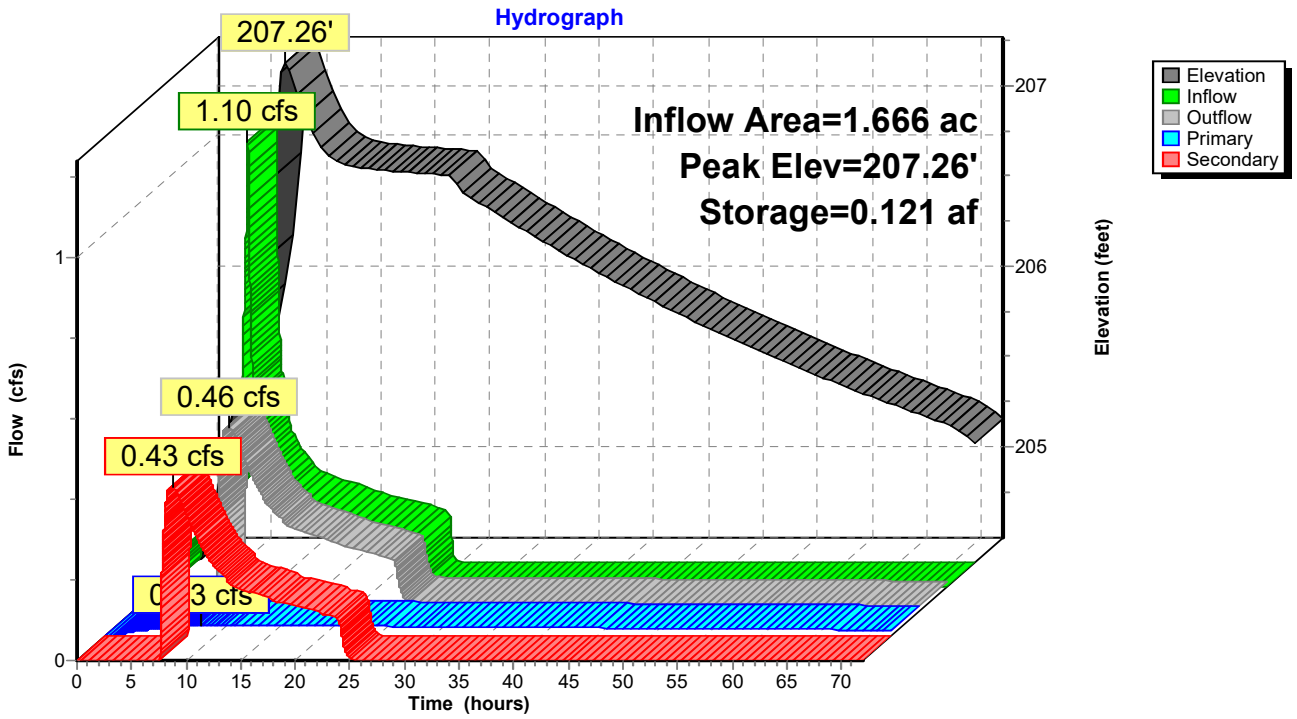
11,605.2 cf Field - 3,884.1 cf Chambers = 7,721.1 cf Stone x 33.0% Voids = 2,548.0 cf Stone Storage

Chamber Storage + Stone Storage = 6,432.0 cf = 0.148 af
Overall Storage Efficiency = 55.4%
Overall System Size = 89.06' x 34.75' x 3.75'

84 Chambers
429.8 cy Field
286.0 cy Stone



Pond 10P: DC-780 Chambers



Summary for Pond 11P: PLANTER #10

Inflow Area = 0.145 ac,100.00% Impervious, Inflow Depth = 3.27" for 10 YEAR event
Inflow = 0.12 cfs @ 7.88 hrs, Volume= 0.039 af
Outflow = 0.08 cfs @ 8.15 hrs, Volume= 0.039 af, Atten= 36%, Lag= 16.5 min
Primary = 0.08 cfs @ 8.15 hrs, Volume= 0.039 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 217.66' @ 8.15 hrs Surf.Area= 597 sf Storage= 253 cf

Plug-Flow detention time= 71.3 min calculated for 0.039 af (100% of inflow)
Center-of-Mass det. time= 71.3 min (734.1 - 662.8)

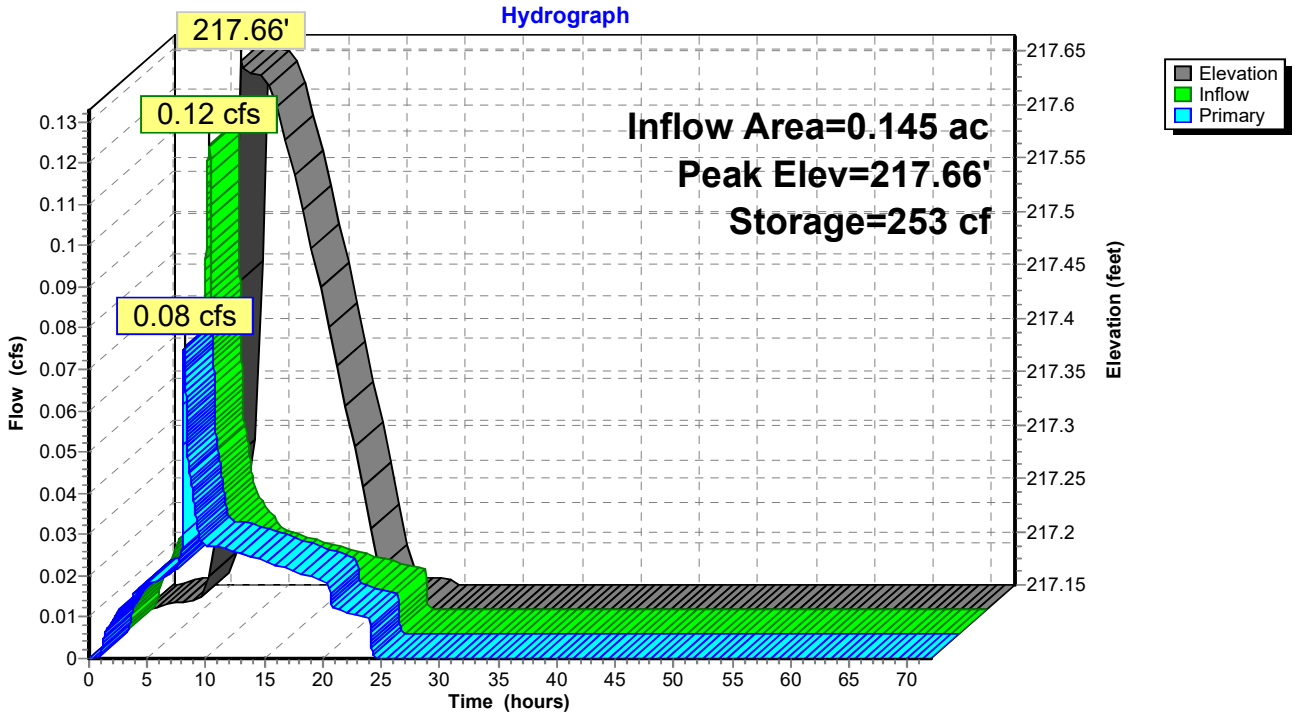
Volume	Invert	Avail.Storage	Storage Description
#1	217.15'	592 cf	**Ponding Depth (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
217.15	388	0	0
218.15	795	592	592

Device	Routing	Invert	Outlet Devices
#1	Primary	217.00'	**4.0" Round Culvert** L= 1.0' Ke= 0.500 Inlet / Outlet Invert= 217.00' / 216.99' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.09 sf
#2	Device 1	217.65'	**4.0" Horiz. Orifice/Grate** C= 0.600
#3	Device 1	217.15'	**2.000 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.08 cfs @ 8.15 hrs HW=217.66' (Free Discharge)
└**1=Culvert** (Passes 0.08 cfs of 0.30 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.05 cfs @ 0.56 fps)
  └**3=Exfiltration** (Exfiltration Controls 0.03 cfs)

Pond 11P: PLANTER #10



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment 1S: North Building & Runoff Area=1,748 sf 100.00% Impervious Runoff Depth=3.77"
Tc=5.0 min CN=0/98 Runoff=0.04 cfs 0.013 af

Subcatchment 2S: North Building & Runoff Area=3,051 sf 100.00% Impervious Runoff Depth=3.77"
Tc=5.0 min CN=0/98 Runoff=0.07 cfs 0.022 af

Subcatchment 3S: North Building & Runoff Area=3,051 sf 100.00% Impervious Runoff Depth=3.77"
Tc=5.0 min CN=0/98 Runoff=0.07 cfs 0.022 af

Subcatchment 4S: North Building & Runoff Area=1,700 sf 100.00% Impervious Runoff Depth=3.77"
Tc=5.0 min CN=0/98 Runoff=0.04 cfs 0.012 af

Subcatchment 5S: Middle Building Runoff Area=1,658 sf 100.00% Impervious Runoff Depth=3.77"
Tc=5.0 min CN=0/98 Runoff=0.04 cfs 0.012 af

Subcatchment 6S: Middle Building & Runoff Area=3,291 sf 100.00% Impervious Runoff Depth=3.77"
Tc=5.0 min CN=0/98 Runoff=0.07 cfs 0.024 af

Subcatchment 7S: Middle/South Building Runoff Area=3,309 sf 100.00% Impervious Runoff Depth=3.77"
Tc=5.0 min CN=0/98 Runoff=0.07 cfs 0.024 af

Subcatchment 8S: South Building & Runoff Area=3,051 sf 100.00% Impervious Runoff Depth=3.77"
Tc=5.0 min CN=0/98 Runoff=0.07 cfs 0.022 af

Subcatchment 9S: South Building & Runoff Area=1,699 sf 100.00% Impervious Runoff Depth=3.77"
Tc=5.0 min CN=0/98 Runoff=0.04 cfs 0.012 af

Subcatchment 10S: Parking and Runoff Area=49,998 sf 70.63% Impervious Runoff Depth=3.36"
Tc=5.0 min CN=84/98 Runoff=0.96 cfs 0.321 af

Subcatchment 11S: N Springbrook Rd Runoff Area=6,300 sf 100.00% Impervious Runoff Depth=3.77"
Tc=5.0 min CN=0/98 Runoff=0.14 cfs 0.045 af

Reach 1R: 6" PVC Avg. Flow Depth=0.18' Max Vel=3.41 fps Inflow=0.21 cfs 0.069 af
6.0" Round Pipe n=0.013 L=37.5' S=0.0200 '/' Capacity=0.79 cfs Outflow=0.21 cfs 0.069 af

Reach 2R: 6" PVC Avg. Flow Depth=0.15' Max Vel=3.12 fps Inflow=0.15 cfs 0.094 af
6.0" Round Pipe n=0.013 L=36.1' S=0.0199 '/' Capacity=0.79 cfs Outflow=0.15 cfs 0.094 af

Reach 3R: 10" PVC Avg. Flow Depth=0.46' Max Vel=4.22 fps Inflow=1.31 cfs 0.483 af
10.0" Round Pipe n=0.013 L=57.3' S=0.0101 '/' Capacity=2.20 cfs Outflow=1.31 cfs 0.483 af

Reach 4R: 10" PVC Avg. Flow Depth=0.18' Max Vel=7.25 fps Inflow=0.65 cfs 0.467 af
10.0" Round Pipe n=0.013 L=50.8' S=0.0766 '/' Capacity=6.06 cfs Outflow=0.65 cfs 0.467 af

Reach 5R: 4" PVC Avg. Flow Depth=0.14' Max Vel=3.31 fps Inflow=0.11 cfs 0.045 af
4.0" Round Pipe n=0.013 L=21.2' S=0.0274 '/' Capacity=0.31 cfs Outflow=0.11 cfs 0.045 af

Pond 1P: PLANTER #1 Peak Elev=216.92' Storage=53 cf Inflow=0.04 cfs 0.013 af
Outflow=0.04 cfs 0.013 af

Pond 2P: PLANTER #2 Peak Elev=216.71' Storage=101 cf Inflow=0.07 cfs 0.022 af
Outflow=0.07 cfs 0.022 af

Pond 3P: PLANTER #3 Peak Elev=216.78' Storage=101 cf Inflow=0.07 cfs 0.022 af
Outflow=0.07 cfs 0.022 af

Pond 4P: PLANTER #4 Peak Elev=217.03' Storage=55 cf Inflow=0.04 cfs 0.012 af
Outflow=0.04 cfs 0.012 af

Pond 5P: PLANTER #5 Peak Elev=212.73' Storage=84 cf Inflow=0.04 cfs 0.012 af
Outflow=0.02 cfs 0.012 af

Pond 6P: PLANTER #6 Peak Elev=212.21' Storage=169 cf Inflow=0.07 cfs 0.024 af
Outflow=0.03 cfs 0.024 af

Pond 7P: PLANTER #7 Peak Elev=210.86' Storage=167 cf Inflow=0.07 cfs 0.024 af
Outflow=0.02 cfs 0.024 af

Pond 8P: PLANTER #8 Peak Elev=209.97' Storage=102 cf Inflow=0.07 cfs 0.022 af
Outflow=0.07 cfs 0.022 af

Pond 9P: PLANTER #9 Peak Elev=209.80' Storage=62 cf Inflow=0.04 cfs 0.012 af
Outflow=0.04 cfs 0.012 af

Pond 10P: DC-780 Chambers Peak Elev=207.60' Storage=0.132 af Inflow=1.31 cfs 0.483 af
Primary=0.03 cfs 0.120 af Secondary=0.62 cfs 0.348 af Outflow=0.65 cfs 0.467 af

Pond 11P: PLANTER #10 Peak Elev=217.69' Storage=269 cf Inflow=0.14 cfs 0.045 af
Outflow=0.11 cfs 0.045 af

Total Runoff Area = 1.810 ac Runoff Volume = 0.529 af Average Runoff Depth = 3.51"
18.62% Pervious = 0.337 ac 81.38% Impervious = 1.473 ac

Summary for Subcatchment 1S: North Building & Sidewalk

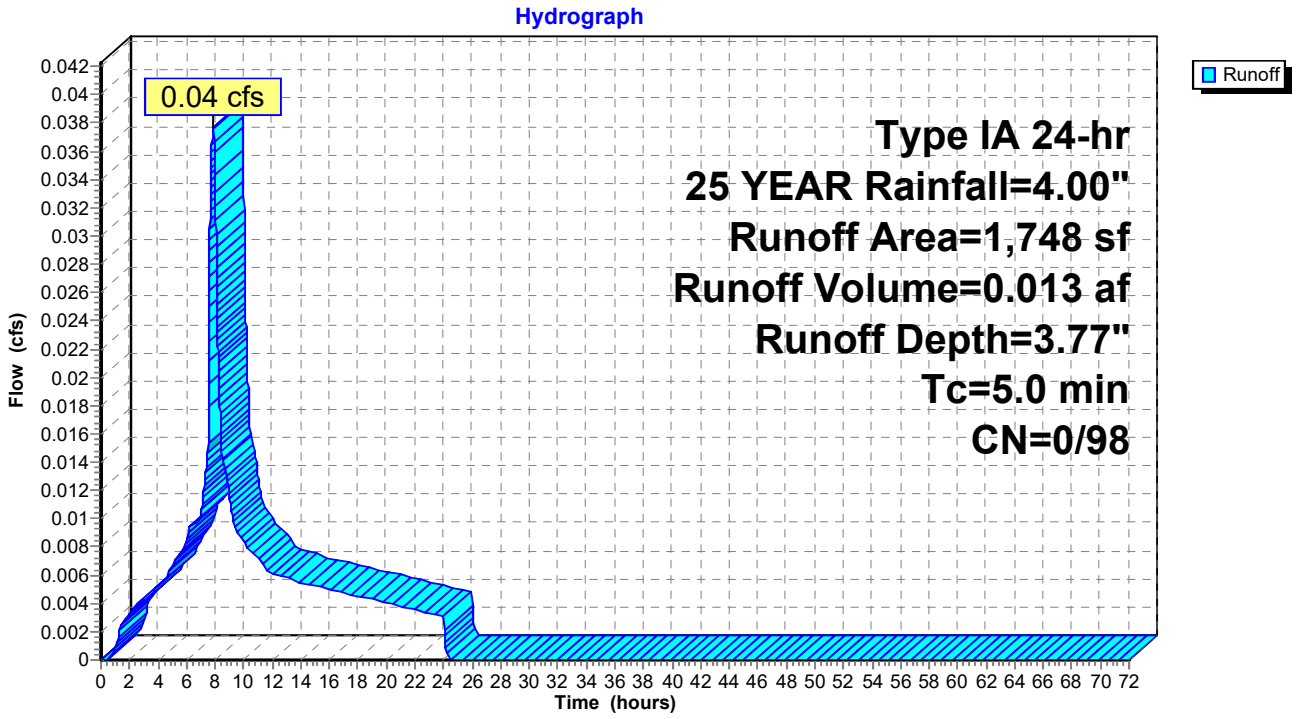
Runoff = 0.04 cfs @ 7.88 hrs, Volume= 0.013 af, Depth= 3.77"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 YEAR Rainfall=4.00"

	Area (sf)	CN	Description
*	1,698	98	Roofs
*	50	98	Concrete Sidewalk
	1,748	98	Weighted Average
	1,748		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 1S: North Building & Sidewalk



Summary for Subcatchment 2S: North Building & Sidewalk

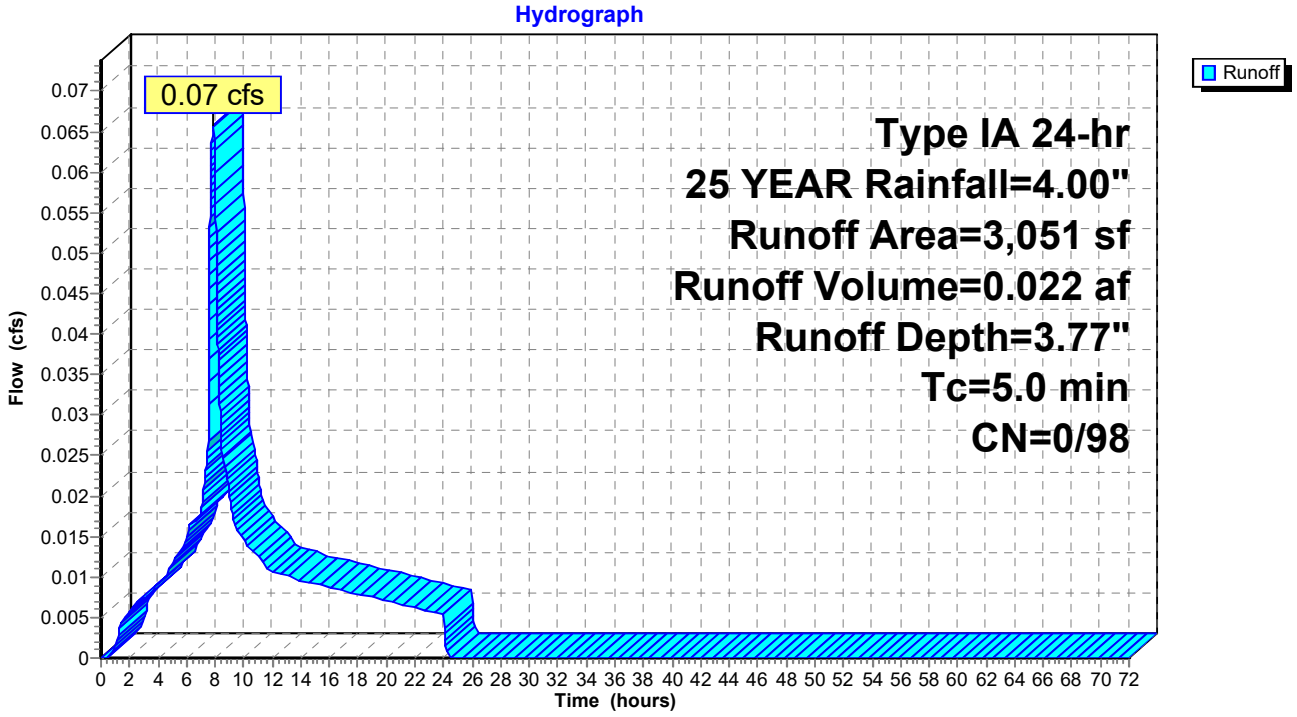
Runoff = 0.07 cfs @ 7.88 hrs, Volume= 0.022 af, Depth= 3.77"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 YEAR Rainfall=4.00"

	Area (sf)	CN	Description
*	2,798	98	Roofs
*	253	98	Concrete Sidewalk
	3,051	98	Weighted Average
	3,051		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 2S: North Building & Sidewalk



Summary for Subcatchment 3S: North Building & Sidewalk

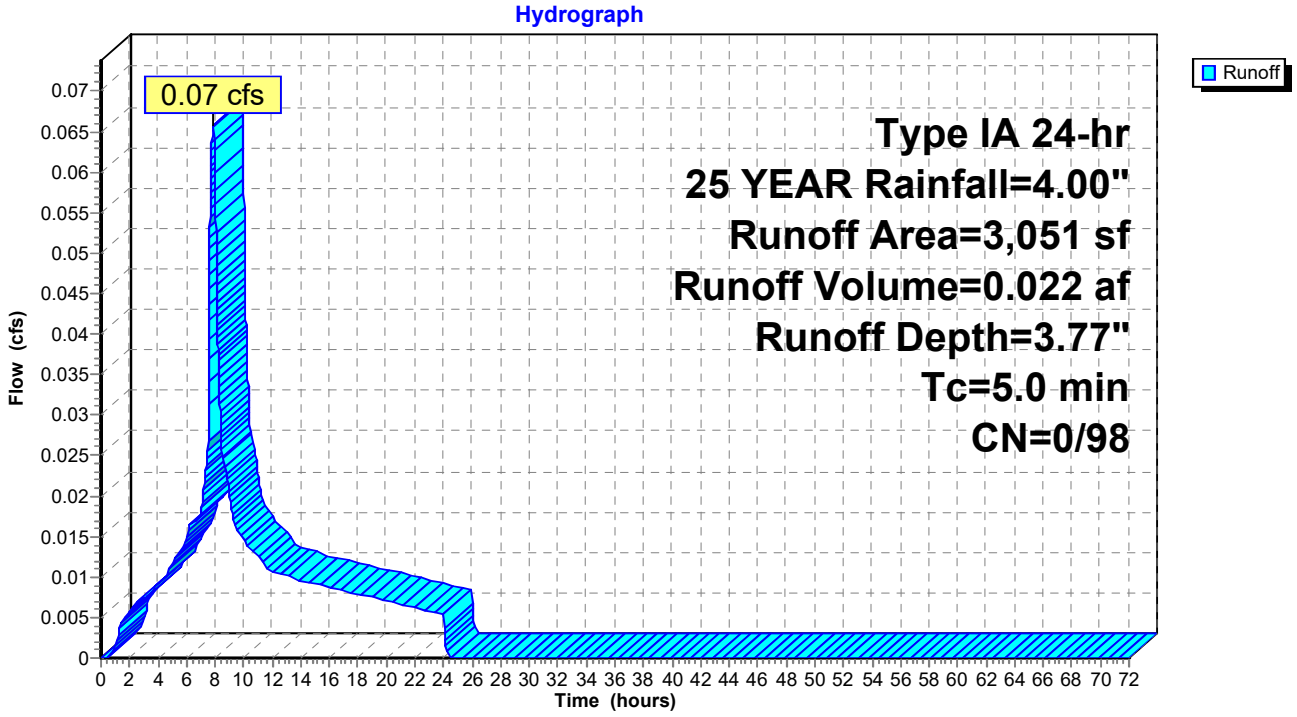
Runoff = 0.07 cfs @ 7.88 hrs, Volume= 0.022 af, Depth= 3.77"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 YEAR Rainfall=4.00"

	Area (sf)	CN	Description
*	2,798	98	Roofs
*	253	98	Concrete Sidewalk
	3,051	98	Weighted Average
	3,051		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 3S: North Building & Sidewalk



Summary for Subcatchment 4S: North Building & Sidewalk

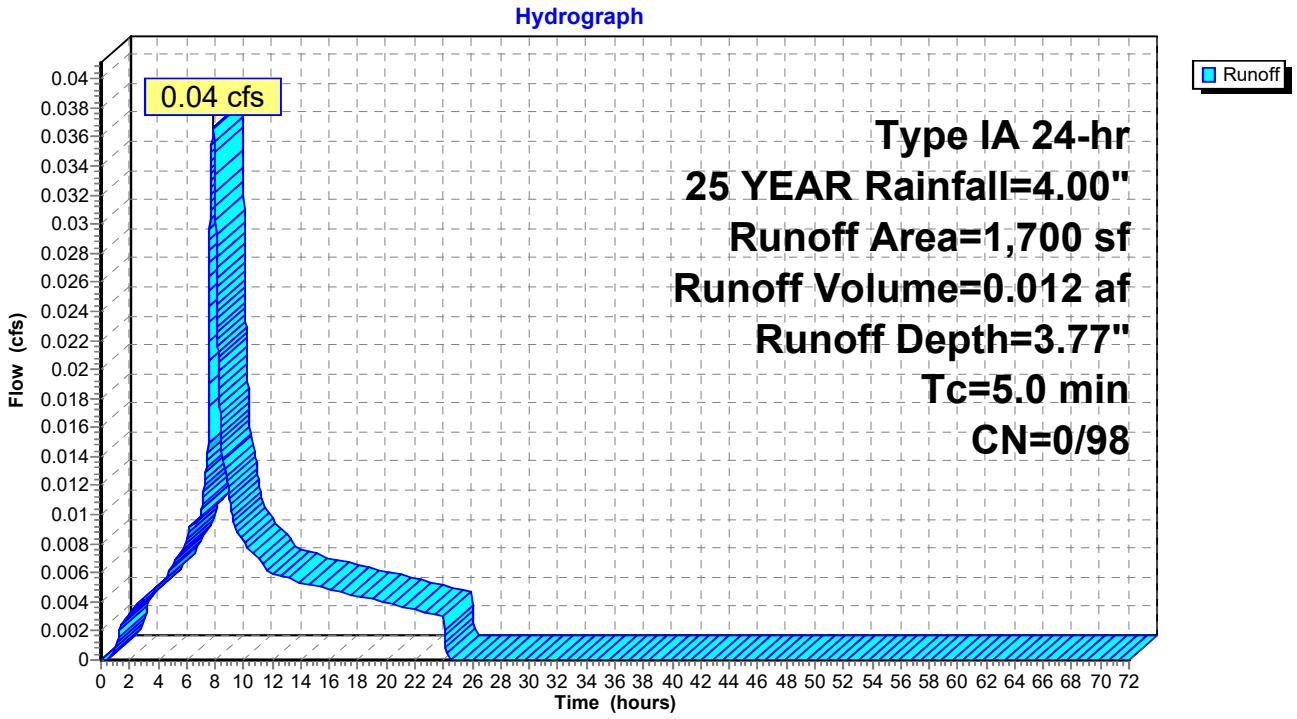
Runoff = 0.04 cfs @ 7.88 hrs, Volume= 0.012 af, Depth= 3.77"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 YEAR Rainfall=4.00"

	Area (sf)	CN	Description
*	1,447	98	Roofs
*	253	98	Concrete Sidewalk
	1,700	98	Weighted Average
	1,700		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 4S: North Building & Sidewalk



Summary for Subcatchment 5S: Middle Building

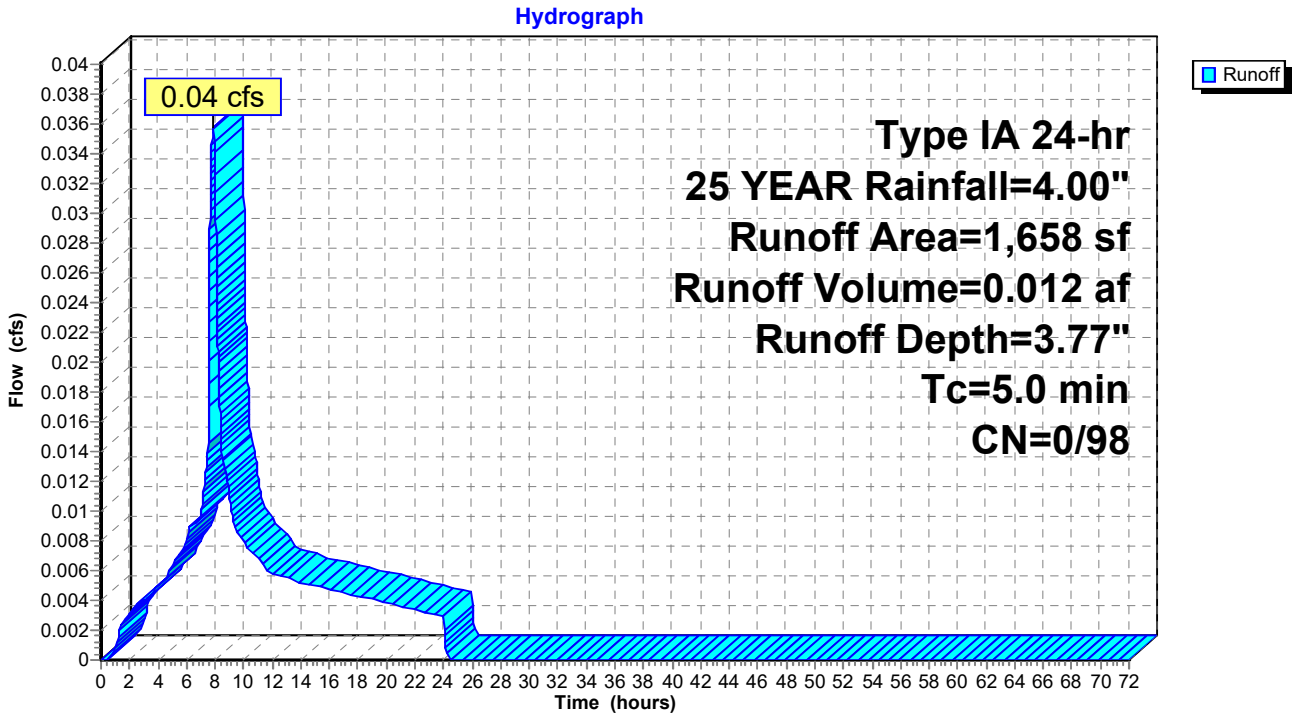
Runoff = 0.04 cfs @ 7.88 hrs, Volume= 0.012 af, Depth= 3.77"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 YEAR Rainfall=4.00"

	Area (sf)	CN	Description
*	1,447	98	Roofs
*	211	98	Concrete Sidewalk
	1,658	98	Weighted Average
	1,658		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 5S: Middle Building



Summary for Subcatchment 6S: Middle Building & Sidewalk

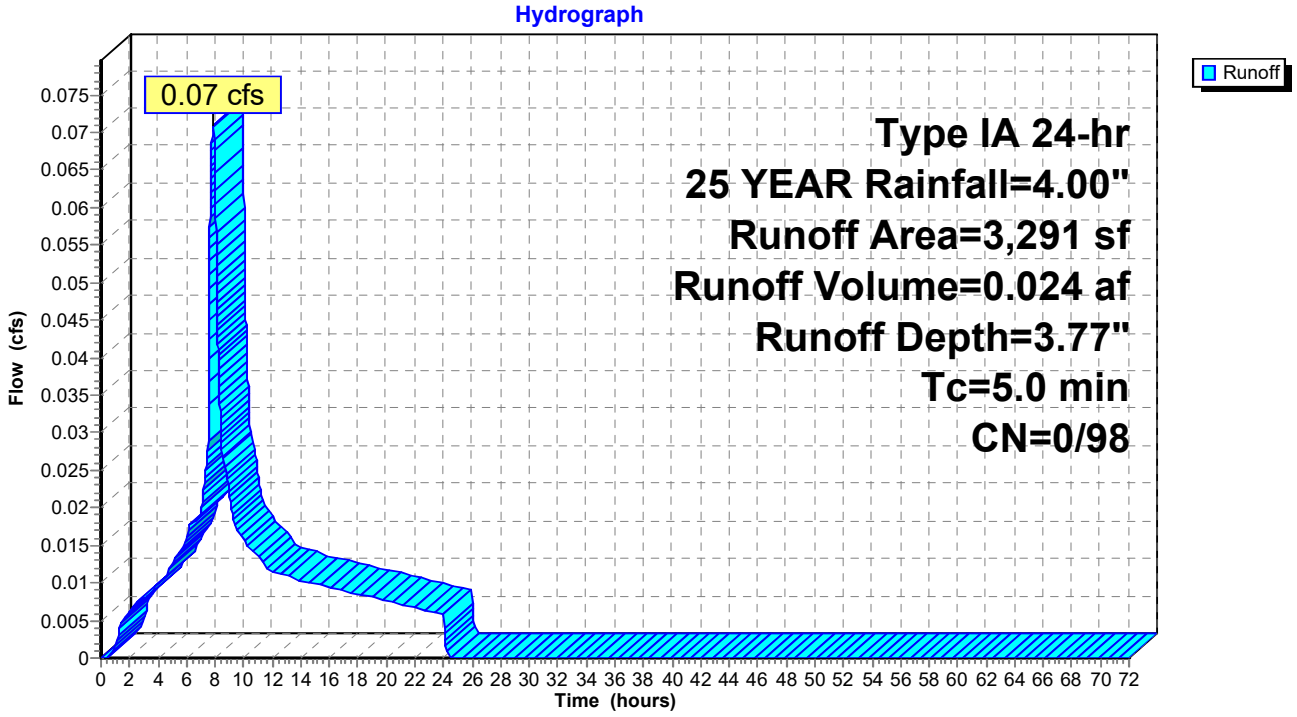
Runoff = 0.07 cfs @ 7.88 hrs, Volume= 0.024 af, Depth= 3.77"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 YEAR Rainfall=4.00"

	Area (sf)	CN	Description
*	2,798	98	Roofs
*	493	98	Concrete Sidewalk
	3,291	98	Weighted Average
	3,291		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 6S: Middle Building & Sidewalk



Summary for Subcatchment 7S: Middle/South Building & Sidewalk

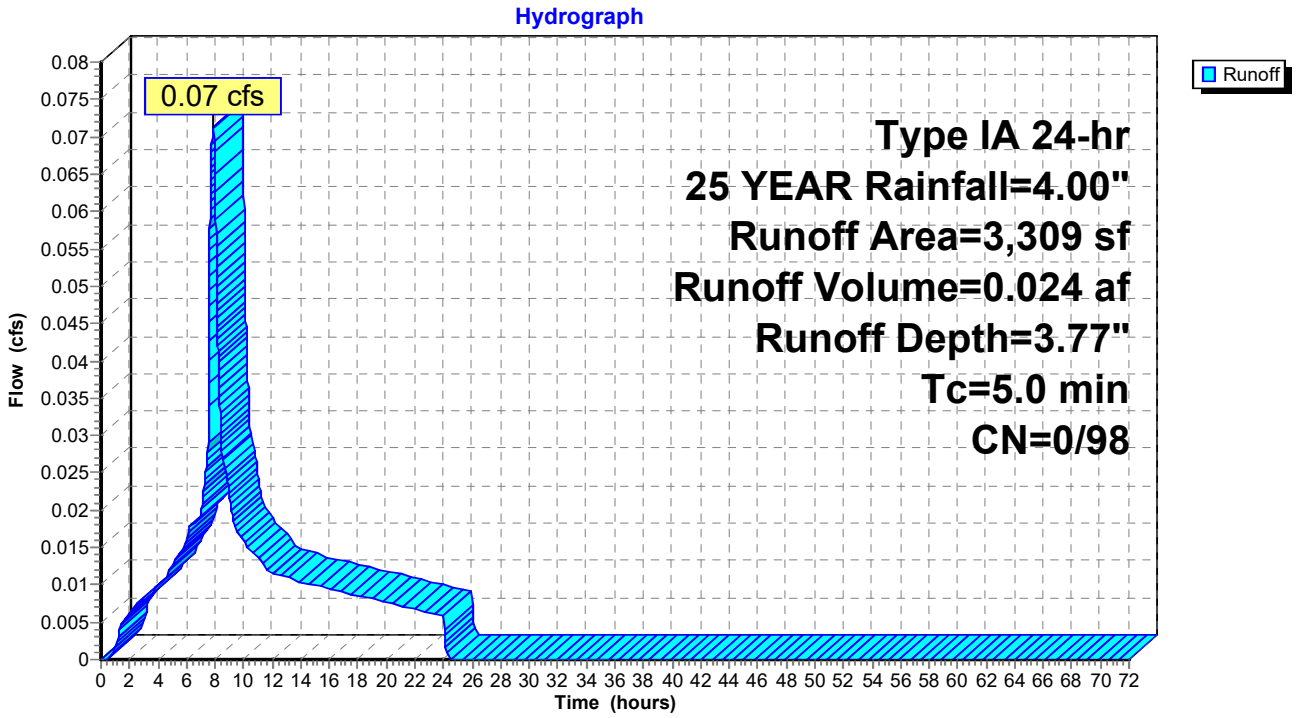
Runoff = 0.07 cfs @ 7.88 hrs, Volume= 0.024 af, Depth= 3.77"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 YEAR Rainfall=4.00"

	Area (sf)	CN	Description
*	1,406	98	Roofs
*	1,407	98	Roofs
*	496	98	Concrete Sidewalk
	3,309	98	Weighted Average
	3,309		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 7S: Middle/South Building & Sidewalk



Summary for Subcatchment 8S: South Building & Sidewalk

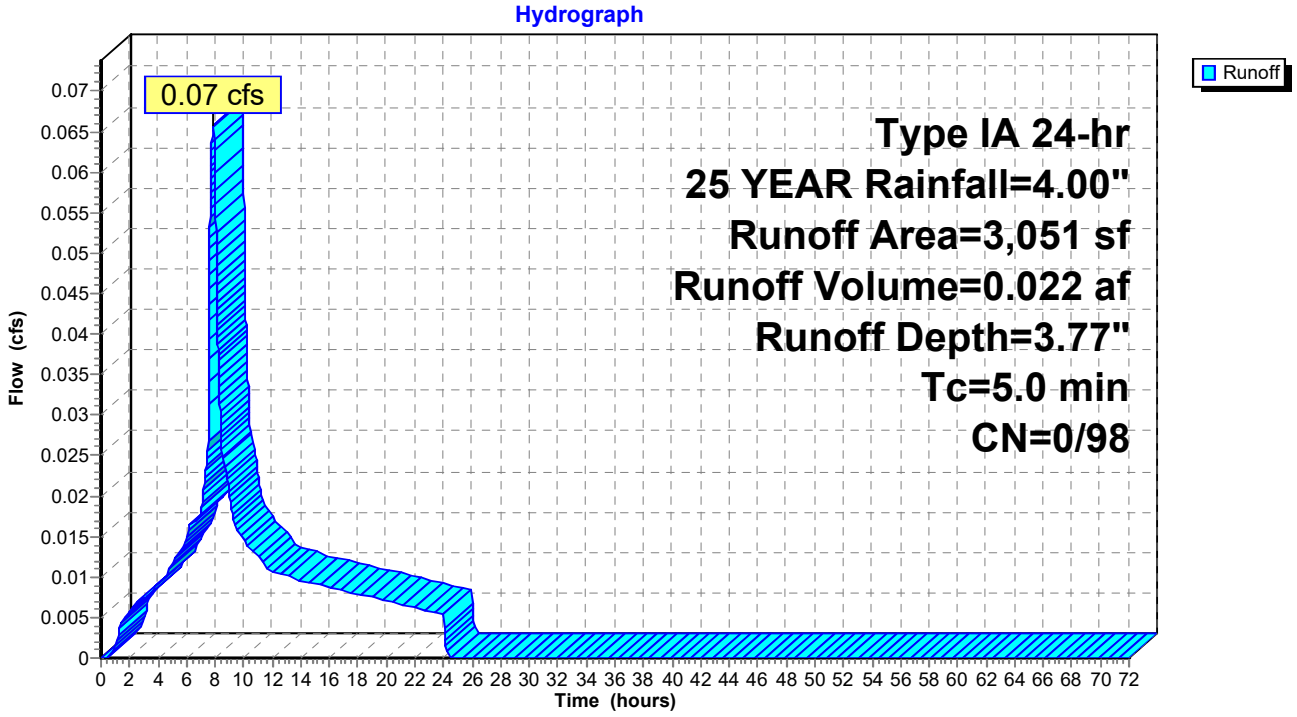
Runoff = 0.07 cfs @ 7.88 hrs, Volume= 0.022 af, Depth= 3.77"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 YEAR Rainfall=4.00"

	Area (sf)	CN	Description
*	2,798	98	Roofs
*	253	98	Concrete Sidewalk
	3,051	98	Weighted Average
	3,051		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 8S: South Building & Sidewalk



Summary for Subcatchment 9S: South Building & Sidewalk

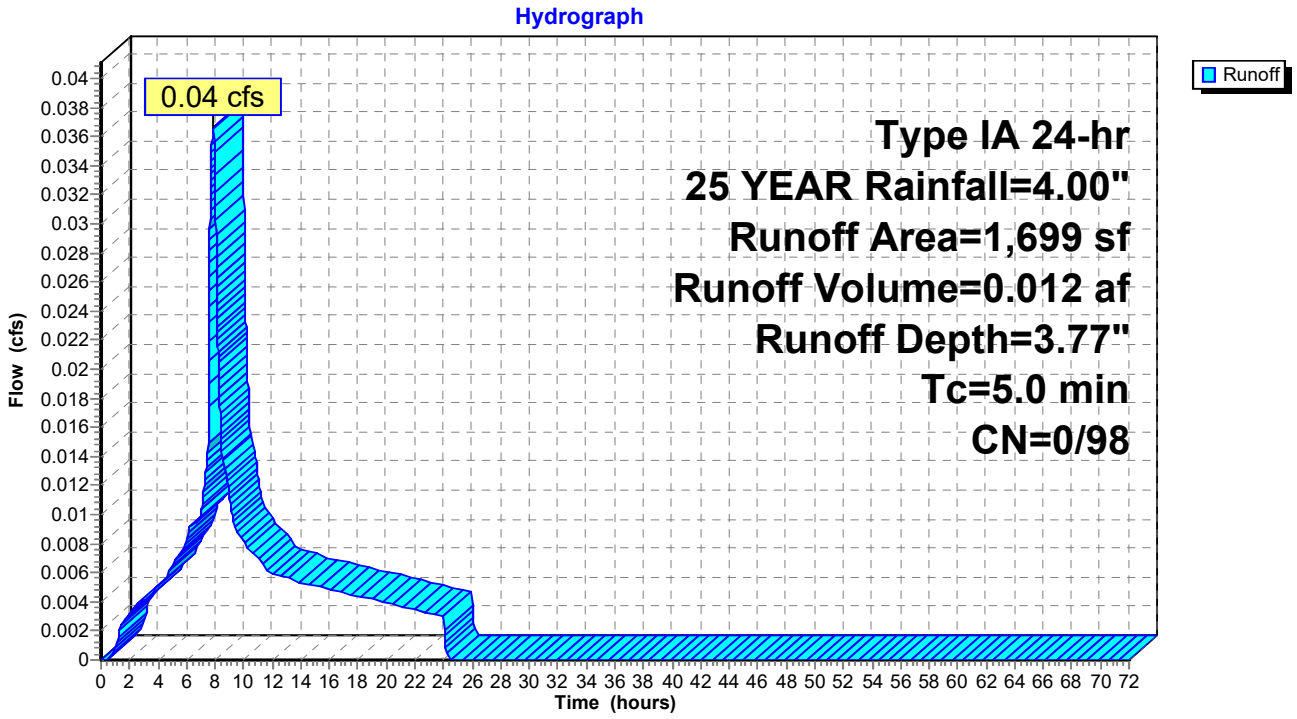
Runoff = 0.04 cfs @ 7.88 hrs, Volume= 0.012 af, Depth= 3.77"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 YEAR Rainfall=4.00"

	Area (sf)	CN	Description
*	1,447	98	Roofs
*	252	98	Concrete Sidewalk
	1,699	98	Weighted Average
	1,699		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 9S: South Building & Sidewalk



Summary for Subcatchment 10S: Parking and Landscaping

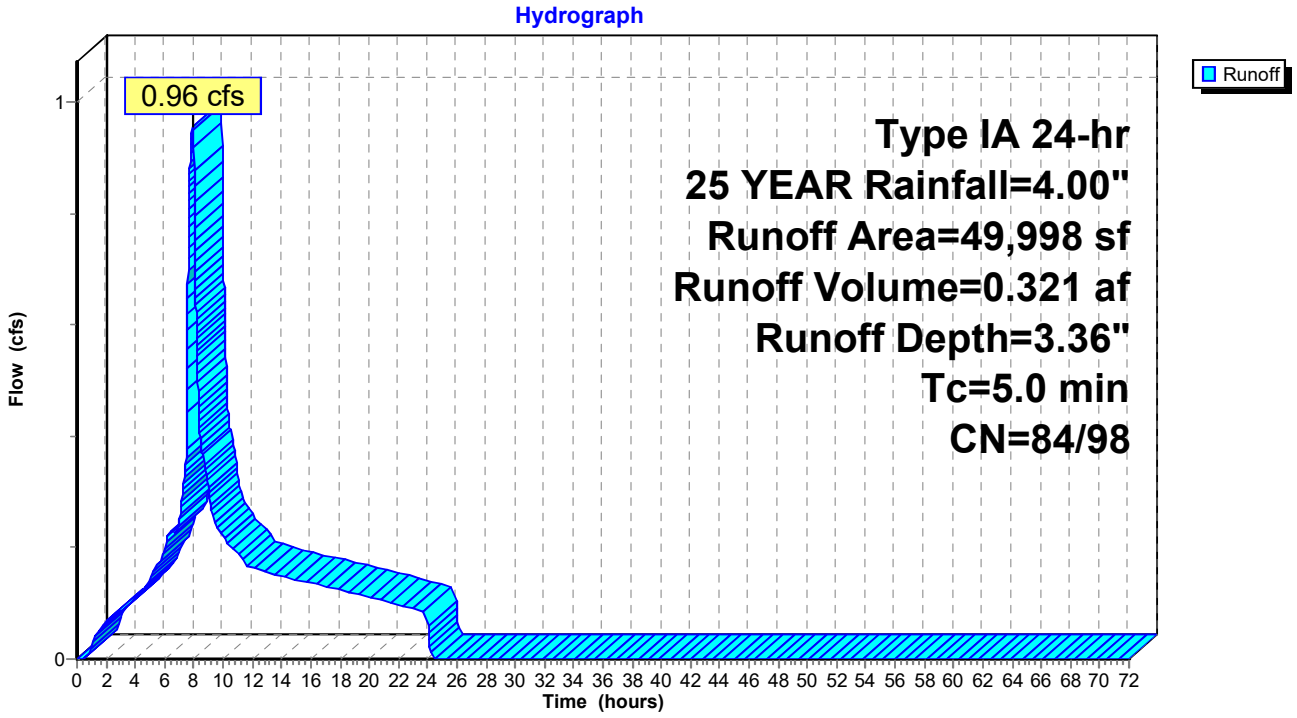
Runoff = 0.96 cfs @ 7.89 hrs, Volume= 0.321 af, Depth= 3.36"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 YEAR Rainfall=4.00"

	Area (sf)	CN	Description
	14,686	84	50-75% Grass cover, Fair, HSG D
*	31,601	98	Paved Parking
*	3,711	98	Concrete Sidewalk
	49,998	94	Weighted Average
	14,686		29.37% Pervious Area
	35,312		70.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 10S: Parking and Landscaping



Summary for Subcatchment 11S: N Springbrook Rd

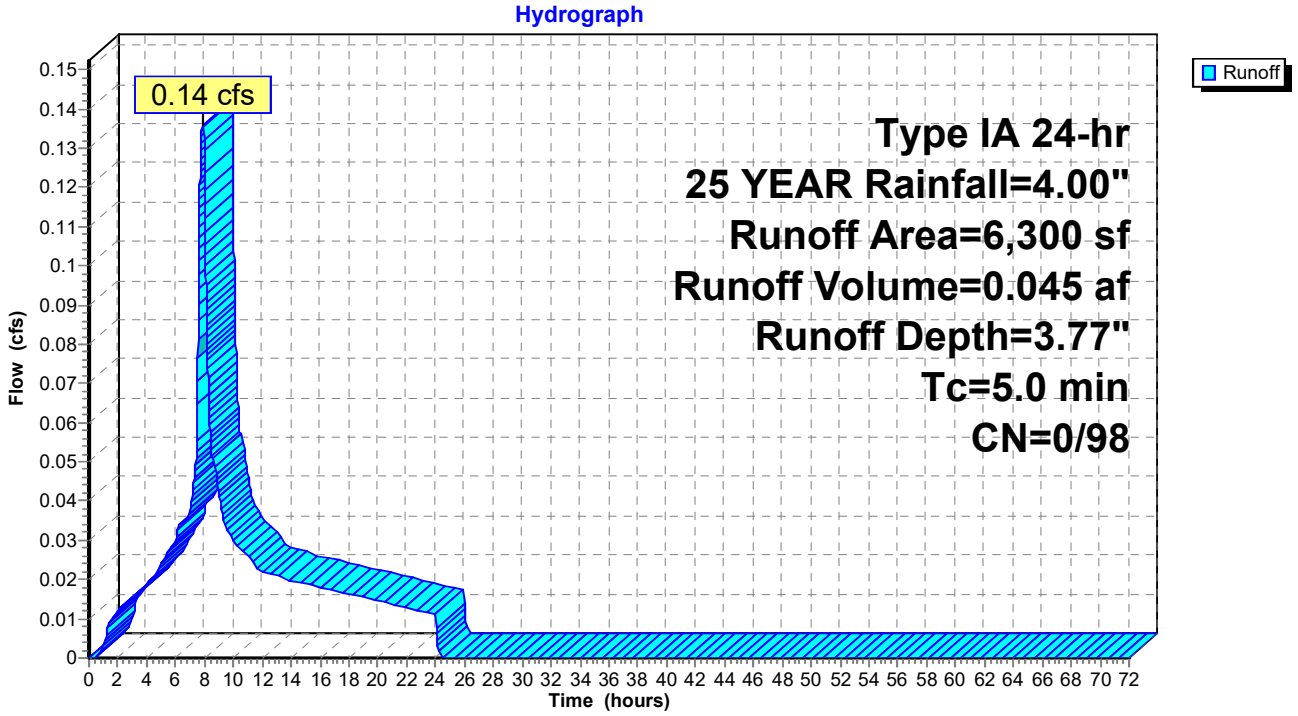
Runoff = 0.14 cfs @ 7.88 hrs, Volume= 0.045 af, Depth= 3.77"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25 YEAR Rainfall=4.00"

	Area (sf)	CN	Description
*	6,300	98	N Springbrook Rd Section to be treated
	6,300		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 11S: N Springbrook Rd



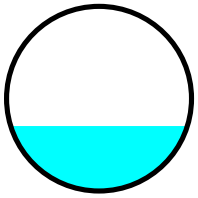
Summary for Reach 1R: 6" PVC

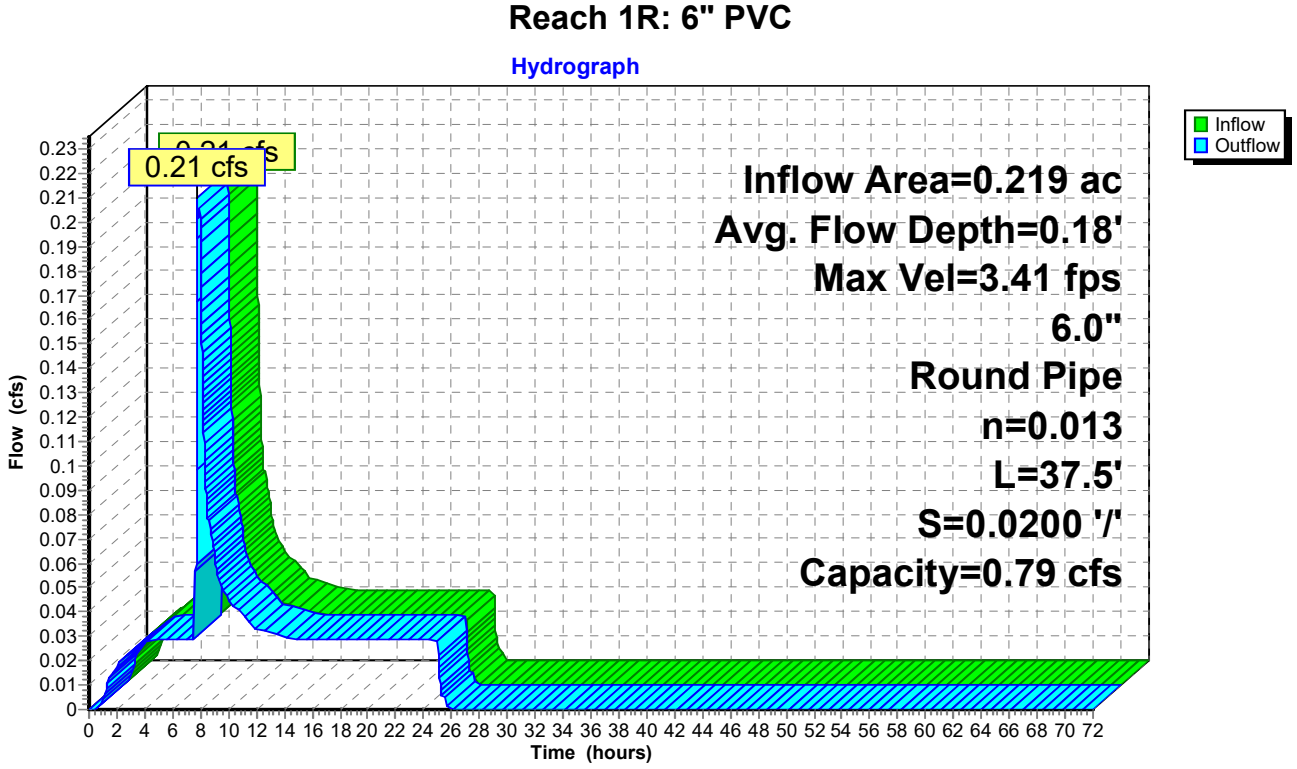
Inflow Area = 0.219 ac,100.00% Impervious, Inflow Depth = 3.77" for 25 YEAR event
Inflow = 0.21 cfs @ 7.88 hrs, Volume= 0.069 af
Outflow = 0.21 cfs @ 7.75 hrs, Volume= 0.069 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.41 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.92 fps, Avg. Travel Time= 0.3 min

Peak Storage= 2 cf @ 7.75 hrs
Average Depth at Peak Storage= 0.18'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.79 cfs

6.0" Round Pipe
n= 0.013
Length= 37.5' Slope= 0.0200 '/'
Inlet Invert= 212.29', Outlet Invert= 211.54'





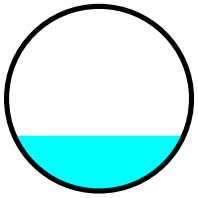
Summary for Reach 2R: 6" PVC

Inflow Area = 0.299 ac,100.00% Impervious, Inflow Depth = 3.77" for 25 YEAR event
Inflow = 0.15 cfs @ 7.93 hrs, Volume= 0.094 af
Outflow = 0.15 cfs @ 7.86 hrs, Volume= 0.094 af, Atten= 0%, Lag= 0.0 min

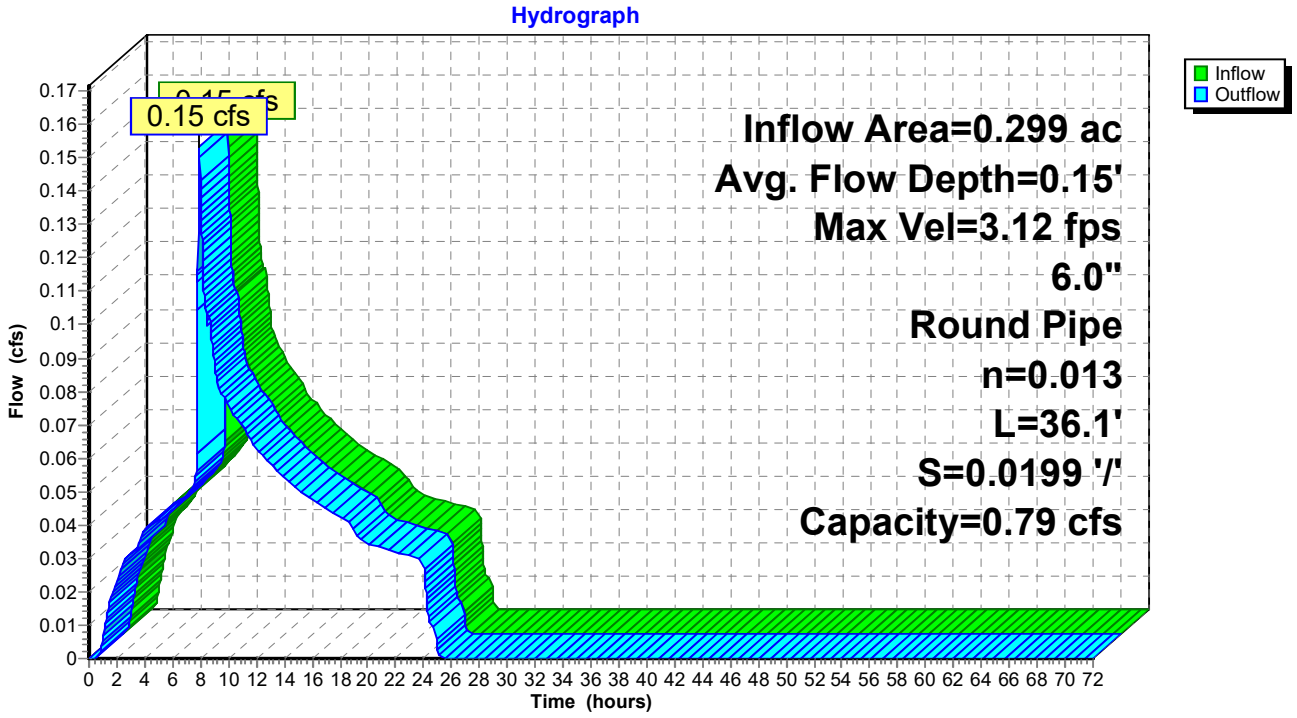
Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.12 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 2.13 fps, Avg. Travel Time= 0.3 min

Peak Storage= 2 cf @ 7.86 hrs
Average Depth at Peak Storage= 0.15'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.79 cfs

6.0" Round Pipe
n= 0.013
Length= 36.1' Slope= 0.0199 '/'
Inlet Invert= 208.45', Outlet Invert= 207.73'



Reach 2R: 6" PVC



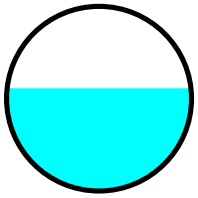
Summary for Reach 3R: 10" PVC

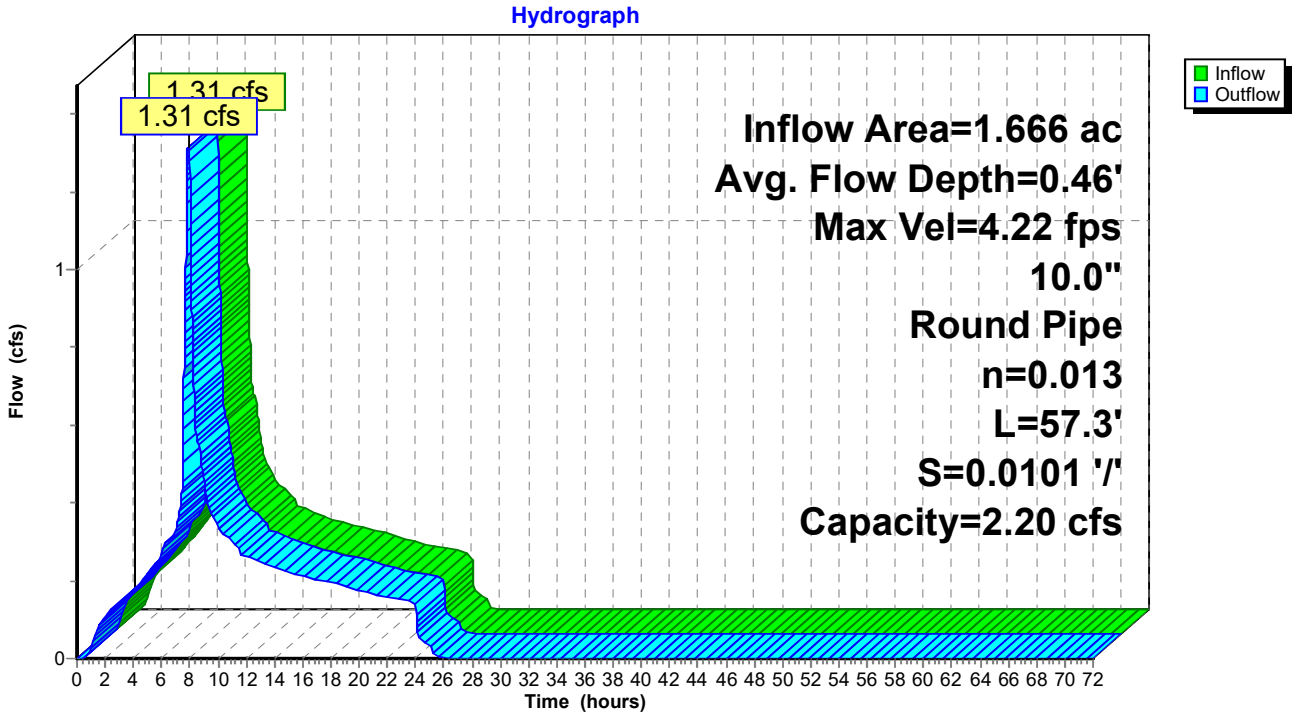
Inflow Area = 1.666 ac, 79.76% Impervious, Inflow Depth = 3.48" for 25 YEAR event
Inflow = 1.31 cfs @ 7.90 hrs, Volume= 0.483 af
Outflow = 1.31 cfs @ 7.89 hrs, Volume= 0.483 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.22 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 2.47 fps, Avg. Travel Time= 0.4 min

Peak Storage= 18 cf @ 7.89 hrs
Average Depth at Peak Storage= 0.46'
Bank-Full Depth= 0.83' Flow Area= 0.5 sf, Capacity= 2.20 cfs

10.0" Round Pipe
n= 0.013
Length= 57.3' Slope= 0.0101 '/'
Inlet Invert= 207.73', Outlet Invert= 207.15'





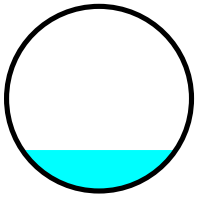
Summary for Reach 4R: 10" PVC

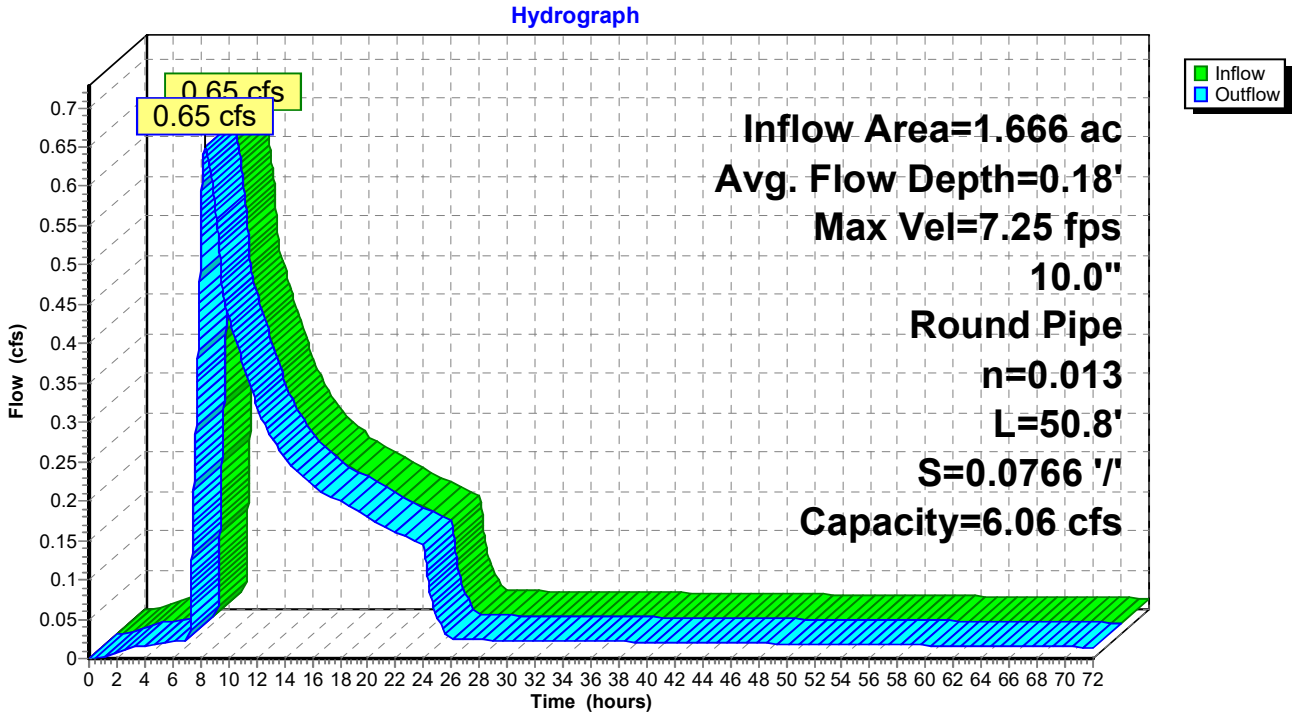
Inflow Area = 1.666 ac, 79.76% Impervious, Inflow Depth > 3.37" for 25 YEAR event
Inflow = 0.65 cfs @ 8.35 hrs, Volume= 0.467 af
Outflow = 0.65 cfs @ 8.35 hrs, Volume= 0.467 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.25 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 3.22 fps, Avg. Travel Time= 0.3 min

Peak Storage= 5 cf @ 8.35 hrs
Average Depth at Peak Storage= 0.18'
Bank-Full Depth= 0.83' Flow Area= 0.5 sf, Capacity= 6.06 cfs

10.0" Round Pipe
n= 0.013
Length= 50.8' Slope= 0.0766 '/'
Inlet Invert= 206.97', Outlet Invert= 203.08'





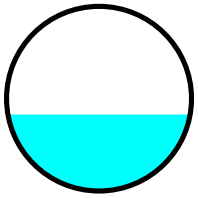
Summary for Reach 5R: 4" PVC

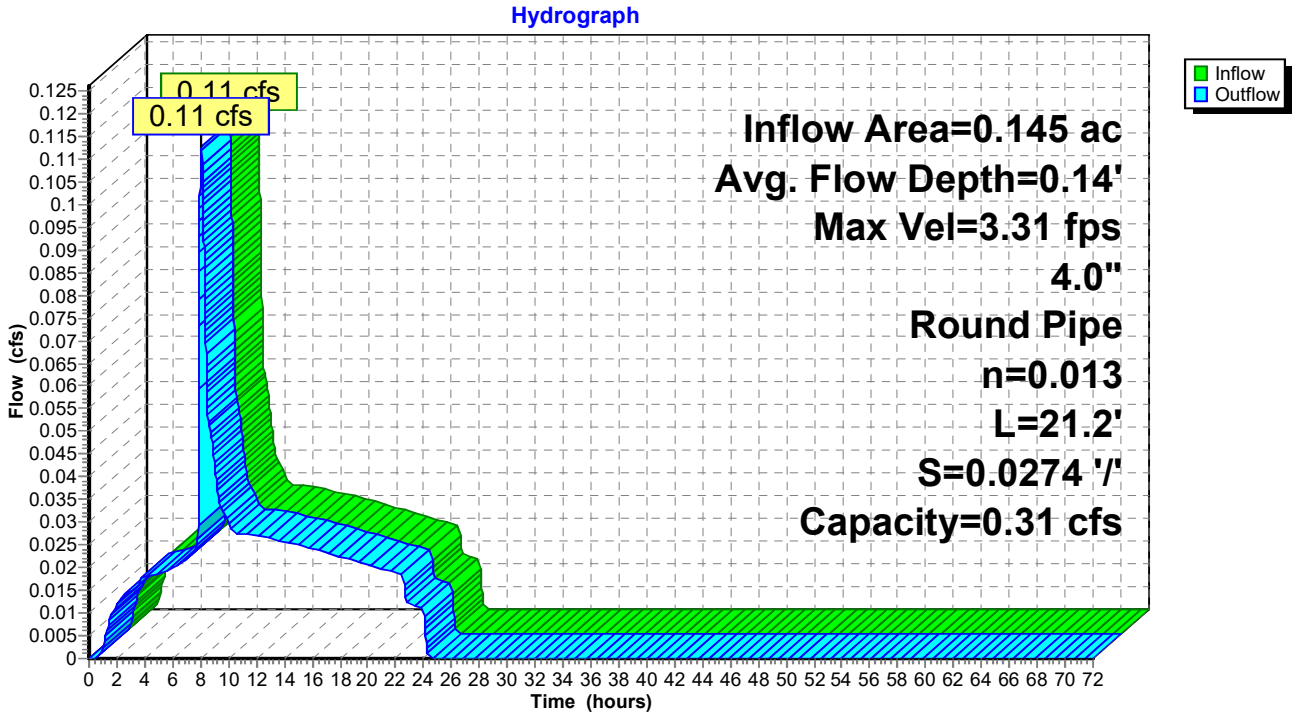
Inflow Area = 0.145 ac,100.00% Impervious, Inflow Depth = 3.77" for 25 YEAR event
Inflow = 0.11 cfs @ 8.05 hrs, Volume= 0.045 af
Outflow = 0.11 cfs @ 8.05 hrs, Volume= 0.045 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.31 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.03 fps, Avg. Travel Time= 0.2 min

Peak Storage= 1 cf @ 8.05 hrs
Average Depth at Peak Storage= 0.14'
Bank-Full Depth= 0.33' Flow Area= 0.1 sf, Capacity= 0.31 cfs

4.0" Round Pipe
n= 0.013
Length= 21.2' Slope= 0.0274 '/'
Inlet Invert= 217.65', Outlet Invert= 217.07'





Summary for Pond 1P: PLANTER #1

Inflow Area = 0.040 ac,100.00% Impervious, Inflow Depth = 3.77" for 25 YEAR event
Inflow = 0.04 cfs @ 7.88 hrs, Volume= 0.013 af
Outflow = 0.04 cfs @ 7.88 hrs, Volume= 0.013 af, Atten= 0%, Lag= 0.1 min
Primary = 0.04 cfs @ 7.88 hrs, Volume= 0.013 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 216.92' @ 7.88 hrs Surf.Area= 106 sf Storage= 53 cf

Plug-Flow detention time= 97.0 min calculated for 0.013 af (100% of inflow)
Center-of-Mass det. time= 97.0 min (756.6 - 659.5)

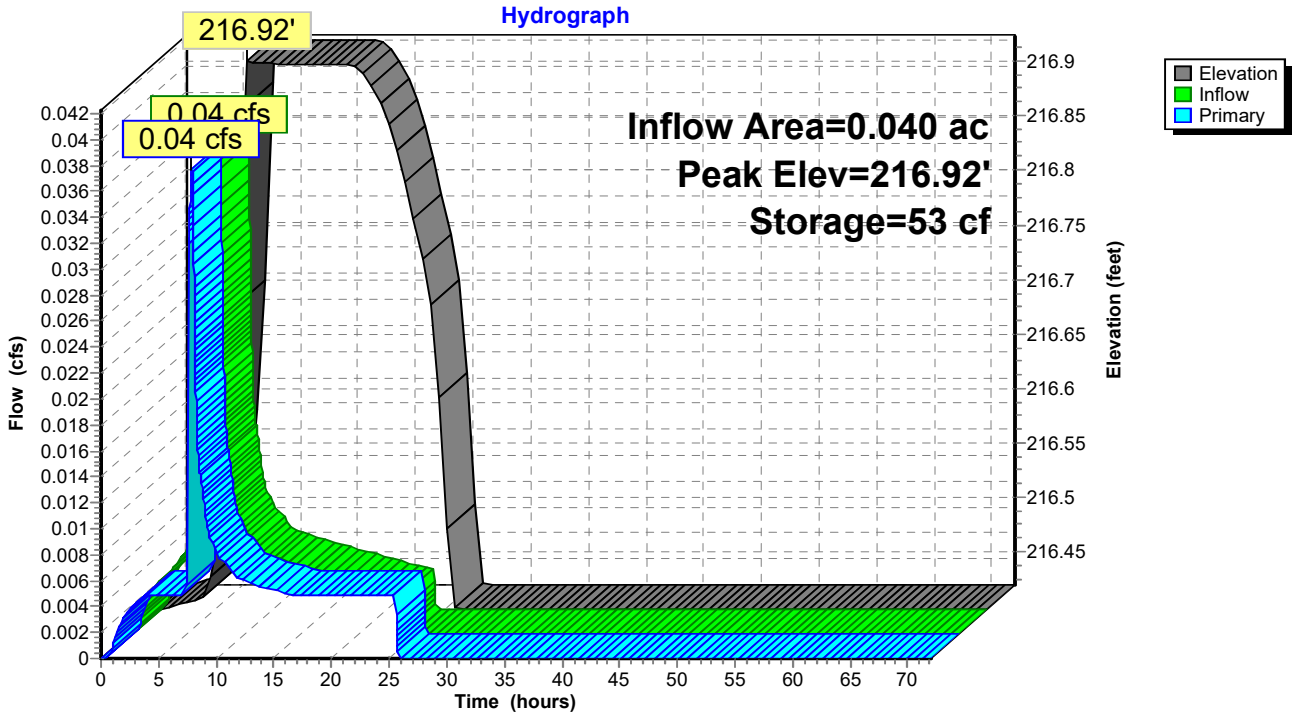
Volume	Invert	Avail.Storage	Storage Description
#1	216.42'	88 cf	**Ponding Depth (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
216.42	106	0	0
217.25	106	88	88

Device	Routing	Invert	Outlet Devices
#1	Primary	213.99'	**6.0" Round Culvert** L= 1.0' Ke= 0.500 Inlet / Outlet Invert= 213.99' / 213.98' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	216.42'	**2.000 in/hr Exfiltration over Surface area**
#3	Device 1	216.92'	**6.0" Horiz. Orifice/Grate** C= 0.610

Primary OutFlow Max=0.05 cfs @ 7.88 hrs HW=216.92' (Free Discharge)
└**1=Culvert** (Passes 0.05 cfs of 1.55 cfs potential flow)
└**2=Exfiltration** (Exfiltration Controls 0.00 cfs)
└**3=Orifice/Grate** (Orifice Controls 0.05 cfs @ 0.25 fps)

Pond 1P: PLANTER #1



Summary for Pond 2P: PLANTER #2

Inflow Area = 0.070 ac,100.00% Impervious, Inflow Depth = 3.77" for 25 YEAR event
Inflow = 0.07 cfs @ 7.88 hrs, Volume= 0.022 af
Outflow = 0.07 cfs @ 7.88 hrs, Volume= 0.022 af, Atten= 0%, Lag= 0.3 min
Primary = 0.07 cfs @ 7.88 hrs, Volume= 0.022 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 216.71' @ 7.88 hrs Surf.Area= 200 sf Storage= 101 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 96.8 min (756.3 - 659.5)

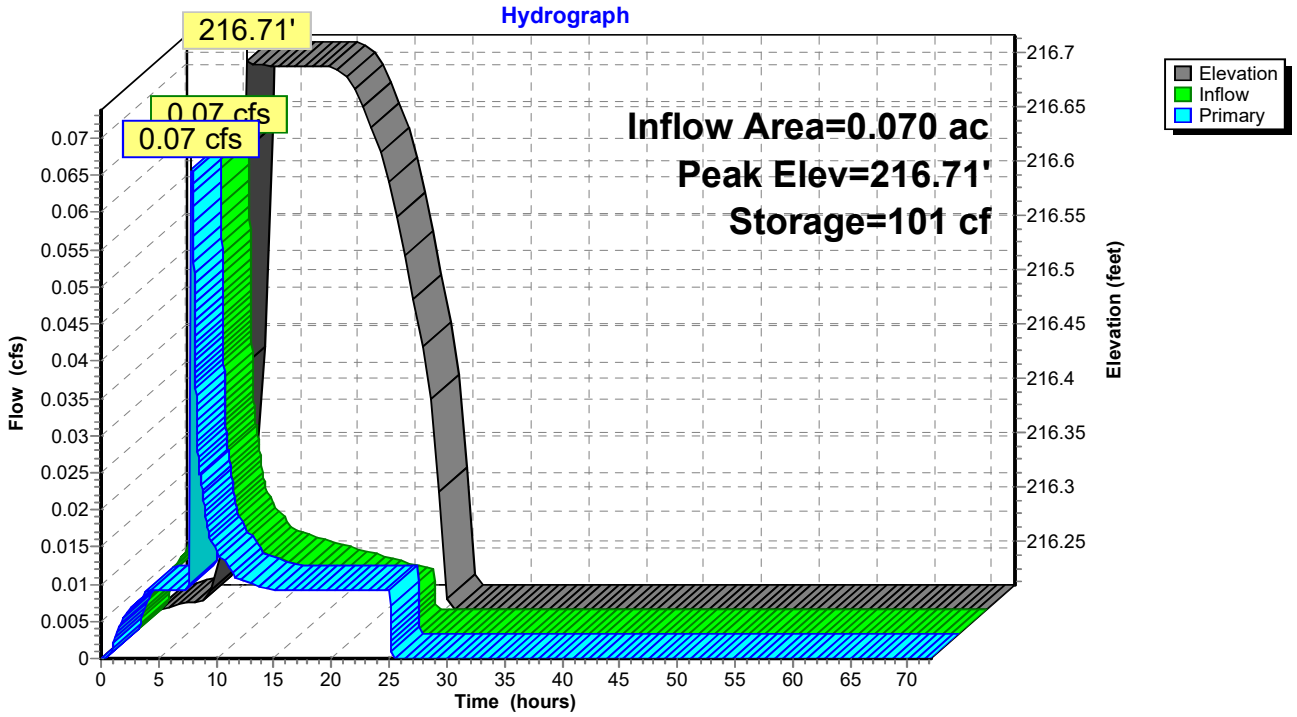
Volume	Invert	Avail.Storage	Storage Description
#1	216.21'	166 cf	**Ponding Depth (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
216.21	200	0	0
217.04	200	166	166

Device	Routing	Invert	Outlet Devices
#1	Primary	213.71'	**6.0" Round Culvert** L= 1.0' Ke= 0.500 Inlet / Outlet Invert= 213.71' / 213.70' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	216.21'	**2.000 in/hr Exfiltration over Surface area**
#3	Device 1	216.71'	**6.0" Horiz. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.07 cfs @ 7.88 hrs HW=216.71' (Free Discharge)
└**1=Culvert** (Passes 0.07 cfs of 1.57 cfs potential flow)
  ├**2=Exfiltration** (Exfiltration Controls 0.01 cfs)
  └**3=Orifice/Grate** (Orifice Controls 0.07 cfs @ 0.33 fps)

Pond 2P: PLANTER #2



Summary for Pond 3P: PLANTER #3

Inflow Area = 0.070 ac,100.00% Impervious, Inflow Depth = 3.77" for 25 YEAR event
Inflow = 0.07 cfs @ 7.88 hrs, Volume= 0.022 af
Outflow = 0.07 cfs @ 7.88 hrs, Volume= 0.022 af, Atten= 0%, Lag= 0.3 min
Primary = 0.07 cfs @ 7.88 hrs, Volume= 0.022 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 216.78' @ 7.88 hrs Surf.Area= 200 sf Storage= 101 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 96.8 min (756.3 - 659.5)

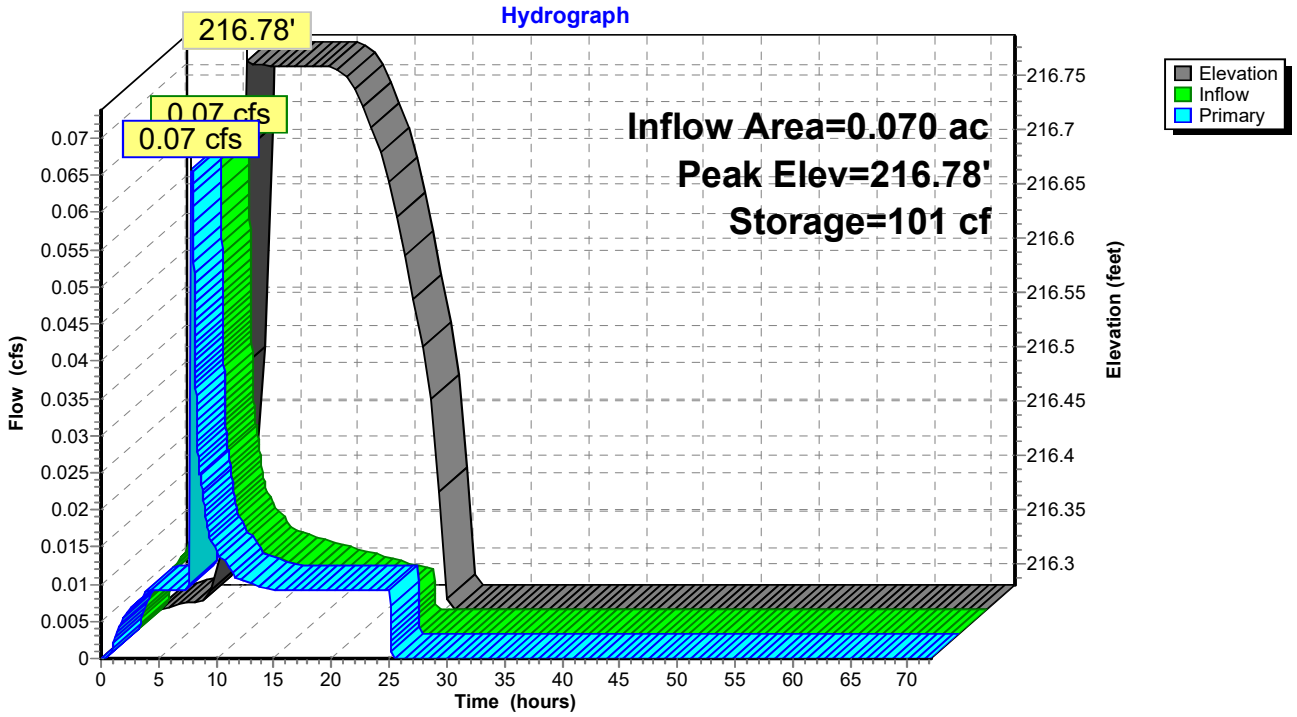
Volume	Invert	Avail.Storage	Storage Description
#1	216.28'	166 cf	**Ponding Depth (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
216.28	200	0	0
217.11	200	166	166

Device	Routing	Invert	Outlet Devices
#1	Primary	213.78'	**6.0" Round Culvert** L= 1.0' Ke= 0.500 Inlet / Outlet Invert= 213.78' / 213.77' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	216.28'	**2.000 in/hr Exfiltration over Surface area**
#3	Device 1	216.78'	**6.0" Horiz. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.07 cfs @ 7.88 hrs HW=216.78' (Free Discharge)
└**1=Culvert** (Passes 0.07 cfs of 1.57 cfs potential flow)
  ├**2=Exfiltration** (Exfiltration Controls 0.01 cfs)
  └**3=Orifice/Grate** (Orifice Controls 0.07 cfs @ 0.33 fps)

Pond 3P: PLANTER #3



Summary for Pond 4P: PLANTER #4

Inflow Area = 0.039 ac,100.00% Impervious, Inflow Depth = 3.77" for 25 YEAR event
Inflow = 0.04 cfs @ 7.88 hrs, Volume= 0.012 af
Outflow = 0.04 cfs @ 7.88 hrs, Volume= 0.012 af, Atten= 0%, Lag= 0.2 min
Primary = 0.04 cfs @ 7.88 hrs, Volume= 0.012 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 217.03' @ 7.88 hrs Surf.Area= 110 sf Storage= 55 cf

Plug-Flow detention time= 96.9 min calculated for 0.012 af (100% of inflow)
Center-of-Mass det. time= 96.9 min (756.5 - 659.5)

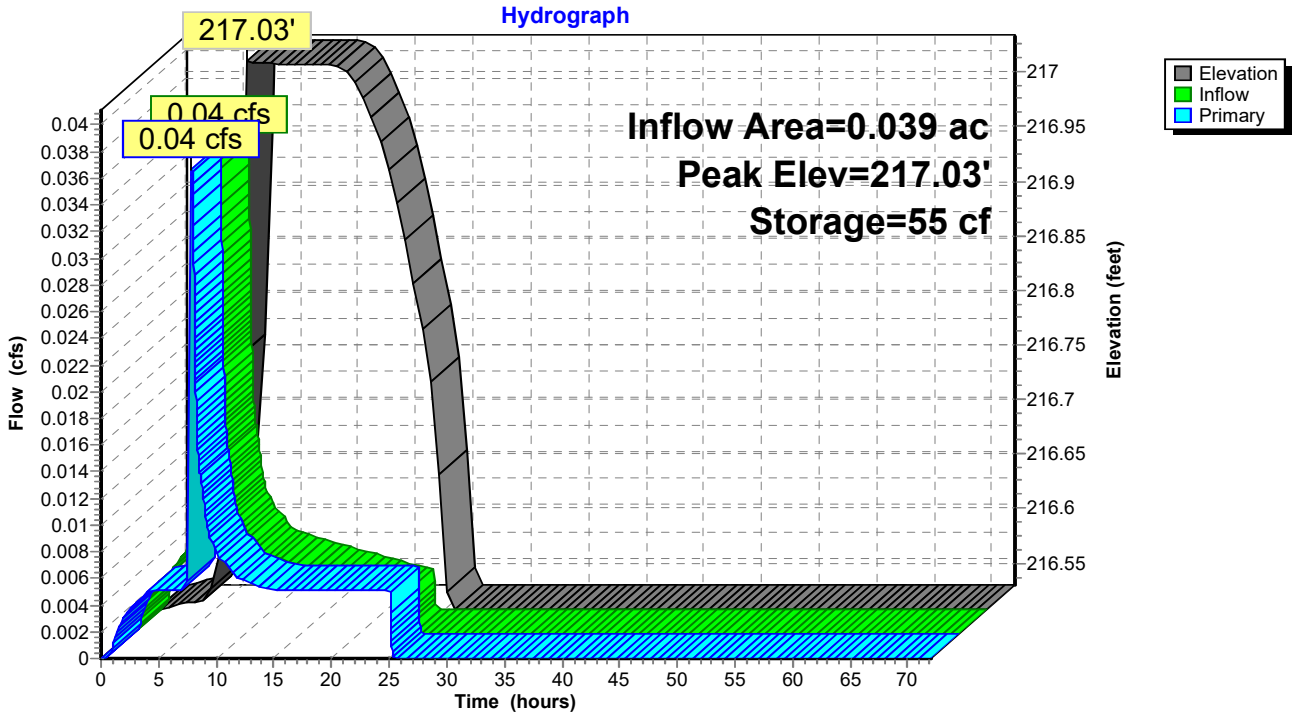
Volume	Invert	Avail.Storage	Storage Description
#1	216.53'	91 cf	**Ponding Depth (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
216.53	110	0	0
217.36	110	91	91

Device	Routing	Invert	Outlet Devices
#1	Primary	214.03'	**6.0" Round Culvert** L= 1.0' Ke= 0.500 Inlet / Outlet Invert= 214.03' / 214.02' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	216.53'	**2.000 in/hr Exfiltration over Surface area**
#3	Device 1	217.03'	**6.0" Horiz. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.05 cfs @ 7.88 hrs HW=217.03' (Free Discharge)
└**1=Culvert** (Passes 0.05 cfs of 1.57 cfs potential flow)
  ├**2=Exfiltration** (Exfiltration Controls 0.01 cfs)
  └**3=Orifice/Grate** (Orifice Controls 0.05 cfs @ 0.25 fps)

Pond 4P: PLANTER #4



Summary for Pond 5P: PLANTER #5

Inflow Area = 0.038 ac,100.00% Impervious, Inflow Depth = 3.77" for 25 YEAR event
Inflow = 0.04 cfs @ 7.88 hrs, Volume= 0.012 af
Outflow = 0.02 cfs @ 8.34 hrs, Volume= 0.012 af, Atten= 54%, Lag= 27.9 min
Primary = 0.02 cfs @ 8.34 hrs, Volume= 0.012 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 212.73' @ 8.34 hrs Surf.Area= 231 sf Storage= 84 cf

Plug-Flow detention time= 61.4 min calculated for 0.012 af (100% of inflow)
Center-of-Mass det. time= 61.4 min (720.9 - 659.5)

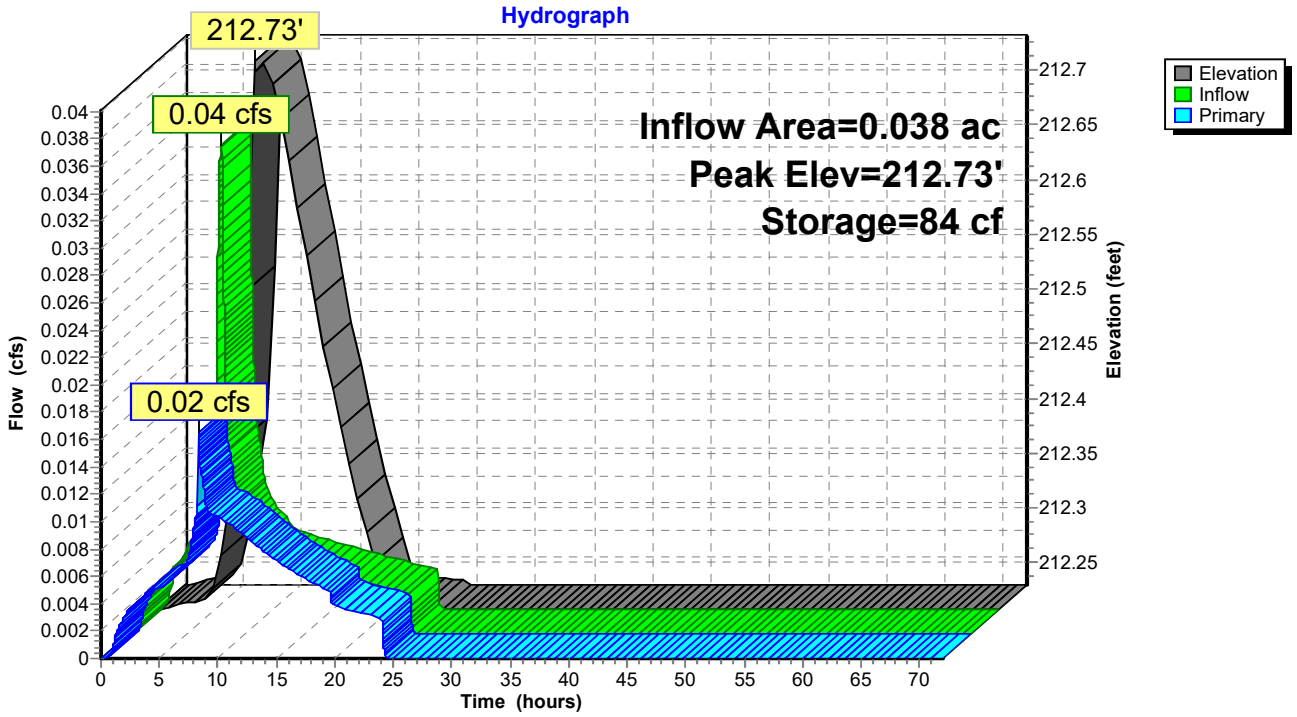
Volume	Invert	Avail.Storage	Storage Description
#1	212.23'	174 cf	**Ponding Depth (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
212.23	104	0	0
213.06	315	174	174

Device	Routing	Invert	Outlet Devices
#1	Primary	209.37'	**6.0" Round Culvert** L= 1.0' Ke= 0.500 Inlet / Outlet Invert= 209.37' / 209.36' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	212.23'	**2.000 in/hr Exfiltration over Surface area**
#3	Device 1	212.73'	**6.0" Horiz. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.03 cfs @ 8.34 hrs HW=212.73' (Free Discharge)
└**1=Culvert** (Passes 0.03 cfs of 1.67 cfs potential flow)
  ├**2=Exfiltration** (Exfiltration Controls 0.01 cfs)
  └**3=Orifice/Grate** (Orifice Controls 0.02 cfs @ 0.11 fps)

Pond 5P: PLANTER #5



Summary for Pond 6P: PLANTER #6

Inflow Area = 0.076 ac,100.00% Impervious, Inflow Depth = 3.77" for 25 YEAR event
Inflow = 0.07 cfs @ 7.88 hrs, Volume= 0.024 af
Outflow = 0.03 cfs @ 8.58 hrs, Volume= 0.024 af, Atten= 62%, Lag= 42.3 min
Primary = 0.03 cfs @ 8.58 hrs, Volume= 0.024 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 212.21' @ 8.58 hrs Surf.Area= 454 sf Storage= 169 cf

Plug-Flow detention time= 61.6 min calculated for 0.024 af (100% of inflow)
Center-of-Mass det. time= 61.6 min (721.2 - 659.5)

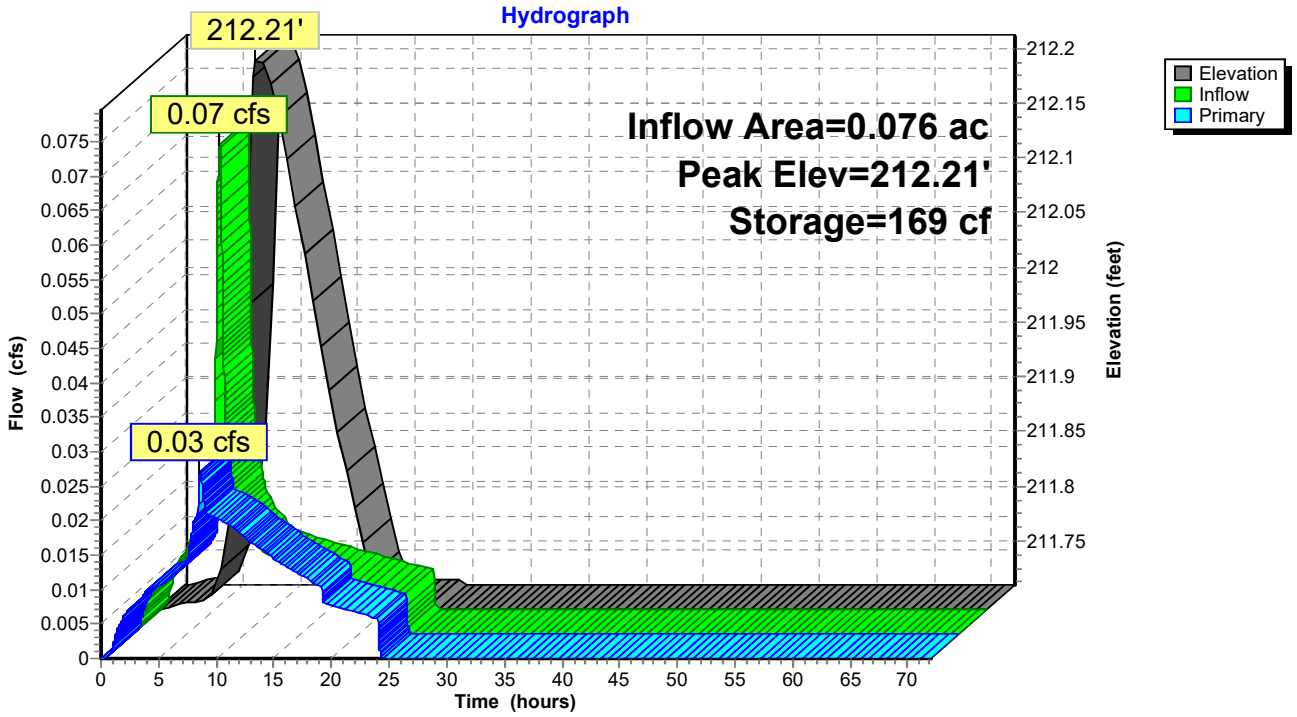
Volume	Invert	Avail.Storage	Storage Description
#1	211.71'	344 cf	**Ponding Depth (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
211.71	221	0	0
212.54	608	344	344

Device	Routing	Invert	Outlet Devices
#1	Primary	209.21'	**6.0" Round Culvert** L= 1.0' Ke= 0.500 Inlet / Outlet Invert= 209.21' / 209.21' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	211.71'	**2.000 in/hr Exfiltration over Surface area**
#3	Device 1	212.21'	**6.0" Horiz. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.04 cfs @ 8.58 hrs HW=212.21' (Free Discharge)
└**1=Culvert** (Passes 0.04 cfs of 1.57 cfs potential flow)
  ├**2=Exfiltration** (Exfiltration Controls 0.02 cfs)
  └**3=Orifice/Grate** (Orifice Controls 0.02 cfs @ 0.11 fps)

Pond 6P: PLANTER #6



Summary for Pond 7P: PLANTER #7

Inflow Area = 0.076 ac,100.00% Impervious, Inflow Depth = 3.77" for 25 YEAR event
Inflow = 0.07 cfs @ 7.88 hrs, Volume= 0.024 af
Outflow = 0.02 cfs @ 8.88 hrs, Volume= 0.024 af, Atten= 67%, Lag= 60.1 min
Primary = 0.02 cfs @ 8.88 hrs, Volume= 0.024 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 210.86' @ 8.88 hrs Surf.Area= 510 sf Storage= 167 cf

Plug-Flow detention time= 53.3 min calculated for 0.024 af (100% of inflow)
Center-of-Mass det. time= 53.3 min (712.9 - 659.5)

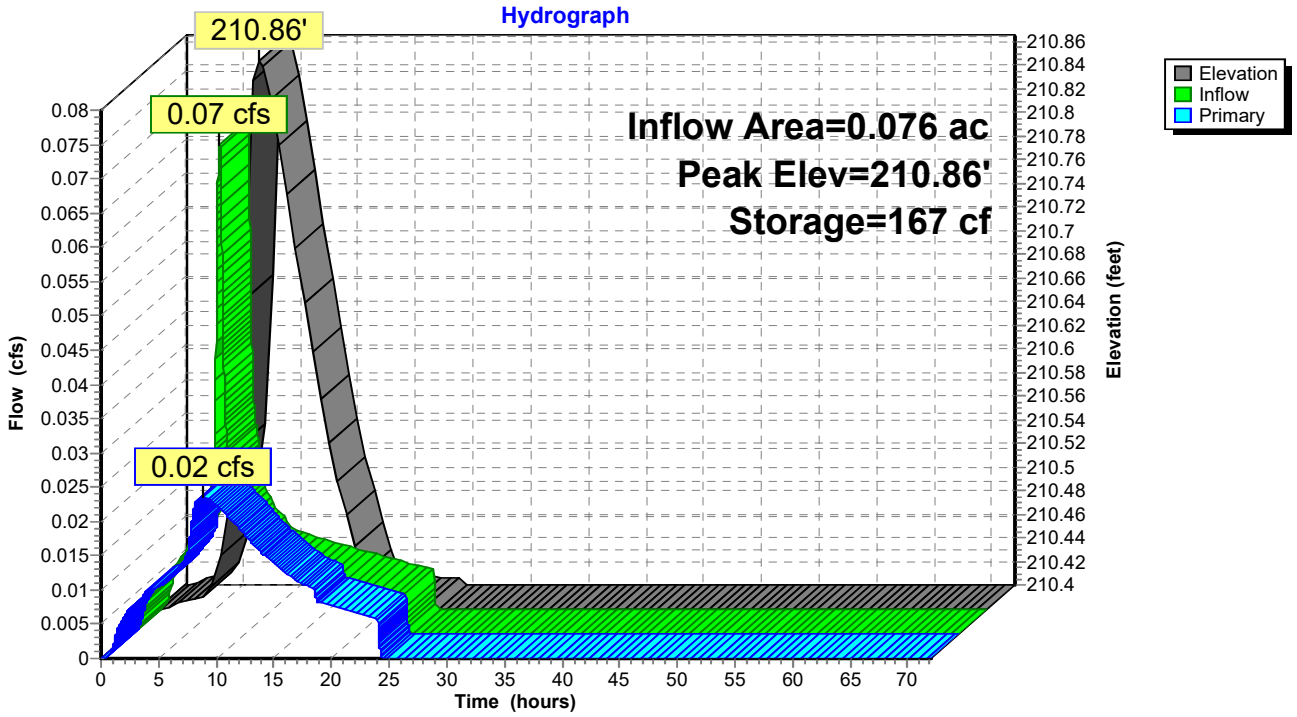
Volume	Invert	Avail.Storage	Storage Description
#1	210.40'	533 cf	**Ponding Depth (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
210.40	208	0	0
211.40	858	533	533

Device	Routing	Invert	Outlet Devices
#1	Primary	207.90'	**6.0" Round Culvert** L= 1.0' Ke= 0.500 Inlet / Outlet Invert= 207.90' / 207.89' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	210.40'	**2.000 in/hr Exfiltration over Surface area**
#3	Device 1	210.90'	**6.0" Horiz. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.02 cfs @ 8.88 hrs HW=210.86' (Free Discharge)
└**1=Culvert** (Passes 0.02 cfs of 1.56 cfs potential flow)
  ├**2=Exfiltration** (Exfiltration Controls 0.02 cfs)
  └**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 7P: PLANTER #7



Summary for Pond 8P: PLANTER #8

Inflow Area = 0.070 ac,100.00% Impervious, Inflow Depth = 3.77" for 25 YEAR event
Inflow = 0.07 cfs @ 7.88 hrs, Volume= 0.022 af
Outflow = 0.07 cfs @ 7.88 hrs, Volume= 0.022 af, Atten= 0%, Lag= 0.3 min
Primary = 0.07 cfs @ 7.88 hrs, Volume= 0.022 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 209.97' @ 7.88 hrs Surf.Area= 203 sf Storage= 102 cf

Plug-Flow detention time= 96.5 min calculated for 0.022 af (100% of inflow)
Center-of-Mass det. time= 96.5 min (756.1 - 659.5)

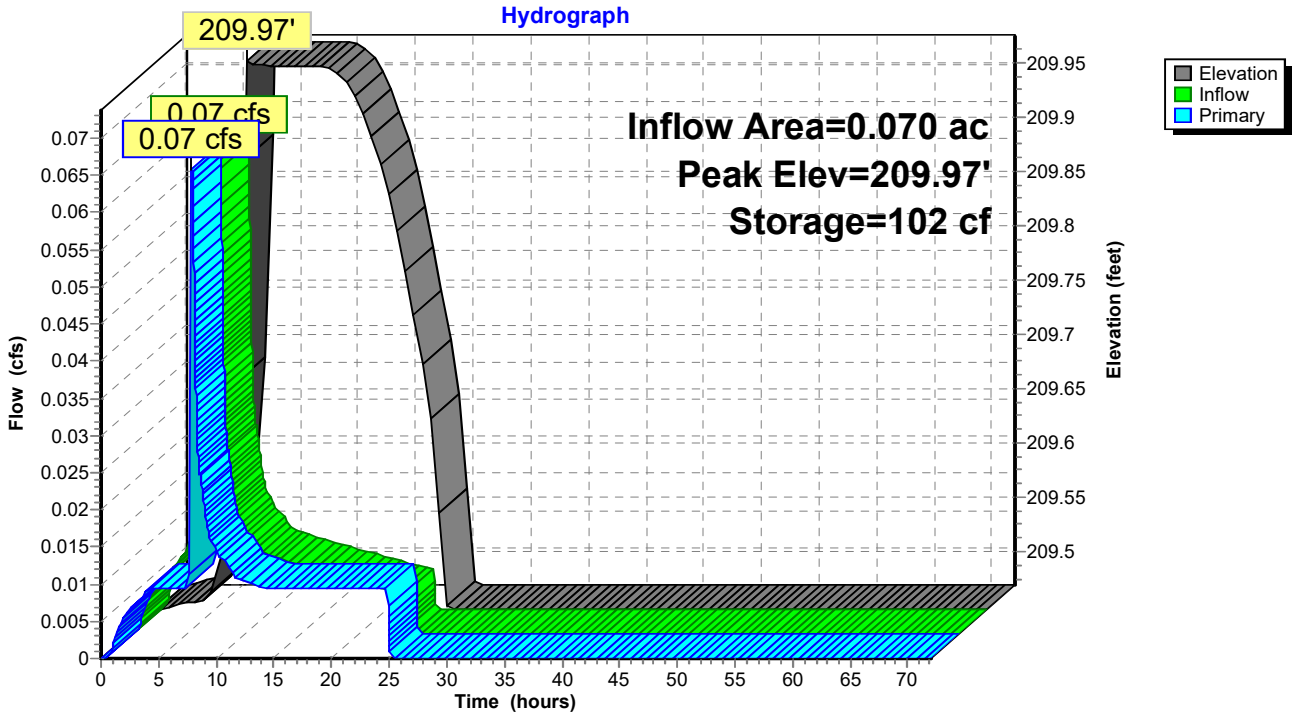
Volume	Invert	Avail.Storage	Storage Description
#1	209.47'	168 cf	**Ponding Depth (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
209.47	203	0	0
210.30	203	168	168

Device	Routing	Invert	Outlet Devices
#1	Primary	206.79'	**6.0" Round Culvert** L= 1.0' Ke= 0.500 Inlet / Outlet Invert= 206.79' / 206.78' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	209.47'	**2.000 in/hr Exfiltration over Surface area**
#3	Device 1	209.97'	**6.0" Horiz. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.07 cfs @ 7.88 hrs HW=209.97' (Free Discharge)
└**1=Culvert** (Passes 0.07 cfs of 1.62 cfs potential flow)
  ├**2=Exfiltration** (Exfiltration Controls 0.01 cfs)
  └**3=Orifice/Grate** (Orifice Controls 0.07 cfs @ 0.33 fps)

Pond 8P: PLANTER #8



Summary for Pond 9P: PLANTER #9

Inflow Area = 0.039 ac,100.00% Impervious, Inflow Depth = 3.77" for 25 YEAR event
Inflow = 0.04 cfs @ 7.88 hrs, Volume= 0.012 af
Outflow = 0.04 cfs @ 7.86 hrs, Volume= 0.012 af, Atten= 0%, Lag= 0.0 min
Primary = 0.04 cfs @ 7.86 hrs, Volume= 0.012 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 209.80' @ 7.86 hrs Surf.Area= 123 sf Storage= 62 cf

Plug-Flow detention time= 93.5 min calculated for 0.012 af (100% of inflow)
Center-of-Mass det. time= 93.5 min (753.0 - 659.5)

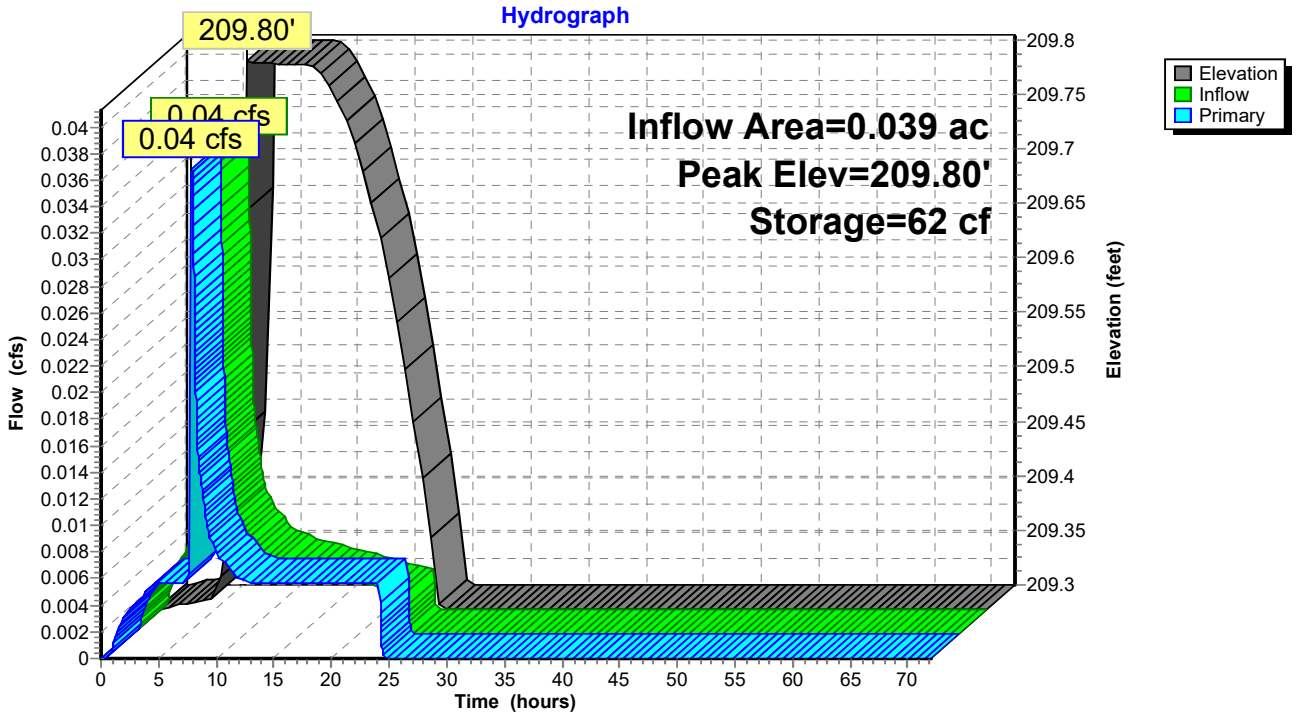
Volume	Invert	Avail.Storage	Storage Description
#1	209.30'	102 cf	**Ponding Depth (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
209.30	123	0	0
210.13	123	102	102

Device	Routing	Invert	Outlet Devices
#1	Primary	206.80'	**6.0" Round Culvert** L= 1.0' Ke= 0.500 Inlet / Outlet Invert= 206.80' / 206.79' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	209.30'	**2.000 in/hr Exfiltration over Surface area**
#3	Device 1	209.80'	**6.0" Horiz. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.05 cfs @ 7.86 hrs HW=209.80' (Free Discharge)
└**1=Culvert** (Passes 0.05 cfs of 1.57 cfs potential flow)
  ├**2=Exfiltration** (Exfiltration Controls 0.01 cfs)
  └**3=Orifice/Grate** (Orifice Controls 0.05 cfs @ 0.25 fps)

Pond 9P: PLANTER #9



Summary for Pond 10P: DC-780 Chambers

Inflow Area = 1.666 ac, 79.76% Impervious, Inflow Depth = 3.48" for 25 YEAR event
Inflow = 1.31 cfs @ 7.89 hrs, Volume= 0.483 af
Outflow = 0.65 cfs @ 8.35 hrs, Volume= 0.467 af, Atten= 51%, Lag= 27.2 min
Primary = 0.03 cfs @ 8.35 hrs, Volume= 0.120 af
Secondary = 0.62 cfs @ 8.35 hrs, Volume= 0.348 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 207.60' @ 8.35 hrs Surf.Area= 0.071 ac Storage= 0.132 af
Flood Elev= 208.75' Surf.Area= 0.071 ac Storage= 0.148 af

Plug-Flow detention time= 460.7 min calculated for 0.467 af (97% of inflow)
Center-of-Mass det. time= 436.2 min (1,139.4 - 703.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	204.50'	0.058 af	**34.75'W x 89.06'L x 3.75'H Field A** 0.266 af Overall - 0.089 af Embedded = 0.177 af x 33.0% Voids
#2A	205.25'	0.089 af	**ADS_StormTech DC-780 +Cap** x 84 Inside #1 Effective Size= 45.4"W x 30.0"H => 6.49 sf x 7.12'L = 46.2 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 7 Rows of 12 Chambers
		0.148 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Secondary	204.50'	**10.0" Round Culvert** L= 1.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 204.50' / 204.49' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.55 sf
#2	Primary	204.50'	**0.8" Horiz. 1/2 of 2-YR Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	206.55'	**4.4" Horiz. 2-YR Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	207.26'	**2.5" Horiz. 25-YR Orifice** C= 0.600 Limited to weir flow at low heads
#5	Device 1	207.60'	**10.0" Horiz. Emergency Overflow** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.03 cfs @ 8.35 hrs HW=207.60' (Free Discharge)
└**2=1/2 of 2-YR Orifice** (Orifice Controls 0.03 cfs @ 8.48 fps)

Secondary OutFlow Max=0.62 cfs @ 8.35 hrs HW=207.60' (Free Discharge)
└**1=Culvert** (Passes 0.62 cfs of 3.40 cfs potential flow)
  ├**3=2-YR Orifice** (Orifice Controls 0.52 cfs @ 4.94 fps)
  ├**4=25-YR Orifice** (Orifice Controls 0.10 cfs @ 2.82 fps)
  └**5=Emergency Overflow** (Weir Controls 0.00 cfs @ 0.18 fps)

Pond 10P: DC-780 Chambers - Chamber Wizard Field A

Chamber Model = ADS_StormTech DC-780 +Cap (ADS StormTech® DC-780 with cap length)
Effective Size= 45.4"W x 30.0"H => 6.49 sf x 7.12'L = 46.2 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

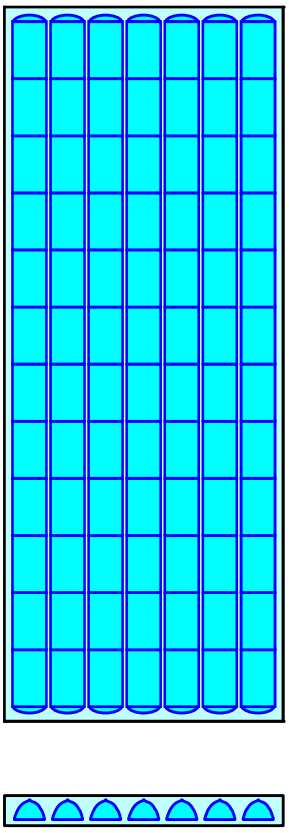
12 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 87.06' Row Length +12.0" End Stone x 2 = 89.06' Base Length
7 Rows x 51.0" Wide + 6.0" Spacing x 6 + 12.0" Side Stone x 2 = 34.75' Base Width
9.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.75' Field Height

84 Chambers x 46.2 cf = 3,884.1 cf Chamber Storage

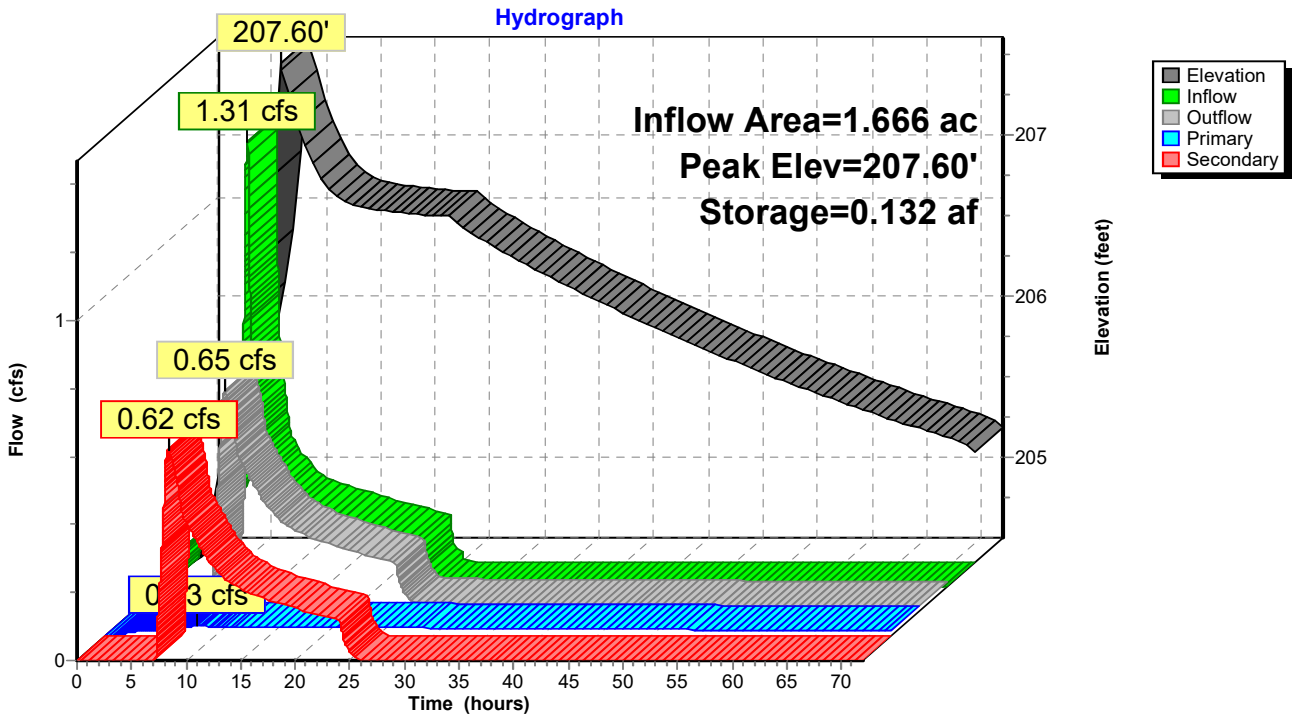
11,605.2 cf Field - 3,884.1 cf Chambers = 7,721.1 cf Stone x 33.0% Voids = 2,548.0 cf Stone Storage

Chamber Storage + Stone Storage = 6,432.0 cf = 0.148 af
Overall Storage Efficiency = 55.4%
Overall System Size = 89.06' x 34.75' x 3.75'

84 Chambers
429.8 cy Field
286.0 cy Stone



Pond 10P: DC-780 Chambers



Summary for Pond 11P: PLANTER #10

Inflow Area = 0.145 ac,100.00% Impervious, Inflow Depth = 3.77" for 25 YEAR event
Inflow = 0.14 cfs @ 7.88 hrs, Volume= 0.045 af
Outflow = 0.11 cfs @ 8.05 hrs, Volume= 0.045 af, Atten= 17%, Lag= 10.3 min
Primary = 0.11 cfs @ 8.05 hrs, Volume= 0.045 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 217.69' @ 8.05 hrs Surf.Area= 608 sf Storage= 269 cf

Plug-Flow detention time= 76.5 min calculated for 0.045 af (100% of inflow)
Center-of-Mass det. time= 76.5 min (736.1 - 659.5)

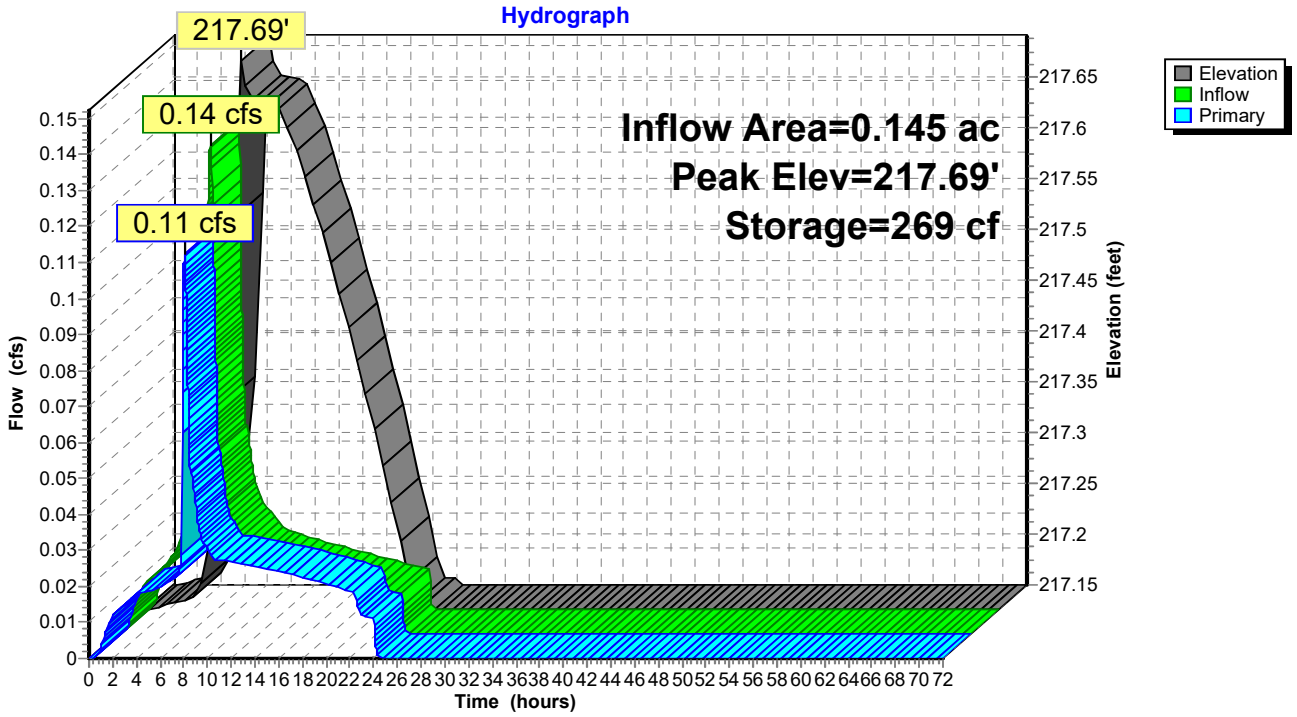
Volume	Invert	Avail.Storage	Storage Description
#1	217.15'	592 cf	**Ponding Depth (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
217.15	388	0	0
218.15	795	592	592

Device	Routing	Invert	Outlet Devices
#1	Primary	217.00'	**4.0" Round Culvert** L= 1.0' Ke= 0.500 Inlet / Outlet Invert= 217.00' / 216.99' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.09 sf
#2	Device 1	217.65'	**4.0" Horiz. Orifice/Grate** C= 0.600
#3	Device 1	217.15'	**2.000 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.11 cfs @ 8.05 hrs HW=217.69' (Free Discharge)
└**1=Culvert** (Passes 0.11 cfs of 0.30 cfs potential flow)
  └**2=Orifice/Grate** (Orifice Controls 0.08 cfs @ 0.97 fps)
  └**3=Exfiltration** (Exfiltration Controls 0.03 cfs)

Pond 11P: PLANTER #10



APPENDIX F
STORMWATER QUALITY CALCULATIONS AND PAC

AKS ENGINEERING & FORESTRY, LLC.
12965 SW HERMAN ROAD, SUITE 100
TUALATIN, OR 97062
503-563-6151

Date: 3/16/2018
Designed by: AMC
Checked by: CEG

1306 N Springbrook Rd

StormFilter Manhole Sizing

STORMFILTER® DESIGN PARAMETERS

Number of Cartridges Required:

$N=Q_{treat}\,(449_{gpm/cfs} / Q_{cart\ gpm/cart})$

Q_{treat} = Water Quality Volume (WQV)

$Q_{cart\ gpm/cart}$ = Treatment per Cartridge = 15 $_{gpm/cart}$

StormFilter Sizing		
Area Requiring Treatment	33,528 SF	
Water Quality Stormwater Event	1.0 inches falling in 24 hr	
WQF (See Hydrograph)	0.16 CFS	
Cartridge Required	$N=Q_{treat}\,(449_{gpm/cfs} / Q_{cart\ gpm/cart})$	$N=Q_{treat}\,(449_{gpm/cfs} / 15_{cart\ gpm/cart})$
	N= 4.79 cart	5 SINGLE CARTRIDGE STORMFILTER

PAC Report

Project Name 1306 N Springbrook Rd	Permit No.	Created 9/28/17 1:54 PM
Project Address 1306 N Springbrook Rd Newberg, OR 97132	Designer AMC	Last Modified 3/28/18 3:36 PM
	Company AKS Engineering & Forestry	Report Generated 3/28/18 3:36 PM

Project Summary

Determine minimum area of water quality facilities for south buildings

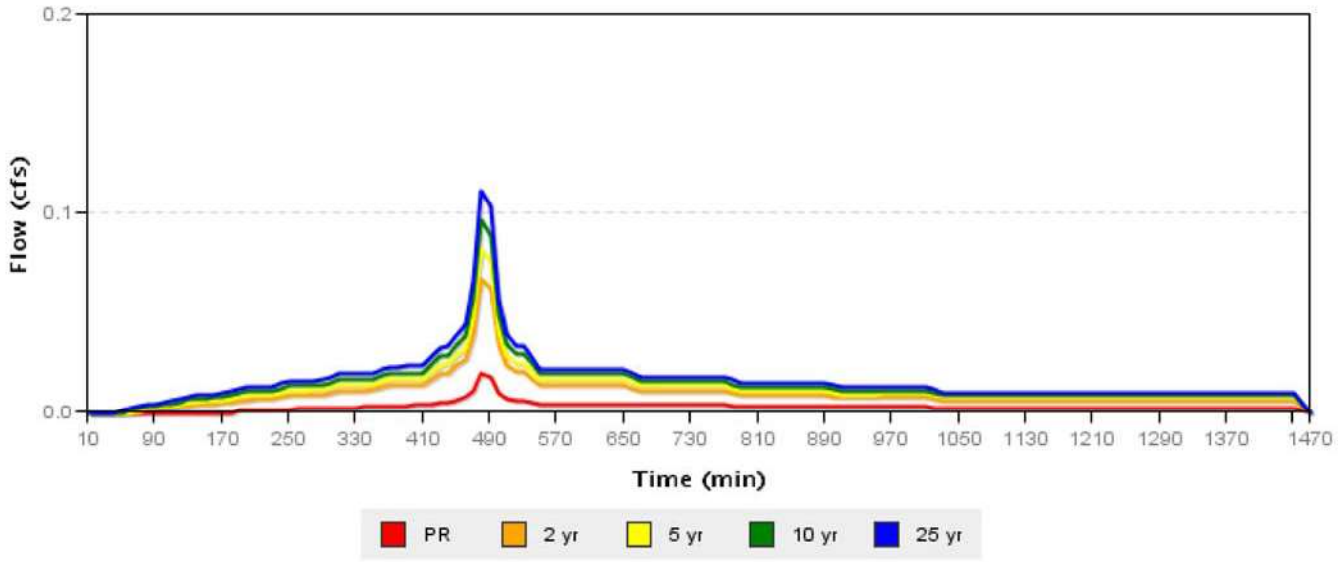
Catchment Name	Impervious Area (sq ft)	Native Soil Design Infiltration Rate	Hierarchy Category	Facility Type	Facility Config	Facility Size (sq ft)	Facility Sizing Ratio	PR Results	Flow Control Results
South Building	4750	0.00	3	Planter (Flat)	D	418	6.4%	Pass	Fail
Middle Building	8258	0.00	3	Basin	D	533	16.1%	Pass	Fail
Northern Building	9551	0.00	3	Planter (Flat)	D	616	6.2%	Pass	Fail
Public Planter	6300	0.00	3	Basin	D	388	11.7%	Pass	Pass

Catchment South Building

Site Soils & Infiltration Testing Data	Infiltration Testing Procedure	**Open Pit Falling Head**
	Native Soil Infiltration Rate (I_{test})	**0.00** ⚠
Correction Factor	CF_{test}	**2**
Design Infiltration Rates	Native Soil (I_{dsgn})	**0.00 in/hr** ⚠
	Imported Growing Medium	**2.00 in/hr**
Catchment Information	Hierarchy Category	**3**
	Disposal Point	**B**
	Hierarchy Description	**Off-site flow to drainageway, river, or storm-only pipe system**
	Pollution Reduction Requirement	**Pass**
	10-year Storm Requirement	**N/A**
	Flow Control Requirement	**If discharging to an overland drainage system or to a storm sewer that discharges to an overland drainage system, including streams, drainageways, and ditches, the 2-year post-development peak flow must be equal or less than half of the 2-year pre-development rate and the 5, 10, and 25-year post-development peak rate must be equal or less than the pre-development rates for the corresponding design storms.**
	Impervious Area	**4750 sq ft** **0.109 acre**
	Time of Concentration (Tc)	**5**
	Pre-Development Curve Number (CN_{pre})	**80**
	Post-Development Curve Number (CN_{post})	**98**

⚠ Indicates value is outside of recommended range

SBUH Results



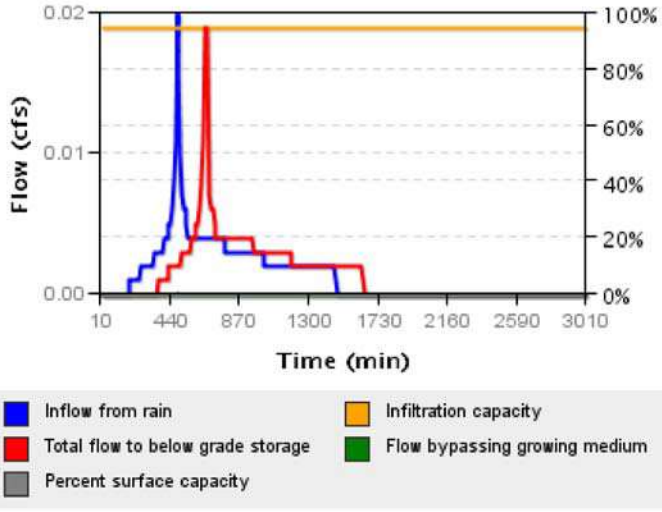
	Pre-Development Rate and Volume		Post-Development Rate and Volume	
	Peak Rate (cfs)	Volume (cf)	Peak Rate (cfs)	Volume (cf)
PR	0	15.232	0.02	248.201
2 yr	0.019	324.763	0.067	859.493
5 yr	0.029	465.306	0.082	1056.36
10 yr	0.041	616.474	0.097	1253.521
25 yr	0.054	775.565	0.111	1450.869

Facility South Building

Facility Details	Facility Type	**Planter (Flat)**
	Facility Configuration	**D: Lined Facility with RS and Ud**
	Facility Shape	**Planter**
	Above Grade Storage Data	
	Bottom Area	**418 sq ft**
	Bottom Width	**5.00 ft**
	Storage Depth 1	**12.0 in**
	Growing Medium Depth	**18 in**
	Surface Capacity at Depth 1	**418.0 cu ft**
	Design Infiltration Rate for Native Soil	**0.000 in/hr**
	Infiltration Capacity	**0.019 cfs**
Facility Facts	Total Facility Area Including Freeboard	**418.00 sq ft**
	Sizing Ratio	**6.4%**
Pollution Reduction Results	Pollution Reduction Score	**Pass**
	Overflow Volume	**342.420 cf**
	Surface Capacity Used	**2%**
Flow Control Results	Flow Control Score	**Fail**
	Overflow Volume	**1718.651 cf**
	Surface Capacity Used	**100%**

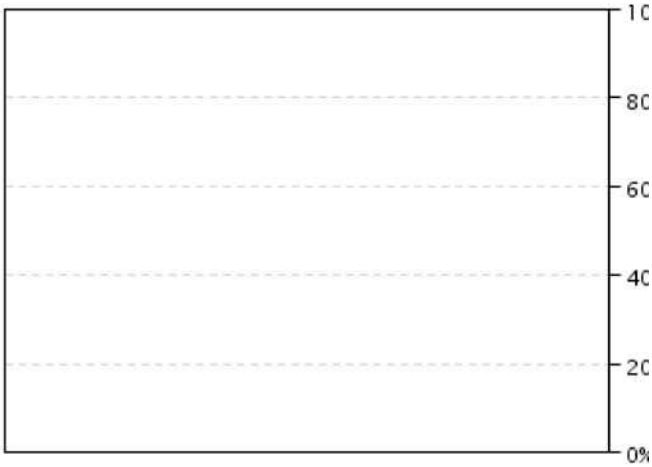
	Post-development outflow (cfs)		Pre-development inflow (cfs)	
2 year	0.019	≤ ½ of	0.019	**Fail**
5 year	0.019	≤	0.029	**Pass**
10 year	0.019	≤	0.041	**Pass**
25 year	0.019	≤	0.054	**Pass**

Pollution Reduction Event Surface Facility Modeling

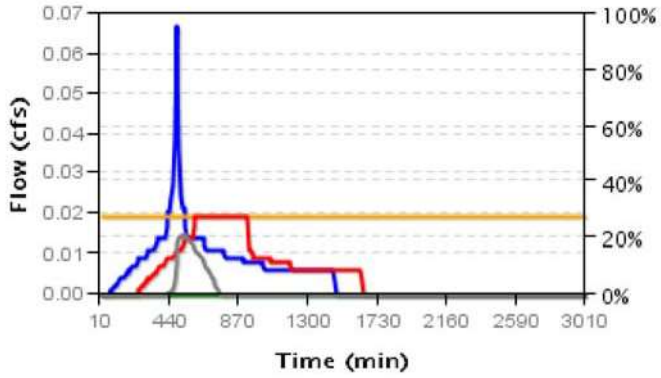


Inflow from rain
Total flow to below grade storage
Percent surface capacity
Infiltration capacity
Flow bypassing growing medium

Pollution Reduction Event Below Grade Modeling

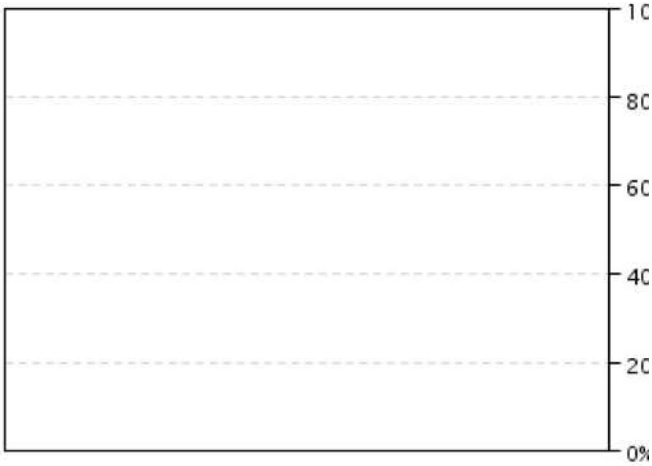


2 Year Event Surface Facility Modeling

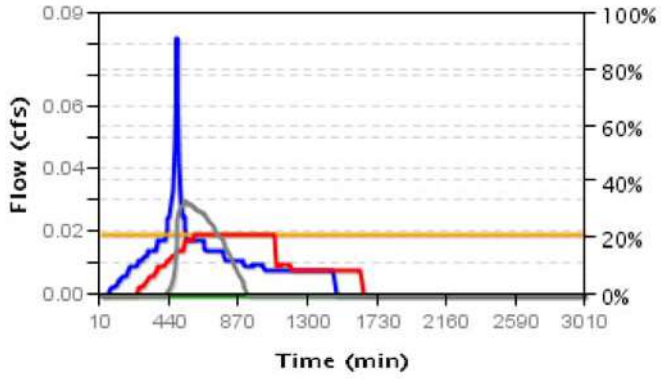


Inflow from rain
Total flow to below grade storage
Percent surface capacity
Infiltration capacity
Flow bypassing growing medium

2 Year Event Below Grade Modeling

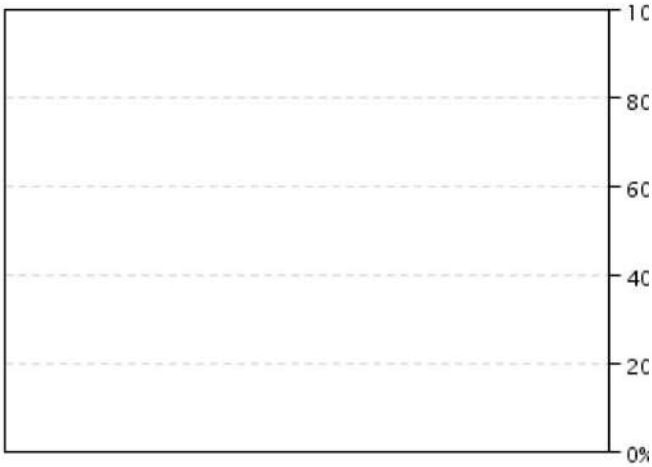


5 Year Event Surface Facility Modeling

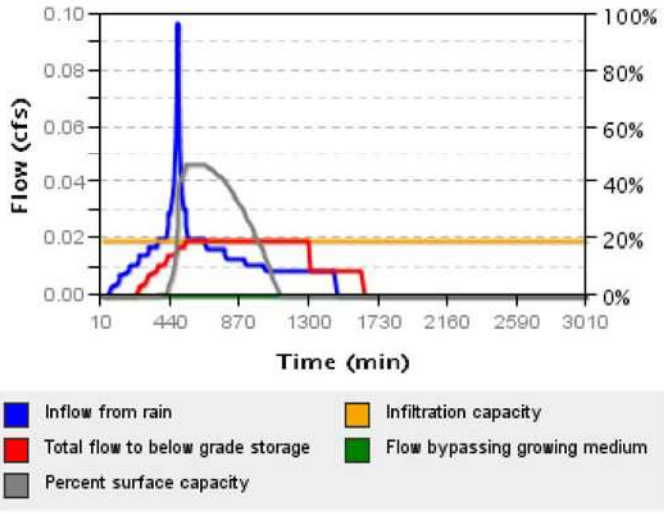


Inflow from rain
Total flow to below grade storage
Percent surface capacity
Infiltration capacity
Flow bypassing growing medium

5 Year Event Below Grade Modeling

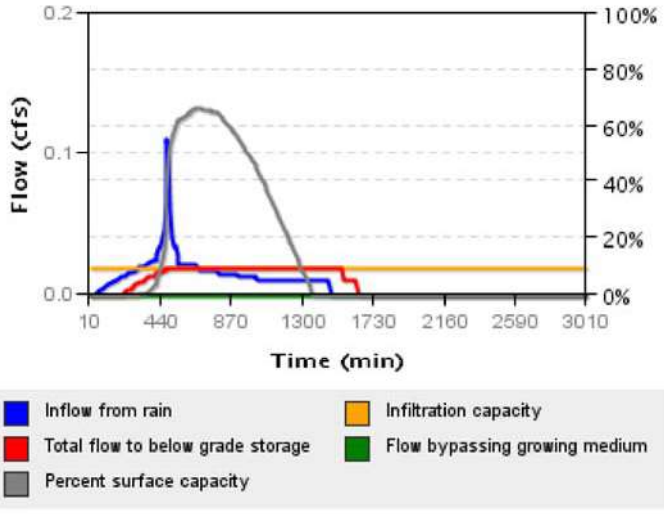


10 Year Event Surface Facility Modeling

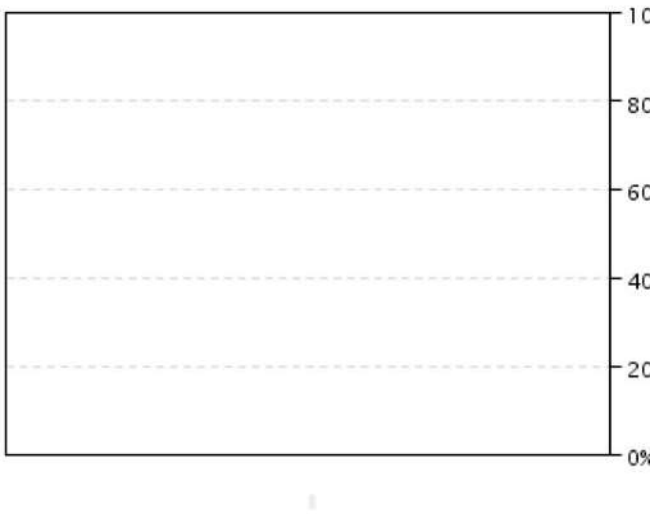


10 Year Event Below Grade Modeling

25 Year Event Surface Facility Modeling



25 Year Event Below Grade Modeling

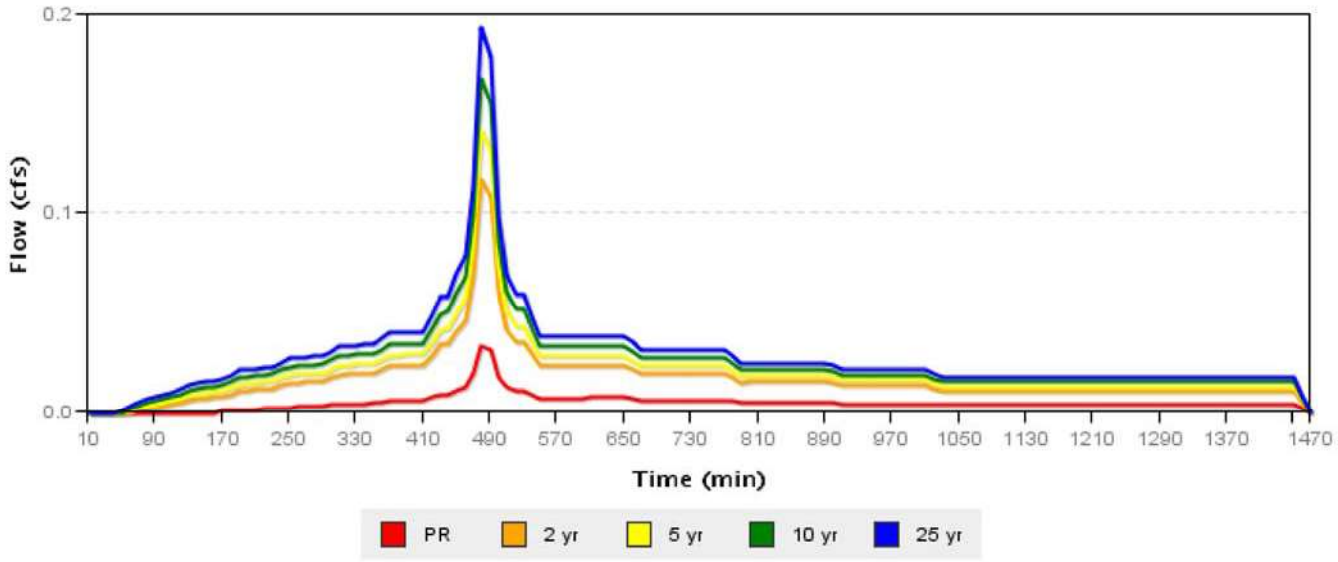


Catchment Middle Building

Site Soils & Infiltration Testing Data	Infiltration Testing Procedure	**Open Pit Falling Head**
	Native Soil Infiltration Rate (I_{test})	**0.00** ⚠
Correction Factor	CF_{test}	**2**
Design Infiltration Rates	Native Soil (I_{dsgn})	**0.00 in/hr** ⚠
	Imported Growing Medium	**2.00 in/hr**
Catchment Information	Hierarchy Category	**3**
	Disposal Point	**B**
	Hierarchy Description	**Off-site flow to drainageway, river, or storm-only pipe system**
	Pollution Reduction Requirement	**Pass**
	10-year Storm Requirement	**N/A**
	Flow Control Requirement	**If discharging to an overland drainage system or to a storm sewer that discharges to an overland drainage system, including streams, drainageways, and ditches, the 2-year post-development peak flow must be equal or less than half of the 2-year pre-development rate and the 5, 10, and 25-year post-development peak rate must be equal or less than the pre-development rates for the corresponding design storms.**
	Impervious Area	**8258 sq ft** **0.190 acre**
	Time of Concentration (Tc)	**5**
	Pre-Development Curve Number (CN_{pre})	**80**
	Post-Development Curve Number (CN_{post})	**98**

⚠ Indicates value is outside of recommended range

SBUH Results



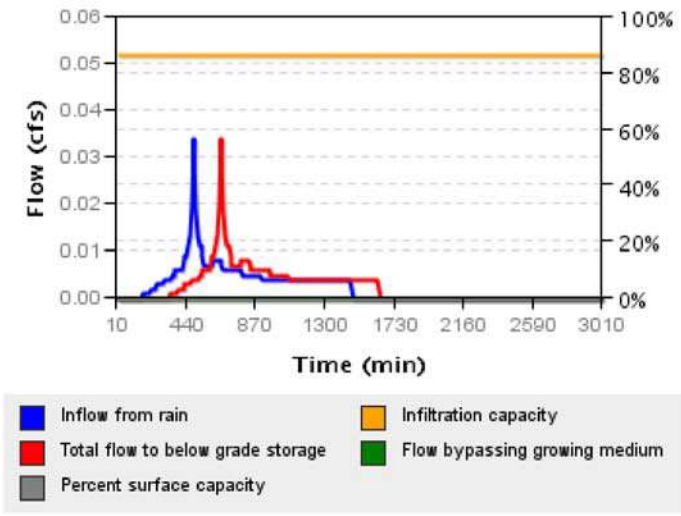
	Pre-Development Rate and Volume		Post-Development Rate and Volume	
	Peak Rate (cfs)	Volume (cf)	Peak Rate (cfs)	Volume (cf)
PR	0.001	26.481	0.034	431.504
2 yr	0.033	564.609	0.117	1494.251
5 yr	0.051	808.947	0.142	1836.509
10 yr	0.071	1071.756	0.168	2179.28
25 yr	0.094	1348.34	0.194	2522.373

Facility Middle Building

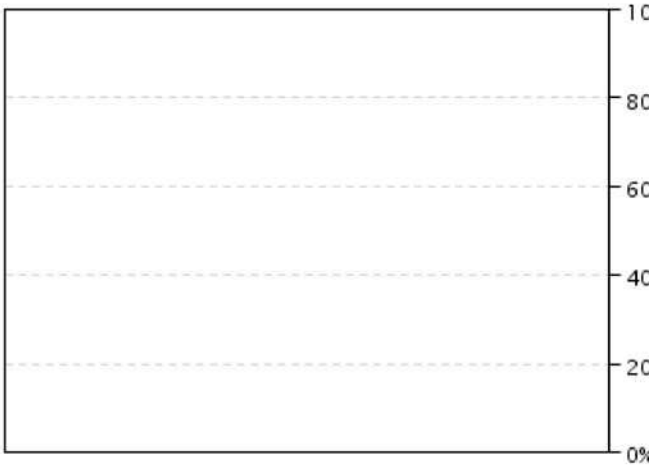
Facility Details	Facility Type	**Basin**
	Facility Configuration	**D: Lined Facility with RS and Ud**
	Facility Shape	**Rectangle**
	Above Grade Storage Data	
	Bottom Area	**533 sq ft**
	Bottom Width	**6.00 ft**
	Side Slope	**4.0:1**
	Storage Depth 1	**12.0 in**
	Growing Medium Depth	**18 in**
	Freeboard Depth	**0.00 in**
	Surface Capacity at Depth 1	**929.1 cu ft**
	Design Infiltration Rate for Native Soil	**0.000 in/hr**
	Infiltration Capacity	**0.052 cfs**
Facility Facts	Total Facility Area Including Freeboard	**1341.93 sq ft**
	Sizing Ratio	**16.1%**
Pollution Reduction Results	Pollution Reduction Score	**Pass**
	Overflow Volume	**434.900 cf**
	Surface Capacity Used	**0%**
Flow Control Results	Flow Control Score	**Fail**
	Overflow Volume	**2191.178 cf**
	Surface Capacity Used	**22%**

	Post-development outflow (cfs)		Pre-development inflow (cfs)	
2 year	0.052	≤ ½ of	0.033	**Fail**
5 year	0.052	≤	0.051	**Fail**
10 year	0.052	≤	0.071	**Pass**
25 year	0.052	≤	0.094	**Pass**

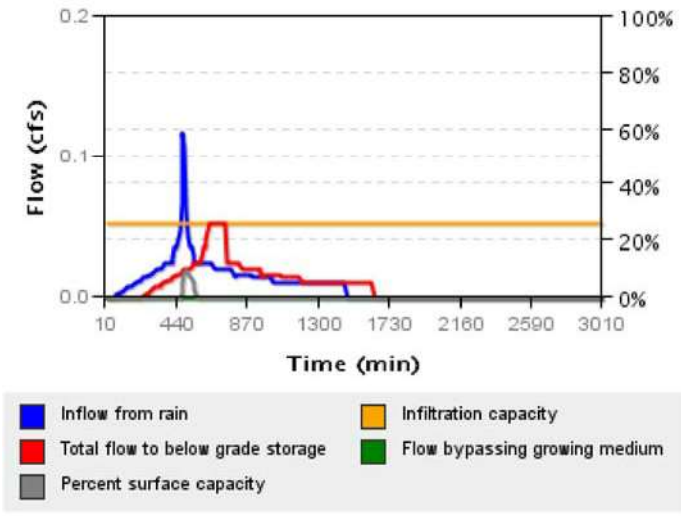
Pollution Reduction Event Surface Facility Modeling



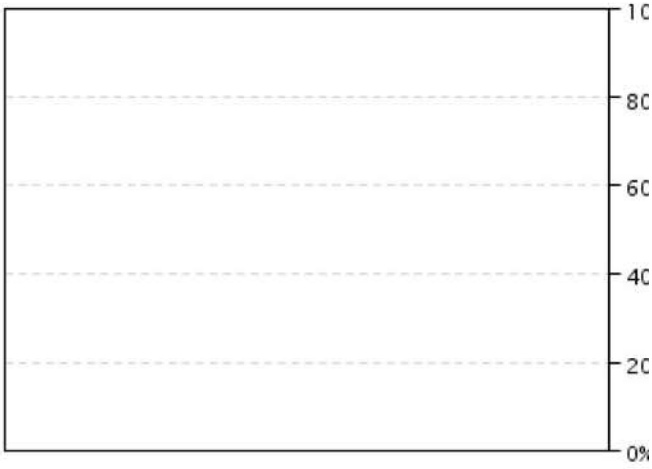
Pollution Reduction Event Below Grade Modeling



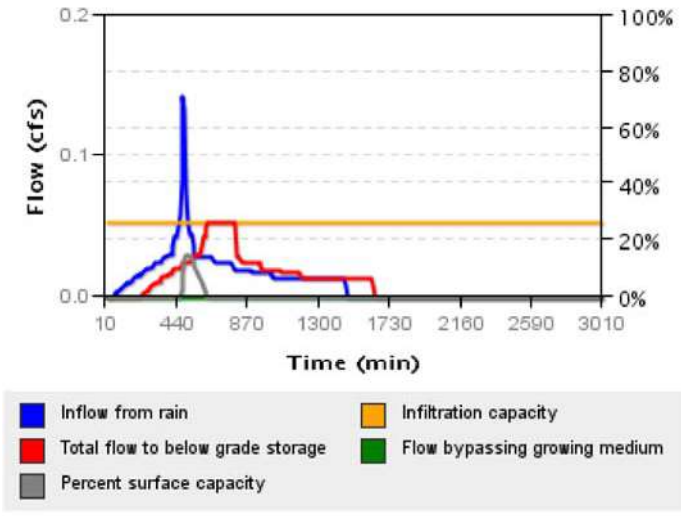
2 Year Event Surface Facility Modeling



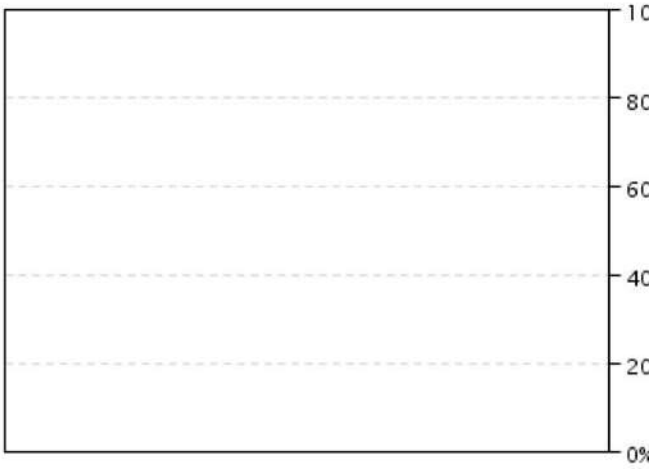
2 Year Event Below Grade Modeling



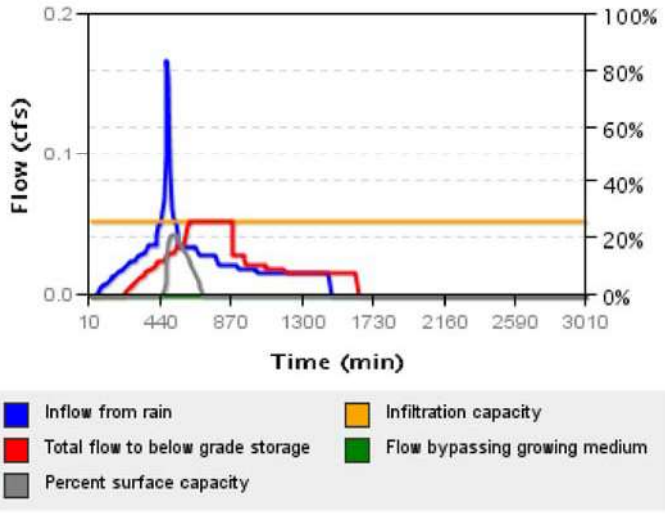
5 Year Event Surface Facility Modeling



5 Year Event Below Grade Modeling

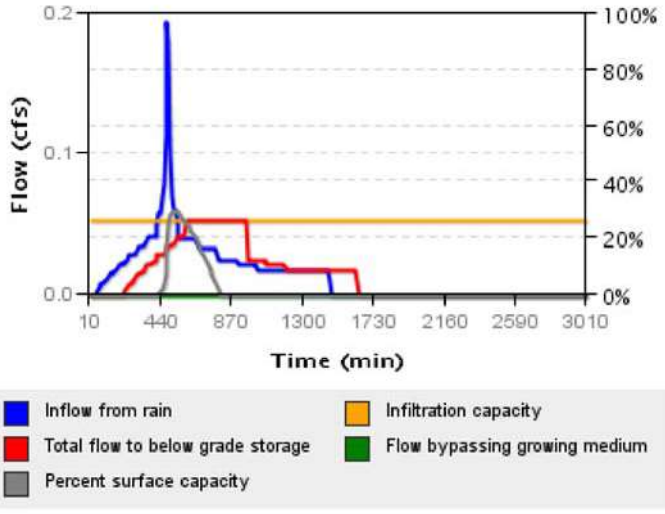


10 Year Event Surface Facility Modeling

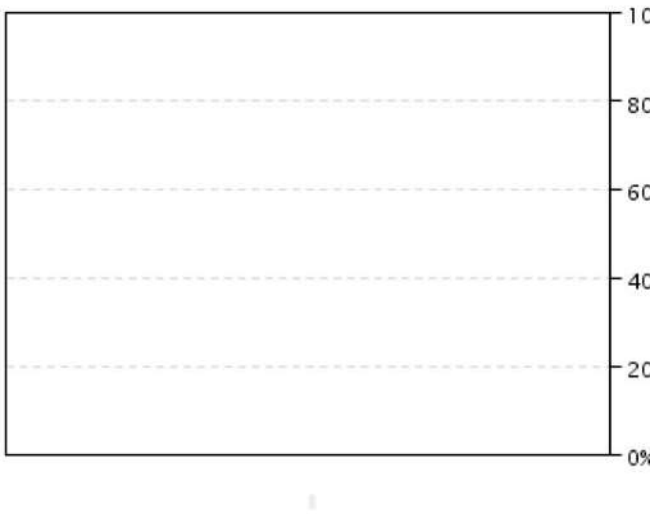


10 Year Event Below Grade Modeling

25 Year Event Surface Facility Modeling



25 Year Event Below Grade Modeling

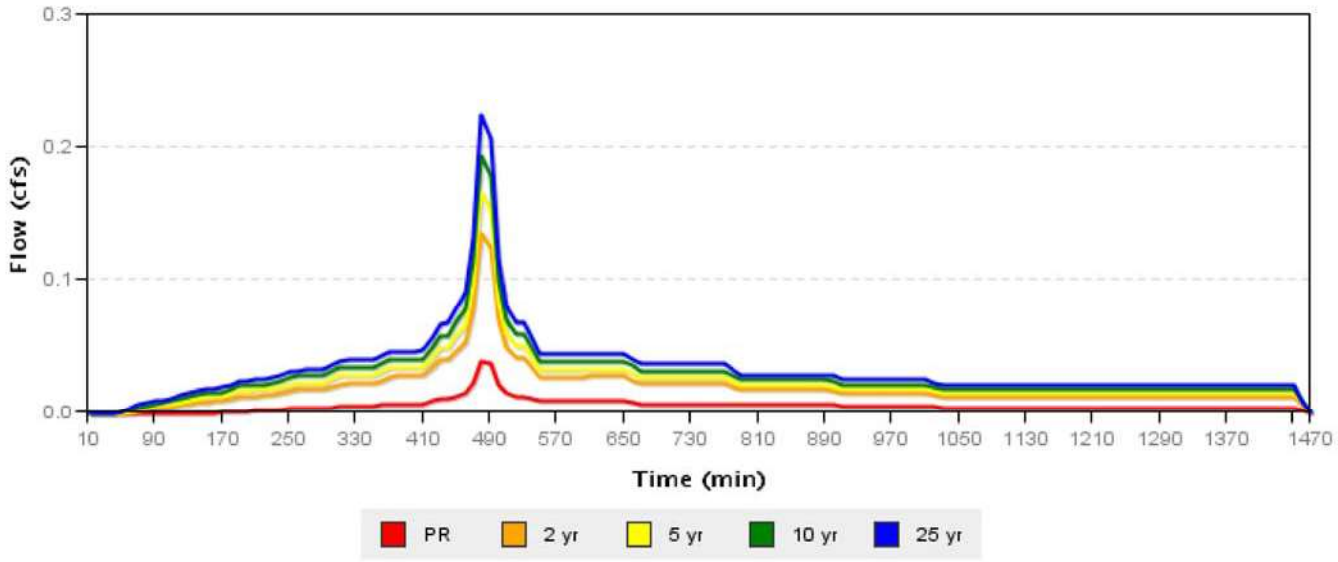


Catchment Northern Building

Site Soils & Infiltration Testing Data	Infiltration Testing Procedure	**Open Pit Falling Head**
	Native Soil Infiltration Rate (I_{test})	**0.00** ⚠
Correction Factor	CF_{test}	**2**
Design Infiltration Rates	Native Soil (I_{dsgn})	**0.00 in/hr** ⚠
	Imported Growing Medium	**2.00 in/hr**
Catchment Information	Hierarchy Category	**3**
	Disposal Point	**B**
	Hierarchy Description	**Off-site flow to drainageway, river, or storm-only pipe system**
	Pollution Reduction Requirement	**Pass**
	10-year Storm Requirement	**N/A**
	Flow Control Requirement	**If discharging to an overland drainage system or to a storm sewer that discharges to an overland drainage system, including streams, drainageways, and ditches, the 2-year post-development peak flow must be equal or less than half of the 2-year pre-development rate and the 5, 10, and 25-year post-development peak rate must be equal or less than the pre-development rates for the corresponding design storms.**
	Impervious Area	**9551 sq ft** **0.219 acre**
	Time of Concentration (Tc)	**5**
	Pre-Development Curve Number (CN_{pre})	**80**
	Post-Development Curve Number (CN_{post})	**98**

⚠ Indicates value is outside of recommended range

SBUH Results



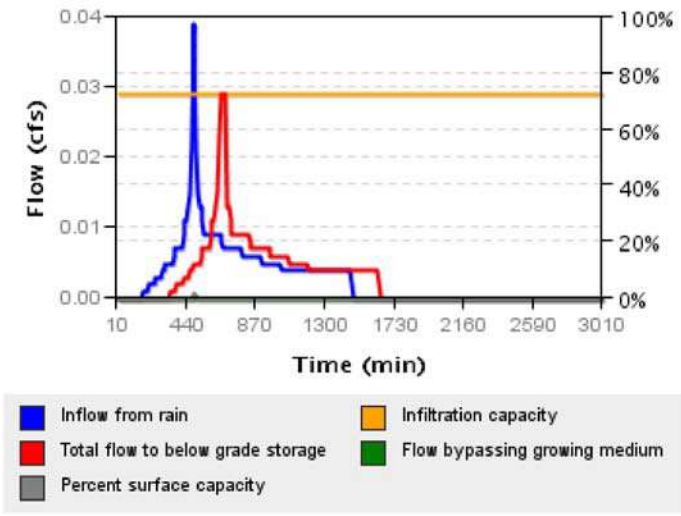
	Pre-Development Rate and Volume		Post-Development Rate and Volume	
	Peak Rate (cfs)	Volume (cf)	Peak Rate (cfs)	Volume (cf)
PR	0.001	30.627	0.039	499.067
2 yr	0.038	653.013	0.135	1728.214
5 yr	0.059	935.608	0.165	2124.062
10 yr	0.082	1239.567	0.194	2520.501
25 yr	0.109	1559.457	0.224	2917.315

Facility Northern Building

Facility Details	Facility Type	**Planter (Flat)**
	Facility Configuration	**D: Lined Facility with RS and Ud**
	Facility Shape	**Planter**
	Above Grade Storage Data	
	Bottom Area	**616 sq ft**
	Bottom Width	**4.00 ft**
	Storage Depth 1	**12.0 in**
	Growing Medium Depth	**18 in**
	Surface Capacity at Depth 1	**616.0 cu ft**
	Design Infiltration Rate for Native Soil	**0.000 in/hr**
	Infiltration Capacity	**0.029 cfs**
Facility Facts	Total Facility Area Including Freeboard	**616.00 sq ft**
	Sizing Ratio	**6.2%**
Pollution Reduction Results	Pollution Reduction Score	**Pass**
	Overflow Volume	**516.746 cf**
	Surface Capacity Used	**2%**
Flow Control Results	Flow Control Score	**Fail**
	Overflow Volume	**2616.397 cf**
	Surface Capacity Used	**100%**

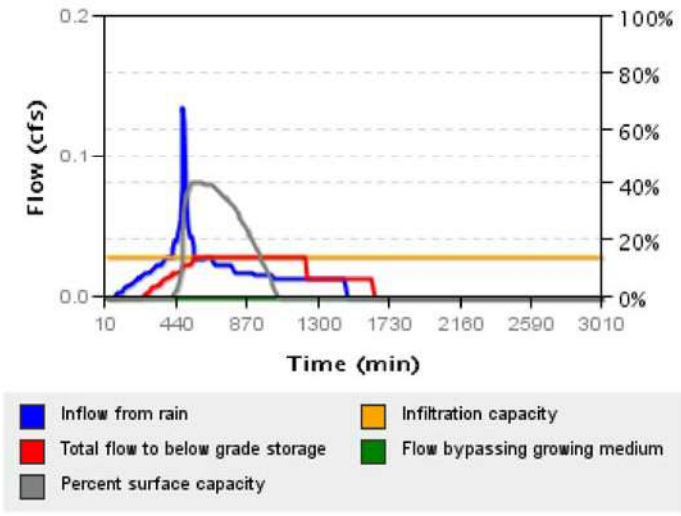
	Post-development outflow (cfs)		Pre-development inflow (cfs)	
2 year	0.029	≤ ½ of	0.038	**Fail**
5 year	0.029	≤	0.059	**Pass**
10 year	0.032	≤	0.082	**Pass**
25 year	0.08	≤	0.109	**Pass**

Pollution Reduction Event Surface Facility Modeling

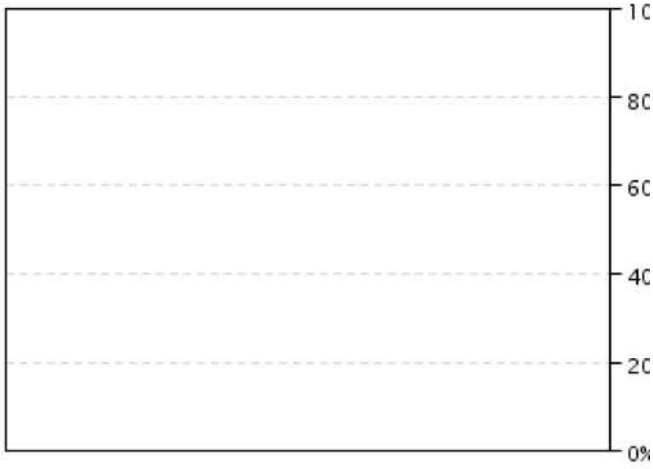


Pollution Reduction Event Below Grade Modeling

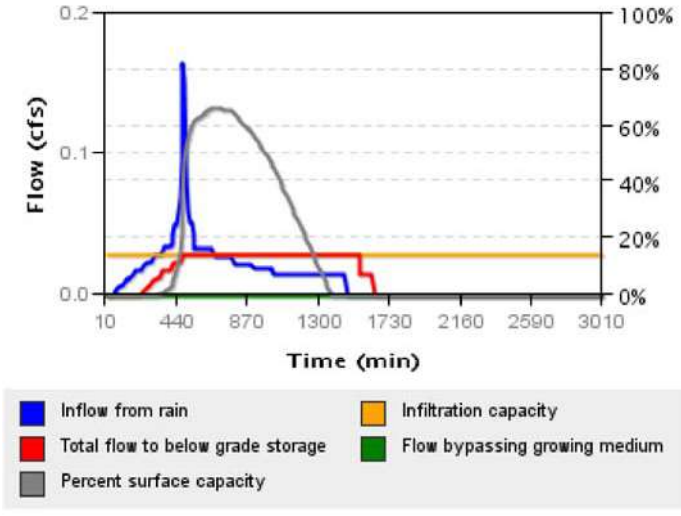
2 Year Event Surface Facility Modeling



2 Year Event Below Grade Modeling

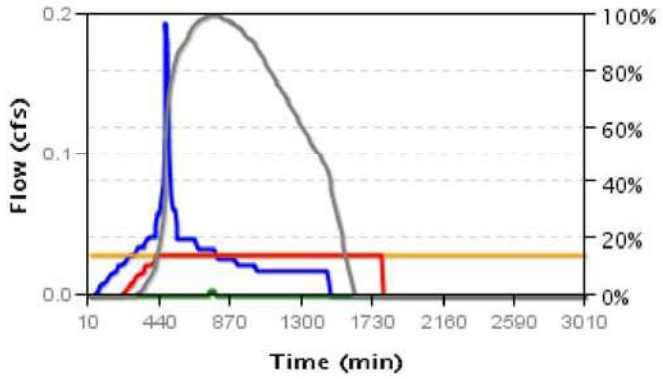


5 Year Event Surface Facility Modeling



5 Year Event Below Grade Modeling

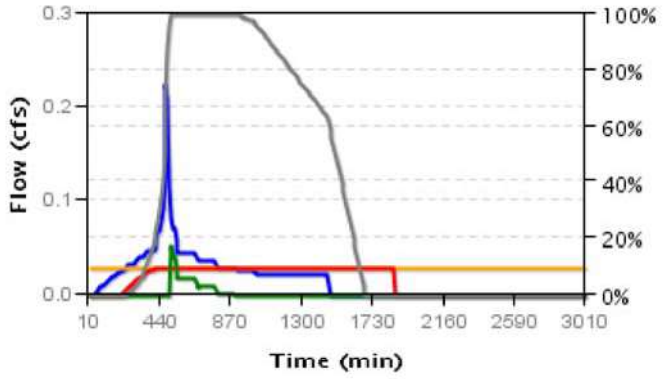
10 Year Event Surface Facility Modeling



Inflow from rain
Infiltration capacity
Total flow to below grade storage
Flow bypassing growing medium
Percent surface capacity

10 Year Event Below Grade Modeling

25 Year Event Surface Facility Modeling



Inflow from rain
Infiltration capacity
Total flow to below grade storage
Flow bypassing growing medium
Percent surface capacity

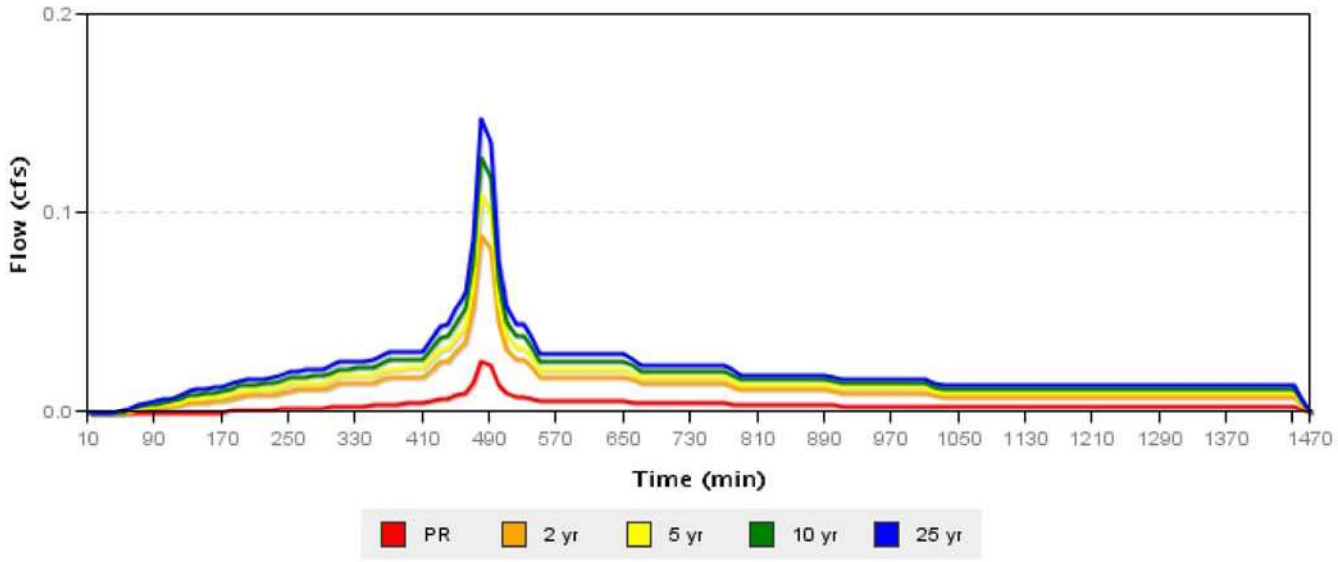
25 Year Event Below Grade Modeling

Catchment Public Planter

Site Soils & Infiltration Testing Data	Infiltration Testing Procedure	**Open Pit Falling Head**
	Native Soil Infiltration Rate (I_{test})	**0.00** ⚠
Correction Factor	CF_{test}	**2**
Design Infiltration Rates	Native Soil (I_{dsgn})	**0.00 in/hr** ⚠
	Imported Growing Medium	**2.00 in/hr**
Catchment Information	Hierarchy Category	**3**
	Disposal Point	**B**
	Hierarchy Description	**Off-site flow to drainageway, river, or storm-only pipe system**
	Pollution Reduction Requirement	**Pass**
	10-year Storm Requirement	**N/A**
	Flow Control Requirement	**If discharging to an overland drainage system or to a storm sewer that discharges to an overland drainage system, including streams, drainageways, and ditches, the 2-year post-development peak flow must be equal or less than half of the 2-year pre-development rate and the 5, 10, and 25-year post-development peak rate must be equal or less than the pre-development rates for the corresponding design storms.**
	Impervious Area	**6300 sq ft** **0.145 acre**
	Time of Concentration (Tc)	**5**
	Pre-Development Curve Number (CN_{pre})	**98**
	Post-Development Curve Number (CN_{post})	**98**

⚠ Indicates value is outside of recommended range

SBUH Results



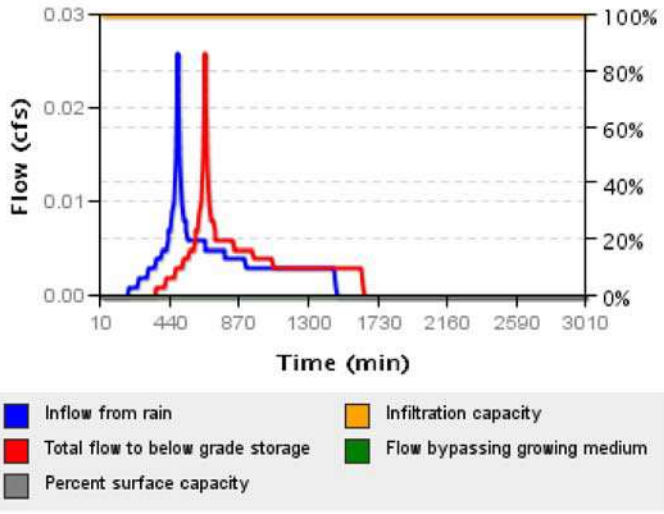
	Pre-Development Rate and Volume		Post-Development Rate and Volume	
	Peak Rate (cfs)	Volume (cf)	Peak Rate (cfs)	Volume (cf)
PR	0.026	329.193	0.026	329.193
2 yr	0.089	1139.959	0.089	1139.959
5 yr	0.109	1401.067	0.109	1401.067
10 yr	0.128	1662.565	0.128	1662.565
25 yr	0.148	1924.31	0.148	1924.31

Facility Public Planter

Facility Details	Facility Type	**Basin**
	Facility Configuration	**D: Lined Facility with RS and Ud**
	Facility Shape	**Amoeba**
	Above Grade Storage Data	
	Bottom Area	**388 sq ft**
	Bottom Perimeter Length	**88.00 ft**
	Side Slope	**4.0:1**
	Storage Depth 1	**12.0 in**
	Growing Medium Depth	**18 in**
	Freeboard Depth	**0.00 in**
	Surface Capacity at Depth 1	**564.0 cu ft**
	Design Infiltration Rate for Native Soil	**0.000 in/hr**
	Infiltration Capacity	**0.030 cfs**
Facility Facts	Total Facility Area Including Freeboard	**740.00 sq ft**
	Sizing Ratio	**11.7%**
Pollution Reduction Results	Pollution Reduction Score	**Pass**
	Overflow Volume	**329.193 cf**
	Surface Capacity Used	**0%**
Flow Control Results	Flow Control Score	**Pass**
	Overflow Volume	**1659.273 cf**
	Surface Capacity Used	**38%**

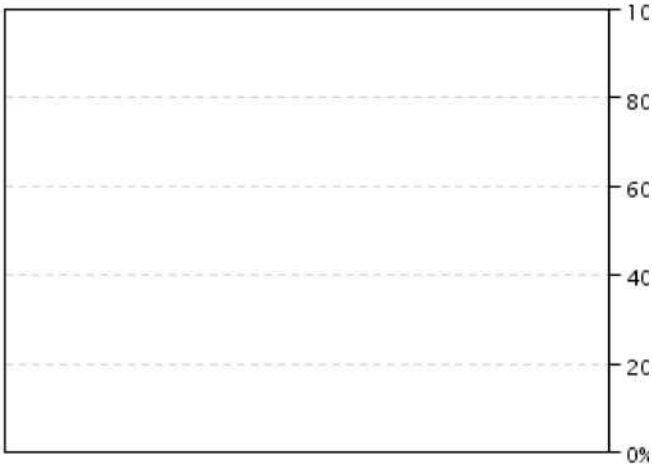
	Post-development outflow (cfs)		Pre-development inflow (cfs)	
2 year	0.03	≤ ½ of	0.089	**Pass**
5 year	0.03	≤	0.109	**Pass**
10 year	0.03	≤	0.128	**Pass**
25 year	0.03	≤	0.148	**Pass**

Pollution Reduction Event Surface Facility Modeling

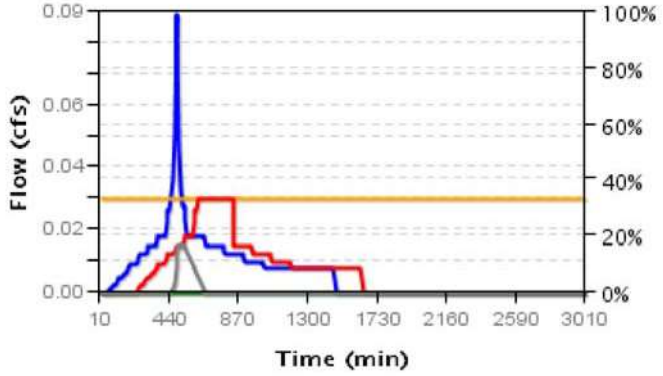


Inflow from rain
Infiltration capacity
Total flow to below grade storage
Flow bypassing growing medium
Percent surface capacity

Pollution Reduction Event Below Grade Modeling

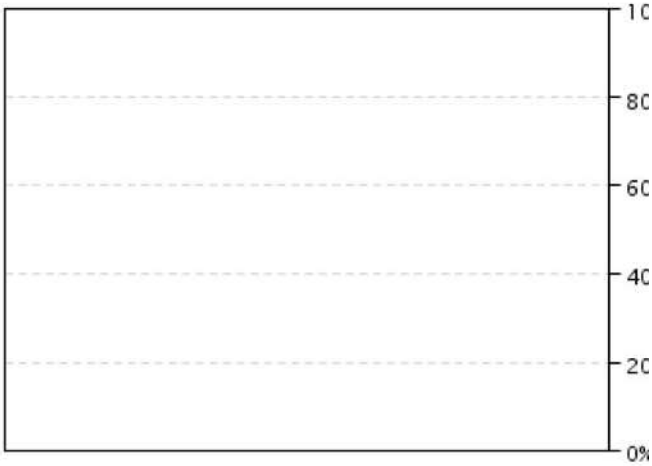


2 Year Event Surface Facility Modeling

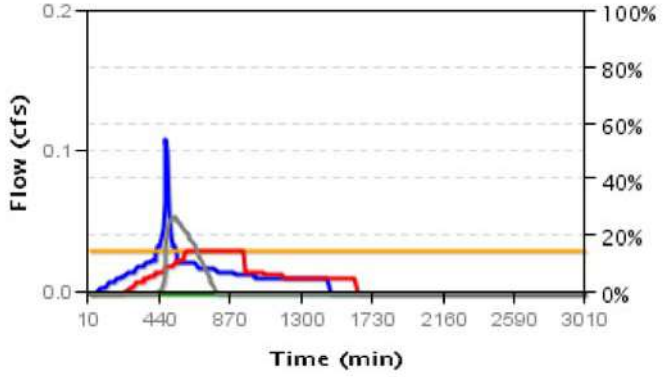


Inflow from rain
Infiltration capacity
Total flow to below grade storage
Flow bypassing growing medium
Percent surface capacity

2 Year Event Below Grade Modeling

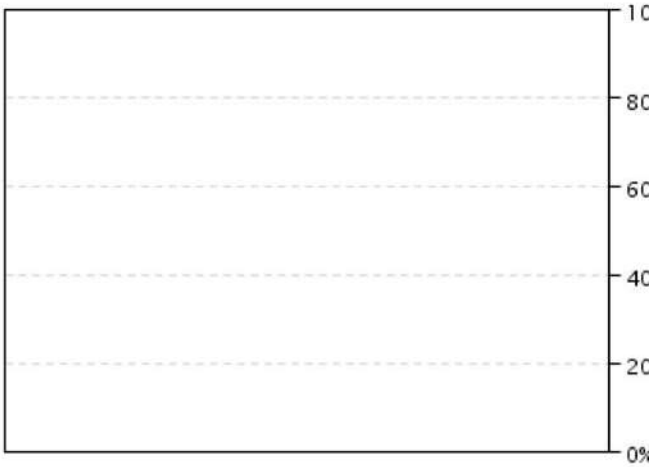


5 Year Event Surface Facility Modeling

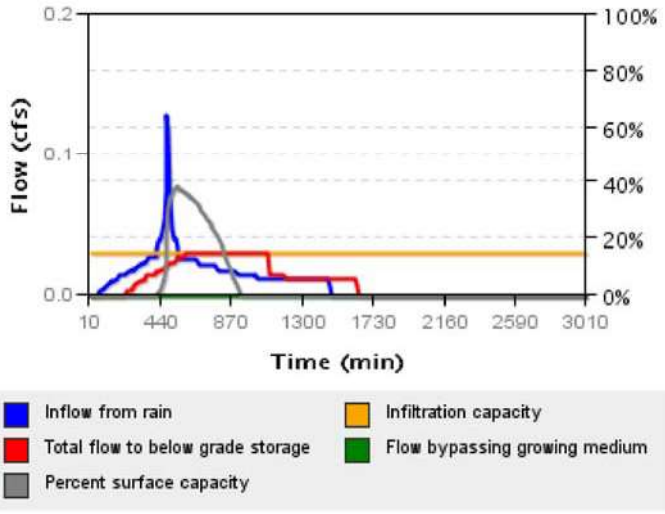


Inflow from rain
Infiltration capacity
Total flow to below grade storage
Flow bypassing growing medium
Percent surface capacity

5 Year Event Below Grade Modeling

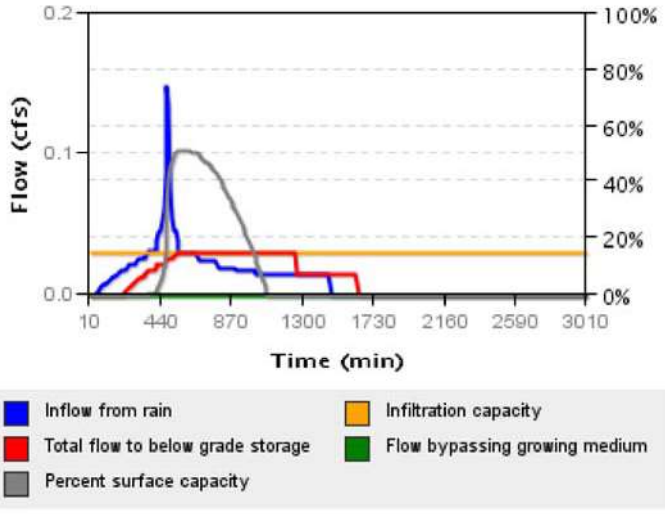


10 Year Event Surface Facility Modeling

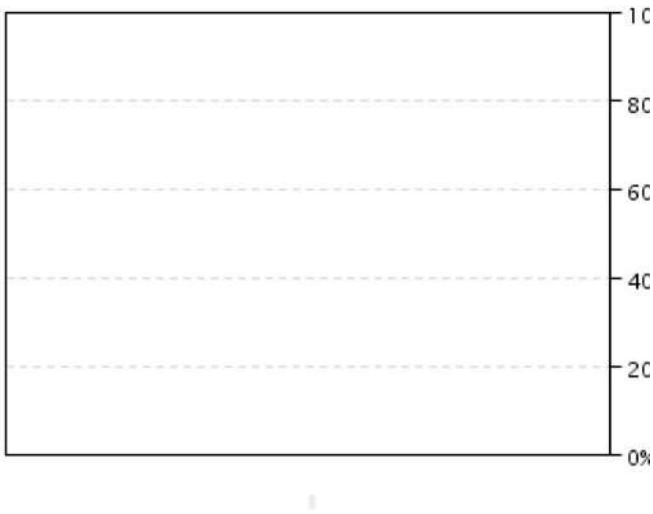


10 Year Event Below Grade Modeling

25 Year Event Surface Facility Modeling



25 Year Event Below Grade Modeling



APPENDIX G
USDA-NRCS SOIL RESOURCE REPORT

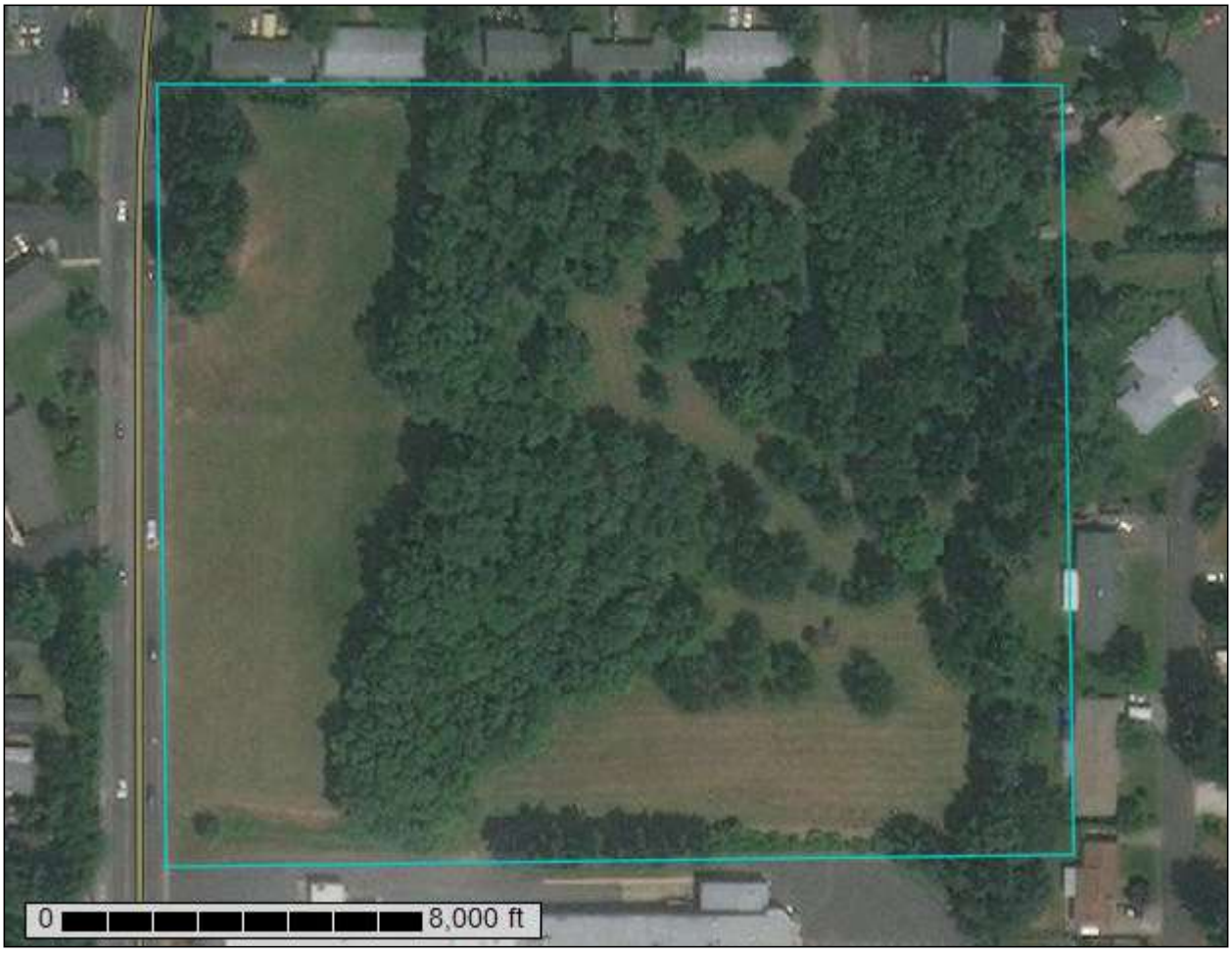
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Yamhill County, Oregon



January 24, 2018

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

Map Scale: 1:1,570 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 20 40 80 120

Feet
0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Yamhill County, Oregon
Survey Area Data: Version 5, Sep 19, 2017

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

Date(s) aerial images were photographed: Aug 19, 2015—Sep 13, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
2027A	Verboort silty clay loam, 0 to 3 percent slopes	3.2	32.9%
2300A	Aloha silt loam, 0 to 3 percent slopes	0.3	3.1%
2310A	Woodburn silt loam, 0 to 3 percent slopes	6.3	64.0%
Totals for Area of Interest		**9.9**	**100.0%**

Soil Information for All Uses

Soil Reports

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

Soil Physical Properties

This folder contains a collection of tabular reports that present soil physical properties. The reports (tables) include all selected map units and components for each map unit. Soil physical properties are measured or inferred from direct observations in the field or laboratory. Examples of soil physical properties include percent clay, organic matter, saturated hydraulic conductivity, available water capacity, and bulk density.

Engineering Properties

This table gives the engineering classifications and the range of engineering properties for the layers of each soil in the survey area.

Hydrologic soil group is a group of soils having similar runoff potential under similar storm and cover conditions. The criteria for determining Hydrologic soil group is found in the National Engineering Handbook, Chapter 7 issued May 2007(http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba). Listing HSGs by soil map unit component and not by soil series is a new concept for the engineers. Past engineering references contained lists of HSGs by soil series. Soil series are continually being defined and redefined, and the list of soil series names changes so frequently as to make the task of maintaining a single national list virtually impossible. Therefore, the criteria is now used to calculate the HSG using the component soil properties and no such national series lists will be maintained. All such references are obsolete and their use should be discontinued. Soil properties that influence runoff potential are those that influence the minimum rate of infiltration for a bare soil after prolonged wetting and when not frozen. These properties are depth to a seasonal high water table, saturated hydraulic conductivity after prolonged wetting, and depth to a layer with a very slow water transmission

rate. Changes in soil properties caused by land management or climate changes also cause the hydrologic soil group to change. The influence of ground cover is treated independently. There are four hydrologic soil groups, A, B, C, and D, and three dual groups, A/D, B/D, and C/D. In the dual groups, the first letter is for drained areas and the second letter is for undrained areas.

The four hydrologic soil groups are described in the following paragraphs:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Depth to the upper and lower boundaries of each layer is indicated.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, "gravelly."

Classification of the soils is determined according to the Unified soil classification system (ASTM, 2005) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 2004).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group

index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Percentage of rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

References:

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Absence of an entry indicates that the data were not estimated. The asterisk '*' denotes the representative texture; other possible textures follow the dash. The criteria for determining the hydrologic soil group for individual soil components is found in the National Engineering Handbook, Chapter 7 issued May 2007(http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba). Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Engineering Properties–Yamhill County, Oregon														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*
2027A—Verboort silty clay loam, 0 to 3 percent slopes														
Verboort	94	D	0-8	Silty clay loam	ML	A-7, A-6	0-0-0	0-0-0	100-100-100	100-100-100	95-98-100	90-93-95	40-45-50	15-18-20
			8-12	Silty clay loam	ML	A-6, A-7	0-0-0	0-0-0	100-100-100	100-100-100	95-98-100	90-93-95	40-45-50	15-18-20
			12-19	Silt loam, silty clay loam	CL	A-6, A-7	0-0-0	0-0-0	100-100-100	100-100-100	90-98-100	90-93-95	30-41-45	10-16-20
			19-28	Silty clay, clay	CH	A-7	0-0-0	0-0-0	100-100-100	100-100-100	95-99-100	90-91-100	55-65-75	35-43-45
			28-33	Silty clay loam, silty clay	CH	A-7	0-0-0	0-0-0	100-100-100	100-100-100	95-99-100	90-94-100	50-60-75	30-40-45
			33-60	Silt loam, silty clay loam	CL, CH	A-6, A-7	0-0-0	0-0-0	100-100-100	100-100-100	95-98-100	80-94-100	35-45-55	15-20-25

Engineering Properties–Yamhill County, Oregon														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*
2300A—Aloha silt loam, 0 to 3 percent slopes														
Aloha	96	C/D	0-8	Silt loam	ML, CL-ML, CL	A-6, A-4	0-0-0	0-0-0	100-100-100	95-100-100	95-97-100	85-85-95	25-35-40	5-9-15
			8-15	Loam, silt loam	ML, CL-ML, CL	A-4, A-6	0-0-0	0-0-0	100-100-100	95-100-100	95-97-100	75-85-95	25-35-40	5-9-15
			15-22	Silt loam, loam	CL	A-6	0-0-0	0-0-0	100-100-100	100-100-100	95-97-100	75-85-95	30-36-40	10-13-15
			22-31	Silt loam, loam	CL	A-6	0-0-0	0-0-0	100-100-100	100-100-100	95-98-100	75-82-95	30-36-40	10-13-15
			31-46	Silt loam, loam	CL	A-6	0-0-0	0-0-0	100-100-100	100-100-100	90-98-100	65-82-95	30-36-40	10-13-15
			46-60	Silt loam, loam	CL, CL-ML	A-6, A-4	0-0-0	0-0-0	100-100-100	100-100-100	90-98-100	65-80-95	25-30-40	5-10-15
			60-65	Silt loam, loam, very fine sandy loam	CL, CL-ML	A-4, A-6	0-0-0	0-0-0	100-100-100	100-100-100	90-97-100	60-64-95	25-28-40	5-8-15

Engineering Properties–Yamhill County, Oregon														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*
2310A—Woodburn silt loam, 0 to 3 percent slopes														
Woodburn	93	C	0-9	Silt loam	ML, CL	A-4, A-6	0-0-0	0-0-0	95-99-100	95-98-100	95-97-100	85-94-100	30-36-40	5-11-15
			9-17	Silt loam	ML, CL	A-6, A-4	0-0-0	0-0-0	95-99-100	95-98-100	95-97-100	85-94-100	30-36-40	5-11-15
			17-25	Silty clay loam, silt loam	CL	A-6, A-7	0-0-0	0-0-0	100-100-100	100-100-100	95-99-100	90-97-100	30-38-45	10-15-20
			25-32	Silty clay loam, silt loam	CL	A-6, A-7	0-0-0	0-0-0	100-100-100	100-100-100	95-99-100	90-97-100	30-38-45	10-15-20
			32-39	Silt loam, silty clay loam	CL	A-7, A-6	0-0-0	0-0-0	100-100-100	100-100-100	95-99-100	90-97-100	30-36-45	10-14-20
			39-54	Silt loam, silty clay loam	CL	A-7, A-6	0-0-0	0-0-0	100-100-100	100-100-100	95-99-100	90-97-100	30-36-45	10-14-20
			54-68	Silty clay loam, silt loam	CL-ML, CL	A-6, A-4	0-0-0	0-0-0	100-100-100	100-100-100	95-98-100	80-90-100	25-35-40	5-11-15
			68-80	Stratified fine sandy loam to silt loam	ML, SM	A-4	0-0-0	0-0-0	100-100-100	100-100-100	70-92-100	40-60-90	20-28-35	NP-5-10
			80-92	Stratified fine sandy loam to silt loam	ML, SM	A-4	0-0-0	0-0-0	100-100-100	100-100-100	70-92-100	40-51-90	20-28-35	NP-5-10

APPENDIX H
TR55 RUNOFF CURVE NUMBERS

Table 2-2a Runoff curve numbers for urban areas [1/]

Cover description: Cover type and hydrologic condition	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 2-2c Runoff curve numbers for other agricultural lands [1/]

Cover description		Curve numbers for hydrologic soil group			
Cover type	Hydrologic condition	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.

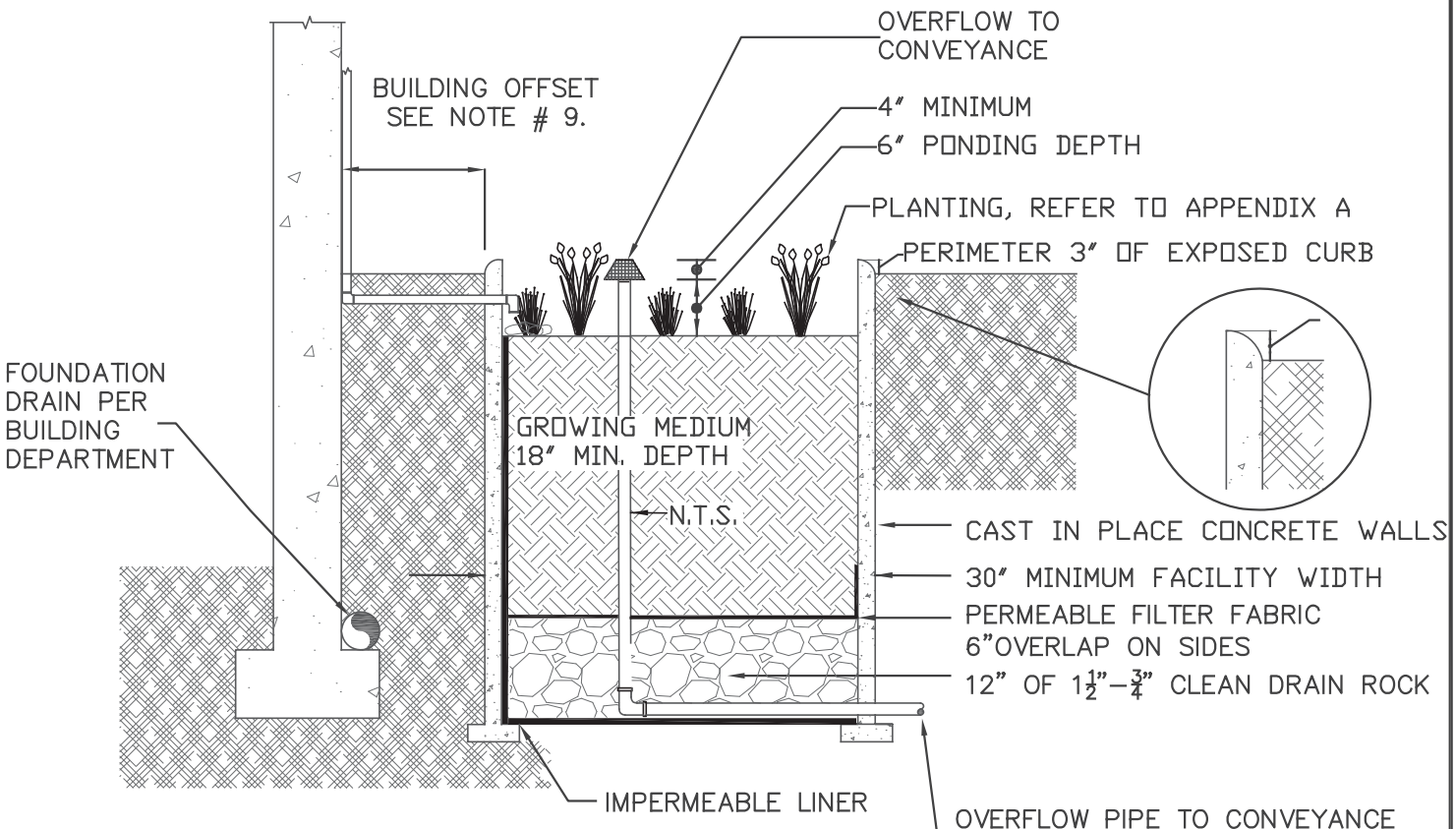
4 Actual curve number is less than 30; use CN = 30 for runoff computations.

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.

APPENDIX I
OPPERATIONS AND MAINTAINACE

PRIVATE/ PUBLIC WATER QUALITY & QUANTITY TREATMENT



OVERFLOW PIPE SIZE (1/8 in./ft. SLOPE)	
MAX PROJECT ROOF AREA (ft.)	OVERFLOW PIPE SIZE (in.)
822	3
1,880	4
3,340	6

OVERFLOW PIPE SIZE (1/4 in./ft. SLOPE)	
MAX PROJECT ROOF AREA (ft.)	OVERFLOW PIPE SIZE (in.)
1,160	3
2,650	4
4,720	6

NOTES:

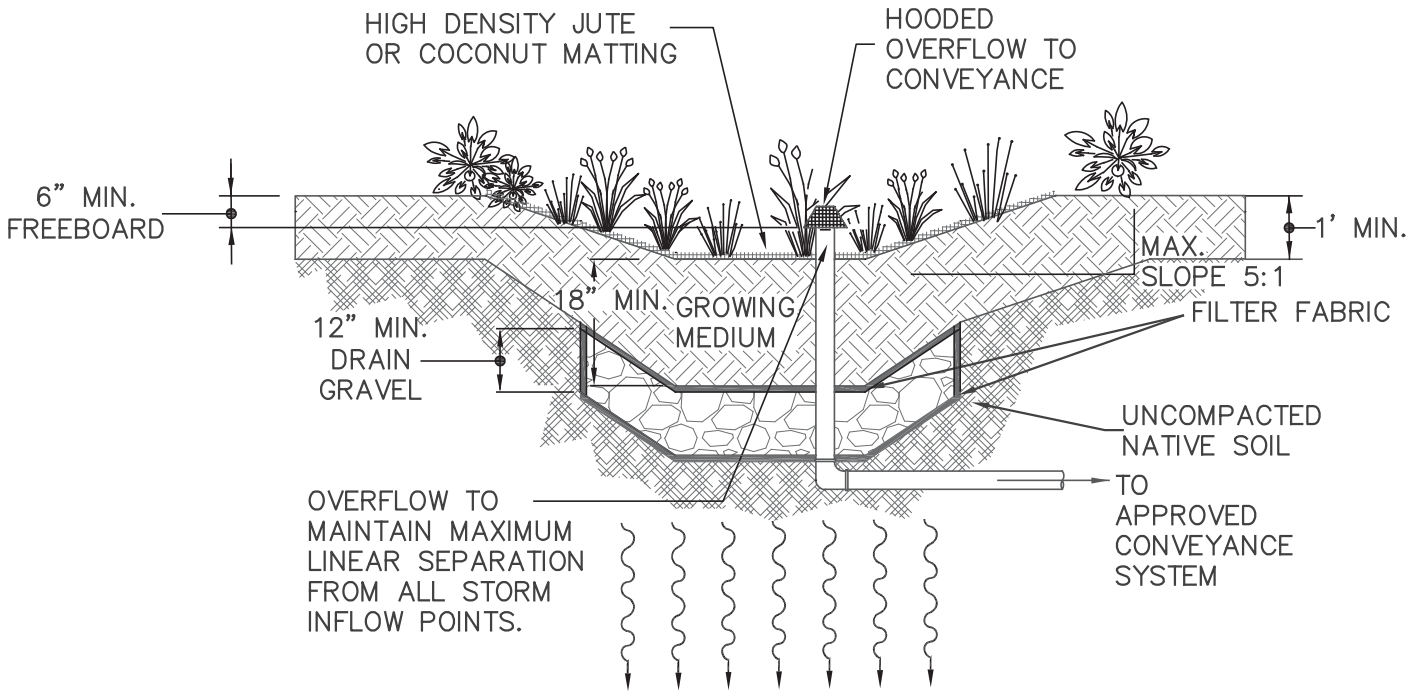
1. MAXIMUM SLOPE OF PLANTER 0.5%.
2. NO TREES OR DEEP ROOTED VEGETATION OVER PIPING IS ALLOWED IN FACILITY.
3. STORM PIPING TO FACILITY THROUGH WALL CORE HOLES, MAINTAIN MAXIMUM DISTANCE FROM THE OVERFLOW PIPE AS POSSIBLE.
4. PRIVATE OVERFLOW PIPE TO BE MINIMUM SPECIFIED IN PLUMBING CODE, SEE TABLE. PUBLIC FACILITIES SHALL BE SIZED TO CONVEY THE 25 YEAR STORM.
5. ENERGY DISSIPATERS REQUIRED AT WATER ENTRANCES MINIMUM 18"X18"X6" OF 4 TO 6 INCH ANGULAR RIPRAP.
6. PERMEABLE FILTER FABRIC REQUIRED BETWEEN LAYERS
7. IMPERMEABLE LINER REQUIRED AT FACILITY BOTTOM AND ON WALLS ADJACENT TO STRUCTURES (AS SHOWN).
8. "PARTIAL" INFILTRATION FACILITIES ARE ENCOURAGED. IMPERMEABLE LINER LOCATED AT FACILITY BOTTOM, MAY BE REMOVED FOR "PARTIAL" INFILTRATION, APPROVAL BY DESIGN PROFESSIONAL AND BUILDING DEPARTMENT REQUIRED.
9. BUILDING OFFSET REQUIRED ONLY WHEN INFILTRATING, 10 FT MINIMUM.
10. MUST BE LOCATED A MINIMUM OF 3 FT FROM ADJACENT PROPERTY LINE.

City of Newberg
PUBLIC WORKS ENGINEERING DIVISION
414 E. FIRST STREET NEWBERG, OR 97132
PHONE: 503-537-1240
FAX: 503-537-1277

REVISIONS:

FLOW THROUGH PLANTER

SCALE: N.T.S.
DATE: MARCH 2014
APPROVED BY: JAY H.
STANDARD DRAWING 452



NOTES:

1. PROVIDE OVERFLOW CONVEYANCE SYSTEM, OVERFLOW CONVEYANCE HEIGHT TO ALLOW 6" MAXIMUM PONDING, PIPING TO A MINIMUM OF THE PLUMBING CODE OR CONVEY THE 25 YEAR STORM.

2. FLOW DISSIPATORS SHOULD BE USED IF ENTRY SLOPE TO THE BASIN IS GREATER THAN 5:1.

3. SEPARATION BETWEEN DRAIN GRAVEL AND GROWING MEDIUM SHALL BE PERMEABLE FILTER FABRIC.

4. TREATMENT AREA SHALL HAVE HIGH DENSITY JUTE OR COCONUT MATTING OVER 18" MINIMUM OF GROWING MEDIUM OR BASE STABILIZATION METHOD AS APPROVED BY THE CITY.

5. REFER TO APPENDIX A OF THE STANDARDS DESIGN MANUAL FOR PLANTING REQUIREMENTS.

6. TOP OF BANK OF FACILITY MUST BE LOCATED 10' FROM ANY STRUCTURE AND 3' FROM ADJACENT PROPERTY LINES.

City of Newberg
PUBLIC WORKS ENGINEERING DIVISION
414 E. FIRST STREET NEWBERG, OR 97132
PHONE: 503-537-1240
FAX: 503-537-1277

REVISIONS:

RAIN GARDEN

SCALE: N.T.S.
DATE: MARCH 2014
APPROVED BY: JAY H.
STANDARD DRAWING 457

CONTECH STORMWATER SOLUTIONS

StormFilter Inspection and Maintenance Procedures

The Stormwater Management StormFilter®

Maintenance Guidelines

The primary purpose of the Stormwater Management StormFilter® is to filter out and prevent pollutants from entering our waterways. Like any effective filtration system, periodically these pollutants must be removed to restore the StormFilter to its full efficiency and effectiveness.

Maintenance requirements and frequency are dependent on the pollutant load characteristics of each site. Maintenance activities may be required in the event of a chemical spill or due to excessive sediment loading from site erosion or extreme storms. It is a good practice to inspect the system after major storm events.

Maintenance Procedures

Although there are likely many effective maintenance options, we believe the following procedure is efficient and can be implemented using common equipment and existing maintenance protocols. A two step procedure is recommended as follows:

1. Inspection

Inspection of the vault interior to determine the need for maintenance.

2. Maintenance

Cartridge replacement

Sediment removal

Inspection and Maintenance Timing

At least one scheduled inspection should take place per year with maintenance following as warranted.

First, an inspection should be done before the winter season. During the inspection the need for maintenance should be determined and, if disposal during maintenance will be required, samples of the accumulated sediments and media should be obtained.

Second, if warranted, a maintenance (replacement of the filter cartridges and removal of accumulated sediments) should be performed during periods of dry weather.

In addition to these two activities, it is important to check the condition of the StormFilter unit after major storms for potential damage caused by high flows and for high sediment accumulation that may be caused by localized erosion in the drainage area. It may be necessary to adjust the inspection/ maintenance schedule depending on the actual operating conditions encountered by the system. In general, inspection activities can be conducted at any time, and maintenance should occur, if warranted, in late summer to early fall when flows into the system are not likely to be present.

Maintenance Frequency

The primary factor controlling timing of maintenance of the StormFilter is sediment loading.

A properly functioning system will remove solids from water by trapping particulates in the porous structure of the filter media inside the cartridges. The flow through the system will naturally decrease as more and more particulates are trapped. Eventually the flow through the cartridges will be low enough to require replacement. It may be possible to extend the usable span of the cartridges by removing sediment from upstream trapping devices on a routine as-needed basis in order to prevent material from being re-suspended and discharged to the StormFilter treatment system.

Site conditions greatly influence maintenance requirements. StormFilter units located in areas with erosion or active construction may need to be inspected and maintained more often than those with fully stabilized surface conditions.

The maintenance frequency may be adjusted as additional monitoring information becomes available during the inspection program. Areas that develop known problems should be inspected more frequently than areas that demonstrate no problems, particularly after major storms. Ultimately, inspection and maintenance activities should be scheduled based on the historic records and characteristics of an individual StormFilter system or site. It is recommended that the site owner develop a database to properly manage StormFilter inspection and maintenance programs.

Prior to the development of the maintenance database, the following maintenance frequencies should be followed:

Inspection

One time per year

After major storms

Maintenance

As needed, based on results of inspection (The average maintenance lifecycle is approximately 1-3 years)

Per Regulatory requirement

In the event of a chemical spill

Frequencies should be updated as required. The recommended initial frequency for inspection is one time per year. StormFilter units should be inspected after major storms.

Sediment removal and cartridge replacement on an as needed basis is recommended unless site conditions warrant.

Once an understanding of site characteristics has been established, maintenance may not be needed for one to three years, but inspection is warranted and recommended annually.

Inspection Procedures

The primary goal of an inspection is to assess the condition of the cartridges relative to the level of visual sediment loading as it relates to decreased treatment capacity. It may be desirable to conduct this inspection during a storm to observe the relative flow through the filter cartridges. If the submerged cartridges are severely plugged, then typically large amounts of sediments will be present and very little flow will be discharged from the drainage pipes. If this is the case, then maintenance is warranted and the cartridges need to be replaced.

Warning: In the case of a spill, the worker should abort inspection activities until the proper guidance is obtained. Notify the local hazard control agency and CONTECH Stormwater Solutions immediately.

To conduct an inspection:

Important: Inspection should be performed by a person who is familiar with the operation and configuration of the StormFilter treatment unit.

1. If applicable, set up safety equipment to protect and notify surrounding vehicle and pedestrian traffic.
2. Visually inspect the external condition of the unit and take notes concerning defects/problems.

3. Open the access portals to the vault and allow the system vent.
4. Without entering the vault, visually inspect the inside of the unit, and note accumulations of liquids and solids.
5. Be sure to record the level of sediment build-up on the floor of the vault, in the forebay, and on top of the cartridges. If flow is occurring, note the flow of water per drainage pipe. Record all observations. Digital pictures are valuable for historical documentation.
6. Close and fasten the access portals.
7. Remove safety equipment.
8. If appropriate, make notes about the local drainage area relative to ongoing construction, erosion problems, or high loading of other materials to the system.
9. Discuss conditions that suggest maintenance and make decision as to weather or not maintenance is needed.

Maintenance Decision Tree

The need for maintenance is typically based on results of the inspection. The following Maintenance Decision Tree should be used as a general guide. (Other factors, such as Regulatory Requirements, may need to be considered)

1. Sediment loading on the vault floor.
   a. If >4" of accumulated sediment, maintenance is required.
2. Sediment loading on top of the cartridge.
   a. If >1/4" of accumulation, maintenance is required.
3. Submerged cartridges.
   a. If >4" of static water in the cartridge bay for more that 24 hours after end of rain event, maintenance is required.
4. Plugged media.
   a. If pore space between media granules is absent, maintenance is required.
5. Bypass condition.
   a. If inspection is conducted during an average rain fall event and StormFilter remains in bypass condition (water over the internal outlet baffle wall or submerged cartridges), maintenance is required.
6. Hazardous material release.
   a. If hazardous material release (automotive fluids or other) is reported, maintenance is required.
7. Pronounced scum line.
   a. If pronounced scum line (say ≥ 1/4" thick) is present above top cap, maintenance is required.
8. Calendar Lifecycle.
   a. If system has not been maintained for 3 years maintenance is required.

Assumptions

- No rainfall for 24 hours or more
- No upstream detention (at least not draining into StormFilter)
- Structure is online
- Outlet pipe is clear of obstruction
- Construction bypass is plugged

Maintenance

Depending on the configuration of the particular system, maintenance personnel will be required to enter the vault to perform the maintenance.

Important: If vault entry is required, OSHA rules for confined space entry must be followed.

Filter cartridge replacement should occur during dry weather. It may be necessary to plug the filter inlet pipe if base flows is occurring.

Replacement cartridges can be delivered to the site or customers facility. Information concerning how to obtain the replacement cartridges is available from CONTECH Stormwater Solutions.

Warning: In the case of a spill, the maintenance personnel should abort maintenance activities until the proper guidance is obtained. Notify the local hazard control agency and CONTECH Stormwater Solutions immediately.

To conduct cartridge replacement and sediment removal maintenance:

1. If applicable, set up safety equipment to protect maintenance personnel and pedestrians from site hazards.
2. Visually inspect the external condition of the unit and take notes concerning defects/problems.
3. Open the doors (access portals) to the vault and allow the system to vent.
4. Without entering the vault, give the inside of the unit, including components, a general condition inspection.
5. Make notes about the external and internal condition of the vault. Give particular attention to recording the level of sediment build-up on the floor of the vault, in the forebay, and on top of the internal components.
6. Using appropriate equipment offload the replacement cartridges (up to 150 lbs. each) and set aside.
7. Remove used cartridges from the vault using one of the following methods:

Method 1:

A. This activity will require that maintenance personnel enter the vault to remove the cartridges from the under drain manifold and place them under the vault opening for lifting (removal). Unscrew (counterclockwise rotations) each filter cartridge from the underdrain connector. Roll the loose cartridge, on edge, to a convenient spot beneath the vault access.

Using appropriate hoisting equipment, attach a cable from the boom, crane, or tripod to the loose cartridge. Contact CONTECH Stormwater Solutions for suggested attachment devices.

Important: Note that cartridges containing leaf media (CSF) do not require unscrewing from their connectors. Take care not to damage the manifold connectors. This connector should remain installed in the manifold and could be capped during the maintenance activity to prevent sediments from entering the underdrain manifold.

B. Remove the used cartridges (up to 250 lbs. each) from the vault.

Important: Care must be used to avoid damaging the cartridges during removal and installation. The cost of repairing components damaged during maintenance will be the responsibility of the owner unless CONTECH Stormwater Solutions performs the maintenance activities and damage is not related to discharges to the system.

C. Set the used cartridge aside or load onto the hauling truck.

D. Continue steps a through c until all cartridges have been removed.

Method 2:

A. Enter the vault using appropriate confined space protocols.

B. Unscrew the cartridge cap.

C. Remove the cartridge hood screws (3) hood and float.

D. At location under structure access, tip the cartridge on its side.

Important: Note that cartridges containing media other than the leaf media require unscrewing from their threaded connectors. Take care not to damage the manifold connectors. This connector should remain installed in the manifold and capped if necessary.

D. Empty the cartridge onto the vault floor. Reassemble the empty cartridge.

E. Set the empty, used cartridge aside or load onto the hauling truck.

F. Continue steps a through e until all cartridges have been removed.

8. Remove accumulated sediment from the floor of the vault and from the forebay. This can most effectively be accomplished by use of a vacuum truck.
9. Once the sediments are removed, assess the condition of the vault and the condition of the connectors. The connectors are short sections of 2-inch schedule 40 PVC, or threaded schedule 80 PVC that should protrude about 1" above the floor of the vault. Lightly wash down the vault interior.
   a. If desired, apply a light coating of FDA approved silicon lube to the outside of the exposed portion of the connectors. This ensures a watertight connection between the cartridge and the drainage pipe.
   b. Replace any damaged connectors.
10. Using the vacuum truck boom, crane, or tripod, lower and install the new cartridges. Once again, take care not to damage connections.
11. Close and fasten the door.
12. Remove safety equipment.
13. Finally, dispose of the accumulated materials in accordance with applicable regulations. Make arrangements to return the used empty cartridges to CONTECH Stormwater Solutions.

Related Maintenance Activities -

Performed on an as-needed basis

StormFilter units are often just one of many structures in a more comprehensive stormwater drainage and treatment system.

In order for maintenance of the StormFilter to be successful, it is imperative that all other components be properly maintained. The maintenance/repair of upstream facilities should be carried out prior to StormFilter maintenance activities.

In addition to considering upstream facilities, it is also important to correct any problems identified in the drainage area. Drainage area concerns may include: erosion problems, heavy oil loading, and discharges of inappropriate materials.

Material Disposal

The accumulated sediment found in stormwater treatment and conveyance systems must be handled and disposed of in accordance with regulatory protocols. It is possible for sediments to contain measurable concentrations of heavy metals and organic chemicals (such as pesticides and petroleum products). Areas with the greatest potential for high pollutant loading include industrial areas and heavily traveled roads.

Sediments and water must be disposed of in accordance with all applicable waste disposal regulations. When scheduling maintenance, consideration must be made for the disposal of solid and liquid wastes. This typically requires coordination with a local landfill for solid waste disposal. For liquid waste disposal a number of options are available including a municipal vacuum truck decant facility, local waste water treatment plant or on-site treatment and discharge.

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CONTECH STORMWATER SOLUTIONS
800.925.5240
contechstormwater.com

Support

- Drawings and specifications are available at contechstormwater.com.
- Site-specific design support is available from our engineers.

CONTECH Construction Products Inc. provides site solutions for the civil engineering industry. CONTECH's portfolio includes bridges, drainage, sanitary sewer, stormwater and earth stabilization products. For information on other CONTECH division offerings, visit contech-cpi.com or call 800.338.1122

Inspection Report

Date: _____ Personnel: _____

Location: _____ System Size: _____

System Type: Vault ☐ Cast-In-Place ☐ Linear Catch Basin ☐ Manhole ☐ Other ☐

Sediment Thickness in Forebay: _____ Date: _____

Sediment Depth on Vault Floor: _____

Structural Damage: _____

Estimated Flow from Drainage Pipes (if available): _____

Cartridges Submerged: Yes ☐ No ☐ Depth of Standing Water: _____

StormFilter Maintenance Activities (check off if done and give description)

☐ Trash and Debris Removal: _____

☐ Minor Structural Repairs: _____

☐ Drainage Area Report _____

Excessive Oil Loading: Yes ☐ No ☐ Source: _____

Sediment Accumulation on Pavement: Yes ☐ No ☐ Source: _____

Erosion of Landscaped Areas: Yes ☐ No ☐ Source: _____

Items Needing Further Work: _____

Owners should contact the local public works department and inquire about how the department disposes of their street waste residuals.

Other Comments:

_____

_____

_____

_____

_____

_____

_____

_____

Review the condition reports from the previous inspection visits.

StormFilter Maintenance Report

Date: _____ Personnel: _____

Location: _____ System Size: _____

System Type: Vault ☐ Cast-In-Place ☐ Linear Catch Basin ☐ Manhole ☐ Other ☐

List Safety Procedures and Equipment Used: _____

_____

_____

System Observations

Months in Service:

Oil in Forebay: Yes ☐ No ☐

Sediment Depth in Forebay: _____

Sediment Depth on Vault Floor: _____

Structural Damage: _____

Drainage Area Report

Excessive Oil Loading: Yes ☐ No ☐ Source: _____

Sediment Accumulation on Pavement: Yes ☐ No ☐ Source: _____

Erosion of Landscaped Areas: Yes ☐ No ☐ Source: _____

StormFilter Cartridge Replacement Maintenance Activities

Remove Trash and Debris: Yes ☐ No ☐ Details: _____

Replace Cartridges: Yes ☐ No ☐ Details: _____

Sediment Removed: Yes ☐ No ☐ Details: _____

Quantity of Sediment Removed (estimate?):

Minor Structural Repairs: Yes ☐ No ☐ Details: _____

Residuals (debris, sediment) Disposal Methods: _____

Notes:

_____

_____

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