



AGENDA
REGULAR MEETING OF THE
WINDSOR HEIGHTS CITY COUNCIL
Monday, June 3, 2024 - 6:00 PM
WINDSOR HEIGHTS COUNCIL CHAMBERS - 1133 66th ST
ZOOM: <https://us02web.zoom.us/j/7832856334>
Meeting ID: 783 285 6334

Notice to the Public: If you would like the supporting documents and information, please call City Hall by noon the day of the meeting. Copies of City Council Agendas are free to the public. In consideration of all, if you have a cell phone, please turn it off or put it on silent ring. The use of obscene and vulgar language, hate speech, racial slurs, slanderous comments, and any other disruptive behavior during the Council meeting will not be tolerated and the offender may be barred by the presiding officer from further comment before the Council during the meeting and/or removed from the meeting.

1. **Call to Order/Roll Call/Pledge of Allegiance**
2. **Approval of the Agenda**
3. **Public Hearing:**
 - A. Public Hearing on the Proposed Plans, Specifications, Form of Contract, and Estimate of Costs for the Windsor Heights CEC Solar Project
 - B. Consideration of the Proposed Plans, Specifications, Form of Contract, and Estimate of Costs for the Windsor Heights CEC Solar Project
 - C. Public Hearing on Proposed Development Agreement with Windsor Millang, L.L.C., the Windsor, L.L.C. and Jensfam, LLC
4. **Public Forum:** This is time set aside for comments from the public on topics of City business other than those listed on the agenda. No action may be taken. Please come to the podium, state your name and address for the record and keep your comments to no more than 5 minutes.
5. **Consent Agenda:** Any item on the Consent Agenda may be removed for separate consideration.
 - A. Approve Minutes of the Regular Council Meeting on May 20, 2024
 - B. Approve Financial Reports
 - C. Approve 73rd St Phase 1 (TP-U-8477(615)--70-77) Change Order 1
 - D. Approve the Mayor to Sign Certificate Authorizing Execution of Amendment to ChildServe 2022B Bonds
 - E. Approve FY 25 Tobacco Permits
 - F. Refunding fees for the Community Event Center for Iowa Primary Care on Thursday, May 30th, 2024
 - G. Approve Lexipol Policy Management Platform Master Service Agreement
 - H. Approve Resolution No. 2024-41 - A Resolution Appointing Larry James to the Board of Adjustment
6. **Action Items:**

The agenda was posted on the official bulletin boards, posted to www.windsorheights.org, and city social media platforms in compliance with the requirements of city ordinances and the open meetings law.

- A. Consideration of Resolution No. 2024-40 - A Resolution Approving the Site Plan for The Windsor at 1148 63rd Street
 - B. Consideration of Resolution No. 2024-39 -A Resolution Approving Development Agreement with Windsor Millang, L.L.C., the Windsor, L.L.C. and Jensfam, LLC, Authorizing Annual Appropriation Tax Increment Payments and Pledging Certain Tax Increment Revenues to the Payment of the Agreement
 - C. Consideration of Authorizing Execution of Contract With Wright Tree Service For Debris Removal
 - D. Consideration of Payment to JC Midwest Services For Storm Cleanup Services
 - E. Consideration of the 3rd Reading of Ordinance 2024-04 - An Ordinance Amending the Code of Ordinances for the City of Windsor Heights, Iowa, by Amending Chapter 185, Governing Floodplain Management; and to Adopt and Publish
7. **Reports:**
- A. Mayor, Council Reports and Committee Updates, and Administration Reports
8. **Closed Session** Under Iowa Code Section 21.5(1)(c): To Discuss Strategy With Counsel In Matters That Are Presently In Litigation Or Where Litigation Is Imminent Where Its Disclosure Would Be Likely To Prejudice Or Disadvantage The Position Of The Governmental Body In That Litigation.
9. **Adjourn**

The agenda was posted on the official bulletin boards, posted to www.windsorheights.org, and city social media platforms in compliance with the requirements of city ordinances and the open meetings law.



**STAFF REPORT
CITY COUNCIL**

June 3, 2024

TO: CITY COUNCIL

FROM:

SUBJECT: Public Hearing on the Proposed Plans, Specifications, Form of Contract, and
Estimate of Costs for the Windsor Heights CEC Solar Project

GENERAL INFORMATION

ATTACHMENTS

1. 00 11 13 USER-NOTICE TO BIDDERS

SECTION 00 11 13
NOTICE TO BIDDERS

NOTICE IS HEREBY GIVEN: That sealed bids will be received by the City of Windsor Heights, Iowa at City Hall, 1145 66th Street, Suite 1, Windsor Heights, IA 50324 until 1:00 PM CDT on the 26th day of June, 2024. The bids will be opened immediately after and publicly read aloud.

WINDSOR HEIGHTS CEC SOLAR

WINDSOR HEIGHTS, IOWA

KED BLUESTONE PROJECT NO. 124-037

The bids are for a single Prime Contract for installation of a solar panel array on the South facing roof of the community center and update of the electrical service for a net metering solution. Electrical connection will be routed from the East electrical room to the roof for connection to the solar array.

A Public Hearing will be conducted at a meeting to be held at the Public Safety Building, City of Windsor Heights, 1133 66th Street, Windsor Heights, IA 50324 at 6:00 PM, on the 3rd day of June, 2024, at which time and place any person may appear and file objections to the proposed plans, specifications, form of contract, and the estimated cost of said project.

A pre-bid conference is scheduled for Thursday June 13, 2024; at 2:30 pm at the project site, 6900 School Street, Windsor Heights, IA 50324; with a walk-through of the existing building immediately following.

Sealed proposals will be opened and bids tabulated at 1:05 PM on 26th day of June, 2024, in the office of the City Clerk, City of Windsor Heights, 1145 66th Street, Suite 1, Windsor Heights, IA 50324 for consideration by the City of Windsor Heights at its meeting at 6:00 P.M. on July 1, 2024.

Work is anticipated to commence upon award of contract or Notice to Proceed, on or about July 8, 2024, and be substantially complete by end of the year, and as coordinated with Owner based on use schedule, constructed in one phase as shown on the Contract Documents.

Plans and specifications governing the construction of the proposed Work have been prepared by KED Bluestone of Johnson, Iowa.

Direct questions to Caleb Jens, caleb.jens@kedbluestone.com; 515.259.5958.

Copies of the Bidding Documents may be obtained through Beeline + Blue via their website at <https://www.beelineandblue.com> or by phone at 515-244-1611; or in person at 2507 Ingersoll Avenue; Des Moines, IA 50312, in accordance with the Instructions to Bidders.

Documents may also be viewed at the following plan rooms:

1. Beeline + Blue; Attn: McGraw Hill Plan Room; 2507 Ingersoll Avenue; Des Moines, IA 50312; 515-244-1611; <https://www.beelineandblue.com>.
2. Construction Update Online Plan Room; Master Builders of Iowa, 221 Park St. Des Moines, IA, 50303, 515-288-8904; <http://www.mbionline.com>
3. Dodge Data and Analytics (online plan room); 4300 Beltway Place, Suite 180; Arlington, TX 73018; ph. (877) 784-9556. <http://dodgeprojects.construction.com>.
4. iSqFt (online plan room); ph. (800)364-2059; www.isqft.com.

Bid security in the amount of 5% of the total bid in the form of certified check, credit union share draft, or surety bond written on an original AIA Document A310, Bid Bond is required for this project, and must be submitted at the time of bid. The successful bidder will be required to provide surety Performance and Payment Bonds in an amount equal to one hundred percent (100%) of the Contract Sum.

Refer to other bidding requirements described in Instructions to Bidders.

Submit your offer on the Bid Form provided.

Your offer will be required to be submitted under a condition of irrevocability for a period of thirty (30) days after submission.

The award of the contract may be made by the Owner to any responsible bidder or bidders offering suitable supplies, equipment and/or service at the lowest price taking into consideration the quality of materials or service in the best interest of the Owner. The right is reserved to reject any and all bids, or any part thereof, and to waive informalities, and to enter into such contract or contracts as shall be deemed in the best interest of the Owner.

By virtue of statutory authority, a preference will be given to products and provisions grown and coal produced within the State of Iowa, to the extent lawfully required under Iowa statutes.

The bidder shall not include sales tax in the bid. The City of Windsor Heights will distribute tax exemption certificates and authorization letters to the Contractor and all subcontractors who are identified. The Contractor and subcontractor may make copies of the tax exemption certificates and provide a copy to each supplier providing construction materials. These tax exemption certificates and authorization letters are applicable only for this specific project under the Contract

By order of the Mike Jones, Mayor, Windsor Heights, Iowa.

Publish between May 12 and June 13, 2024

END OF SECTION



**STAFF REPORT
CITY COUNCIL**

June 3, 2024

TO: CITY COUNCIL

FROM: Adam Plagge, City Administrator

SUBJECT: Public Hearing on Proposed Development Agreement with Windsor Millang, L.L.C., the Windsor, L.L.C. and Jensfam, LLC

GENERAL INFORMATION

This is a proposed Development Agreement between Windsor Millang, The Windsor, Jensfarm and the City of Windsor Heights regarding the proposed development of 'The Windsor' for which the site plan is also included in tonight's City Council Agenda.

Background

The City of Windsor Heights passed the attached Resolution 22-43 in 2022 amending the City's Urban Revitalization Plan providing a by right schedule of abatement of taxes for new multifamily construction in the amount of 100% of actual value for years 1-5 and 75% of actual value for years 6-7. The Windsor developer proceeded with their project under the understanding it would be eligible for this abatement schedule. Subsequently in 2023, the state legislature removed the school levy from revitalization abatement schedules statewide. This proposed Development Agreement primarily addresses the funding gap that was created by rebating through TIF, the equivalent of the property taxes removed from the original abatement schedule. The proposed rebate does exclude the school's Physical Plant and Equipment Levy tax which is not included in TIF collections but would otherwise have been included in the original abatement.

Based on the project's \$20 million investment, current applicable levies and rollbacks, the rebated amount per the agreement shall not exceed \$909,535.

The Abatement Application for the reduced amount will be processed as normal when received.

Other Information

As part of this agreement the developer is required to plant 50 trees on the site or provide the

difference to the City for planting elsewhere. There is a proposed gap of 8 trees that will be provided by the developer to the City per the site plan. These trees can be integrated into a City ROW tree planting program anticipated to be kicked off this Fall.

This agreement also specifies the transfer of City property to the Developer and Developer property to the City. Subject to approval of this agreement and the site plan, legal counsel will bring further action forward to complete these transfers.

The Development Agreement is subject to annual appropriation to minimize debt capacity constraints.

ATTACHMENTS

1. Execution Version-Development Agreement Final
2. Abatement Schedule

DEVELOPMENT AGREEMENT

This Agreement is entered into between the City of Windsor Heights, Iowa (the “City”) and Windsor Millang, L.L.C., The Windsor, L.L.C., and Jensfam, LLC (collectively, the “Developer”) as of the ____ day of _____, 2024 (the “Commencement Date”).

WHEREAS, the City has established the Windsor Heights Consolidated Urban Renewal Area (the “Urban Renewal Area”), and has adopted a tax increment ordinance for the Urban Renewal Area; and

WHEREAS, the Developer has acquired certain real property which is situated in the City, lies within the Urban Renewal Area and is more specifically described on Exhibit A hereto (the “Property”); and

WHEREAS, the Developer has undertaken a blight alleviation and economic development project on the Property consisting of the construction of a new apartment building (the “Project”) including at least ninety (90) apartment units (the “Apartment Units”); and

WHEREAS, the Developer has requested that the City provide financial assistance in the form of incremental property tax payments to be used by the Developer in paying the costs of constructing the Project; and

WHEREAS, Chapter 15A of the Code of Iowa authorizes cities to provide grants, loans, guarantees, tax incentives and other financial assistance to or for the benefit of private persons;

NOW THEREFORE, the parties hereto agree as follows:

A. Developer’s Covenants

1. Project Construction. The Developer agrees to undertake the Project on the Property. The Developer agrees that the completed Project will include at least ninety (90) Apartment Units. Furthermore, the Developer agrees to invest not less than \$20,000,000 into capital improvements for the Project, including design, construction work and other furnishings.

The Developer agrees to submit a site plan (the “Site Plan”) for the development of the Project to the City. Upon approval by the City, the Site Plan shall be attached hereto as Exhibit B. The Site Plan shall include a mix of at least fifty (50) overstory and understory trees of at least 1.5” in caliper. If the Site Plan is unable to accommodate fifty (50) trees, then the Developer shall be responsible for providing the City the deficit number of trees to be planted in other areas within the City. The Developer agrees to construct the Project substantially in accordance with the Site Plan and to complete such construction by no later than December 31, 2026.

The Developer agrees to use the completed Project in its business operations throughout the Term (as hereinafter defined) of this Agreement (the “Business Operations Requirement”). For purposes of this Agreement, the Project is being used as part of the Developer’s business operations if all of the Apartment Units are occupied or are being offered for occupancy at a market rate.

During the Term of this Agreement, the Developer agrees to maintain, preserve, and keep the Property, including but not limited to the Project, useful and in good repair and working order, ordinary wear and tear excepted, and from time to time will make all necessary repairs, replacements, renewals, and additions. In addition, the Developer agrees to regularly maintain, to a high standard, all landscaped areas on the Property so that they present a neat and attractive appearance. Further, the Developer agrees to maintain compliance with local zoning, land use, building and safety codes and regulations.

2. Ownership of Property; Use of Project; Developer's Annual Report. The Developer agrees to submit an annual report (the "Annual Report") to the satisfaction of the City by no later than each October 15th during the Term commencing October 15th of the year in which the Triggering Certification (as hereinafter defined) is filed by the Developer, demonstrating that (i) the Business Operations Requirement is being met; and (ii) the Developer owns the Property, including the Project. The Developer agrees to provide such supporting documentation as may be requested by the City as an accompaniment to the Annual Report.

3. Property Taxes. The Developer agrees to make or ensure timely payment of all property taxes as they come due with respect to the Property with the completed Project thereon throughout the Term and to submit a receipt or cancelled check in evidence of each such payment.

4. Property Tax Abatement. The Developer hereby acknowledges that it will submit an application for property tax exemption with respect to the actual assessed taxable value added by the Project on the Property under the City's urban revitalization plan (the "Urban Revitalization Plan") adopted pursuant to Chapter 404 of the Code of Iowa.

Further, the Developer acknowledges that, pursuant to Chapter 404.3D of the Code of Iowa (effective as of July 1, 2024), the available exemption benefit for the Property described in the Urban Revitalization Plan shall not apply to property tax levies (the "Non-Exempt School District Levies") imposed by the Des Moines Independent Community School District.

5. Property Tax Payment Certification. The Developer agrees to certify to the City by no later than October 15 of each year during the Term, commencing October 15 of the year in which the new valuation from the Project is determined by the Polk County Assessor and placed upon the property tax rolls, an amount (the "Developer's Estimate") equal to the estimated Incremental Property Tax Revenues (as hereinafter defined) anticipated to be paid in the fiscal year immediately following such certification with respect to the taxable valuation of the Property. The first such certification made hereunder shall be hereinafter referred to as the "Triggering Certification". In submitting each such Developer's Estimate, the Developer will complete and submit the worksheet (the "Worksheet") attached hereto as Exhibit C. The City reserves the right to review and request revisions to each such Developer's Estimate to ensure the accuracy of the figures submitted. The Triggering Certification must be made by October 15th of the year in which the full taxable valuation resulting from the Project is placed upon the property tax rolls of Polk County, Iowa or October 15, 2027, whichever is sooner.

For purposes of this Agreement, Incremental Property Tax Revenues shall mean the sum of (1) the property tax revenues attributable to the Unabated Valuation (if any) of the Property with the Project thereon divided and made available to the City for deposit in the Windsor TIF

Account (as hereinafter defined) of the Windsor Heights Urban Renewal Area Tax Increment Fund (as hereinafter defined) under the provisions of Section 403.19 of the Code of Iowa, as amended; plus (2) the revenues generated by the Non-Exempt School District Levies of the Project less the school district levies for debt service, the school district instructional support and physical plant and equipment levies, and any other school district levies which may be exempted from the calculation of revenues pursuant to Section 403.19 of the Code of Iowa by action of the Iowa General Assembly.

For purposes of this Agreement, “Windsor TIF Account” shall mean a separate account within the Windsor Heights Urban Renewal Tax Increment Revenue Fund of the City in which there shall be deposited Incremental Property Tax Revenues received by the City with respect to the Project.

For purposes of this Agreement, “Windsor Heights Urban Renewal Area Tax Increment Fund” shall mean the special fund of the City created under the authority of Section 403.19(2) of the Code of Iowa, which fund was created to pay the principal of and interest on loans, monies advanced to, or indebtedness, whether funded, refunded, assumed, or otherwise, including bonds or other obligations issued under the authority of Chapters 15A, 403, or 384 of the Code, incurred by the City to finance or refinance in whole or in part projects undertaken in the Urban Renewal Area.

For purposes of this Agreement, “Unabated Valuation” shall mean the assessed taxable valuation of the Property added by the Project that is not subject to tax exemption under the City’s Urban Revitalization Plan.

Upon request, the City staff shall provide reasonable assistance to the Developer in completing the worksheet required under this Section A.5.

6. Low and Moderate Income Housing Assistance. The Developer hereby acknowledges that the Project is being undertaken as a blight alleviation project in the Urban Renewal Area. If at any time during the Term of this Agreement a future judicial, administrative or legislative determination is made, resulting in the City being required to satisfy the “low and moderate income assistance” requirement, as set forth in Section 403.22 of the Code of Iowa, with respect to the Project, then the Developer shall be liable to the City for the provision of an amount attributable to the remaining Term of the Agreement equal to the then-required low and moderate income assistance amount (the “LMI Amount”). In satisfaction of this liability, the City shall work with the Developer to find a solution that does not affect the feasibility of the Project. Such solution shall include offering the Developer an opportunity to separately satisfy the “low and moderate income assistance” requirement for the Project or extending the Payments as set out in Section B.10 below so that the Developer realizes the total benefit of this Agreement. Only if the Developer is unable to separately satisfy the “low and moderate income assistance” requirement in some other way, may the City withhold an amount equal to the LMI Amount from the Payments (as hereinafter defined) remaining to be made hereunder or seek cash payment from the Developer.

7. Transfer of Ownership of Property. Beginning on the Commencement Date and continuing for a period of five (5) years thereafter, the Developer agrees that it will not

sell or otherwise transfer ownership of any portion of the Property, including the Project, without the prior written consent of the City.

8. Default Provisions.

a. Events of Default. The following shall be “Events of Default” under this Agreement, and the term “Event of Default” shall mean, whenever it is used in this Agreement (unless otherwise provided), any one or more of the following events:

- (i) Failure by the Developer to complete construction of the Project substantially in accordance with the terms and conditions of this Agreement.
- (ii) Failure by the Developer to fully and timely remit payment of property taxes when due and owing.
- (iii) Failure by the Developer to enter into the Assessment Agreement pursuant to the terms and conditions of this Agreement.
- (iv) Failure by the Developer to comply with Sections A.2, A.5 and A.7 of this Agreement.
- (v) Failure by the Developer to observe or perform any other material covenant on its part, to be observed or performed hereunder.

b. Notice and Remedies. Whenever any Event of Default described in this Agreement occurs, the City shall provide written notice to the Developer describing the cause of the default and the steps that must be taken by the Developer in order to cure the default. The Developer shall have thirty (30) days after receipt of the notice to cure the default or to provide assurances satisfactory to City that the default will be cured as soon as reasonably possible. If the Developer fails to cure the default or provide assurances, City shall then have the right to:

- (i) Pursue any action available to it, at law or in equity, in order to enforce the terms of this Agreement.
- (ii) Withhold the Payments under Section B.1 of this Agreement, such right being additional to the right of annual appropriation as set forth in Section B.2 below.
- (iii) Terminate this Agreement.

9. Legal Fees. The Developer hereby acknowledges that the City will cover the initial payment of legal fees and administrative costs (the “Actual Admin Costs”) incurred by the City in connection with the drafting, negotiation and authorization of this Agreement, including the necessary amendment to the Urban Renewal Plan for the Urban Renewal Area. Furthermore, the Developer agrees that the City shall withhold an amount (the “Admin Withholding Amount”) equal to the lesser of (1) \$10,000 or (2) the Actual Admin Costs from the Incremental Property Tax Revenues before making any Payments to the Developer, as provided for under Section B.2 below, in order to recover some or all of the Actual Admin Costs.

B. City's Obligations

1. Payments. In recognition of the Developer's obligations set out above, the City agrees to make fourteen (14) semiannual economic development tax increment payments (the "Payments" and, individually each, a "Payment") to the Developer during the Term pursuant to Chapters 15A and 403 of the Code of Iowa, provided however that the aggregate, total amount of the Payments to be made under this Agreement during the Term shall not exceed \$909,535 (the "Maximum Payment Total"). The Payments shall be funded from the incremental valuation of the Property for a period not in excess of seven (7) fiscal years, commencing in the first year of the Payments. All Payments under this Agreement shall be subject to annual appropriation by the City Council, as provided hereunder.

The Payments shall not constitute general obligations of the City, but shall be made solely and only from the Incremental Property Tax Revenues received by the City from the Polk County Treasurer attributable to the taxable valuation of the Property.

Prior to funding any Payments under this Agreement, the City will first withhold from the Incremental Property Tax Revenues an amount equal to the Admin Withholding Amount. Once an amount equal to the Admin Withholding Amount has been withheld by the City, the Payments shall be made as hereinafter set forth.

The Payments will be made on December 1 and June 1 of each fiscal year following an affirmative appropriation decision as provided for under Section B.3 below, beginning on December 1 of the fiscal year immediately succeeding the year in which the Triggering Certification is made, and continuing for a period of a total of seven (7) fiscal years, provided, however, that no Payments will be made after the sooner of (1) the date on which the aggregate sum of Payments made hereunder equals the Maximum Payment Total; or (2) June 1, 2035.

For example, assuming the Triggering Certification is made October 15, 2026 and all appropriation determinations are approved affirmatively by the City Council under Section B.3 below, then Payments will be made on each December 1 and June 1, beginning December 1, 2027, and continuing through and including the sooner of June 1, 34 or the date on which the aggregate sum of Payments made hereunder equals the Maximum Payment Total.

2. Annual Appropriation. The Payments shall be subject to annual appropriation by the City Council. Prior to December 1 of each year during the Term (as hereinafter defined) of this Agreement, beginning in the fiscal year in which the Triggering Certification is filed, the City Council of the City shall consider the question of obligating for appropriation to the funding of the Payments due in the following fiscal year, an amount (the "Appropriated Amount") of Incremental Property Tax Revenues to be collected in the following fiscal year equal to or less than the most recently submitted Developer's Estimate.

In any given fiscal year, if the City Council determines to not obligate the then-considered Appropriated Amount, then the City will be under no obligation to fund the Payments scheduled to become due in the following fiscal year, and the Developer will have no rights whatsoever to compel the City to make such Payments, to seek damages relative thereto or to compel the funding of such Payments in future fiscal years. A determination by the City Council to not obligate funds

for any particular fiscal year's Payments shall not render this Agreement null and void, and the Developer shall make the next succeeding submission of the Developer's Estimate as called for in Section A.5 above, provided however that no Payment shall be made after June 1, 2035. In the event of a Non-Appropriation, the City Council shall report such Non-Appropriation decision on the Municipal Securities Rulemaking Board's Electronic Municipal Market Access system as if it were a material event as defined in 17 C.F.R. 240.15c2-12 within thirty (30) days of the date of the Non-Appropriation decision.

3. Payment Amounts. The aggregate Payments to be made in a fiscal year shall not exceed an amount equal to the corresponding Appropriated Amount (for example, for the Payments due on December 1, 2027 and on June 1, 2028, the aggregate maximum amount of such Payments would be determined by the Appropriated Amount determined for certification by December 1, 2026). Furthermore, the amount of each such Payment shall not exceed the amount of Incremental Property Tax Revenues (excluding allocations of "back-fill" or "make-up" payments from the State of Iowa for property tax credits or roll-back) actually received by the City from the Polk County Treasurer attributable to the taxable incremental valuation of the Property in the six (6) months immediately preceding such Payment due date.

4. Certification of Payment Obligation. In any given fiscal year, if the City Council determines to obligate the then-considered Appropriated Amount, as set forth in Section B.2 above, then the Director of Finance will certify by December 1 of each such year to the Polk County Auditor an amount equal to the most recently obligated Appropriated Amount.

C. Real Estate Transfers.

1. Transfer of Real Property. The Developer agrees to transfer to the City unencumbered, fee simple title to the property legally described on Exhibit D-1 hereto at a purchase price of One Dollar (\$1.00). In exchange for the Developer transferring the property described on Exhibit D-1 hereto to the City, the City agrees to transfer to the Developer unencumbered, fee simple title to the property legally described on Exhibit D-2 hereto at the purchase price of One Dollar (\$1.00).

The real estate transactions (the "Real Estate Transactions") described in this Section C.1 shall be more specifically documented under separate real estate purchase agreement, deeds and such other documentation as shall be deemed necessary by the parties. The Real Estate Transactions shall be closed no later than January 1st, 2025.

2. Easements. The Developer agrees to provide the necessary easements to the City on the portion of real property legally described on Exhibit D-3.

3. Restoration of Property. The Developer will, at its own expense, promptly repair any damage to the real property described on Exhibit D-4 hereto that is any way disturbed by the construction of the Project including the necessary grading and replanting of any landscape features.

D. Administrative Provisions

1. Amendment and Assignment. Neither party may cause this Agreement to be amended, assigned, assumed, sold or otherwise transferred without the prior written consent of the other party. However, the City hereby gives its permission that the Developer's rights to receive the Payments hereunder may be assigned by the Developer to a private lender, as security on a credit facility taken with respect to the Project, without further action or consent on the part of the City, and the City agrees to reasonably cooperate with the Developer and the Developer's lenders in signing or expressly acknowledging any such assignments.

2. Successors. This Agreement shall inure to the benefit of and be binding upon the successors and assigns of the parties.

3. Term. The term (the "Term") of this Agreement shall commence on the Commencement Date and end on June 1, 2035 or on such earlier date upon which the aggregate sum of Payments made to the Developer equals the Maximum Payment Total.

4. Choice of Law. This Agreement shall be deemed to be a contract made under the laws of the State of Iowa and for all purposes shall be governed by and construed in accordance with laws of the State of Iowa.

5. Notices. Except as otherwise expressly provided in this Agreement, a notice or other communication under the Agreement, by either the City or the Developer to the other, shall be sufficiently given or delivered if it is dispatched by registered or certified mail, postage prepaid, return receipt requested, or delivered personally, and:

a) In the case of the Developer, is addressed to or delivered personally to 3611 NE Otter View Circle, #42, Ankeny, IA 50021

b) In the case of City, is addressed to or delivered personally to City Administrator, Windsor Heights City Hall, 1145 66th Street, Windsor Heights, IA 50324.

c) The City or the Developer may upon written notice to the other, change the address to which such notices and demands are made.

The City and the Developer have caused this Agreement to be signed, in their names and on their behalf by their duly authorized officers, all as of the day and date written above.

CITY OF WINDSOR HEIGHTS, IOWA

By: _____
Mayor

Attest:

City Clerk

WINDSOR MILLANG, L.L.C.

By: _____
Todd Millang, Manager

THE WINDSOR, L.L.C.

By: _____
Todd Millang, Manager

JENSFAM, LLC

By: _____
Nick Jensen, Manager

EXHIBIT A
LEGAL DESCRIPTION OF THE PROPERTY

The South 73.60 feet of Lot Three (3) in HOPKINS PLACE, an Official Plat; and the North ½ of Lot Twenty-three (23) and all of Lot Twenty-four (24) in HOPKINS PLACE, an Official Plat; all now included in and forming a part of the City of Windsor Heights, Polk County, Iowa

AND

Lot Twenty-two (22) (except the South 15 feet) and the South ½ of Lot Twenty-three (23) in HOPKINS-WOEHLER PLACE, an Official Plat now included in and forming a part of the City of Windsor Heights, Polk County, Iowa

AND

The East 265.4 feet of Lot Eleven (11); and Lot Twelve (12) (except the West 155 feet thereof); and the West 17.5 feet of the South 15 feet of Lot Twenty-two (22), all in HOPKINS-WOEHLER PLACE, an Official Plat, now included in and forming a part of the City of Windsor Heights, Polk County, Iowa

AND

Lot Four (4) in HOPKINS PLACE, an Official Plat, now included in and forming a part of the City of Windsor Heights, Polk County, Iowa

AND

Lot Five (5), except the West 15 feet thereof, in HOPKINS-WOEHLER PLACE, an Official Plat, now included in and forming a part of the City of Windsor Heights, Polk County, Iowa

AND

The North 60 feet of Lot Two (2) and the South 60 feet of the North 120 feet of Lots Two (2) and Three (3) in HOPKINS PLACE, an Official Plat, now included in and forming a part of the City of Windsor Heights, Polk County, Iowa

AND

EXCEPT those parts acquired by the State of Iowa, City of Des Moines and the City of Windsor Heights by Condemnation recorded in Book 7465 Page 428 in the Office of the Recorder of Polk County, Iowa.

[illegible]

EXHIBIT C
DEVELOPER'S ESTIMATE WORKSHEET

- (1) Date of Preparation: October ____, 20__.
- (2) Assessed Taxable Valuation of Property as of January 1, 20__:
\$_____.
- (3) Base Taxable Valuation of Property:
\$_____.
- (4) Incremental Taxable Unabated Valuation of Property (2 minus 3):
\$_____ (the "Unabated TIF Value").
- (5) Current City fiscal year consolidated property tax levy rate for purposes of calculating Incremental Property Tax Revenues (the "Adjusted Levy Rate"):
\$_____ per thousand of value.
- (6) The Unabated TIF Value (4) factored by the Adjusted Levy Rate (5).
\$_____ x \$_____ /1000 = \$_____ (the "Unabated Value TIF Estimate")
- (7) Revenues Generated by the Non-Exempt School District Levies on the Abated Valuation less the school district levies for debt service, the school district instructional support and physical plant and equipment levies, and any other school district which may be exempted from the calculation of revenues pursuant to Section 403.19 of the Code of Iowa by action of the Iowa General Assembly:
\$_____ (the "School District Levy Revenues").
- (8) The sum of the Unabated Value TIF Estimate (7) plus the School District Levy Revenues (8)
\$_____ + \$_____ = \$_____ (the "Developer's Estimate")

The base valuation of the Property for purposes of calculating Incremental Property Tax Revenues under Section 403.19 of the Code of Iowa and the Agreement shall be the taxable valuation of the Property as of January 1 of the year prior to the year in which the Triggering Certification is filed

EXHIBIT D-1

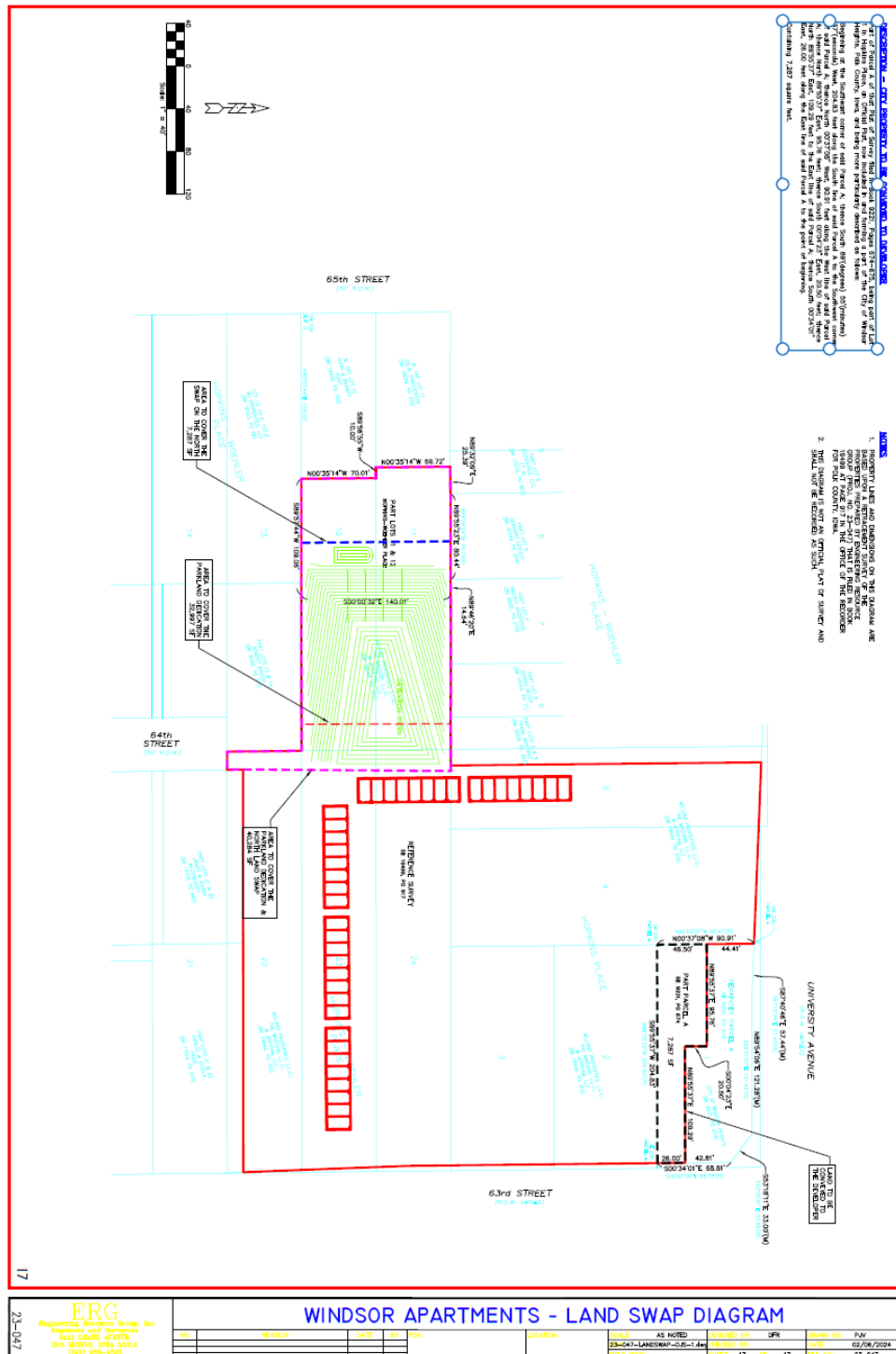
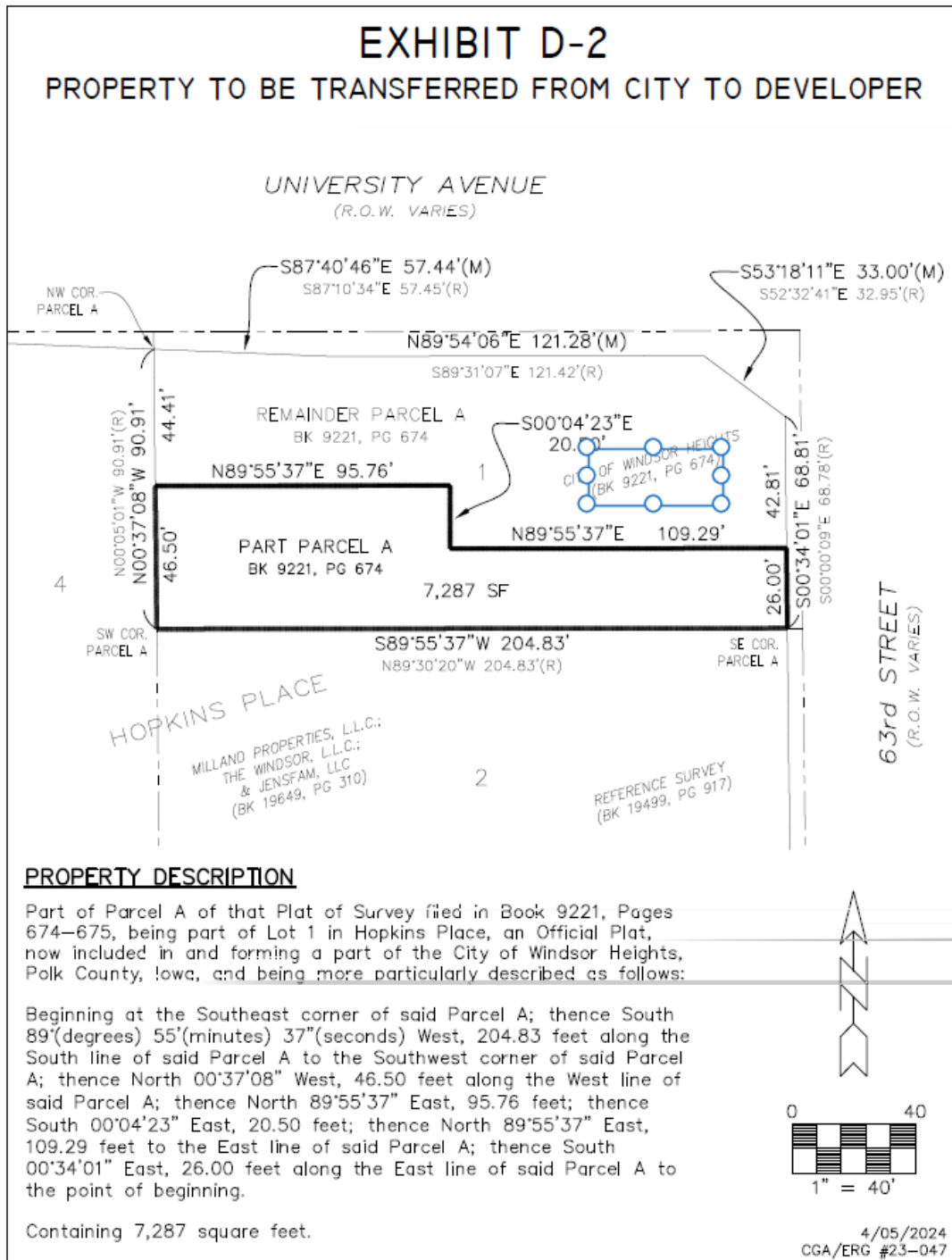


EXHIBIT D-2
PROPERTY TO BE TRANSFERRED FROM CITY TO DEVELOPER



J:\2023 Projects\23-047\Design\23-047-LANDSWAP.dwg, 5/6/2024 3:40:24 PM, DJS

EXHIBIT D-3
DESCRIPTION OF EASEMENT PROPERTY

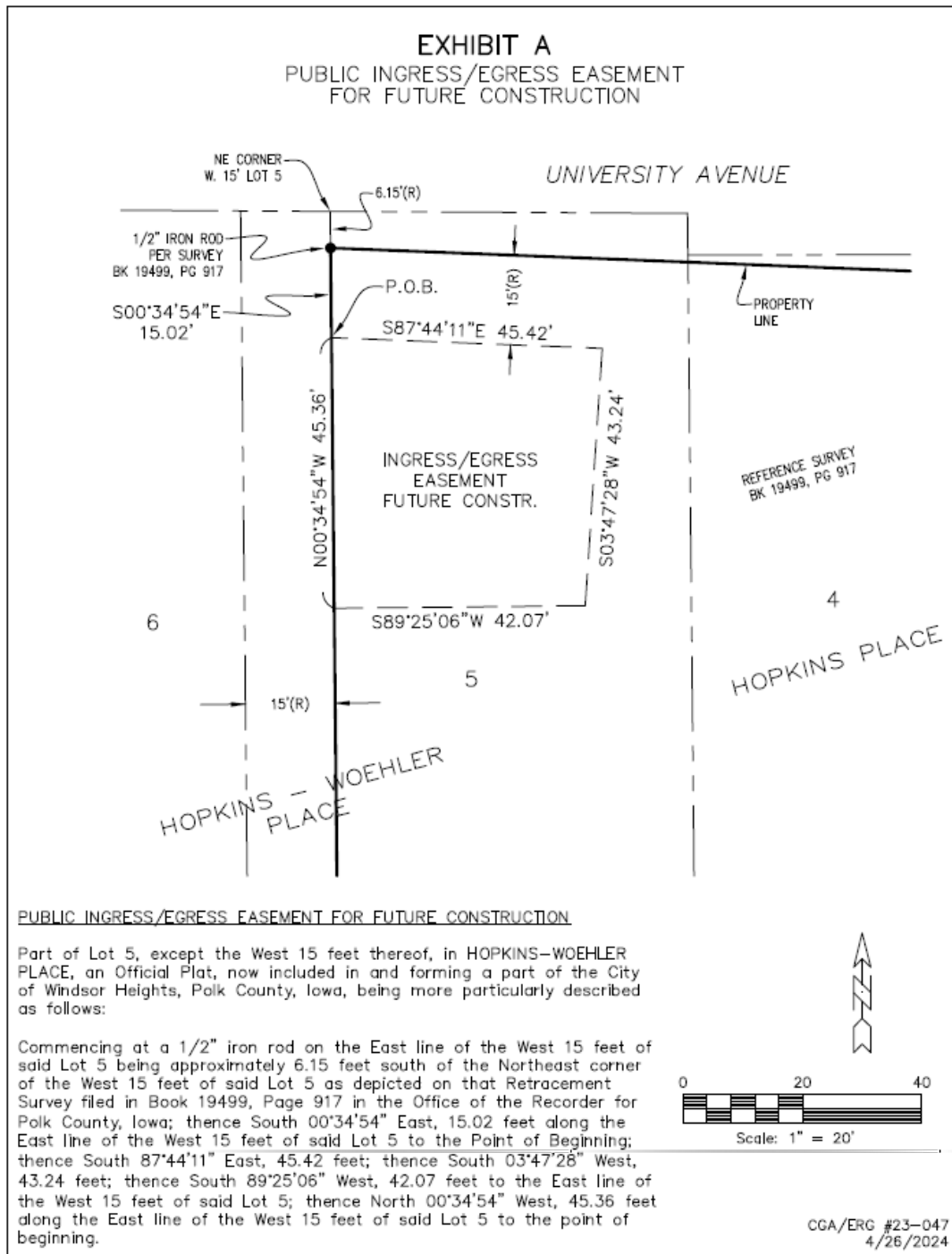


EXHIBIT D-4

DESCRIPTION OF PROPERTY TO BE RESTORED BY DEVELOPER

BEG SW COR THN N ALNG W LN 90.91F SELY 178.87F SE 32.95F S 68.78F TO PT ON S LN W 204.83F TO POB LT 1 HOPKINS PLACE not withstanding the portion of the property referred to in Exhibit D-2 to be transferred by the City to the Developer.

AMENDED AND RESTATED URBAN REVITALIZATION PLAN

CITY OF WINDSOR HEIGHTS, IOWA
WINDSOR HEIGHTS URBAN REVITALIZATION AREA

OCTOBER, 2022

INTRODUCTION

The Urban Revitalization Act, Chapter 404 of the Code of Iowa, is intended to encourage development, redevelopment and revitalization within a designated area of a city by authorizing property tax development incentives to the private sector. Qualified real estate within a designated area may be eligible to receive a total or partial exemption from property taxes on improvements for a specified number of years, with the goal of providing communities with a long-term increase or stabilization in the local tax base by encouraging new construction which might not otherwise occur.

Section 404.1 of the Code of Iowa provides that a City Council may designate an area of the City as a revitalization area, if that area is any of the following:

“An area in which there is a predominance of buildings or improvements, whether residential or nonresidential, which by reason of dilapidation, deterioration, obsolescence, inadequate provision for ventilation, light, air, sanitation, or open spaces, high density of population and overcrowding, the existence of conditions which endanger life or property by fire and other causes or a combination of such factors, is conducive to ill health, transmission of disease, infant mortality, juvenile delinquency or crime and which is detrimental to the public health, safety, or welfare.”

“An area which by reason of the presence of a substantial number of deteriorated or deteriorating structures, predominance of defective or inadequate street layout, incompatible land use relationships, faulty lot layout in relation to size, adequacy, accessibility or usefulness, unsanitary or unsafe conditions, deterioration of site or other improvements, diversity of ownership, tax or special assessment delinquency exceeding the actual value of the land, defective or unusual conditions of title, or the existence of conditions which endanger life or property by fire and other causes, or a combination of such factors, substantially impairs or arrests the sound growth of a municipality, retards the provision of housing accommodations or constitutes an economic or social liability and is a menace to the public health, safety, or welfare in its present condition and use.”

“An area in which there is a predominance of buildings or improvements which by reason of age, history, architecture or significance should be preserved or restored to productive use.”

“An area which is appropriate as an economic development area as defined in Section 403.17 of the Code of Iowa.”

“An area designated as appropriate for public improvements related to housing and residential development, or construction of housing and residential development including single or multifamily housing.”

Section 404.2 of the Code of Iowa requires that a city prepare a plan to govern activities within the proposed revitalization area, and the balance of this document is intended to set out the elements of a plan that are mandated by state law.

A. DESCRIPTION OF THE AREA AND MAP

The revitalization area shall be known as the Windsor Heights Urban Revitalization Area (the “Revitalization Area”), and the legal description of real property to be included within the Revitalization Area is as follows:

All real property situated within the incorporated municipal limits of the City of Windsor Heights, Polk County, State of Iowa as of November 1, 2018.

A map showing the real property to be included within the Revitalization Area is attached as Exhibit A.

B. DESIGNATION CRITERIA

In accordance with Section 404.1 of the Act, the City Council has made the following determinations with respect to the Revitalization Area:

1. The Revitalization Area is an area which is appropriate as an economic development area as defined in Section 403.17 of the Code of Iowa.

2. The Revitalization Area is an area which is appropriate for public improvements related to housing and residential development, or construction of housing and residential development, including single or multifamily housing.

3. The redevelopment, economic development and promotion of housing and residential development in the Revitalization Area is necessary in the interest of the public welfare of the residents of the City and the Revitalization Area substantially meets the criteria set forth in Section 404.1 of the Act.

C. OBJECTIVES

This plan is prepared in conformance with Section 404.2 of the Code of Iowa for the purpose of providing incentives and outlining procedures to enhance the potential for new residential development in the Revitalization Area. Planning goals include revitalizing the area through the promotion of new construction on vacant land, rehabilitation of existing residential property, stabilizing and increasing the tax base, and providing overall aesthetic improvement.

D. PRESENT ZONING AND PROPOSED LAND USE

The property within the Revitalization Area is zoned for residential, commercial and industrial purposes, and new and expanded residential development is proposed in the Revitalization Area.

E. PROPOSALS FOR EXPANDING CITY SERVICES

The City proposes that, as it becomes financially feasible, the provision of municipal services to the Revitalization Area will be expanded and improved to meet the demands of new residential development.

F. ELIGIBLE IMPROVEMENTS AND EXEMPTIONS

1. **Residential Improvements (Single Family).** The construction of new residential facilities and the rehabilitation of and the construction of additions to existing residential facilities.

Exemption: All qualified real estate assessed as residential property, excluding property classified as residential property under Section 441.21, subsection 14, paragraph “a”, subparagraph (6) of the Code of Iowa, is eligible to receive an exemption from taxation on the first \$75,000 of actual value added by the improvements for a period of four years, as follows:

For the first year, an exemption from taxation on 100% of the first \$75,000 of actual value added.

For the second year, an exemption from taxation on 75% of the first \$75,000 of actual value added.

For the third year, an exemption from taxation on 50% of the first \$75,000 of actual value added.

For the fourth year, an exemption from taxation on 25% of the first \$75,000 of actual value added.

2. **Residential Improvements (Multifamily).** The construction of new residential facilities and the rehabilitation of and the construction of additions to existing residential facilities if such residential facilities contain three or more separate dwelling units.

Exemption: All qualified real estate assessed as residential property under Section 441.21, subsection 14, paragraph “a”, subparagraph (6) of the Code of Iowa, is eligible to receive an exemption from taxation for a period of seven years as follows:

For the first through fifth years, an exemption from taxation on 100% of the actual value added.

For the sixth and seventh years, an exemption from taxation on 75% of the actual value added.

G. ACTUAL VALUE ADDED

Actual value added by improvements, as used in this plan, means the actual value added as of the first year for which the exemption was received. In order to be eligible for tax abatement for residential improvements, the increase in actual value of the property must be at least 10%.

All improvements, in order to be considered eligible, must be completed in conformance with all applicable regulations of the City of Windsor Heights, and must be completed during the time the Revitalization Area is designated by ordinance as a revitalization area.

H. TIME FRAME

Eligibility for tax abatement under this plan will exist after the date of the adoption of the ordinance designating the Revitalization Area, until, in the opinion of the City Council, the desired level of revitalization has been attained or economic conditions are such that the continuation of the exemption granted would cease to be of benefit to the City, in which case the City Council may repeal the ordinance, pursuant to Section 404.7 of the Code of Iowa. In the event the ordinance is repealed, all exemptions granted prior to such repeal shall continue until their expiration.

I. APPLICATION PROCEDURES

An application shall be filed for each new exemption claimed. The property owner must apply to the City for an exemption by February 1st of the assessment year for which the exemption is first claimed. The application shall contain, but not be limited to, the following information: The nature of the improvement, its cost, and the estimated or actual date of completion of the improvement.

J. APPROVAL OF APPLICATIONS

The City Council shall approve all applications submitted for completed projects if:

1. The project, as determined by the City Council, is in conformance with this plan;
2. The project is located within the Revitalization Area; and,
3. The improvements were made during the time the Revitalization Area was designated by ordinance as a revitalization area.

All approved applications shall be forwarded to the County Assessor for review, pursuant to Section 404.5 of the Code of Iowa. The County Assessor shall make a physical review of all properties with approved applications. The County Assessor shall determine the increase in actual value for tax purposes due to the improvements and notify the applicant of the determination, which may be appealed to the local board of review pursuant to Section 441.37 of the Code of Iowa. After the initial tax exemption is granted, the County Assessor shall continue to grant the tax exemption for the time period specified on the approved application. The tax

exemptions for the succeeding years shall be granted without the owner(s) having to file an application for succeeding years.

K. OTHER SOURCES OF REVITALIZATION FUNDS

The City anticipates no federal or state grants or loans for improvements in the Revitalization Area at this time other than those of conventional lending institutions at normal market rates.

However, it is not the intention of the City to prohibit the use of other appropriate federal or state revitalization or incentive programs within the area.

L. RELOCATION PROVISIONS

The City does not anticipate the displacement or relocation of any persons, families, or businesses as a result of the improvements to be made in the Revitalization Area.

M. OWNERS OF PROPERTY AND ASSESSED VALUATION

The names and addresses of the owners of the property located within the Revitalization Area and the assessed valuation of such property is set forth on Exhibit B attached hereto.

N. REVITALIZATION AREA ALSO INCLUDED IN WINDSOR HEIGHTS CONSOLIDATED URBAN RENEWAL AREA

A portion of the real property being included as part of the Revitalization Area has also been included in the City's existing Windsor Heights Consolidated Urban Renewal Area established pursuant to the Urban Renewal Act, Chapter 403 of the Code of Iowa. Properties from which incremental property tax revenues have been pledged for the payment of bonds, notes, contracts or other urban renewal obligations of the City are ineligible for tax exemption under Section F of this Plan.

EXHIBIT A

MAP OF PROPERTY IN WINDSOR HEIGHTS URBAN REVITALIZATION AREA

EXHIBIT B

**NAME AND ADDRESSES OF THE OWNERS OF PROPERTY LOCATED WITHIN THE
REVITALIZATION AREA AND ASSESSED VALUATION OF SUCH PROPERTY**

City of Windsor Heights Regular Business Meeting Minutes
Monday, May 20, 2024 - 6:00 PM
WINDSOR HEIGHTS COUNCIL CHAMBERS - 1133 66th ST

1. Call to Order/Roll Call/Pledge of Allegiance

Mayor Jones called the meeting to order at 6:00 PM. Council members present: Susan Skeries, Michael Libbie, Lauren Campbell, Threase Harms, and Joseph Jones. Staff present: City Administrator Adam Plagge, City Clerk Adam Strait, Finance Director Rachelle Swisher, Police Chief Pete Roth, Fire Chief Jim Mease, City Engineer Justin Ernst

2. Approval of the Agenda

Motion by Threase Harms to APPROVE. Seconded by Joseph Jones. Motion passed 5-0.

3. Presentation from MPO

Chris Shires from the Des Moines Area Metropolitan Planning Organization (MPO) presented the organization's Comprehensive Safety Action Plan which has a goal to reduce and/or eliminate fatal and serious injury crashes.

A. Presentation Documents

4. Public Forum: This is time set aside for comments from the public on topics of City business other than those listed on the agenda. No action may be taken. Please come to the podium, state your name and address for the record and keep your comments to no more than 5 minutes.

No pulic comment given

5. Consent Agenda: Any item on the Consent Agenda may be removed for separate consideration.

Motion by Joseph Jones to APPROVE. Seconded by Threase Harms. Motion passed 5-0.

A. Approve Minutes of the Regular Council Meeting on May 6, 2024

B. Approve Financial Reports

C. Approve Resolution No. 2024-36 - A Resolution Setting a Date of Meeting at Which it is Proposed to Approve a Development Agreement with Millang Properties, L.L.C., the Windsor, L.L.C. and Jensfam, LLC, Including Annual Appropriation Tax Increment Payments

D. Approve Resolution 2024-38 A Resolution Setting a Public Hearing on the Plans, Specifications, Form of Contract and Estimate of Costs for the Windsor Heights CEC Solar Project

6. Action Items:

A. Consideration of Sister Cities Windsor Heights Representative's Request for Reimbursement for 2024 Kofu, Japan Delegation Trip

Mayor Mike Jones presented the request. Threase Harms suggested around \$4,000 based on her research for a trip as described. Staff confirmed based on a 2023 request that there was \$3,800 allocated in the City budget. Motion by Threase Harms to APPROVE Up to \$3,800 for Reimbursement for Sister Cities Windsor Heights Representative's 2024 Kofu, Japan Delegation Trip. Seconded by Joseph Jones. Motion passed 5-0.

- B. Consideration of Resolution No. 2024-37 - Resolution awarding General Obligation Urban Renewal Bonds, Series 2024A and authorizing and approving a Loan Agreement, providing for the sale and issuance of Bonds and providing for the levy of taxes to pay the same
Tionna Pooler, City Financial Advisor, presented the bid tabulation and presented an overview of the sale of the bond with the recommendation to award the bid to Northland Securities, Inc. Motion by Threase Harms to APPROVE. Seconded by Joseph Jones. Motion passed 5-0.
- C. Consideration of Resolution No. 2024-35 - A Resolution Awarding the 2024 Televising Project to Hydro-Klean, LLC
Adam Plagge presented the need for the televising project and the concerns impacting residents. Justin Ernst was available to answer Council questions. Motion by Threase Harms to APPROVE. Seconded by Joseph Jones. Motion passed 5-0.
- D. Consideration of the 2nd Reading of Ordinance 2024-04 - An Ordinance Amending the Code of Ordinances for the City of Windsor Heights, Iowa, by Amending Chapter 185, Governing Floodplain Management
Adam Plagge commented that there had been no changes to the ordinance and no comments received. Motion by Threase Harms to APPROVE. Seconded by Susan Skeries. Motion passed 5-0.
- E. Consideration of the 3rd Reading of Ordinance No. 2024-03 - An Ordinance Amending the Code of Ordinances for the City of Windsor Heights, Iowa, by Amending Chapter 136, Governing Sidewalk Regulations; and to Adopt and Publish
Adam Plagge commented that there had been no changes to the ordinance and no comments received. Letters have been sent to residents and there has been two residents who have opted in. Motion by Michael Libbie to APPROVE. Seconded by Susan Skeries. Motion passed 5-0.

7. **Reports:**

- A. Mayor, Council Reports and Committee Updates, and Administration Reports
Mike Jones - The MPO policy committee meet last week, There are 5 million dollars left in carbon reduction money that didn't go to DART, A subcommittee is putting together an application to apply for funding, It would potentially be something to look at for 73rd Street funding, Will bring an update once the parameters are set
Threase Harms - MAC meeting is upcoming in June, Personal and Finance Committee meeting upcoming, Enjoyed time in DC for the partnership trip
Lauren Campbell - Attended DART meeting on May 7, Spoke towards reimagined DART for Windsor Heights to ensure we still have access to high quality public transportation, A survey will be coming for elected officials and city administrators as well as focus groups, Thanks to all who went to DC for the partnership trip and advocated for the City's needs, Thank to DART for putting on the rodeo, Represented the City well with bus driving skills
Michael Libbie - Had a productive DMDC meeting, Had a long Economic Development Committee, Talked to the new owner of 6500 University Ave and what he may do there, Other topics included the land use map, historic homes along University, ideas for Sherwood Forest, and the status of the old Sears building
Joseph Jones - No report
Susan Skeries - Had a fun time in DC with everyone from Windsor Heights and everyone from Des Moines area, Attended the Metro Waste Authority (MWA) meeting on May 15th, Held a Special Events Committee meeting on Friday, Mayor Jones sent out a reminder for Dinner Dispatch's 5 year anniversary on May 21, Set up a Chamber Connection event at MWA's facility in Grimes on May 30, On May 31 is Touch a Truck

sponsored by Matt Cale and Marco's Pizza also attending will be MidAmerican Energy, MWA, Goldfish Swim School, Customer Concrete Pumping, Public Works, Police Department, and Fire Department, Always looking for volunteers for events to help have eyes and ears on kids, Big Urbandale Chamber event is coming up on May 23 the Central Iowa Business Conference, June 2 is the second Movies in the Park showing Elemental and still looking for volunteers to help

Adam Plagge - The Windsor will be in front of Planning and Zoning on Wednesday and will come up to Council at next meeting, Be weather aware for tomorrow's storms, Public Works is on alert, Met with the Foundation on a game plan for Nights in the Heights, Thanks to Lieutenant Norris for working with Walmart to allow for parking in their parking lot, Update on 73rd Street concerns: Walked 73rd and didn't see any pedestrian impact, Seems to have calmed down

i Police Report

8. **Adjourn**

Motion by Threase Harms to adjourn at 6:54 PM. Seconded by Joseph Jones. Motion passed 5-0.

Mike Jones, Mayor

Adam Strait, City Clerk



**STAFF REPORT
CITY COUNCIL**
June 3, 2024

TO: CITY COUNCIL
FROM:
SUBJECT: Approve Financial Reports

GENERAL INFORMATION

ATTACHMENTS

1. Claims Report
2. Claims Report Vendor Activity

VENDOR NAME	REFERENCE	AMOUNT	VENDOR TOTAL	CHECK#	CHECK DATE
AIRGAS	OXYGEN	7.20		56810	5/17/24
AIRGAS	OXYGEN	71.58	78.78	56872	5/24/24
AMAZON CAPITAL SERVICES	OFFICE SUPPLIES	61.68		56811	5/17/24
AMAZON CAPITAL SERVICES	POPCORN BAGS	74.99	136.67	56873	5/24/24
AMERICAN ALARMS	CELLULAR COMMUNICATOR		1,557.04	56812	5/17/24
AMERITAS LIFE INS. CORP.	VISION INS	298.00		4904	5/17/24
AMERITAS LIFE INS. CORP.	DENTAL	3,091.92		4905	5/17/24
AMERITAS LIFE INS. CORP.	VISION INS	254.28	3,644.20	4919	5/21/24
ARNOLD MOTOR SUPPLY	SUPPLIES		249.46	56813	5/17/24
ASSURITY	ASSURITY		773.04	4923	5/21/24
BAKER ELECTRIC INC.	UTILITY LOCATES		5,618.84	56874	5/24/24
BANKERS TRUST COMPANY	CC FEES	34.22		4906	5/17/24
BANKERS TRUST COMPANY	CC FEES	260.24		4907	5/17/24
BANKERS TRUST COMPANY	CC FEES	136.16		4908	5/17/24
BANKERS TRUST COMPANY	SEE VENDOR	3,393.70	3,824.32	56871	5/22/24
BARCO MUNICIPAL PRODUCTS	SQUARE POSTS		334.31	56814	5/17/24
BITUMINOUS MATERIALS	AMIBOND		200.00	56815	5/17/24
BOLTON & MENK	COLBY PARK	100,462.00		56816	5/17/24
BOLTON & MENK	73RD ST RAISE GRANT	4,218.00	104,680.00	56875	5/24/24
BOOT BARN INC	CLOTHING ALLOWANCE	166.47		56817	5/17/24
BOOT BARN INC	CLOTHING ALLOWANCE	324.69	491.16	56876	5/24/24
BOUND TREE MEDICAL LLC	MEDICAL SUPPLIES		646.42	56818	5/17/24
BOWERS, RYAN	CLOTHING ALLOWANCE		145.98	56877	5/24/24
BRICK GENTRY PC	APRIL LEGAL FEES		5,655.00	56819	5/17/24
BULLZEYE, INC	APRIL PSB CLEANING		901.00	56820	5/17/24
CAPITAL ONE TRADE CREDIT	SUPPLIES	169.98		56821	5/17/24
CAPITAL ONE TRADE CREDIT	COMPACTOR REPAIRS	15.14	185.12	56878	5/24/24
CENTURY LINK	TELEPHONE		230.26	56879	5/24/24
CINTAS	SUPPLIES		14.30	56880	5/24/24
CITY OF WEST DES MOINES	WESTCOM		12,602.18	56822	5/17/24
CLIVE POWER EQUIP.	SUPPLIES	55.60		56823	5/17/24
CLIVE POWER EQUIP.	3HP EDGER	821.00	876.60	56881	5/24/24
CONSTRUCTION MATERIALS TESTING	COLBY PARK		498.75	56824	5/17/24
CORELL RECYCLING	CONCRETE DISPOSAL		292.53	56825	5/17/24
DES MOINES REGISTER	NEWSPAPER		91.98	56882	5/24/24
DES MOINES WATER WORKS	1133 66TH ST		89.12	56826	5/17/24
EASTERN IOWA TIRE	TRUCK #4 NEW TIRE		179.12	56827	5/17/24
EILEENS COOKIES	COOKIES - MOVIES IN PARK		108.00	56883	5/24/24
ELECTRICAL ENG.& EQUIPMENT	SUPPLIES		15.50	56828	5/17/24
EMERGENCY APPARATUS MAINTENANC	E551 ANNUAL MAINTENANCE		5,527.67	56829	5/17/24
EO JOHNSON	COPIER		607.30	56830	5/17/24
FEDERAL TAX DEPOSIT	FED/FICA TAX	28,915.33		4920	5/21/24
FEDERAL TAX DEPOSIT	FED/FICA TAX	1,946.54	30,861.87	4925	5/21/24
GALLS INC	CLOTHING ALLOWANCE	478.71		56831	5/17/24
GALLS INC	CLOTHING ALLOWANCE	118.40	597.11	56884	5/24/24
GAME ONE	CLOTHING ALLOWANCE		916.60	56832	5/17/24
GANNETT IOWA LOCALIQ	PUBLICATIONS		770.03	56833	5/17/24
GRIMES ASPHALT & PAVING	STREET MAINTENANCE SUPPLIES	229.50		56834	5/17/24
GRIMES ASPHALT & PAVING	STREET MAINTENANCE SUPPLIES	273.00	502.50	56885	5/24/24
HY-VEE ACCOUNTS RECEIVABLE	FLOWERING ANNUALS		229.31	56835	5/17/24
ICMA RETIREMENT TRUST	ICMA	551.48		4917	5/21/24
ICMA RETIREMENT TRUST	ICMA	1,309.84	1,861.32	4926	5/22/24
INTERSTATE ALL BATTERY	MOWER BATTERY		109.40	56836	5/17/24
IOWA PRISON INDUSTRIES	CLOTHING ALLOWANCE		230.00	56837	5/17/24

VENDOR NAME	REFERENCE	AMOUNT	VENDOR TOTAL	CHECK#	CHECK DATE
IOWA TUCKPOINTING LLC	PW SHOP		3,580.00	56838	5/17/24
IPERS	PROTECT IPERS		33,995.76	4916	5/21/24
ISOLVED BENEFIT SERVICES	FLEX - BENEFITS		1,810.00	4921	5/21/24
JEO CONSULTING GROUP	CRS PROGRAM ASSISTANCE		641.25	56839	5/17/24
KING'S MATERIAL, INC	LIONS PARK MULCH		579.73	56840	5/17/24
LOGAN CONTRACTORS SUPPLY	SURVEYOR FLAGS	55.38		56841	5/17/24
LOGAN CONTRACTORS SUPPLY	MARKING PAINT	108.00	163.38	56886	5/24/24
MANHATTANLIFE	MANHATTAN LIFE	288.74		4922	5/21/24
MANHATTANLIFE	BENEFITS	99.77	388.51	56842	5/17/24
WINDSOR HEIGHTS MP LLC	PIZZA MOVIES IN THE PARK		140.00	56887	5/24/24
MARTIN MARIETTA AGGREG.	STREET MAINTENANCE		734.28	56888	5/24/24
MASTROIANNI, VICTORIO	STORMWATER REIMBURSEMENT PROGR		512.81	56843	5/17/24
MED COMPASS MOBILE HEALTH SERV	STAFF PHYSICALS/FIT TESTING		1,860.00	56844	5/17/24
MENARDS	SUPPLIES	216.23		56845	5/17/24
MENARDS	PEAT MOSS	179.88	396.11	56889	5/24/24
MERSEAL, BRETT	REIMBURSE PAINT/SPACKLING		67.09	56890	5/24/24
METRO WASTE AUTHORITY	GARBAGE FEES	30,650.38		56846	5/17/24
METRO WASTE AUTHORITY	100 YARD WASTE STICKERS	150.00	30,800.38	56891	5/24/24
METRONET	INTERNET		628.21	56892	5/24/24
MIDAMERICAN ENERGY	801 73RD ST		30.31	4909	5/17/24
MOTOROLA SOLUTIONS, INC	PS RADIOS		9,772.24	56847	5/17/24
O'REILLY AUTO PARTS	MAINTENANCE SUPPLIES		129.21	56848	5/17/24
OMNI BILLING	EMS BILLING APRIL		1,268.20	56849	5/17/24
PFM FINANCIAL ADVISORS LLC	VALUATION ANALYSIS		7,500.00	56850	5/17/24
PLAGGE, ADAM	DC TRIP REIMBURSEMENT		416.51	56851	5/17/24
PPG ARCHITECTURAL FINISHES	CEC HAND RAILS PAINT		63.70	56852	5/17/24
PREMIER AUTOMOTIVE	C500 REPAIRS		1,833.63	56853	5/17/24
PURCHASE POWER	POSTAGE		820.99	56893	5/24/24
QPS EMPLOYMENT GROUP	5/4/24 DOUGLAS, LOUIS	1,601.46		56854	5/17/24
QPS EMPLOYMENT GROUP	5/18/24 DOUGLAS, LOUIS	312.48	1,913.94	56894	5/24/24
QUALITY PEST CONTROL, INC	PEST CONTROL		88.00	56855	5/17/24
RANGEMASTERS TRAINING CTR	CLOTHING ALLOWANCE	122.87		56856	5/17/24
RANGEMASTERS TRAINING CTR	CLOTHING ALLOWANCE	180.49	303.36	56895	5/24/24
RELIASTAR LIFE INS CO	NISSAN		75.00	56896	5/24/24
RISSI ELECTRIC	LED LIGHT UPGRADE DAY ROOM		200.00	56857	5/17/24
ROETMAN, JOE	CLOTHING ALLOWANCE REIMBURSE		635.15	56858	5/17/24
SAFE BUILDING COMPLIANCE	APRIL RENTAL INSPECTIONS		300.00	56859	5/17/24
SKERIES, SUSAN	EARTH DAY REIMBURSEMENT	77.51		56860	5/17/24
SKERIES, SUSAN	REIMBURSE MOVIES IN THE PARK	30.66	108.17	56897	5/24/24
STREICHER'S	CLOTHING ALLOWANCE		1,782.98	56898	5/24/24
TRANSUNION RISK & ALTERNATIVE	MONTHLY CHARGES		75.00	56861	5/17/24
TREASURER STATE OF IOWA	STATE TAX	8,285.96		4918	5/21/24
TREASURER STATE OF IOWA	STATE TAX	288.08	8,574.04	4924	5/21/24
ULINE	SUPPLIES		407.78	56899	5/24/24
UMB BANK	2016B PRINCIPAL	255,291.25		4910	5/17/24
UMB BANK	2016A PRINCIPAL	127,568.75		4911	5/17/24
UMB BANK	2020B PRINCIPAL	243,579.00		4912	5/17/24
UMB BANK	2020A INTEREST	769,915.00		4913	5/17/24
UMB BANK	2020A BOND FEES	600.00		4914	5/17/24
UMB BANK	2020B BOND FEES	600.00	1,397,554.00	4915	5/17/24
UPHDM OCCUPATIONAL MED	PHYSICAL		736.54	56862	5/17/24
WERTJES UNIFORMS	CLOTHING ALLOWANCE		330.50	56863	5/17/24
WEST DES MOINES TRUE VALUE	PIPE WRENCH/CHEATER BAR		151.73	56864	5/17/24
WEX FLEET UNIVERSAL	FUEL		3,315.95	56865	5/17/24

VENDOR NAME	REFERENCE	AMOUNT	VENDOR TOTAL	CHECK#	CHECK DATE
WRIGHT OUTDOOR SOLUTIONS	SPRING BED CLEANUP/PLANTINGS		4,346.07	56866	5/17/24
ZIMCO SUPPLY CO	GRASS SEED		377.00	56900	5/24/24
ZWC CONDOMINIUM ASSOC	CONDO ASSOC		335.95	56901	5/24/24
			=====		
	Accounts Payable Total		1,706,076.25		

Payroll Checks

001	GENERAL	3,982.00
110	ROAD USE TAX	610.97
740	STORM WATER	152.74

	Total Paid On: 5/21/24	4,745.71
001	GENERAL	68,711.02
110	ROAD USE TAX	6,817.04
740	STORM WATER	1,570.30

	Total Paid On: 5/24/24	77,098.36
		=====
	Total Payroll Paid	81,844.07
		=====
	Report Total	1,787,920.32
		=====

**CLAIMS REPORT
CLAIMS FUND SUMMARY**

Payroll Checks: 5/17/2024- 5/30/2024

FUND	NAME	AMOUNT
001	GENERAL	225,387.63
110	ROAD USE TAX	30,546.52
112	EMPLOYEE BENEFITS	4,874.53
200	DEBT SERVICE	1,397,554.00
303	COLBY PARK	44,055.25
322	73RD STREET PROJECT	9,697.00
323	68TH ST NORTH	5,560.00
326	68TH ST SOUTH	25,849.50
327	SALT SHED PROJECT	45.50
350	CAPITAL EQUIPMENT FUND	9,772.24
670	LANDFILL/GARBAGE	30,800.38
740	STORM WATER	3,777.77

	TOTAL FUNDS	1,787,920.32

ACCOUNTS PAYABLE VENDOR ACTIVITY

INVOICE NO	LN	DATE	PO NO	REFERENCE	TRACK		1099	NET	CHECK	PD DATE
					CD	GL ACCOUNT				
58 BANKERS TRUST COMPANY										
05172024 1	1	5/17/24		CC FEES		001-620-6405		34.22	4906	5/17/24 E
05172024 2	1	5/17/24		CC FEES		001-620-6405		260.24	4907	5/17/24 E
05172024 3	1	5/17/24		CC FEES		001-620-6405		136.16	4908	5/17/24 E
05222024 3526	1	5/22/24		STORAGE UNIT		001-470-6499		31.99	56871	5/22/24
05222024 3526	2	5/22/24		IMFOA DUES		001-620-6210		50.00	56871	5/22/24
05222024 3526	3	5/22/24		ZOOM		001-610-6507		31.98	56871	5/22/24
05222024 3526	4	5/22/24		ADOBE		001-615-6507		251.91	56871	5/22/24
05222024 3534	1	5/22/24		CONSTANT CONTACT		001-620-6373		81.00	56871	5/22/24
05222024 3534	2	5/22/24		LASERFICHE CONFERENCE		001-620-6240		86.00	56871	5/22/24
05222024 3534	3	5/22/24		LASERFICHE CONFERENCE		001-620-6240		11.75	56871	5/22/24
05222024 3534	4	5/22/24		LASERFICHE CONFERENCE		001-620-6240		26.37	56871	5/22/24
05222024 3534	5	5/22/24		LASERFICHE CONFERENCE		001-620-6240		25.54	56871	5/22/24
05222024 3534	6	5/22/24		LASERFICHE CONFERENCE		001-620-6240		18.21	56871	5/22/24
05222024 3534	7	5/22/24		LASERFICHE CONFERENCE		001-620-6240		7.32	56871	5/22/24
05222024 3534	8	5/22/24		LASERFICHE CONFERENCE		001-620-6240		58.77	56871	5/22/24
05222024 3534	9	5/22/24		LASERFICHE CONFERENCE		001-620-6240		19.95	56871	5/22/24
05222024 3534	10	5/22/24		LASERFICHE CONFERENCE		001-620-6240		5.49	56871	5/22/24
05222024 3534	11	5/22/24		LASERFICHE CONFERENCE		001-620-6240		80.00	56871	5/22/24
05222024 8417	1	5/22/24		NOTARY		001-110-6120		30.00	56871	5/22/24
05222024 8425	1	5/22/24		DS AMBULANCE MIRROR		001-150-6332		283.18	56871	5/22/24
05222024 8425	2	5/22/24		DS AMBULANCE MIRROR CREDIT		001-150-6332		42.80-	56871	5/22/24
05222024 8425	3	5/22/24		CLOTHING ALLOWANCE		001-150-6180		129.76	56871	5/22/24
05222024 8425	4	5/22/24		OFFICE CHAIRS FD		001-150-6721		470.97	56871	5/22/24
05222024 8425	5	5/22/24		FIRE PPE		001-150-6504		117.07	56871	5/22/24
05222024 8425	6	5/22/24		U557 STARTER		001-150-6332		179.54	56871	5/22/24
05222024 8425	7	5/22/24		FIRE PPE		001-150-6504		213.99	56871	5/22/24
05222024 8425	8	5/22/24		FIRE PREVENTION MATERIAL		001-150-6510		283.21	56871	5/22/24
05222024 8425	9	5/22/24		IA FIRE CHIEFS ASSOC MEMBERSHI		001-150-6210		25.00	56871	5/22/24
05222024 8425	10	5/22/24		GYM EQUIPMENT REPLACEMENT		001-150-6310		38.79	56871	5/22/24
05222024 8433	1	5/22/24		TRAINING		110-210-6230		100.00	56871	5/22/24
05222024 8433	2	5/22/24		CEC WATER PUMP		001-480-6511		316.18	56871	5/22/24
05222024 8433	3	5/22/24		TRAINING		110-210-6230		188.11	56871	5/22/24
05222024 8433	4	5/22/24		CEC WATER FOUNTAIN		001-480-6511		119.35	56871	5/22/24
05222024 8433	5	5/22/24		EARTH DAY DRINKS		001-470-6499		87.42	56871	5/22/24
05222024 9977	1	5/22/24		OFFICE SUPPLIES		001-620-6506		22.32	56871	5/22/24
05222024 9977	2	5/22/24		PUBLICATIONS		001-620-6414		25.40	56871	5/22/24
05222024 9993	1	5/22/24		GARAGE DOOR REPAIRS		001-110-6504		19.93	56871	5/22/24

BANKERS TRUST COMPANY								3824.32		

***** REPORT TOTAL *****								3824.32		



**STAFF REPORT
CITY COUNCIL**

June 3, 2024

TO: CITY COUNCIL

FROM: Justin Ernst, City Engineer

SUBJECT: Approve 73rd St Phase 1 (TP-U-8477(615)--70-77) Change Order 1

GENERAL INFORMATION

During the installation of the water main on 73rd Street, it was found that what was thought to be a circular 36" storm sewer was a 4'x4' concrete box storm sewer. The storm sewer appears to be in good working order. It was decided to utilize the existing concrete box storm sewer. By utilizing the existing storm sewer, the intake will be formed around the storm sewer and that was not planned. This change order is the price to construct the new intake. Overall, there will be a cost savings in utilizing the existing pipe and making these changes.

ATTACHMENTS

1. change_order_1_20240529



City of Windsor Heights - Iowa

Change Order Details

77-8477-615

Description	STP-U-8477(615)--70-77, Letting Date- March 19, 2024 73rd st Phase 1
Prime Contractor	ABSOLUTE CONCRETE CONSTRUCTION, INC.
Change Order	1
Status	Pending
Date Created	05/29/2024
Type	Non-Significant - Federal-aid Participating
Change Order Description	8001 - Add item "Intake, SW-506 MOD, CAST-IN-PLACE"
Awarded Project Amount	\$6,739,027.05
Authorized Project Amount	\$6,739,027.05
Change Order Amount	\$14,250.00
Revised Project Amount	\$6,753,277.05

B - Reason for change:

8001 - The plans have the structure to be an SW-506 for Int-56 (Sta 43+75), however, during construction a 4'x4' pipe was discovered that will be reused. The new structure will be formed around the existing pipe. Installation will be per standard specification 2435.

C - Settlement for cost(s) of change as follows with items addressed in Sections F and/or G:

8001 - (('EACH' ITEM): Intake, SW-506 MOD, Cast-in-Place) \$14,250.00/EA

1 EA x \$14,250.00/EA = \$14,250.00 Total cost of the additional work shown in Section F

D - Justification for cost(s) (See I.M. 6.000 Attachment D, Chapter 2.36, for acceptable justification):

8001 - The unit price is less than the high \$27,000 and average \$15,069.35 but higher than the low \$5,107.23.

E - Contract time adjustment:

1 additional working days added.

New Items

Line Number	Item ID	Unit	Quantity	Unit Price	Extension
Section: 0001 - STP-U-8477(615)--70-77, Roadway Items - Division 1					
8001	2599-9999005	EACH	1.000	\$14,250.000	\$14,250.00
('EACH' ITEM): INTAKE, SW-506 MOD, CAST-IN-PLACE					
Reason: The plans have the structure to be an SW-506 for Int-56 (Sta 43+75), however, during construction a 4'x4' pipe was discovered that will be reused. The new structure will be formed around the existing pipe. Installation will be per standard specification 2435. Method of measurement shall be per each installed. Basis of payment shall be per each installed. Justification of Cost: Unit price is acceptable when compared to unit prices for Intake, SW-506 MOD in the IDOT Summary of Awarded Contract Unit prices March 2022 to present. The unit price is less than the high \$27,000 and average \$15,069.35 but higher than the low \$5,107.23.					
			Funding Details		
77-8477-615-CAT-1 77-8477-615-CAT-1 77-8477-615			1.000	\$14,250.000	\$14,250.00
1 item					Total: \$14,250.00

Funding Summary

Fund Package	Original Amount	Authorized Amount	Pending Change	Revised Amount
77-8477-615-CAT-1 77-8477-615-CAT-1 77-8477-615	\$5,625,602.05	\$5,625,602.05	\$14,250.00	\$5,639,852.05
77-8477-615-CAT-2 77-8477-615-CAT-2 77-8477-615	\$1,113,425.00	\$1,113,425.00	\$0.00	\$1,113,425.00
77-8477-615-CAT-3 NON-PARTICIPATING	\$0.00	\$0.00	\$0.00	\$0.00
3 fund packages	\$6,739,027.05	\$6,739,027.05	\$14,250.00	\$6,753,277.05

Time Limit Changes

Type	Original Deadline	Current Deadline	Pending Extension	Pending Deadline
Working Days	300.0 Days	300.0 Days	1.0 Day	301.0 Days
Working Days, Late Start Date - 05/06/2024, Liquidated Damage Rate - 2,500				
Reason: Change order 1 additional work.				
1 time limit				

AGREED BY CONTRACTOR:

By: _____ Date: _____

Title: _____

RECOMMENDED BY ENGINEER:

By: _____ Date: _____

Title: _____

APPROVED BY WINDSOR HEIGHTS:

By: _____ Date: _____

Title: _____



**STAFF REPORT
CITY COUNCIL**

June 3, 2024

TO: CITY COUNCIL

FROM: Adam Plagge, City Administrator

SUBJECT: Approve the Mayor to Sign Certificate Authorizing Execution of Amendment to ChildServe 2022B Bonds

GENERAL INFORMATION

The City of Windsor Heights has acted as an issuer of tax-exempt bond debt for ChildServe in some prior deals. ChildServe also has some outstanding bonds with the Iowa Finance Authority. Childserve is needing to modify a few terms in our Indenture of Trust that will allow ChildServe to extend the draw period on its 2022B Bond Series. Although the Issuer of the 2022B Bonds is IFA, since the City of Windsor Heights is a party to the Indenture, the City's consent to enter into the amendment. There are no financial ramifications to the City of Windsor Heights as part of these bonds. The draft amendment is attached for reference and are expected to be finalized in the coming days.

ATTACHMENTS

1. Amendment to Fifth Supplement to Indenture - ChildServe - 2022 V. 2 - 3949135 v.2

IOWA FINANCE AUTHORITY
and
CITY OF WINDSOR HEIGHTS, IOWA
to
UMB BANK, n.a.
as Trustee

AMENDMENT TO THE
FIFTH SUPPLEMENTAL INDENTURE OF TRUST

Dated as of June __, 2024

THIS AMENDMENT TO THE FIFTH SUPPLEMENTAL INDENTURE OF TRUST (the “Amendment”), dated and effective as of the _____ day of June, 2024, is by and among the Iowa Finance Authority, a public and instrumentality and agency of the State of Iowa (the “Authority”), the City of Windsor Heights, Iowa, a municipal corporation and political subdivision organized and existing under the laws and the Constitution of the State of Iowa (the “City”), and UMB Bank, n.a., a national banking association, as successor trustee to Bankers Trust Company f/k/a/ Bankers Trust Company, NA, an Iowa-chartered banking association (the “Trustee”).

W I T N E S S E T H:

WHEREAS, the Authority and Wells Fargo Bank, National Association, as initial trustee, entered into an Indenture of Trust dated as of March 1, 2006 (as previously supplemented and amended by the Supplemental Indenture of Trust dated as of March 1, 2013, by the Second Supplemental Indenture of Trust dated as of April 24, 2015 for which Bankers Trust Company served as successor trustee, by a Third Supplemental Indenture of Trust dated as of April 24, 2015, by a Fourth Supplemental Indenture of Trust dated as of May 1, 2019, and by a Fifth Supplemental Indenture of Trust dated as of March 1, 2022 (altogether, the “Indenture”); and

WHEREAS, pursuant to the Indenture, the City previously issued its Revenue and Refunding Bonds (ChildServe Project) Series 2015A (the “Series 2015A Bonds”) and loaned the proceeds thereof to Borrower under a Loan Agreement dated April 24, 2015 with respect to the Series 2015A Bonds (the “Series 2015A Loan Agreement”) between Borrower and the City; and

WHEREAS, pursuant to the Indenture, the Authority previously issued its Revenue and Refunding Bonds (ChildServe Project) Series 2015B (the “Series 2015B Bonds”) and loaned the proceeds thereof to Borrower under a Loan Agreement dated as of April 24, 2015 with respect to the Series 2015B Bonds (the “Series 2015B Loan Agreement”) between Borrower and the Authority; and

WHEREAS, pursuant to the Indenture, the Authority issued its Revenue and Refunding Bonds (ChildServe Project) Series 2022A in an aggregate principal amount of \$18,400,000 (the “Series 2022A Bonds”) and its Revenue and Refunding Bonds (ChildServe Project) Series 2022B (Taxable) in an aggregate amount of \$4,100,000 (the “Series 2022B Bonds”) and loaned the proceeds of the Series 2022A Bonds and the Series 2022B Bonds to Borrower under a Loan Agreement dated as of March 1, 2022 (the “Series 2022 Loan Agreement”) among Borrower, Authority and Bankers Trust Company, as purchaser; and

WHEREAS, Borrower desires to make certain amendments to the Fifth Supplemental Indenture of Trust dated as of March 1, 2022 (the “Fifth Supplemental Indenture”); and

WHEREAS, the Borrower has previously entered into a (i) Mortgage and Security Agreement and Fixture Financing Statement dated as of March 1, 2006, as amended by the First Amendment to Mortgage and Security Agreement and Fixture Financing Statement dated as of March 14, 2013, the Second Amendment to Mortgage and Security Agreement and Fixture

Financing Statement dated as of April 14, 2015, an Assignment of Mortgage and Security Agreement and Fixture Financing Statement dated as of April 24, 2015, a Third Amendment to Mortgage and Security Agreement and Fixture Financing Statement dated as of May 1, 2019, an Assignment of Mortgage and Security Agreement and Fixture Financing Agreement dated as of March 9, 2022, a Partial Release of Real Estate Mortgage dated as of March 9, 2022, a Fourth Amendment to Mortgage and Security Agreement and Fixture Financing Statement dated as of March 9, 2022; and a (ii) Mortgage and Security Agreement and Fixture Financing Statement dated as of July 25, 2022 (altogether, the “Mortgage”), pursuant to which the Borrower pledged certain of its real and personal property (the “Mortgaged Property”) as security for the Series 2015A Bonds, the Series 2015B Bonds, the Series 2022A Bonds, the Series 2022B Bonds and any Additional Bonds; and

WHEREAS, Section 10.02 of the Indenture permits the amendment to the Indenture with the consent of the Bondholders; and

WHEREAS, the Authority, the City and the Trustee desire to enter into this Amendment for the purpose of supplementing the Indenture in connection with the amendment to certain provisions of the Series 2022B Bonds and as set forth herein;

NOW, THEREFORE, the parties hereto in consideration of the promises and mutual covenants and agreements hereinafter contained do hereby agree as follows:

Section 1. Definitions. Any terms used herein and not otherwise defined shall have the meanings set forth in the Indenture. The following definitions shall be added to or modified in Section 1.01 of the Indenture:

“Series 2022 Loan Agreement” means the Loan Agreement among the Authority, the Borrower and Bankers Trust Company, as purchaser, dated as of March 1, 2022, as amended by the Amendment to Loan Agreement (the “Amendment to Loan Agreement”) among the Authority, the Borrower and Bankers Trust Company, as purchaser, dated as of June __, 2024.

“Supplemental Indenture” means an agreement supplemental hereto executed pursuant to Article IX hereof and includes a previously supplemented and amended Supplemental Indenture of Trust dated as of March 1, 2013, the Second Supplemental Indenture of Trust dated as of April 24, 2015, the Third Supplemental Indenture of Trust dated as of April 24, 2015, the Fourth Supplemental Indenture of Trust dated as of May 1, 2019, a Fifth Supplemental Indenture of Trust dated as of March 1, 2022 and an Amendment to Fifth Supplemental Indenture of Trust dated as of June __, 2024.

Section 2. Exchange of Series 2022B Bonds.

(a) The Series 2022B Bonds in a form that shall be substantially in the form set forth as an exhibit to the Amendment to Loan Agreement, dated as of the date hereof, shall be exchanged for the originally executed Series 2022B Bonds.

(c) The Trustee shall authenticate the Series 2022B Bonds and such executed certificate of the Trustee upon the Series 2022B Bonds shall be conclusive evidence that such

Series 2022B Bonds have been authenticated and delivered under the Indenture. Trustee shall then deliver the Series 2022 Bonds to the Purchaser as directed by the Authority upon the filing with the Trustee of the following documents:

1. A copy, duly certified by the Director of the Authority, of the Resolution adopted by the Authority authorizing the exchange of the Series 2022B Bonds and the execution and delivery of this Amendment and the Amendment to Loan Agreement.

2. Original executed counterparts of the Amendment to the Series 2022 Loan Agreement, the Mortgage on the New Property (as such term is defined in the Amendment to Loan Agreement) being purchased with proceeds of the Series 2022B Bonds and this Amendment.

3. An opinion of Bond Counsel to the effect that the exchange of the Series 2022B Bond and the execution thereof have been duly authorized, all conditions precedent to the delivery thereof have been fulfilled, the exclusion from gross income for federal income tax purposes of the interest on the Series 2015A Bonds, the Series 2015B Bonds and the Series 2022A Bonds will not be affected by the exchange of the Series 2022B Bonds and the Amendment is authorized and permitted by the Indenture.

Section 3. Additional Provisions. The following additional provisions shall be added to Article XII of the Indenture:

(a) Section 12.11 Annual Information. The Trustee agrees that it will annually on or before August 15 of each year furnish the Issuer with a statement of the amount of the Outstanding Bonds as of the immediately preceding June 30. In addition, the Trustee and the Borrower shall provide the Issuer with any other information which may from time to time be requested concerning the Bonds according to the rules and interpretations of the Governmental Accounting Standards Board required to be disclosed concerning conduit debt obligations.

(b) Section 12.12 Actions by Issuer. Notwithstanding any provision herein or in any other agreement executed by the Issuer with respect to the Bonds to the contrary, the Issuer shall not be required to take any action hereunder unless and until (a) it is requested to take such action, (b) it has received in a timely manner the instrument to be executed in form and substance satisfactory to the Issuer, and (c) it shall have received assurances satisfactory to the Issuer in its sole discretion that its fees and expenses of the Issuer with respect to such action shall be paid; provided that, if the Issuer receives correspondence from the Internal Revenue Service with respect to the Bonds, the Issuer shall forward such correspondence to the Borrower within a reasonable time after such receipt.

(c) Section 12.13 Application of Uniform Electronic Transactions Act. The parties to this Indenture agree this Indenture and all documents related hereto or referenced herein may be entered into as provided for pursuant to and in accordance with Chapter 554D of the Code of Iowa.

Section 4. Counterparts. This Amendment may be simultaneously executed in several counterparts, each of which shall be an original and all of which shall constitute but one and the same instrument.

IN WITNESS WHEREOF, the Authority has caused this Amendment to be signed in its name and on its behalf by its Director; the City has caused this Amendment to be executed in its name and on its behalf by its Mayor and the seal of the City to be hereunto affixed and duly attested by the City Clerk; and the Trustee, to evidence its acceptance of the trusts created hereunder, has caused this Amendment to be executed in its name by its authorized officers and its corporate seal to be hereunto affixed and duly attested, all as of the day and year first above written.

IOWA FINANCE AUTHORITY

By: _____
Authorized Officer

CITY OF WINDSOR HEIGHTS, IOWA

By: _____
Mayor

(SEAL)

Attest:

By: _____
City Clerk

UMB BANK, N.A., as Trustee

By: _____
Minda Barr, Vice President

CONSENT TO AMENDMENT TO THE FIFTH SUPPLEMENTAL INDENTURE OF TRUST

The undersigned, ChildServe Inc., as Borrower, hereby consents to the execution and delivery of the foregoing Amendment and waives any notice requirements under the Indenture.

CHILDSERVE INC. and its Subsidiaries,
ChildServe Habilitation Center Inc., ChildServe
Homes Inc., ChildServe Medical Equipment &
Supply Inc., ChildServe Therapy Inc.,
ChildServe Foundation Inc., ChildServe
Community Options, Inc. and ChildServe
Homecare, Inc.

By _____
_____, Chairperson

By _____
_____, Secretary

CONSENT TO AMENDMENT TO THE FIFTH SUPPLEMENTAL INDENTURE OF TRUST

The undersigned, Bankers Trust Company, as Bondholder, hereby consents to the execution and delivery of the foregoing Amendment and waives any notice requirements under the Indenture.

BANKERS TRUST COMPANY

By _____



**STAFF REPORT
CITY COUNCIL**

June 3, 2024

TO: CITY COUNCIL

FROM: Adam Strait, City Clerk

SUBJECT: Approve FY 25 Tobacco Permits

GENERAL INFORMATION

FY 25 Tobacco Permits

- Hy-Vee Fast and Fresh - 7220 Hickman
- Hy-Vee Food Store - 7101 University
- Kum & Go #4098 - 7229 University
- Super Quick Mart - 7690 Hickman
- Walmart #1764 - 1001 73rd

ATTACHMENTS

None



**STAFF REPORT
CITY COUNCIL**

June 3, 2024

TO: CITY COUNCIL

FROM: Nate Leuthold, Deputy City Clerk

SUBJECT: Refunding fees for the Community Event Center for Iowa Primary Care on Thursday, May 30th, 2024

GENERAL INFORMATION

Iowa Primary Care is requesting a refund of their rental fees from the rental of the Windsor Heights Community Center on Thursday, May 30th from 9 AM to 3 PM. Due to lack of attendance, they canceled their reservation at the CEC and are hosting the event in their own space. Because they are a non-profit, they are requesting the rental fees to be returned to them. The fees paid for the rental (with the non-profit discount) were \$1,056.00.

ATTACHMENTS

None



**STAFF REPORT
CITY COUNCIL**

June 3, 2024

TO: CITY COUNCIL

FROM: Pete Roth

SUBJECT: Approve Lexipol Policy Management Platform Master Service Agreement

GENERAL INFORMATION

The police department is seeking approval for the Master Service Agreement (MSA) with Lexipol to subscribe to their policy and procedures manual services. The total Fiscal Year 2025 (FY 25) cost is estimated at \$17,200.00, which includes focused implementation and training. Beginning in FY 26, the annual subscription fee is estimated at \$9,200.00. This proposal has been in development for several years, and the department will seek grants from external organizations to help offset the costs. The amount has been planned for in the department's current budget.

SUMMARY

Lexipol is a highly regarded organization with over 20 years of experience. They serve over two million public safety and government professionals, offering agencies a comprehensive risk management solution.

Lexipol provides online training, grant services, and an electronic policy management platform, that will be extremely beneficial to our department. The service ensures that policies, procedures, and best practices are continually reviewed and updated in response to changes in state and federal laws, court rulings, and the evolving environment of law enforcement.

The department's current Policy and Procedure Manual, implemented in 2012, and fully revised in 2020, will benefit significantly from Lexipol's services. Their state-specific policy guidance is developed by subject matter experts in Iowa issues and vetted by attorneys. The policy and procedures can be accessed online or on a mobile device through an application. Staff can search for keywords to have the most updated information in the field. Updates and changes are made electronically and pushed out to department members as soon as implementation. The system tracks employee verification and has daily online training covering policies and procedures.

The department plans on applying for the newly created Iowa Law Enforcement Accreditation

Program. Having Lexipol policies will help immensely in that process. In addition, 64 Iowa law enforcement agencies utilize Lexipol for their policy solution.

The department worked closely with Lexipol over the past few years to secure a favorable fee for the subscription. Initially, the cost exceeded \$10,000. However, through negotiations, Lexipol offered a discount of \$1,613.70 on the annual subscription and \$1,415.25 on the one-time training fee, resulting in a total savings of over \$3,000.00.

Staff recommends the approval of the Lexipol Solutions Proposal to enhance the police department's policy management, training, and accreditation efforts.

ATTACHMENTS

1. Proposal - Windsor Heights PD



SOLUTIONS PROPOSAL



PREPARED FOR:

Windsor Heights Police Department
Chief Pete Roth
proth@windsorheights.org

PREPARED BY:

Rosemarie Curran
rcurran@lexipol.com
(949) 272-5818

2611 Internet Blvd, Ste 100
Frisco, Texas 75034
(844) 312-9500
www.lexipol.com

Executive Summary

Public safety agencies and local government organizations today face challenges of keeping personnel safe and healthy, reducing risk and maintaining a positive reputation. Add to that the dynamically changing legislative landscape and evolving best practices, and even the most progressive, forward-thinking departments can struggle to keep up.

Lexipol's solutions are designed to save you time and money while protecting your personnel and your community. Our team consists of professionals with expertise in public safety law, policy, state and federal accreditation, training, mental and physical wellness and grants. We continually monitor changes and trends in legislation, case law and best practices and use this knowledge to create policies, training, wellness resources and funding services that minimize risk and help you effectively serve your community.

THE LEXIPOL ADVANTAGE

Lexipol was founded by public safety experts who saw a need for a better, safer way to run a public safety agency. Since the company launch in 2003, Lexipol has grown to form an entire risk management solution for public safety and local government. Today, we serve more than 10,000 agencies and municipalities and 2 million public safety and government professionals with a range of informational and technological solutions to meet the challenges facing these dynamic industries. In addition to providing policy management, accreditation, online training, wellness resources, and grant assistance, we provide 24/7 industry news and analysis through the digital communities Police1, FireRescue1, Corrections1, EMS1 and Gov1.

Our customers choose Lexipol to make an investment in the safety and security of their personnel, their agencies and their communities. We help agencies address issues that create substantial risk, including:

- Inconsistent and outdated policies
- Lack of technology to easily update and issue policies and training electronically
- Unchecked mental health needs of staff
- Difficulty keeping up with new and changing legislation and practices
- Inability to produce policy acknowledgment and training documentation
- Unfamiliarity of city legal resources with the intricacies of public safety law
- The need to secure grant funding for critical equipment, infrastructure and personnel

Lexipol is backed by the expertise of 440 employees with more than 2,075 years of combined experience in constitutional law, civil rights, ADA and discrimination, mental health, psychology, labor negotiations, Internal Affairs, use of force, hazmat, instructional design, federal and state grants and a whole lot more. That means no more trying to figure out policy, achieve accreditation, develop training or wellness content, or secure funding on your own. You can draw on the experience of our dedicated team members who have researched, taught and lived these issues.

We look forward to working with Windsor Heights Police Department to address your unique challenges.

Scope of Services

Policy Manual

Constitutionally sound, up-to-date policies are the foundation for consistent, safe public safety operations and are key to reducing risk and enhancing personnel and community safety. Lexipol's comprehensive policy manual covers all aspects of your agency's operations.

- More than 155 policies researched and written by public safety attorneys and subject matter experts
- Policies based on State and federal laws and regulations as well as nationwide best practices
- Content customized to reflect your agency's terminology and structure

Daily Training Bulletins (DTBs)

Even the best policy manual lacks effectiveness if it's not backed by training. Lexipol's Daily Training Bulletins are designed to help your personnel learn and apply your agency's policy content through 2-minute training exercises.

- Scenario-based training ties policy to real-world applications
- Understanding and retention of policy content is improved via a singular focus on one distinct aspect of the policy
- Each Daily Training Bulletin concludes with a question that confirms the user understood the training objective
- Daily Training Bulletins can be completed via computers or from smartphones, tablets or other mobile devices
- Reports show completion of Daily Training Bulletins by agency member and topic

Policy Updates

Lexipol's legal and content development teams continuously review state and federal laws and regulations, court decisions and evolving best practices. When needed, we create new and updated policies and provide them to your agency, making it simple and efficient to keep your policy content up to date.

- Updates delivered to you through Lexipol's web-based content delivery platform
- Changes presented in side-by-side comparison against existing policy so you can easily identify modifications/improvements
- Your agency can accept, reject or customize each update

Web-Based Delivery Platform and Mobile App (Knowledge Management System)

Lexipol's online content delivery platform, called KMS, provides secure storage and easy access to all your policy and training content, and our KMS mobile app facilitates staff use of policies and training completion.

- Ability to edit and customize content to reflect your agency's mission and philosophy
- Efficient distribution of policies, updates and training to staff
- Archival and easy retrieval of all versions of your agency's policy manual
- Mobile app provides in-the-field access to policy and training materials

Reports

Lexipol's Knowledge Management System provides intuitive reporting capabilities and easy-to-read reports that enhance command staff meetings and strategic planning.

- Track and report when your personnel have acknowledged policies and policy updates
- Produce reports showing completion of Daily Training Bulletins
- Sort reports by agency member, topic and other subgroups (e.g., shift, assignment)
- Reduce the time your supervisors spend verifying policy acknowledgement and training completion

Supplemental Publication Service

Lexipol's Supplemental Publication Service (SPS) streamlines the storage of your agency's content, giving you one place to access procedures, guidelines, general orders, training guides or secondary policy manuals.

- Electronically links department-specific procedural or supplemental content to your policy manual
- Provides electronic issuance and tracking for your agency's procedural or supplemental content
- Allows you to create Daily Training Bulletins against your procedural content
- Designed for standard operating guidelines, procedures, general orders or field guides

Implementation Policy Tier I: High-Risk Policies

Benefit from our proven, systematic approach to implementing policies. Tier I represents about 20% of the manual, including foundational policies necessary to provide structure and authority to your policy manual, as well as policies addressing high-risk, low-frequency and high-risk, high-frequency incidents. You'll receive one-on-one collaborative assistance to help you review, customize and adopt the policies efficiently and effectively.

Implementation Policy Tier II: High-Liability Policies

Benefit from our proven, systematic approach to implementing policies. Tier II represents about 20% of the manual, including policies that relate to common day-to-day calls for service that have a higher level of potential liability. You'll receive one-on-one collaborative assistance to help you review, customize and adopt the policies efficiently and effectively.

Implementation Policy Tier III: Daily Operations Policies

Benefit from our proven, systematic approach to implementing policies. Tier III represents about 20% of the manual, including policies needed for orderly daily operations of your organization. You'll receive one-on-one collaborative assistance to help you review, customize and adopt the policies efficiently and effectively.

Implementation Policy Tier IV: Defensibility Policies

Benefit from our proven, systematic approach to implementing policies. Tier IV represents about 20% of the manual, including policies essential to agency and agency member defensibility, including civil liability-related topics. You'll receive one-on-one collaborative assistance to help you review, customize and adopt the policies efficiently and effectively.

Implementation Policy Tier V: Operational Consistency Policies

Benefit from our proven, systematic approach to implementing policies. Tier V represents about 20% of the manual, including policies needed to ensure operational consistency across your organization. You'll receive one-on-one collaborative assistance to help you review, customize and adopt the policies efficiently and effectively.



MASTER SERVICE AGREEMENT

Agency's Name: Windsor Heights Police Department
Agency's Address: 1133 66th St
Windsor Heights, Iowa 50324

Attention: Chief Pete Roth

Sales Rep: Rosemarie Curran
Lexipol's Address: 2611 Internet Boulevard, Suite 100
Frisco, Texas 75034

Effective Date: _____
(to be completed by Lexipol upon receipt of signed Agreement)

This Master Service Agreement (the "Agreement") is entered into by and between Lexipol, LLC, a Delaware limited liability company ("Lexipol"), and the department, entity, or organization referenced above ("Agency"). This Agreement consists of:

- (a) this **Cover Sheet**
- (b) **Exhibit A** - Selected Services and Associated Fees
- (c) **Exhibit B** - Terms and Conditions of Service

Each individual signing below represents and warrants that they have full and complete authority to bind the party on whose behalf they are signing to all terms and conditions contained in this Agreement.

Windsor Heights Police Department

Signature: _____
Print Name: _____
Title: _____
Date Signed: _____

Lexipol, LLC

Signature: _____
Print Name: _____
Title: _____
Date Signed: _____

Exhibit A

SELECTED SERVICES AND ASSOCIATED FEES

Agency is purchasing the following:

LE Subscription - July '24

QTY	DESCRIPTION	UNIT PRICE	DISC	DISC AMT	EXTENDED
1	Annual Law Enforcement Policy Manual & Daily Training Bulletins w/Supplemental Publication Service (12 Months)	USD 10,758.00	15%	USD 1,613.70	USD 9,144.30
	Subscription Line Items Total			USD 1,613.70	USD 9,144.30
				USD 1,613.70	USD 9,144.30
LE Subscription - July '24 Discount:					USD 1,613.70
LE Subscription - July '24 TOTAL:					USD 9,144.30

Focused Implementation - One Time Fee

QTY	DESCRIPTION	UNIT PRICE	DISC	DISC AMT	EXTENDED
1	Law Enforcement Focused Implementation	USD 9,435.00	15%	USD 1,415.25	USD 8,019.75
	One-Time Line Items Total			USD 1,415.25	USD 8,019.75
				USD 1,415.25	USD 8,019.75
Focused Implementation - One Time Fee Discount:					USD 1,415.25
Focused Implementation - One Time Fee TOTAL:					USD 8,019.75

*Law Enforcement pricing is based on 14 Law Enforcement Sworn Officers.

Discount Notes

Discount Receiving contract in 2024

Notes

Implementation notes: Agency intends to start from scratch with Lexipol content and does not plan to have Lexipol bring over any of their existing content into their new Lexipol manual. As such, a Policy Cross Reference and Agency-Content Extraction are not included on this quote

Exhibit B
Terms and Conditions of Service

These Terms and Conditions of Service (the “Terms”) govern the rights and obligations of Lexipol and Agency under this Agreement. Lexipol and Agency may each be referred to herein as a “Party” and collectively as the “Parties.”

1. Definitions. Each of the following capitalized terms will have the meaning included in this Section. Other capitalized terms are defined within their respective sections, below.

1.1 “Agency” means the department, agency, office, organization, company, or other entity purchasing and/or subscribing to Lexipol Services, as may be further denoted on the cover sheet to which these Terms are attached.

1.2 “Agency Data” means all data, information, and content owned by Agency prior to the Effective Date, or which Agency provides during the Term of this Agreement for purposes of identifying authorized users, confirming departmental information, or which are ancillary to receipt of Lexipol Services.

1.3 “Agreement” means the combination of the cover sheet (signature page); Exhibit A (“Selected Services and Associated Fees”); this Exhibit B; and any other documents attached hereto and expressly incorporated herein by reference.

1.4 “Effective Date” means the date specified on the cover sheet (signature page), or as otherwise expressly set forth and agreed upon by Lexipol and Agency in writing and defined as the “Effective Date.”

1.5 “Initial Term” means the period commencing on the Effective Date and continuing for the length of time indicated on Exhibit A. If not so indicated, the default Initial Term is one (1) year from the Effective Date.

1.6 “Lexipol Content” means all content in any format including but not limited to written content, images, videos, data, information, and software multimedia provided by Lexipol and/or its licensors via the Services.

1.7 “Services” means all products and services, including but not limited to all software subscriptions, content licensing, professional services, and ancillary support services as may be offered by Lexipol and/or its affiliates from time to time.

2. Term; Renewal. This Agreement becomes enforceable upon signature by Agency’s authorized representative, with an Effective Date as indicated on the cover page. This Agreement shall renew in successive one-year periods (each, a “Renewal Term”) on the anniversary of the Effective Date unless terminated as set forth herein. The Initial Term and all Renewal Terms collectively comprise the “Term” of this Agreement.

3. Termination.

3.1 For Convenience; Non-Appropriation. This Agreement may be terminated by Agency at any time for convenience (including due to lack of appropriation of funds) by providing written notice to Lexipol.¹

3.2 For Cause. This Agreement may be terminated by either party, effective immediately, (a) in the event the other party fails to discharge any obligation, including payment obligations, or remedy any default hereunder for a period of more than thirty (30) calendar days after it has been provided written notice of such failure or default; or (b) in the event that the other party makes an assignment for the benefit of creditors or commences or has commenced against it any proceeding in bankruptcy, insolvency or reorganization pursuant to the bankruptcy laws of any applicable jurisdiction.

3.3 Effect of Expiration or Termination. Upon the expiration or termination of this Agreement for any reason, Agency’s access to the Services ordered pursuant to Exhibit A herein shall cease unless Lexipol has, in its sole discretion, provided for their limited continuation. Termination or expiration of this Agreement shall not, however, relieve either party from any obligation or liability that has accrued under this Agreement prior to the date of such termination or expiration, including payment obligations.

¹ Note: fees paid for Online Services (as defined herein) are not eligible for refund, proration, or offset in the event of Agency’s termination for convenience as Online Services are delivered in full as of the Effective Date. Fees pre-paid for Professional Services may be eligible for offset to the extent such Services have not been delivered by Lexipol to Agency.

4. Fees; Invoicing. Lexipol will invoice Agency at the commencement of the Initial Term and thirty (30) days prior to the commencement of each Renewal Term, if applicable. Agency agrees to remit payment within thirty (30) calendar days of receipt of Lexipol's invoice. Payments may be made electronically through Lexipol's online customer portal or by mailing a check to Lexipol at 2611 Internet Blvd, Ste. 100, Frisco, TX 75034 (Attn: Accounts Receivable). Agency is responsible for all third-party fees (e.g., wire fees, bank fees, credit card processing fees) incurred when paying electronically, and such fees are in addition to those listed on Exhibit A. Lexipol reserves the right to increase fees for Renewal Terms following notice to Agency. All fee amounts stated in Exhibit A are exclusive of taxes. Unless otherwise exempt, Agency is responsible for and will pay in full all taxes related to receipt of Lexipol's Services. If Agency is exempt, it must send its exemption certificate(s) to taxes@lexipol.com.

5. Terms of Service. The following provisions govern access to and use of specific Lexipol's Services:

5.1 Online Services. Lexipol's Online Services include all online services offered by Lexipol and its partners, affiliates, and licensors. Online Services include, without limitation, Lexipol's Policy Knowledge Management System ("KMS"), Learning Management System ("LMS")², Cordico wellness application(s), GrantFinder, and Virtual Instructor-Led Training (collectively, the "Online Services").

5.2 Professional Services. Lexipol's Professional Services include certain paid Services that are not part of Lexipol's Online Services and which require the professional expertise of Lexipol personnel and/or contractors, including implementation support for policy manuals, technical support for online learning, accreditation consulting, grant writing³, and projects requiring regular input from Lexipol's subject matter experts (collectively, "Professional Services"). Professional Services may also be referred to as "One-Time" Services on Exhibit A.

5.3 Intellectual Property. Lexipol's Services, and the Lexipol Content underlying such Services, are proprietary and, where applicable, protected under U.S. copyright, trademark, patent, and/or other applicable laws. By subscribing to Lexipol's Online Services, Agency and its personnel receive a personal, limited, non-sublicensable and non-assignable license to access and use such Services in conformity with these Terms. Nothing contained in this Agreement, and no course of dealing, shall be construed as conferring any right of ownership to Lexipol's Services or Lexipol Content. Lexipol's policy Content may be incorporated into Agency's final policies⁴, including beyond the expiration or termination of this Agreement, but Agency may not create other Derivative Works, share Lexipol Content with third parties, or commercialize Lexipol Content in any way. As used herein, other "Derivative Works" include any work product based on or which incorporates Lexipol Content, including any revision, modification, abridgement, condensation, expansion, compilation, or any other form in which Lexipol Content, or any portion thereof, is recast, transformed, or adapted. Agency acknowledges and agrees that Lexipol shall have no responsibility to update the Lexipol Content used by Agency beyond the Term of this Agreement and that Lexipol shall have no liability for Agency's creation or use of Derivative Works.

5.4 Account Security. Access to Lexipol's Services is personal and unique to Agency. Agency shall not assign, transfer, or provide access to Lexipol Services to any third party without Lexipol's prior written consent. Agency is responsible for maintaining the security and confidentiality of Agency's usernames and passwords and the security of Agency's accounts. Agency will immediately notify Lexipol if Agency becomes aware that any person or entity other than authorized Agency personnel has used Agency's account or Agency's usernames and/or passwords.

5.5 Agency Data. Lexipol's use of Agency Data is limited to providing the Services, retaining records in the regular course of business, and complying with valid legal obligations. Lexipol will use commercially reasonable efforts to ensure the security of all Agency Data. Lexipol's Services use the Secure Socket Layer (SSL) protocol, which encrypts information as it travels between Lexipol and Agency. However, data transmission on the internet is not always 100% secure and Lexipol cannot and does not warrant that information Agency transmits to or through Lexipol or the Services is 100% secure.

² LMS Services include, but are not limited to: PoliceOne Academy, FireRescue1 Academy, EMS1 Academy, Corrections1 Academy, and LocalGovU.

³ Agency is responsible for submitting all information reasonably required by Lexipol's grant writing team in a timely manner and always at least five (5) days prior to each grant application submission date. Agency is responsible submissions of final grant applications by grant deadlines. Failure to timely submit required materials to Lexipol's grant writing team will result in rollover of project fees to next grant application cycle, not a refund of fees. Requests for cancellation of grant writing services which have already begun will result in a 50% fee of the total value of the service.

⁴ NOTE: AGENCY ACKNOWLEDGES AND AGREES THAT, PRIOR TO USE OR FINAL PUBLICATION BY AGENCY, ALL AGENCY POLICIES AND DAILY TRAINING BULLETINS (DTBs) HAVE BEEN INDIVIDUALLY REVIEWED AND ADOPTED BY AGENCY. AGENCY ACKNOWLEDGES AND AGREES THAT IT, AND NOT LEXIPOL, WILL BE CONSIDERED THE "POLICY MAKER" WITH REGARD TO EACH AND EVERY SUCH POLICY AND DTB.

6. Confidentiality. Each Party may disclose information to the other Party that would be reasonably considered confidential, including Agency Data (collectively, "Confidential Information"). The receiving Party will: (a) limit disclosure of any such Confidential Information to authorized representatives; (b) advise its personnel and agents of the confidential nature of the Confidential Information and of the obligations set forth in this Agreement; and (c) not disclose any Confidential Information to any third party unless expressly authorized by the disclosing Party. Each Party may disclose Confidential Information pursuant to a valid governmental, judicial, or administrative order, subpoena, regulatory request, or equivalent, provided that the disclosing Party promptly notifies, to the extent practicable, the other Party prior to such disclosure so that the other party may seek to make such disclosure subject to a protective order or other appropriate remedy to preserve the confidentiality of the Confidential Information.

7. Warranty. LEXIPOL WARRANTS THAT ITS SERVICES SHALL NOT INFRINGE THE RIGHTS OR INTELLECTUAL PROPERTY OF OTHERS, ARE PROVIDED IN A PROFESSIONAL AND WORKMANLIKE MANNER IN ACCORDANCE WITH PREVAILING INDUSTRY STANDARDS, AND THAT THEY SHALL BE FIT FOR THE SPECIFIC PURPOSES SET FORTH HEREIN. NOTWITHSTANDING THE FOREGOING, LEXIPOL'S SERVICES ARE PROVIDED "AS-IS" AND LEXIPOL DISCLAIMS ALL OTHER WARRANTIES, EXPRESS, IMPLIED, OR OTHERWISE.

8. Indemnification; Limitation of Liability. Lexipol will indemnify, defend, and hold harmless Agency from and against any and all loss, liability, damage, claim, cost, charge, demand, fine, penalty, or expense arising directly and solely out of Lexipol's acts or omissions in providing the Services. Each Party's cumulative liability resulting from any claims, demands, or actions arising out of or relating to this Agreement shall not exceed the aggregate amount of fees paid by Agency to Lexipol during the twelve-month period immediately prior to the assertion of such claim, demand, or action. In no event shall either Party be liable for indirect, incidental, consequential, special, exemplary damages, or lost profits.

9. General Terms.

9.1 Entire Agreement. This Agreement embodies the entire agreement between the Parties and supersedes all prior agreements with respect to the subject matter hereof. No representation, promise, or statement of intention has been made by either party that is not embodied herein. Terms and conditions set forth in any purchase order or other document that are inconsistent with or in addition to the terms and conditions set forth in this Agreement are rejected in their entirety and void, regardless of when received, without further action. No amendment, modification, or supplement to this Agreement shall be binding unless it is made in writing and signed by both parties.

9.2 General Interpretation. The terms of this Agreement have been chosen by the parties hereto to express their mutual intent. This Agreement shall be construed equally against each party without regard to any presumption or rule requiring construction against the party who drafted this Agreement or any portion thereof.

9.3 Invalidity of Provisions. Each provision contained in this Agreement is distinct and severable. A declaration of invalidity or unenforceability of any provision or portion thereof shall not affect the validity or enforceability of any other provision. Should any provision or portion thereof be held to be invalid or unenforceable, the parties agree that the reviewing authority should endeavor to give effect to the parties' intention as reflected in such provision to the maximum extent possible.

9.4 Governing Law. Each party shall maintain compliance with all applicable laws, rules, regulations, and orders relating to its obligations pursuant to this Agreement. This Agreement shall be construed in accordance with, and governed by, the laws of the state in which Agency is located, without giving effect to any choice of law doctrine that would cause the law of any other jurisdiction to apply.

9.5 Assignment. This Agreement may not be assigned by either party without the prior written consent of the other. Notwithstanding the foregoing, this Agreement may be assumed by a party's successor in interest through merger, acquisition, or consolidation without additional notice or consent.

9.6 Waiver. Either party's failure to exercise, or delay in exercising, any right or remedy under any provision of this Agreement shall not constitute a waiver of such right or remedy.

9.7 Notices. Any notice required hereunder shall be in writing and shall be made by certified mail (postage prepaid) to known, authorized recipients at such address as each party may indicate from time to time. In addition, electronic mail (email) to established and authorized recipients is acceptable when acknowledged by the receiving party.



**STAFF REPORT
CITY COUNCIL**
June 3, 2024

TO: CITY COUNCIL

FROM: Mike Jones, Mayor

SUBJECT: Approve Resolution No. 2024-41 - A Resolution Appointing Larry James to the Board of Adjustment

GENERAL INFORMATION

ATTACHMENTS

1. Resolution No. 2024-41 Appointing BOA Member

RESOLUTION NO. 2024-41

RESOLUTION APPOINTING LARRY JAMES TO THE BOARD OF ADJUSTMENT

WHEREAS, Chapter 179 of the City Code of Windsor Heights authorizes the creation of a Board of Adjustment to conduct administrative reviews of decisions made by the Zoning Administrator and to hear and decide on Conditional Use Permits, appeals, and requests for special exceptions and variances to the Windsor Heights Zoning Code; and

WHEREAS, the Board of Adjustment is made up of five persons, appointed by City Council, who pursuant to Iowa Code 392.12, serve five-year terms; and

WHEREAS, the Board of Adjustment currently has a vacancy and Mayor Jones has nominated one qualified individual, Larry James, to serve.

NOW, THEREFORE, BE IT RESOLVED, by the City Council of the City of Windsor Heights, Iowa that Larry James is appointed to serve on the Board of Adjustment with their five-year terms beginning on June 3rd, 2024.

Passed and approved this 3rd day of June, 2024.

Mike Jones, Mayor

Attest: Adam Strait, City Clerk



**STAFF REPORT
CITY COUNCIL**

June 3, 2024

TO: CITY COUNCIL

FROM:

SUBJECT: Consideration of Resolution No. 2024-40 - A Resolution Approving the Site Plan
for The Windsor at 1148 63rd Street

GENERAL INFORMATION

ATTACHMENTS

1. The Windsor Staff Report
2. Site Plan
3. Storm Water Managment Plan Report
4. 4.23.24 The Windsor Comments Letter
5. The Windsor Concept Park and Trail Sketch
6. The Windsor Traffic Staff Memo_040524
7. Traffic Letter Caliber Development 03202024
8. Resolution No. 2024-40 The WIndsor 1148 63rd St Site Plan

STAFF REPORT

Date: June 3, 2024
To: Windsor Heights City Council
From: Trey Rouse
Subject: Site Plan: 1148 63rd Street (University Avenue and 63rd Street Corner)

General Information

Applicant: Nick Jensen
3611 NE Otterview Circle
Ankeny, IA 50021
Property Owner: The Windsor LLC
Proposed Use: Residential, Multi-Family
Zoning: UC (Urban Center District)
Location: University Avenue and 63rd Street Corner

Summary

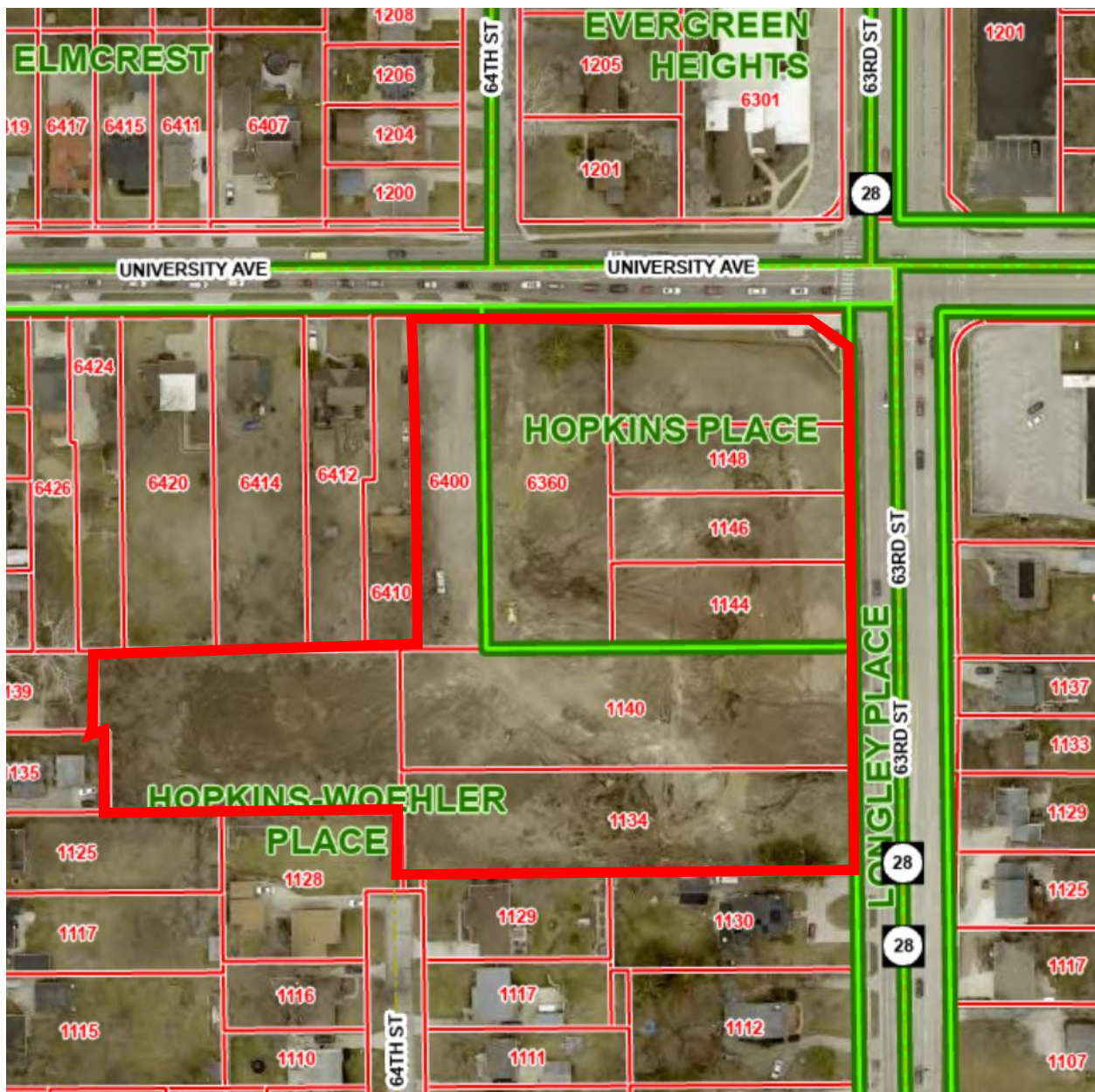
The applicant, Nick Jensen representing The Windsor LLC, is requesting to develop The Windsor Apartments, a 101-Unit Multi-Family Dwelling Unit Development in the UC District (Urban Center District) for the use of the property described as University Avenue and 63rd Street Corner. The UC District (Urban Center District) allows for Residential, Multi-Family use within the UC District by right. This development would include 1-Bedroom Unit apartments and 2-Bedroom apartments with roughly half of the units being each form of unit, all at market value with no restrictions such as age or income level that include on site surface parking (108 stalls), garage parking (40 garages), and underground parking (40 stalls). This development also includes short-term (26 parking spots) and long-term bike parking (11 parking spots) throughout the surface parking and underground parking. This project is also a recipient of a \$1 million workforce housing tax credit. This project also provides pedestrian access to University Avenue and 63rd Street in addition to dedicating property as part of the project that could help provide future pedestrian access between 64th Street and University.

City Staff has completed a review of the documentation submitted by the applicant. The submitted application materials are attached to this report.

Existing Conditions

The 5.01-acre lot is in the UC – Urban Center Zoning District. This Zoning District allows for up to 20 residential units/acre. The property has had the previous structures demolished and removed from the property. The developer has received a grading permit and is currently grading at their own risk in anticipation of this Site Plan submission. Currently only trees and vegetation

remain. This property currently has one full-access driveway onto the property from University Avenue. ROW Grading has begun on the property and the applicant received the ROW Grading Permit from City Council and Staff.

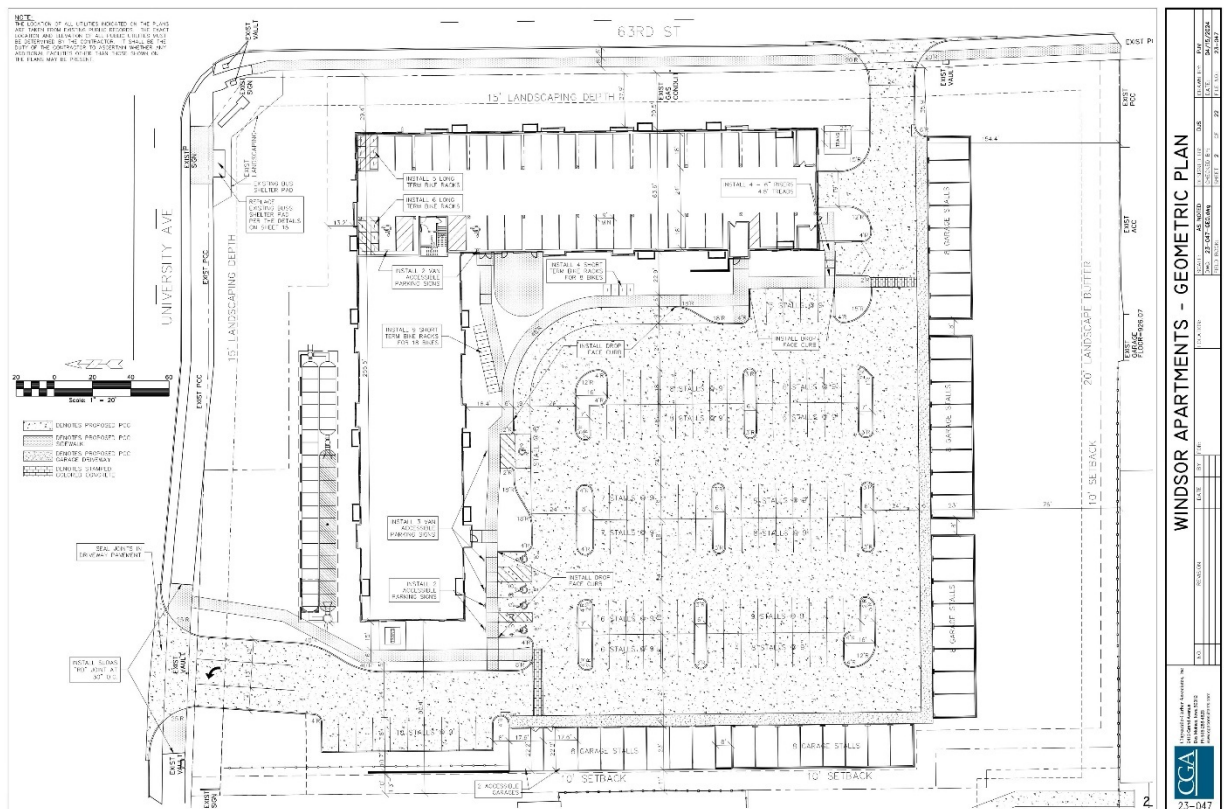


Legal Description

PART OF PARCEL A IN LOT 1 OF HOPKINS PLACE, AN OFFICIAL PLAT, PER THAT PLAT OF SURVEY FILED IN BOOK 9221, PAGES 674-675 IN THE OFFICE OF THE RECORDER FOR POLK COUNTY, IOWA; AND PART OF LOTS 2, 3 AND 4 IN HOPKINS PLACE, AN OFFICIAL PLAT; AND PART OF LOTS 5, 11, 12, 22, 23, AND 24 IN HOPKINS-WOEHLER PLACE, AN OFFICIAL PLAT, ALL NOW INCLUDED IN AND FORMING A PART OF THE CITY OF WINDSOR HEIGHTS, POLK COUNTY, IOWA, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTHWEST CORNER OF SAID PARCEL A IN LOT 1 OF HOPKINS PLACE, A POINT AT THE INTERSECTION OF THE SOUTH RIGHT-OF-WAY LINE OF UNIVERSITY AVENUE AS PRESENTLY ESTABLISHED AND THE EAST LINE OF SAID LOT 4 IN HOPKINS PLACE; THENCE SOUTH 00°37'08" EAST, 44.41 FEET ALONG THE WEST LINE OF SAID PARCEL A; THENCE NORTH 89°55'37" EAST, 95.76 FEET; THENCE SOUTH 00°04'23" EAST, 20.50 FEET; THENCE NORTH 89°55'37" EAST, 109.29 FEET TO THE EAST LINE OF SAID PARCEL A ALSO BEING THE WEST RIGHT-OF-WAY LINE OF 63RD STREET AS PRESENTLY ESTABLISHED; THENCE SOUTH 00°34'01" EAST, 26.00 FEET ALONG THE WEST RIGHT-OF-WAY LINE OF 63RD STREET TO THE SOUTHEAST CORNER OF SAID PARCEL A; THENCE SOUTH 00°38'53" EAST, 59.95 FEET ALONG THE WEST RIGHT-OF-WAY LINE OF 63RD STREET; THENCE SOUTH 00°35'55" EAST, 59.72 FEET ALONG THE WEST RIGHT-OF-WAY LINE OF 63RD STREET; THENCE SOUTH 00°38'11" EAST, 73.65 FEET ALONG THE WEST RIGHT-OF-WAY LINE OF 63RD STREET; THENCE SOUTH 00°37'06" EAST, 39.94 FEET ALONG THE WEST RIGHT-OF-WAY LINE OF 63RD STREET; THENCE SOUTH 02°11'11" EAST, 100.25 FEET ALONG THE WEST RIGHT-OF-WAY LINE OF 63RD STREET; THENCE SOUTH 02°17'50" EAST, 54.89 FEET ALONG THE WEST RIGHT-OF-WAY LINE OF 63RD STREET TO THE NORTH LINE OF THE SOUTH 15 FEET OF SAID LOT 22 IN HOPKINS-WOEHLER PLACE; THENCE SOUTH 89°55'49" WEST, 369.78 FEET ALONG THE NORTH LINE OF THE SOUTH 15 FEET OF SAID LOT 22; THENCE NORTH 00°57'32" WEST, 69.96 FEET; THENCE NORTH 89°51'53" WEST, 9.28 FEET; THENCE NORTH 00°34'54" WEST, 124.91 FEET TO THE SOUTHEAST CORNER OF THE WEST 15 FEET OF SAID LOT 5 IN HOPKINS-WOEHLER PLACE; THENCE NORTH 00°34'54" WEST, 291.23 FEET ALONG THE EAST LINE OF THE WEST 15 FEET OF SAID LOT 5 TO THE SOUTH RIGHT-OF-WAY LINE OF UNIVERSITY AVENUE; THENCE SOUTH 87°44'11" EAST, 170.21 FEET ALONG THE SOUTH RIGHT-OF-WAY LINE OF UNIVERSITY AVENUE TO THE POINT OF BEGINNING. CONTAINING 168,618 SQUARE FEET (3.87 ACRES).

Site Plan for Development



University Avenue is on the left, 63rd Street is on the top of the above Site Plan

Background of Parcel/Lot

This parcel was previously nine parcels owned by Windsor Community Presbyterian Church that had single-family dwellings along with a parking lot in the wooded area to the west. The single-family dwellings have since been bought, demolished, and the parcels replatted for this project.

Adjacent Land Use

Direction	Zoning	Use
North	Urban Center District (UC)	Church/Residential, Single Family
South	R-2 District	Residential, Single Family
East	N/A (Outside City Limits)	Church/Residential, Single Family
West	Urban Center District (UC)	Residential, Single Family

Zoning Bulk Regulations

Category	UC
----------	----

Lot Area	5,000 sq.ft.
Lot Width	25 ft
Front Yard Setback	0 ft
Side Yard Setback	0 ft
Rear Yard Setback	10 ft (When abutting Residential Zoning District, must have fully landscaped or visual buffer)

Traffic Study/Traffic Information

At the request of the City, the applicant completed a traffic study on the University Avenue and 63rd Street corridor and determined the project's contribution to the current traffic in the corridor and has met on-site during peak P.M traffic to discuss the unique access challenges this property faces. A traffic study was completed by the applicant and reviewed by City Staff. The traffic study shows that the traffic created by The Windsor project would create further issues with the current congestion noticed by the University Avenue and 63rd Street corridor based upon their current design. Staff requested further information and clarification and provided solutions to the applicant. The applicant has retention of the full access on University Avenue instead of the suggested right-in/right-out by City Staff. 63rd St. access is under Iowa DOT jurisdiction and the developer is limited by the Iowa DOT to a Right In Right Out.

City staff reached out to City of Des Moines traffic staff regarding the signal timing at 63rd and University as potential issues were observed onsite during peak P.M. traffic. The City of Des Moines manages this signal. They confirmed that the timings appear appropriate for the traffic volumes last captured at the intersection but stated they are looking to get updated counts to confirm if anything more could be changed here.

They also stated that this signal is due to get an updated controller next year which will allow the city of Des Moines to better monitor and adjust the signal timings in a more responsive manner.

The traffic study is attached.

Parkland Dedication

With the development or redevelopment of a parcel or lot into residential (with the exception of Single-Family residential) there is a required Parkland Dedication attached to the development based upon the type or residential development and units developed.

As part of the site plan review process City staff and the developer met to discuss trail and parkland dedication. It was agreed to provide for City Council consideration for an exchange of property as shown on page 18 of the site plan. The City is to provide the developer with 7,287 sq. ft. of unutilized ROW property at the corner of University Ave. and 63rd, south of the trail and existing landscaping. In exchange, the developer is to provide 40,284 sq. ft. of property west of their proposed development as "Parkland". This parkland includes the primary detention basin

for The Windsor, which the developer will continue to be responsible for maintaining in its proposed form. However, the basin could be expanded in the future to efficiently serve additional redevelopment projects adjacent to The Windsor, while minimizing water surface area used for detention that would otherwise become undevelopable.

The land exchange and parkland dedication are intended to be mutually beneficial, allowing for The Windsor to incorporate their northern nyloplast basin on currently unutilized city property while incorporating a nascent city park and trail property as sketched out in the attached Park and Trail Concept on the developer's property intended to be dedicated to the city. The concept anticipates potential future additional adjacent parkland dedications as adjoining properties redevelop as envisioned in the Future Land Use Map. These dedications would complete the trail connection between University and 64th St, create enough parkland for active use and efficiently satisfy future stormwater detention requirements.

Equation for Parkland Dedication:

(number of units) x (1.5 individuals/unit) x (.005 acres/individual)

The Windsor Apartments Parkland Dedication Requirement:

101 Units x 1.5 (Individuals/Unit) x .005 (Acres/Individual) = 0.7575 Acres

The applicant has provided and set aside land to meet this requirement as stated by the City. This can be seen in the attached diagram and meets the minimum Parkland Dedication requirement and can be accepted by the City Council or another form of compensation can be met.

Landscaping and Plantings

The applicant has provided a landscaping plan within the site plan (sheet 14) to illustrate the planting locations and types of plantings that will be on the development. The plantings provided and shown meet the requirements of the landscaping requirements by numbers and utilize plants on the approved Windsor Heights Tree/Plant list. The required number of trees and shrubs based upon the size of development are 58 trees (1/2000 sq. ft. of pervious area) and 286 shrubs (5/2000 sq. ft. of pervious area).

This requirement has been met as the applicant shows in the site plan to be providing 62 trees in total (utilizing 16 existing trees) and 299 shrubs.

In addition to this, A draft development requires the developer to plant 50 trees on the site in an effort to replace some of the lost tree canopy resulting from the project. The development agreement proposes any shortfall in trees planted on the site, to the proposed 50, be provided to the City for planting elsewhere in the City. Based on the proposed site plan, the developer will be required to provide the City eight trees.

Building Façade

Within the Urban Center District, there is a building façade material requirement based upon the quality of the materials and the percentage of the primary street facing façade that the material covers. The Urban Center District requires 75% of the street facing façade be brick on the first

floor (not including windows and doorways) with the remainder of the first floor being any grade A or grade B material. All other floors may be grade A or grade B materials.

The primary street frontages that need to meet this requirement are the north and east side of the development. Shown on sheet 22, the north side of the development meets these requirements with 75% brick and 25% other grade A or grade B material (Fiber Cement Siding). Also shown on sheet 22, the east side of the development meets the requirements of having 99% brick façade with 1% being another material.

Stormwater/Drainage

The applicant has provided a Stormwater Plan to address the stormwater drainage on the proposed site and to address the stormwater requirements that are outlined within the City Code. On sheets 5 – 11, the details of their stormwater plan are provided and how they impact the site. Having an underground north basin to supplement stormwater needs near University Avenue, along with basins that line the southern part of the site. These basins include the southeast basin, south basin, and west basin closest to 64th Street. Each of these are considered to be dry basins (or detention basin that do not have water remain in them constantly like a retention basin/pond) that fill during storms or rain and gradually discharge at either the same rate as what is discharged now or a slower rate to become dry when not being directly filled. These basins also include within and surrounding them different plantings along the end and use a ditch mixture for absorption and storm detention. This is seen heavily within the west basin as the main director of where excess water heads towards 64th Street.

The applicant has provided updated Stormwater management plans but still has conditions of quality to be met along with other conditions that were agreed with City Staff to be considered conditions of approval for the Site Plan. At this time, the Site Plan does not meet the requirements as set forth by the City of Windsor Heights but with the conditions of approval that are laid out further in this report, the applicant would meet all of the requirements.

The Stormwater Management Plan is attached.

Parking Requirements

Based upon the proposed site and development, minimum parking requirements have been established by the City of Windsor Heights.

Automotive Vehicle parking for a Multi-Family Dwelling use is 1 Parking Stall/Unit. This would require 101 parking stalls based upon the size of the development. The applicant meets this parking requirement by providing: 40 underground parking stalls, 40 garage parking stalls, and 108 surface parking stalls.

Bike parking is required at developments as well. Short-term and Long-term bike parking are considered to be separate and are required in different capacities. 1 Short-term bike parking stall is required for every 4 units. 1 Long-term bike parking stall is required for every 10 units. This creates the requirements of 26 short-term bike parking stalls and 11 long-term bike parking stalls. The applicant meets this requirement by providing 26 short-term bike parking stalls and 22

long-term bike parking stalls on the surface parking area and underground parking area. There is a condition within the conditions for approval to make sure all bike parking has enough space for use, the garage long-term bike parking needs this to be addressed.

Screenings and Buffers

Screening and buffers are required to protect less intensive uses found in the R-1, R-2, and R-3 Districts from more intense uses that are commonly found in the UC, CC, and LI Districts. The Windsor Apartment project is located within the UC District and considered a more intensive district compared to surrounding Zoning Districts. The Windsor project abuts the R-2 District on its southern site boundary, so it is required to have a minimum of a 10 ft. fully opaque buffer according to Table 173.05-03-Screened Buffer Yard Requirements.

Table 173.05-03 – Screened Buffer Yard Requirements

		Less Intensive Adjacent District
		R-1*, R-2*, & R-3
More Intensive District	UC, CC	10 Feet
	LI	20 Feet
*Applies to residential uses only.		

The following requirements need to be met for the opaque buffer between the Zoning Districts:

2. Opaque Barrier. An opaque barrier shall be provided which visually screens the conditions listed in subsection 1 from less intensive uses by employing one or more of the following in any combination to obtain a solid barrier of at least 6' in height:

- a. A solid wood and/or masonry fence or wall at least six feet in height.
- b. A landscaped screen, using a minimum of 50% evergreen plant material, capable of providing a substantially opaque, hedge-like barrier and attaining a minimum height of six feet within three years of planting. (Note: All planting materials shall conform to the minimum caliper/size requirements set in Table 173-02)
- c. A landscaped earth berm with a maximum slope of three to one, rising no less than six feet above the existing grade of the lot line separating the zoning districts.
- d. Any combination of these methods that achieves a cumulative height of six feet.

The applicant is meeting this requirement with a fully landscaped buffer to create the required opaque residential buffer with approved planting materials as listed in Table 173-02.

The applicant is also required to screen any Trash Enclosure that is on the premises according to the city standards and requirements. This needs to be an opaque buffer that does not allow direct viewing of the Trash Enclosure. The applicant has met this requirement with the proposed 6' wall enclosure that matches the façade of the closest walls of the primary structure on the site. This can be seen within the Site Plan.

Comprehensive Plan Review

The Windsor Heights Comprehensive Plan has been reviewed by City Staff to make sure that this project aligns with the goals and ideals of the Comprehensive Plan. The proposed Windsor Apartment development project meets several of the goals identified and outlined within the Comprehensive Plan and addresses the following goals as determined by the City Staff. The Comprehensive Plan supports the proposed project as it is presented.

Neighborhood Enhancement:

1. Broaden the mix of housing to appeal to a wide range of people of all stages of life.
 - a. This project assists in achieving this goal by introducing more available housing for current or future residents of Windsor Heights. It also provides a diversity in housing as much of the surrounding area is Single-Family Dwelling Unit housing with this providing Multi-Family Dwelling Units.

Economic Development:

1. Support strategic redevelopment along key corridors, including University Avenue, Hickman Road, 73rd Street, and 63rd Street.
 - a. This project goes to supporting strategic redevelopment along both University Avenue and 63rd Street. With many new residents living in this area, it not only benefits the tax base of the area for the City, but also gives more opportunity to surrounding businesses for foot traffic and new patrons to their establishments.

Future Land Use Map

The future land use map should be used as guidance for areas throughout the City. The map identifies this location as mixed use, which is defined on page 40 of the 2017 Comprehensive Plan. "Mixed Use. This area encourages combinations of limited commercial, office, and residential uses.

The proposed project conforms to the vision that has been laid out by the Comprehensive Plan Future Land Use Map.



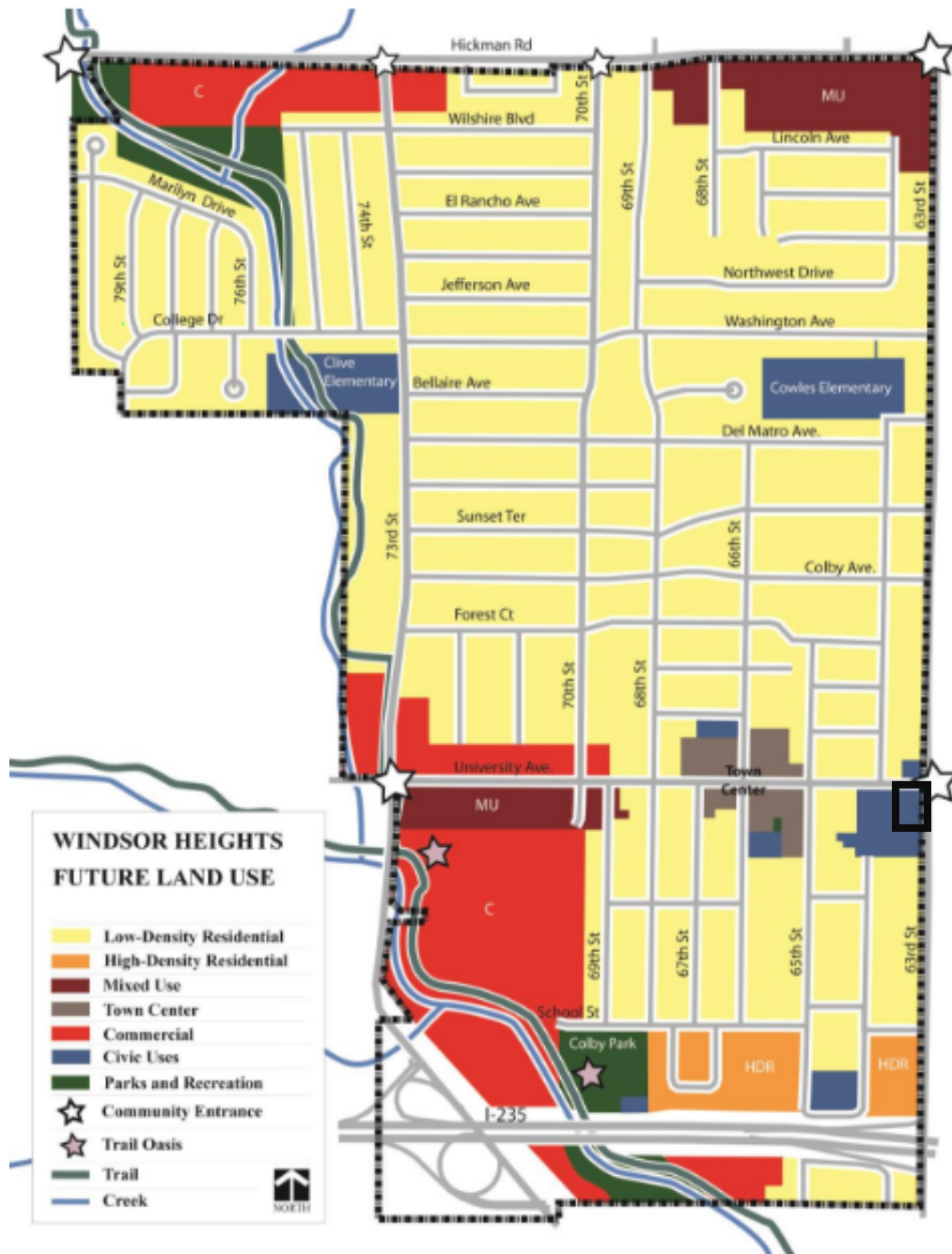


Figure 2: Windsor Heights' 2017 Comprehensive Plan's
Future Land Use Map

Zoning Map

The parcels are currently zoned for Urban Center District which is defined in [Table 168-1 Purposes of Zoning Districts](#) as “This district recognizes the mixed-use character primarily along the University Avenue corridor, which is the principal route through central Windsor Heights. This district contains a combination of residential, commercial, and office uses and is known for its walkability and main street feel.”

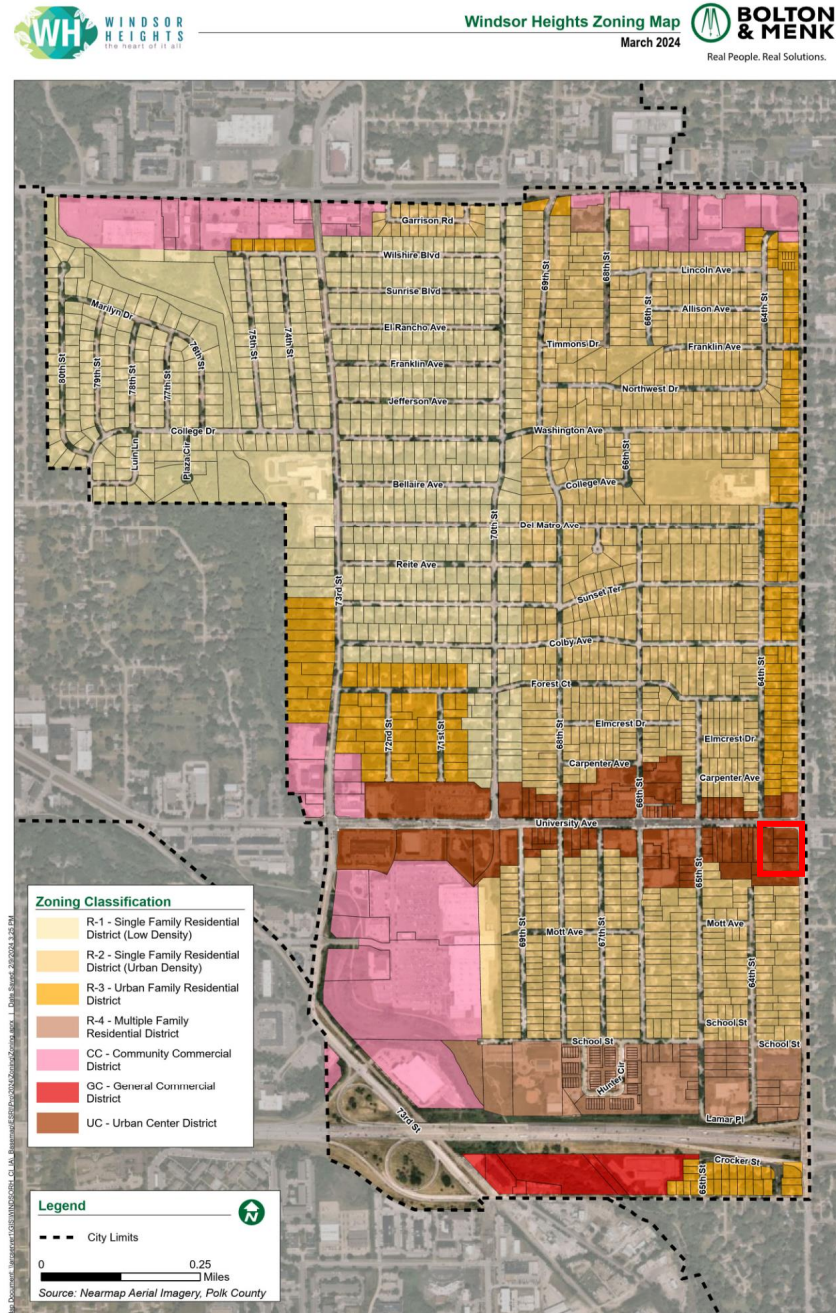


Figure 3: Current Zoning Map

Public Comments Received

The City of Windsor Heights City Staff, at the time of the creation of this Staff Report, received Public Comments virtually from one (1) resident and participated in the Public Hearing at the Planning and Zoning Commission meeting where three (3) members of the public spoke.

Comments brought forth by the Public Hearing and Virtual Outreach:

1. Traffic issues existing on University Avenue would worsen due to the addition of the project on the corner.
2. Stormwater concerns about how the water would drain, where it would drain, and at what rate it would drain from the basins.
3. Public safety concerns about the residents living south of the project site on 64th Street and having children in the neighborhood going onto or near the West Basin.
4. Lack of communication by the City about the project and meetings on the project.

Current Work Done at Site

The developer has begun grading and received the necessary permits to begin this form of work on their site. The permits received (grading and shell building permits) can be approved outside of the Site Plan review process but the Site Plan review process needs to be complete for development to begin. The developer has been grading at their own risk and has obtained the shell building permit for footing construction, again this has been done at their own risk due to their timeline constraints and unresolved storm water design issues.

Conclusion and Recommendation from Staff

After reviewing all of the documentation submitted by the applicant by City Staff and all City Departments, Staff compared the project to the goals and vision of the Comprehensive Plan and other City plans. After review and comparison, Staff came to their recommendation.

The City Staff recommends to the City Council that they approve the site plan for 1148 63rd Street (The Windsor Apartments) with the conditions recommended by City Staff and the Planning and Zoning Commission.

Conclusion and Recommendation from Planning and Zoning Commission

After holding a meeting and Public Hearing on May 22nd, 2024, the Planning and Zoning Commission reviewed all documentation presented by City Staff and the Applicant. After review, they heard from the public during the public hearing, and discussed their recommendation to City Council. The Planning and Zoning Commission came to their recommendation.

The Planning and Zoning Commission recommends approval of the site plan for 1148 63rd Street (The Windsor Apartments) by the City Council with the conditions of approval laid out by City Staff along with the Traffic condition that the full access driveway be allowed on University Avenue, as long as it is aligned with 64th Street and that moving this driveway to the west isn't possible, on a temporary/review basis. This temporary full access will be allowed for 3 years after the receipt of the certificate of occupancy (received within 6 months after opening) and will be determined to be reviewed if within that 3 years there are more total accidents than what has previously happened in the last 3 years (6 total

accidents) at which time City Council may require the developer to turn that access into a right-in/right-out access if deemed necessary for public safety.

Recommended Motion

Motion to approve the 1148 63rd Street Site Plan (The Windsor Apartments) with the conditions of approval laid out by City Staff along with the Traffic condition that the full access driveway be allowed on University Avenue, as long as it is aligned with 64th Street and that moving this driveway to the west isn't possible, on a temporary/review basis. This temporary full access will be allowed for 3 years after the receipt of the certificate of occupancy (received within 6 months after opening) and will be determined to be reviewed if within that 3 years there are more total accidents than what has previously happened in the last 3 years (6 total accidents) at which time City Council may require the developer to turn that access into a right-in/right-out access if deemed necessary for public safety.

Conditions:

All of the following conditions will be met, reviewed by the city department assigned, and deemed complete before approval of the site plan and before any development can take place.

General Comments

1. All permits related to the project will be held and released concurrently at the approval of the following:
 - a. Approval of signs and utility from Safe Building.
 - b. Revision of site plan application in accordance with the comment letter and all corresponding comments from each City Department.
 - c. Professional Signatures on Final Site Plan including Licensed Surveyor (Chapter 170.10)
 - d. City Council approval of site plan.

Storm Water General Comments

1. The Rev calculation for the West Detention in Appendix H uses cumulative storage numbers that do not match the stage-storage curve for the West Basin within the model output. Please resolve the discrepancy.
2. The WQv standard is required by the Windsor Heights City Code. Please adjust the detention facilities to meet this standard.
3. Include a soil management plan in the report. Provide details for topsoil preservation and respread in the report and include notes in the plans (See 11. Topsoil Requirements in the Windsor Heights Storm Water Standards).

Storm Water Plan Sheet Comments

4. Add bioretention cell components (aggregate layer depth, amended soil depth, amended soil specs, etc.) to the plans if that is how the WQv standard will be met.

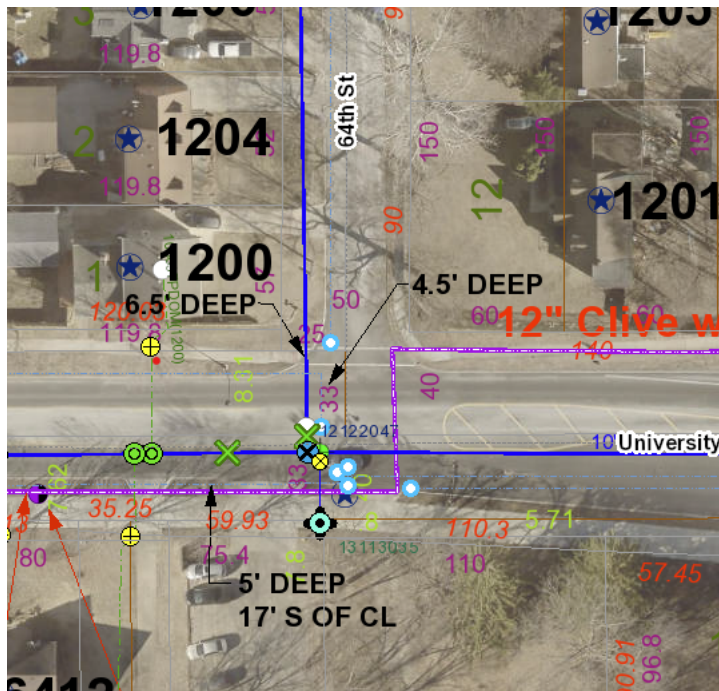
5. The emergency overflow of the West Basin is the entire south, north and west sides. What is the plan to protect that? Right now it just shows turf.
6. Ensure the 100-yr WSELs in the plans match the stormwater report. For example, see the Southeast Basin numbers.
7. Show details of the outlet onto 64th Street. (ie. FES, etc.). Plans show pipe run STSP-7.

Stormwater Other Comments

8. Adjust western water basin design to accommodate a walkway per 3/27/24 email and map or provide explanation for any alternative design. A walkway connection along the southern section of the pond is the highest priority.
9. Storm water agreement to match final signed site plan.

Des Moines Water Works Comments

1. The existing hydrant near the proposed entrance will need to be removed & a new hydrant assembly installed...instead of installing a 90 bend to head east, install tapping & sleeve & valve lay straight south to proposed location. The actual 12" Clive main location will need to be verified. The hydrant lead will need a minimum of 10' separation from the existing 12" 90 Bend. Note should be added for the contractor installing new hydrant assembly to protect & avoid existing thrust block on the 90-degree bend.
2. Hydrants and valves are to have a minimum separation of 10' from trees shrubs.



Engineering Comments

1. Complete Stormwater Maintenance Agreement and submit per instructions. Final agreement once final property ownership is determined Complete Stormwater

Maintenance Agreement and submit per instructions. Final agreement once final property ownership is determined. Presuming dedication of the western detention basin to the city, the maintenance agreement shall stipulate the developer maintain the detention basin, per the approved site plan, within the parkland dedication area in perpetuity.

2. Provided trail easement to be filed once site plan is approved.
3. Provide DOT approval of driveway.
4. Finalize easements once final property ownership is determined.
5. RECP to be minimum of Type 2, note on plans.
6. TRM to be minimum of Type 2, note on plans.

Planning Comments

Parkland Dedication:

1. Fulfill Parkland Dedication requirement determined by City Council as either a physical dedication or monetary value substitute as determined by Section 172.15 of the Zoning Code.
 - a. Will be considered a condition of approval.
2. Remove any dead or diseased trees in parkland dedication area, per the direction of City Staff, prior to dedication as per the April 1st, 2024 City Council Parkland Dedication discussion.
3. Place native plantings in the parkland dedication area and establish those plantings before dedication as per the April 1st City Council Parkland Dedication discussion.

Bike Parking:

4. Indoor Long-Term Bike Parking and Car parking in garage don't work with the current design as people won't be able to get out of their cars. Please address.

Landscaping Comments

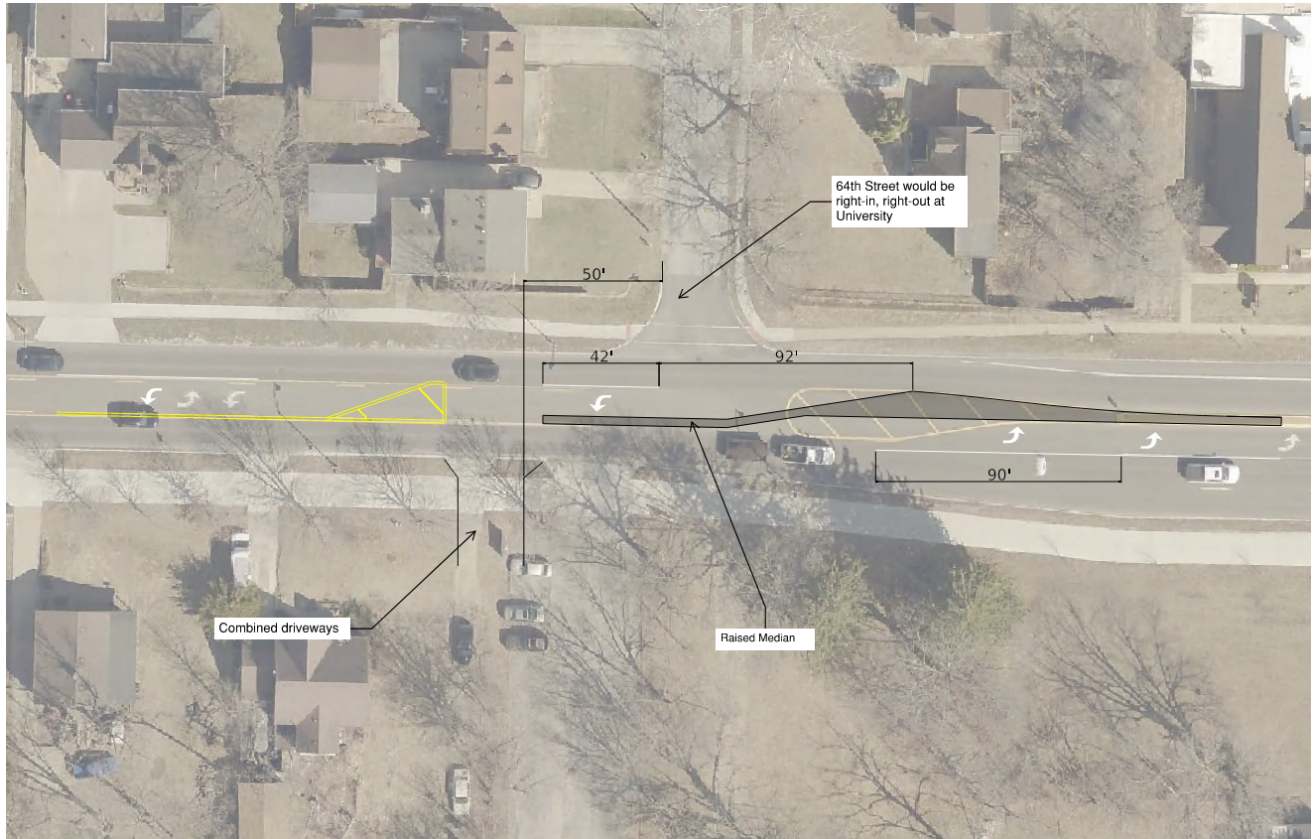
Photometric Plan:

1. Show foot candle data at building entrances and pathways to said entrances from the parking lot and other public spaces.

Traffic General Comments

1. University Avenue Access (page 9)
 - a. As shown on the 4/15/24 site plan, the proposed driveway aligned with 64th Street on University is within the functional area of the intersection of 63rd/University. Queues are anticipated and have been observed to block this driveway in the peak hours. Per the report, the delay for residents leaving the apartment is LOS F. Creating a westbound left turn lane on University for the apartments will limit the ability to extend the eastbound left turn lane at 63rd street which is already a heavy movement.

- i. It is encouraged that the developer work with adjacent property owners to move the full access driveway further west away from the intersection of 63rd Street. Note: Both city staff and/or the developer have reached out in person, letter, and phone to the owner of 6412 University Avenue to discuss options and received no response from the property owner.
- ii. One idea for the driveway moved further west follows:



- iii. If the above is not an option, the developer should make the driveway right-in, right-out only by placing a median across the intersection with 64th Street.

Traffic Other Comments

If City Council chooses to recommend allowing the proposed full access on University Avenue, the City Administration recommends it be a temporary full access and a condition on the site plan approval. A temporary full-access shall be allowed on to University Ave as shown in the site plan. Said access shall be limited to a duration of three years from the date an occupancy certificate is issued for any structure built, after which time the City Council must review the access to determine if the temporary full-access may continue or otherwise terminated and converted to a right-in-right-out only access. Temporary full access may also be terminated prior to three years as directed by the Council if they so determine said access has contributed to additional total accidents or if roadway improvements are determined necessary. When

temporary full-access is terminated, any action needed to discourage use as a full-access shall be a cost of the developer.

Attachments

1. Application Materials (as submitted)
2. Staff Traffic Memo
3. Traffic Letter from Caliber Traffic Engineer
4. Park and Trail Concept
5. Stormwater Management Plan

NOTE:
THE LOCATION OF ALL UTILITIES INDICATED ON THE PLANS ARE TAKEN FROM EXISTING PUBLIC RECORDS. THE EXACT LOCATION AND ELEVATION OF ALL PUBLIC UTILITIES MUST BE DETERMINED BY THE CONTRACTOR. IT SHALL BE THE DUTY OF THE CONTRACTOR TO ASCERTAIN WHETHER ANY ADDITIONAL FACILITIES OTHER THAN THOSE SHOWN ON THE PLANS MAY BE PRESENT.

APPLICANT/DEVELOPER/OWNER

THE WINDSOR LLC
3611 NE OTTERVIEW CIRCLE
ANKENY, IA 50021
NICK JENSEN
515-333-4403
NICK@CALIBERIOWA.COM

OPEN SPACE:

SITE AREA = 168,618 SF (3.87 AC)
EXISTING IMPERVIOUS SURFACE = 24,948 SF (0.57 AC)
MINIMUM OPEN SPACE = N/A
BUILDING FOOTPRINT = 25,901 SF (0.59 AC)
GARAGE BUILDING FOOTPRINTS = 11,319 SF (0.26 AC)
SIDEWALK = 4,771 SF (0.11 AC)
PAVEMENT = 53,072 SF (1.22 AC)
(2,325 SF OPEN SPACE ISLANDS)
TOTAL IMPERVIOUS = 95,063 SF (2.18 AC) 56.4%
OPEN SPACE = 73,555 SF (1.69 AC) 43.6%

SETBACKS

FY = 0'
SY = 0'
RY = 10'

UNITS:

101 UNITS

PARKING

REQUIRED: 1/UNIT = 105 STALLS

PROVIDED:

BASEMENT PARKING = 40
ACCESSIBLE STALLS REQUIRED = 2
PROVIDED = 2
VAN ACCESSIBLE REQUIRED = 1
PROVIDED = 2
GARAGE PARKING = 40
ACCESSIBLE STALLS REQUIRED = 2
PROVIDED = 2
VAN ACCESSIBLE REQUIRED = 1
PROVIDED = 2
SURFACE PARKING = 108
ACCESSIBLE STALLS REQUIRED = 5
PROVIDED = 5
VAN ACCESSIBLE REQUIRED = 1
PROVIDED = 3

BIKE PARKING

REQUIRED:
SHORT TERM = 1/4 UNITS = 26
LONG TERM = 1/10 UNITS = 11

PROVIDED:
SHORT TERM = 13 RACKS FOR 2 BIKES EACH
LONG TERM = 11 RACKS FOR 2 BIKES EACH

BUILDING COVERAGE

60% MAXIMUM
PROVIDED = 16%

FLOOR AREA RATIO

1.00 MAXIMUM
PROVIDED = 0.71

UTILITIES OWNERSHIP:

STORM SEWERS	CITY OF WINDSOR HEIGHTS
SANITARY SEWERS	CITY OF WINDSOR HEIGHTS
WATER	DUIWW
NATURAL GAS	MID AMERICAN
ELECTRIC	MID AMERICAN
TELEPHONE	LUMEN

BUILDING HEIGHT

60' MAX

CONSTRUCTION SCHEDULE:

ITEM	BEGIN	COMPLETED
SITE DEMOLITION	02/24	05/24
PAVING	05/24	10/25
GRADING/EROSION CONTROL	02/24	10/25
BUILDINGS	04/24	10/25
LANDSCAPING	09/24	10/25

LEGAL DESCRIPTION
Part of Parcel A in Lot 1 of Hopkins Place, an Official Plat, per that Plat of Survey filed in Book 9221, Pages 674-675 in the Office of the Recorder for Polk County, Iowa; and part of Lots 2, 3 and 4 in Hopkins Place, an Official Plat; and part of Lots 5, 11, 12, 22, 23, and 24 in Hopkins-Woehler Place, an Official Plat, all now included in and forming a part of the City of Windsor Heights, Polk County, Iowa, being more particularly described as follows:

Beginning at the Northwest Corner of said Parcel A in Lot 1 of Hopkins Place, a point at the intersection of the South right-of-way line of University Avenue as presently established and the East line of said Lot 4 in Hopkins Place; thence South 00°37'08" East, 44.41 feet along the West line of said Parcel A; thence North 89°55'37" East, 95.76 feet; thence South 00°34'23" East, 20.50 feet; thence North 89°55'37" East, 109.29 feet to the East line of said Parcel A also being the West right-of-way line of 63rd Street as presently established; thence South 00°34'01" East, 26.00 feet along the West right-of-way line of 63rd Street to the Southeast corner of said Parcel A; thence South 00°38'53" East, 59.95 feet along the West right-of-way line of 63rd Street; thence South 00°35'55" East, 59.72 feet along the West right-of-way line of 63rd Street; thence South 00°38'11" East, 73.65 feet along the West right-of-way line of 63rd Street; thence South 00°37'06" East, 39.94 feet along the West right-of-way line of 63rd Street; thence South 02°11'11" East, 100.25 feet along the West right-of-way line of 63rd Street; thence South 02°17'50" East, 54.89 feet along the West right-of-way line of 63rd Street to the North line of the South 15 feet of said Lot 22 in Hopkins-Woehler Place; thence South 89°55'49" West, 359.03 feet along the North line of the South 15 feet of said Lot 22; thence North 00°38'30" West, 96.59 feet; thence South 89°25'06" West, 20.39 feet; thence North 00°34'54" West, 98.48 feet to the Southeast corner of the West 15 feet of said Lot 5 in Hopkins-Woehler Place; thence North 00°34'54" West, 291.23 feet along the East line of the West 15 feet of said Lot 5 to the South right-of-way line of University Avenue; thence South 87°44'11" East, 170.21 feet along the South right-of-way line of University Avenue to the point of beginning.

Containing 167,311 square feet (3.84 acres).

PARKLAND DEDICATION

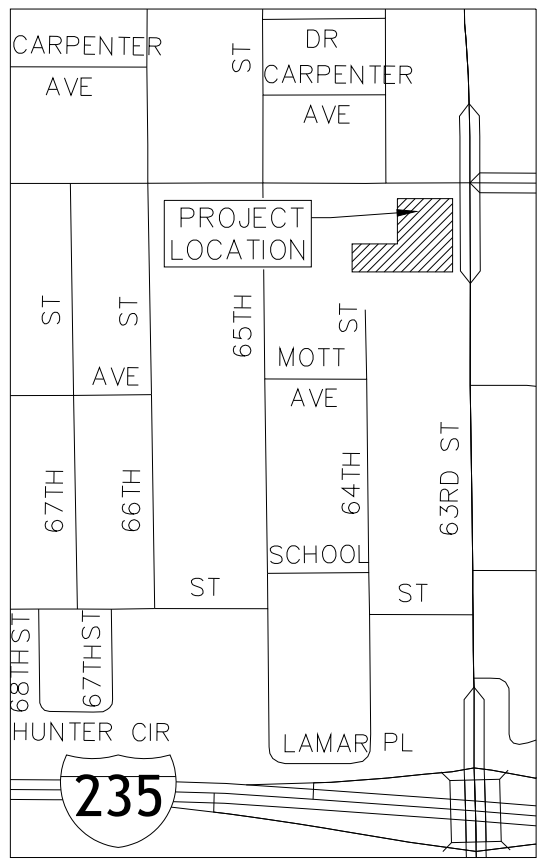
REQUIRED 0.005 ACRES PER RESIDENT
105 UNITS x 1.5 x 0.005 = 0.788 ACRES

DANIEL BREDBECK
1201 64TH ST

WINDSOR COMMUNITY
PRESBYTERIAN CHURCH
6301 UNIVERSITY AVE

SHEET INDEX

- 1 - PROJECT MAP
- 2 - GEOMETRIC PLAN
- 3 - GRADING PLAN - 1
- 4 - GRADING PLAN - 2
- 5 - STORM SEWER PLAN
- 6 - STORM DETAILS - 1
- 7 - STORM DETAILS - 2
- 8 - STORM DETAILS - 3
- 9 - STORM DETAILS - 4
- 10 - STORM DETAILS - 5
- 11 - STORM DETAILS - 6
- 12 - UTILITY PLAN
- 13 - DEMOLITION PLAN
- 14 - LANDSCAPING PLAN
- 15 - DETAIL SHEET
- 16 - CRASH ENCLOSURE DETAIL
- 17 - EROSION CONTROL PLAN
- 18 - LAND SWAP DIAGRAM
- 19 - STREET IMPROVEMENT
- 20 - TRAFFIC CONTROL
- 21 - TRAIL DETOUR
- 22 - BUILDING ELEVATIONS



VICINITY MAP
NTS

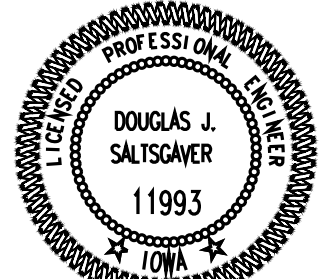
GENERAL NOTES:

1. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE CURRENT URBAN STANDARDS SPECIFICATIONS FOR PUBLIC IMPROVEMENTS.
2. ALL DEBRIS SPILLED ON THE STREETS OR ADJACENT PROPERTY SHALL BE PROMPTLY REMOVED BY THE CONTRACTOR.
3. ALL CONSTRUCTION PROCEDURES AND MATERIALS TO MEET OR EXCEED MINIMUM REQUIREMENTS OF THE CITY.
4. ALL WORK SHALL BE DONE IN ACCORDANCE WITH CURRENT OSHA CODES AND STANDARDS. NOTHING INDICATED ON THESE PLANS SHALL RELIEVE THE CONTRACTOR FROM COMPLYING WITH ANY AND ALL APPROPRIATE SAFETY REGULATIONS.
5. THE CONTRACTOR SHALL FURNISH AND PLACE ALL NECESSARY SIGNS AND BARRICADES DURING CONSTRUCTION IN ACCORDANCE WITH THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR GIVING THE CITY PROPER NOTICE FOR THE REQUIRED INSPECTIONS.
7. WORK SHALL INCLUDE CONNECTION TO EXISTING PUBLIC UTILITIES AND ANY AND ALL FITTINGS, CLEANOUTS AND APPURTENANCES REQUIRED BY CODES.
8. THE CONTRACTOR IS RESPONSIBLE FOR CLEARING & GRUBBING THE SITE, AND REMOVAL & DISPOSAL OF ANY DELETERIOUS AND EXCESS MATERIALS FROM THE SITE.
9. ANY DAMAGE DONE TO THE EXISTING FENCES, YARDS OR OTHER IMPROVEMENTS SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
10. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ANY AND ALL REQUIRED PERMITS FOR PERFORMING THE WORK INCLUDING SIDEWALK AND DRIVEWAY APPROACH.
11. A SIDEWALK AND DRIVEWAY APPROACH PERMIT WILL BE REQUIRED OF THE DEVELOPER OR CONTRACTOR.
12. LIGHTING MUST BE LOW GLARE CUT-OFF TYPE FIXTURES TO REDUCE THE GLARE OF LIGHT POLLUTION ON SURROUNDING PROPERTIES.
13. ALL WORK IN THE ROW OF UNIVERSITY AVENUE SHALL BE PER THE MOST CURRENT SUDAS SPECIFICATIONS.

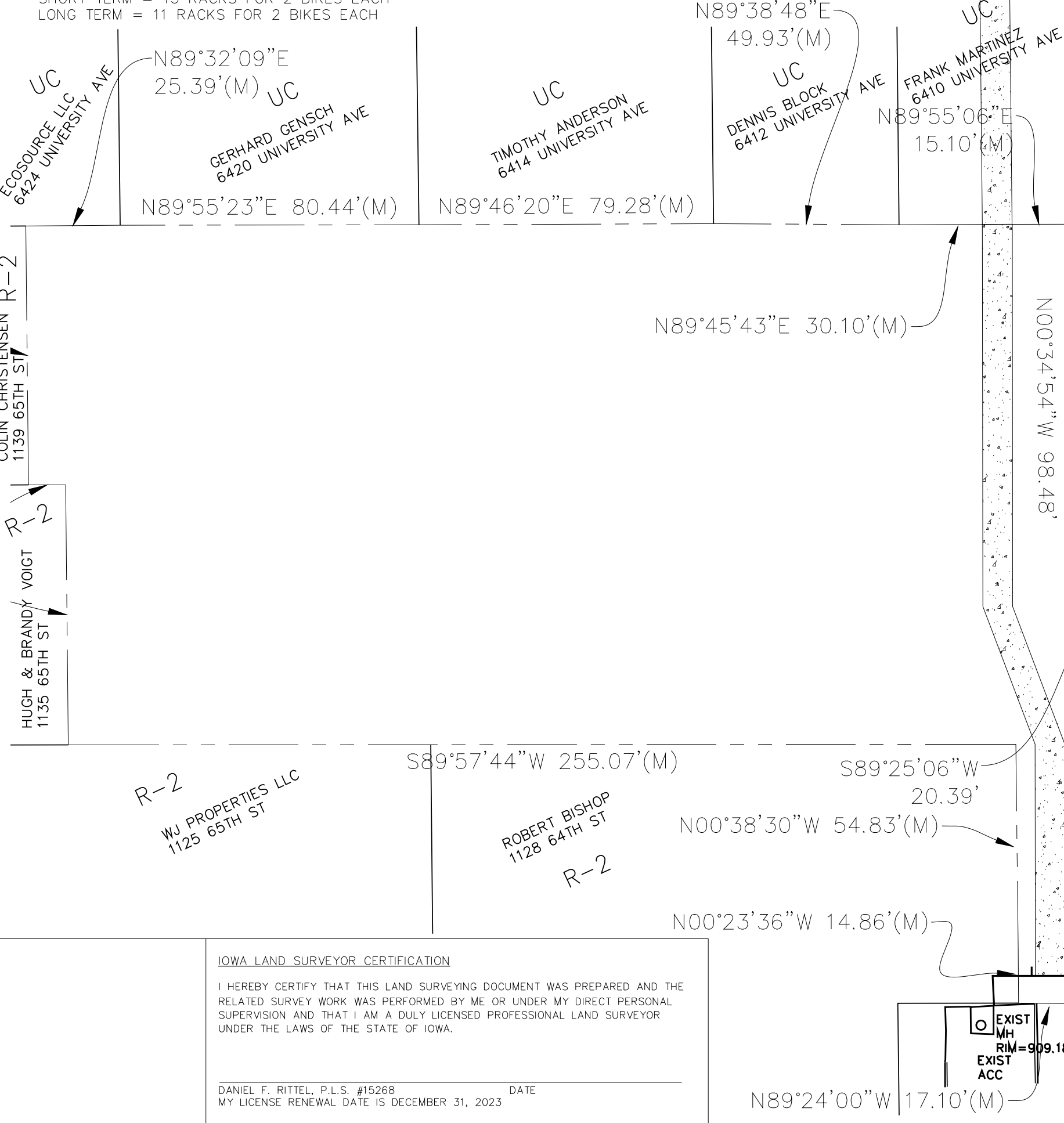
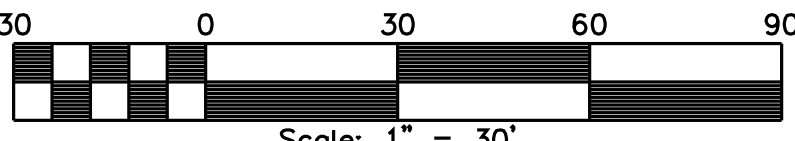
P.C.C. PAVING:

1. ALL SUBGRADE UNDER SLAB TO BE COMPACTED TO 95% STANDARD PROCTOR DENSITY FOR A MINIMUM OF 24".
2. MOISTEN SUBGRADE PRIOR TO PLACING CONCRETE.
3. CONCRETE SHALL HAVE A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 4000 PSI.
4. AGGREGATE SHALL BE CLASS 3.
5. CONCRETE SURFACES SHALL BE BURLAP FINISH. CHECK SURFACE WITH TEMPLATE NO DEVIATION OVER 1/8" IN 10' IS PERMITTED. ALL CONCRETE SHALL SLOPE TO DRAIN.
6. ALL CONCRETE SHALL BE CURED WITH AN ASTM C309 TYPE 2, WATER BASED WHITE PIGMENTED CURING COMPOUND PER IDOT SEC. 4105.
7. SAW CUT JOINTS AS SOON AS CONCRETE HAS SET ENOUGH TO PREVENT RAVELING AND PRIOR TO ANY CRACKING.
8. SAW CUTS TO BE 1/8" TO 1/4" WIDE; DEPTH: LONGITUDINAL T/3, TRANSVERSE T/4.
9. LONGITUDINAL JOINT SPACING SHALL NOT BE GREATER THAN 12'. TRANSVERSE SPACING SHALL NOT BE GREATER THAN 15'. JOINT LAYOUT SHALL BE APPROVED BY THE ENGINEER.
10. BARS AT LONGITUDINAL JOINTS TO BE 1/2" X 30" DEFORMED AT 30" O.C.
11. ALL JOIS SHALL BE FILLED.
12. THE CONTRACTOR TO BARRICADE SLAB FOR 14 DAYS AFTER PLACING.
13. ON SITE PAVING THICKNESS SHALL BE AS FOLLOWS: 4" SIDEWALKS, 6" DRIVEWAYS, AND PARKING STALLS. DRIVE PAVEMENT WITHIN R/W (CURB TO BACK OF WALK) SHALL BE 7" MIN. PERIMETER SIDEWALK SHALL BE 5" MIN EXCEPT WITHIN DRIVE PAVEMENT.
14. SUBMIT DESIGN MIX AS DESIGNED BY INDEPENDENT TESTING LABORATORY PRIOR TO PLACING ANY CONCRETE.
15. ALL WORK TO COMPLY WITH CURRENT ACI STANDARDS.
16. THE CONTRACTOR SHALL PAINT PARKING STALLS.
17. ALL DEBRIS SPILLED ON THE CITY STREETS OR ADJACENT PROPERTY SHALL BE PROMPTLY REMOVED BY THE CONTRACTOR. NOTIFY CITY OF PROPOSED BORROW OR FILL SITE LOCATIONS AND HAUL ROUTES.

DSaltsgaver@gaconsultants.com



ENGINEERING CERTIFICATION
I HEREBY CERTIFY THAT THIS ENGINEERING DOCUMENT, SPECIFICATION OR REPORT WAS PREPARED BY ME, OR UNDER MY DIRECT PERSONAL SUPERVISION, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF IOWA.
DOUGLAS J. SALTSGAVER, P.E. #11993
MY REGISTRATION RENEWAL DATE IS DECEMBER 31, 2024
PAGES OR SHEETS COVERED BY THIS SEAL
1 - 21



IOWA LAND SURVEYOR CERTIFICATION
I HEREBY CERTIFY THAT THIS LAND SURVEYING DOCUMENT WAS PREPARED AND THE RELATED SURVEY WORK WAS PERFORMED BY ME OR UNDER MY DIRECT PERSONAL SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL LAND SURVEYOR UNDER THE LAWS OF THE STATE OF IOWA.
DANIEL F. RITTEL, P.L.S. #15088
DATE
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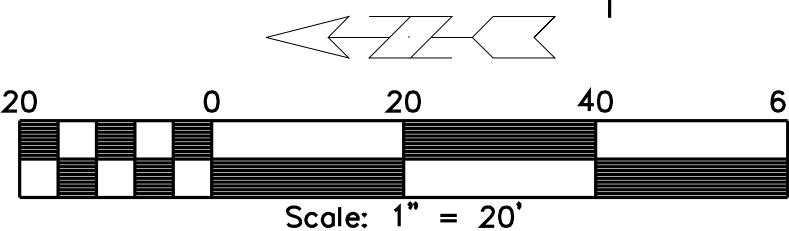
WINDSOR APARTMENTS - PROJECT MAP

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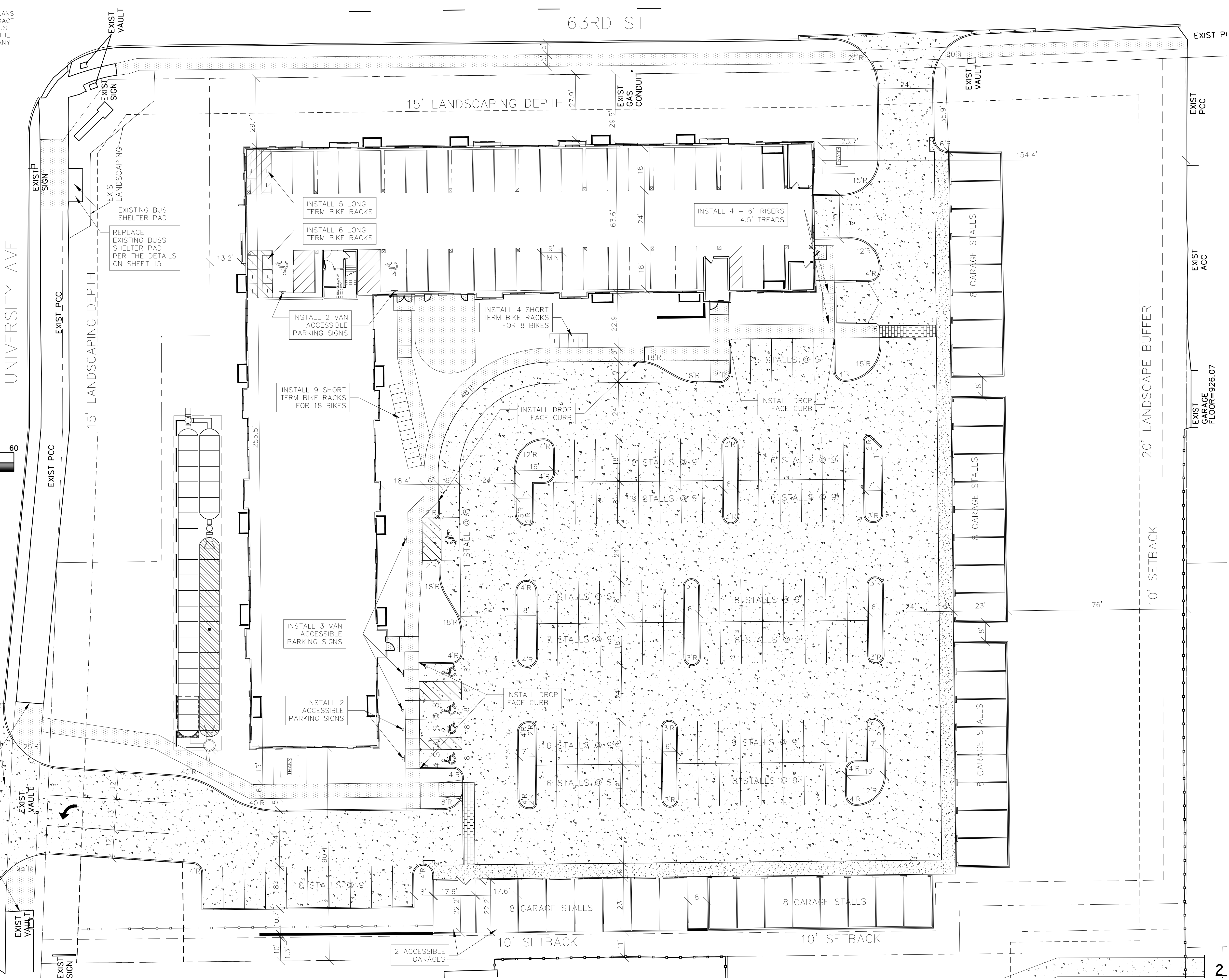
NOTE:
THE LOCATION OF ALL UTILITIES INDICATED ON THE PLANS
ARE TAKEN FROM EXISTING PUBLIC RECORDS. THE EXACT
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ADDITIONAL FACILITIES OTHER THAN THOSE SHOWN ON
THE PLANS MAY BE PRESENT.



- DENOTES PROPOSED PCC
- DENOTES PROPOSED PCC SIDEWALK
- DENOTES PROPOSED PCC GARAGE DRIVEWAY
- DENOTES STAMPED COLORED CONCRETE

SEAL JOINTS IN
DRIVEWAY PAVEMENT

INSTALL SUDAS
"RD" JOINT AT
30" O.C.



WINDSOR APARTMENTS - GEOMETRIC PLAN

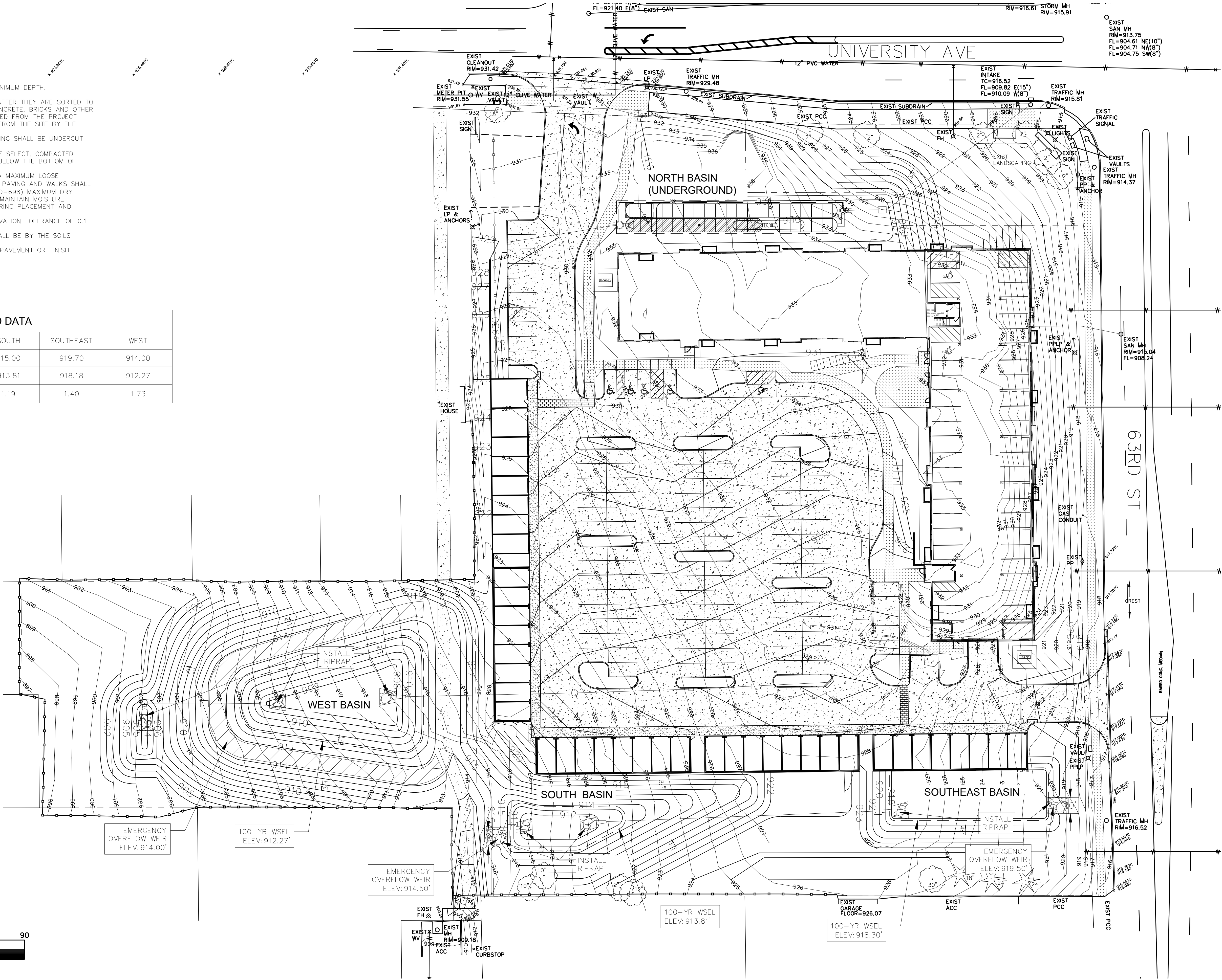
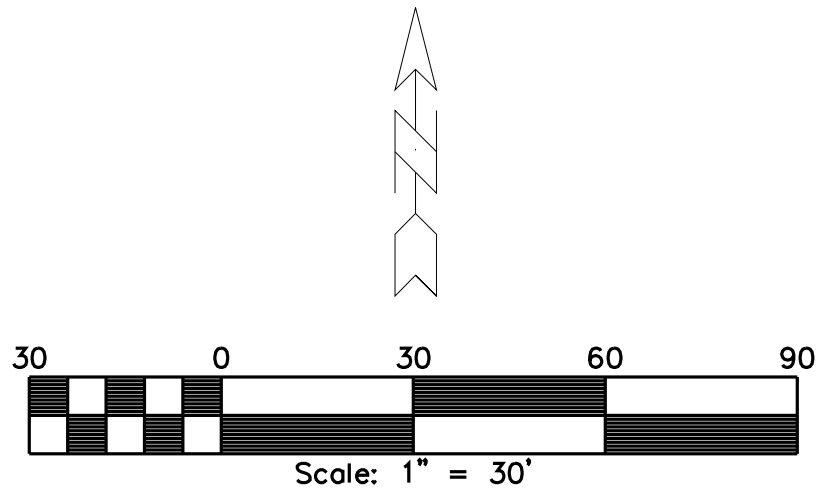
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NOTE:
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GRADING NOTES:

1. REMOVE ALL EXISTING ORGANIC MATERIAL TO 6" MINIMUM DEPTH.
2. PROOF ROLL THE EXPOSED SUB GRADE.
3. NATIVE SOILS MAY BE REUSED FOR COMMON FILL AFTER THEY ARE SORTED TO REMOVE ALL DELETERIOUS MATERIALS SUCH AS CONCRETE, BRICKS AND OTHER RUBBLE. DELETERIOUS MATERIALS SHALL BE REMOVED FROM THE PROJECT SITE. ALL EXCESS MATERIALS SHALL BE REMOVED FROM THE SITE BY THE CONTRACTOR.
4. ANY SOFT SPOTS DISCOVERED DURING PROOF ROLLING SHALL BE UNDERCUT AND RECOMPACTED.
5. ALL PAVEMENTS SHALL HAVE A MINIMUM OF 12" OF SELECT, COMPACTED MATERIAL OF CL OR ML CLASSIFICATION DIRECTLY BELOW THE BOTTOM OF SLAB.
6. FILL SHALL BE PLACED IN UNIFORM LIFTS HAVING A MAXIMUM LOOSE THICKNESS OF 9". COMPACTION BELOW SLABS AND PAVING AND WALKS SHALL BE AT LEAST 95% OF STANDARD PROCTOR (ASTM D-698) MAXIMUM DRY DENSITY. COMPACT TO 90% AT OTHER LOCATIONS. MAINTAIN MOISTURE CONTENT OF CONTROLLED FILL ABOVE OPTIMUM DURING PLACEMENT AND COMPACTION.
7. THE ENTIRE SITE SHALL BE FINE GRADED WITH ELEVATION TOLERANCE OF 0.1 FOOT.
8. OBSERVATION AND TESTING OF FILL OPERATION SHALL BE BY THE SOILS ENGINEER HIRED BY THE CONTRACTOR.
9. ALL PROPOSED SPOT ELEVATIONS ARE TO TOP OF PAVEMENT OR FINISH GRADE, UNLESS OTHERWISE NOTED.

POND DATA				
	NORTH	SOUTH	SOUTHEAST	WEST
TOP OF POND	928.75	915.00	919.70	914.00
100YR EL	924.65	913.81	918.18	912.27
FREEBOARD	4.10	1.19	1.40	1.73



WINDSOR APARTMENTS - GRADING PLAN - I

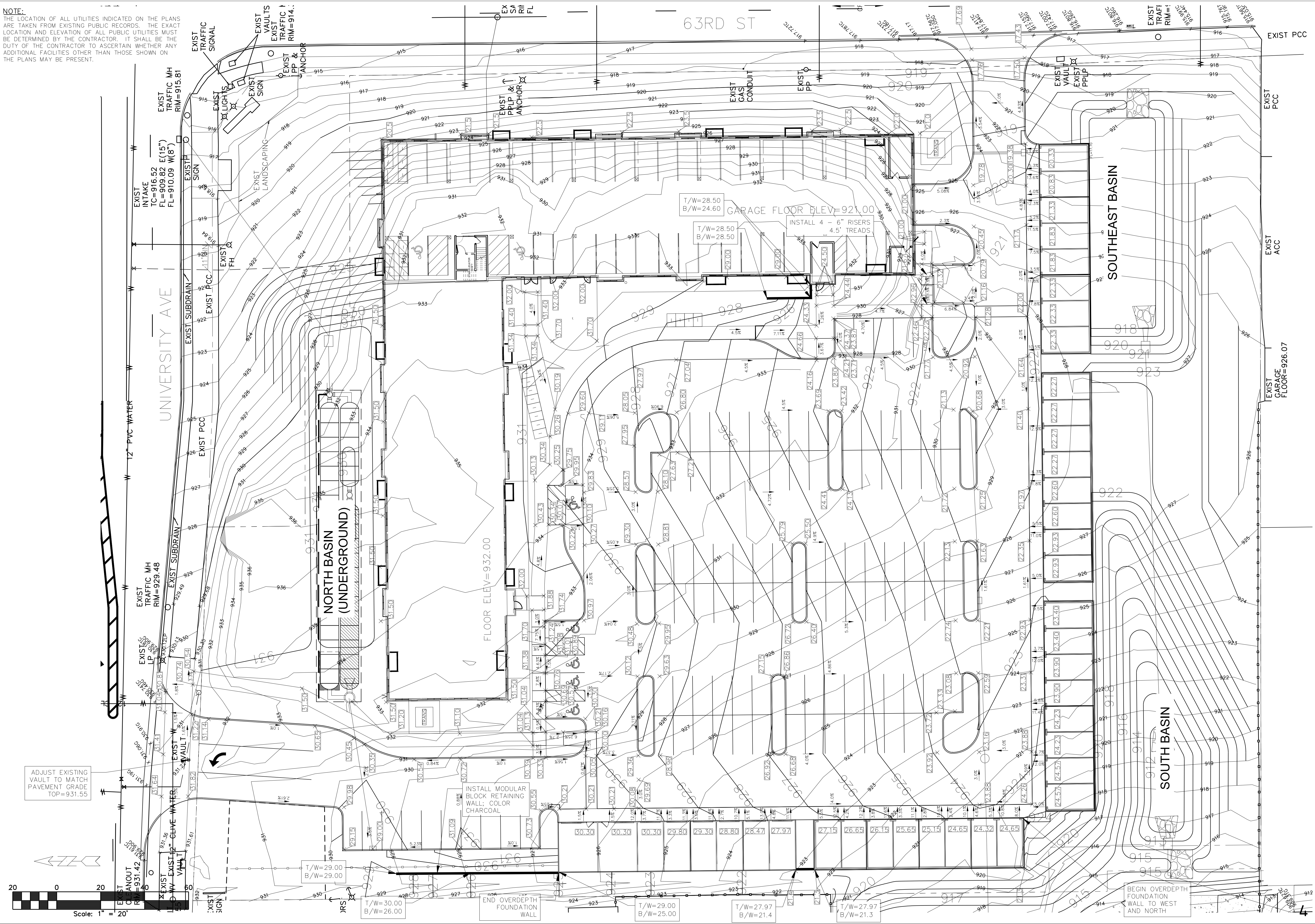


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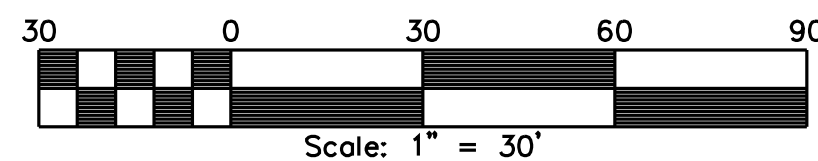
WINDSOR APARTMENTS - GRADING PLAN - 2

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1. ALL BACKFILL SHALL BE COMPACTED TO 95% STANDARD PROCTOR. CONTRACTOR TO COORDINATE WITH TESTING COMPANY. TESTING PAID BY OWNER.
2. ALL PVC PIPE SHALL BE SCHEDULE 40.
3. ALL CONNECTIONS TO DOWNSPOUTS SHALL INCLUDE A C.I. DOWNSPOUT BOOT.
4. ALL NYLOPLAST INTAKES SHALL HAVE MINIMUM 10" SUMP.



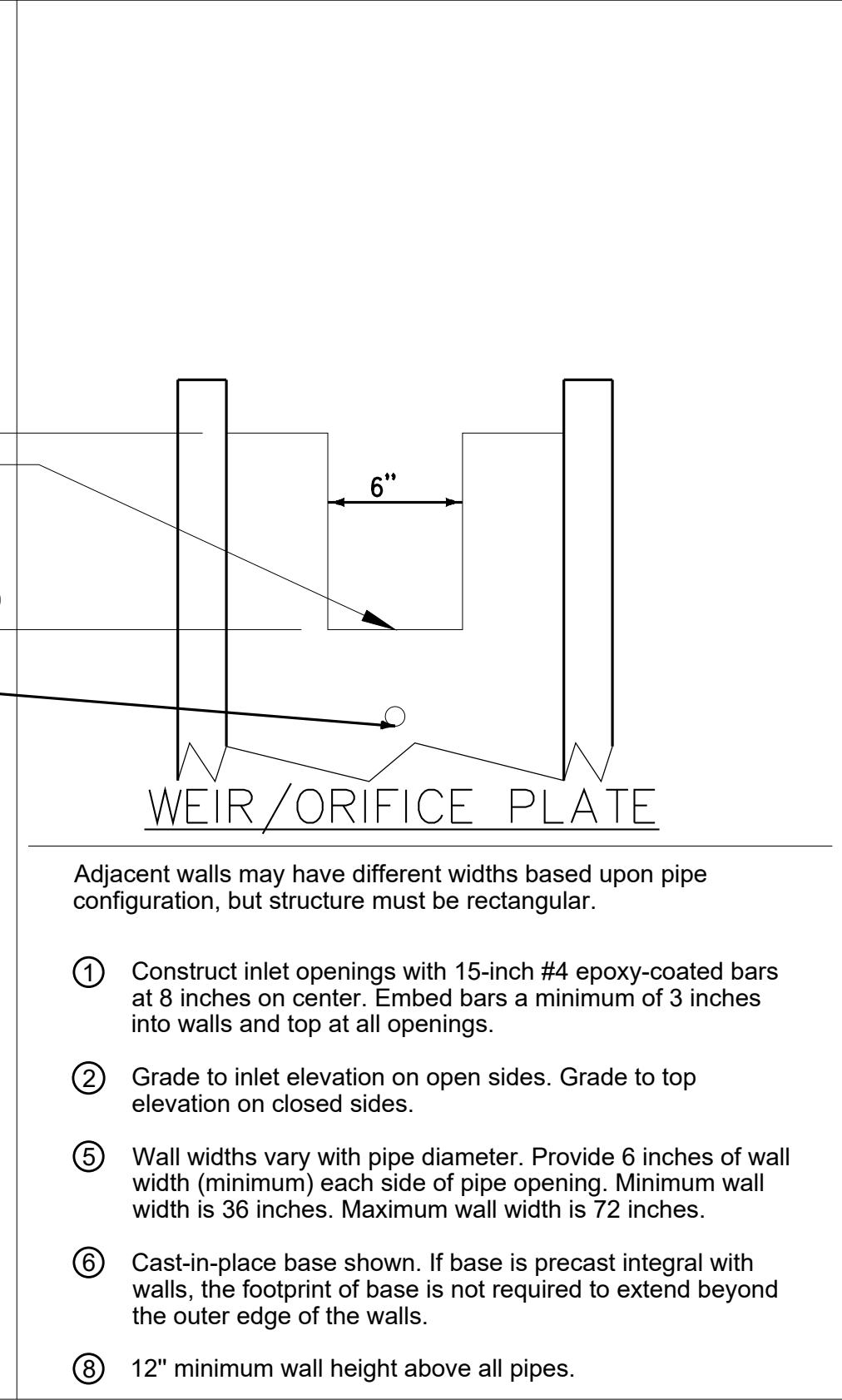
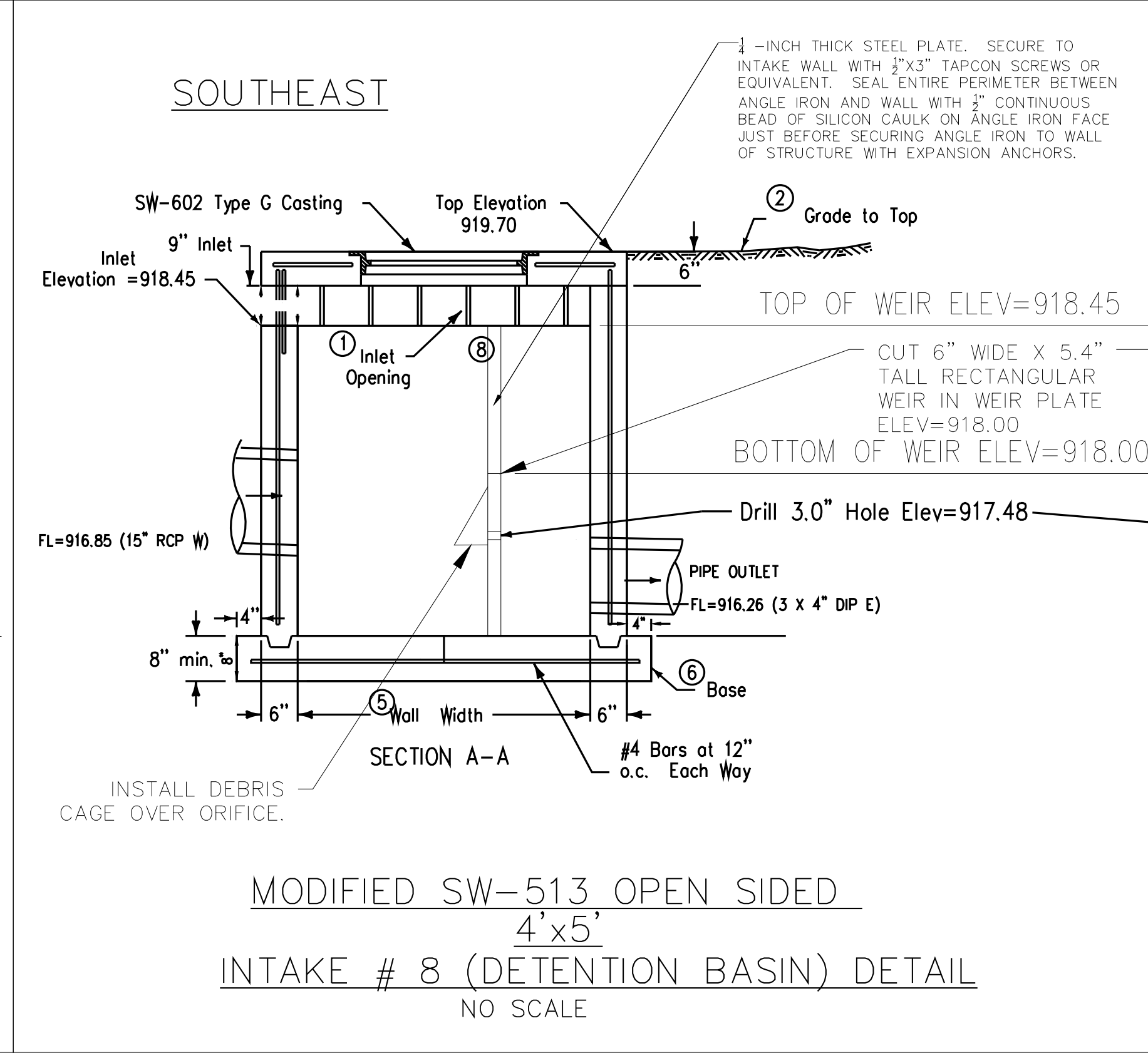
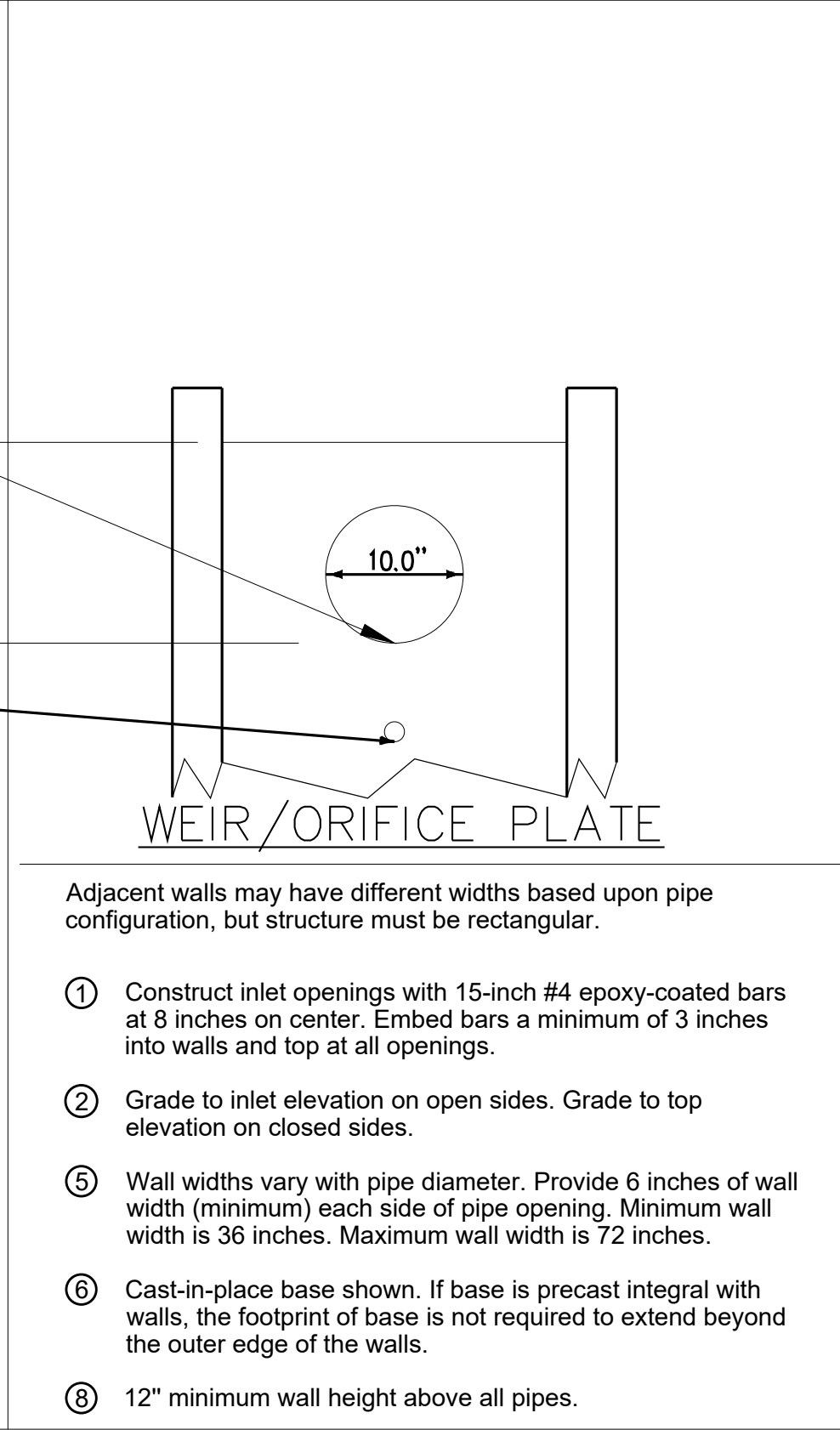
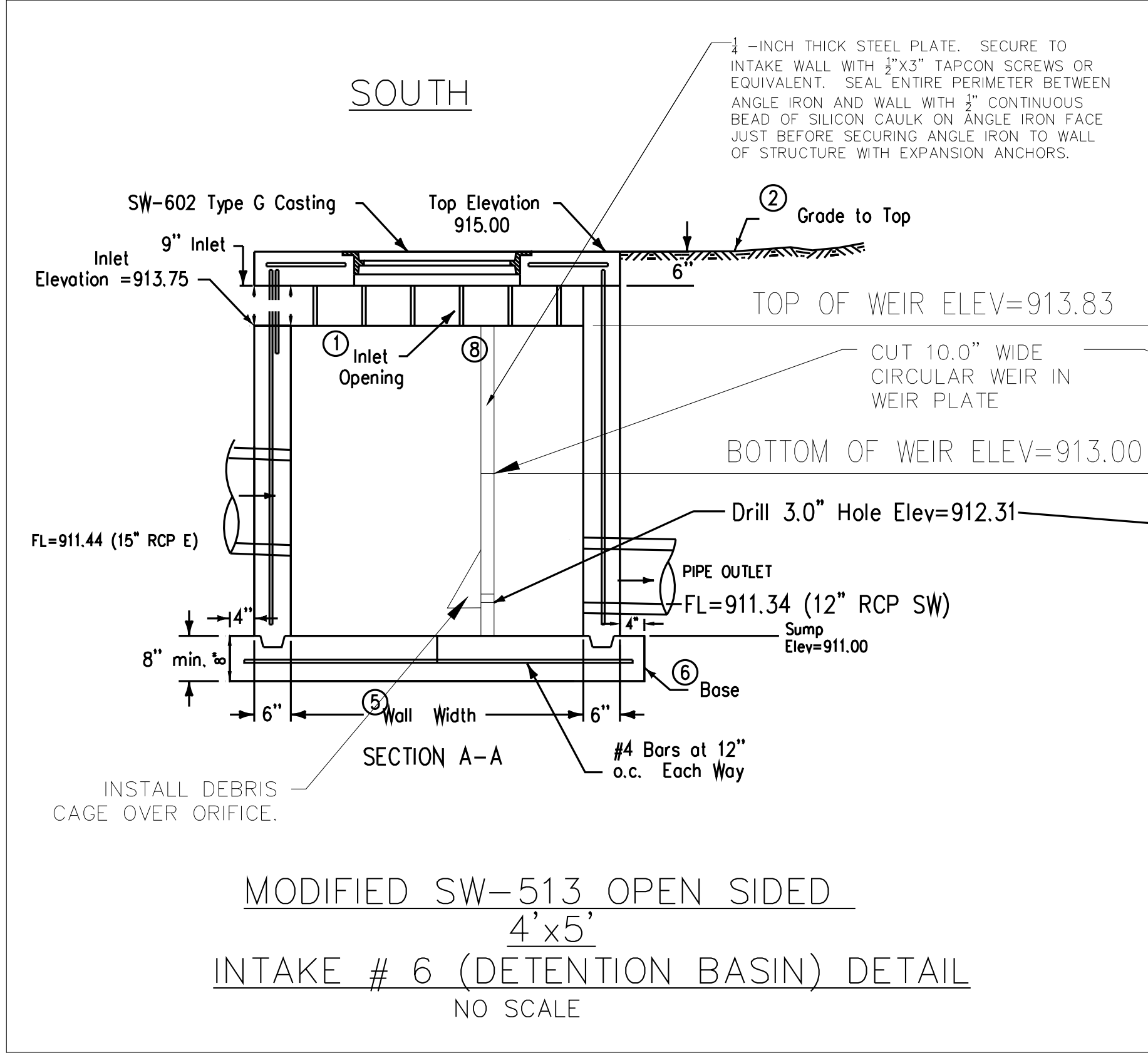
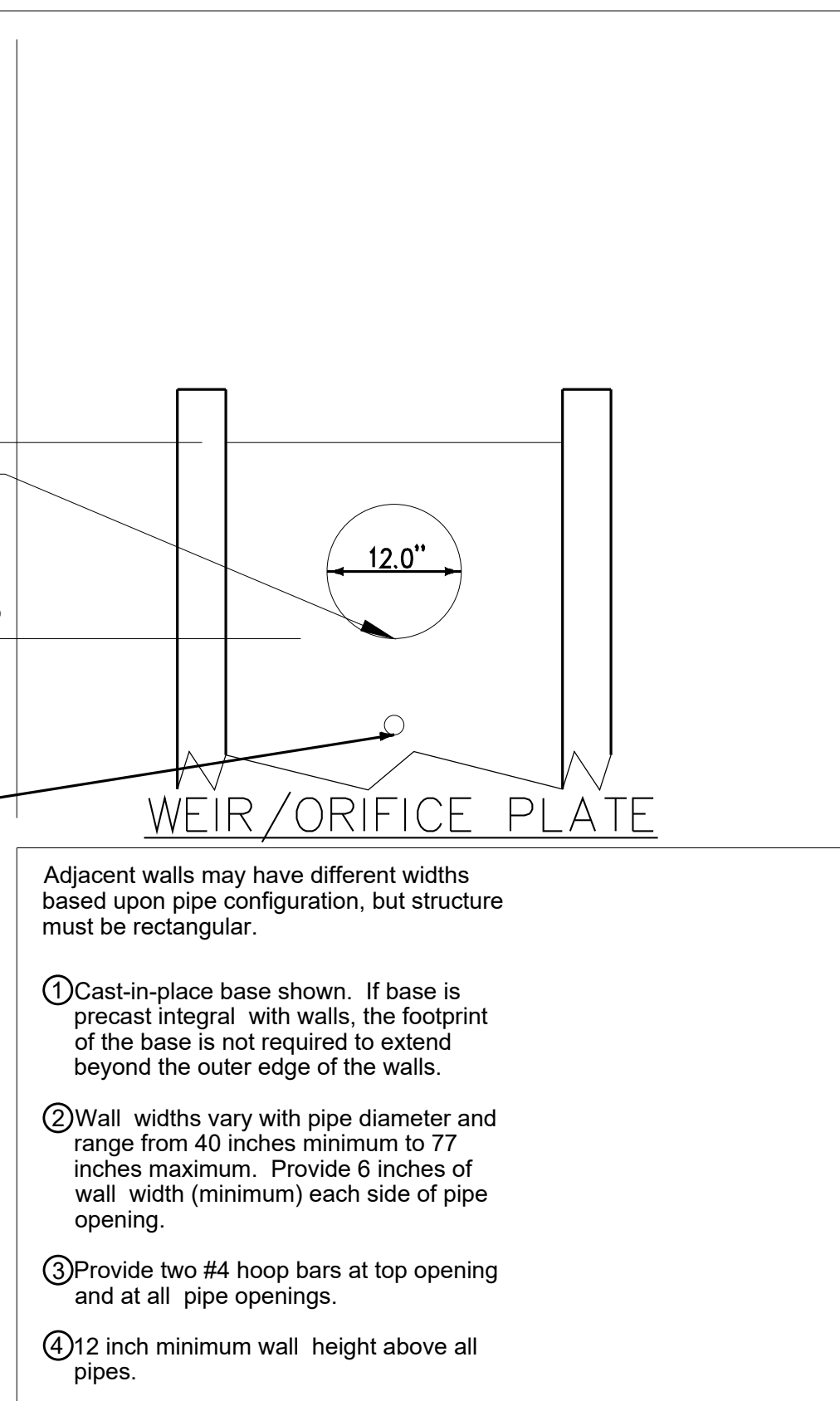
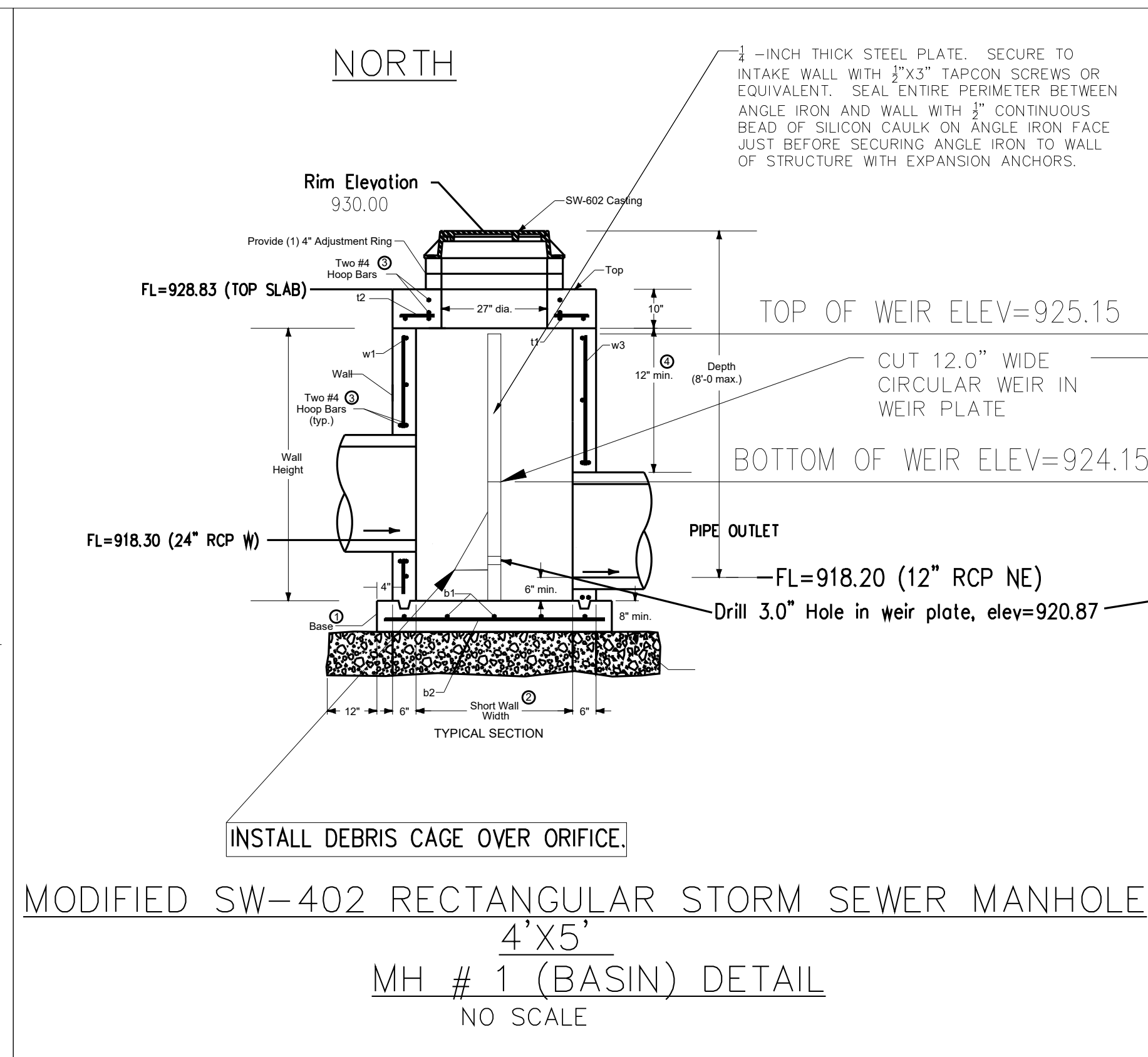
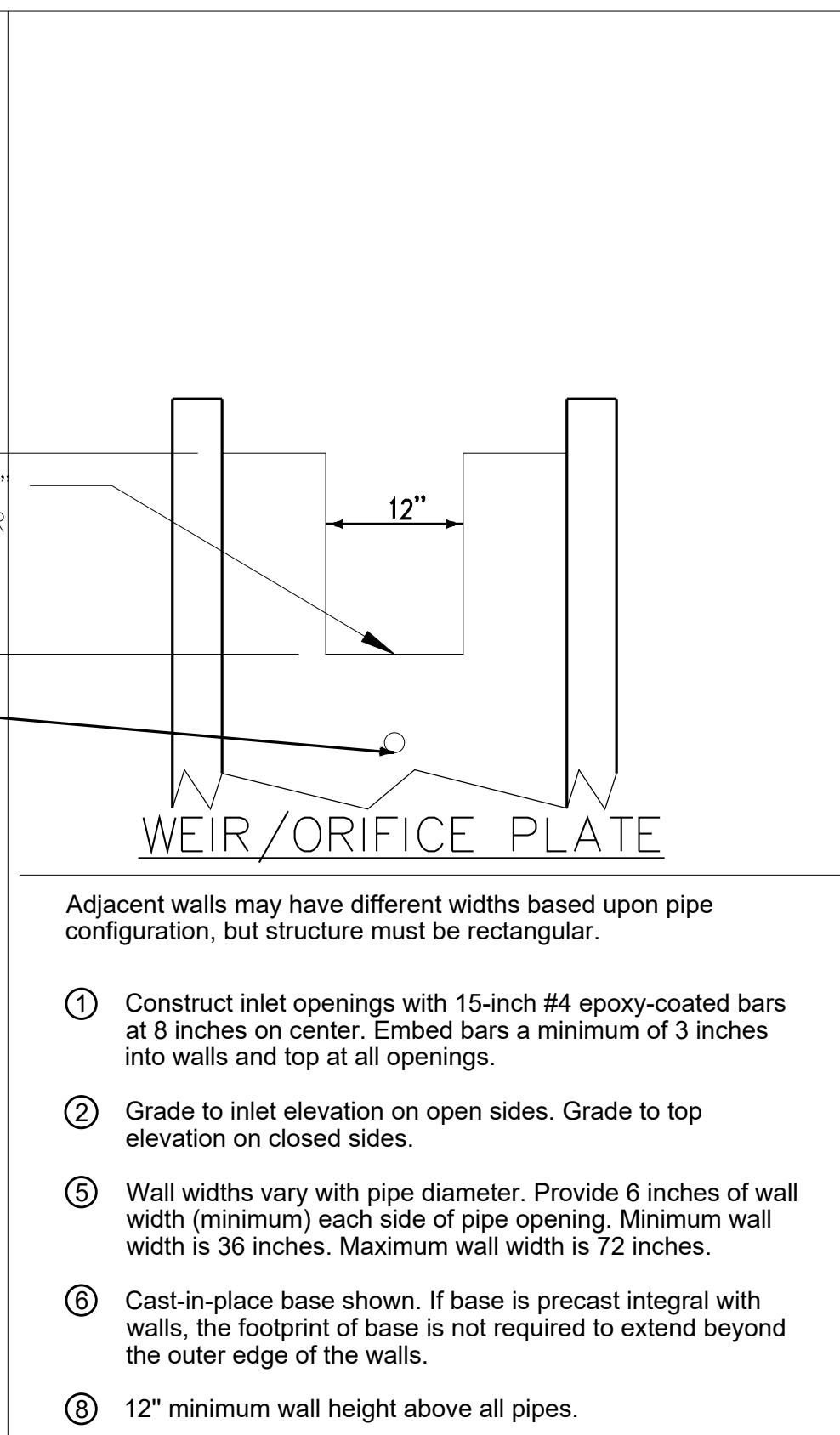
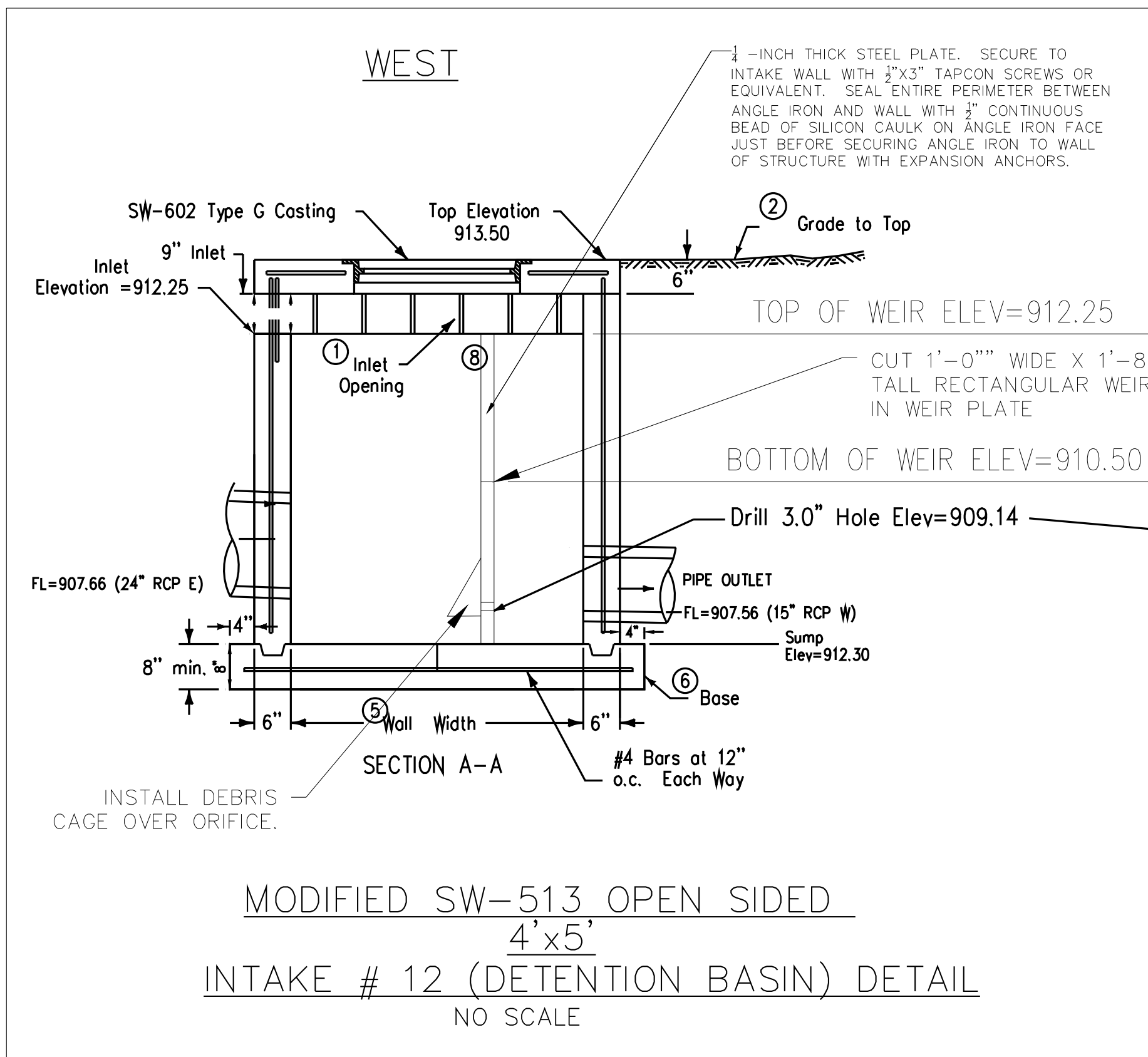
WINDSOR APARTMENTS - STORM SEWER PLAN

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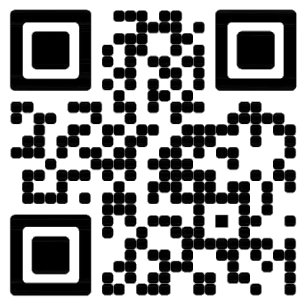
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PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER	
ADS SALES REP	
PROJECT NO.	



63RD & UNIVERSITY 2 CHAMBER

WINDSOR HEIGHTS, IA, USA

MC-7200 STORMTECH CHAMBER SPECIFICATIONS

- CHAMBERS SHALL BE STORMTECH MC-7200.
- CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
- CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 60x101.
- CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
- THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
- CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
- REQUIREMENTS FOR HANDLING AND INSTALLATION:
 - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
 - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
 - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 450 LBS/FT/%. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
- ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
 - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
 - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
 - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
- CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF MC-7200 CHAMBER SYSTEM

- STORMTECH MC-7200 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
- STORMTECH MC-7200 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-7200 CONSTRUCTION GUIDE".
- CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
 - STONESHOOTER LOCATED OFF THE CHAMBER BED.
 - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
 - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
- THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
- JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
- MAINTAIN MINIMUM - 9" (230 mm) SPACING BETWEEN THE CHAMBER ROWS.
- INLET AND OUTLET MANIFOLDS MUST BE INSERTED A MINIMUM OF 12" (300 mm) INTO CHAMBER END CAPS.
- EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE MEETING THE AASHTO M43 DESIGNATION OF #3 OR #4.
- STONE SHALL BE BROUGHT UP EVENLY AROUND CHAMBERS SO AS NOT TO DISTORT THE CHAMBER SHAPE. STONE DEPTHS SHOULD NEVER DIFFER BY MORE THAN 12" (300 mm) BETWEEN ADJACENT CHAMBER ROWS.
- STONE MUST BE PLACED ON THE TOP CENTER OF THE CHAMBER TO ANCHOR THE CHAMBERS IN PLACE AND PRESERVE ROW SPACING.
- THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIAL BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
- ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

- STORMTECH MC-7200 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-7200 CONSTRUCTION GUIDE".
- THE USE OF EQUIPMENT OVER MC-7200 CHAMBERS IS LIMITED:
 - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
 - NO RUBBER TIRED LOADER, DUMP TRUCK, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-7200 CONSTRUCTION GUIDE".
 - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH MC-7200 CONSTRUCTION GUIDE".
- FULL 36" (900 mm) OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY USING THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

CONTACT STORMTECH AT 1-888-892-2694 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

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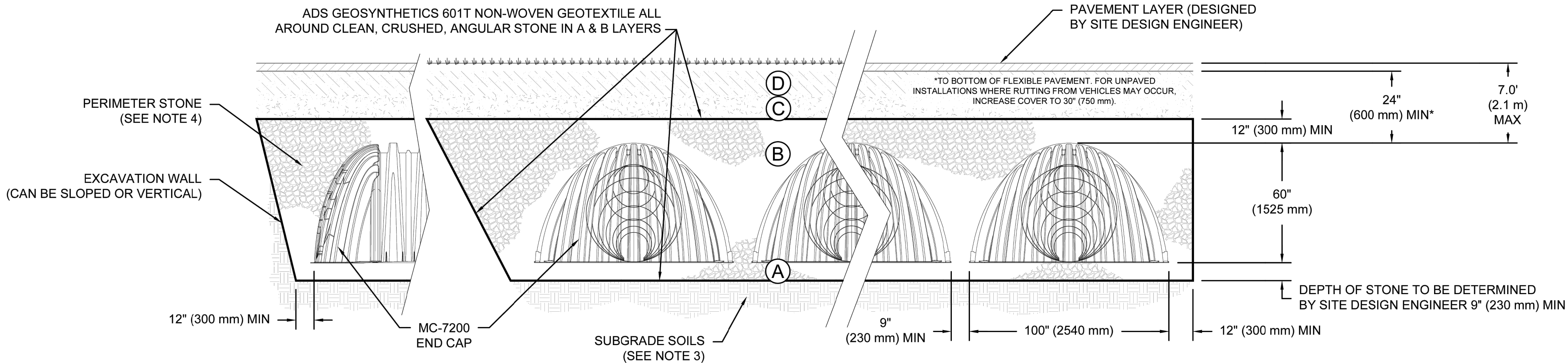


ACCEPTABLE FILL MATERIALS: STORMTECH MC-7200 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	FINAL FILL: FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	INITIAL FILL: FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 24" (600 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145¹ A-1, A-2-4, A-3 OR AASHTO M43¹ 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS.
B	EMBEDMENT STONE: FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43¹ 3, 4	NO COMPACTION REQUIRED.
A	FOUNDATION STONE: FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43¹ 3, 4	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.²,³

PLEASE NOTE:

1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.



NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 60x101
2. MC-7200 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:

• TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.

• TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".

• TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 450 LBS/FT/%. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

63RD & UNIVERSITY 2 CHAMBER

WINDSOR HEIGHTS, IA, USA

DATE: DRAWN: BH

PROJECT #: CHECKED: N/A

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Chamber System

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SHEET

3 OF 5

THIS DRAWING HAS BEEN PREPARED BASED ON INFORMATION PROVIDED TO ADS UNDER THE DIRECTION OF THE SITE DESIGN ENGINEER OR OTHER PROJECT REPRESENTATIVE. THE SITE DESIGN ENGINEER SHALL REVIEW THIS DRAWING PRIOR TO CONSTRUCTION. IT IS THE ULTIMATE RESPONSIBILITY OF THE SITE DESIGN ENGINEER TO ENSURE THAT THE PRODUCT(S) DEPICTED AND ALL ASSOCIATED DETAILS MEET ALL APPLICABLE LAWS, REGULATIONS, AND PROJECT REQUIREMENTS.

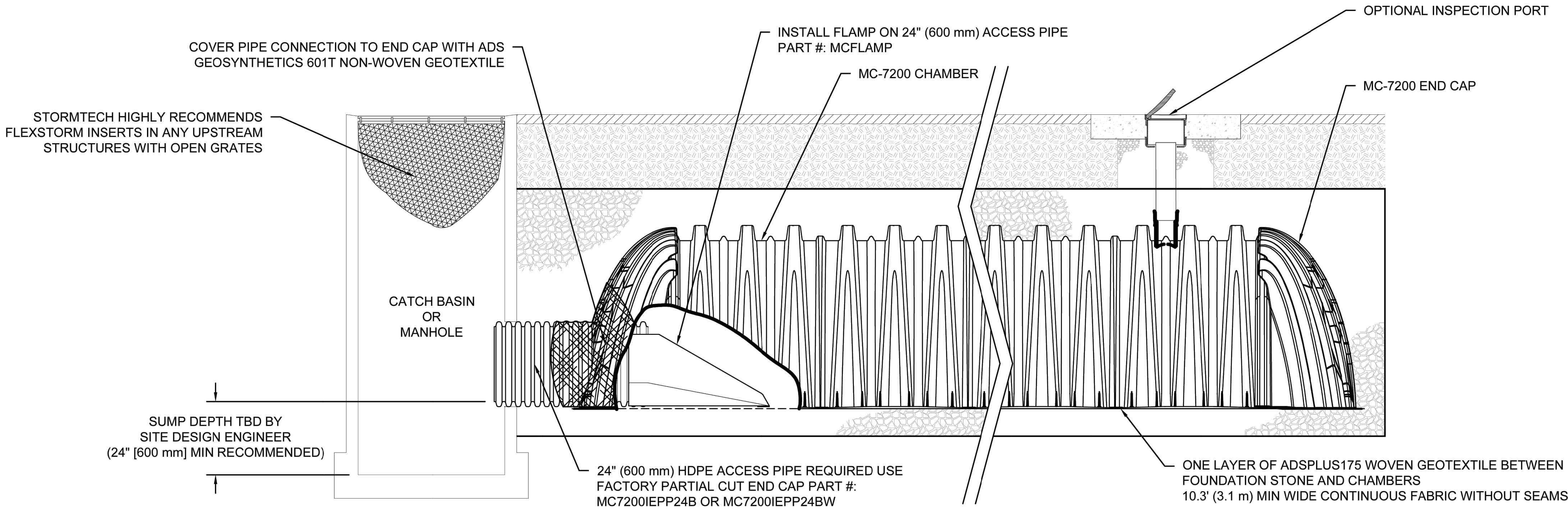
WINDSOR APARTMENTS - STORM DETAILS - 4

NO.	REVISION		DATE	BY	FOR	LOCATION:	SCALE: AS NOTED		DESIGNED BY: DJS	DRAWN BY: PJW						
							DWG: 23-047-STW-5.dwg									
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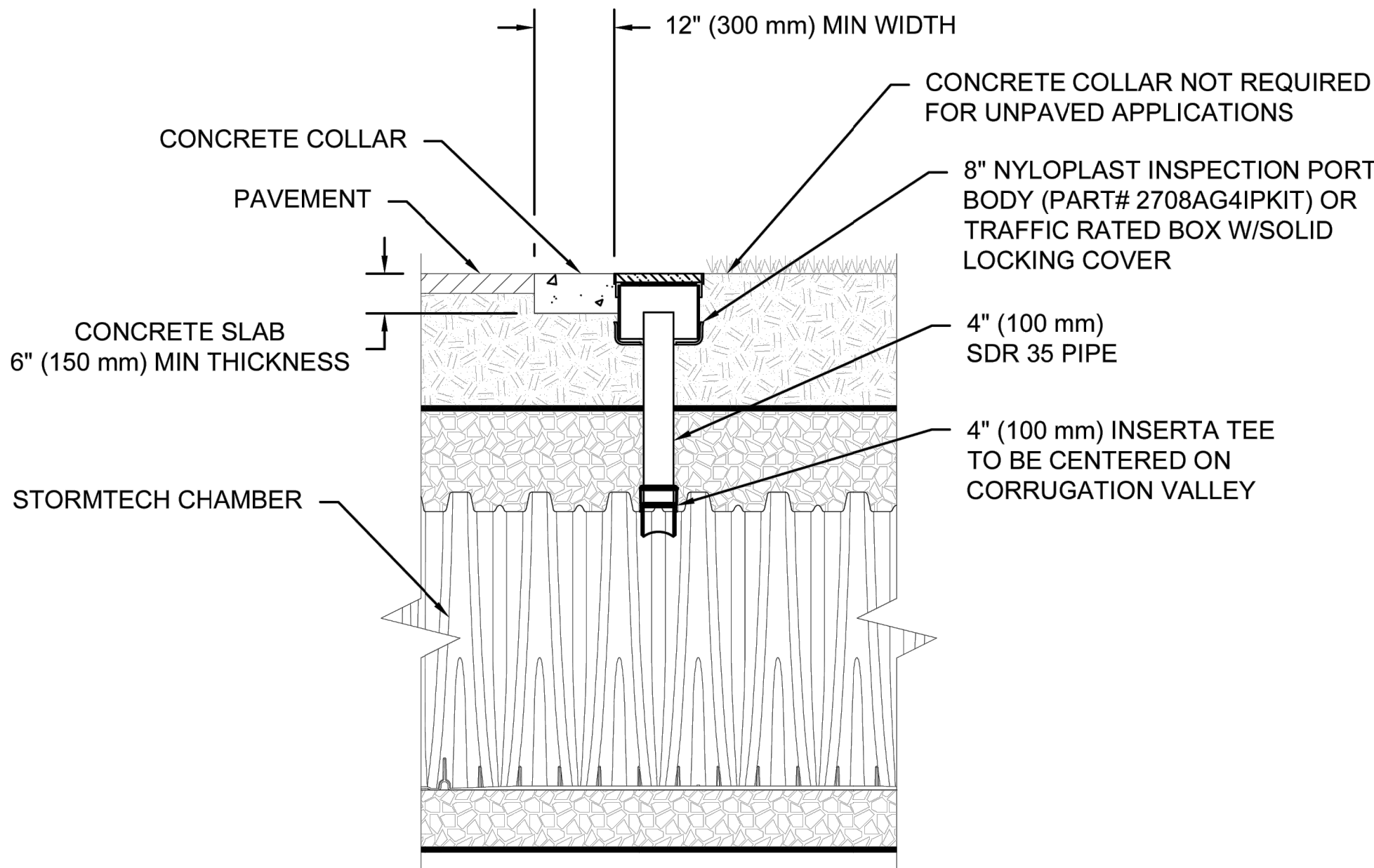
MC-7200 ISOLATOR ROW PLUS DETAIL
NTS

INSPECTION & MAINTENANCE

- STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
 - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
 - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
 - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
 - A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
 - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
 - B. ALL ISOLATOR PLUS ROWS
 - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
 - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
 - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
 - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
 - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
 - B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
 - C. VACUUM STRUCTURE SUMP AS REQUIRED
- STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.
- STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

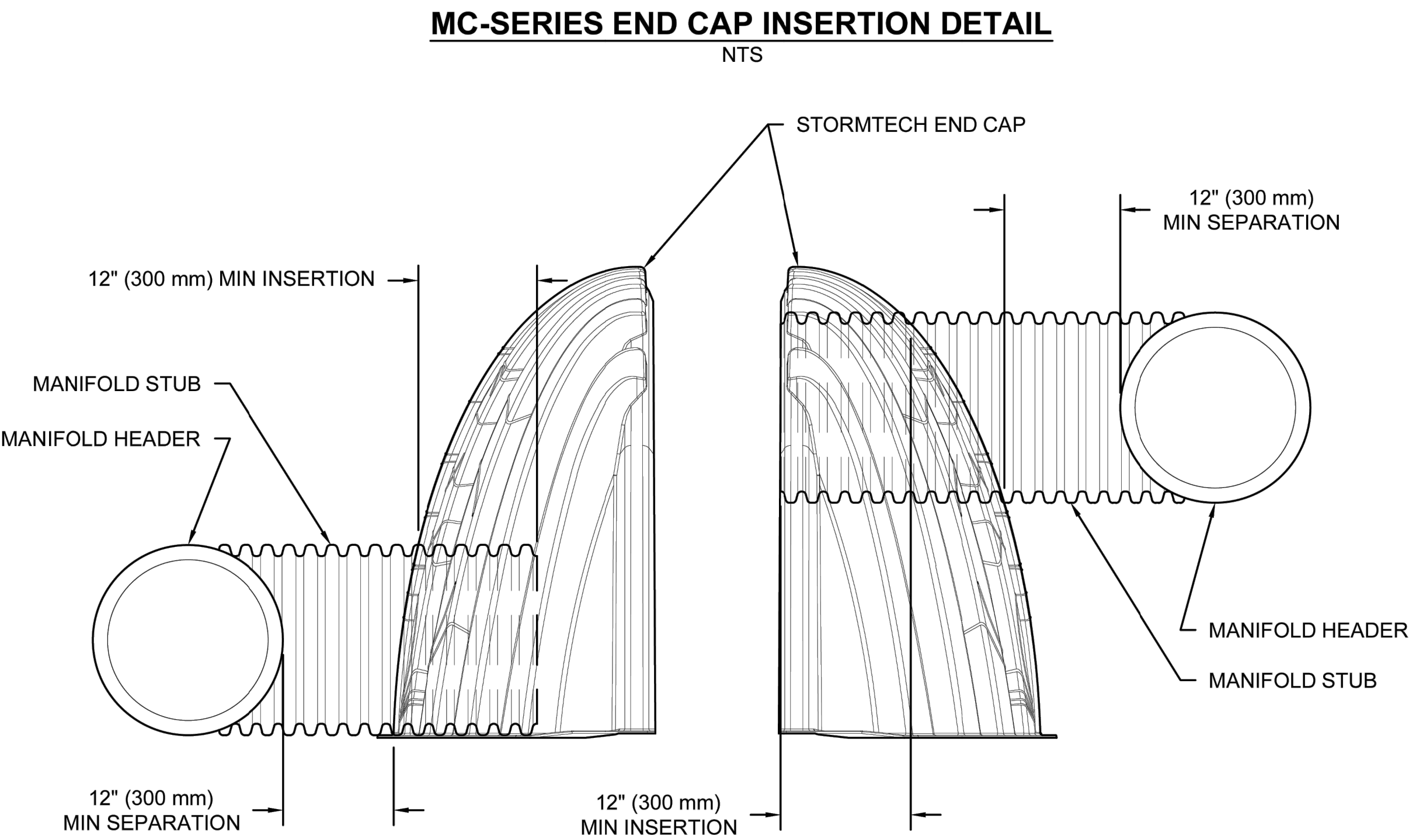
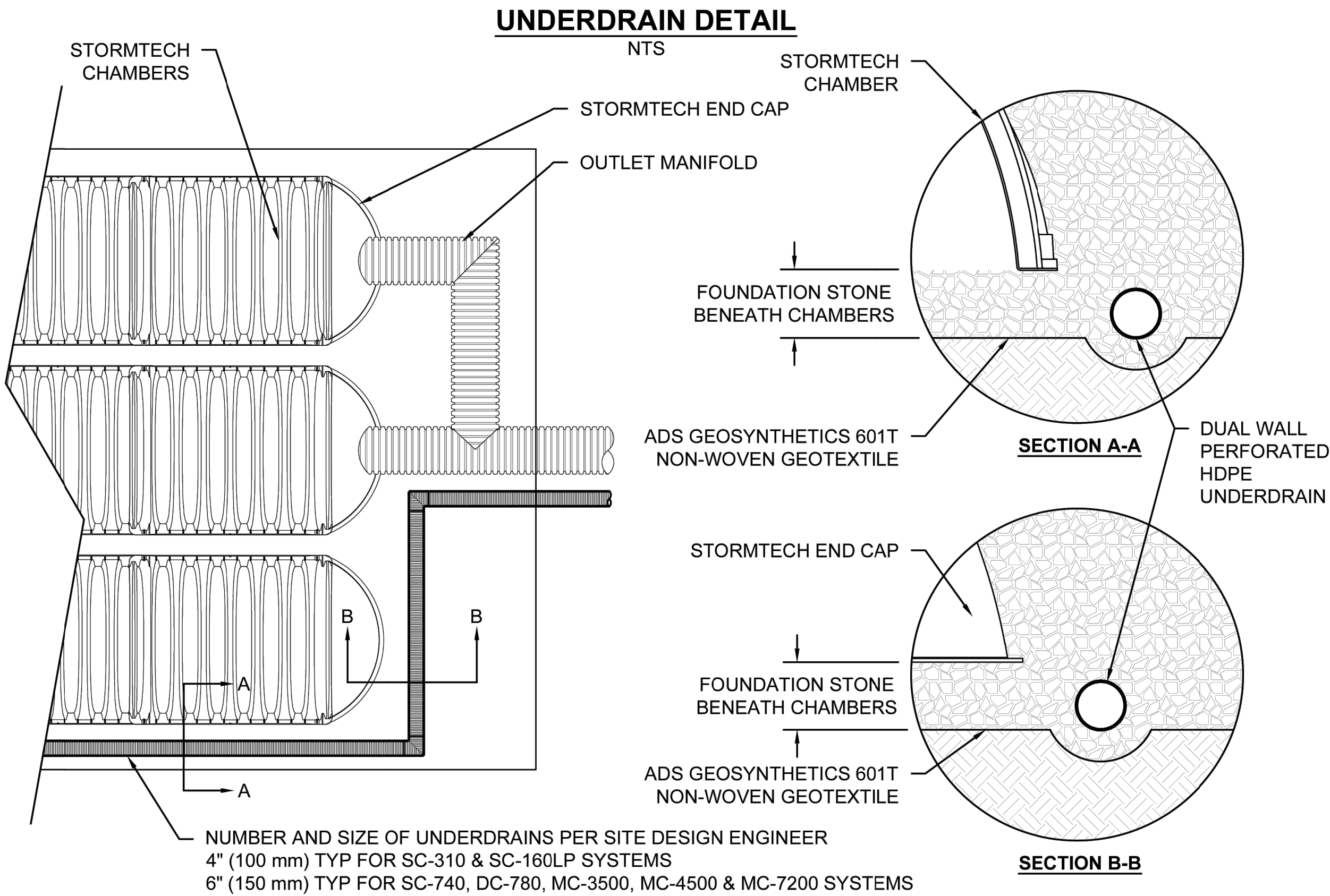
- INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.
- CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.



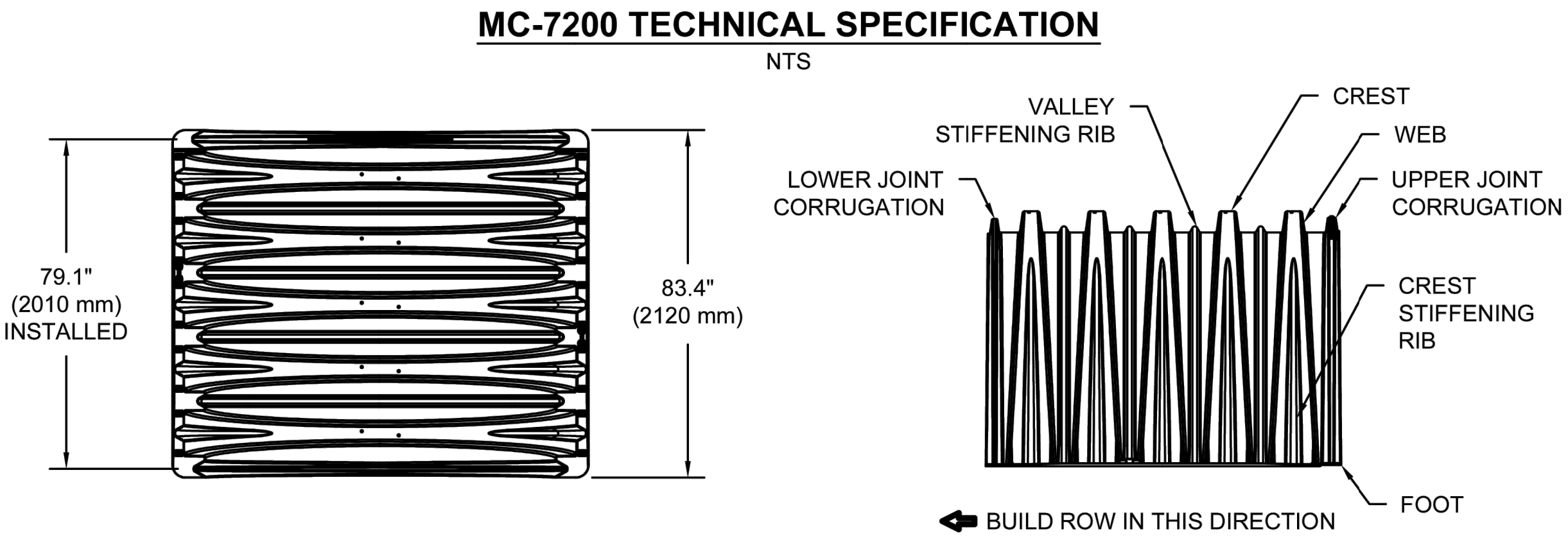
NOTE:
INSPECTION PORTS MAY BE CONNECTED THROUGH ANY CHAMBER CORRUGATION VALLEY.

4" PVC INSPECTION PORT DETAIL
(MC SERIES CHAMBER)
NTS

 4640 TRUEMAN BLVD HILLIARD, OH 43026 1-800-733-7473		StormTech® Chamber System		888-892-2894 WWW.STORMTECH.COM																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
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NOTE: MANIFOLD STUB MUST BE LAID HORIZONTAL FOR A PROPER FIT IN END CAP OPENING.



NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	100.0" X 60.0" X 79.1"	(2540 mm X 1524 mm X 2010 mm)
CHAMBER STORAGE	175.9 CUBIC FEET	(4.98 m ³)
MINIMUM INSTALLED STORAGE*	267.3 CUBIC FEET	(7.56 m ³)
WEIGHT (NOMINAL)	205 lbs.	(92.9 kg)

NOMINAL END CAP SPECIFICATIONS

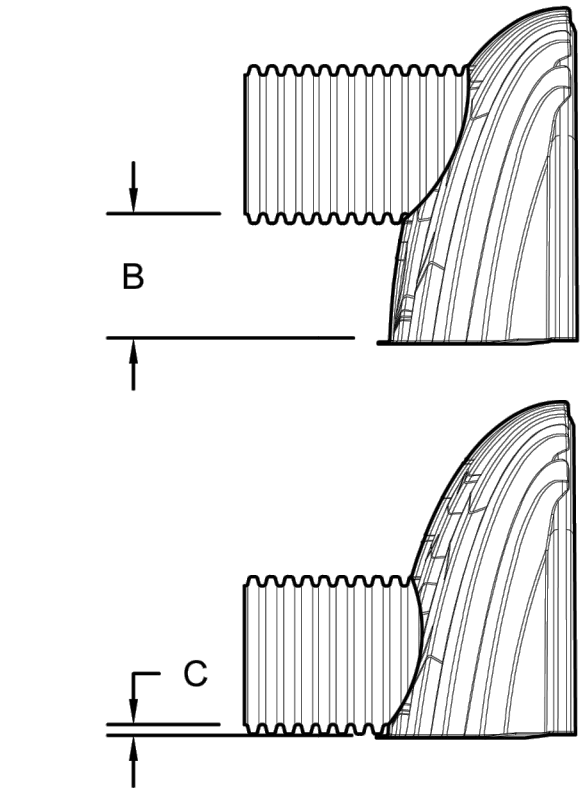
SIZE (W X H X INSTALLED LENGTH)	90.0" X 61.0" X 32.8"	(2286 mm X 1549 mm X 833 mm)
END CAP STORAGE	39.5 CUBIC FEET	(1.12 m ³)
MINIMUM INSTALLED STORAGE*	115.3 CUBIC FEET	(3.26 m ³)
WEIGHT (NOMINAL)	90 lbs.	(40.8 kg)

*ASSUMES 12" (305 mm) STONE ABOVE, 9" (229 mm) STONE FOUNDATION AND BETWEEN CHAMBERS, 12" (305 mm) STONE PERIMETER IN FRONT OF END CAPS AND 40% STONE POROSITY.

PARTIAL CUT HOLES AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
PARTIAL CUT HOLES AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
END CAPS WITH A PREFABRICATED WELDED STUB END WITH "W"

PART #	STUB	B	C
MC7200IEPP06T	6" (150 mm)	42.54" (1081 mm)	---
MC7200IEPP06B	---	---	0.86" (22 mm)
MC7200IEPP08T	8" (200 mm)	40.50" (1029 mm)	---
MC7200IEPP08B	---	---	1.01" (26 mm)
MC7200IEPP10T	10" (250 mm)	38.37" (975 mm)	---
MC7200IEPP10B	---	---	1.33" (34 mm)
MC7200IEPP12T	12" (300 mm)	35.69" (907 mm)	---
MC7200IEPP12B	---	---	1.55" (39 mm)
MC7200IEPP15T	15" (375 mm)	32.72" (831 mm)	---
MC7200IEPP15B	---	---	1.70" (43 mm)
MC7200IEPP18T	18" (450 mm)	29.36" (746 mm)	---
MC7200IEPP18TW	---	---	---
MC7200IEPP18B	---	---	1.97" (50 mm)
MC7200IEPP18BW	---	---	---
MC7200IEPP24T	24" (600 mm)	23.05" (585 mm)	---
MC7200IEPP24TW	---	---	---
MC7200IEPP24B	---	---	2.26" (57 mm)
MC7200IEPP24BW	---	---	---
MC7200IEPP30BW	30" (750 mm)	---	2.95" (75 mm)
MC7200IEPP36BW	36" (900 mm)	---	3.25" (83 mm)
MC7200IEPP42BW	42" (1050 mm)	---	3.55" (90 mm)

NOTE: ALL DIMENSIONS ARE NOMINAL



CUSTOM PREFABRICATED INVERTS ARE AVAILABLE UPON REQUEST. INVENTORIED MANIFOLDS INCLUDE 12-24" (300-600 mm) SIZE ON SIZE AND 15-48" (375-1200 mm) ECCENTRIC MANIFOLDS. CUSTOM INVERT LOCATIONS ON THE MC-7200 END CAP CUT IN THE FIELD ARE NOT RECOMMENDED FOR PIPE SIZES GREATER THAN 10" (250 mm). THE INVERT LOCATION IN COLUMN 'B' ARE THE HIGHEST POSSIBLE FOR THE PIPE SIZE.

63RD & UNIVERSITY 2 CHAMBER

WINDSOR HEIGHTS, IA, USA

DATE:
 DRAWN: BH

PROJECT #:
 CHECKED: N/A

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5 OF 5

WINDSOR APARTMENTS - STORM DETAILS - 6

NO.	DATE	BY	FOR	LOCATION	SCALE	AS NOTED	DESIGNED BY: DJS	DRAWN BY: PJW
					DWG: 23-047-STW-7.dwg		CHECKED BY:	DATE: 04/15/2024
					FIELD BOOK:		SHEET 11 OF 22	FILE NO: 23-047

CCGA

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Ph 515-268-4823
www.cgsaonline.com

23-047

NOTE:
THE LOCATION OF ALL UTILITIES INDICATED ON THE PLANS ARE TAKEN FROM EXISTING PUBLIC RECORDS. THE EXACT LOCATION AND ELEVATION OF ALL PUBLIC UTILITIES MUST BE DETERMINED BY THE CONTRACTOR. IT SHALL BE THE DUTY OF THE CONTRACTOR TO ASCERTAIN WHETHER ANY ADDITIONAL FACILITIES OTHER THAN THOSE SHOWN ON THE PLANS MAY BE PRESENT.

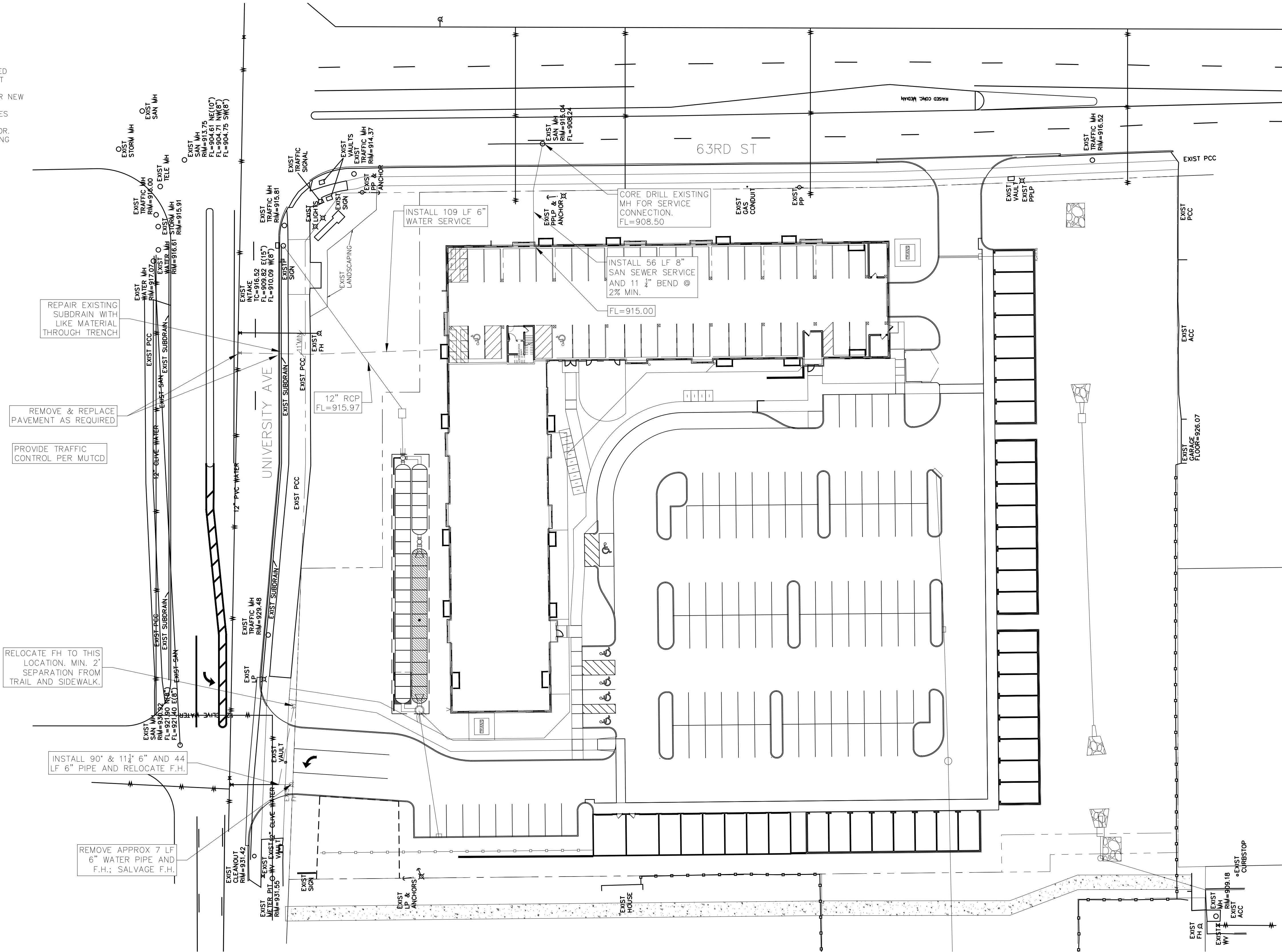
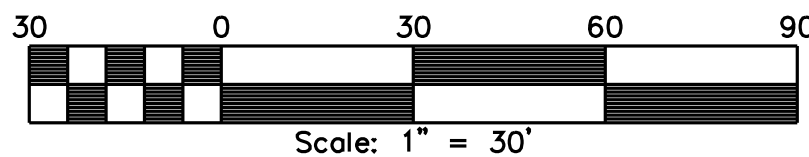
WATER SERVICE:

1. CONTRACTORS SHALL ARRANGE FOR AND PAY FOR ANY REQUIRED TAPS TO MAINS. OWNER TO PAY FOR ANY SYSTEM DEVELOPMENT FEES.
2. CONTRACTOR SHALL COMPLETE WATER SERVICE APPLICATION FOR NEW SERVICE.
3. THE CONTRACTOR SHALL COMPLY WITH ALL CITY AND DES MOINES WATER WORKS REGULATIONS.
4. ALL BACKFILL SHALL BE COMPACTED TO 95% STANDARD PROCTOR. CONTRACTOR SHALL COORDINATE WITH TESTING COMPANY. TESTING PAID BY OWNER.

SANITARY SEWERS:

1. ALL TRENCHES SHALL BE COMPACTED TO 95% STANDARD PROCTOR
2. SERVICE SHALL BE 8".
3. INSTALL ALL CLEANOUTS REQUIRED BY PLUMBING CODE

ALL UNIVERSITY AVENUE PAVEMENT PATCHING TO FOLLOW SUDAS DETAIL 7040.101 OR 7040.102. MATCH EXISTING HMA OVERLAY THICKNESS. ALL HMA JOINTS TO BE SEALED. PAVEMENT MARKING TO BE RESTORED WITH EPOXY PAINT.



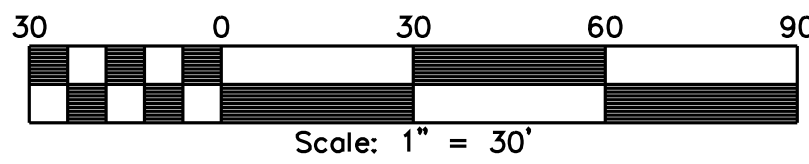
WINDSOR APARTMENTS - UTILITY PLAN

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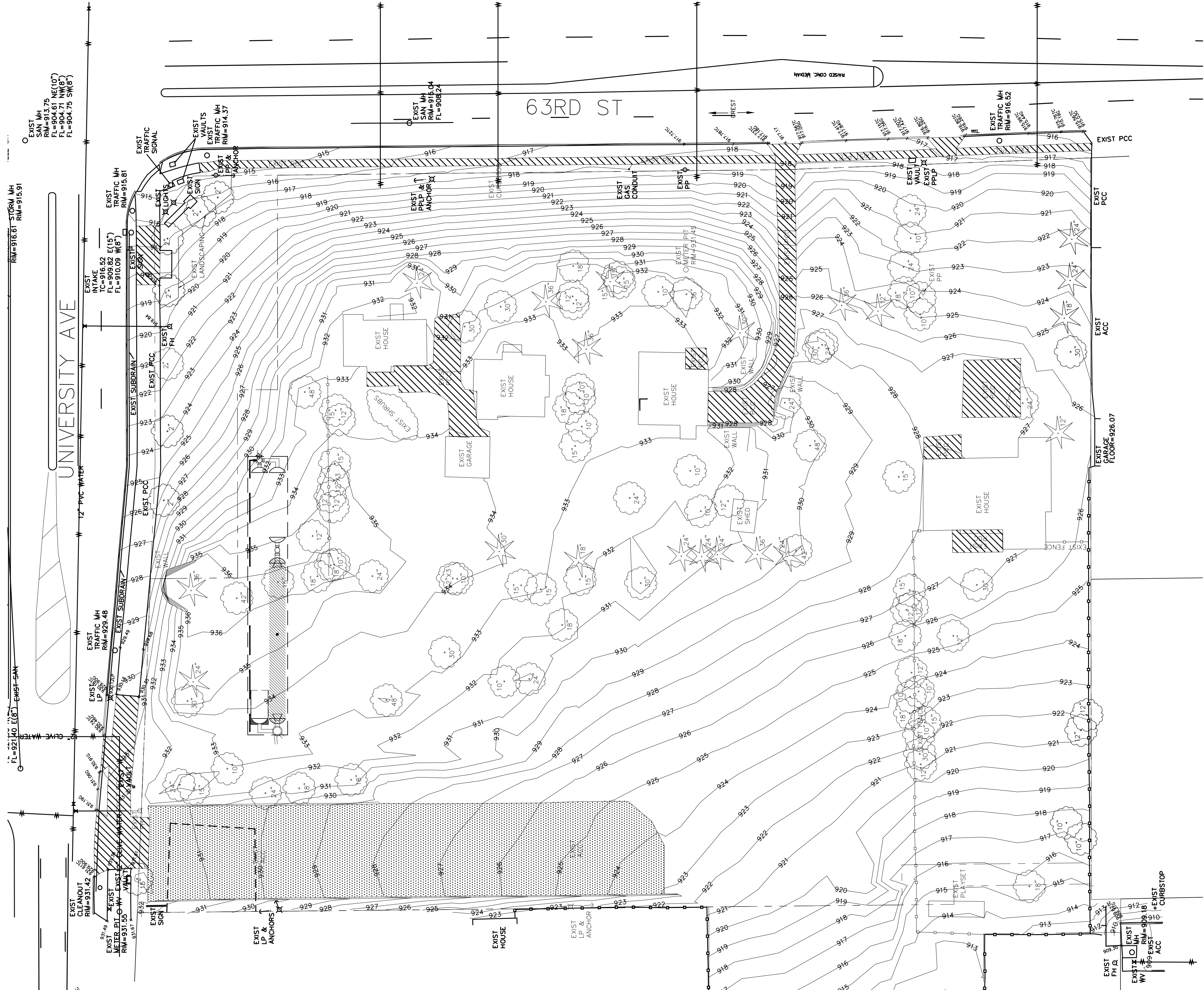


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																DJS		PJV	
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																		04/15/2024	
																		FILE NO.:	
																		23-047	

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DUTY OF THE CONTRACTOR TO ASCERTAIN WHETHER ANY
ADDITIONAL FACILITIES OTHER THAN THOSE SHOWN ON
THE PLANS MAY BE PRESENT.



-  DENOTES EXISTING PCC TO BE REMOVED
-  DENOTES EXISTING ACC TO BE REMOVED
-  DENOTES TREE TO REMAIN
-  DENOTES TREE TO BE REMOVED



WINDSOR APARTMENTS - DEMOLITION PLAN

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DATE BY FOR

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SCALE: AS NOTED
DWG: 23-047-DEM0.dwg
FIELD BOOK:

DESIGNED BY: DJS

DRAWN BY: PJW

DATE: 04/15/2024

SHEET 13

OF 22

FILE NO:

23-047

NOTES:

1. THE LOCATION OF ALL UTILITIES INDICATED ON THE PLANS ARE TAKEN FROM EXISTING PUBLIC RECORDS. THE EXACT LOCATION AND ELEVATION OF ALL PUBLIC UTILITIES MUST BE DETERMINED BY THE CONTRACTOR. IT SHALL BE THE DUTY OF THE CONTRACTOR TO ASCERTAIN WHETHER ANY ADDITIONAL FACILITIES OTHER THAN THOSE SHOWN ON THE PLANS MAY BE PRESENT.
2. CONTRACTOR SHALL PLACE ORGANIC MULCH AROUND ALL TREES AND IN ALL LANDSCAPE BEDS TO A DEPTH OF 3 INCHES.

LANDSCAPE REQUIREMENTS (UC)

REQUIRED:
TREES: 1/2,000 SF OF PERVIOUS AREA
SHRUBS: 5 /2,000 SF OF PERVIOUS AREA
PERVIOUS AREA = 114,036 SF

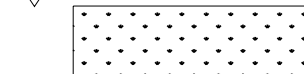
REQUIRED TREES = 58
REQUIRED SHRUBS = 286

PLANTS PROVIDED

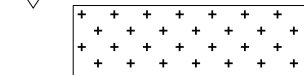
62 = TREES
299 = SHRUBS
16 = EXISTING TREES

LANDSCAPE CONSTRUCTION NOTES

A TYPE 1 (PERMANENT LAWN MIXTURE)

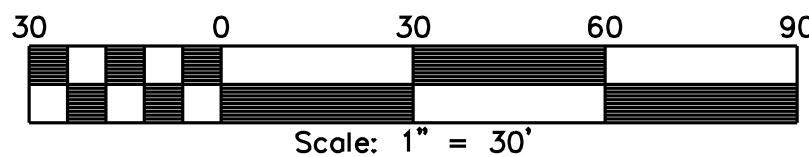
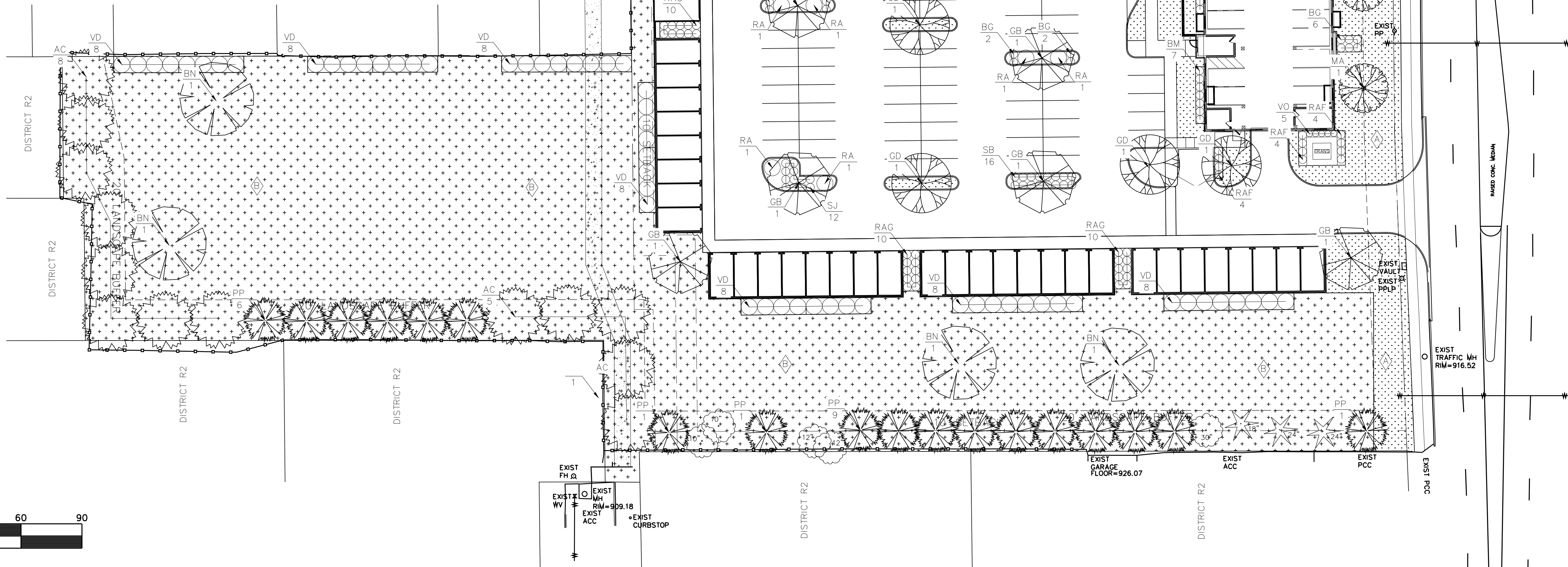


B TYPE 3 (PERMANENT WARM-SEASON SLOPE & DITCH MIXTURE)



PLANT SCHEDULE:

Code	Common Name	Botanical Name	Quantity	Min. Planting size
BN	River Birch	Betula Nigra	4	2" cal. B&B
GB	Presidential Gold Ginkgo(Male)	Ginkgo Biloba 'The President'	10	2" cal. B&B
GD	Espresso Kentucky Coffeetree(Male)	Gymnocladius dioicus 'Espresso'	7	2" cal. B&B
MA	Amur Maackia	Maackia amurensis	10	2" cal. B&B
PP	Colorado Blue Spruce	Picea pungens	18	6'
AC	White Fir	Abies concolor	13	6'
RA	Grow-Low Fragrant Sumac	Rhus aromatica 'Grow-Low'	21	2 Gallon
RAF	Fragrant Sumac	Rhus aromatica	18	2 Gallon
BG	Green Velvet Boxwood	Buxus x 'Green Velvet'	32	2 Gallon
SB	Gold Flame Spirea	Spiraea x bumalda 'Goldflame'	56	2 Gallon
SJ	Gold Mound Spirea	Spiraea japonica 'Goldmound'	38	2 Gallon
BM	Boxwood Koreanus	Buxus microphylla koreana	25	2 Gallon
RAG	Green Mound Alpine Currant	Ribes alpinum 'Green Mound'	30	2 Gallon
VO	Dwarf Cranerry Bush	Viburnum opulus 'Nanum'	23	2 Gallon
VD	Arrowwood Viburnum	Viburnum dentatum	56	2 Gallon



WINDSOR APARTMENTS - LANDSCAPING PLAN

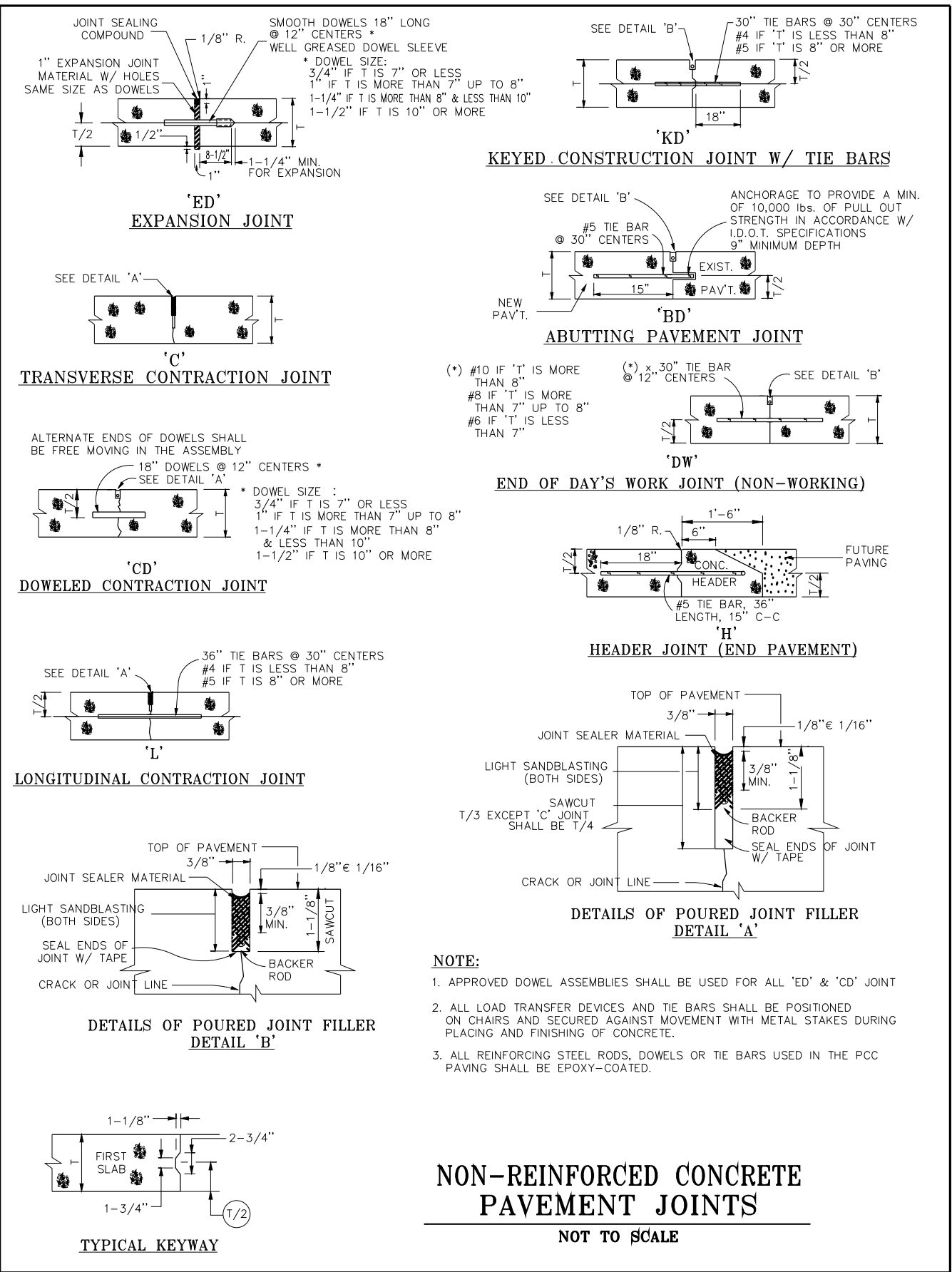
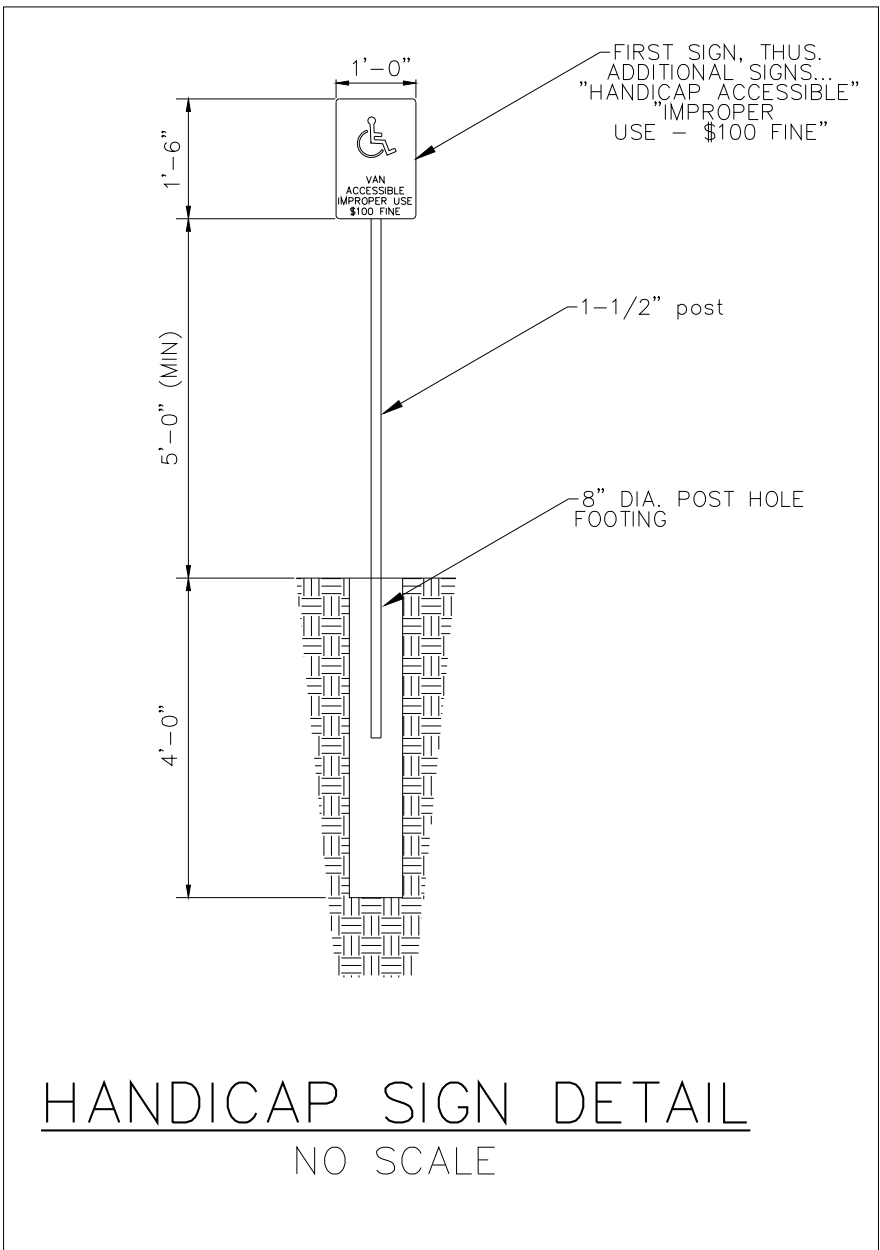
Clapsdille-Garber Associates, Inc.
2413 Grand Avenue
Des Moines, Iowa 50312
Ph 515-288-4853
www.clapsdillegarber.com



23-047

NO.	REVISION	DATE	BY	FOR

SCALE:	AS NOTED	DESIGNED BY:	DJS	DRAWN BY:	PJV
DWG:	23-047-LND.dwg	CHECKED BY:		DATE:	04/15/2024
FIELD BOOK:		SHEET	14	OF	22
		FILE NO.:			23-047



NOTE:
THE LOCATION OF ALL UTILITIES INDICATED ON THE PLANS ARE TAKEN FROM EXISTING PUBLIC RECORDS. THE EXACT LOCATION AND ELEVATION OF ALL PUBLIC UTILITIES MUST BE DETERMINED BY THE CONTRACTOR. IT SHALL BE THE DUTY OF THE CONTRACTOR TO ASCERTAIN WHETHER ANY ADDITIONAL FACILITIES OTHER THAN THOSE SHOWN ON THE PLANS MAY BE PRESENT.

- 153— DENOTES EXIST. CONTOUR
—155— DENOTES PROPOSED CONTOUR
X 56.85 DENOTES PROPOSED SPOT ELEVATION
T/W DENOTES TOP OF WALL ELEVATION
B/W DENOTES BOTTOM OF WALL ELEVATION
X=77.08G DENOTES EXISTING GUTTER ELEVATION
X=74.02TC DENOTES DOWNSPOUT LOCATION
DENOTES TREE TO BE REMOVED
DENOTES PROPOSED ROLLED PERMANENT EROSION CONTROL PRODUCT, RE: SUDAS 9040.103
DENOTES PROPOSED TURF REINFORCED MAT.
—XXXX— DENOTES SILT FENCE OR FILTER SOCK
DENOTES DIRECTION OF FLOW

NOTICE:
ALL CONTRACTORS AND SUB-CONTRACTORS MUST SIGN THE NPDES CERTIFICATION STATEMENT PRIOR TO PERFORMING ANY WORK ON SITE. BY SIGNING THE CERTIFICATION STATEMENT, THE CONTRACTOR AND/OR SUBCONTRACTOR AGREES TO BECOME A CO-PERMITTEE WITH THE OWNER AND OTHER CO-PERMITTEES. AS A CO-PERMITTEE, YOU AND YOUR COMPANY ARE LEGALLY REQUIRED UNDER THE CLEAN WATER ACT AND THE CODE OF IOWA TO ENSURE COMPLIANCE WITH THE TERMS AND CONDITIONS OF THE STORM WATER POLLUTION PREVENTION PLAN DEVELOPED UNDER THE NPDES PERMIT. SIGNIFICANT PENALTIES MAY BE IMPOSED BY THE EPA AND/OR THE IDNR SHOULD A PERMITTEE OR CO-PERMITTEE VIOLATE NPDES PERMIT REQUIREMENTS.

INSTALL SILT FENCE OR FILTER SOCK (TYP)

INSTALL TURF REINFORCED MAT (TYP)

2,849 LF OF SILT FENCE/FILTER SOCK

INTAKE PROTECTION:
FOR STREET INTAKES, PLACE SILT FENCE AROUND INTAKES AFTER INTAKE INSTALLED. AFTER PAVEMENT PLACED, PLACE FILTER SOCK AND/OR BASKET IN INTAKE

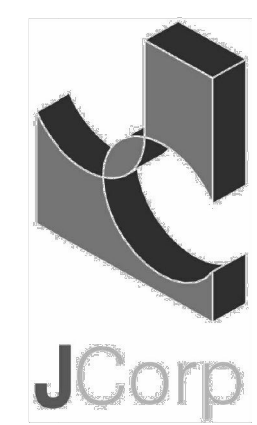
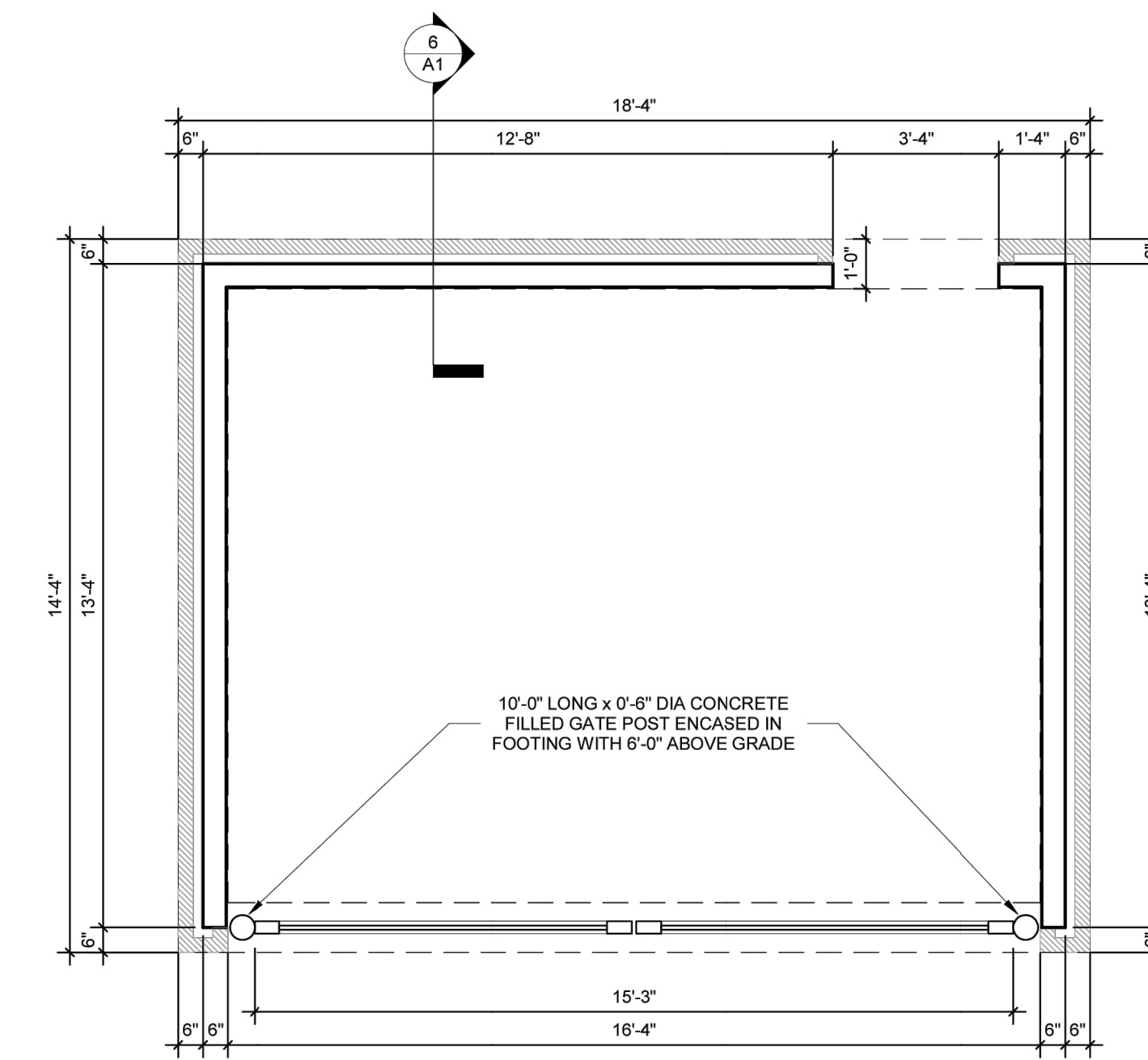
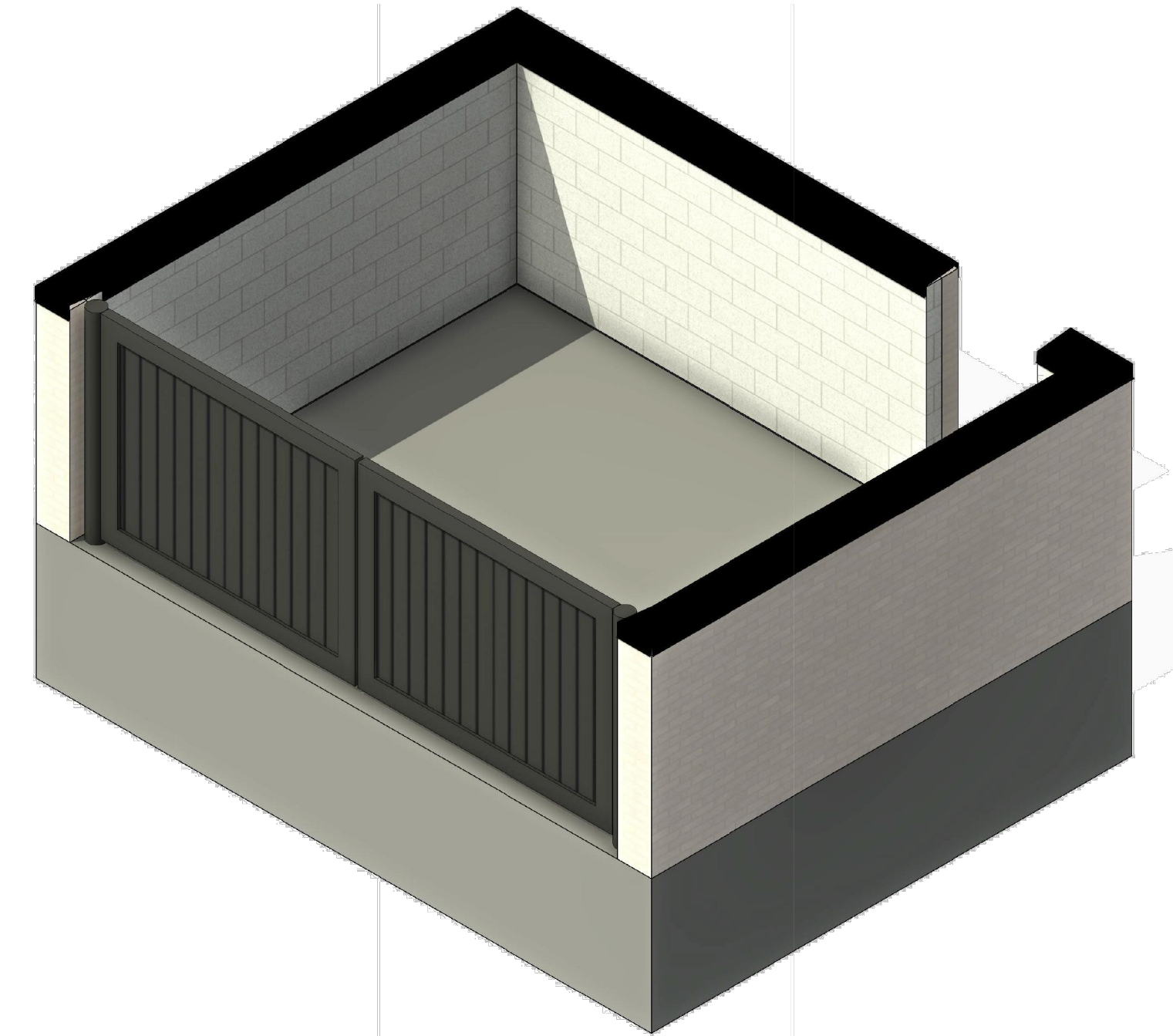
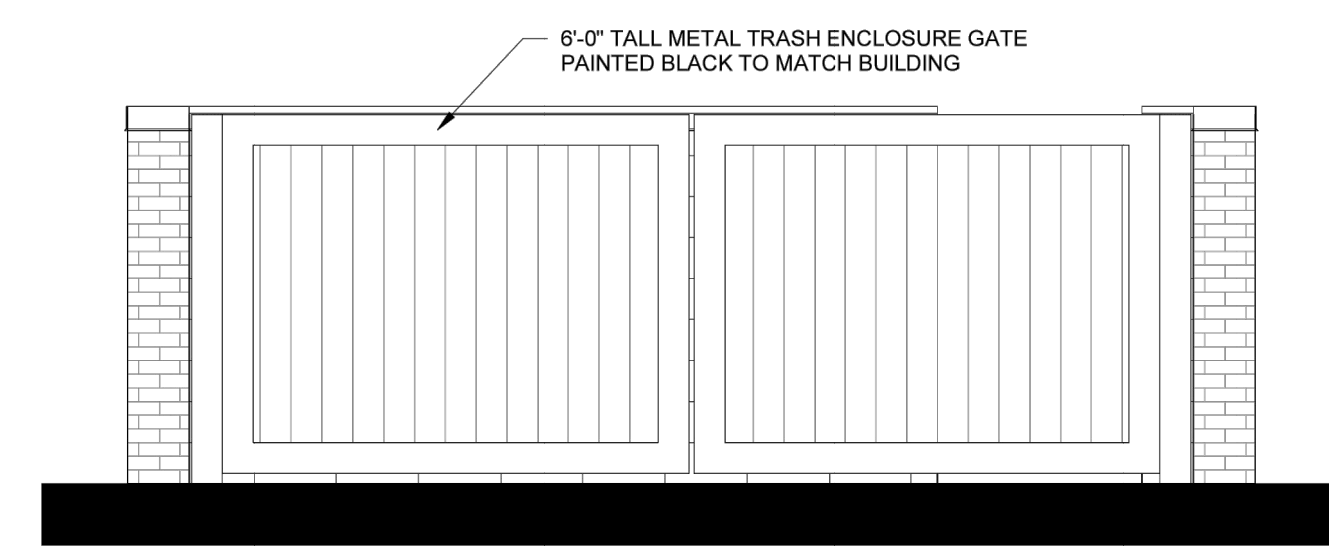
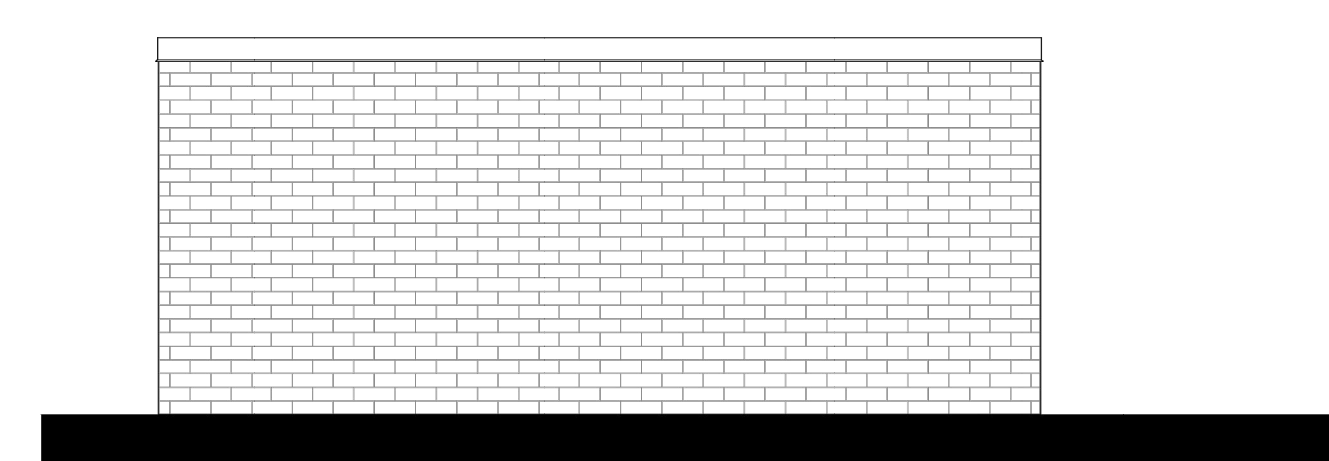
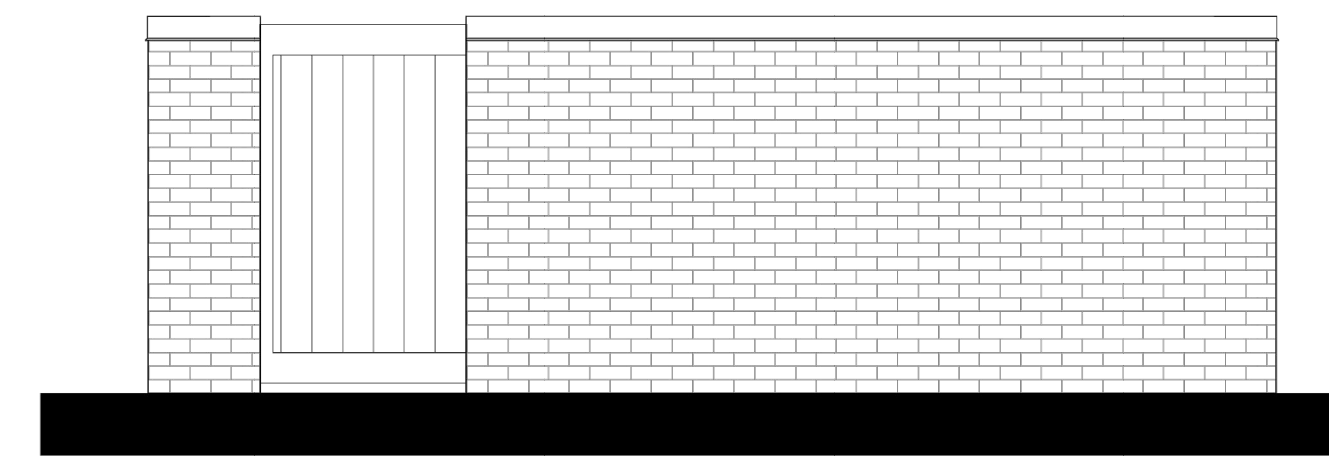
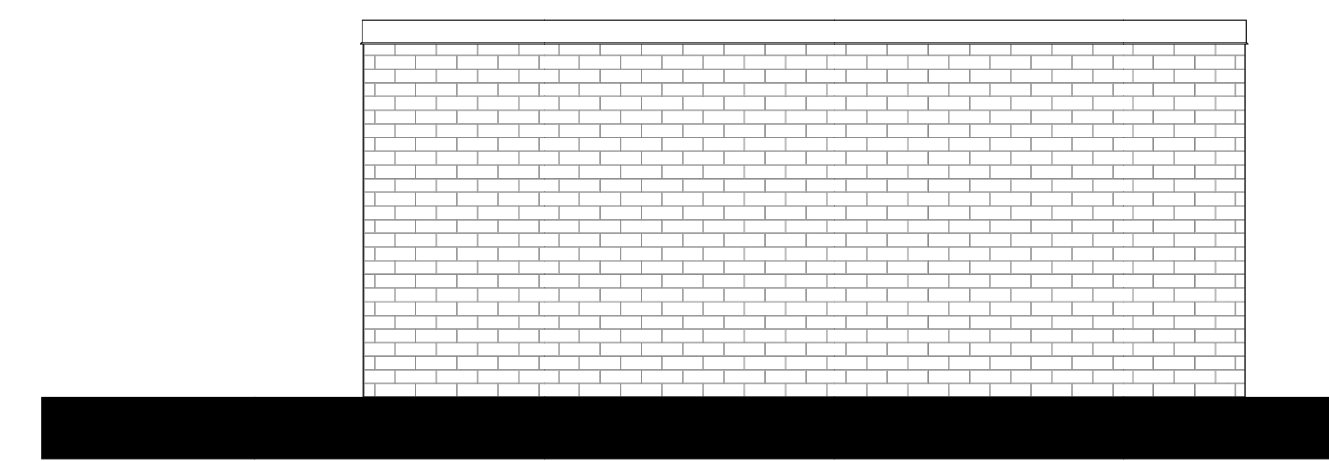
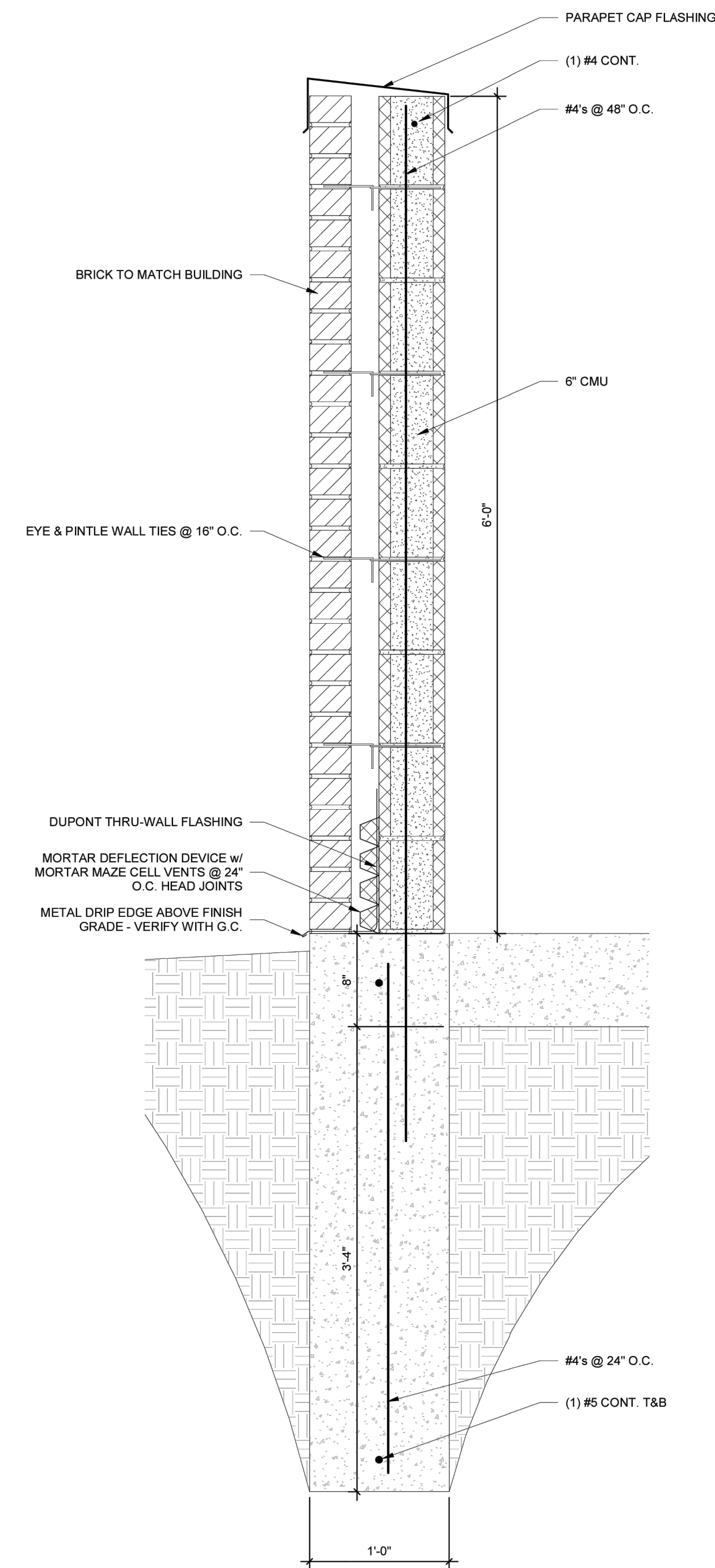
DISTANCE FROM SITE TO RECEIVING WATERS
OF WALNUT CREEK 3,000 FEET
STORM WATER POLLUTION PREVENTION PLAN

REVISION	DATE

30 0 30 60 90
Scale: 1" = 30'

CGA

Clapsaddle-Garber Associates, Inc.
2413 Grand Avenue
Des Moines, Iowa 50312
Ph 515-288-4823
www.cgaconsultants.com



3611 NE Otterview Circle #43
Ankeny, IA 50021
Phone: (515) 597-5457
www.jcorpdesignbuild.com

PROJECT: Windsor - Trash Enclosure

REVISIONS:

03 / 20 / 2024

PROJECT NO: 00-000

CONTENTS:
Plan, Elevations, Sections

SHEET NO:

A1

WINDSOR APARTMENTS - TRASH ENCLOSURE DETAIL

Clapsaddle-Garber Associates, Inc
2413 Grand Avenue
Des Moines, Iowa 50312
Ph 515-288-4823
www.cgaconsultants.com



23-047

SCALE:	AS NOTED	DESIGNED BY:	DJS	DRAWN BY:	PJV
DWG:	23-047-DTL-2.dwg	CHECKED BY:	DJS	DATE:	04/15/2024
FIELD BOOK:		SHEET	16	OF	22
				FILE NO.:	23-047

BY	FOR:	LOCATION:

NO.	REVISION	DATE

2413 Grand Avenue
Des Moines, Iowa 50312
Ph 515-288-4823
www.cgaconsultants.com

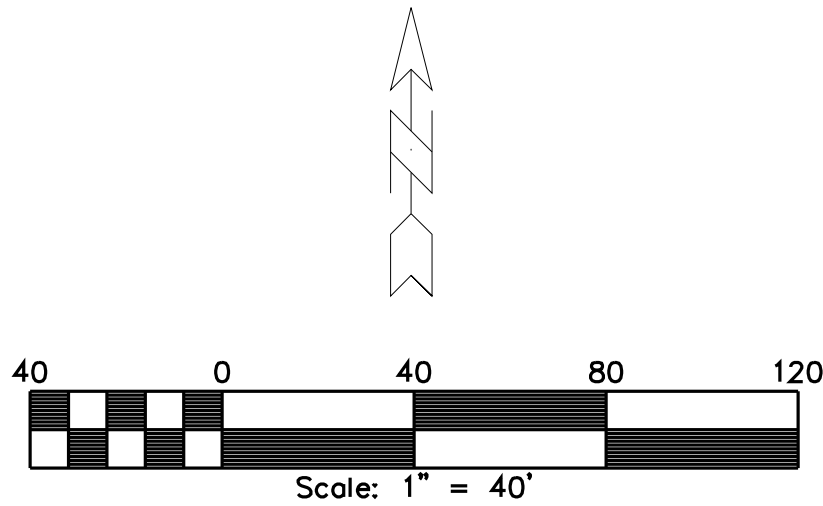
Part of Parcel A of that Plat of Survey filed in Book 9221, Pages 674-675, being part of Lot 1 in Hopkins Place, an Official Plat, now included in and forming a part of the City of Windsor Heights, Polk County, Iowa, and being more particularly described as follows:

Containing 7,287 square feet.

Part of Lots 11, 12, 22, 23, and 24 in Hopkins-Woehler Place, an Official Plat, now included in and forming a part of the City of Windsor Heights, Polk County, Iowa, and being more particularly described as follows:

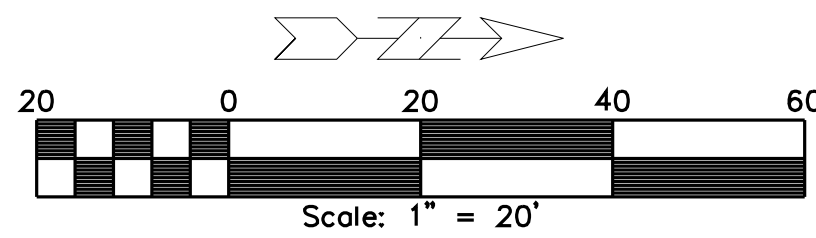
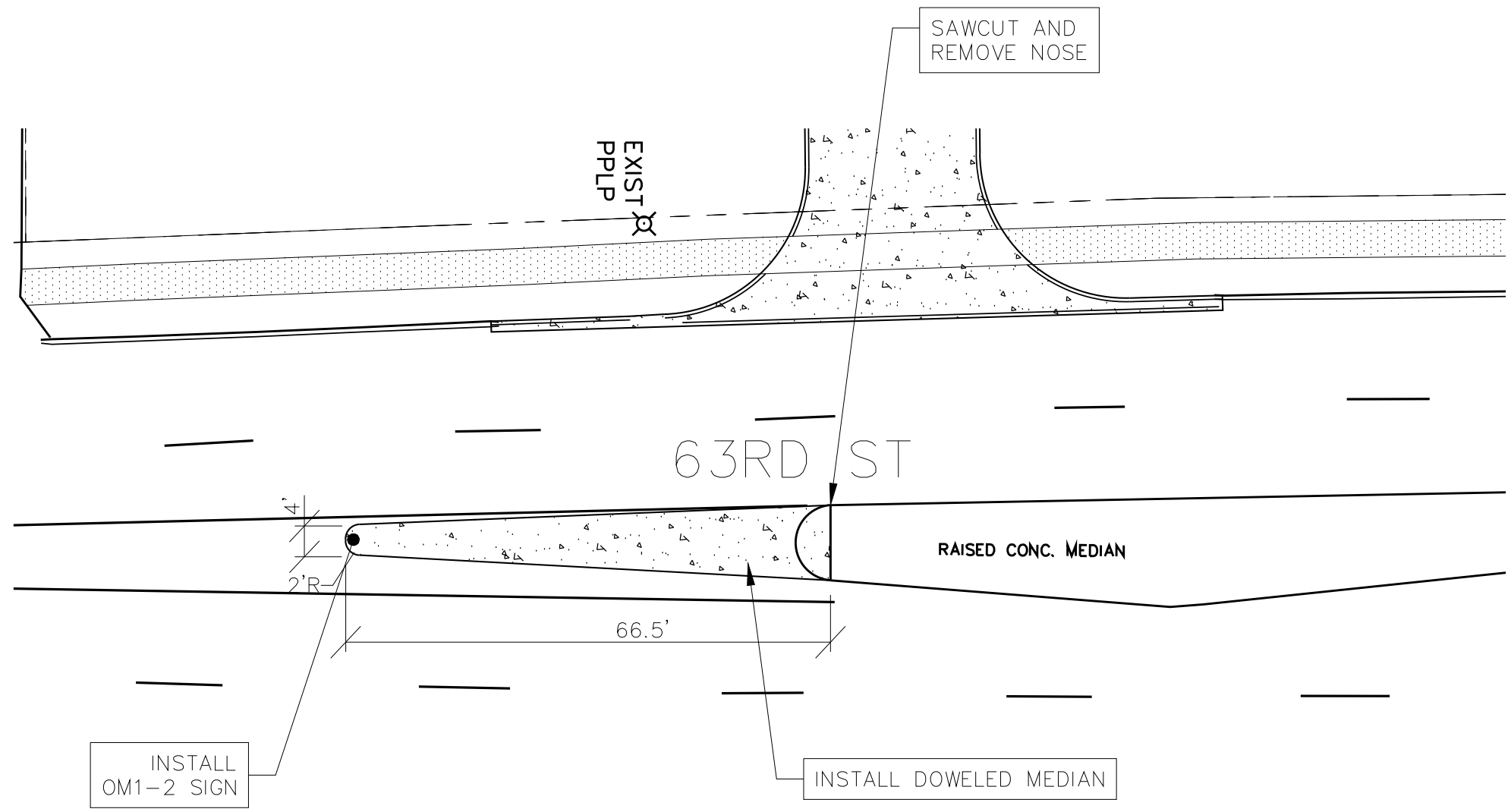
Containing 41,591 square feet.

1. PROPERTY LINES AND DIMENSIONS ON THIS DIAGRAM ARE BASED UPON A RETRACEMENT SURVEY OF THE PROPERTIES PREPARED BY ENGINEERING RESOURCE GROUP (PROJ. NO. 23-047) THAT IS FILED IN BOOK 19499 AT PAGE 917 IN THE OFFICE OF THE RECORDER FOR POLK COUNTY, IOWA.
2. THIS DIAGRAM IS NOT AN OFFICIAL PLAT OF SURVEY AND SHALL NOT BE RECORDED AS SUCH.

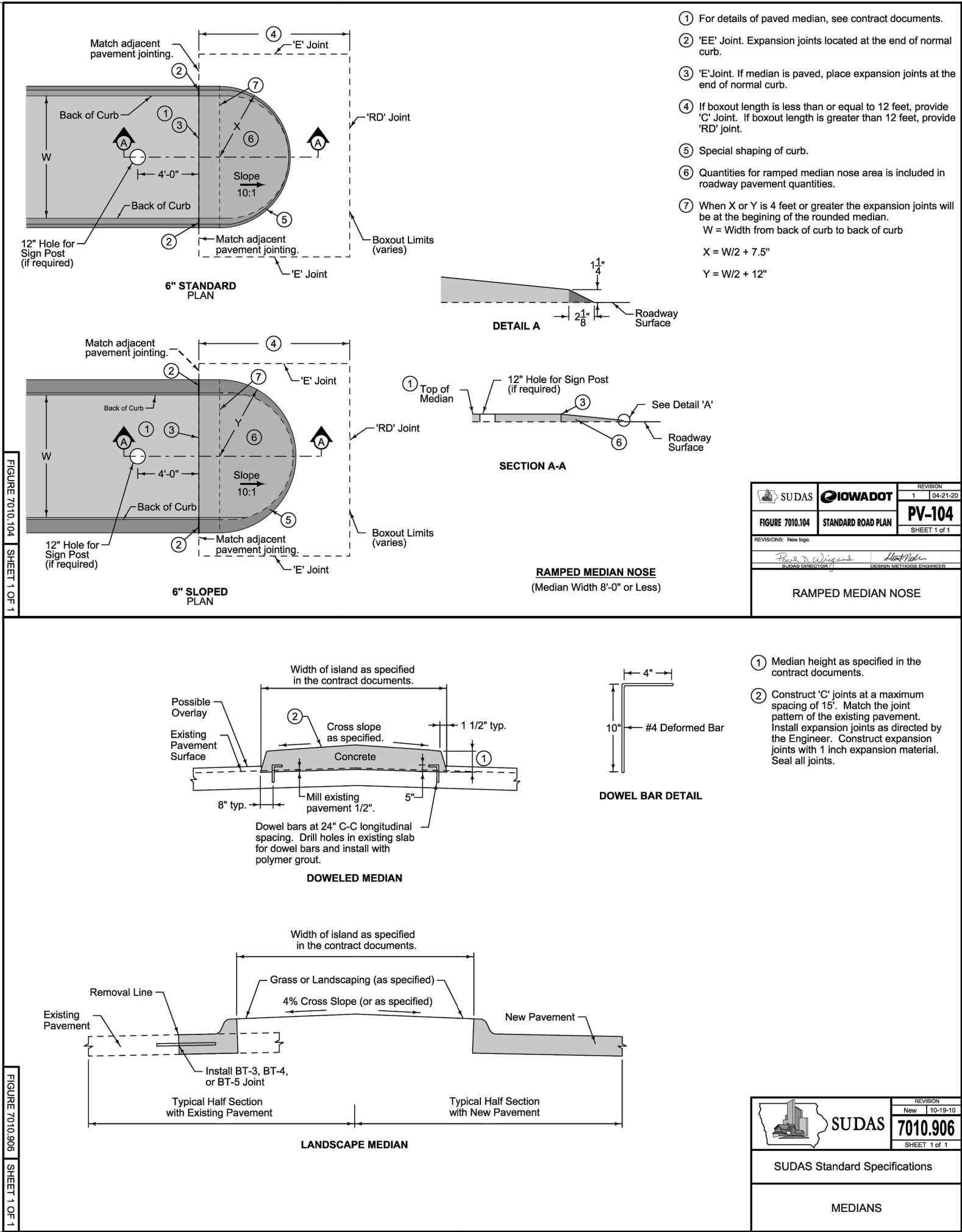
18

N.O.	REVISION	DATE	BY:	FOR:	LOCATION:	SCALE:	AS NOTED	DESIGNED BY:	DPR	DRAWN BY:
						DWG	23-047-LANDSWAP.dwg	CHECKED BY:		DATE: 04/15/2024
						FIELD BOOK:	SHEET 18 OF 22			FILE NO.: 23-047

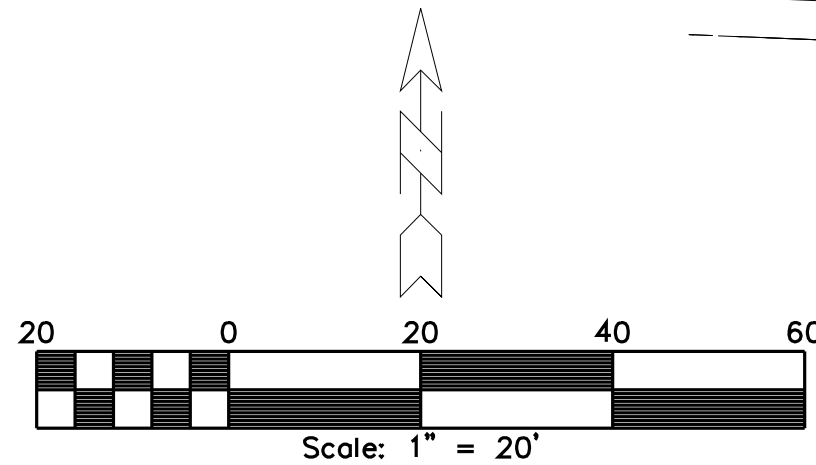
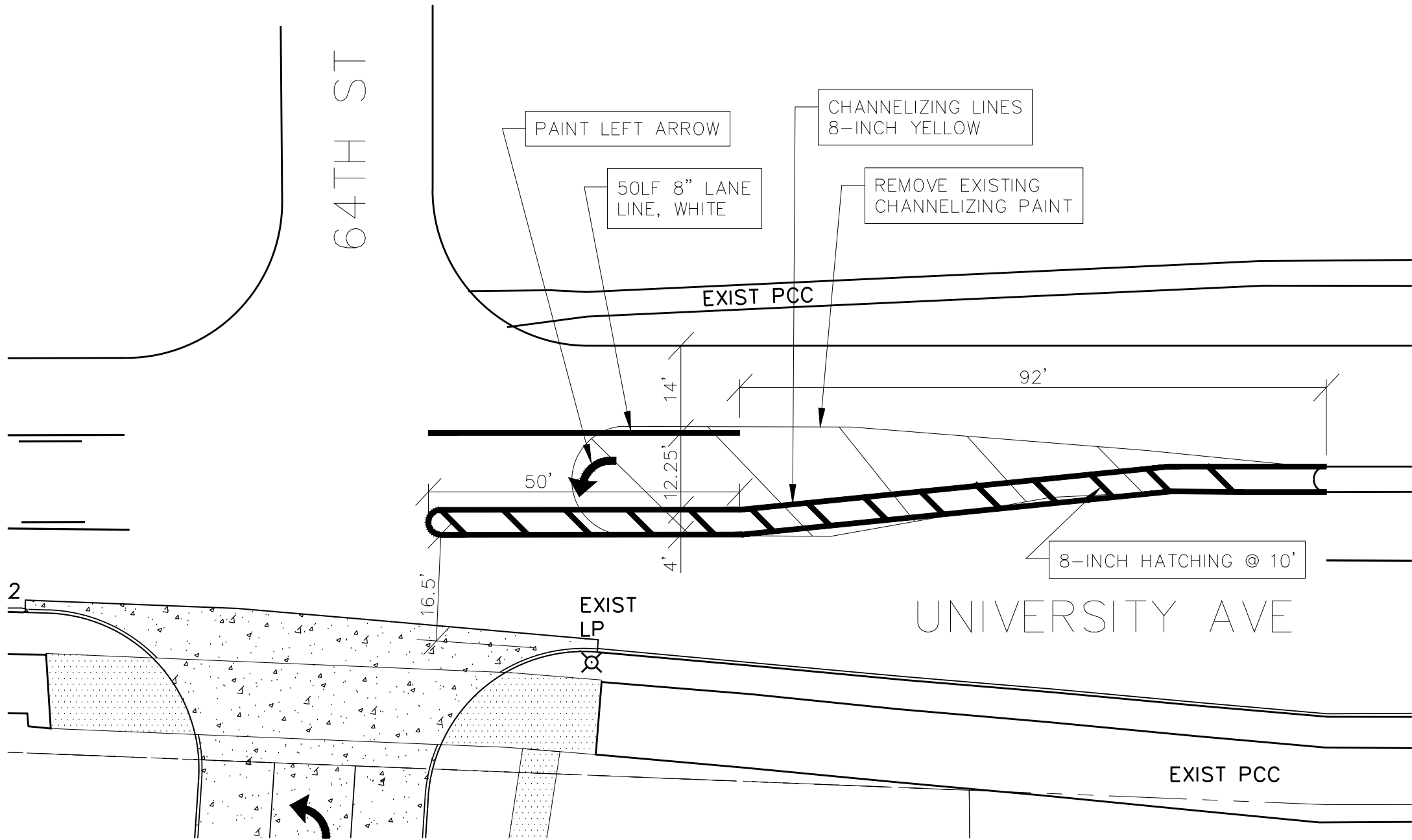
NOTE:
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63RD STREET MEDIAN EXTENSION



- NOTES:
1. THE ROADWAY SHALL MAINTAIN THROUGH BI-DIRECTIONAL TRAFFIC. ROADWAY WORK SHALL ONLY TAKE PLACE ON ONE SIDE OF THE STREET AT ANY ONE TIME.
 2. MAINTAIN MINIMUM 10' CLEAR LANE WIDTHS.
 3. ACCESS SHALL BE MAINTAINED TO ADJACENT BUSINESSES AND RESIDENTS AT ALL TIMES.
 4. CONTRACTOR IS RESPONSIBLE TO MAKE SURE ALL SIGNAGE AND TRAFFIC CONTROL DEVICES ARE IN COMPLIANCE WITH CURRENT MUTCD MANUAL.
 5. ALL PROPOSED SIGNS TO BE PLACED IN PLAIN VIEW.
 6. THE CITY MAY REQUIRE THE USE OF FLAGGERS IF OPERATIONAL OR SAFETY CONCERNS DEVELOP WITH THE PROPOSED TRAFFIC CONTROL PLAN.
 7. ALL PAVEMENT MARKINGS ON UNIVERSITY AVENUE SHALL BE EPOXY AND GROUND IN INCLUDING SYMBOLS.
 8. REMOVAL OF PAVEMENT MARKINGS SHALL BE COMPLETED BY WATER BLASTING ONLY.
 9. REFERENCE CURRENT VERSION OF MUTCD MANUAL FOR PAVEMENT MARKING AND SIGN PLACEMENT REQUIREMENTS.



UNIVERSITY TURN LANE

WINDSOR APARTMENTS - STREET IMPROVEMENT

Clapsdille-Garber Associates, Inc.
2413 Grand Avenue
Des Moines, Iowa 50312
Ph 515-268-4853
www.garberassociates.com

CCGA

23-047

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1. ALL TRAFFIC CONTROL DEVICES & BARRIERS SHALL BE FURNISHED, ERECTED, MAINTAINED, & REMOVED BY THE CONTRACTOR.
2. PROPOSED CHANGES TO THE TRAFFIC CONTROL PLAN SHALL BE REVIEWED WITH THE ENGINEER BEFORE CHANGES ARE MADE.
3. ACCESS TO NEIGHBORING BUILDINGS SHALL BE MAINTAINED AT ALL TIMES.
4. ALL UTILITY WORK WITHIN THE PUBLIC R.O.W. SHALL CONFORM TO THE CITY OF WINDSOR HEIGHTS STANDARDS & THE CURRENT ADDITION OF THE MUTCD.
5. TWO-WAY TRAFFIC SHALL BE MAINTAINED AT ALL TIMES ALONG 63RD ST & UNIVERSITY AVE.
6. THE CONTRACTOR SHALL USE CARE WHEN WORKING UNDER/OVER/AROUND ELECTRICAL LINES.
7. FLASHING OR STEADY BURN WARNING LIGHTS ARE REQUIRED ON TYPE II BARRICADES FOR OVERNIGHT CLOSURES.
8. WORK AREA MUST BE ENCLOSED WITH BARRICADES, FENCING, OR A COMBINATION OF THE TWO.
9. REFERENCE DOT TC-228 FOR TRAFFIC CONTROL SPACING.
10. REFERENCE DOT TC-601 FOR TRAIL CLOSING AND SPACING

SIDEWALK CLOSED
AHEAD
←
CROSS HERE

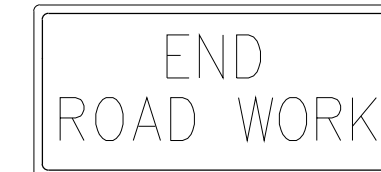
R9-11,
24"x18"

A



W20-1
48"x48"

B



G20-2A
48"x24"

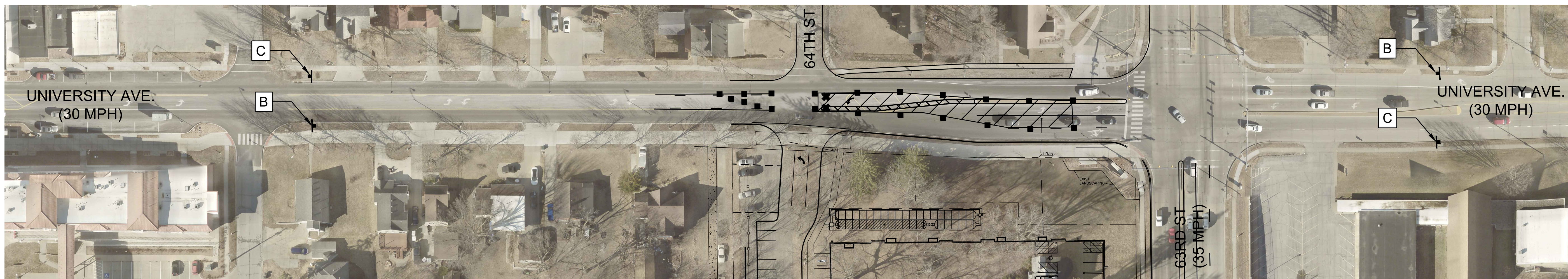
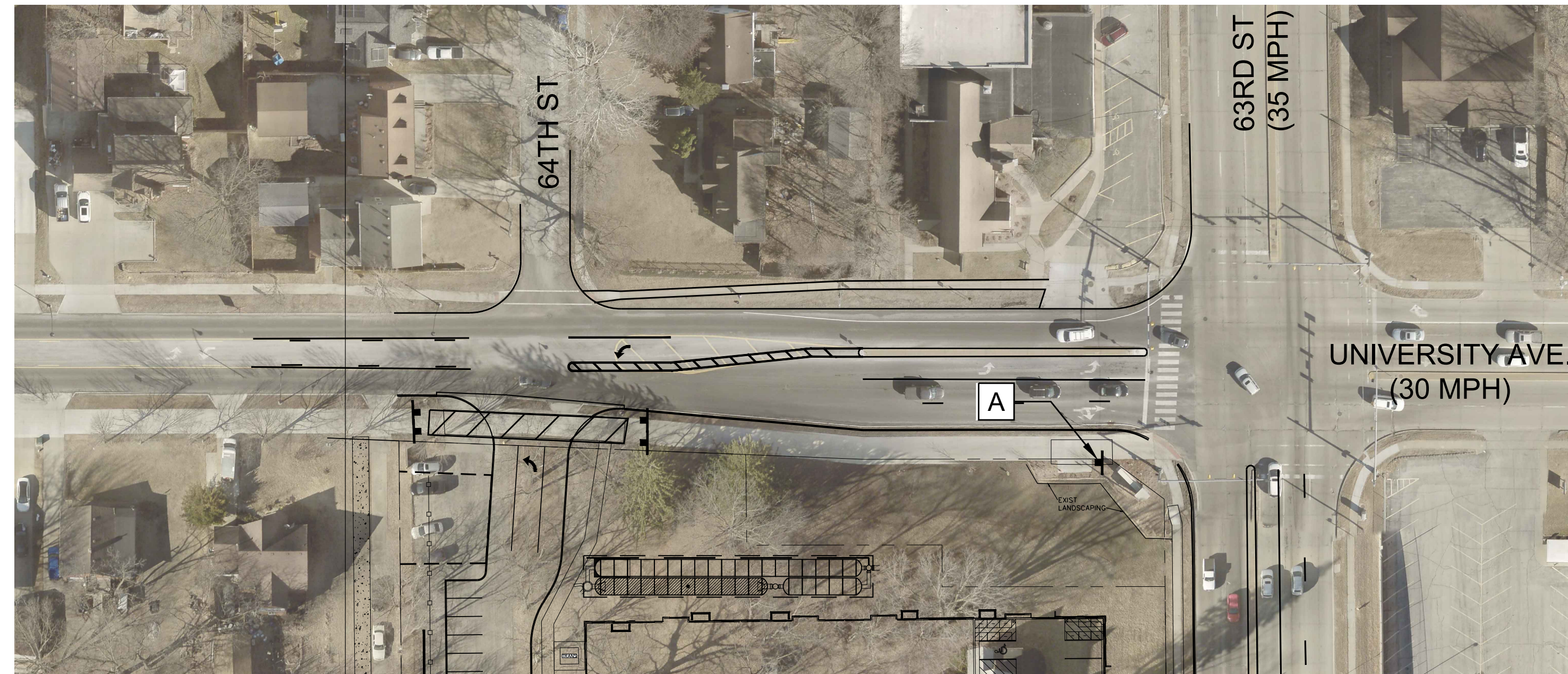
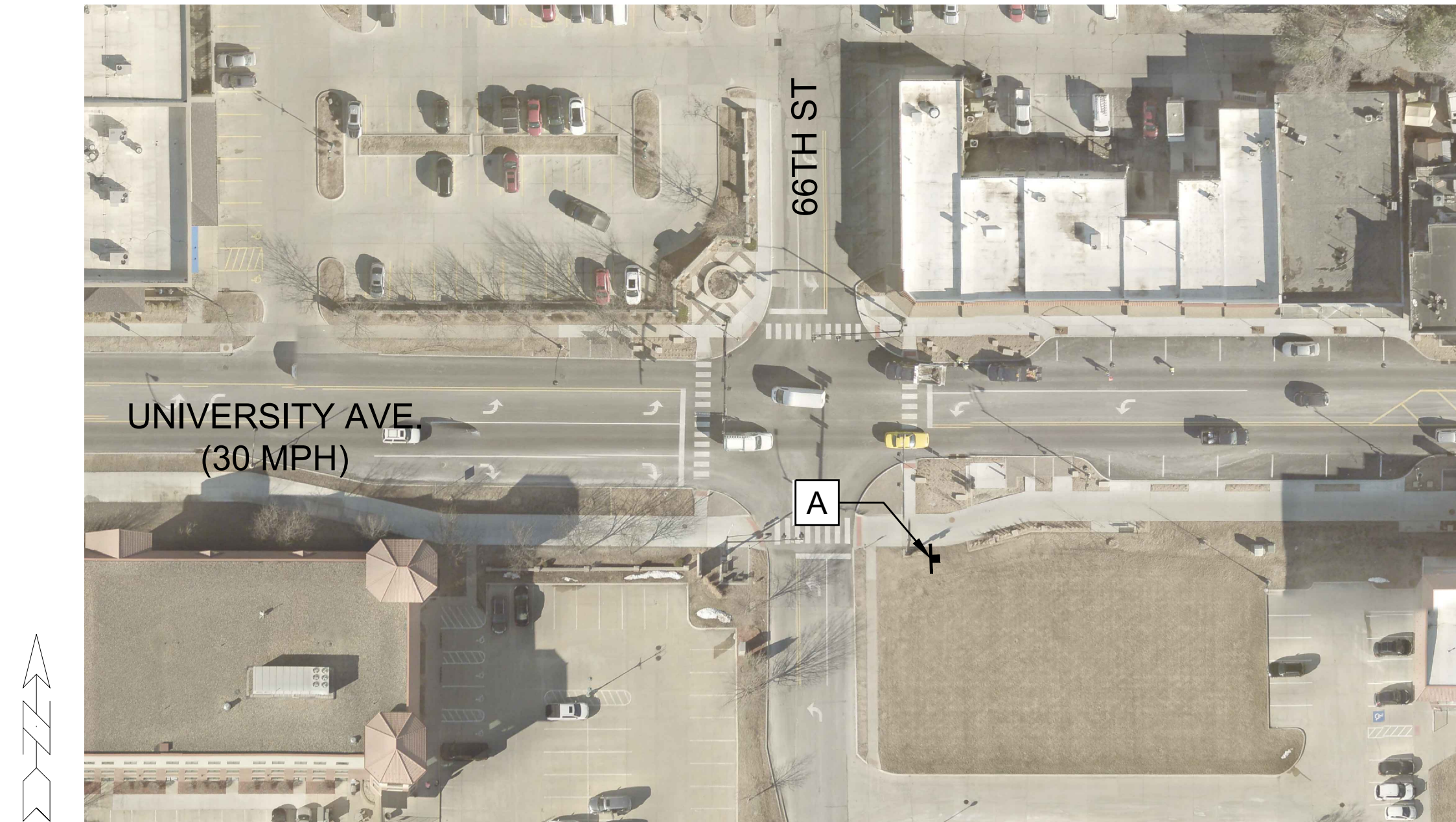
C

WORK ZONE

TEMPORARY SIGN

■ 42" CHANNELIZER

✖ DRUM

 PEDESTRIAN PATH CLOSURE



5 NORTH ELEVATION
SCALE: 1/16" = 1'-0"



1 WEST ELEVATION
SCALE: 1/16" = 1'-0"



6 SOUTH ELEVATION
SCALE: 1/16" = 1'-0"



2 EAST ELEVATION
SCALE: 1/16" = 1'-0"



4 SOUTH (INNER) ELEVATION
SCALE: 1/16" = 1'-0"



3 WEST (INNER) ELEVATION
SCALE: 1/16" = 1'-0"

PRELIMINARY- NOT FOR CONSTRUCTION



3611 NE Otterview Circle #43
Ankeny, IA 50021
Phone: (515) 597-5457
www.jcorpdesignbuild.com

PROJECT:
The Windsor
6400 University Ave.
Windsor Heights, IA 50324

REVISIONS:
02/28/2024
CHECK SET

03 / 20 / 2024

PROJECT NO: 21-050

CONTENTS:
Elevations

SHEET NO:
A201

WINDSOR APARTMENTS - BUILDING ELEVATIONS

Clipsaddle-Garber Associates, Inc.
2413 Grand Avenue
Des Moines, Iowa 50312
Ph 515-268-4623
www.garberassociates.com



23-047

NO.	REVISION	DATE	BY	FOR	LOCATION:	SCALE:	AS NOTED	DESIGNED BY:	DJS	DRAWN BY:	PJV
						DWG: 23-047-DTL-3.dwg		CHECKED BY:	DJS	DATE:	04/15/2024
						FIELD BOOK:		SHEET	22	OF	22
										FILE NO.:	23-047

STORM WATER MANAGEMENT CALCULATIONS

FOR

1148 63RD ST.
63RD & University

Developer: Caliber Iowa
3611 NE Otterview Circle
Ankeny, IA 50021
Contact: Duane Jensen
Contact Phone No.: 515-290-3400

PROJECT NO. 23-047

May 9, 2024

Prepared by:

Clapsaddle-Garber Associates
2413 Grand Avenue
Des Moines, Iowa 50312
515-288-4823

	<u>ENGINEERING CERTIFICATION</u> I HEREBY CERTIFY THAT THIS ENGINEERING DOCUMENT, SPECIFICATION OR REPORT WAS PREPARED BY ME, OR UNDER MY DIRECT PERSONAL SUPERVISION, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF IOWA. DOUGLAS J. SALTGAVER, P.E. #11993 _____ DATE _____ MY REGISTRATION RENEWAL DATE IS DECEMBER 31, 2024 PAGES OR SHEETS COVERED BY THIS SEAL _____ _____ _____ _____

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Appendix D: Natural Conditions HydroCad Report	
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Appendix H: Water Quality, Recharge Calculations	
Appendix I: Stage-Storage Table	
Appendix J: Storm Sewer Calculations	
Appendix K: Site Plans	

Stormwater Management Overview

1.0 GENERAL

36th ON 6th LLC is proposing a new development including of an apartment complex at 1148 63rd ST, Windsor Heights, IA. The property is currently zoned UC (University Ave Mixed Use District). This stormwater management report will address the stormwater management and storm sewer system design associated with the site. This site will include a proposed apartment building, 5 garage units, parking lot, sidewalks, site development and corresponding utilities, stormwater management facility (SMF) and other site improvements.

The stormwater management for the site is generally governed by the Windsor Heights, IA Code of Ordinances that references the Iowa Stormwater Management Manual (ISWMM). The objective of the proposed storm water management facility is to collect, hold, treat, and provide a controlled flow release for surface water generated during the design year storm events. Section 6.0 further outlines the City's relevant ordinance.

2.0 NATURAL CONDITIONS

2.1 GENERAL

This site is located at the intersection of University Ave and 63RD St. in Windsor Heights, IA.

2.2 PRE-IMPROVEMENT CONDITIONS

The project site is tributary to Walnut Creek, located approximately 0.6 Mi. southwest of the site. The pre-developed site area is largely comprised of grass and dense tree coverage. There are 4 existing single-family homes, a gravel/dirt path accessed from University Avenue, a paved driveway access from 63rd St. The north center of the site is a high point which slopes in multiple directions, North, West, Southwest and Southeast.

2.3 FEMA FLOOD ZONES

The entire site is located outside of mapped flood plains or flood ways as provided on the effective FIRM panel 19153C0327F, February 1, 2019.

2.4 SOILS REPORT

Construction Materials Testing report prepared exploration borings for the site and is included in the Appendix of this report. In addition, a Web Soil Survey was generated for this site. The result of this survey shows the site consists of type B soil, for more information see Appendix C.

2.5 Natural Drainage Areas (Pre-Development Conditions)

Table 2.1 Natural Drainage Areas

Existing Drainage Areas (Pre-Development Conditions)					
Drainage Area Label	Total Area (AC)	Impervious Area (AC)	Pervious Area (AC)	Curve Number	Time of Concentration (min)
North	1.12	0	1.12	58	9.0
West	2.56	0	2.56	58	9.4
South	0.67	0	0.67	58	9.2
Southeast	0.69	0	0.69	58	8.3

3.0 PROPOSED CONDITIONS

3.1 GENERAL

The proposed site development will include construction of a proposed building, the corresponding parking area, and associated utilities such as storm sewer. Stormwater management of the site improvements will be achieved by 4 detention basins located North, West, South, and Southeast on the property. Storm sewer systems will convey drainage from the proposed parking areas and building into the proposed detention basin.

The undetained area will be mostly grass area with 0.02 acres of pavement in the southeast undetained drainage area. See Table 3.1 for calculations. See landscape plan on sheet 14 for seeding details.

The proposed detention basins will provide stormwater management and will discharge into a proposed storm sewer system or overland and flow into Walnut Creek. A detailed map depicting the proposed drainage conditions is provided in Appendix B.

In addition to Windsor Height's storm water requirements, water quality has also been considered and will be addressed as follows. The North drainage area will be treated by an isolator row within the underground detention chambers. The above ground West detention pond will utilize Hydrodynamic Separators. The South and Southeast ponds meet recharge volume calculations are shown in Appendix H.

Recharge volumes have also been calculated based on Rev equations. The 3" orifice outlet has been designed to be at the elevation needed to meet the recharge volume requirements. Recharge calculations are shown in Appendix H. The site consists of Type B soils, expected infiltration rate is 0.34 in/hour per Iowa Storm Water Management Manual.

Table 3.1 Proposed Drainage Areas

Proposed Drainage Areas					
Drainage Area Label	Total Area (AC)	Impervious Area (AC)	Pervious Area (AC)	Curve Number	Time of Concentration (min)
North	0.98	0.74	0.24	89	8.1
North Undetained	0.53	0	0.53	61	5
West	1.91	1.29	0.62	86	6.7
West Undetained	0.54	0	0.54	61	5
South	0.48	0.11	0.37	69	11.0
South Undetained	0.09	0	0.09	61	5
Southeast	0.33	0.14	0.19	76	7.3
Southeast Undetained	0.15	0.2	0.15	61	5.0

4.0 STORM SEWER ANALYSIS

4.1 GENERAL

The proposed storm sewer systems have been designed to convey surface drainage to the proposed detention basins. The SCS Method was utilized to estimate peak discharges for drainage areas. Area intakes were analyzed for both the 5-year and 100-year events. Storm sewer pipes were analyzed to convey the 10-year event to the proposed SMF.

Table 4.1 Proposed Pipe Table

Pipe ID	Size (Inches)	Type	Length (Feet)	Slope (%)	Capacity (CFS)	Peak Flow 100-YR (CFS)
STSP-1	15	RCP	7	1.00	*	*
STSP-2	15	RCP	34	13.33	*	*
STSP-3	24	RCP	30	1.00	*	*
STSP-4	24	RCP	98	1.00	22.62	18.13
STSP-5	24	RCP	72	1.00	22.62	18.13
STSP-6	18	RCP	85	1.00	10.50	10.44
STSP-7	12	RCP	60	2.57	*	*
STSP-8	12	RCP	8	3.00	*	*
STSP-9	4	(3) DIP	30	1.00	*	*
STSP-10	10	PVC	82	1.00	2.18	1.79
STSP-11	12	PVC	62	1.00	3.56	3.28
STSP-12	15	PVC	140	1.00	6.45	4.84
STSP-13	15	PVC	20	1.00	6.46	5.74
STSP-14	15	PVC	52	1.00	6.42	5.72
STSP-15	15	PVC	20	1.00	6.27	5.65
STSP-16	12	RCP	81	3.00	6.17	2.06
STSP-17	24	N12	21	1.00	*	*
STSP-18	12	RCP	104	7.59	*	*
STSP-19	12	SLOTTED CMP	22	1.00	2.01	1.09
STSP-20	12	DIP	29	1.00	3.56	1.07

*Storm Sewer Pipe calculations have been included in the detention calculations Appendix F and are not shown on table 4.1.

5.0 STORMWATER MANAGEMENT FACILITY (SMF)

5.1 GENERAL

The drainage improvements are intended to provide treatment and limit the peak design storm maximum runoff rate from the onsite developed site to the outlet points.

The proposed SMF and control structure is sized to accept and provide treatment and a controlled flow release of the onsite flows collected. The proposed SMF will provide design storm event flood protection volume and the water quality volume & water quality recharge rate for the onsite area draining to it.

The proposed SMF detention basins and control structures will be sized to provide the required attenuation storage below the emergency overflow for the 100-year Natural Conditions 24-hour design storm event peak runoff rates using the USDA-NRCS WINTR-55 program identified by the County. This program computes the runoff rates and corresponding volumes for the post construction condition.

5.2 NPDES

This project will require an NPDES construction stormwater permit based on the size of the proposed work. This permit, along with all other necessary City stormwater, grading, and erosion control permits, will be obtained prior to commencing construction activities. The Stormwater Pollution Prevention Plan (SWPPP) sheets provided with the site plans identify the necessary measures for temporary and permanent erosion and sediment control. Refer to the Storm Water Pollution Prevention Plan provided with the site plan in Appendix G.

5.3 TIME OF CONCENTRATION

The NRCS velocity method in the HydroCAD programs were used to calculate the times of concentration for all scenarios and methods. Calculations are shown in the attached outputs.

5.4 PROJECT AREA

A post condition drainage basin map has been included in the Exhibit Section. This Exhibit shows the onsite and offsite tributary sub-catchment areas.

5.5 VARIABLES AND MODELING

5.5.1 Runoff Curve Numbers

The proposed site and tributary area contain primarily type B hydrologic soil type. This classification of soil type was determined by the soils project engineer. This soil classification has been further confirmed by web soil survey. The runoff curve numbers used were associated with the soil type and normal (average) Antecedent Moisture Condition (AMC II) for type B soils.

The land use and weighted runoff curve number summary table is provided in the model output tables located in the Exhibits. The numbers

were weighted by the program based on the proportionate area assigned to each classification. The proposed numbers used reflect the pre-settlement (natural condition) and post improvement condition. The calculations do not include any additional rainfall loss method accommodations due to evaporation or infiltration in the pond.

5.5.2 Rainfall Rates

The rainfall data used for both analyses is the recommended SUDAS values for central Iowa section 5. The standard settings include 24-hour rainfall depth duration using the NRCS SCS type II rainfall distribution and a dimensional unit hydrograph standard.

5.6 CONTROL STRUCTURE

The control structure is sized to satisfy as follows:

(A) Water Quality Volume - To reduce potential increases in downstream erosion and water pollution, practices or techniques shall be employed that capture and treat runoff from a 1.25" rainfall event. The volume can be infiltrated or detained and released over a 24-hour period. To assist with water quality, the recharge rate has been calculated and provided. This standard addresses approximately 90% of Article 8. Stormwater and Erosion Control Management Division 1. Stormwater Runoff 128 rainfall events that occur in Central Iowa.

(B) Channel Protection Volume – To reduce potential increases in erosion and stream degradation, practices or techniques shall be employed that provide extended detention of the runoff that occurs during 1-year, 24-hour rainfall event. The volume shall be detained and released at a minimum over 24 hours and a maximum of 48 hours. This standard addresses approximately 98% of the rainfall events that occur in Central Iowa.

(C) Overbank Flood Protection - To minimize surcharge of downstream storm sewer systems and reduce the frequency of flash flooding, practices and techniques shall be employed that limit peak release rates that are anticipated to occur post development during the 2-, 5- and 10-year, 24-hour storm events to levels no greater than those expected to occur from natural conditions from a given site from the same storm event. Natural conditions are defined in Section 7 of this Division.

(D) Extreme Flood Protection - To reduce the frequency and impacts caused by larger flood events, practices and techniques shall be employed that limit peak release rates that are anticipated to occur post-development during the 25-, 50- and 100-year, 24- hour storm events to levels no greater than those expected to occur from natural conditions from a given site from the same storm event. Natural conditions are defined in Section 7 of this division.

The calculations for the control structure multi-year outflow peak rates are included in the HydroCAD output and in the summary of this analysis.

Structures will use a SUDAS SW-513 storm sewer structure modified with multiple outlets (weirs/orifices) to limit the flow to the design release rates and provide water quality treatment with an added bioretention cell & required recharge volume. The upper outlet is provided to attenuate less frequent storm water peak flows. The 3" orifice has been placed at the elevation required to meet the recharge volume and can be found in the Exhibits section.

Should a design storm event occur that is greater than the detention basin capacity or any intakes become inoperative, water would be directed over the proposed emergency overflow. The SMF includes a top emergency broad crested weir for any extremely infrequent events. The secondary weir is located above the 100-year design storm maximum modeled stage and one foot below the top of SMF top of berm to provide one foot of freeboard in the detention basin.

6.0 STORMWATER REGULATIONS

The location of the project involves the City of Windsor Heights stormwater regulations. The regulations and design criteria are outline below in Table 6.1:

Table 6.1 Design Criteria

Performance Standard	Requirements
City of Windsor Heights City Code Chapter 161 Post-Construction Storm Water Control	Any redevelopment disturbing 50% or more of a site shall provide stormwater management at the Water Quality Volume standard and shall meet the Channel Protection standard.
	Provide on-site treatment during construction and post-construction to ensure no increases over pre-settlement conditions (meadow not in good condition, CD=58) for the one-year, 24-hour storm event, the five-year, 24-hour storm event, and the 100-year, 24-hour storm event.
	Provide on-site water quality treatment to reduce potential increases in downstream water pollution. Practices or techniques shall be employed that capture and treat runoff from a 1.25" rainfall event, as further defined within the ISWMM.
	Provide extended detention of the 1-year, 24-hour storm event – with release rates established as per methods defined within the ISWMM manual to provide a minimum drawdown period of 24 hours.
	Practices and techniques shall be employed that limit allowable peak release rate that are anticipated to occur post-development during the 2, 5 and 10-year, 24-hour storm events to levels no greater than those expected to occur from natural conditions a given site from a similar storm event.
	Practices and techniques shall be employed that limit allowable peak release rate that are anticipated to occur post-development during the 25, 50 and 100-year, 24-hour storm events to levels no greater than those expected to occur from natural conditions a given site from a similar storm event.
	Retain on-site for recharge a portion of the water quality treatment volume calculated as a soil specific recharge factor multiplied by the volumetric runoff coefficient multiplied by the area and all divided by 12. The soil specific recharge factor is given as 0.08 for HSG D soils. The volumetric runoff coefficient is calculated as $0.05 + 0.009$ multiplied by the site impervious percentage.

7.0 SUMMARY

The proposed stormwater management system consists of 4 proposed detention basins with control structures that outlet toward an existing public storm sewer system and ultimately drains toward Walnut Creek. A summary of the proposed SMF is provided in Table 7.1.

Statewide Urban Design and Specifications (SUDAS). The rainfall events analyzed include the water quality volume (1.25"), 1-year (2.67"), 2-year (3.08"), 5-year (3.81"), 10-year (4.46"), 25-year (5.44"), 50-year (6.26"), 100-year (7.12") design storms.

The below table summarizes the results of the stormwater model by comparing the stormwater runoff rates of the pre-development conditions to the proposed conditions for each design rainfall event. The proposed HydroCAD model is provided in Appendix E.

Table 7.1 Site Runoff Calculations – North

Rainfall Event	Pre-Development Peak Flow (CFS)	Post-Development Peak SWM Flow (CFS)
	South	South
1-YR, 24-HR Storm (2.67")	0.10	0.15*
2-YR, 24-HR Storm (3.08")	0.30	0.30
5-YR, 24-HR Storm (3.81")	0.80	0.71
10-YR, 24-HR Storm (4.46")	1.37	1.14
25-YR, 24-HR Storm (5.44")	2.36	1.82
50-YR, 24-HR Storm (6.26")	3.29	2.42
100-YR, 24-HR Storm (7.12")	4.33	3.07

*The 1-year rainfall events are unable to meet the City of Windsor Height's stormwater release rate requirements for more information see description below table 7.5. Undetained runoff calculations have been included within this table.

Table 7.2 Site Runoff Calculations – South/Southeast

Rainfall Event	Pre-Development Peak Flow (CFS)	Post-Development Peak SWM Flow (CFS)
	South	South
1-YR, 24-HR Storm (2.67")	0.13	0.12
2-YR, 24-HR Storm (3.08")	0.37	0.20
5-YR, 24-HR Storm (3.81")	0.98	0.39
10-YR, 24-HR Storm (4.46")	1.68	0.58
25-YR, 24-HR Storm (5.44")	2.90	0.99
50-YR, 24-HR Storm (6.26")	4.04	1.33
100-YR, 24-HR Storm (7.12")	5.31	1.85

Table 7.4 Site Runoff Calculations - West

Rainfall Event	Pre-Development Peak Flow (CFS)	Post-Development Peak SWM Flow (CFS)
	West	West
1-YR, 24-HR Storm (2.67")	0.22	0.22
2-YR, 24-HR Storm (3.08")	0.67	0.44
5-YR, 24-HR Storm (3.81")	1.80	0.97
10-YR, 24-HR Storm (4.46")	3.07	2.30
25-YR, 24-HR Storm (5.44")	5.30	4.86
50-YR, 24-HR Storm (6.26")	7.39	7.11
100-YR, 24-HR Storm (7.12")	9.74	9.42

Table 7.5 Detention Calculations

Rainfall Event	Conditions		Max Elevation of Detention Area Per Rainfall Event							
	Pre-Development Peak Flow Combined (CFS)	Post-Development Peak Flow Combined (CFS)	North		South		Southeast		West	
			Release Rate	Top of Detention	Release Rate	Top of Detention	Release Rate	Top of Detention	Release Rate	Top of Detention
				928.75'		915.00'		920.00'		914.00'
1-YR, 24-HR Storm (2.67")	0.46	0.49*	0.09	921.15	0.03	912.44	0.02	917.57	0.20	909.96
2-YR, 24-HR Storm (3.08")	1.33	0.94	0.14	921.37	0.07	912.52	0.03	917.62	0.25	910.38
5-YR, 24-HR Storm (3.81")	3.58	2.07	0.23	921.90	0.14	912.81	0.09	917.73	0.87	910.81
10-YR, 24-HR Storm (4.46")	6.09	4.02	0.28	922.24	0.23	913.09	0.12	917.86	2.10	911.16
25-YR, 24-HR Storm (5.44")	10.56	7.67	0.36	923.33	0.60	913.32	0.18	918.05	4.37	911.64
50-YR, 24-HR Storm (6.26")	14.70	10.86	0.43	924.17	1.11	913.52	0.30	918.17	6.25	911.97
100-YR, 24-HR Storm (7.12")	19.37	14.34	1.38	924.65	1.20	913.81	0.47	918.30	8.11	912.27

*The 1-year rainfall event is unable to meet the City of Windsor Height's stormwater release rate requirements. This is due to the existing site conditions and topography; a majority of the site is being developed but the surrounding edges of the property need to tie into existing grade. This results in 1.62-acres of undetained area that cannot be captured on the 5.04-acre site. This results in small rain events being unable to be detained and released at or below the pre-development rate.

Per City requirements, each rainfall event's post construction peak flow rate must be equal to or less than the pre-development peak flow rates. The proposed underground & above ground detention basin designs meet this requirement for all, but the 1-year rain event shown in above Tables 7.1 - 7.5. The stormwater system was designed to meet the City of Windsor Heights post-construction stormwater management requirements and the outlet devices are depicted below. The water quality volume calculations are provided in Appendix G.

1. North Detention Basin Primary Outlet Device
 - a. The primary outlet device for underground systems is a 3" diameter circular orifice that will allow stormwater to exit the system over a 24-hour period. The 3" orifice outlet has been designed at an elevation that is required to meet recharge requirements. The secondary outlet is a 12" circular culvert that is used to contain the post-construction 50-year and 100-year storm events.
2. South Detention Basin Primary Outlet Device
 - a. The primary outlet device for the aboveground system is a 3" diameter circular orifice for the 1.25", 1-year, 2-year, and 5-year storm events. The 3" orifice outlet has been designed at an elevation that is required to meet recharge requirements. The secondary outlet is a 10" circular overflow weir that is used to contain the post-construction 10-year, 25-year, 50-year and 100-year storm events.
3. Southeast Detention Basin Primary Outlet Device
 - a. The primary outlet device for the aboveground system is a 3" diameter circular orifice for the 1.25", 1-year, 2-year, 5-year, and 10-year events. The 3" orifice outlet has been designed at an elevation that is required to meet recharge requirements. The secondary device is a 6" x 5.4" rectangular overflow weir that will contain the post-construction 25-year, 50-year and 100-year event storm.
4. West Detention Basin Primary Outlet Device
 - a. The primary outlet device for the aboveground system is a 3" diameter circular orifice for the 1.25", 1-year and 2-year events. The 3" orifice outlet has been designed at an elevation that is required to meet recharge requirements. The secondary outlet device is a 12" x 20" rectangular overflow weir that will contain the post-construction 5-year, 10- year, 25-year, 50-year and 100-year event storm.
 - b. Following the primary, secondary and final outlet device. The West Detention Basin will be piped to a secondary outfall. Due to the lack of existing storm sewer on site the most favorable outfall method to reduce erosion to the existing site is to be dispersed via level spreader. The secondary outfall of the west detention area is 4' below the west detention area and will be outlet on existing grade and will over top the designed weir elevation and flow off site.

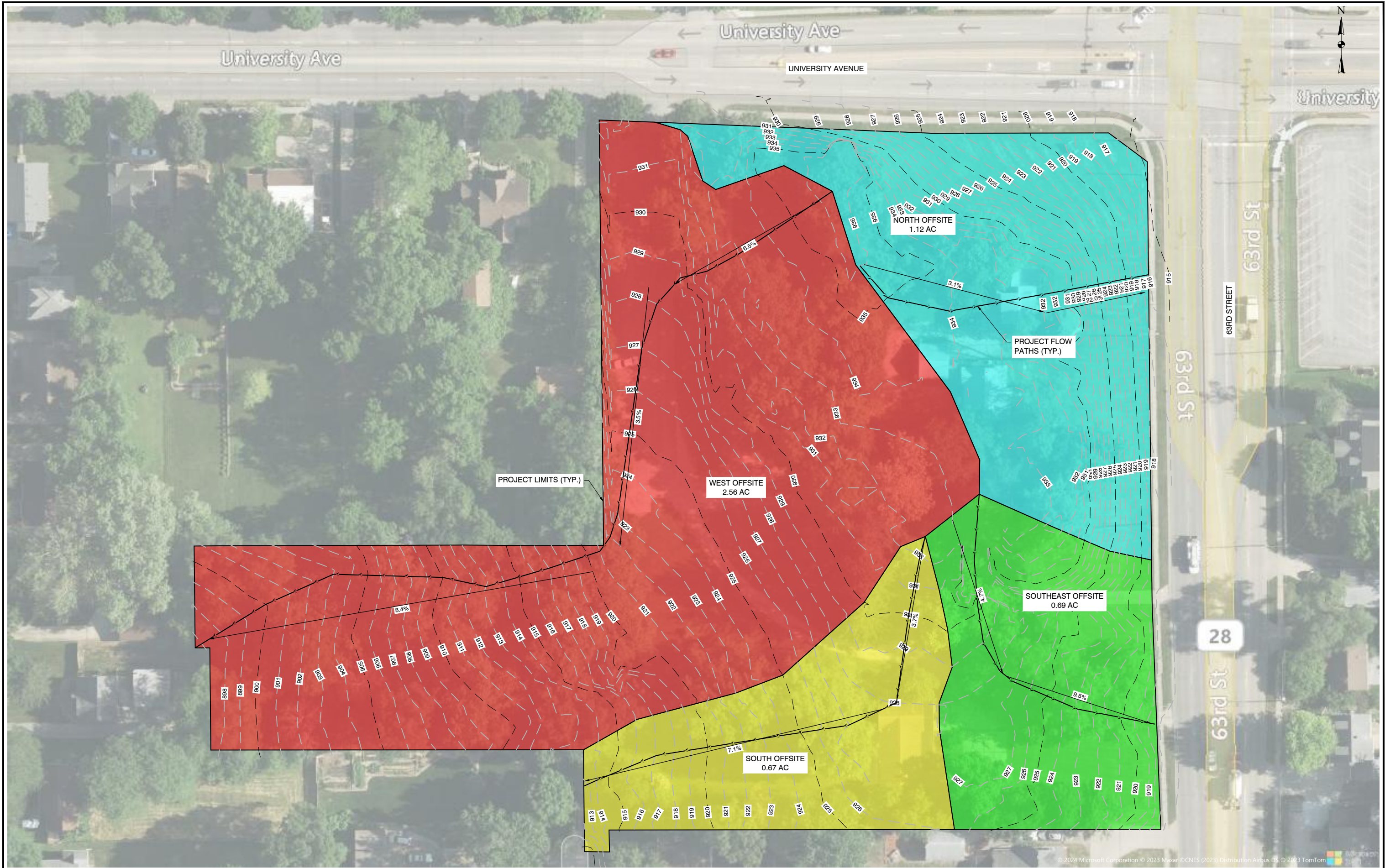
Refer to Appendix F for details of the stormwater basin and outlet structures.

Refer to Appendix H for Recharge Volume calculations.

Appendices

Appendix A: Natural Conditions Drainage Map

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NO.	REVISION	BY	DATE	NO.	REVISION	BY	DATE

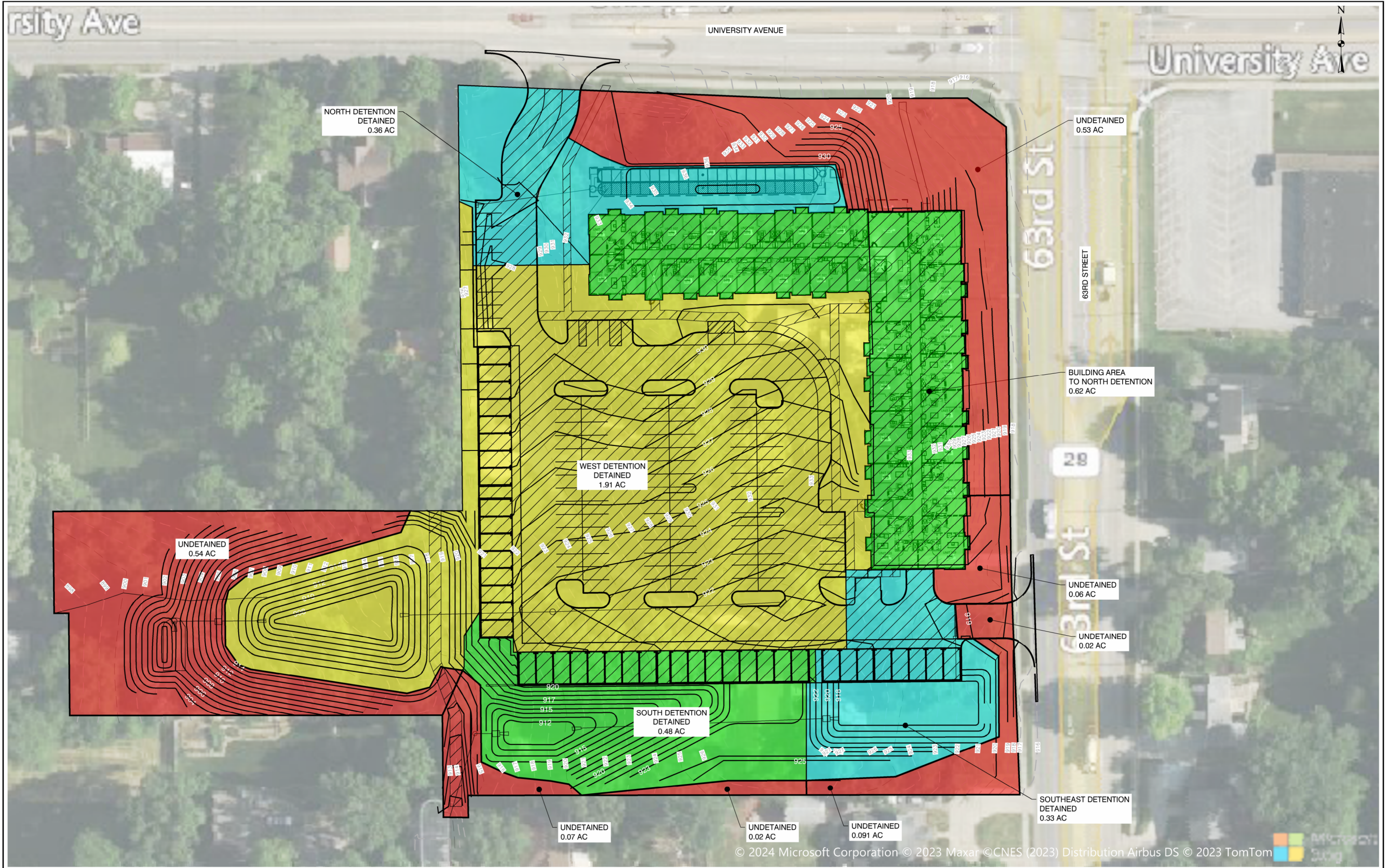
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CHECKED: ---	DATE: ---
APPROVED: ---	DATE: ---

APARTMENT COMPLEX
WINDSOR HEIGHTS, IOWA

**NATURAL CONDITIONS
DRAINAGE MAP**

PROJECT NO. 23-047
SHEET NO. 1 OF 1

Appendix B: Post Development Conditions Drainage Map



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APPROVED: _____	DATE: _____

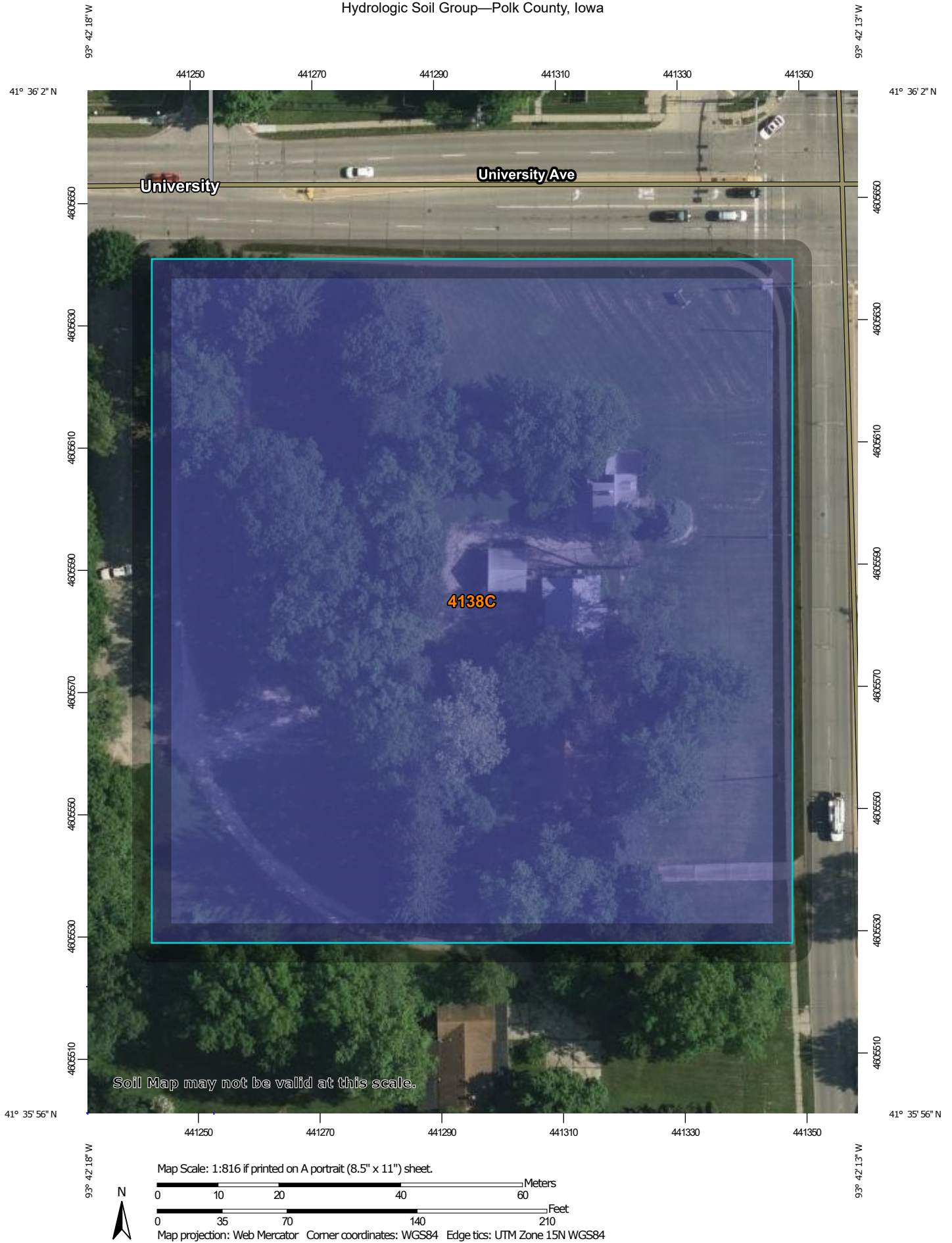
APARTMENT COMPLEX
WINDSOR HEIGHTS, IOWA

**POST DEVELOPMENT
CONDITIONS DRAINAGE MAP**

PROJECT NO. 23-047
SHEET NO. 1 OF 1

Appendix C: Hydrological Soil Report

Hydrologic Soil Group—Polk County, Iowa



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

Soil Rating Polygons

 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Lines

 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Points

 A
 A/D
 B
 B/D

 C
 C/D
 D
 Not rated or not available

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 1:12,000.

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: Polk County, Iowa
 Survey Area Data: Version 26, Sep 12, 2023

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

Date(s) aerial images were photographed: May 29, 2020—Jun 12, 2020

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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
4138C	Clarion-Urban land complex, 5 to 9 percent slopes	B	2.9	100.0%
Totals for Area of Interest			2.9	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

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.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

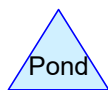
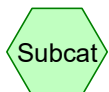
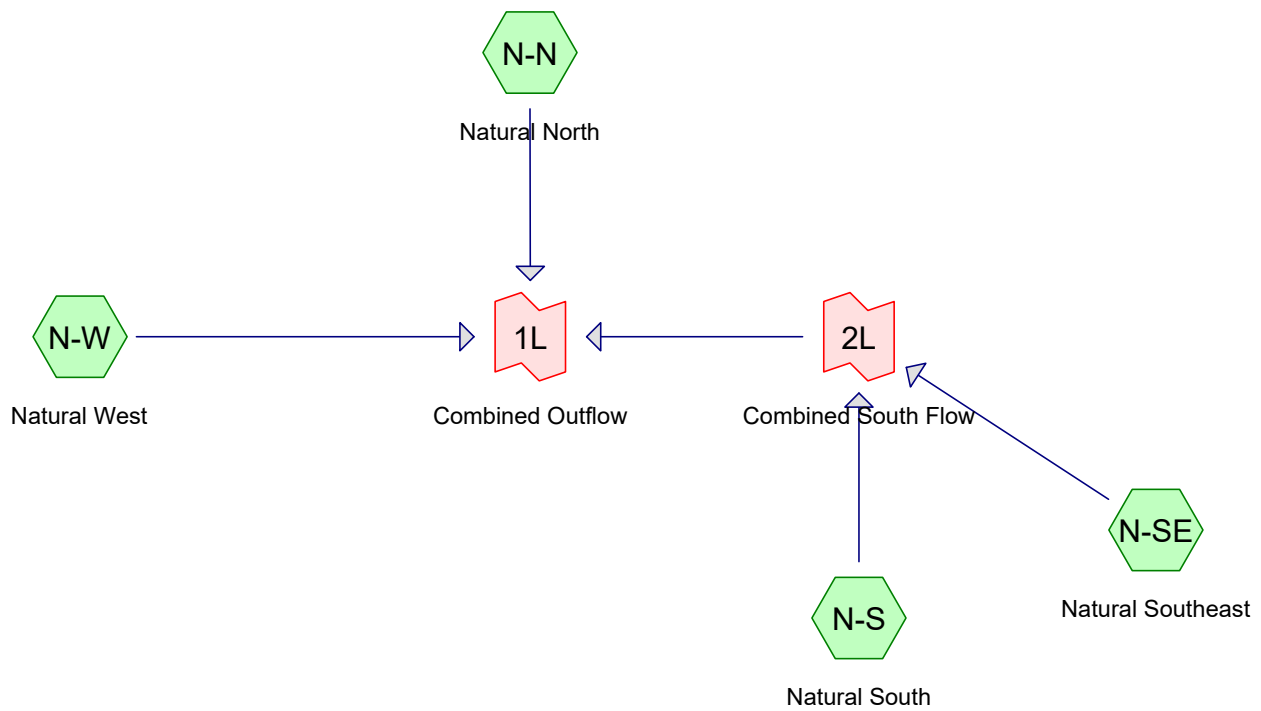
Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Appendix D: Natural Conditions HydroCad Report



Routing Diagram for 23-047 Natural Site Conditions
Prepared by Clappsaddle-Garber Associates, Printed 5/7/2024
HydroCAD® 10.20-2g s/n 02733 © 2022 HydroCAD Software Solutions LLC

23-047 Natural Site Conditions

Prepared by Clappsaddle-Garber Associates

Printed 5/7/2024

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Page 2

Project Notes

Rainfall events imported from "NRCS-Rain.txt" for 1476 IA Polk

23-047 Natural Site Conditions

Prepared by Clappsaddle-Garber Associates

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Printed 5/7/2024

Page 3

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-Year	Type II 24-hr		Default	24.00	1	2.67	2
2	2-Year	Type II 24-hr		Default	24.00	1	3.08	2
3	5-Year	Type II 24-hr		Default	24.00	1	3.81	2
4	10-Year	Type II 24-hr		Default	24.00	1	4.46	2
5	25-Year	Type II 24-hr		Default	24.00	1	5.44	2
6	50-Year	Type II 24-hr		Default	24.00	1	6.26	2
7	100-Year	Type II 24-hr		Default	24.00	1	7.12	2

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
5.040	58	Meadow, non-grazed, HSG B (N-N, N-S, N-SE, N-W)
5.040	58	TOTAL AREA

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
5.040	HSG B	N-N, N-S, N-SE, N-W
0.000	HSG C	
0.000	HSG D	
0.000	Other	
5.040		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	5.040	0.000	0.000	0.000	5.040	Meadow, non-grazed	N-N, N-S, N-SE, N-W
0.000	5.040	0.000	0.000	0.000	5.040	TOTAL AREA	

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Type II 24-hr 1-Year Rainfall=2.67"

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Time span=2.00-26.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentN-N: Natural North

Runoff Area=1.120 ac 0.00% Impervious Runoff Depth=0.18"
Flow Length=209' Tc=9.0 min CN=58 Runoff=0.10 cfs 0.016 af

SubcatchmentN-S: Natural South

Runoff Area=0.670 ac 0.00% Impervious Runoff Depth=0.18"
Flow Length=337' Tc=9.2 min CN=58 Runoff=0.06 cfs 0.010 af

SubcatchmentN-SE: Natural Southeast

Runoff Area=0.690 ac 0.00% Impervious Runoff Depth=0.18"
Flow Length=266' Tc=8.3 min CN=58 Runoff=0.07 cfs 0.010 af

SubcatchmentN-W: Natural West

Runoff Area=2.560 ac 0.00% Impervious Runoff Depth=0.18"
Flow Length=420' Tc=9.4 min CN=58 Runoff=0.22 cfs 0.038 af

Link 1L: Combined Outflow

Inflow=0.46 cfs 0.074 af
Primary=0.46 cfs 0.074 af

Link 2L: Combined South Flow

Inflow=0.13 cfs 0.020 af
Primary=0.13 cfs 0.020 af

Total Runoff Area = 5.040 ac Runoff Volume = 0.074 af Average Runoff Depth = 0.18"
100.00% Pervious = 5.040 ac 0.00% Impervious = 0.000 ac

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Type II 24-hr 1-Year Rainfall=2.67"

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Summary for Subcatchment N-N: Natural North

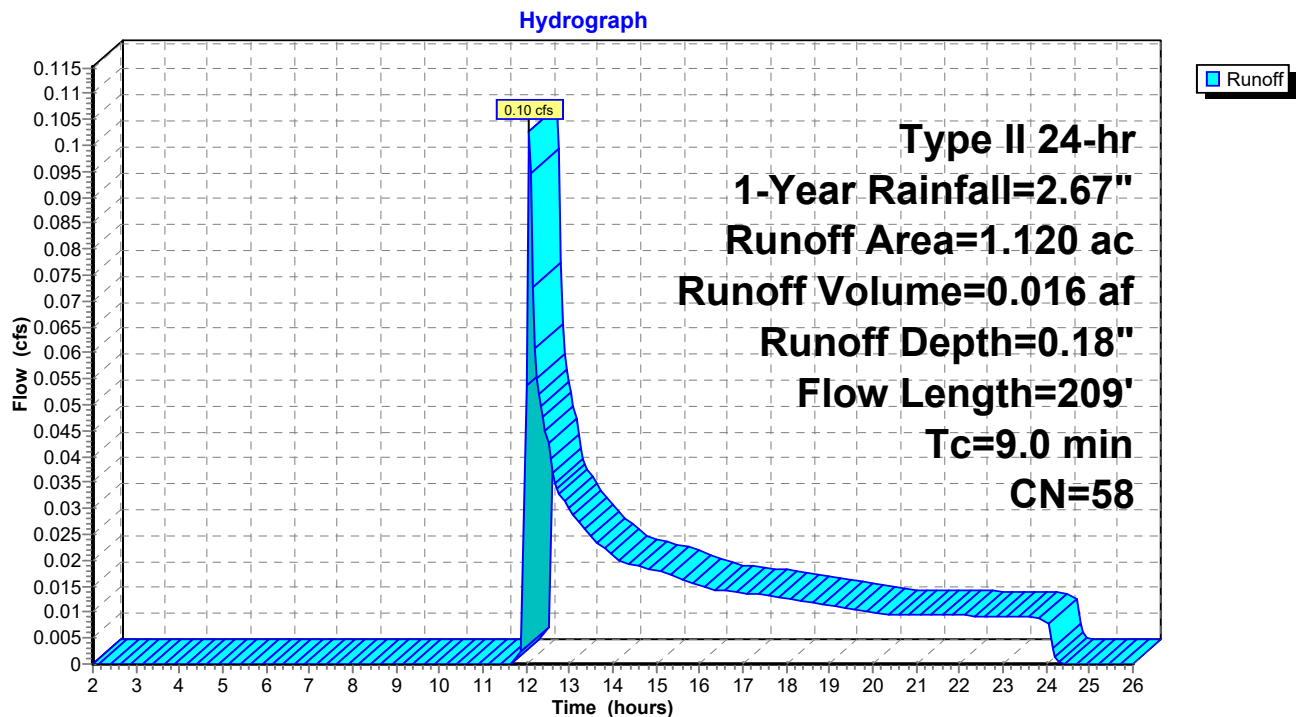
Runoff = 0.10 cfs @ 12.07 hrs, Volume= 0.016 af, Depth= 0.18"
Routed to Link 1L : Combined Outflow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-26.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-Year Rainfall=2.67"

Area (ac)	CN	Description
1.120	58	Meadow, non-grazed, HSG B
1.120		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	100	0.0310	0.20		Sheet Flow, SHEET (MEADOW) Grass: Short n= 0.150 P2= 3.04"
0.6	109	0.2200	3.28		Shallow Concentrated Flow, SHALLOW (MEADOW) Short Grass Pasture Kv= 7.0 fps
9.0	209	Total			

Subcatchment N-N: Natural North



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Type II 24-hr 1-Year Rainfall=2.67"

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Summary for Subcatchment N-S: Natural South

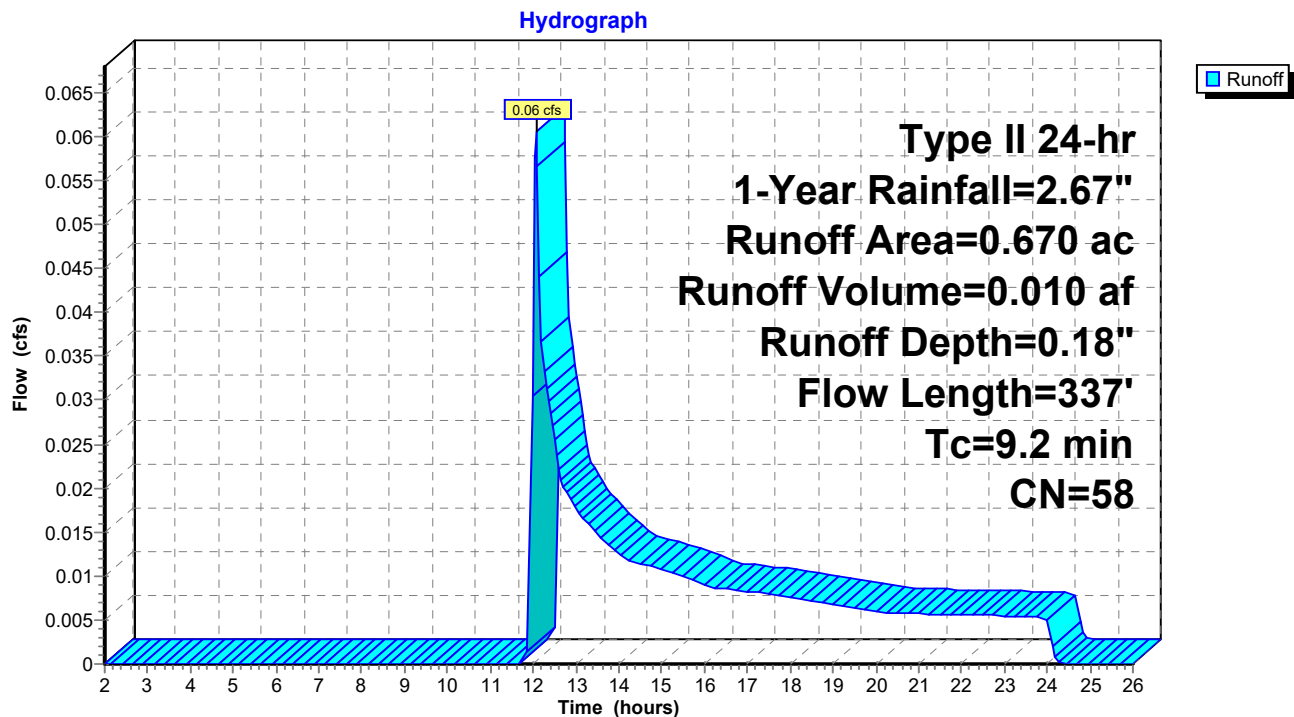
Runoff = 0.06 cfs @ 12.07 hrs, Volume= 0.010 af, Depth= 0.18"
Routed to Link 2L : Combined South Flow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-26.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-Year Rainfall=2.67"

Area (ac)	CN	Description
0.670	58	Meadow, non-grazed, HSG B
0.670		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	100	0.0480	0.24		Sheet Flow, SHEET (MEADOW) Grass: Short n= 0.150 P2= 3.04"
2.1	237	0.0740	1.90		Shallow Concentrated Flow, SHALLOW (MEADOW) Short Grass Pasture Kv= 7.0 fps
9.2	337	Total			

Subcatchment N-S: Natural South



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Type II 24-hr 1-Year Rainfall=2.67"

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Summary for Subcatchment N-SE: Natural Southeast

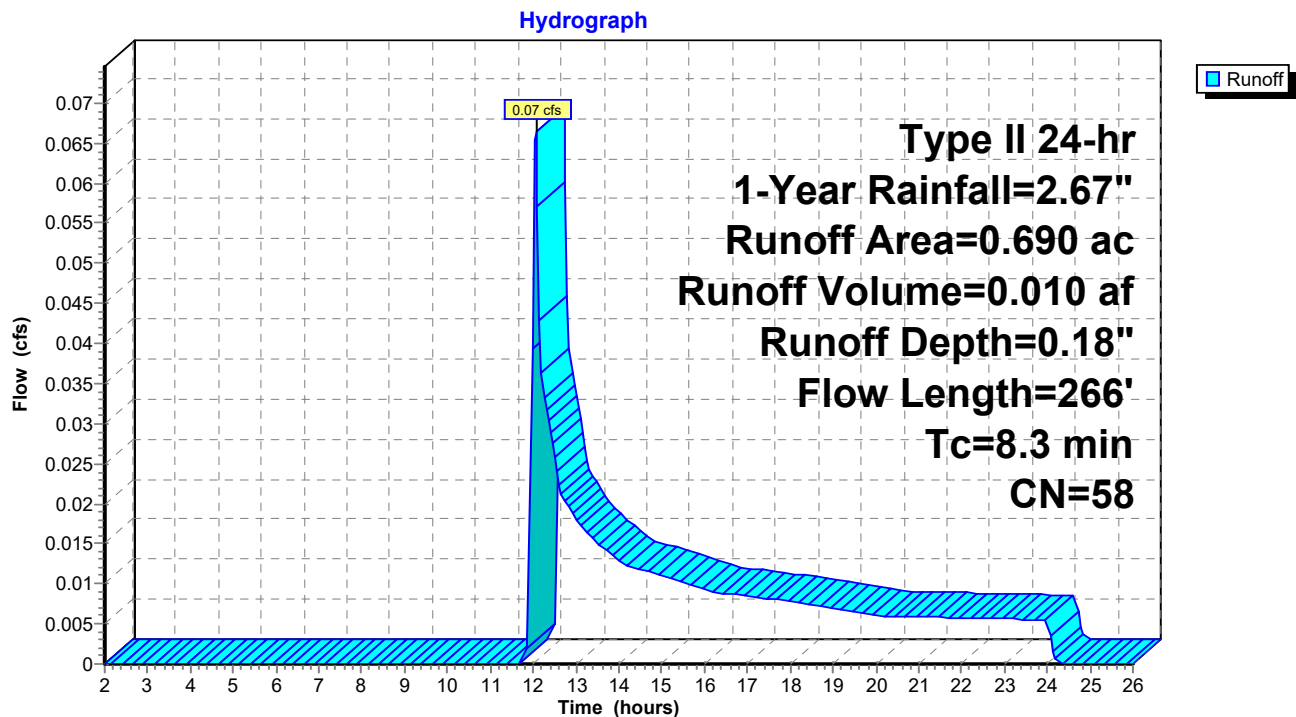
Runoff = 0.07 cfs @ 12.06 hrs, Volume= 0.010 af, Depth= 0.18"
Routed to Link 2L : Combined South Flow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-26.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-Year Rainfall=2.67"

Area (ac)	CN	Description
0.690	58	Meadow, non-grazed, HSG B
0.690		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	100	0.0470	0.23		Sheet Flow, Grass: Short n= 0.150 P2= 3.04"
1.2	166	0.1000	2.21		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
8.3	266	Total			

Subcatchment N-SE: Natural Southeast



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Type II 24-hr 1-Year Rainfall=2.67"

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Summary for Subcatchment N-W: Natural West

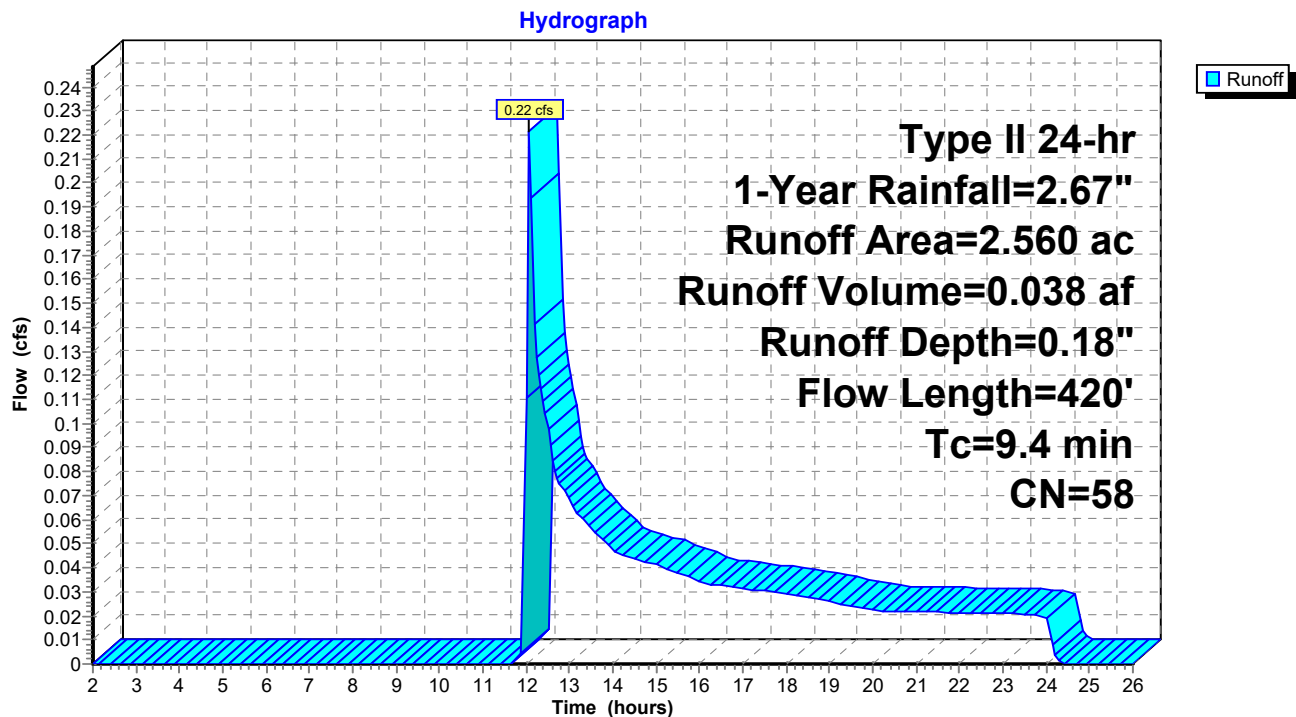
Runoff = 0.22 cfs @ 12.08 hrs, Volume= 0.038 af, Depth= 0.18"
Routed to Link 1L : Combined Outflow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-26.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-Year Rainfall=2.67"

Area (ac)	CN	Description
2.560	58	Meadow, non-grazed, HSG B
2.560		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	100	0.0650	0.27		Sheet Flow, SHEET (MEADOW) Grass: Short n= 0.150 P2= 3.04"
3.1	320	0.0600	1.71		Shallow Concentrated Flow, SHALLOW (MEADOW) Short Grass Pasture Kv= 7.0 fps
9.4	420	Total			

Subcatchment N-W: Natural West



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Type II 24-hr 1-Year Rainfall=2.67"

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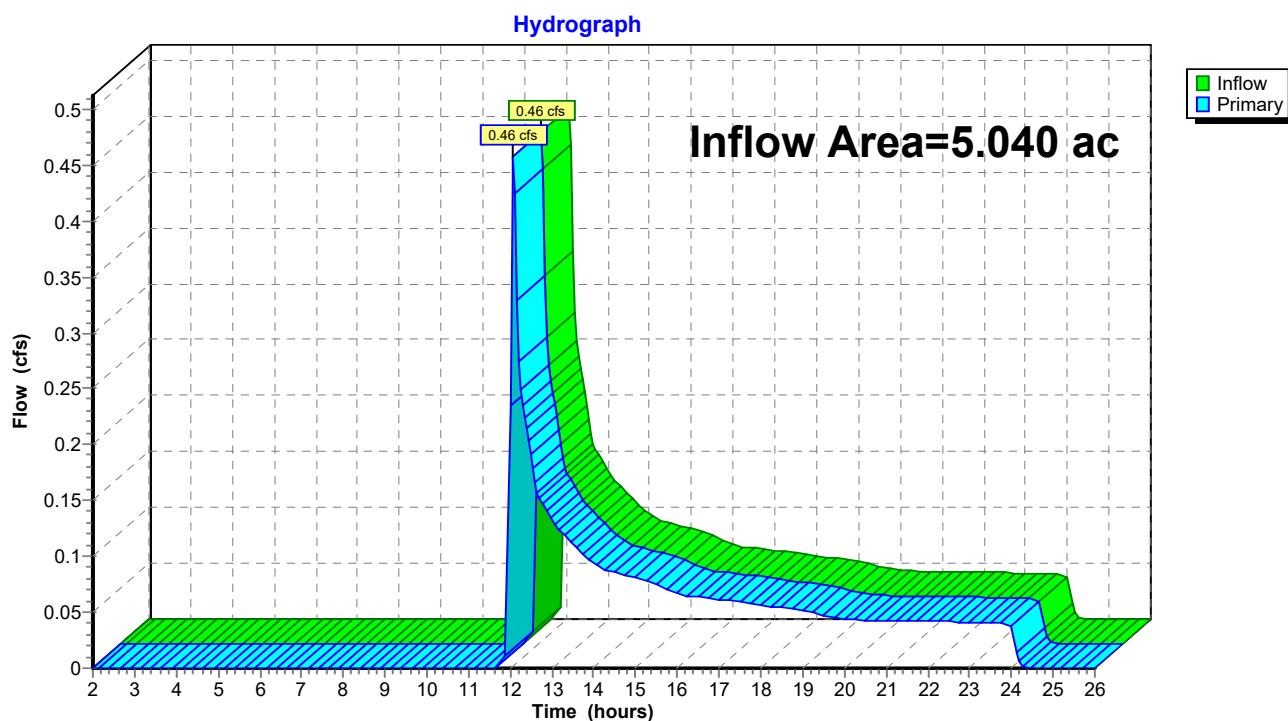
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Summary for Link 1L: Combined Outflow

Inflow Area = 5.040 ac, 0.00% Impervious, Inflow Depth = 0.18" for 1-Year event
Inflow = 0.46 cfs @ 12.07 hrs, Volume= 0.074 af
Primary = 0.46 cfs @ 12.07 hrs, Volume= 0.074 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-26.00 hrs, dt= 0.05 hrs

Link 1L: Combined Outflow



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Type II 24-hr 1-Year Rainfall=2.67"

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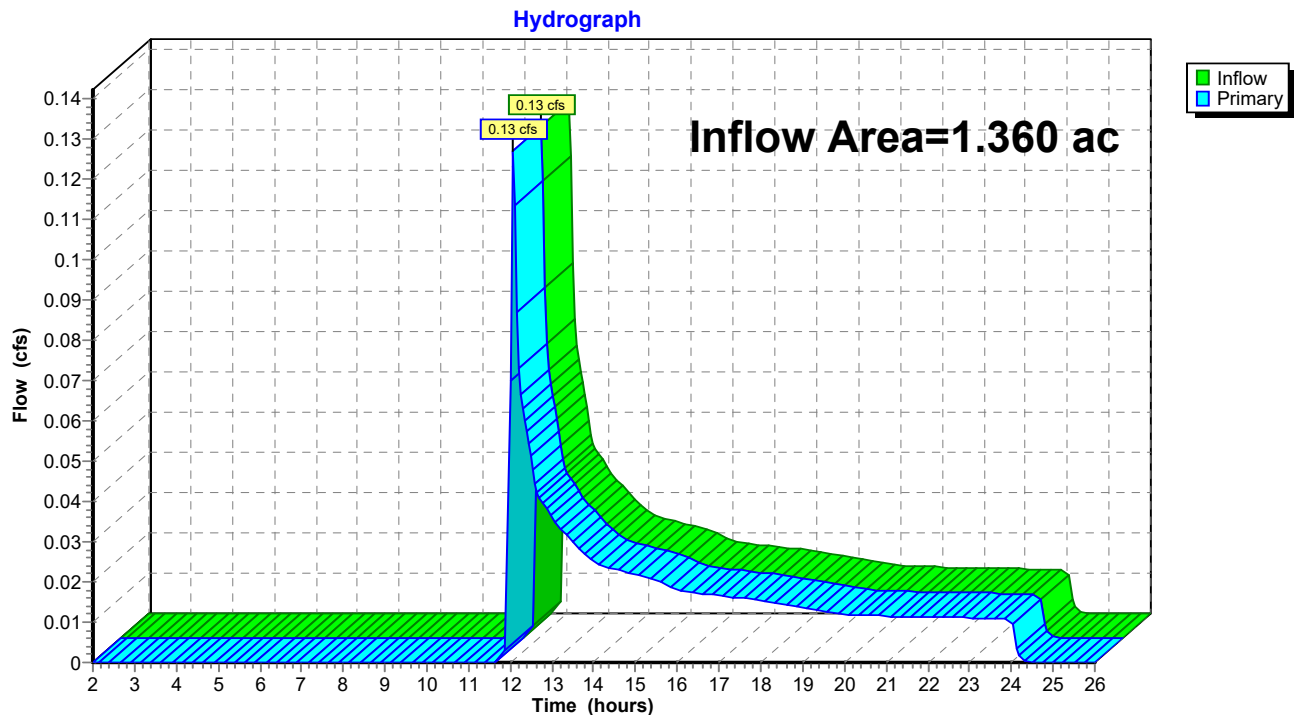
Page 13

Summary for Link 2L: Combined South Flow

Inflow Area = 1.360 ac, 0.00% Impervious, Inflow Depth = 0.18" for 1-Year event
Inflow = 0.13 cfs @ 12.07 hrs, Volume= 0.020 af
Primary = 0.13 cfs @ 12.07 hrs, Volume= 0.020 af, Atten= 0%, Lag= 0.0 min
Routed to Link 1L : Combined Outflow

Primary outflow = Inflow, Time Span= 2.00-26.00 hrs, dt= 0.05 hrs

Link 2L: Combined South Flow



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Type II 24-hr 2-Year Rainfall=3.08"

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Time span=2.00-26.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentN-N: Natural North

Runoff Area=1.120 ac 0.00% Impervious Runoff Depth=0.30"
Flow Length=209' Tc=9.0 min CN=58 Runoff=0.30 cfs 0.028 af

SubcatchmentN-S: Natural South

Runoff Area=0.670 ac 0.00% Impervious Runoff Depth=0.30"
Flow Length=337' Tc=9.2 min CN=58 Runoff=0.18 cfs 0.017 af

SubcatchmentN-SE: Natural Southeast

Runoff Area=0.690 ac 0.00% Impervious Runoff Depth=0.30"
Flow Length=266' Tc=8.3 min CN=58 Runoff=0.19 cfs 0.017 af

SubcatchmentN-W: Natural West

Runoff Area=2.560 ac 0.00% Impervious Runoff Depth=0.30"
Flow Length=420' Tc=9.4 min CN=58 Runoff=0.67 cfs 0.064 af

Link 1L: Combined Outflow

Inflow=1.33 cfs 0.126 af
Primary=1.33 cfs 0.126 af

Link 2L: Combined South Flow

Inflow=0.37 cfs 0.034 af
Primary=0.37 cfs 0.034 af

Total Runoff Area = 5.040 ac Runoff Volume = 0.126 af Average Runoff Depth = 0.30"
100.00% Pervious = 5.040 ac 0.00% Impervious = 0.000 ac

23-047 Natural Site Conditions

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Type II 24-hr 2-Year Rainfall=3.08"

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Summary for Subcatchment N-N: Natural North

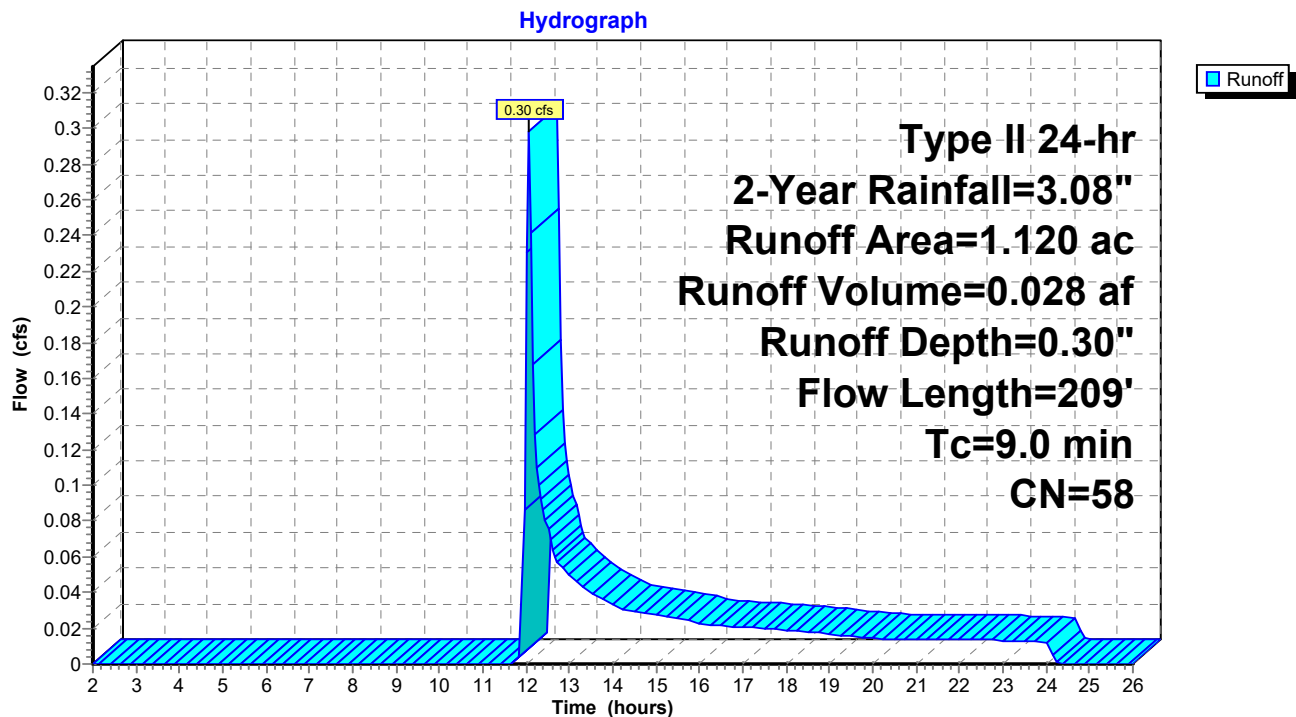
Runoff = 0.30 cfs @ 12.05 hrs, Volume= 0.028 af, Depth= 0.30"
Routed to Link 1L : Combined Outflow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-26.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-Year Rainfall=3.08"

Area (ac)	CN	Description
1.120	58	Meadow, non-grazed, HSG B
1.120		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	100	0.0310	0.20		Sheet Flow, SHEET (MEADOW) Grass: Short n= 0.150 P2= 3.04"
0.6	109	0.2200	3.28		Shallow Concentrated Flow, SHALLOW (MEADOW) Short Grass Pasture Kv= 7.0 fps
9.0	209	Total			

Subcatchment N-N: Natural North



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Type II 24-hr 2-Year Rainfall=3.08"

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Summary for Subcatchment N-S: Natural South

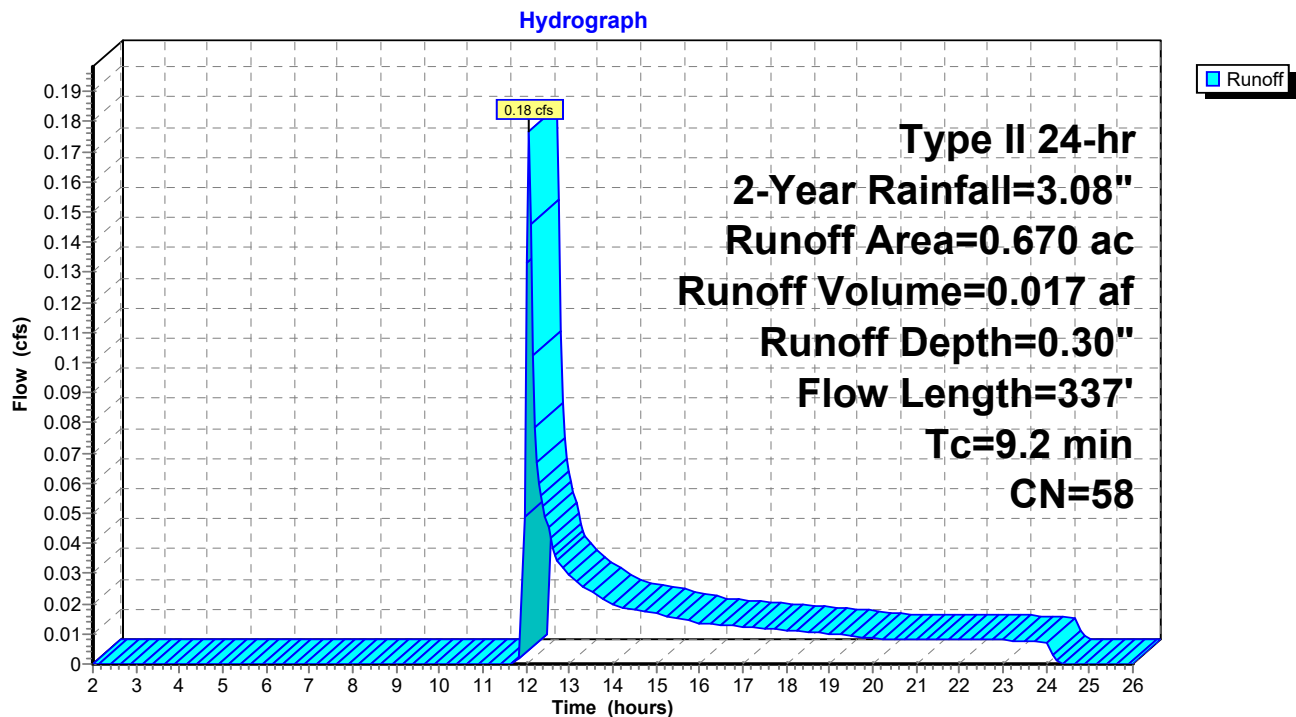
Runoff = 0.18 cfs @ 12.05 hrs, Volume= 0.017 af, Depth= 0.30"
Routed to Link 2L : Combined South Flow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-26.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-Year Rainfall=3.08"

Area (ac)	CN	Description
0.670	58	Meadow, non-grazed, HSG B
0.670		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	100	0.0480	0.24		Sheet Flow, SHEET (MEADOW) Grass: Short n= 0.150 P2= 3.04"
2.1	237	0.0740	1.90		Shallow Concentrated Flow, SHALLOW (MEADOW) Short Grass Pasture Kv= 7.0 fps
9.2	337	Total			

Subcatchment N-S: Natural South



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Type II 24-hr 2-Year Rainfall=3.08"

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Summary for Subcatchment N-SE: Natural Southeast

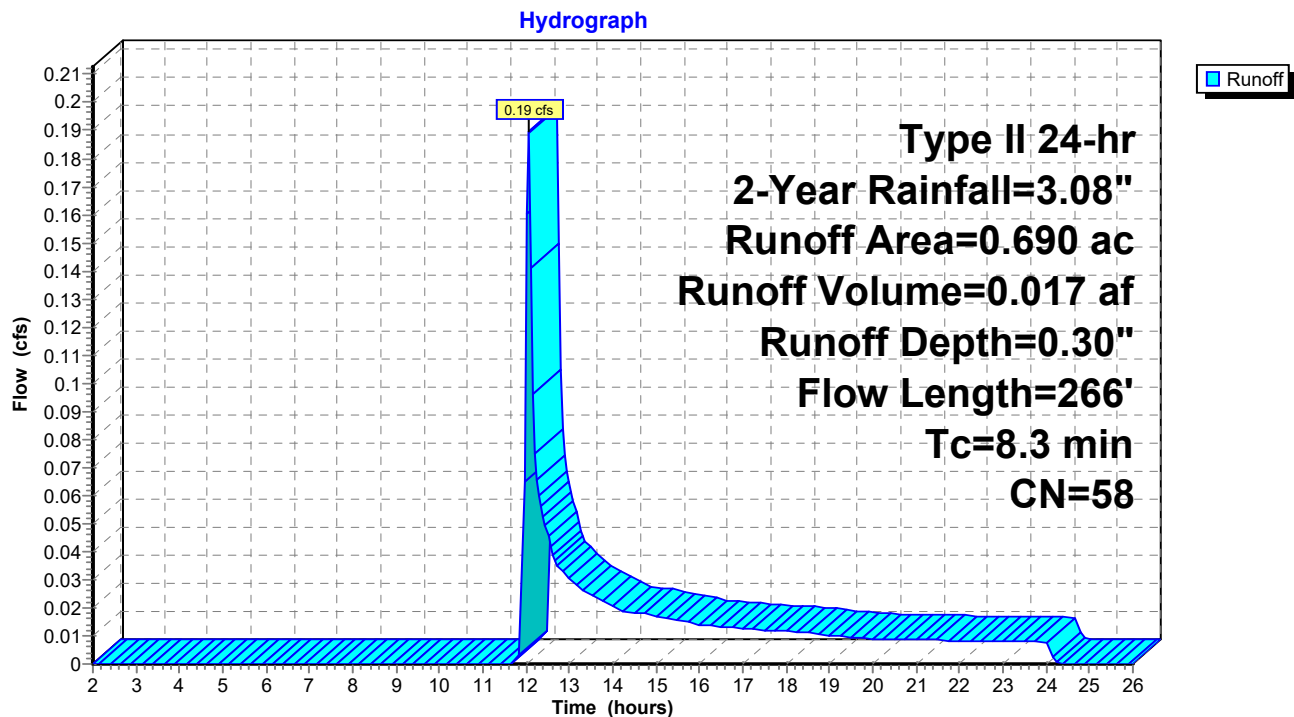
Runoff = 0.19 cfs @ 12.04 hrs, Volume= 0.017 af, Depth= 0.30"
Routed to Link 2L : Combined South Flow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-26.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-Year Rainfall=3.08"

Area (ac)	CN	Description
0.690	58	Meadow, non-grazed, HSG B
0.690		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	100	0.0470	0.23		Sheet Flow, Grass: Short n= 0.150 P2= 3.04"
1.2	166	0.1000	2.21		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
8.3	266	Total			

Subcatchment N-SE: Natural Southeast



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Type II 24-hr 2-Year Rainfall=3.08"

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Summary for Subcatchment N-W: Natural West

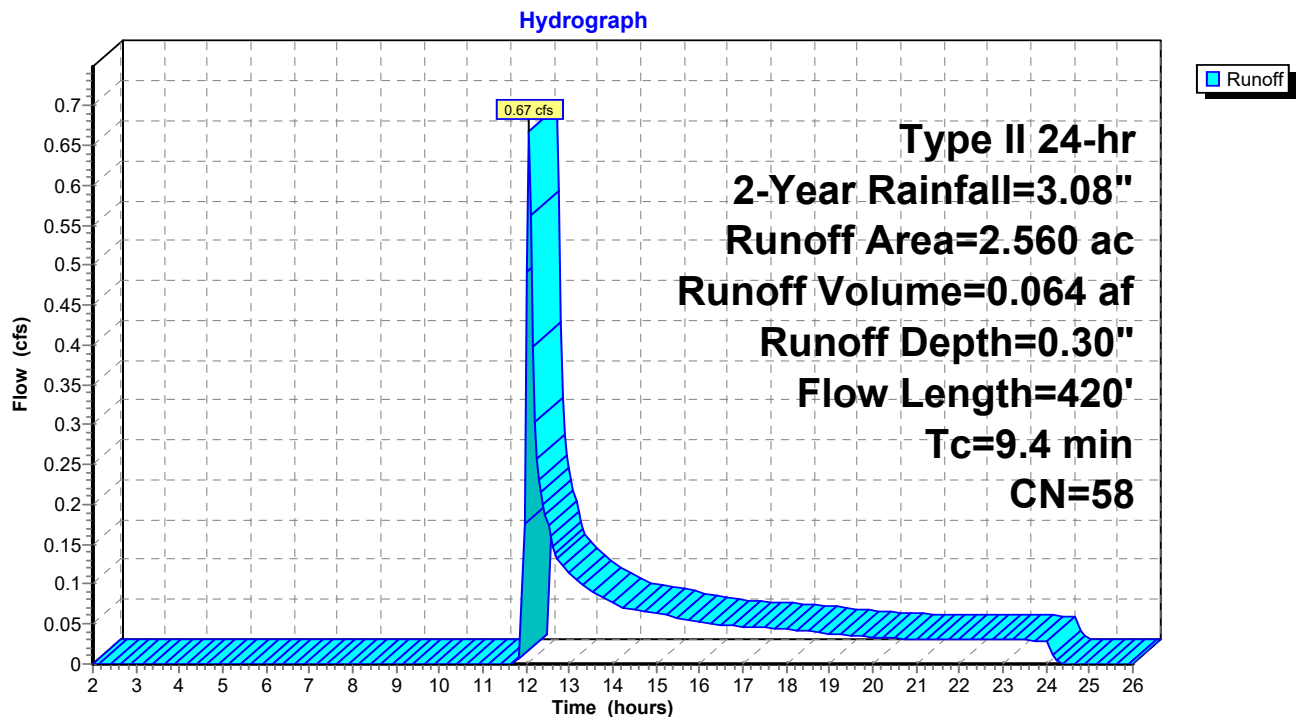
Runoff = 0.67 cfs @ 12.06 hrs, Volume= 0.064 af, Depth= 0.30"
Routed to Link 1L : Combined Outflow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-26.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-Year Rainfall=3.08"

Area (ac)	CN	Description
2.560	58	Meadow, non-grazed, HSG B
2.560		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	100	0.0650	0.27		Sheet Flow, SHEET (MEADOW) Grass: Short n= 0.150 P2= 3.04"
3.1	320	0.0600	1.71		Shallow Concentrated Flow, SHALLOW (MEADOW) Short Grass Pasture Kv= 7.0 fps
9.4	420	Total			

Subcatchment N-W: Natural West



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Type II 24-hr 2-Year Rainfall=3.08"

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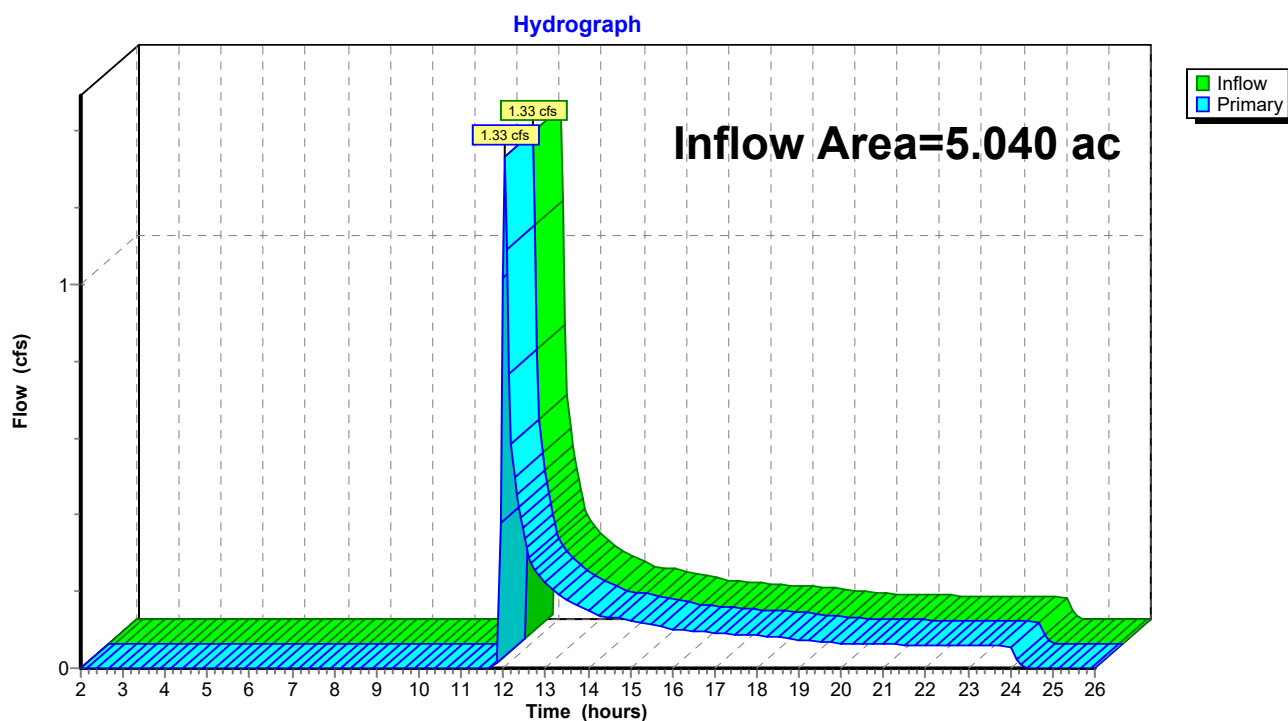
Page 19

Summary for Link 1L: Combined Outflow

Inflow Area = 5.040 ac, 0.00% Impervious, Inflow Depth = 0.30" for 2-Year event
Inflow = 1.33 cfs @ 12.05 hrs, Volume= 0.126 af
Primary = 1.33 cfs @ 12.05 hrs, Volume= 0.126 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-26.00 hrs, dt= 0.05 hrs

Link 1L: Combined Outflow



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Type II 24-hr 2-Year Rainfall=3.08"

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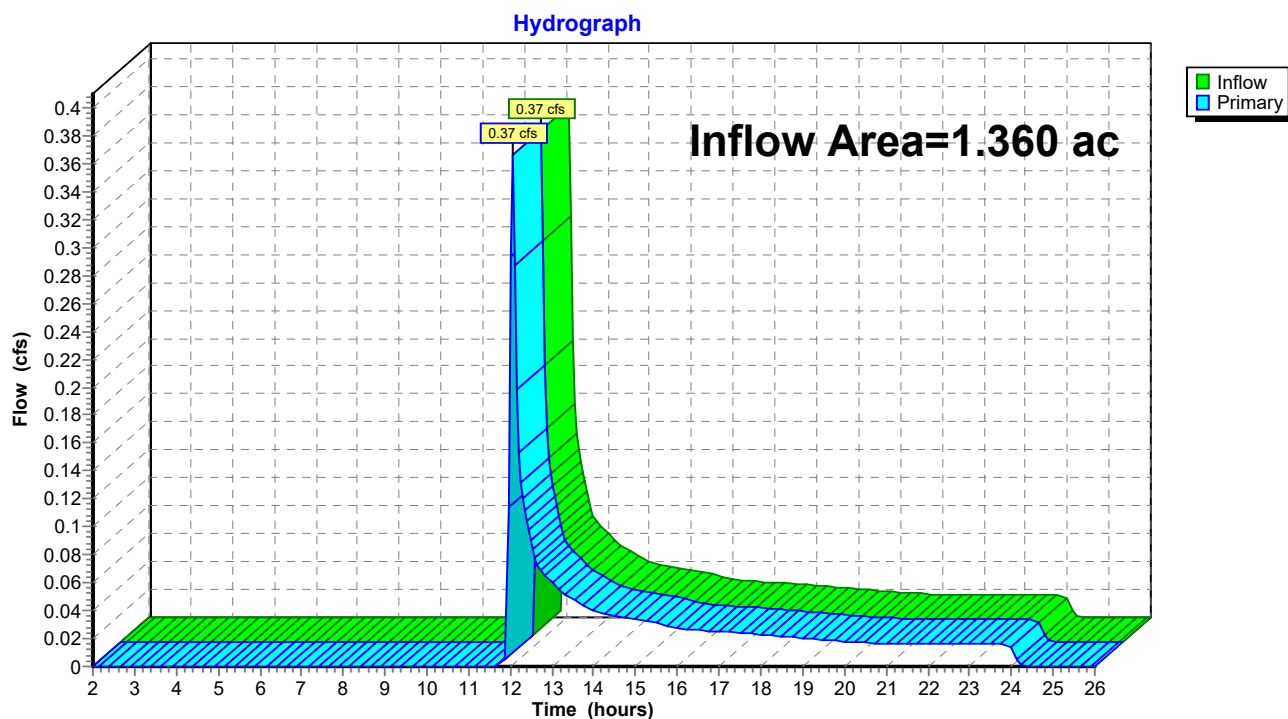
Page 20

Summary for Link 2L: Combined South Flow

Inflow Area = 1.360 ac, 0.00% Impervious, Inflow Depth = 0.30" for 2-Year event
Inflow = 0.37 cfs @ 12.05 hrs, Volume= 0.034 af
Primary = 0.37 cfs @ 12.05 hrs, Volume= 0.034 af, Atten= 0%, Lag= 0.0 min
Routed to Link 1L : Combined Outflow

Primary outflow = Inflow, Time Span= 2.00-26.00 hrs, dt= 0.05 hrs

Link 2L: Combined South Flow



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Type II 24-hr 5-Year Rainfall=3.81"

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Time span=2.00-26.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentN-N: Natural North

Runoff Area=1.120 ac 0.00% Impervious Runoff Depth=0.58"
Flow Length=209' Tc=9.0 min CN=58 Runoff=0.80 cfs 0.054 af

SubcatchmentN-S: Natural South

Runoff Area=0.670 ac 0.00% Impervious Runoff Depth=0.58"
Flow Length=337' Tc=9.2 min CN=58 Runoff=0.48 cfs 0.032 af

SubcatchmentN-SE: Natural Southeast

Runoff Area=0.690 ac 0.00% Impervious Runoff Depth=0.58"
Flow Length=266' Tc=8.3 min CN=58 Runoff=0.51 cfs 0.033 af

SubcatchmentN-W: Natural West

Runoff Area=2.560 ac 0.00% Impervious Runoff Depth=0.58"
Flow Length=420' Tc=9.4 min CN=58 Runoff=1.80 cfs 0.124 af

Link 1L: Combined Outflow

Inflow=3.58 cfs 0.244 af
Primary=3.58 cfs 0.244 af

Link 2L: Combined South Flow

Inflow=0.98 cfs 0.066 af
Primary=0.98 cfs 0.066 af

Total Runoff Area = 5.040 ac Runoff Volume = 0.244 af Average Runoff Depth = 0.58"
100.00% Pervious = 5.040 ac 0.00% Impervious = 0.000 ac

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Type II 24-hr 5-Year Rainfall=3.81"

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Summary for Subcatchment N-N: Natural North

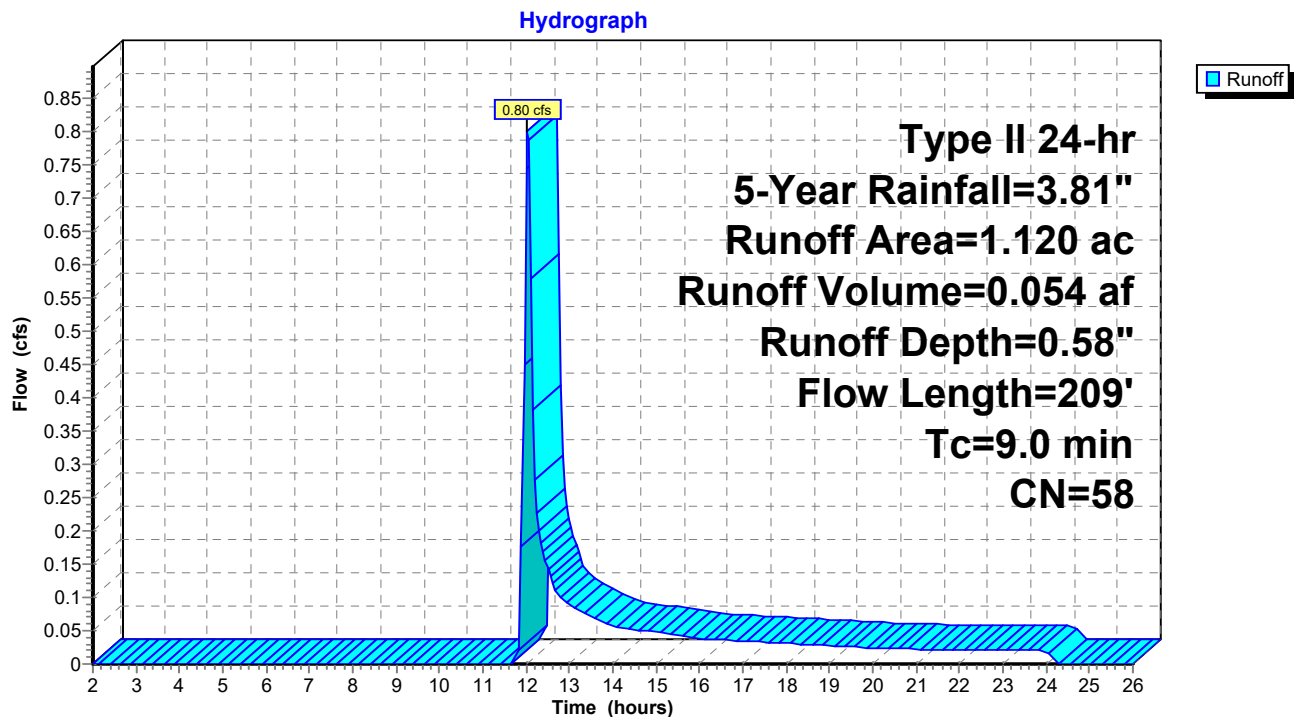
Runoff = 0.80 cfs @ 12.03 hrs, Volume= 0.054 af, Depth= 0.58"
Routed to Link 1L : Combined Outflow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-26.00 hrs, dt= 0.05 hrs
Type II 24-hr 5-Year Rainfall=3.81"

Area (ac)	CN	Description
1.120	58	Meadow, non-grazed, HSG B
1.120		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	100	0.0310	0.20		Sheet Flow, SHEET (MEADOW) Grass: Short n= 0.150 P2= 3.04"
0.6	109	0.2200	3.28		Shallow Concentrated Flow, SHALLOW (MEADOW) Short Grass Pasture Kv= 7.0 fps
9.0	209	Total			

Subcatchment N-N: Natural North



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Summary for Subcatchment N-S: Natural South

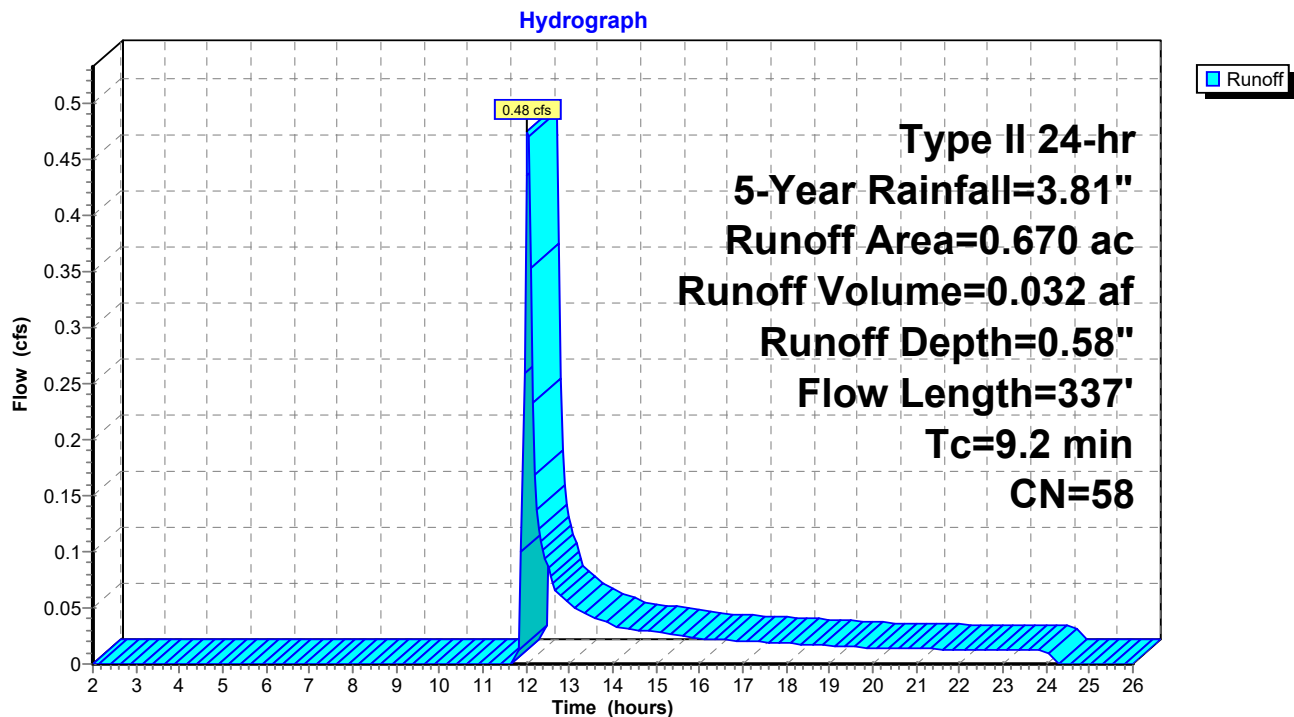
Runoff = 0.48 cfs @ 12.04 hrs, Volume= 0.032 af, Depth= 0.58"
Routed to Link 2L : Combined South Flow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-26.00 hrs, dt= 0.05 hrs
Type II 24-hr 5-Year Rainfall=3.81"

Area (ac)	CN	Description
0.670	58	Meadow, non-grazed, HSG B
0.670		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	100	0.0480	0.24		Sheet Flow, SHEET (MEADOW) Grass: Short n= 0.150 P2= 3.04"
2.1	237	0.0740	1.90		Shallow Concentrated Flow, SHALLOW (MEADOW) Short Grass Pasture Kv= 7.0 fps
9.2	337	Total			

Subcatchment N-S: Natural South



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Type II 24-hr 5-Year Rainfall=3.81"

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Summary for Subcatchment N-SE: Natural Southeast

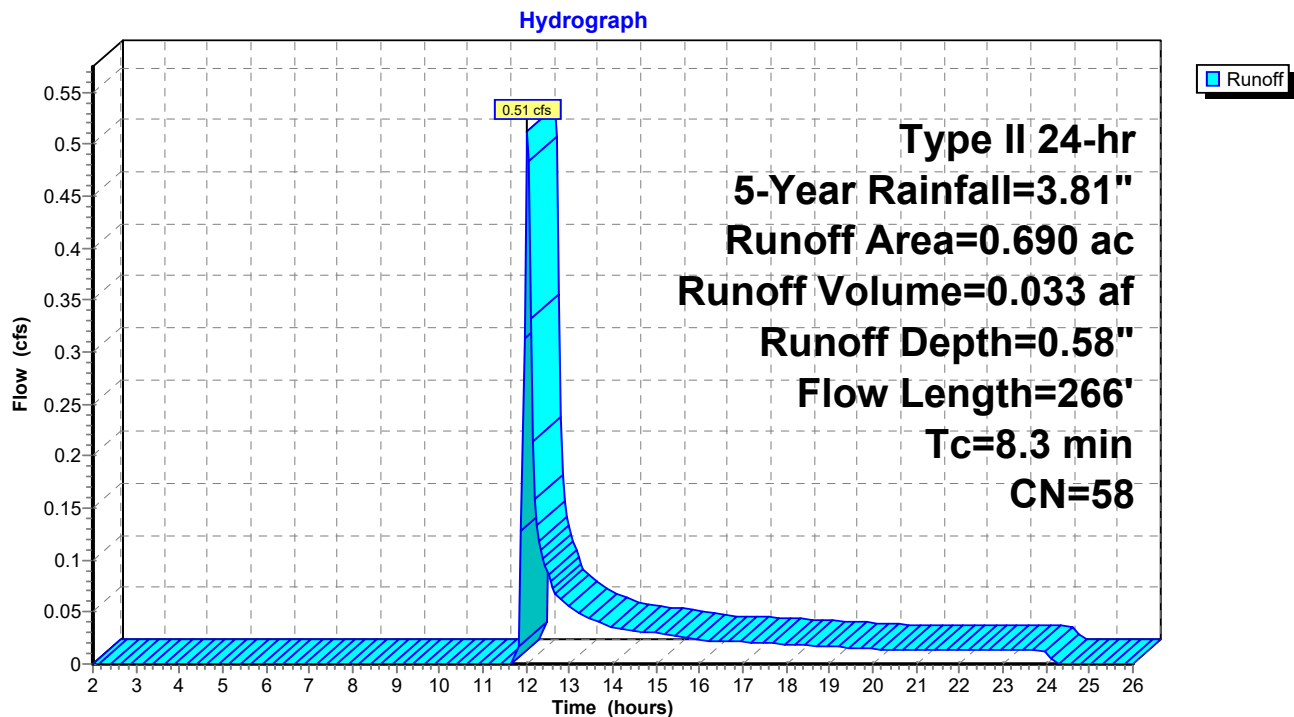
Runoff = 0.51 cfs @ 12.02 hrs, Volume= 0.033 af, Depth= 0.58"
Routed to Link 2L : Combined South Flow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-26.00 hrs, dt= 0.05 hrs
Type II 24-hr 5-Year Rainfall=3.81"

Area (ac)	CN	Description
0.690	58	Meadow, non-grazed, HSG B
0.690		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	100	0.0470	0.23		Sheet Flow, Grass: Short n= 0.150 P2= 3.04"
1.2	166	0.1000	2.21		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
8.3	266	Total			

Subcatchment N-SE: Natural Southeast



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Type II 24-hr 5-Year Rainfall=3.81"

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Summary for Subcatchment N-W: Natural West

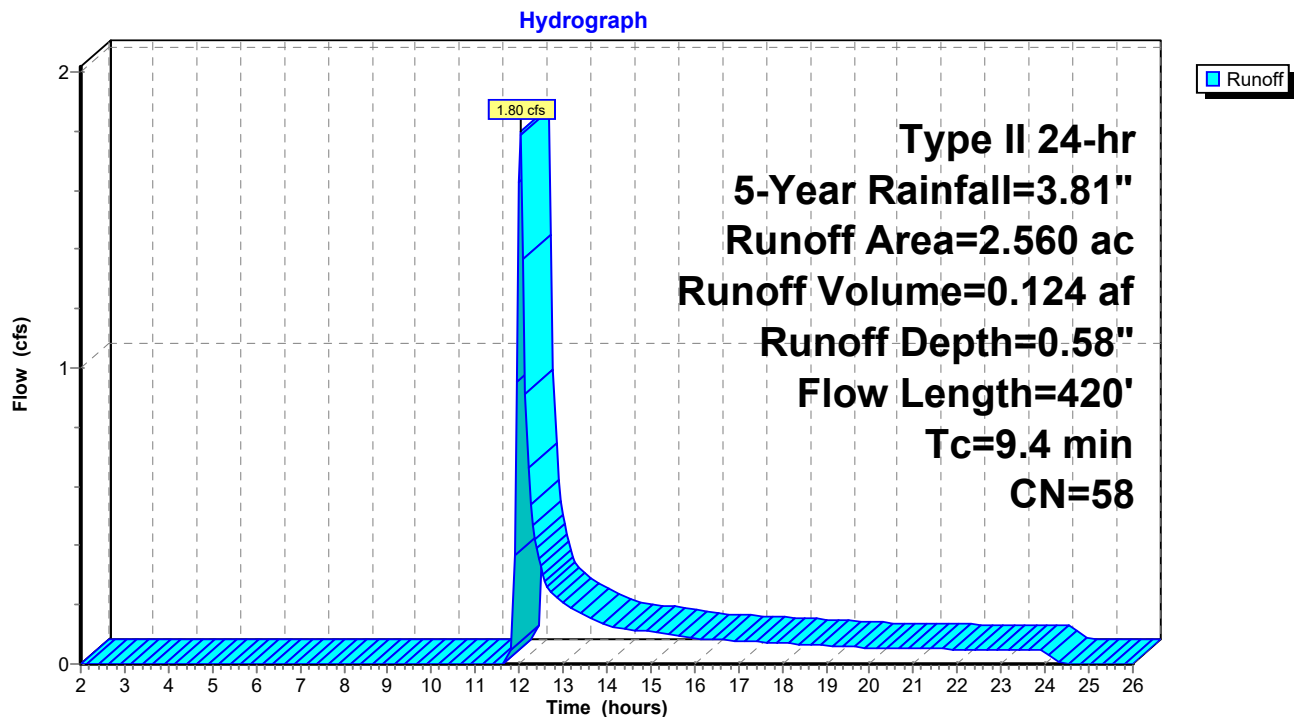
Runoff = 1.80 cfs @ 12.04 hrs, Volume= 0.124 af, Depth= 0.58"
Routed to Link 1L : Combined Outflow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-26.00 hrs, dt= 0.05 hrs
Type II 24-hr 5-Year Rainfall=3.81"

Area (ac)	CN	Description
2.560	58	Meadow, non-grazed, HSG B
2.560		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	100	0.0650	0.27		Sheet Flow, SHEET (MEADOW) Grass: Short n= 0.150 P2= 3.04"
3.1	320	0.0600	1.71		Shallow Concentrated Flow, SHALLOW (MEADOW) Short Grass Pasture Kv= 7.0 fps
9.4	420	Total			

Subcatchment N-W: Natural West



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Type II 24-hr 5-Year Rainfall=3.81"

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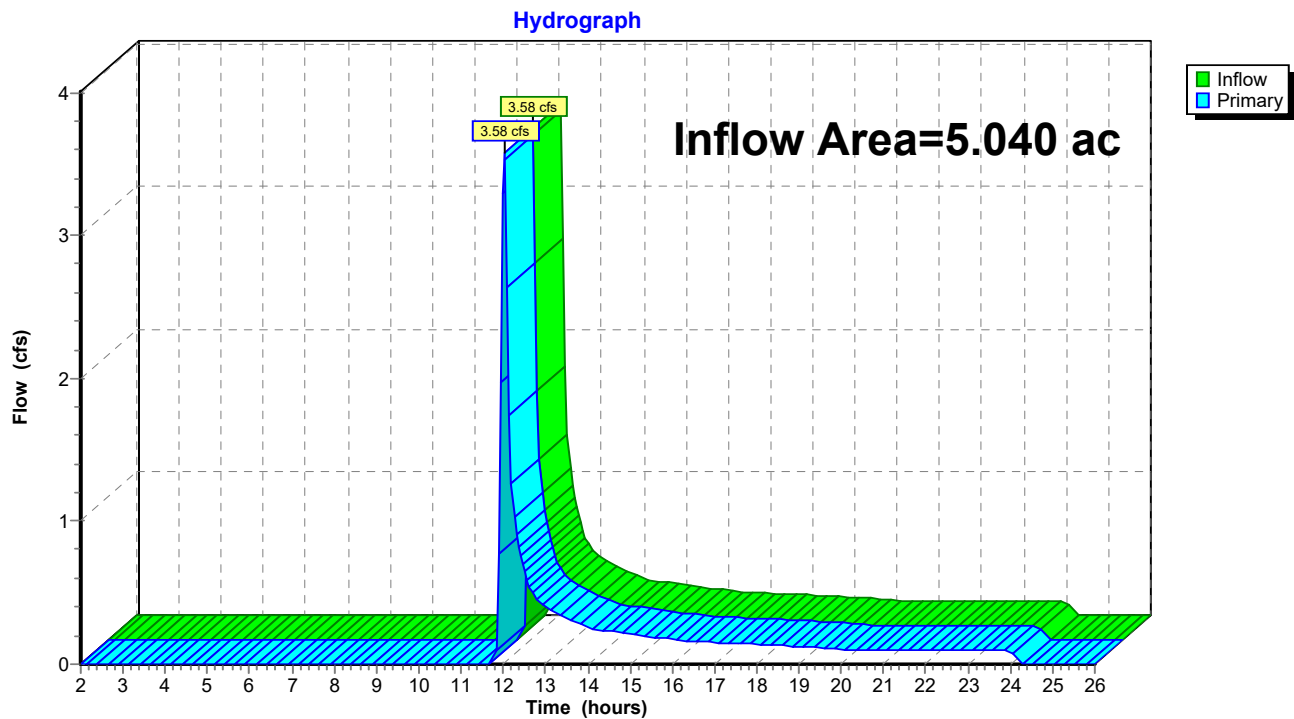
Page 26

Summary for Link 1L: Combined Outflow

Inflow Area = 5.040 ac, 0.00% Impervious, Inflow Depth = 0.58" for 5-Year event
Inflow = 3.58 cfs @ 12.04 hrs, Volume= 0.244 af
Primary = 3.58 cfs @ 12.04 hrs, Volume= 0.244 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-26.00 hrs, dt= 0.05 hrs

Link 1L: Combined Outflow



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Type II 24-hr 5-Year Rainfall=3.81"

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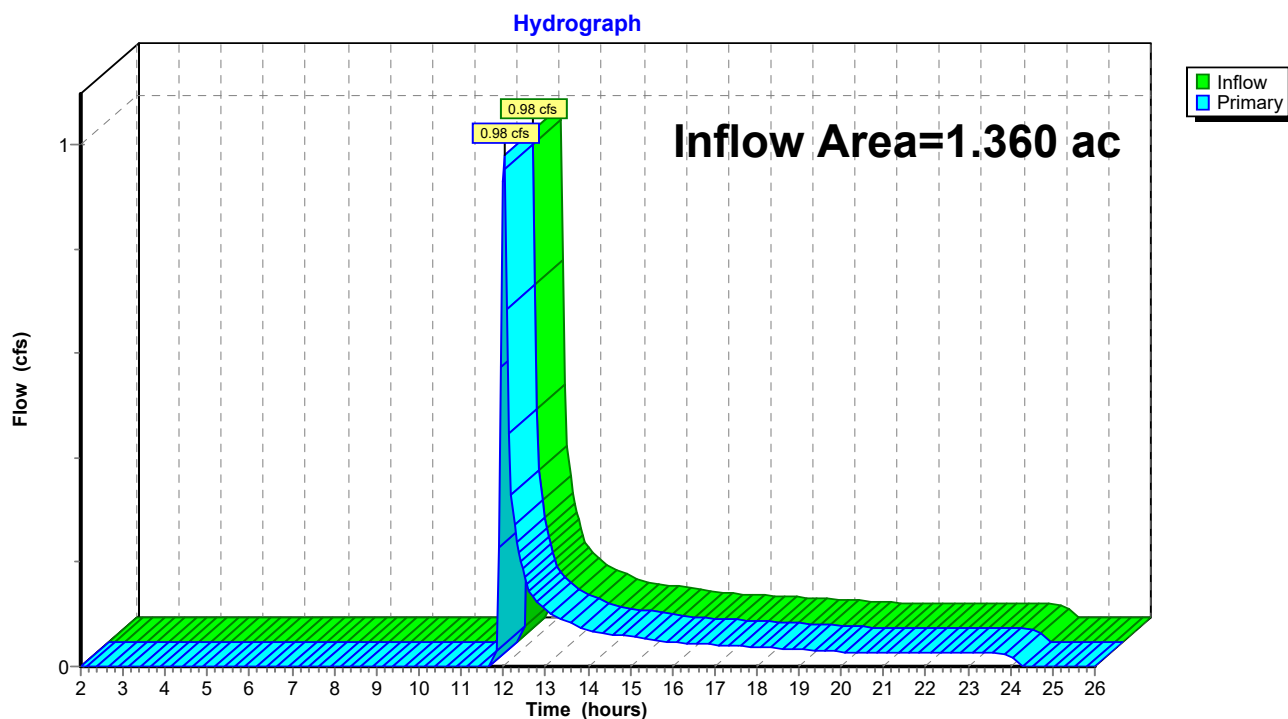
Page 27

Summary for Link 2L: Combined South Flow

Inflow Area = 1.360 ac, 0.00% Impervious, Inflow Depth = 0.58" for 5-Year event
Inflow = 0.98 cfs @ 12.03 hrs, Volume= 0.066 af
Primary = 0.98 cfs @ 12.03 hrs, Volume= 0.066 af, Atten= 0%, Lag= 0.0 min
Routed to Link 1L : Combined Outflow

Primary outflow = Inflow, Time Span= 2.00-26.00 hrs, dt= 0.05 hrs

Link 2L: Combined South Flow



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Type II 24-hr 10-Year Rainfall=4.46"

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Time span=2.00-26.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentN-N: Natural North

Runoff Area=1.120 ac 0.00% Impervious Runoff Depth=0.88"
Flow Length=209' Tc=9.0 min CN=58 Runoff=1.37 cfs 0.083 af

SubcatchmentN-S: Natural South

Runoff Area=0.670 ac 0.00% Impervious Runoff Depth=0.88"
Flow Length=337' Tc=9.2 min CN=58 Runoff=0.81 cfs 0.049 af

SubcatchmentN-SE: Natural Southeast

Runoff Area=0.690 ac 0.00% Impervious Runoff Depth=0.88"
Flow Length=266' Tc=8.3 min CN=58 Runoff=0.87 cfs 0.051 af

SubcatchmentN-W: Natural West

Runoff Area=2.560 ac 0.00% Impervious Runoff Depth=0.88"
Flow Length=420' Tc=9.4 min CN=58 Runoff=3.07 cfs 0.189 af

Link 1L: Combined Outflow

Inflow=6.09 cfs 0.372 af
Primary=6.09 cfs 0.372 af

Link 2L: Combined South Flow

Inflow=1.68 cfs 0.100 af
Primary=1.68 cfs 0.100 af

Total Runoff Area = 5.040 ac Runoff Volume = 0.372 af Average Runoff Depth = 0.88"
100.00% Pervious = 5.040 ac 0.00% Impervious = 0.000 ac

23-047 Natural Site Conditions

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Type II 24-hr 10-Year Rainfall=4.46"

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Summary for Subcatchment N-N: Natural North

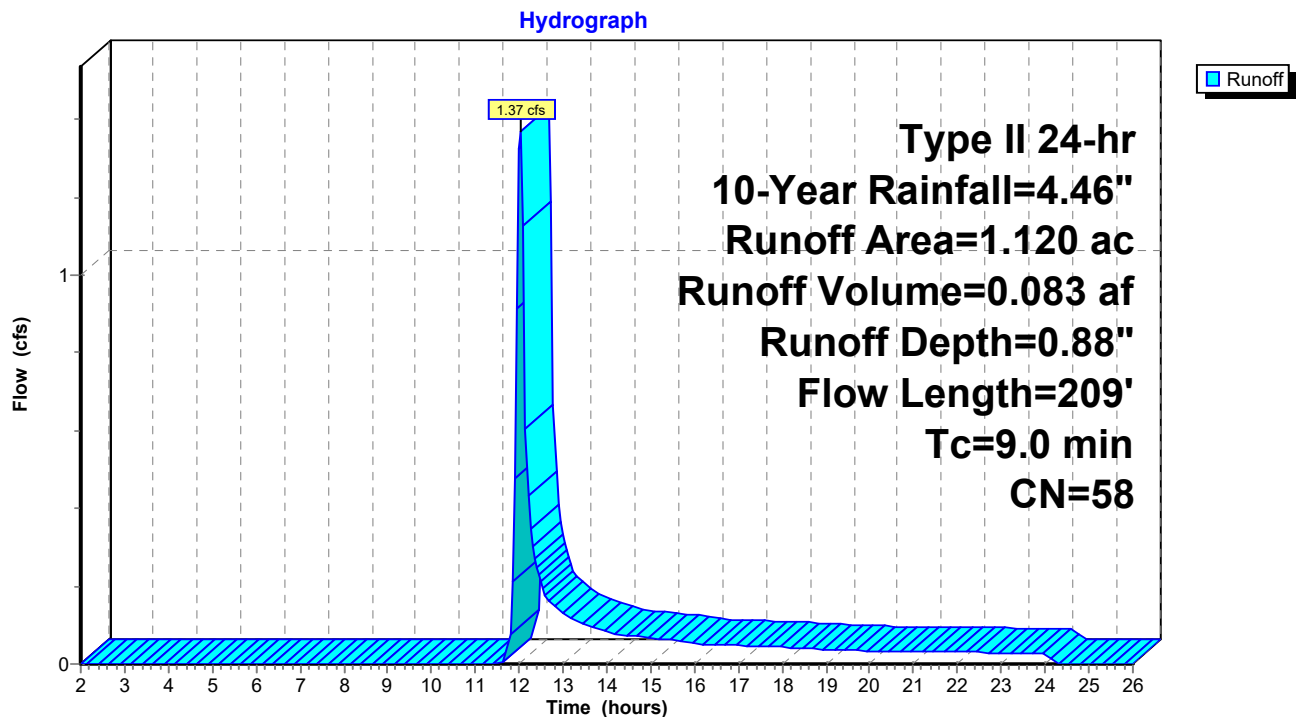
Runoff = 1.37 cfs @ 12.02 hrs, Volume= 0.083 af, Depth= 0.88"
Routed to Link 1L : Combined Outflow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-26.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-Year Rainfall=4.46"

Area (ac)	CN	Description
1.120	58	Meadow, non-grazed, HSG B
1.120		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	100	0.0310	0.20		Sheet Flow, SHEET (MEADOW) Grass: Short n= 0.150 P2= 3.04"
0.6	109	0.2200	3.28		Shallow Concentrated Flow, SHALLOW (MEADOW) Short Grass Pasture Kv= 7.0 fps
9.0	209	Total			

Subcatchment N-N: Natural North



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Type II 24-hr 10-Year Rainfall=4.46"

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Summary for Subcatchment N-S: Natural South

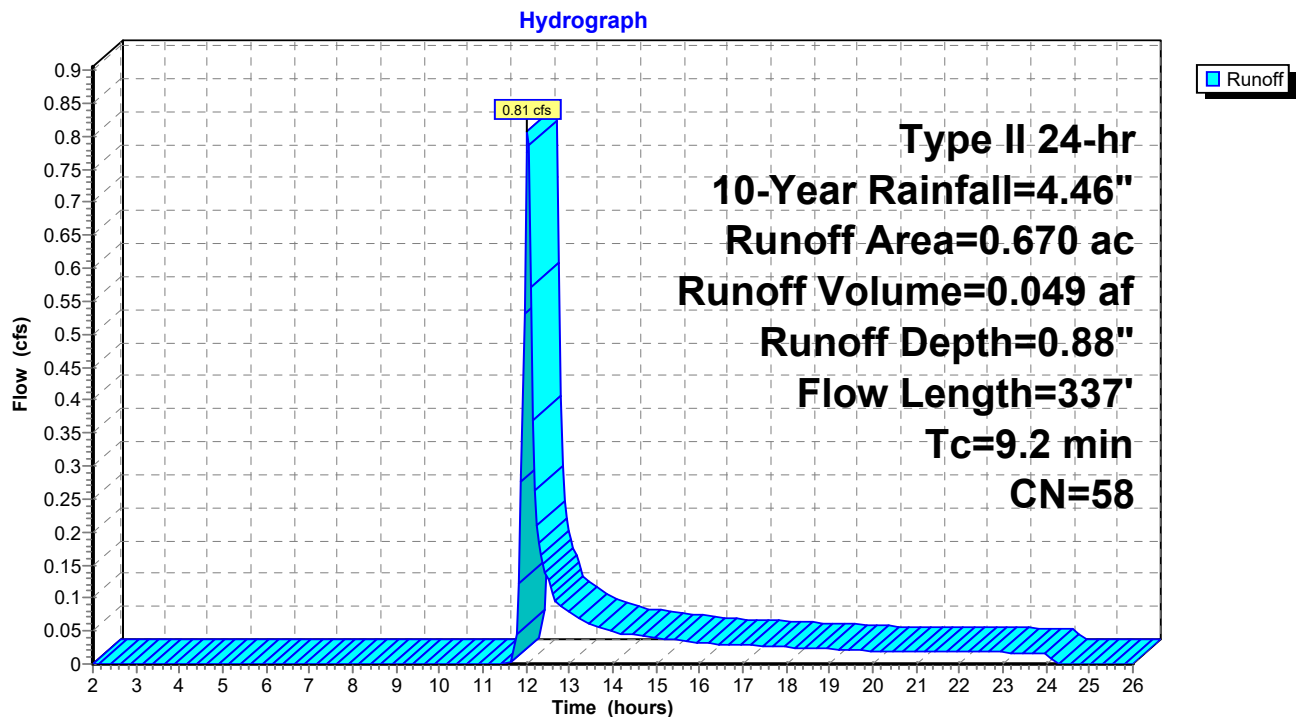
Runoff = 0.81 cfs @ 12.03 hrs, Volume= 0.049 af, Depth= 0.88"
Routed to Link 2L : Combined South Flow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-26.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-Year Rainfall=4.46"

Area (ac)	CN	Description
0.670	58	Meadow, non-grazed, HSG B
0.670		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	100	0.0480	0.24		Sheet Flow, SHEET (MEADOW) Grass: Short n= 0.150 P2= 3.04"
2.1	237	0.0740	1.90		Shallow Concentrated Flow, SHALLOW (MEADOW) Short Grass Pasture Kv= 7.0 fps
9.2	337	Total			

Subcatchment N-S: Natural South



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Type II 24-hr 10-Year Rainfall=4.46"

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Summary for Subcatchment N-SE: Natural Southeast

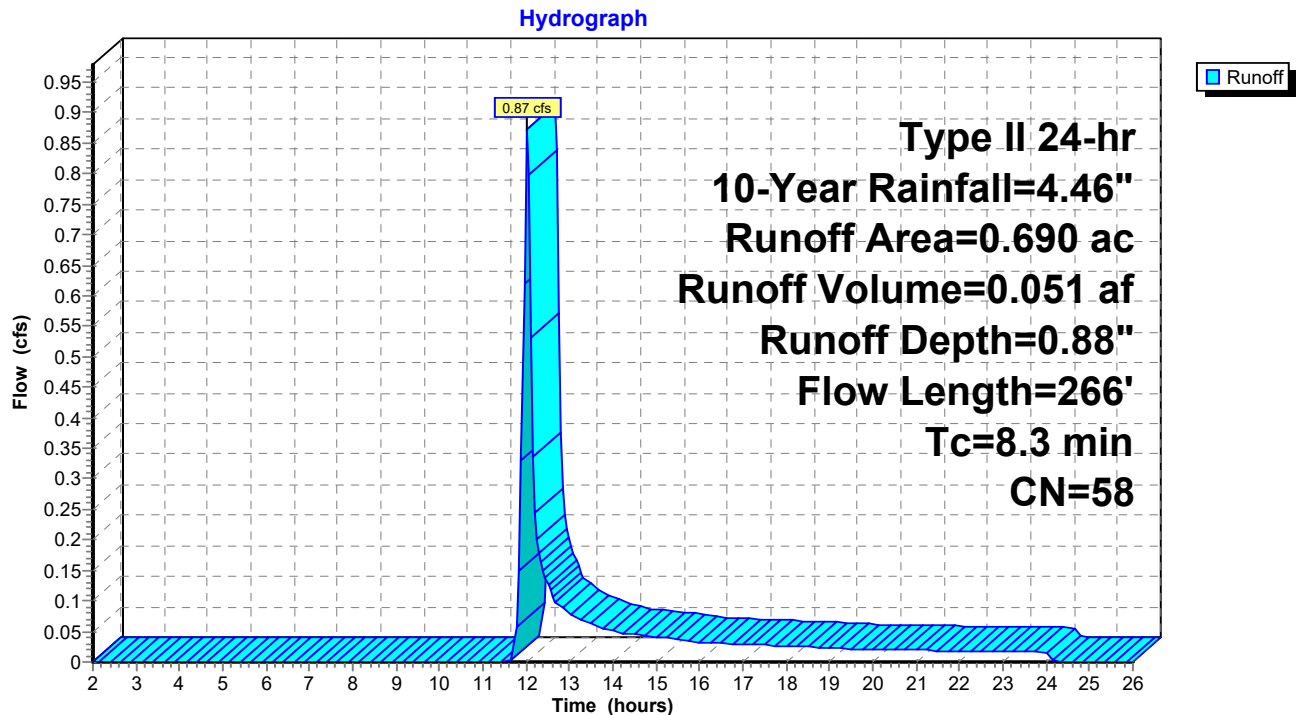
Runoff = 0.87 cfs @ 12.01 hrs, Volume= 0.051 af, Depth= 0.88"
Routed to Link 2L : Combined South Flow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-26.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-Year Rainfall=4.46"

Area (ac)	CN	Description
0.690	58	Meadow, non-grazed, HSG B
0.690		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	100	0.0470	0.23		Sheet Flow, Grass: Short n= 0.150 P2= 3.04"
1.2	166	0.1000	2.21		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
8.3	266	Total			

Subcatchment N-SE: Natural Southeast



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Type II 24-hr 10-Year Rainfall=4.46"

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Summary for Subcatchment N-W: Natural West

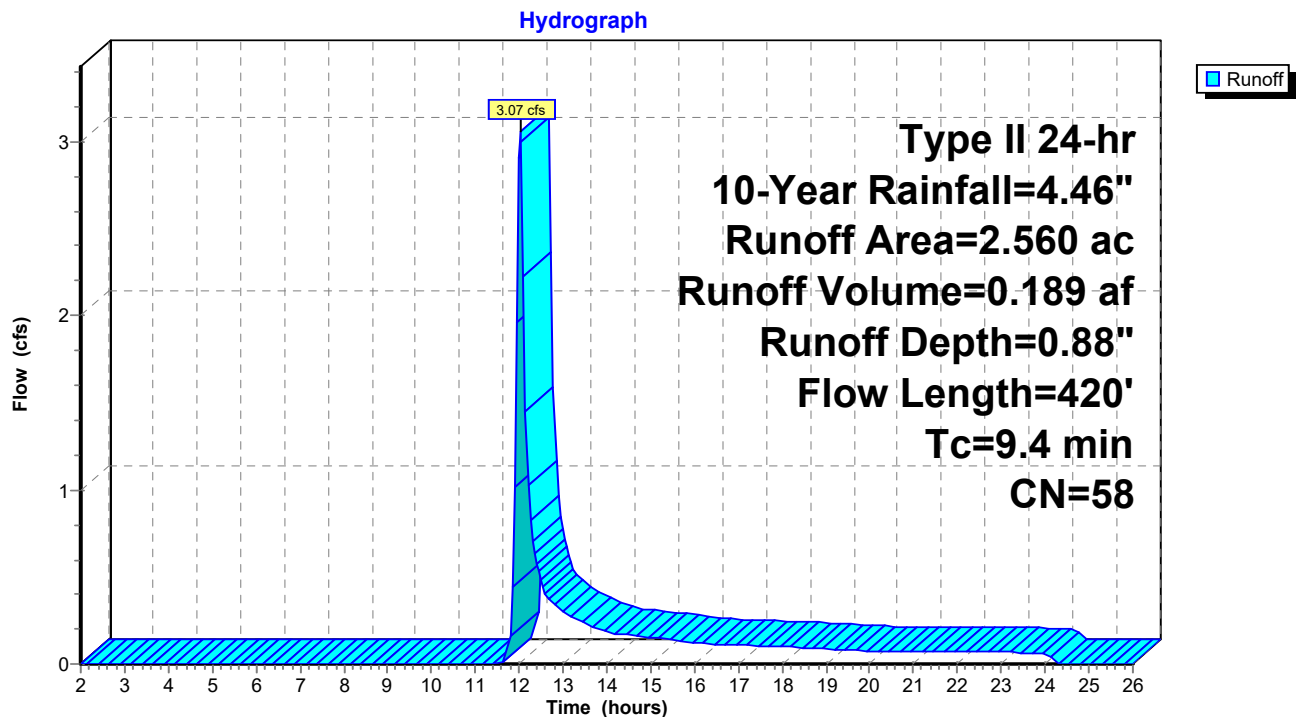
Runoff = 3.07 cfs @ 12.03 hrs, Volume= 0.189 af, Depth= 0.88"
Routed to Link 1L : Combined Outflow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-26.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-Year Rainfall=4.46"

Area (ac)	CN	Description
2.560	58	Meadow, non-grazed, HSG B
2.560		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	100	0.0650	0.27		Sheet Flow, SHEET (MEADOW) Grass: Short n= 0.150 P2= 3.04"
3.1	320	0.0600	1.71		Shallow Concentrated Flow, SHALLOW (MEADOW) Short Grass Pasture Kv= 7.0 fps
9.4	420	Total			

Subcatchment N-W: Natural West



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Type II 24-hr 10-Year Rainfall=4.46"

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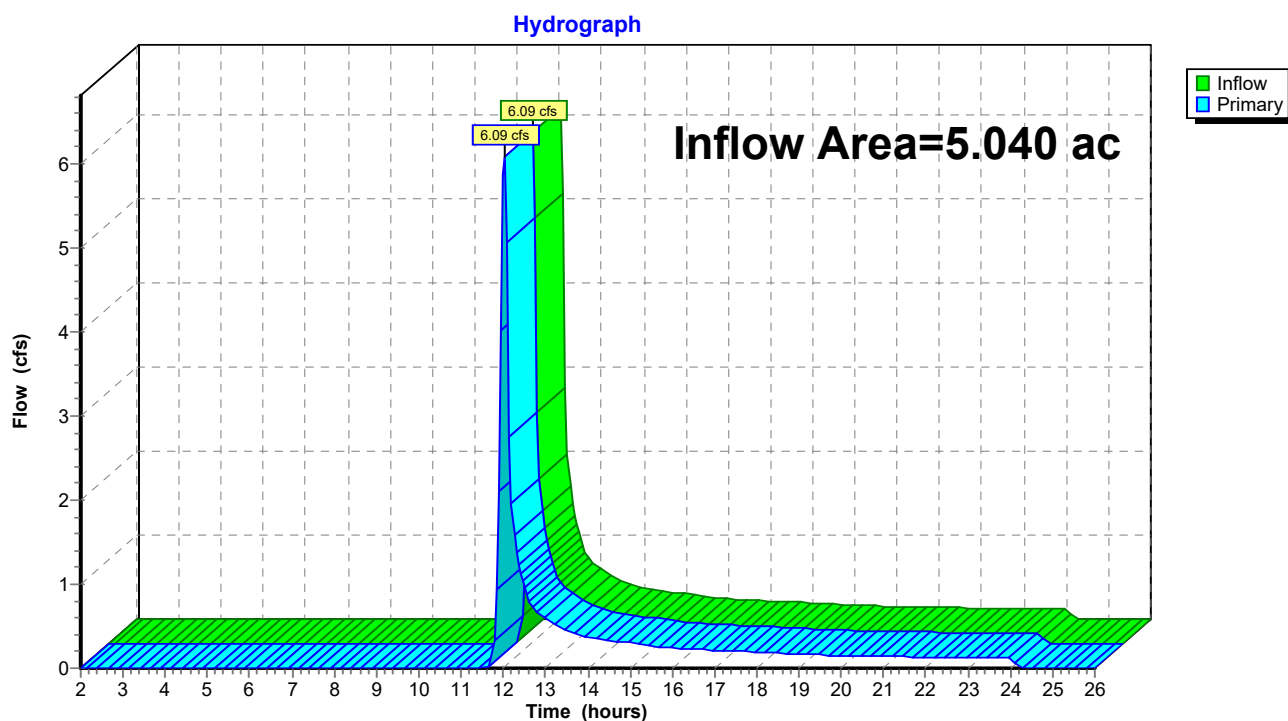
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Summary for Link 1L: Combined Outflow

Inflow Area = 5.040 ac, 0.00% Impervious, Inflow Depth = 0.88" for 10-Year event
Inflow = 6.09 cfs @ 12.03 hrs, Volume= 0.372 af
Primary = 6.09 cfs @ 12.03 hrs, Volume= 0.372 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-26.00 hrs, dt= 0.05 hrs

Link 1L: Combined Outflow



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Type II 24-hr 10-Year Rainfall=4.46"

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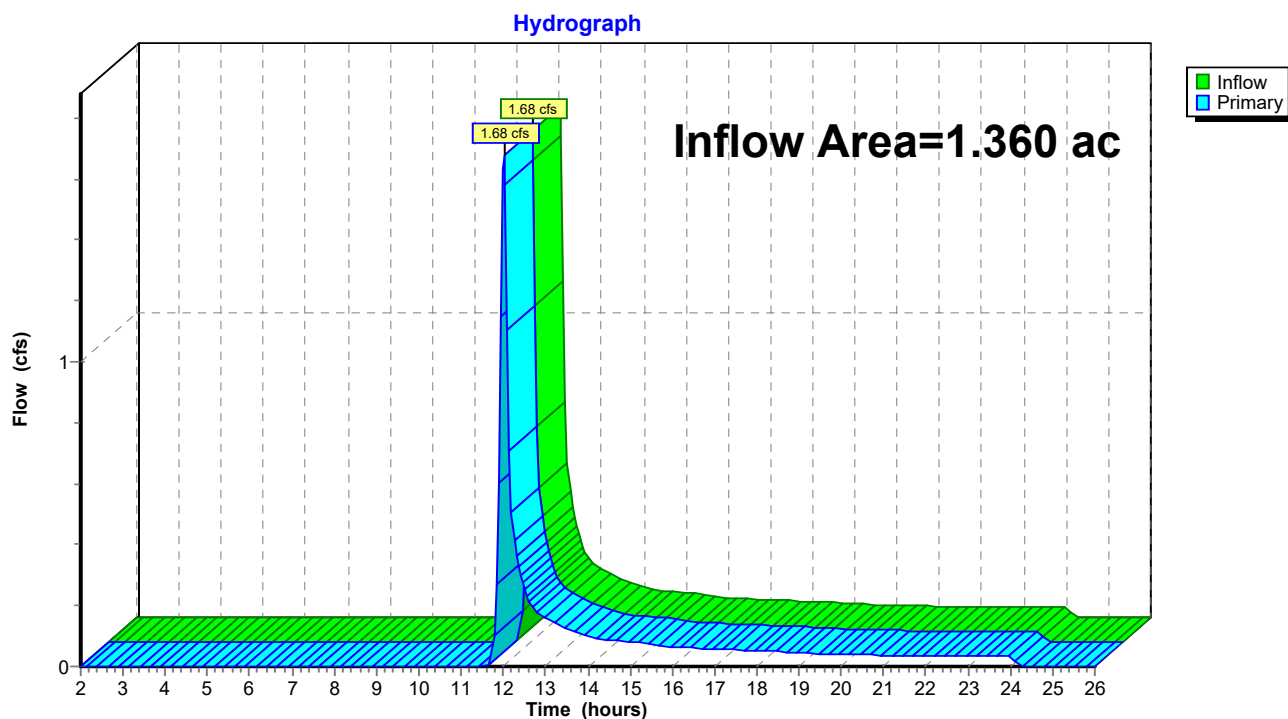
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Summary for Link 2L: Combined South Flow

Inflow Area = 1.360 ac, 0.00% Impervious, Inflow Depth = 0.88" for 10-Year event
Inflow = 1.68 cfs @ 12.02 hrs, Volume= 0.100 af
Primary = 1.68 cfs @ 12.02 hrs, Volume= 0.100 af, Atten= 0%, Lag= 0.0 min
Routed to Link 1L : Combined Outflow

Primary outflow = Inflow, Time Span= 2.00-26.00 hrs, dt= 0.05 hrs

Link 2L: Combined South Flow



23-047 Natural Site Conditions

Type II 24-hr 25-Year Rainfall=5.44"

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Time span=2.00-26.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentN-N: Natural North

Runoff Area=1.120 ac 0.00% Impervious Runoff Depth=1.42"
Flow Length=209' Tc=9.0 min CN=58 Runoff=2.36 cfs 0.132 af

SubcatchmentN-S: Natural South

Runoff Area=0.670 ac 0.00% Impervious Runoff Depth=1.42"
Flow Length=337' Tc=9.2 min CN=58 Runoff=1.40 cfs 0.079 af

SubcatchmentN-SE: Natural Southeast

Runoff Area=0.690 ac 0.00% Impervious Runoff Depth=1.42"
Flow Length=266' Tc=8.3 min CN=58 Runoff=1.50 cfs 0.082 af

SubcatchmentN-W: Natural West

Runoff Area=2.560 ac 0.00% Impervious Runoff Depth=1.42"
Flow Length=420' Tc=9.4 min CN=58 Runoff=5.30 cfs 0.303 af

Link 1L: Combined Outflow

Inflow=10.56 cfs 0.596 af
Primary=10.56 cfs 0.596 af

Link 2L: Combined South Flow

Inflow=2.90 cfs 0.161 af
Primary=2.90 cfs 0.161 af

Total Runoff Area = 5.040 ac Runoff Volume = 0.596 af Average Runoff Depth = 1.42"
100.00% Pervious = 5.040 ac 0.00% Impervious = 0.000 ac

23-047 Natural Site Conditions

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Type II 24-hr 25-Year Rainfall=5.44"

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Summary for Subcatchment N-N: Natural North

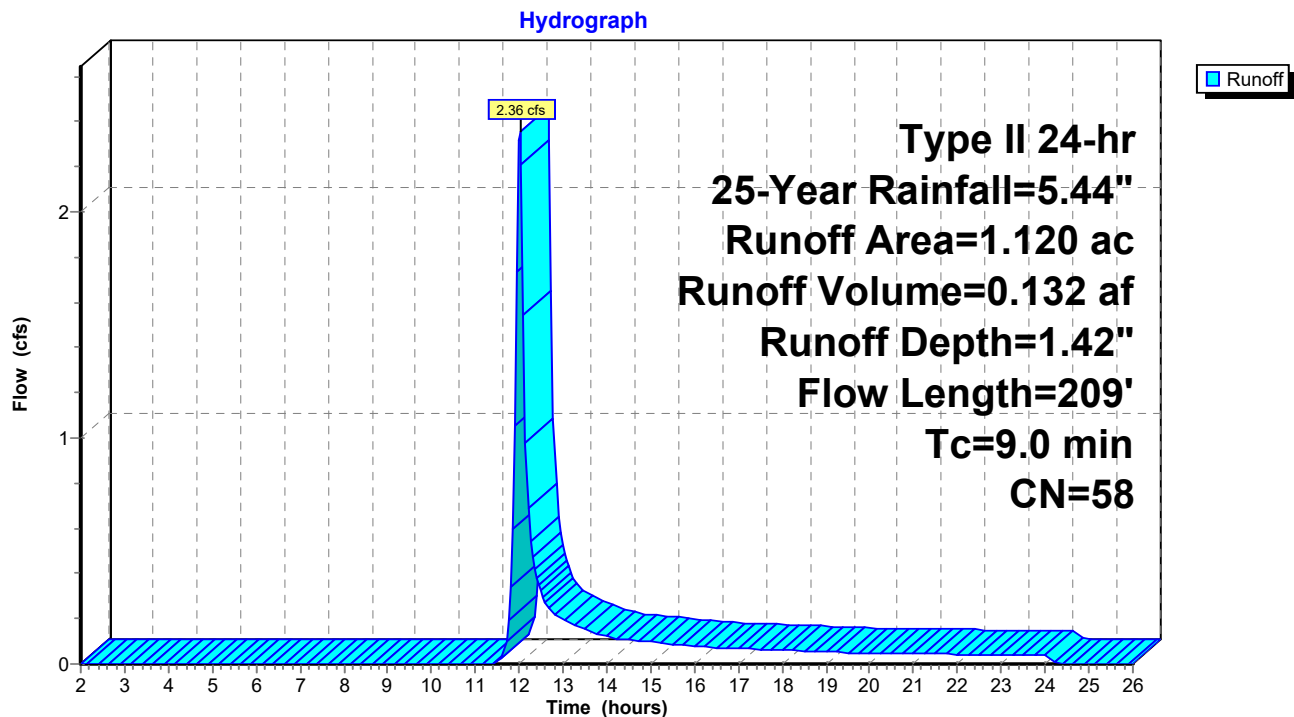
Runoff = 2.36 cfs @ 12.02 hrs, Volume= 0.132 af, Depth= 1.42"
Routed to Link 1L : Combined Outflow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-26.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-Year Rainfall=5.44"

Area (ac)	CN	Description
1.120	58	Meadow, non-grazed, HSG B
1.120		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	100	0.0310	0.20		Sheet Flow, SHEET (MEADOW) Grass: Short n= 0.150 P2= 3.04"
0.6	109	0.2200	3.28		Shallow Concentrated Flow, SHALLOW (MEADOW) Short Grass Pasture Kv= 7.0 fps
9.0	209	Total			

Subcatchment N-N: Natural North



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Type II 24-hr 25-Year Rainfall=5.44"

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Summary for Subcatchment N-S: Natural South

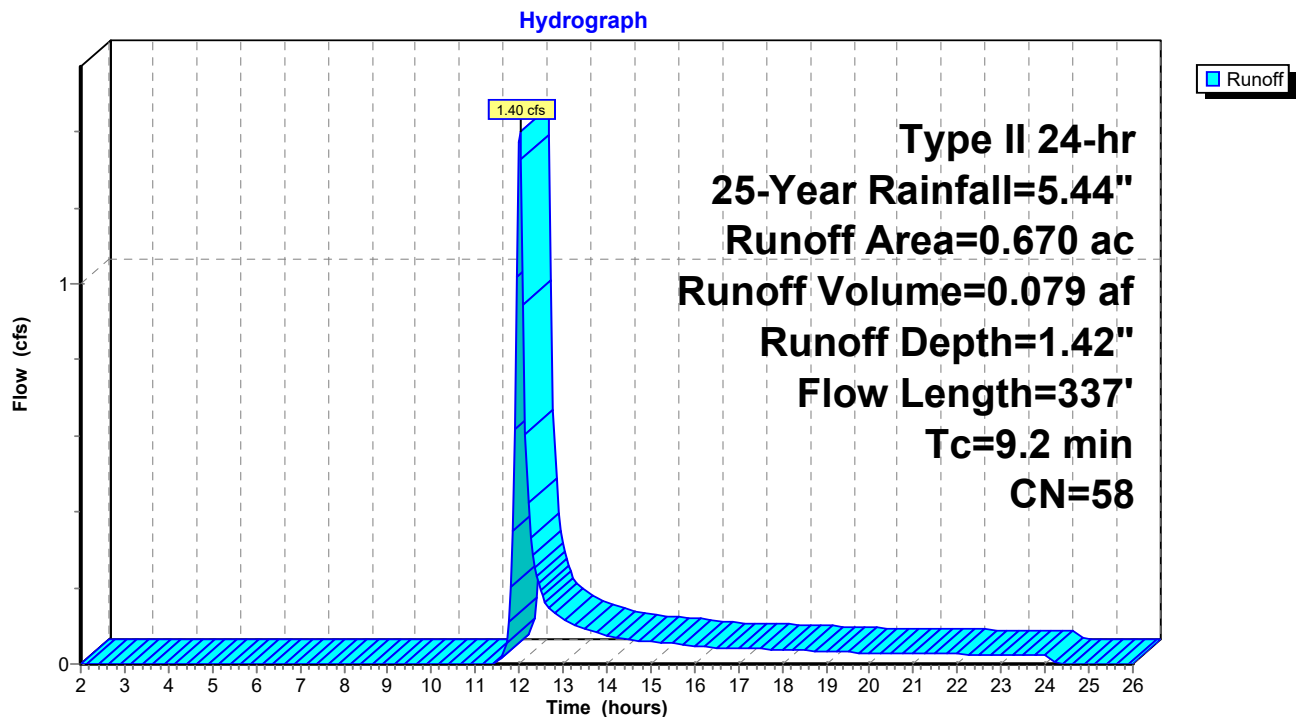
Runoff = 1.40 cfs @ 12.02 hrs, Volume= 0.079 af, Depth= 1.42"
Routed to Link 2L : Combined South Flow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-26.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-Year Rainfall=5.44"

Area (ac)	CN	Description
0.670	58	Meadow, non-grazed, HSG B
0.670		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	100	0.0480	0.24		Sheet Flow, SHEET (MEADOW) Grass: Short n= 0.150 P2= 3.04"
2.1	237	0.0740	1.90		Shallow Concentrated Flow, SHALLOW (MEADOW) Short Grass Pasture Kv= 7.0 fps
9.2	337	Total			

Subcatchment N-S: Natural South



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Type II 24-hr 25-Year Rainfall=5.44"

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Summary for Subcatchment N-SE: Natural Southeast

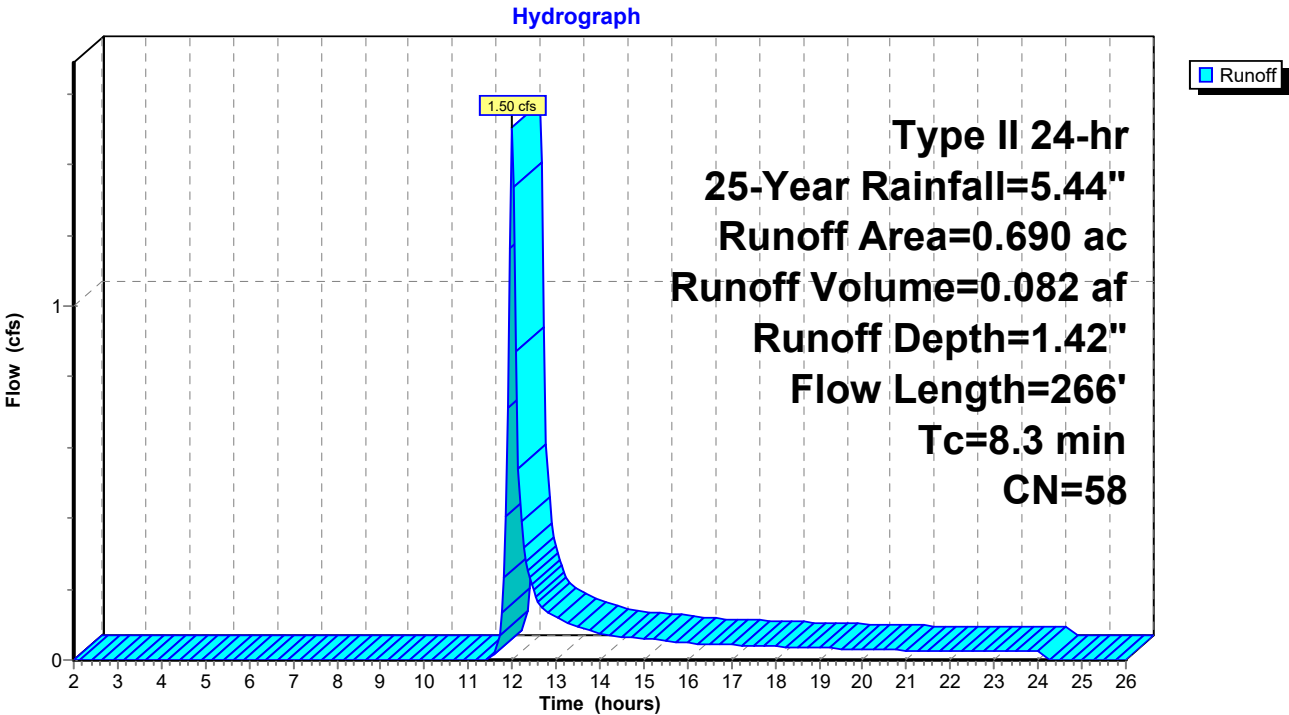
Runoff = 1.50 cfs @ 12.01 hrs, Volume= 0.082 af, Depth= 1.42"
Routed to Link 2L : Combined South Flow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-26.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-Year Rainfall=5.44"

Area (ac)	CN	Description
0.690	58	Meadow, non-grazed, HSG B
0.690		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	100	0.0470	0.23		Sheet Flow, Grass: Short n= 0.150 P2= 3.04"
1.2	166	0.1000	2.21		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
8.3	266	Total			

Subcatchment N-SE: Natural Southeast



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Type II 24-hr 25-Year Rainfall=5.44"

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Summary for Subcatchment N-W: Natural West

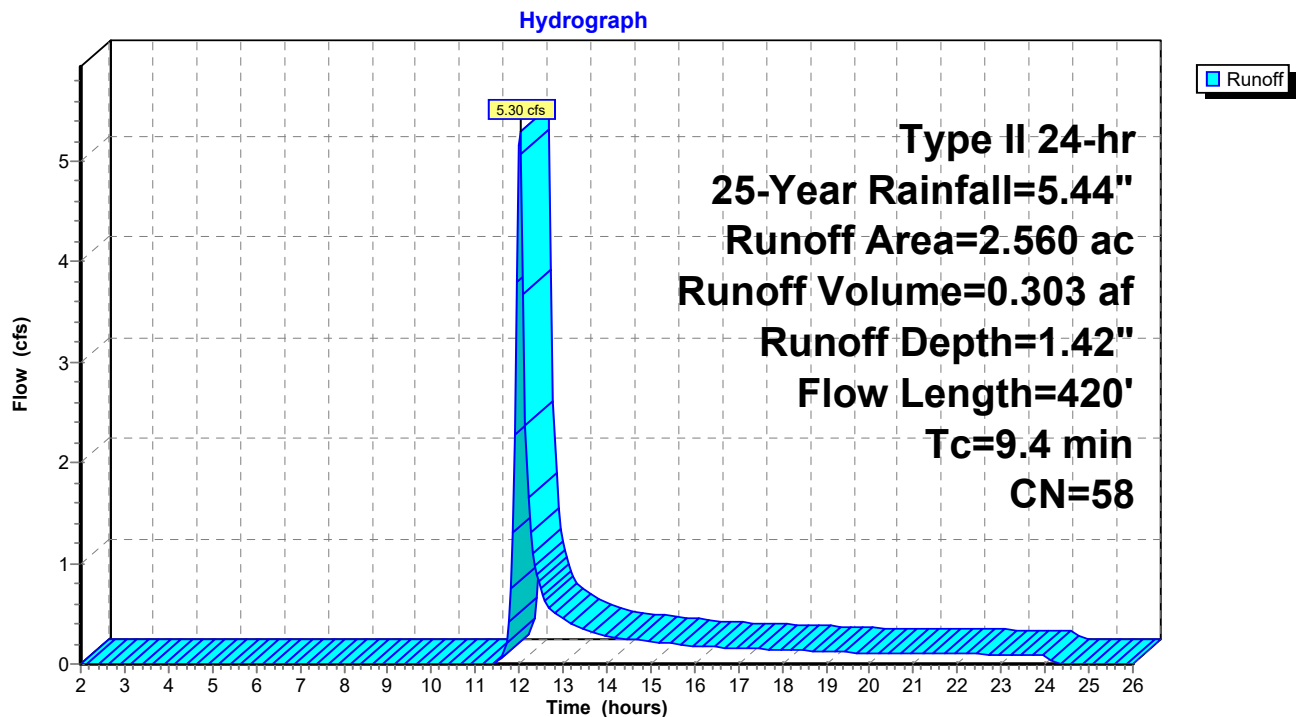
Runoff = 5.30 cfs @ 12.02 hrs, Volume= 0.303 af, Depth= 1.42"
Routed to Link 1L : Combined Outflow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-26.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-Year Rainfall=5.44"

Area (ac)	CN	Description
2.560	58	Meadow, non-grazed, HSG B
2.560		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	100	0.0650	0.27		Sheet Flow, SHEET (MEADOW) Grass: Short n= 0.150 P2= 3.04"
3.1	320	0.0600	1.71		Shallow Concentrated Flow, SHALLOW (MEADOW) Short Grass Pasture Kv= 7.0 fps
9.4	420	Total			

Subcatchment N-W: Natural West



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Type II 24-hr 25-Year Rainfall=5.44"

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Summary for Link 1L: Combined Outflow

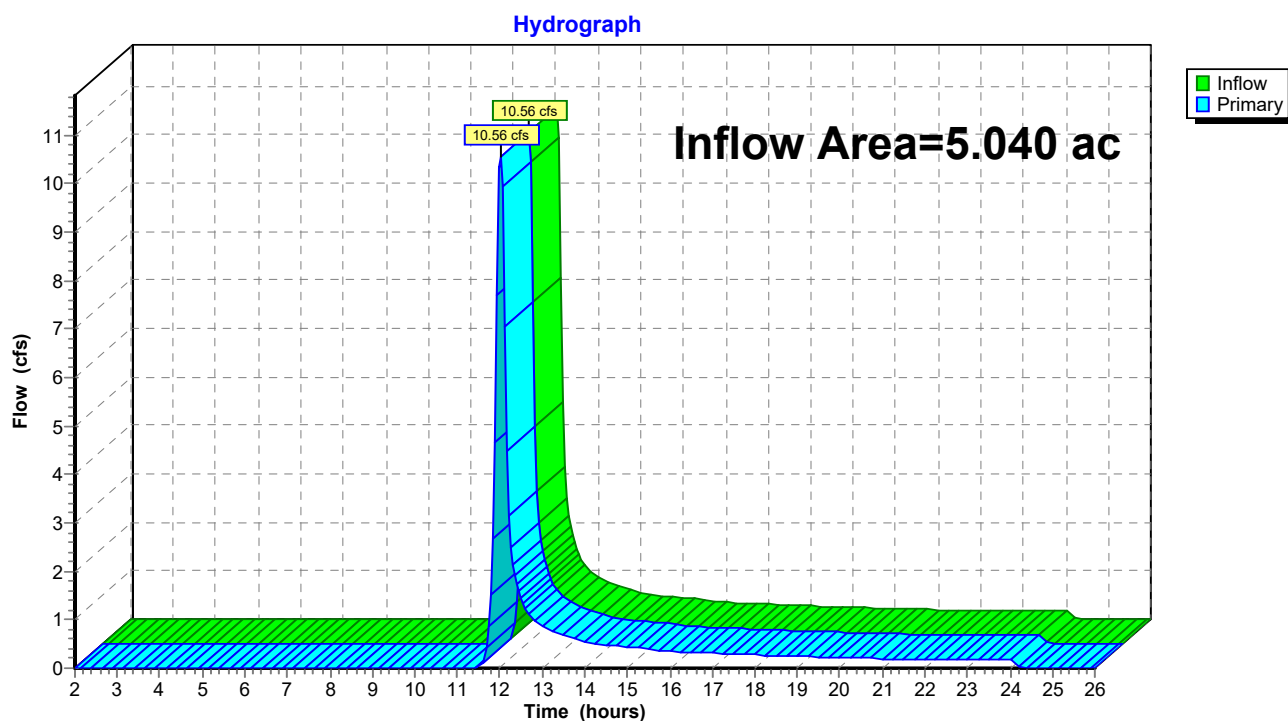
Inflow Area = 5.040 ac, 0.00% Impervious, Inflow Depth = 1.42" for 25-Year event

Inflow = 10.56 cfs @ 12.02 hrs, Volume= 0.596 af

Primary = 10.56 cfs @ 12.02 hrs, Volume= 0.596 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-26.00 hrs, dt= 0.05 hrs

Link 1L: Combined Outflow



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Type II 24-hr 25-Year Rainfall=5.44"

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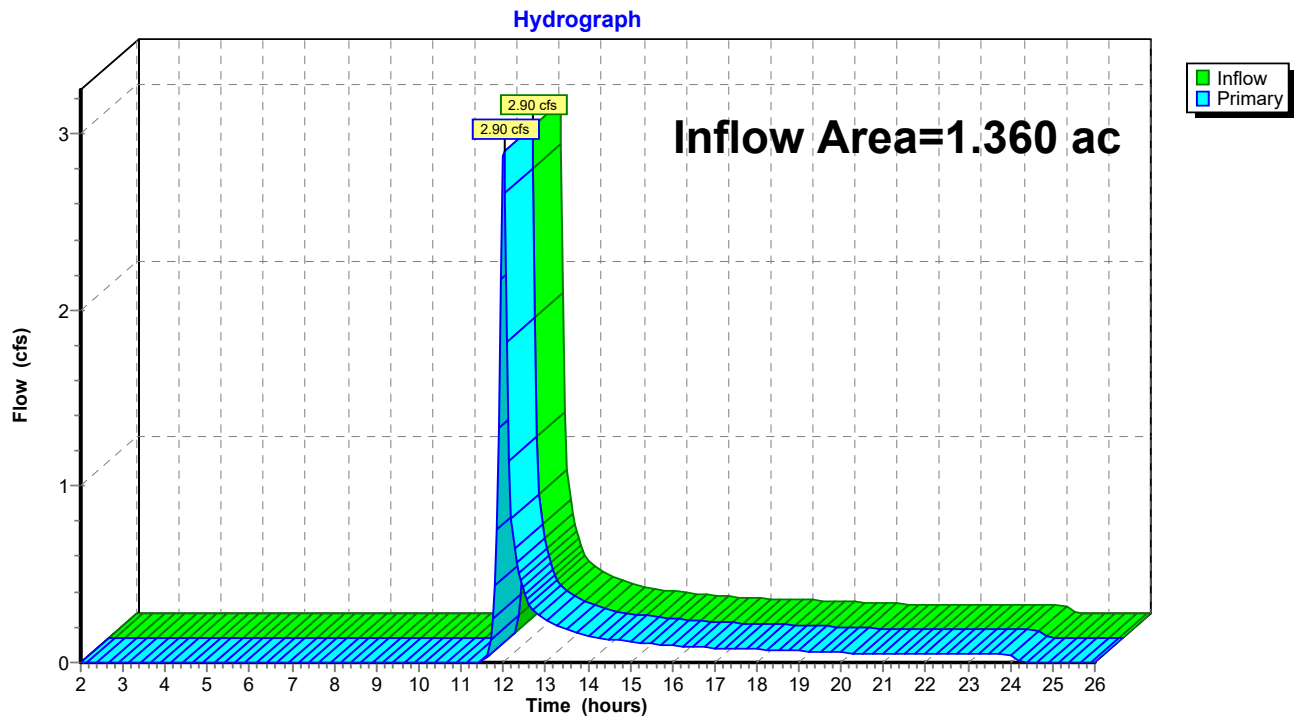
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Summary for Link 2L: Combined South Flow

Inflow Area = 1.360 ac, 0.00% Impervious, Inflow Depth = 1.42" for 25-Year event
Inflow = 2.90 cfs @ 12.01 hrs, Volume= 0.161 af
Primary = 2.90 cfs @ 12.01 hrs, Volume= 0.161 af, Atten= 0%, Lag= 0.0 min
Routed to Link 1L : Combined Outflow

Primary outflow = Inflow, Time Span= 2.00-26.00 hrs, dt= 0.05 hrs

Link 2L: Combined South Flow



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Type II 24-hr 50-Year Rainfall=6.26"

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Time span=2.00-26.00 hrs, dt=0.05 hrs, 481 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentN-N: Natural North

Runoff Area=1.120 ac 0.00% Impervious Runoff Depth=1.92"
Flow Length=209' Tc=9.0 min CN=58 Runoff=3.29 cfs 0.179 af

SubcatchmentN-S: Natural South

Runoff Area=0.670 ac 0.00% Impervious Runoff Depth=1.92"
Flow Length=337' Tc=9.2 min CN=58 Runoff=1.95 cfs 0.107 af

SubcatchmentN-SE: Natural Southeast

Runoff Area=0.690 ac 0.00% Impervious Runoff Depth=1.92"
Flow Length=266' Tc=8.3 min CN=58 Runoff=2.09 cfs 0.110 af

SubcatchmentN-W: Natural West

Runoff Area=2.560 ac 0.00% Impervious Runoff Depth=1.92"
Flow Length=420' Tc=9.4 min CN=58 Runoff=7.39 cfs 0.410 af

Link 1L: Combined Outflow

Inflow=14.70 cfs 0.807 af
Primary=14.70 cfs 0.807 af

Link 2L: Combined South Flow

Inflow=4.04 cfs 0.218 af
Primary=4.04 cfs 0.218 af

Total Runoff Area = 5.040 ac Runoff Volume = 0.807 af Average Runoff Depth = 1.92"
100.00% Pervious = 5.040 ac 0.00% Impervious = 0.000 ac

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Type II 24-hr 50-Year Rainfall=6.26"

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Summary for Subcatchment N-N: Natural North

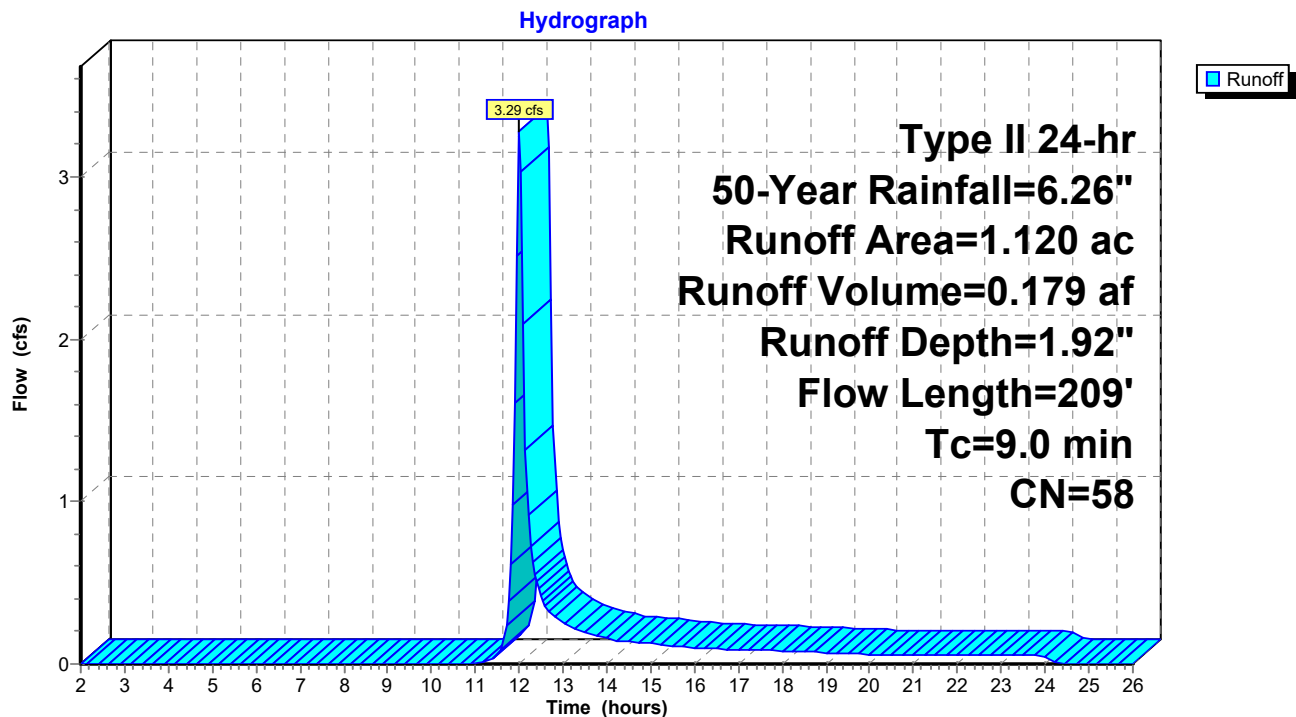
Runoff = 3.29 cfs @ 12.01 hrs, Volume= 0.179 af, Depth= 1.92"
Routed to Link 1L : Combined Outflow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-26.00 hrs, dt= 0.05 hrs
Type II 24-hr 50-Year Rainfall=6.26"

Area (ac)	CN	Description
1.120	58	Meadow, non-grazed, HSG B
1.120		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	100	0.0310	0.20		Sheet Flow, SHEET (MEADOW) Grass: Short n= 0.150 P2= 3.04"
0.6	109	0.2200	3.28		Shallow Concentrated Flow, SHALLOW (MEADOW) Short Grass Pasture Kv= 7.0 fps
9.0	209	Total			

Subcatchment N-N: Natural North



23-047 Natural Site Conditions

Prepared by Clappsaddle-Garber Associates

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Type II 24-hr 50-Year Rainfall=6.26"

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Summary for Subcatchment N-S: Natural South

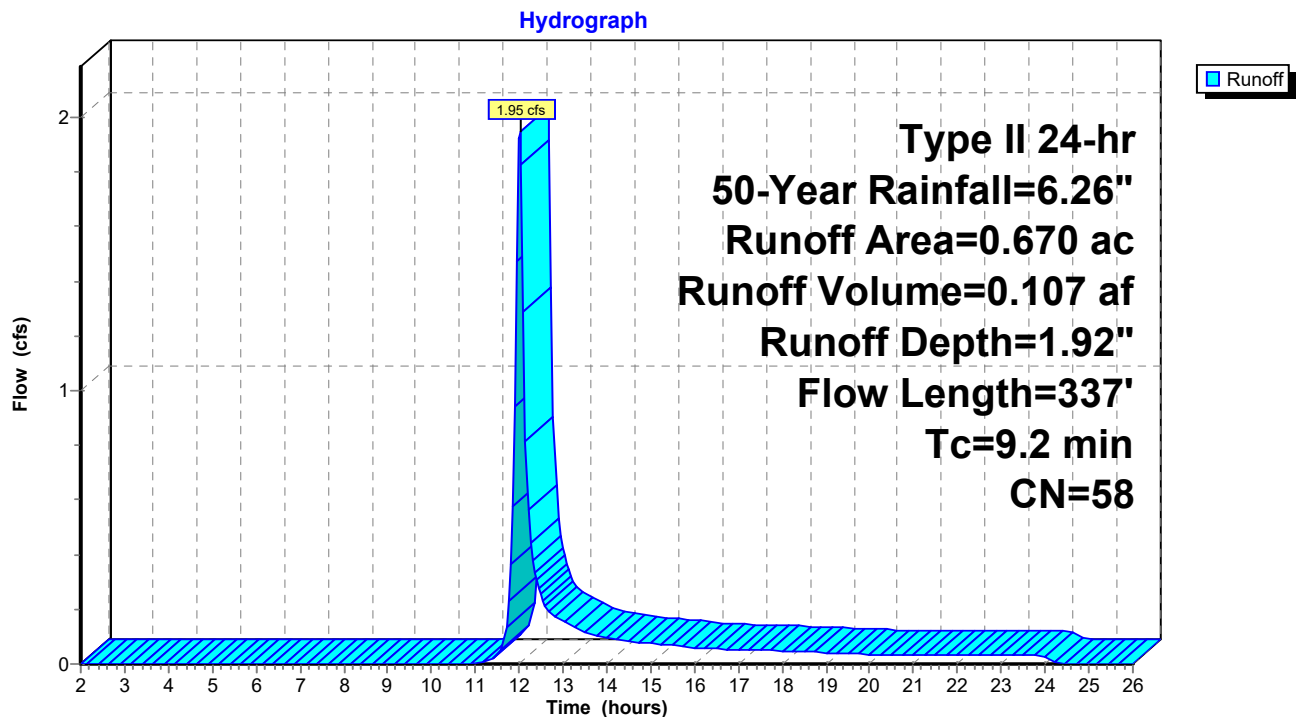
Runoff = 1.95 cfs @ 12.02 hrs, Volume= 0.107 af, Depth= 1.92"
Routed to Link 2L : Combined South Flow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-26.00 hrs, dt= 0.05 hrs
Type II 24-hr 50-Year Rainfall=6.26"

Area (ac)	CN	Description
0.670	58	Meadow, non-grazed, HSG B
0.670		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	100	0.0480	0.24		Sheet Flow, SHEET (MEADOW) Grass: Short n= 0.150 P2= 3.04"
2.1	237	0.0740	1.90		Shallow Concentrated Flow, SHALLOW (MEADOW) Short Grass Pasture Kv= 7.0 fps
9.2	337	Total			

Subcatchment N-S: Natural South



23-047 Natural Site Conditions

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Type II 24-hr 50-Year Rainfall=6.26"

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Summary for Subcatchment N-SE: Natural Southeast

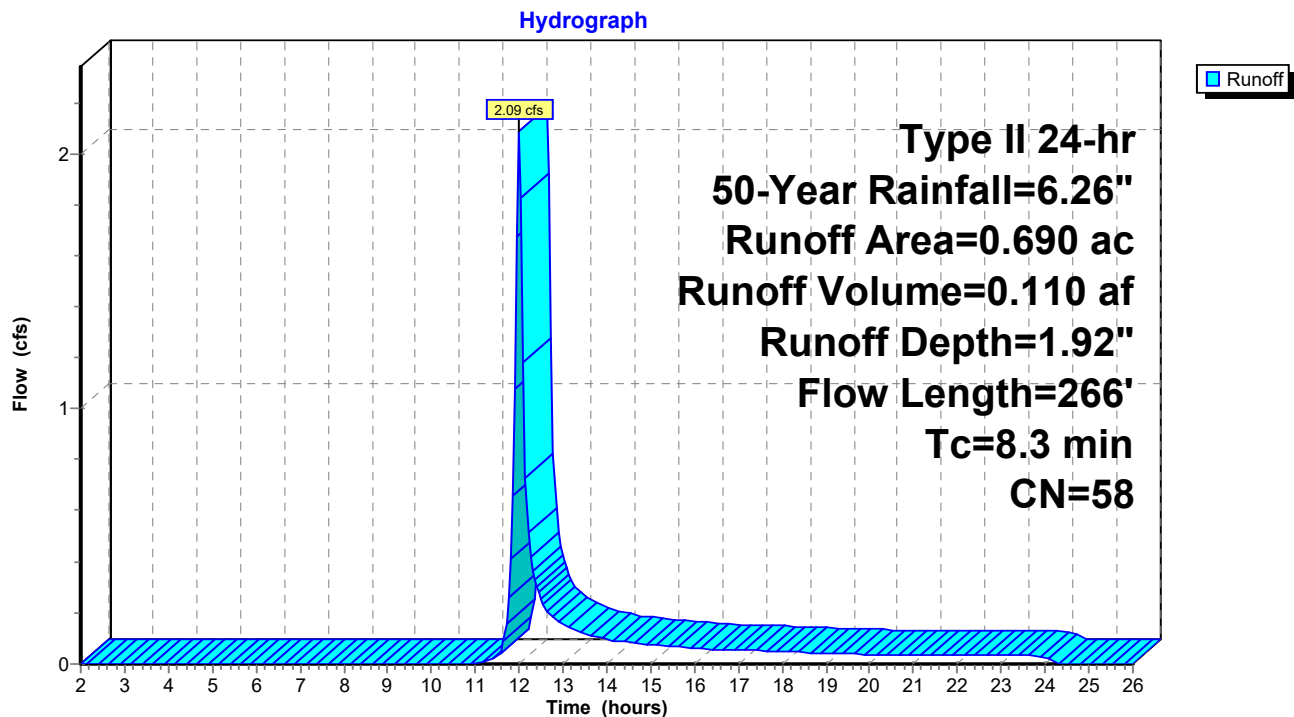
Runoff = 2.09 cfs @ 12.01 hrs, Volume= 0.110 af, Depth= 1.92"
Routed to Link 2L : Combined South Flow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-26.00 hrs, dt= 0.05 hrs
Type II 24-hr 50-Year Rainfall=6.26"

Area (ac)	CN	Description
0.690	58	Meadow, non-grazed, HSG B
0.690		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	100	0.0470	0.23		Sheet Flow, Grass: Short n= 0.150 P2= 3.04"
1.2	166	0.1000	2.21		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
8.3	266	Total			

Subcatchment N-SE: Natural Southeast



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Type II 24-hr 50-Year Rainfall=6.26"

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Summary for Subcatchment N-W: Natural West

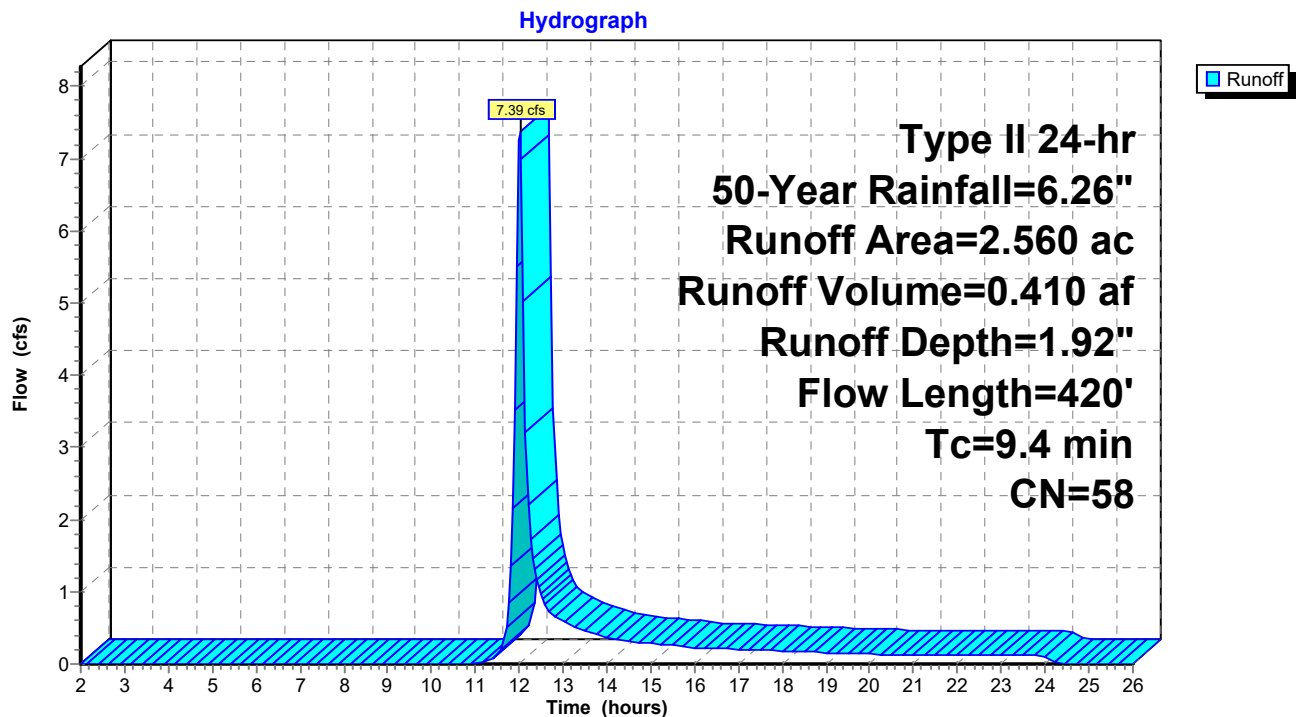
Runoff = 7.39 cfs @ 12.02 hrs, Volume= 0.410 af, Depth= 1.92"
Routed to Link 1L : Combined Outflow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-26.00 hrs, dt= 0.05 hrs
Type II 24-hr 50-Year Rainfall=6.26"

Area (ac)	CN	Description
2.560	58	Meadow, non-grazed, HSG B
2.560		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	100	0.0650	0.27		Sheet Flow, SHEET (MEADOW) Grass: Short n= 0.150 P2= 3.04"
3.1	320	0.0600	1.71		Shallow Concentrated Flow, SHALLOW (MEADOW) Short Grass Pasture Kv= 7.0 fps
9.4	420	Total			

Subcatchment N-W: Natural West



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Type II 24-hr 50-Year Rainfall=6.26"

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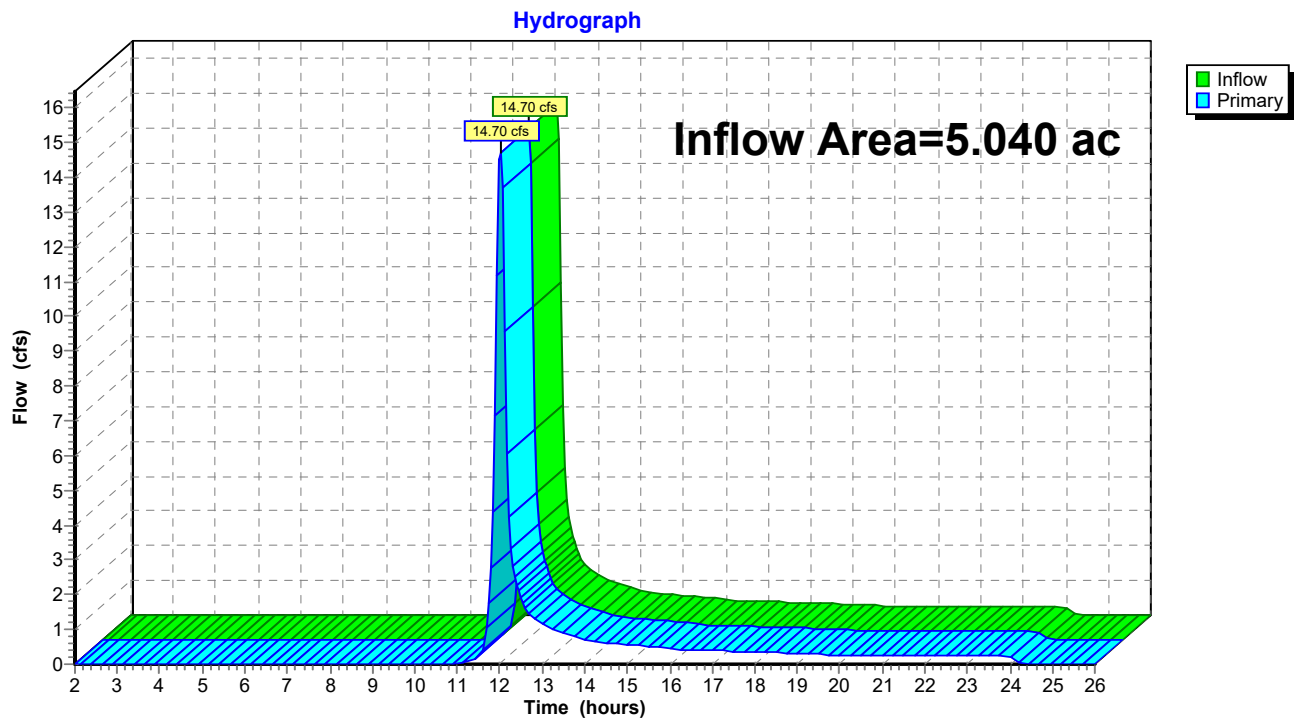
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Summary for Link 1L: Combined Outflow

Inflow Area = 5.040 ac, 0.00% Impervious, Inflow Depth = 1.92" for 50-Year event
Inflow = 14.70 cfs @ 12.01 hrs, Volume= 0.807 af
Primary = 14.70 cfs @ 12.01 hrs, Volume= 0.807 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-26.00 hrs, dt= 0.05 hrs

Link 1L: Combined Outflow



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Type II 24-hr 50-Year Rainfall=6.26"

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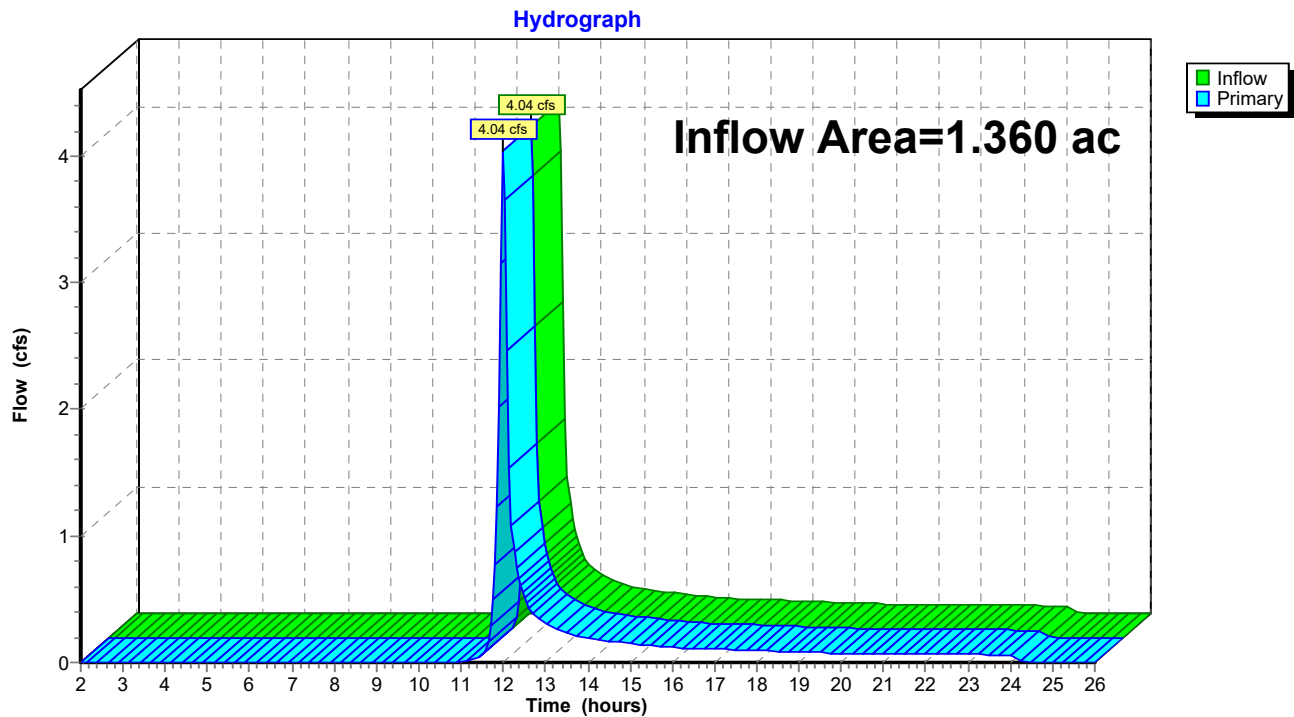
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Summary for Link 2L: Combined South Flow

Inflow Area = 1.360 ac, 0.00% Impervious, Inflow Depth = 1.92" for 50-Year event
Inflow = 4.04 cfs @ 12.01 hrs, Volume= 0.218 af
Primary = 4.04 cfs @ 12.01 hrs, Volume= 0.218 af, Atten= 0%, Lag= 0.0 min
Routed to Link 1L : Combined Outflow

Primary outflow = Inflow, Time Span= 2.00-26.00 hrs, dt= 0.05 hrs

Link 2L: Combined South Flow



23-047 Natural Site Conditions

Type II 24-hr 100-Year Rainfall=7.12"

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Time span=2.00-26.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentN-N: Natural North

Runoff Area=1.120 ac 0.00% Impervious Runoff Depth=2.49"
Flow Length=209' Tc=9.0 min CN=58 Runoff=4.33 cfs 0.233 af

SubcatchmentN-S: Natural South

Runoff Area=0.670 ac 0.00% Impervious Runoff Depth=2.49"
Flow Length=337' Tc=9.2 min CN=58 Runoff=2.57 cfs 0.139 af

SubcatchmentN-SE: Natural Southeast

Runoff Area=0.690 ac 0.00% Impervious Runoff Depth=2.49"
Flow Length=266' Tc=8.3 min CN=58 Runoff=2.75 cfs 0.143 af

SubcatchmentN-W: Natural West

Runoff Area=2.560 ac 0.00% Impervious Runoff Depth=2.49"
Flow Length=420' Tc=9.4 min CN=58 Runoff=9.74 cfs 0.531 af

Link 1L: Combined Outflow

Inflow=19.37 cfs 1.046 af
Primary=19.37 cfs 1.046 af

Link 2L: Combined South Flow

Inflow=5.31 cfs 0.282 af
Primary=5.31 cfs 0.282 af

Total Runoff Area = 5.040 ac Runoff Volume = 1.046 af Average Runoff Depth = 2.49"
100.00% Pervious = 5.040 ac 0.00% Impervious = 0.000 ac

23-047 Natural Site Conditions

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Type II 24-hr 100-Year Rainfall=7.12"

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Summary for Subcatchment N-N: Natural North

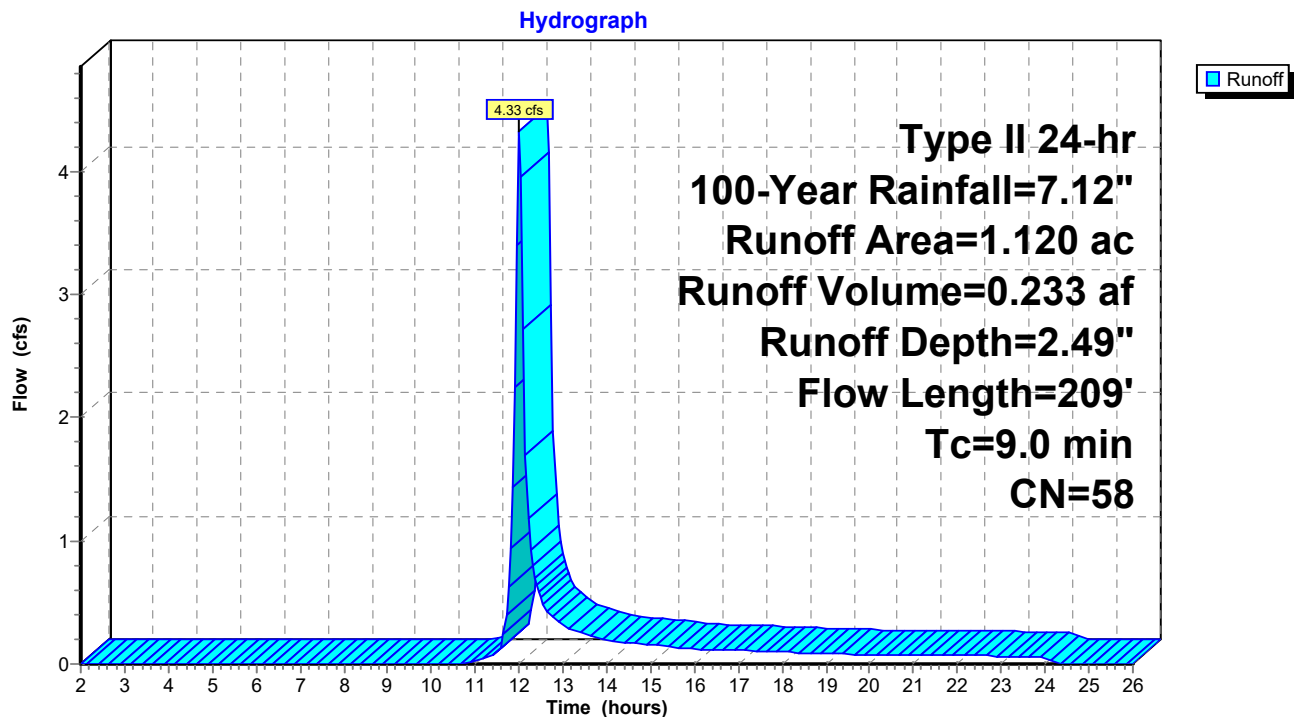
Runoff = 4.33 cfs @ 12.01 hrs, Volume= 0.233 af, Depth= 2.49"
Routed to Link 1L : Combined Outflow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-26.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-Year Rainfall=7.12"

Area (ac)	CN	Description
1.120	58	Meadow, non-grazed, HSG B
1.120		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	100	0.0310	0.20		Sheet Flow, SHEET (MEADOW) Grass: Short n= 0.150 P2= 3.04"
0.6	109	0.2200	3.28		Shallow Concentrated Flow, SHALLOW (MEADOW) Short Grass Pasture Kv= 7.0 fps
9.0	209	Total			

Subcatchment N-N: Natural North



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Type II 24-hr 100-Year Rainfall=7.12"

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Summary for Subcatchment N-S: Natural South

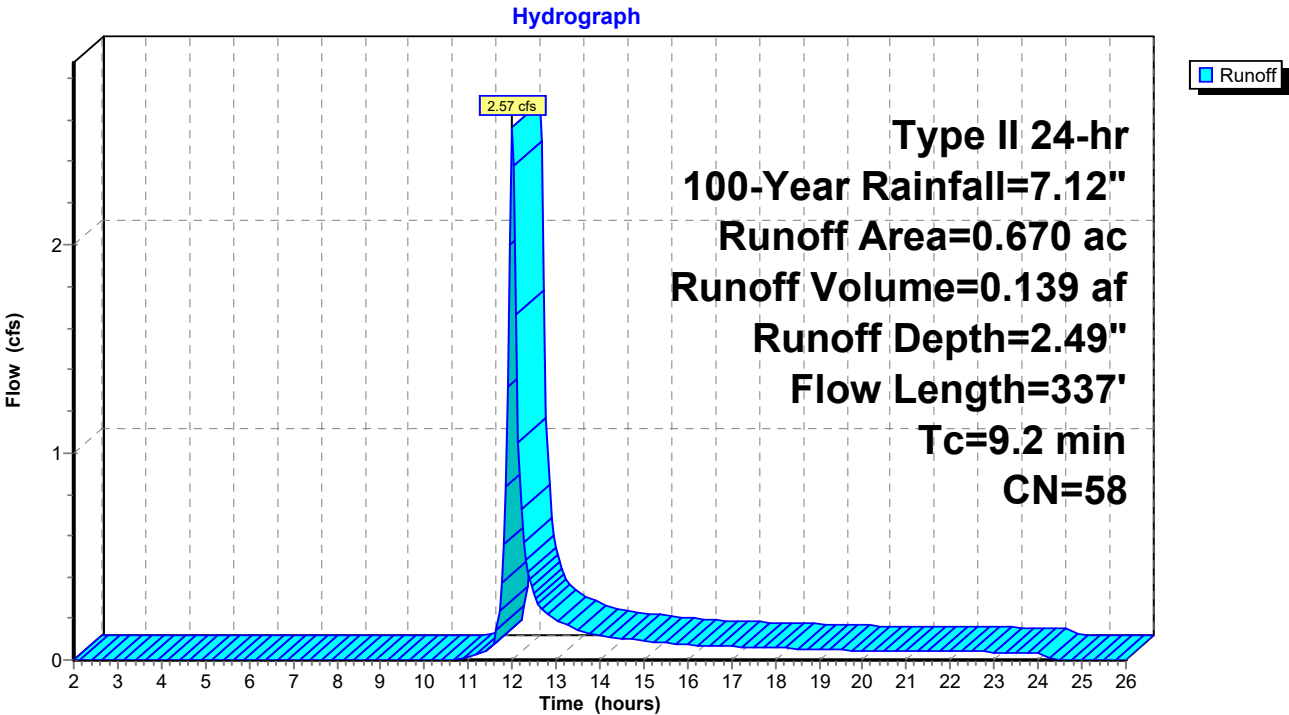
Runoff = 2.57 cfs @ 12.01 hrs, Volume= 0.139 af, Depth= 2.49"
Routed to Link 2L : Combined South Flow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-26.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-Year Rainfall=7.12"

Area (ac)	CN	Description
0.670	58	Meadow, non-grazed, HSG B
0.670		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	100	0.0480	0.24		Sheet Flow, SHEET (MEADOW) Grass: Short n= 0.150 P2= 3.04"
2.1	237	0.0740	1.90		Shallow Concentrated Flow, SHALLOW (MEADOW) Short Grass Pasture Kv= 7.0 fps
9.2	337	Total			

Subcatchment N-S: Natural South



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Type II 24-hr 100-Year Rainfall=7.12"

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Summary for Subcatchment N-SE: Natural Southeast

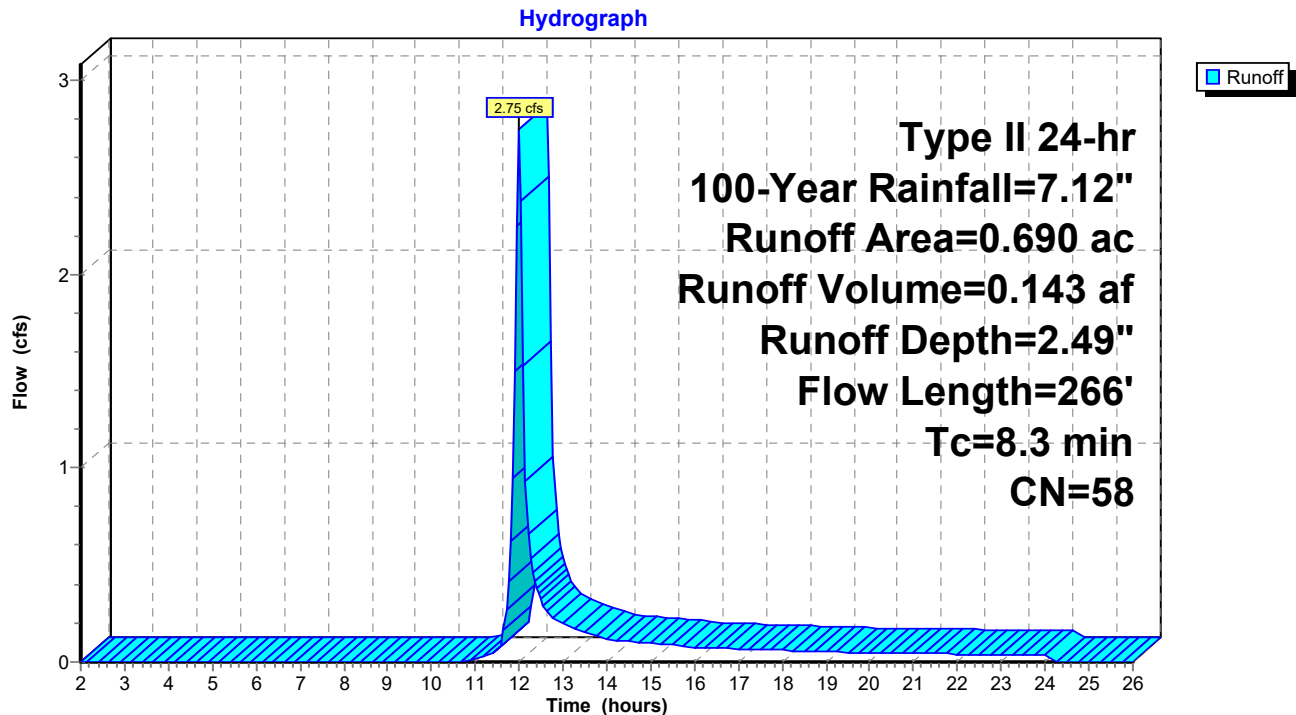
Runoff = 2.75 cfs @ 12.00 hrs, Volume= 0.143 af, Depth= 2.49"
Routed to Link 2L : Combined South Flow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-26.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-Year Rainfall=7.12"

Area (ac)	CN	Description
0.690	58	Meadow, non-grazed, HSG B
0.690		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	100	0.0470	0.23		Sheet Flow, Grass: Short n= 0.150 P2= 3.04"
1.2	166	0.1000	2.21		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
8.3	266	Total			

Subcatchment N-SE: Natural Southeast



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Type II 24-hr 100-Year Rainfall=7.12"

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Summary for Subcatchment N-W: Natural West

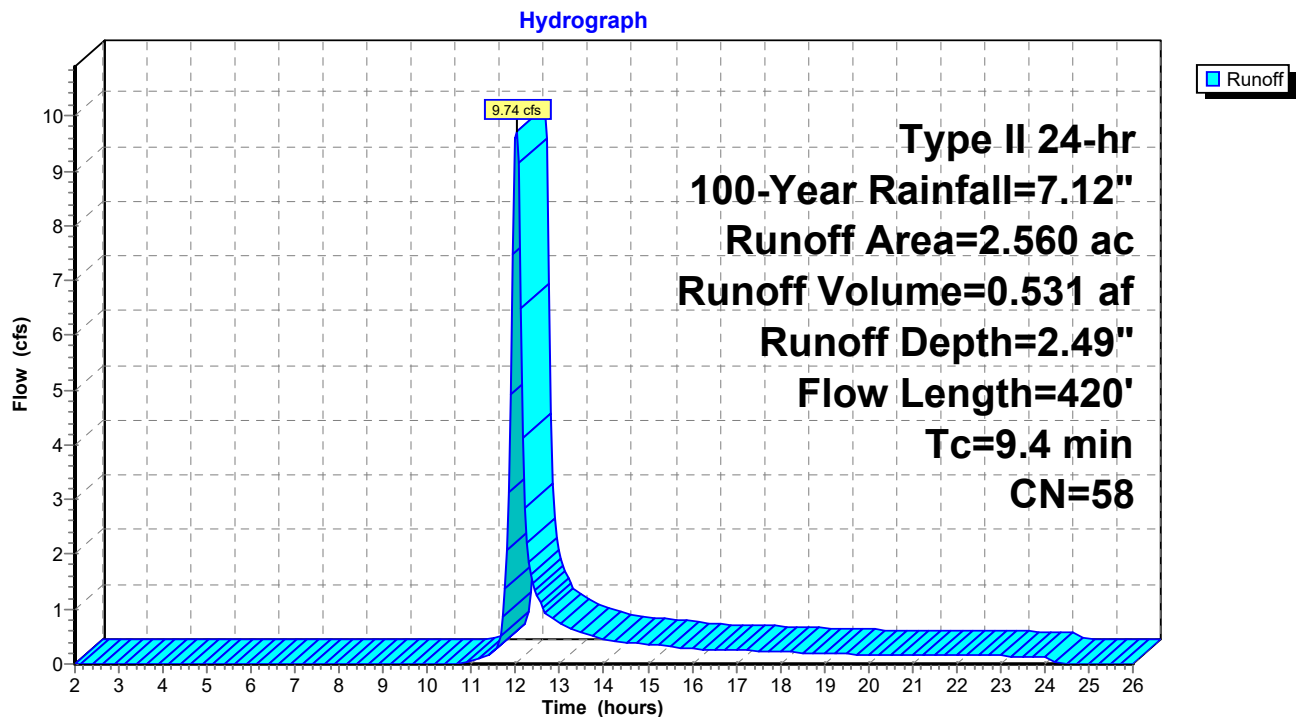
Runoff = 9.74 cfs @ 12.02 hrs, Volume= 0.531 af, Depth= 2.49"
Routed to Link 1L : Combined Outflow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-26.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-Year Rainfall=7.12"

Area (ac)	CN	Description
2.560	58	Meadow, non-grazed, HSG B
2.560		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	100	0.0650	0.27		Sheet Flow, SHEET (MEADOW) Grass: Short n= 0.150 P2= 3.04"
3.1	320	0.0600	1.71		Shallow Concentrated Flow, SHALLOW (MEADOW) Short Grass Pasture Kv= 7.0 fps
9.4	420	Total			

Subcatchment N-W: Natural West



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Type II 24-hr 100-Year Rainfall=7.12"

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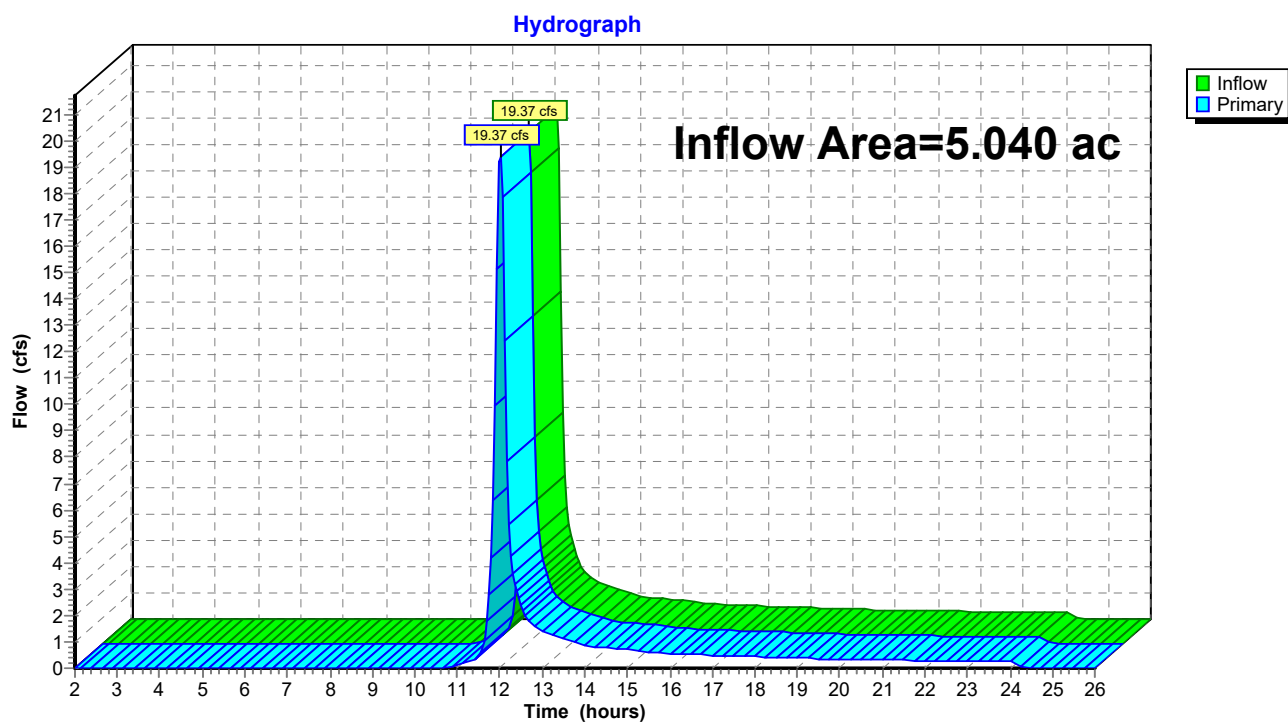
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Summary for Link 1L: Combined Outflow

Inflow Area = 5.040 ac, 0.00% Impervious, Inflow Depth = 2.49" for 100-Year event
Inflow = 19.37 cfs @ 12.01 hrs, Volume= 1.046 af
Primary = 19.37 cfs @ 12.01 hrs, Volume= 1.046 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-26.00 hrs, dt= 0.05 hrs

Link 1L: Combined Outflow



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Type II 24-hr 100-Year Rainfall=7.12"

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Summary for Link 2L: Combined South Flow

Inflow Area = 1.360 ac, 0.00% Impervious, Inflow Depth = 2.49" for 100-Year event

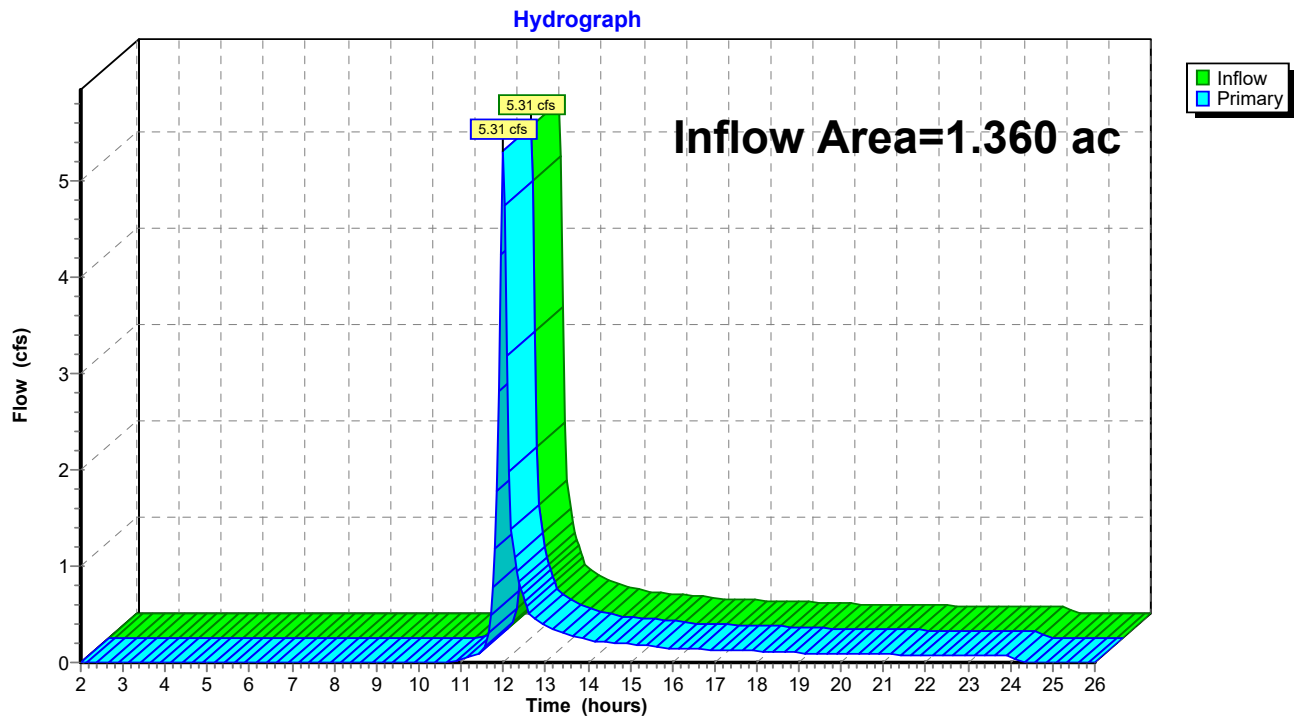
Inflow = 5.31 cfs @ 12.01 hrs, Volume= 0.282 af

Primary = 5.31 cfs @ 12.01 hrs, Volume= 0.282 af, Atten= 0%, Lag= 0.0 min

Routed to Link 1L : Combined Outflow

Primary outflow = Inflow, Time Span= 2.00-26.00 hrs, dt= 0.05 hrs

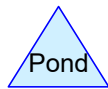
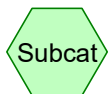
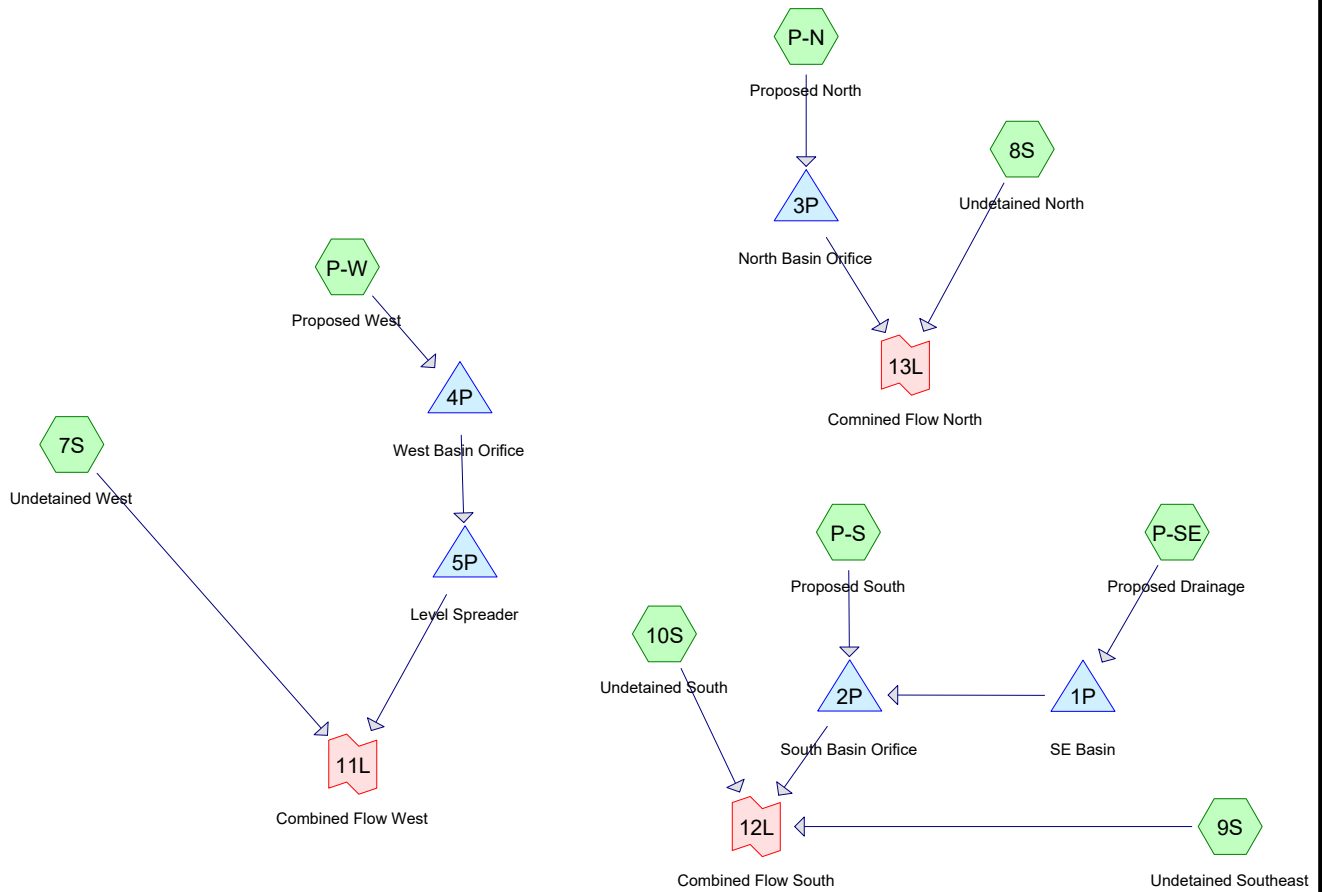
Link 2L: Combined South Flow



Appendix E: Post Development Conditions
HydroCad Report

And

Appendix F: Post Development Conditions
Detention Basin HydroCad Report



Routing Diagram for 23-047 Proposed Site Conditions_5-7-24
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23-047 Proposed Site Conditions_5-7-24

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Project Notes

Rainfall events imported from "NRCS-Rain.txt" for 1476 IA Polk

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Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-Year	Type II 24-hr		Default	24.00	1	2.67	2
2	2-Year	Type II 24-hr		Default	24.00	1	3.08	2
3	5-Year	Type II 24-hr		Default	24.00	1	3.81	2
4	10-Year	Type II 24-hr		Default	24.00	1	4.46	2
5	25-Year	Type II 24-hr		Default	24.00	1	5.44	2
6	50-Year	Type II 24-hr		Default	24.00	1	6.26	2
7	100-Year	Type II 24-hr		Default	24.00	1	7.12	2

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.740	61	>75% Grass cover, Good, HSG B (7S, 8S, 9S, 10S, P-N, P-S, P-SE, P-W)
0.130	98	Paved parking, HSG C (P-SE)
2.140	98	Paved roads w/curbs & sewers, HSG C (P-N, P-S, P-W)
0.020	98	Pavement (9S)
5.030	78	TOTAL AREA

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
2.740	HSG B	7S, 8S, 9S, 10S, P-N, P-S, P-SE, P-W
2.270	HSG C	P-N, P-S, P-SE, P-W
0.000	HSG D	
0.020	Other	9S
5.030		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	2.740	0.000	0.000	0.000	2.740	>75% Grass cover, Good	7S, 8S, 9S, 10 S, P- N, P- S, P- SE,
0.000	0.000	0.130	0.000	0.000	0.130	Paved parking	P- W P- SE
0.000	0.000	2.140	0.000	0.000	2.140	Paved roads w/curbs & sewers	P- N, P- S, P- W 9S
0.000	0.000	0.000	0.000	0.020	0.020	Pavement	
0.000	2.740	2.270	0.000	0.020	5.030	TOTAL AREA	

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Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)
1	P-N	0.00	0.00	230.0	0.0150	0.013	0.0	15.0	0.0
2	P-SE	0.00	0.00	53.0	0.0100	0.013	0.0	15.0	0.0
3	P-W	0.00	0.00	378.0	0.0150	0.013	0.0	18.0	0.0
4	1P	916.26	915.96	30.2	0.0099	0.013	0.0	4.0	0.0
5	2P	911.34	909.31	68.0	0.0299	0.013	0.0	6.0	0.0
6	3P	918.30	910.25	104.0	0.0774	0.013	0.0	12.0	0.0
7	4P	908.00	904.00	32.0	0.1250	0.013	0.0	15.0	0.0

23-047 Proposed Site Conditions_5-7-24*Type II 24-hr 1-Year Rainfall=2.67"*

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Time span=0.00-100.00 hrs, dt=0.01 hrs, 10001 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment7S: UndetainedWest	Runoff Area=0.540 ac 0.00% Impervious Runoff Depth=0.25" Tc=5.0 min CN=61 Runoff=0.15 cfs 0.011 af
Subcatchment8S: UndetainedNorth	Runoff Area=0.530 ac 0.00% Impervious Runoff Depth=0.25" Tc=5.0 min CN=61 Runoff=0.15 cfs 0.011 af
Subcatchment9S: UndetainedSoutheast	Runoff Area=0.170 ac 11.76% Impervious Runoff Depth=0.36" Tc=5.0 min CN=65 Runoff=0.09 cfs 0.005 af
Subcatchment10S: UndetainedSouth	Runoff Area=0.090 ac 0.00% Impervious Runoff Depth=0.25" Tc=5.0 min CN=61 Runoff=0.03 cfs 0.002 af
SubcatchmentP-N: Proposed North	Runoff Area=0.980 ac 75.51% Impervious Runoff Depth=1.60" Flow Length=321' Tc=8.1 min CN=89 Runoff=2.57 cfs 0.131 af
SubcatchmentP-S: Proposed South	Runoff Area=0.480 ac 22.92% Impervious Runoff Depth=0.50" Flow Length=237' Tc=11.1 min CN=69 Runoff=0.30 cfs 0.020 af
SubcatchmentP-SE: Proposed Drainage	Runoff Area=0.330 ac 39.39% Impervious Runoff Depth=0.80" Flow Length=118' Tc=7.3 min CN=76 Runoff=0.44 cfs 0.022 af
SubcatchmentP-W: Proposed West	Runoff Area=1.910 ac 67.54% Impervious Runoff Depth=1.38" Flow Length=1,203' Tc=6.7 min CN=86 Runoff=4.59 cfs 0.220 af
Pond 1P: SE Basin	Peak Elev=917.57' Storage=566 cf Inflow=0.44 cfs 0.022 af Outflow=0.02 cfs 0.012 af
Pond 2P: South Basin Orifice	Peak Elev=912.44' Storage=529 cf Inflow=0.30 cfs 0.032 af Outflow=0.03 cfs 0.023 af
Pond 3P: North Basin Orifice	Peak Elev=921.15' Storage=3,719 cf Inflow=2.57 cfs 0.131 af Outflow=0.09 cfs 0.062 af
Pond 4P: West Basin Orifice	Peak Elev=909.96' Storage=5,540 cf Inflow=4.59 cfs 0.220 af Outflow=0.20 cfs 0.148 af
Pond 5P: Level Spreader	Peak Elev=904.01' Storage=1 cf Inflow=0.20 cfs 0.148 af Outflow=0.20 cfs 0.148 af
Link 11L: Combined Flow West	Inflow=0.22 cfs 0.160 af Primary=0.22 cfs 0.160 af
Link 12L: Combined Flow South	Inflow=0.12 cfs 0.030 af Primary=0.12 cfs 0.030 af
Link 13L: Comnined Flow North	Inflow=0.15 cfs 0.073 af Primary=0.15 cfs 0.073 af

23-047 Proposed Site Conditions_5-7-24*Type II 24-hr 1-Year Rainfall=2.67"*

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Total Runoff Area = 5.030 ac Runoff Volume = 0.422 af Average Runoff Depth = 1.01"
54.47% Pervious = 2.740 ac 45.53% Impervious = 2.290 ac

23-047 Proposed Site Conditions_5-7-24

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Type II 24-hr 1-Year Rainfall=2.67"

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Summary for Subcatchment 7S: Undetained West

Runoff = 0.15 cfs @ 12.00 hrs, Volume= 0.011 af, Depth= 0.25"
Routed to Link 11L : Combined Flow West

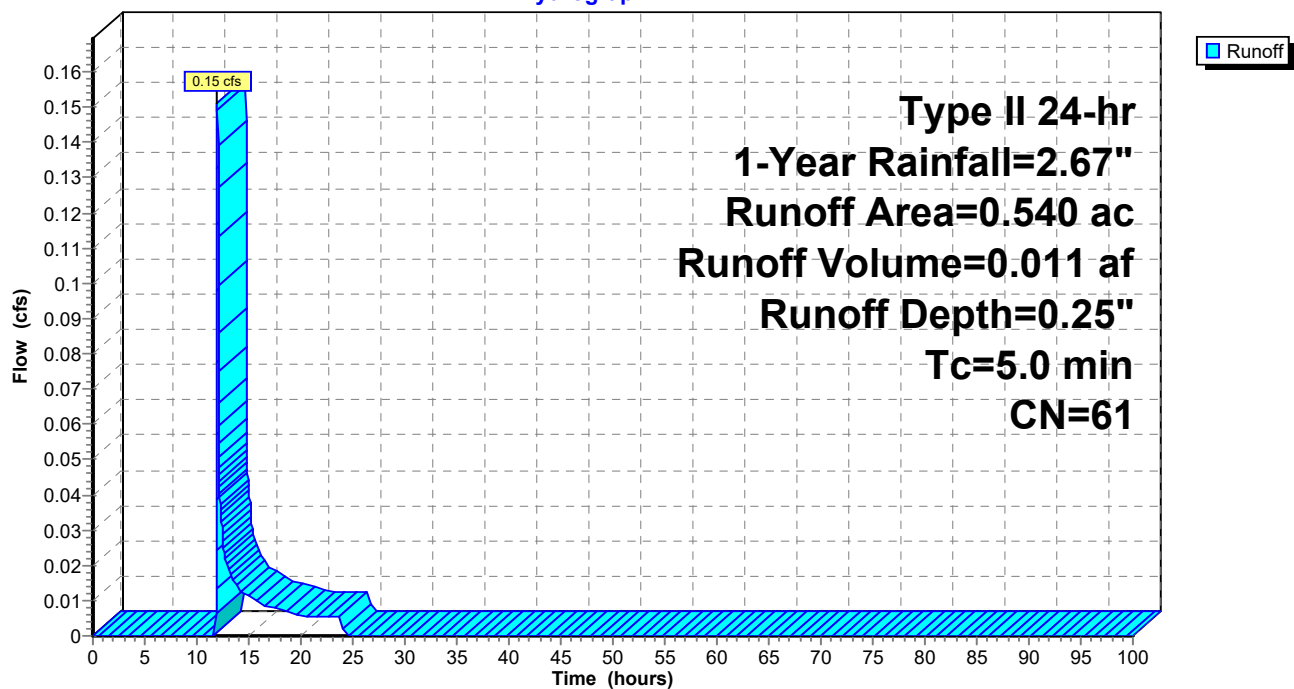
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-Year Rainfall=2.67"

Area (ac)	CN	Description
* 0.540	61	>75% Grass cover, Good, HSG B
0.540		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 7S: Undetained West

Hydrograph



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Type II 24-hr 1-Year Rainfall=2.67"

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Summary for Subcatchment 8S: Undetained North

Runoff = 0.15 cfs @ 12.00 hrs, Volume= 0.011 af, Depth= 0.25"
Routed to Link 13L : Comnined Flow North

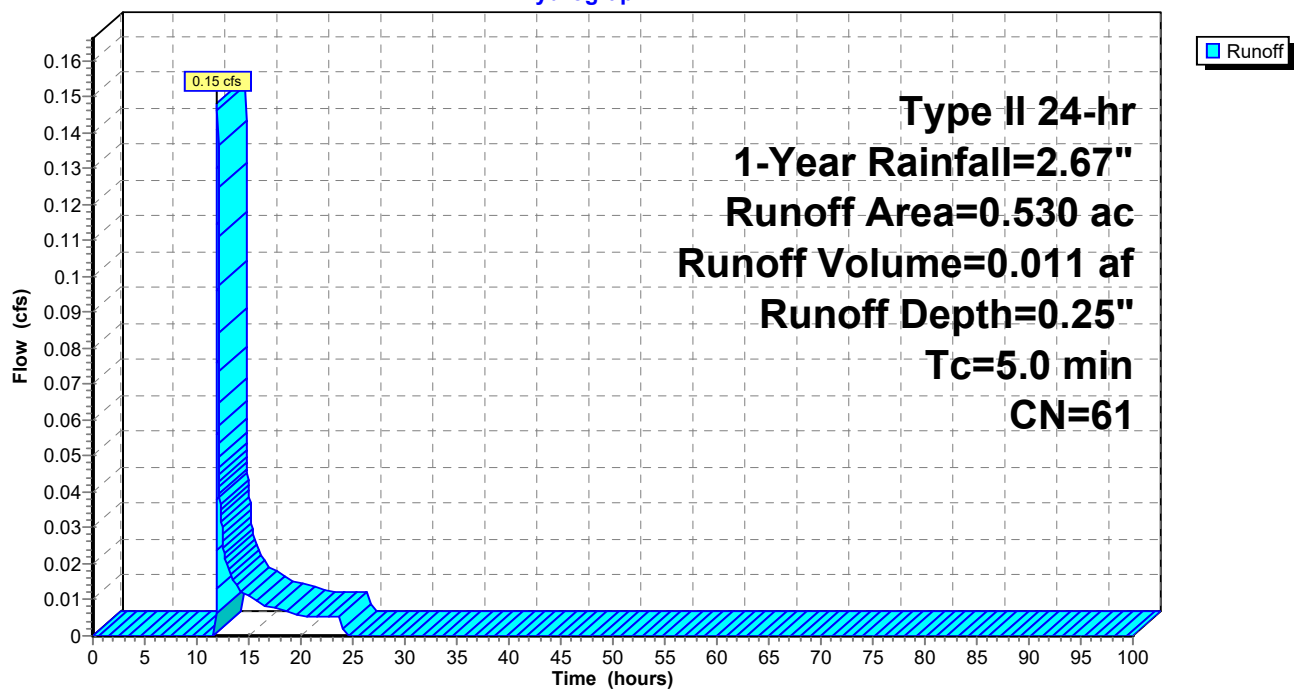
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-Year Rainfall=2.67"

Area (ac)	CN	Description
* 0.530	61	>75% Grass cover, Good, HSG B
0.530		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 8S: Undetained North

Hydrograph



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Type II 24-hr 1-Year Rainfall=2.67"

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Summary for Subcatchment 9S: Undetained Southeast

Runoff = 0.09 cfs @ 11.98 hrs, Volume= 0.005 af, Depth= 0.36"
Routed to Link 12L : Combined Flow South

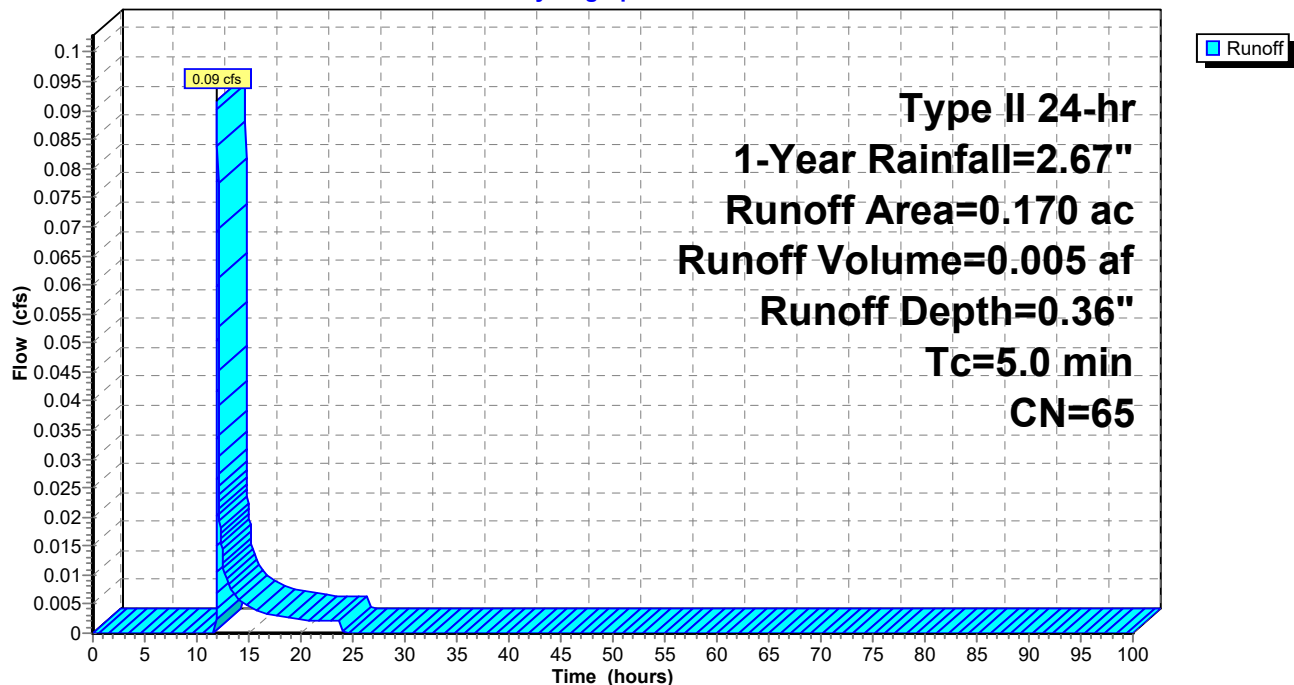
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-Year Rainfall=2.67"

Area (ac)	CN	Description
* 0.150	61	>75% Grass cover, Good, HSG B
* 0.020	98	Pavement
0.170	65	Weighted Average
0.150		88.24% Pervious Area
0.020		11.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 9S: Undetained Southeast

Hydrograph



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Type II 24-hr 1-Year Rainfall=2.67"

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Summary for Subcatchment 10S: Undetained South

Runoff = 0.03 cfs @ 12.00 hrs, Volume= 0.002 af, Depth= 0.25"
Routed to Link 12L : Combined Flow South

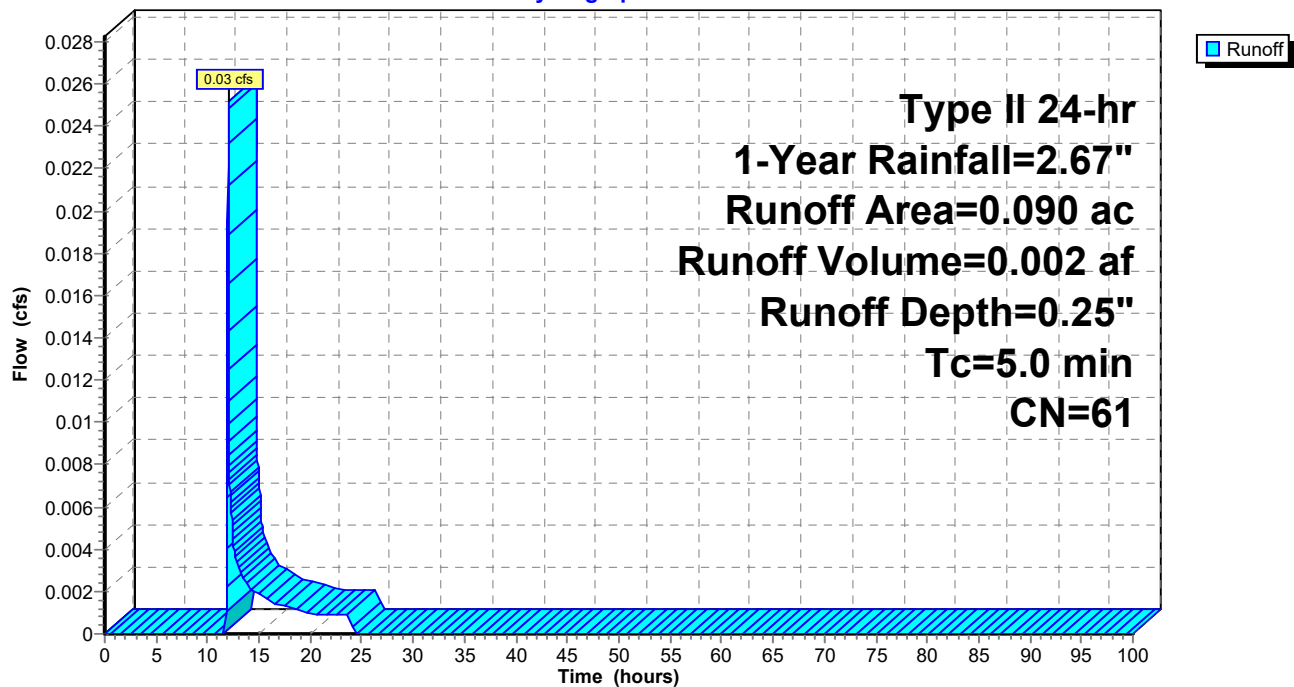
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-Year Rainfall=2.67"

Area (ac)	CN	Description
* 0.090	61	>75% Grass cover, Good, HSG B
0.090		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 10S: Undetained South

Hydrograph



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Type II 24-hr 1-Year Rainfall=2.67"

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Summary for Subcatchment P-N: Proposed North

Runoff = 2.57 cfs @ 12.00 hrs, Volume= 0.131 af, Depth= 1.60"
 Routed to Pond 3P : North Basin Orifice

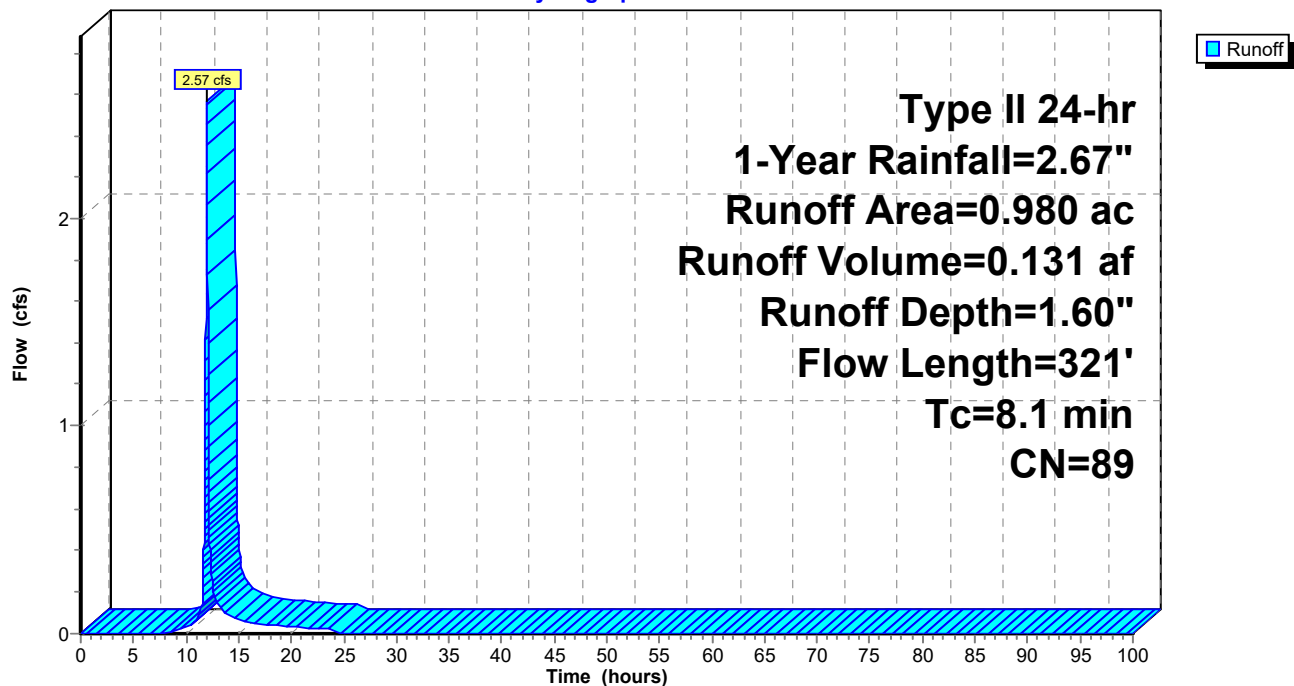
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Type II 24-hr 1-Year Rainfall=2.67"

Area (ac)	CN	Description
* 0.740	98	Paved roads w/curbs & sewers, HSG C
0.240	61	>75% Grass cover, Good, HSG B
0.980	89	Weighted Average
0.240		24.49% Pervious Area
0.740		75.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	91	0.0350	0.20		Sheet Flow, SHEET (GRASS) Grass: Short n= 0.150 P2= 3.04"
0.6	230	0.0150	6.45	7.91	Pipe Channel, PIPE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
8.1	321	Total			

Subcatchment P-N: Proposed North

Hydrograph



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Type II 24-hr 1-Year Rainfall=2.67"

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Summary for Subcatchment P-S: Proposed South

Runoff = 0.30 cfs @ 12.05 hrs, Volume= 0.020 af, Depth= 0.50"
Routed to Pond 2P : South Basin Orifice

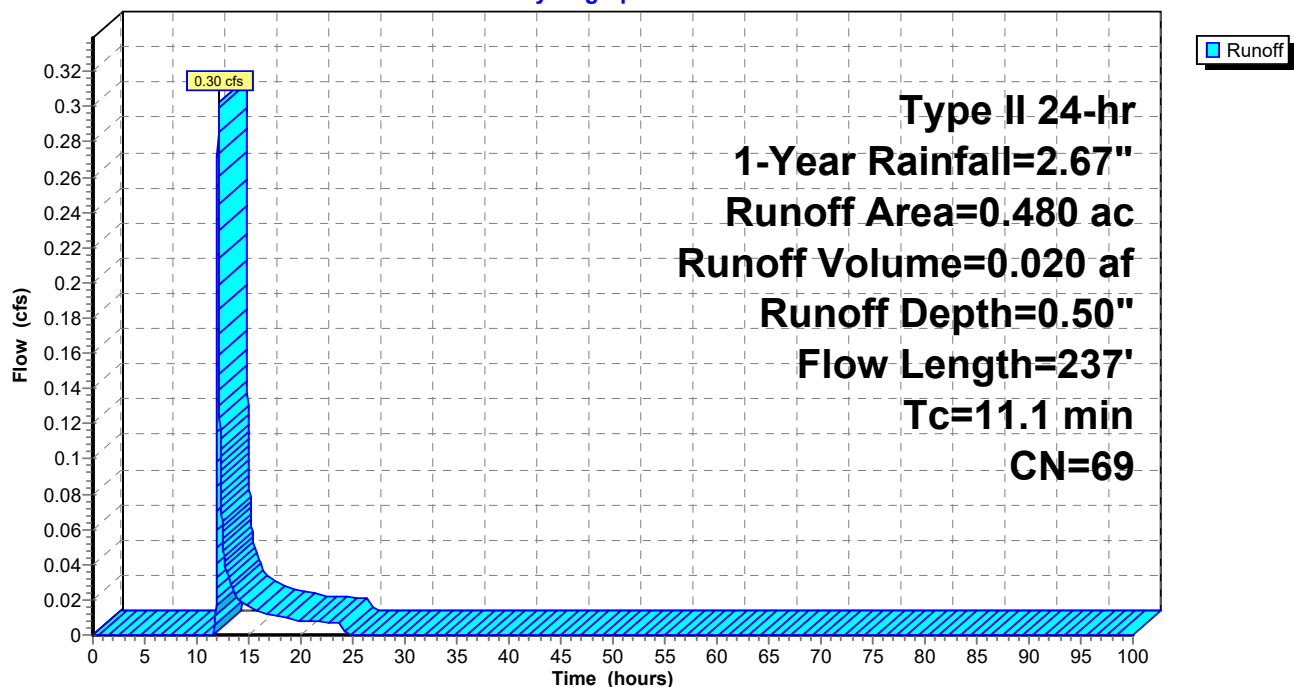
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-Year Rainfall=2.67"

Area (ac)	CN	Description
* 0.110	98	Paved roads w/curbs & sewers, HSG C
0.370	61	>75% Grass cover, Good, HSG B
0.480	69	Weighted Average
0.370		77.08% Pervious Area
0.110		22.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	100	0.0200	0.17		Sheet Flow, SHEET (GRASS) Grass: Short n= 0.150 P2= 3.04"
0.9	112	0.0200	2.12		Shallow Concentrated Flow, SHALLOW (GRASS) Grassed Waterway Kv= 15.0 fps
0.1	25	0.2500	7.50		Shallow Concentrated Flow, SHALLOW (GRASS) Grassed Waterway Kv= 15.0 fps
11.1	237	Total			

Subcatchment P-S: Proposed South

Hydrograph



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Type II 24-hr 1-Year Rainfall=2.67"

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Summary for Subcatchment P-SE: Proposed Drainage

Runoff = 0.44 cfs @ 12.00 hrs, Volume= 0.022 af, Depth= 0.80"
 Routed to Pond 1P : SE Basin

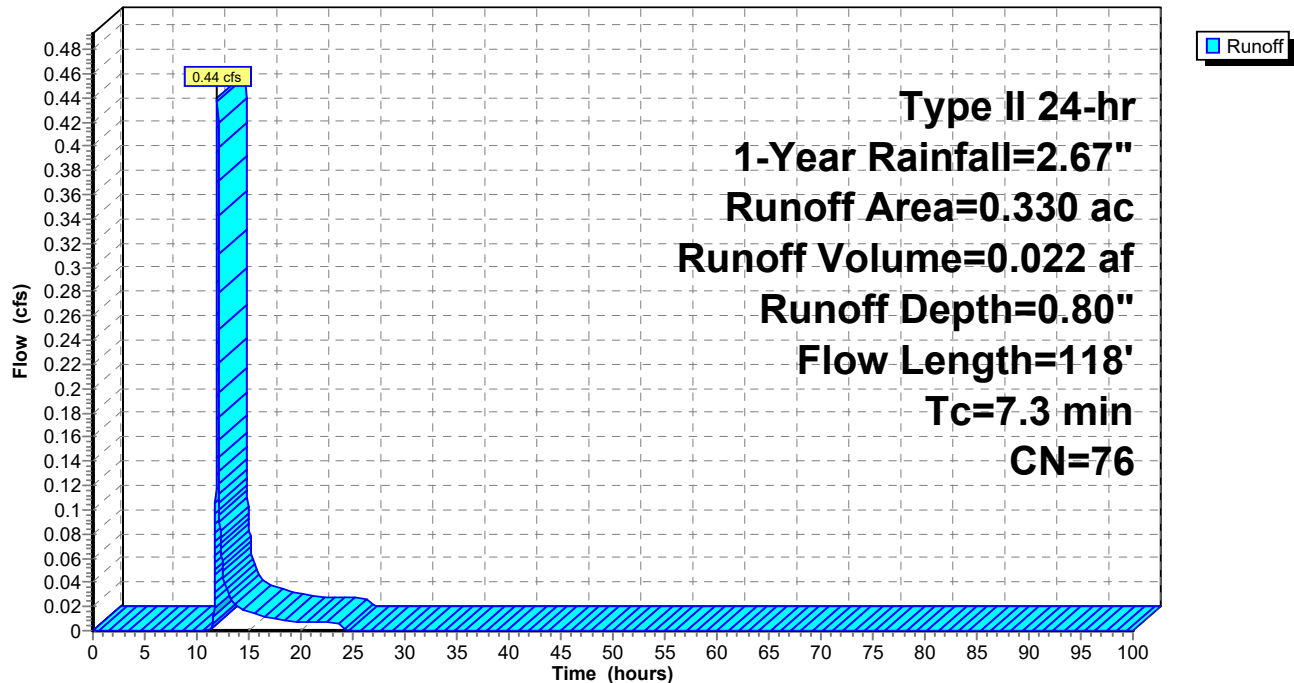
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Type II 24-hr 1-Year Rainfall=2.67"

Area (ac)	CN	Description
0.130	98	Paved parking, HSG C
0.200	61	>75% Grass cover, Good, HSG B
0.330	76	Weighted Average
0.200		60.61% Pervious Area
0.130		39.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	65	0.0200	0.15		Sheet Flow, Grass: Short n= 0.150 P2= 3.04"
0.2	53	0.0100	5.26	6.46	Pipe Channel, 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
7.3	118	Total			

Subcatchment P-SE: Proposed Drainage

Hydrograph



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Type II 24-hr 1-Year Rainfall=2.67"

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Summary for Subcatchment P-W: Proposed West

Runoff = 4.59 cfs @ 11.98 hrs, Volume= 0.220 af, Depth= 1.38"
 Routed to Pond 4P : West Basin Orifice

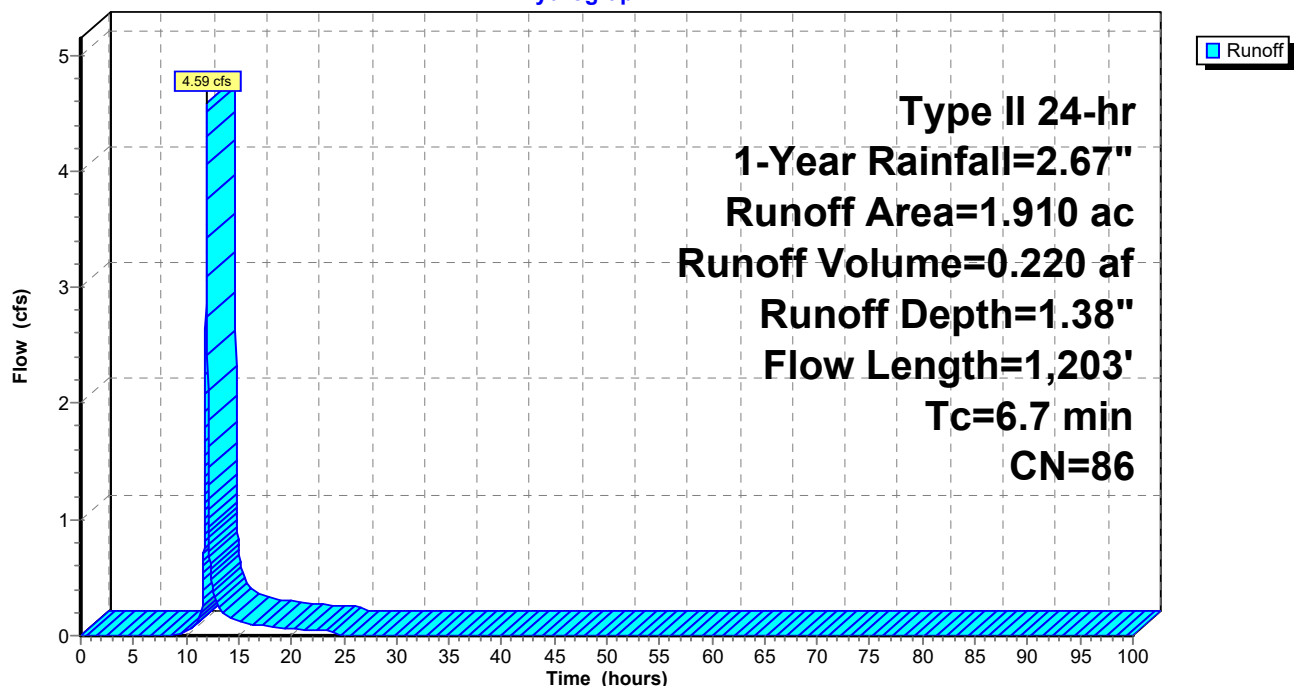
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Type II 24-hr 1-Year Rainfall=2.67"

Area (ac)	CN	Description
* 1.290	98	Paved roads w/curbs & sewers, HSG C
0.620	61	>75% Grass cover, Good, HSG B
1.910	86	Weighted Average
0.620		32.46% Pervious Area
1.290		67.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	100	0.0050	0.77		Sheet Flow, SHEET (PAVED) Smooth surfaces n= 0.011 P2= 3.04"
3.6	725	0.0280	3.40		Shallow Concentrated Flow, SHALLOW (PAVED) Paved Kv= 20.3 fps
0.9	378	0.0150	7.28	12.87	Pipe Channel, Storm Sewer 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
6.7	1,203	Total			

Subcatchment P-W: Proposed West

Hydrograph



23-047 Proposed Site Conditions_5-7-24

Type II 24-hr 1-Year Rainfall=2.67"

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Summary for Pond 1P: SE Basin

Inflow Area = 0.330 ac, 39.39% Impervious, Inflow Depth = 0.80" for 1-Year event
 Inflow = 0.44 cfs @ 12.00 hrs, Volume= 0.022 af
 Outflow = 0.02 cfs @ 14.94 hrs, Volume= 0.012 af, Atten= 96%, Lag= 176.5 min
 Primary = 0.02 cfs @ 14.94 hrs, Volume= 0.012 af
 Routed to Pond 2P : South Basin Orifice

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 917.57' @ 14.94 hrs Surf.Area= 1,723 sf Storage= 566 cf

Plug-Flow detention time= 466.5 min calculated for 0.012 af (56% of inflow)
 Center-of-Mass det. time= 329.8 min (1,194.6 - 864.8)

Volume	Invert	Avail.Storage	Storage Description
#1	916.91'	8,715 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
916.91	0	0	0
918.00	2,856	1,557	1,557
919.00	3,551	3,204	4,760
920.00	4,358	3,955	8,715

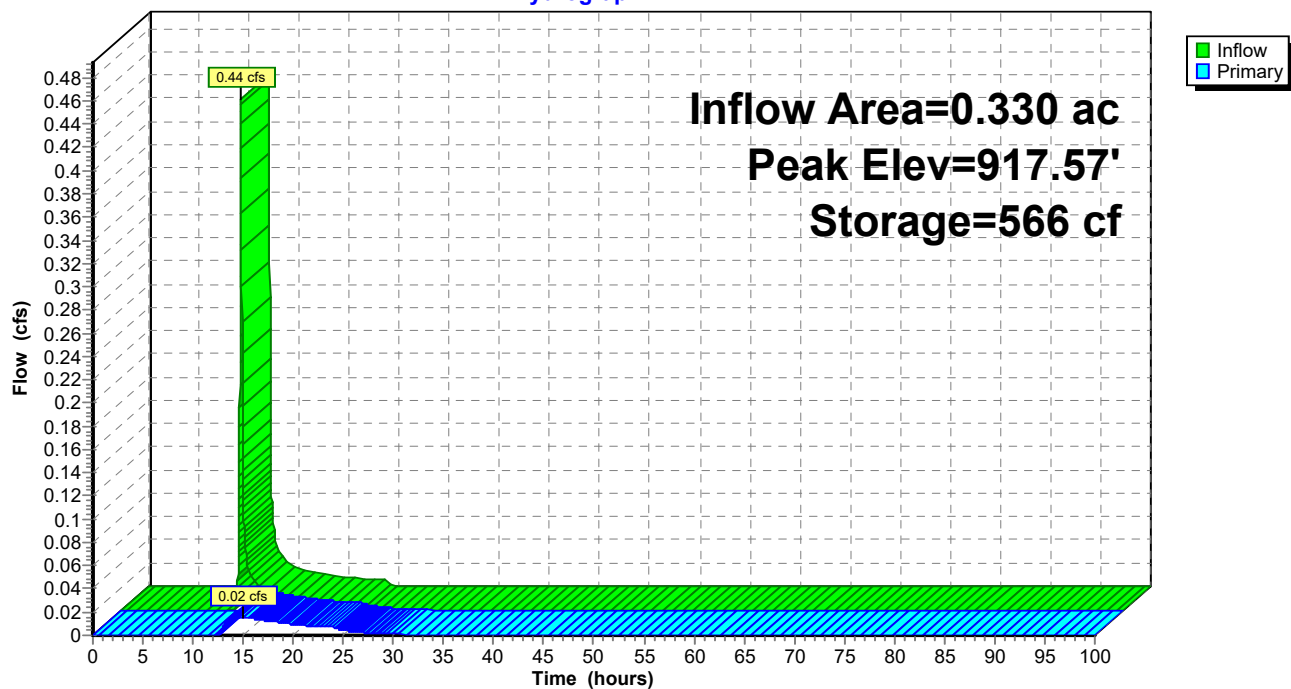
Device	Routing	Invert	Outlet Devices
#1	Primary	916.26'	4.0" Round Culvert X 3.00 L= 30.2' Ke= 0.500 Inlet / Outlet Invert= 916.26' / 915.96' S= 0.0099 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 0.09 sf
#2	Device 1	917.48'	3.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	918.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.45 0.45 0.95 Width (feet) 0.50 0.50 3.00 3.00

Primary OutFlow Max=0.02 cfs @ 14.94 hrs HW=917.57' (Free Discharge)

1=Culvert (Passes 0.02 cfs of 1.00 cfs potential flow)
 2=Orifice/Grate (Orifice Controls 0.02 cfs @ 1.01 fps)
 3=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 1P: SE Basin

Hydrograph



23-047 Proposed Site Conditions_5-7-24

Type II 24-hr 1-Year Rainfall=2.67"

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Summary for Pond 2P: South Basin Orifice

Inflow Area = 0.810 ac, 29.63% Impervious, Inflow Depth = 0.48" for 1-Year event
 Inflow = 0.30 cfs @ 12.05 hrs, Volume= 0.032 af
 Outflow = 0.03 cfs @ 15.35 hrs, Volume= 0.023 af, Atten= 90%, Lag= 198.2 min
 Primary = 0.03 cfs @ 15.35 hrs, Volume= 0.023 af
 Routed to Link 12L : Combined Flow South

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 912.44' @ 15.35 hrs Surf.Area= 954 sf Storage= 529 cf

Plug-Flow detention time= 361.1 min calculated for 0.023 af (71% of inflow)
 Center-of-Mass det. time= 201.3 min (1,211.5 - 1,010.2)

Volume	Invert	Avail.Storage	Storage Description
#1	911.50'	5,431 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
911.50	0	0	0
912.00	682	171	171
913.00	1,303	993	1,163
914.00	2,092	1,698	2,861
915.00	3,048	2,570	5,431

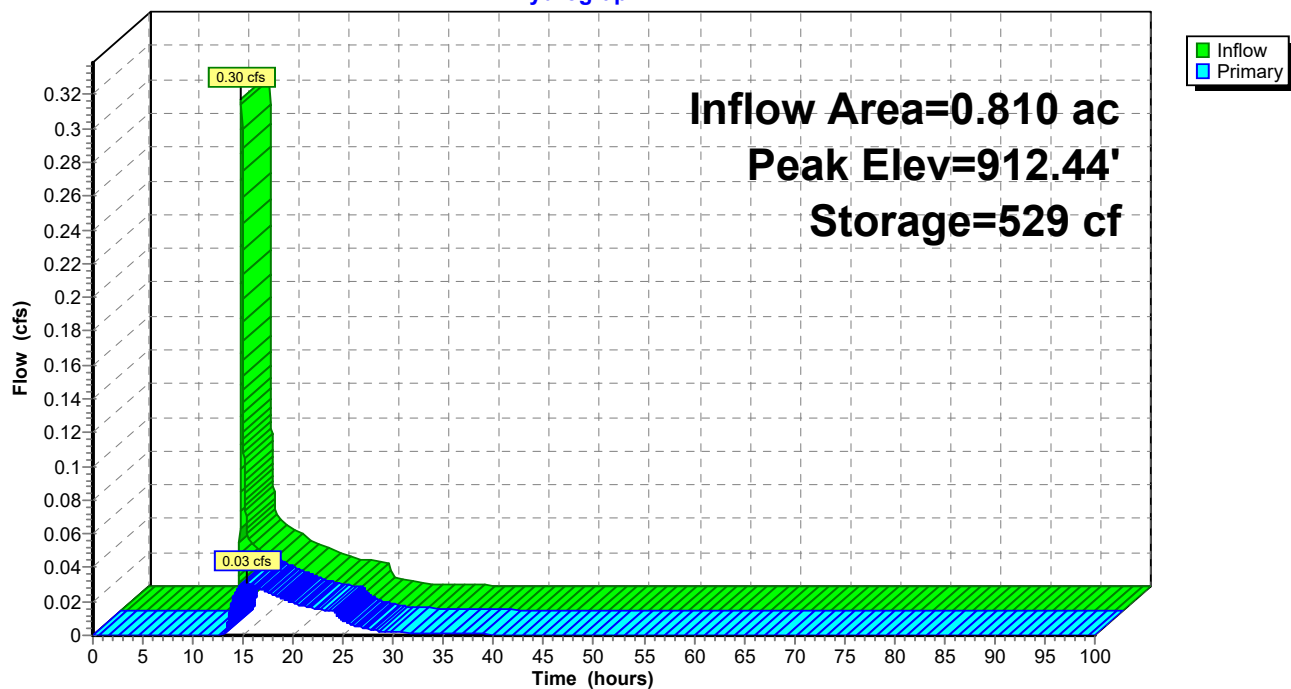
Device	Routing	Invert	Outlet Devices
#1	Primary	911.34'	6.0" Round Culvert L= 68.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 911.34' / 909.31' S= 0.0299 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	912.31'	3.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	913.00'	10.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.03 cfs @ 15.35 hrs HW=912.44' (Free Discharge)

↑ **1=Culvert** (Passes 0.03 cfs of 0.87 cfs potential flow)
 ↑ **2=Orifice/Grate** (Orifice Controls 0.03 cfs @ 1.22 fps)
 ↑ **3=Orifice/Grate** (Controls 0.00 cfs)

Pond 2P: South Basin Orifice

Hydrograph



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Type II 24-hr 1-Year Rainfall=2.67"

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Summary for Pond 3P: North Basin Orifice

Inflow Area = 0.980 ac, 75.51% Impervious, Inflow Depth = 1.60" for 1-Year event
 Inflow = 2.57 cfs @ 12.00 hrs, Volume= 0.131 af
 Outflow = 0.09 cfs @ 13.93 hrs, Volume= 0.062 af, Atten= 96%, Lag= 115.9 min
 Primary = 0.09 cfs @ 13.93 hrs, Volume= 0.062 af
 Routed to Link 13L : Combined Flow North

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 921.15' @ 13.93 hrs Surf.Area= 3,447 sf Storage= 3,719 cf

Plug-Flow detention time= 425.8 min calculated for 0.062 af (48% of inflow)
 Center-of-Mass det. time= 308.5 min (1,125.9 - 817.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	919.40'	6,149 cf	20.08'W x 171.65'L x 6.75'H Field A 23,269 cf Overall - 7,897 cf Embedded = 15,373 cf x 40.0% Voids
#2A	920.15'	7,897 cf	ADS_StormTech MC-7200 +Cap x 44 Inside #1 Effective Size= 91.2"W x 60.0"H => 26.68 sf x 6.59'L = 175.9 cf Overall Size= 100.0"W x 60.0"H x 6.95'L with 0.36' Overlap 44 Chambers in 2 Rows Cap Storage= 39.5 cf x 2 x 2 rows = 158.0 cf
		14,046 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	918.30'	12.0" Round Culvert L= 104.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 918.30' / 910.25' S= 0.0774 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	920.87'	3.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	924.15'	12.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.09 cfs @ 13.93 hrs HW=921.15' (Free Discharge)

↑ **1=Culvert** (Passes 0.09 cfs of 5.79 cfs potential flow)
 ↑ **2=Orifice/Grate** (Orifice Controls 0.09 cfs @ 1.87 fps)
 ↑ **3=Orifice/Grate** (Controls 0.00 cfs)

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Type II 24-hr 1-Year Rainfall=2.67"

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Pond 3P: North Basin Orifice - Chamber Wizard Field A

Chamber Model = ADS_StormTechMC-7200+Cap (ADS StormTech®MC-7200 with cap volume)

Effective Size= 91.2"W x 60.0"H => 26.68 sf x 6.59'L = 175.9 cf

Overall Size= 100.0"W x 60.0"H x 6.95'L with 0.36' Overlap

Cap Storage= 39.5 cf x 2 x 2 rows = 158.0 cf

100.0" Wide + 9.0" Spacing = 109.0" C-C Row Spacing

22 Chambers/Row x 6.59' Long +2.73' Cap Length x 2 = 150.48' Row Length +127.0" End Stone x 2 = 171.65' Base Length

2 Rows x 100.0" Wide + 9.0" Spacing x 1 + 16.0" Side Stone x 2 = 20.08' Base Width

9.0" Stone Base + 60.0" Chamber Height + 12.0" Stone Cover = 6.75' Field Height

44 Chambers x 175.9 cf + 39.5 cf Cap Volume x 2 x 2 Rows = 7,896.5 cf Chamber Storage

23,269.3 cf Field - 7,896.5 cf Chambers = 15,372.8 cf Stone x 40.0% Voids = 6,149.1 cf Stone Storage

Chamber Storage + Stone Storage = 14,045.6 cf = 0.322 af

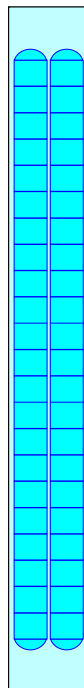
Overall Storage Efficiency = 60.4%

Overall System Size = 171.65' x 20.08' x 6.75'

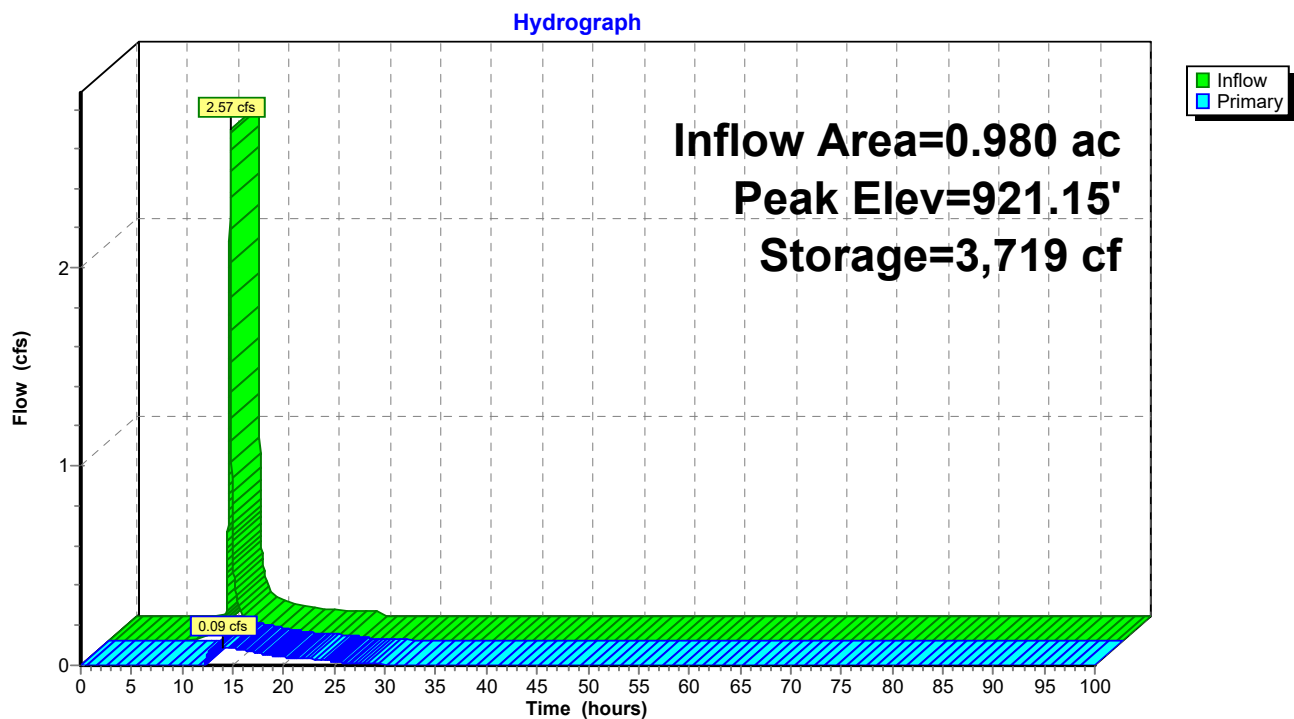
44 Chambers

861.8 cy Field

569.4 cy Stone



Pond 3P: North Basin Orifice



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Type II 24-hr 1-Year Rainfall=2.67"

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Summary for Pond 4P: West Basin Orifice

Inflow Area = 1.910 ac, 67.54% Impervious, Inflow Depth = 1.38" for 1-Year event
 Inflow = 4.59 cfs @ 11.98 hrs, Volume= 0.220 af
 Outflow = 0.20 cfs @ 13.51 hrs, Volume= 0.148 af, Atten= 96%, Lag= 91.8 min
 Primary = 0.20 cfs @ 13.51 hrs, Volume= 0.148 af
 Routed to Pond 5P : Level Spreader

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 909.96' @ 13.51 hrs Surf.Area= 3,327 sf Storage= 5,540 cf

Plug-Flow detention time= 350.2 min calculated for 0.148 af (67% of inflow)
 Center-of-Mass det. time= 242.8 min (1,070.9 - 828.2)

Volume	Invert	Avail.Storage	Storage Description
#1	907.00'	28,862 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
907.00	0	0	0
908.00	1,584	792	792
909.00	2,402	1,993	2,785
910.00	3,364	2,883	5,668
911.00	4,448	3,906	9,574
912.00	5,668	5,058	14,632
913.00	7,027	6,348	20,980
914.00	8,738	7,883	28,862

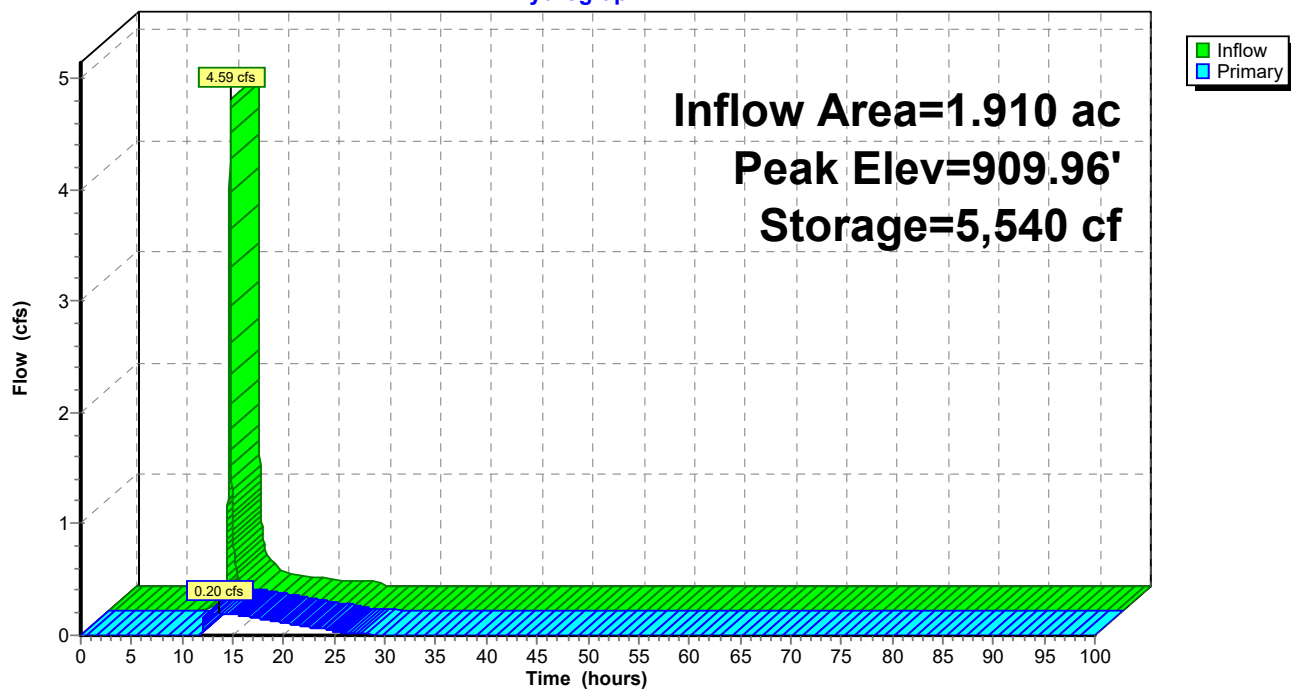
Device	Routing	Invert	Outlet Devices
#1	Primary	908.00'	15.0" Round Culvert L= 32.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 908.00' / 904.00' S= 0.1250 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Device 1	909.14'	3.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	910.50'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.25 1.25 1.75 Width (feet) 1.00 1.00 1.00 1.00

Primary OutFlow Max=0.20 cfs @ 13.51 hrs HW=909.96' (Free Discharge)

- ↑ **1=Culvert** (Passes 0.20 cfs of 6.83 cfs potential flow)
- ↑ **2=Orifice/Grate** (Orifice Controls 0.20 cfs @ 4.02 fps)
- ↑ **3=Custom Weir/Orifice** (Controls 0.00 cfs)

Pond 4P: West Basin Orifice

Hydrograph



23-047 Proposed Site Conditions_5-7-24

Type II 24-hr 1-Year Rainfall=2.67"

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Summary for Pond 5P: Level Spreader

[79] Warning: Submerged Pond 4P Primary device # 1 OUTLET by 0.01'

Inflow Area = 1.910 ac, 67.54% Impervious, Inflow Depth = 0.93" for 1-Year event
 Inflow = 0.20 cfs @ 13.51 hrs, Volume= 0.148 af
 Outflow = 0.20 cfs @ 13.51 hrs, Volume= 0.148 af, Atten= 0%, Lag= 0.1 min
 Primary = 0.20 cfs @ 13.51 hrs, Volume= 0.148 af
 Routed to Link 11L : Combined Flow West

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Peak Elev= 904.01' @ 13.51 hrs Surf.Area= 85 sf Storage= 1 cf

Plug-Flow detention time= 0.1 min calculated for 0.148 af (100% of inflow)

Center-of-Mass det. time= 0.1 min (1,071.0 - 1,070.9)

Volume	Invert	Avail.Storage	Storage Description
#1	904.00'	1,255 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

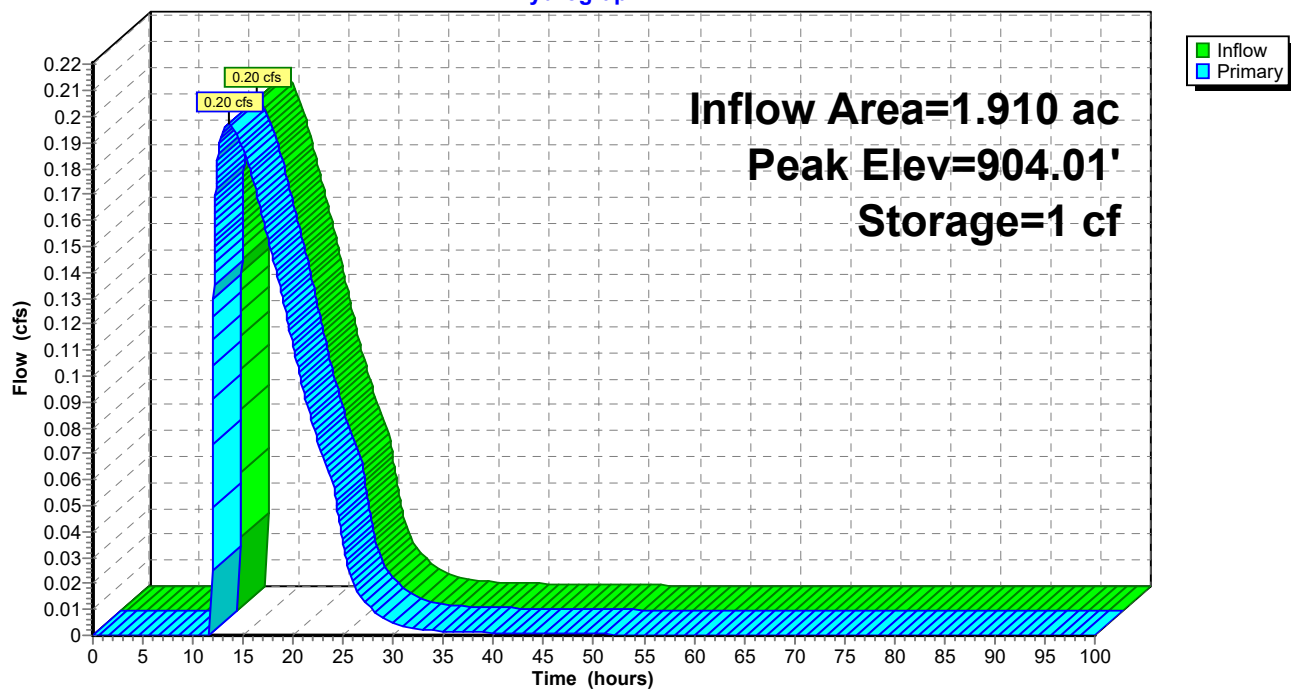
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
904.00	72	0	0
905.00	961	517	517
906.00	515	738	1,255

Device	Routing	Invert	Outlet Devices
#1	Primary	904.00'	30.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=0.17 cfs @ 13.51 hrs HW=904.01' TW=902.00' (Fixed TW Elev= 902.00')↑**1=Sharp-Crested Rectangular Weir**(Weir Controls 0.17 cfs @ 0.39 fps)

Pond 5P: Level Spreader

Hydrograph



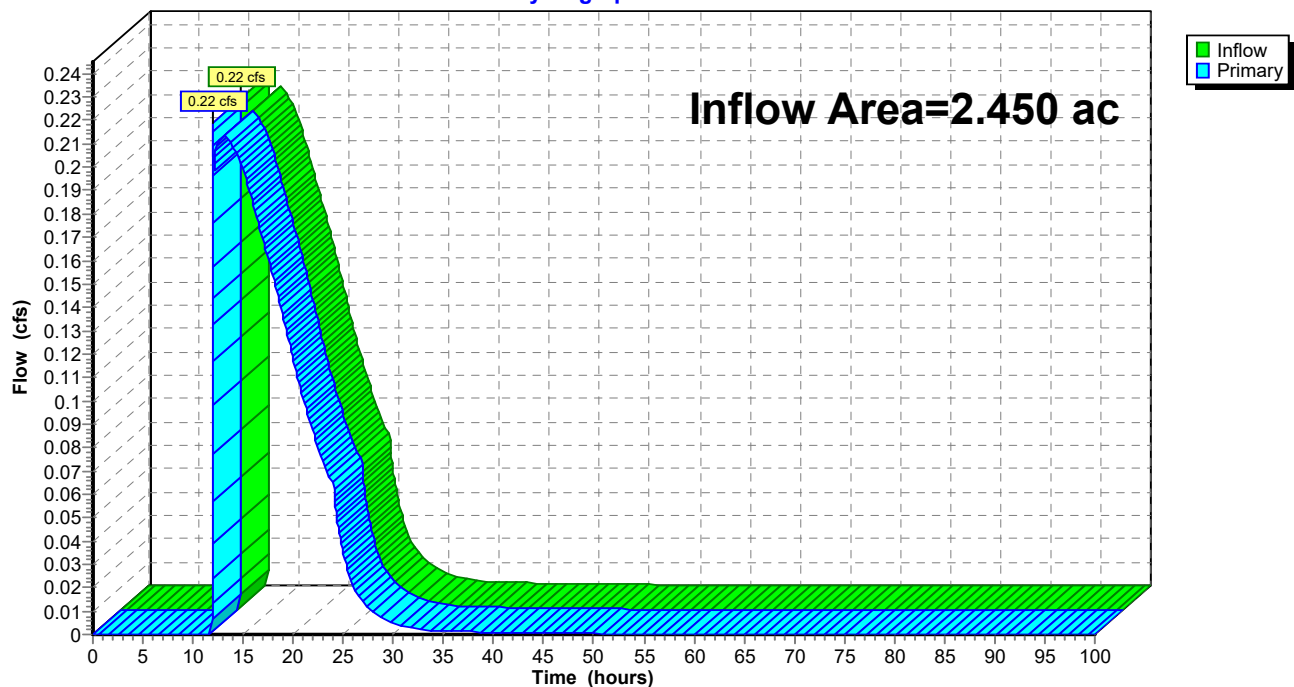
Summary for Link 11L: Combined Flow West

Inflow Area = 2.450 ac, 52.65% Impervious, Inflow Depth = 0.78" for 1-Year event
 Inflow = 0.22 cfs @ 12.03 hrs, Volume= 0.160 af
 Primary = 0.22 cfs @ 12.03 hrs, Volume= 0.160 af, Atten= 0%, Lag= 0.0 min
 Routed to nonexistent node 15L

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Link 11L: Combined Flow West

Hydrograph



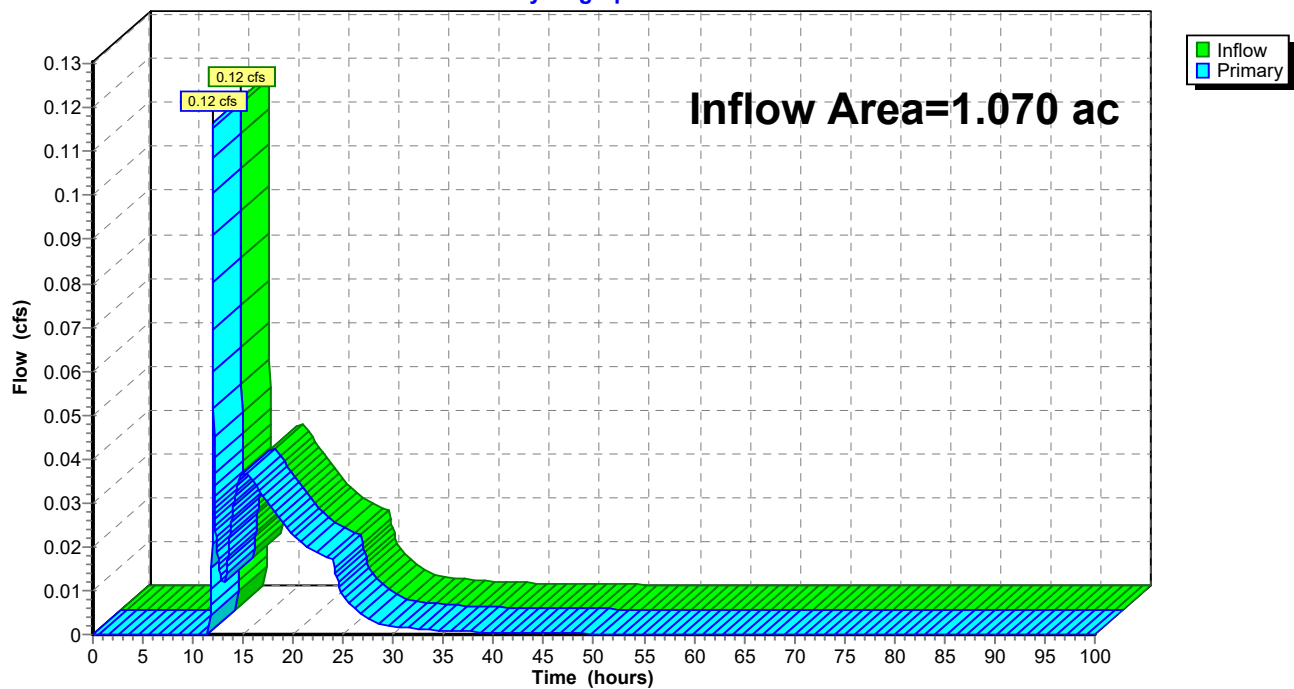
Summary for Link 12L: Combined Flow South

Inflow Area = 1.070 ac, 24.30% Impervious, Inflow Depth = 0.33" for 1-Year event
 Inflow = 0.12 cfs @ 11.99 hrs, Volume= 0.030 af
 Primary = 0.12 cfs @ 11.99 hrs, Volume= 0.030 af, Atten= 0%, Lag= 0.0 min
 Routed to nonexistent node 15L

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Link 12L: Combined Flow South

Hydrograph

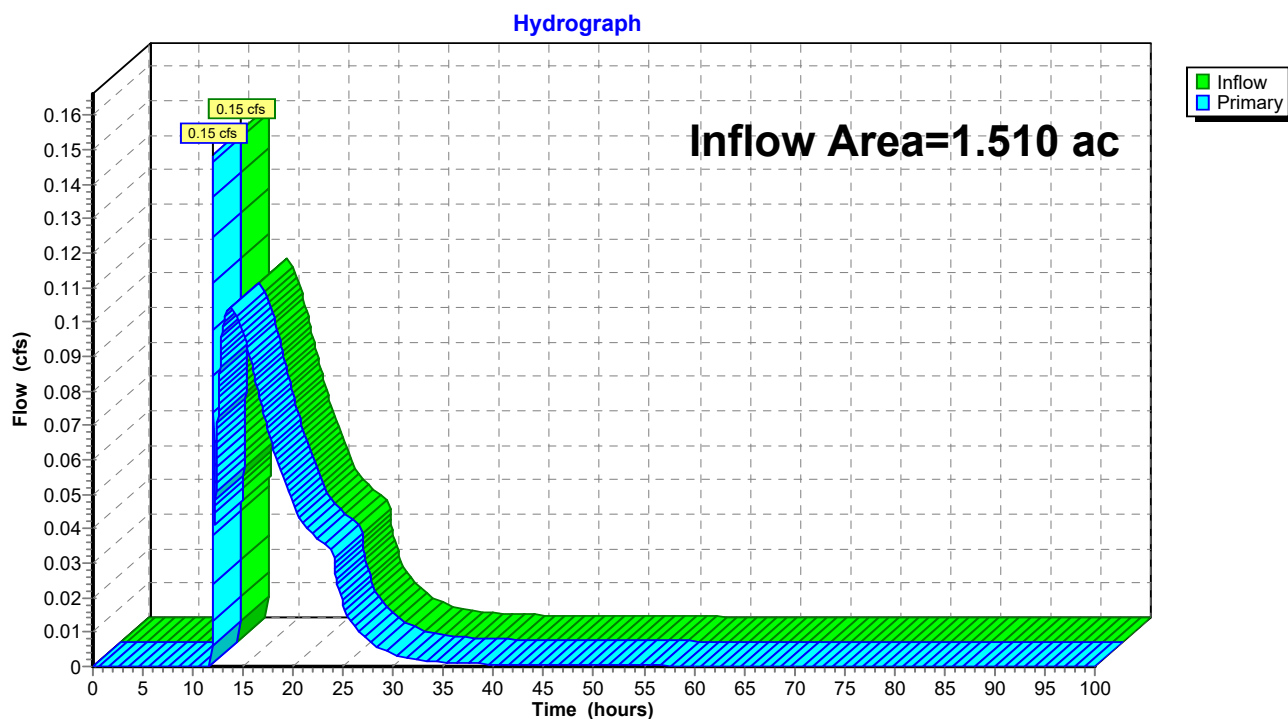


Summary for Link 13L: Comnined Flow North

Inflow Area = 1.510 ac, 49.01% Impervious, Inflow Depth > 0.58" for 1-Year event
 Inflow = 0.15 cfs @ 12.00 hrs, Volume= 0.073 af
 Primary = 0.15 cfs @ 12.00 hrs, Volume= 0.073 af, Atten= 0%, Lag= 0.0 min
 Routed to nonexistent node 15L

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Link 13L: Comnined Flow North



23-047 Proposed Site Conditions_5-7-24*Type II 24-hr 2-Year Rainfall=3.08"*

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Time span=0.00-100.00 hrs, dt=0.01 hrs, 10001 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment7S: UndetainedWest	Runoff Area=0.540 ac 0.00% Impervious Runoff Depth=0.40" Tc=5.0 min CN=61 Runoff=0.31 cfs 0.018 af
Subcatchment8S: UndetainedNorth	Runoff Area=0.530 ac 0.00% Impervious Runoff Depth=0.40" Tc=5.0 min CN=61 Runoff=0.30 cfs 0.017 af
Subcatchment9S: UndetainedSoutheast	Runoff Area=0.170 ac 11.76% Impervious Runoff Depth=0.54" Tc=5.0 min CN=65 Runoff=0.15 cfs 0.008 af
Subcatchment10S: UndetainedSouth	Runoff Area=0.090 ac 0.00% Impervious Runoff Depth=0.40" Tc=5.0 min CN=61 Runoff=0.05 cfs 0.003 af
SubcatchmentP-N: Proposed North	Runoff Area=0.980 ac 75.51% Impervious Runoff Depth=1.97" Flow Length=321' Tc=8.1 min CN=89 Runoff=3.13 cfs 0.161 af
SubcatchmentP-S: Proposed South	Runoff Area=0.480 ac 22.92% Impervious Runoff Depth=0.71" Flow Length=237' Tc=11.1 min CN=69 Runoff=0.46 cfs 0.029 af
SubcatchmentP-SE: Proposed Drainage	Runoff Area=0.330 ac 39.39% Impervious Runoff Depth=1.07" Flow Length=118' Tc=7.3 min CN=76 Runoff=0.60 cfs 0.029 af
SubcatchmentP-W: Proposed West	Runoff Area=1.910 ac 67.54% Impervious Runoff Depth=1.73" Flow Length=1,203' Tc=6.7 min CN=86 Runoff=5.71 cfs 0.276 af
Pond 1P: SE Basin	Peak Elev=917.62' Storage=652 cf Inflow=0.60 cfs 0.029 af Outflow=0.03 cfs 0.020 af
Pond 2P: South Basin Orifice	Peak Elev=912.52' Storage=606 cf Inflow=0.46 cfs 0.048 af Outflow=0.07 cfs 0.039 af
Pond 3P: North Basin Orifice	Peak Elev=921.37' Storage=4,316 cf Inflow=3.13 cfs 0.161 af Outflow=0.14 cfs 0.093 af
Pond 4P: West Basin Orifice	Peak Elev=910.38' Storage=7,009 cf Inflow=5.71 cfs 0.276 af Outflow=0.25 cfs 0.204 af
Pond 5P: Level Spreader	Peak Elev=904.02' Storage=1 cf Inflow=0.25 cfs 0.204 af Outflow=0.25 cfs 0.204 af
Link 11L: Combined Flow West	Inflow=0.44 cfs 0.221 af Primary=0.44 cfs 0.221 af
Link 12L: Combined Flow South	Inflow=0.20 cfs 0.049 af Primary=0.20 cfs 0.049 af
Link 13L: Comnined Flow North	Inflow=0.30 cfs 0.110 af Primary=0.30 cfs 0.110 af

23-047 Proposed Site Conditions_5-7-24*Type II 24-hr 2-Year Rainfall=3.08"*

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Total Runoff Area = 5.030 ac Runoff Volume = 0.541 af Average Runoff Depth = 1.29"
54.47% Pervious = 2.740 ac 45.53% Impervious = 2.290 ac

23-047 Proposed Site Conditions_5-7-24

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Type II 24-hr 2-Year Rainfall=3.08"

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Summary for Subcatchment 7S: Undetained West

Runoff = 0.31 cfs @ 11.99 hrs, Volume= 0.018 af, Depth= 0.40"
Routed to Link 11L : Combined Flow West

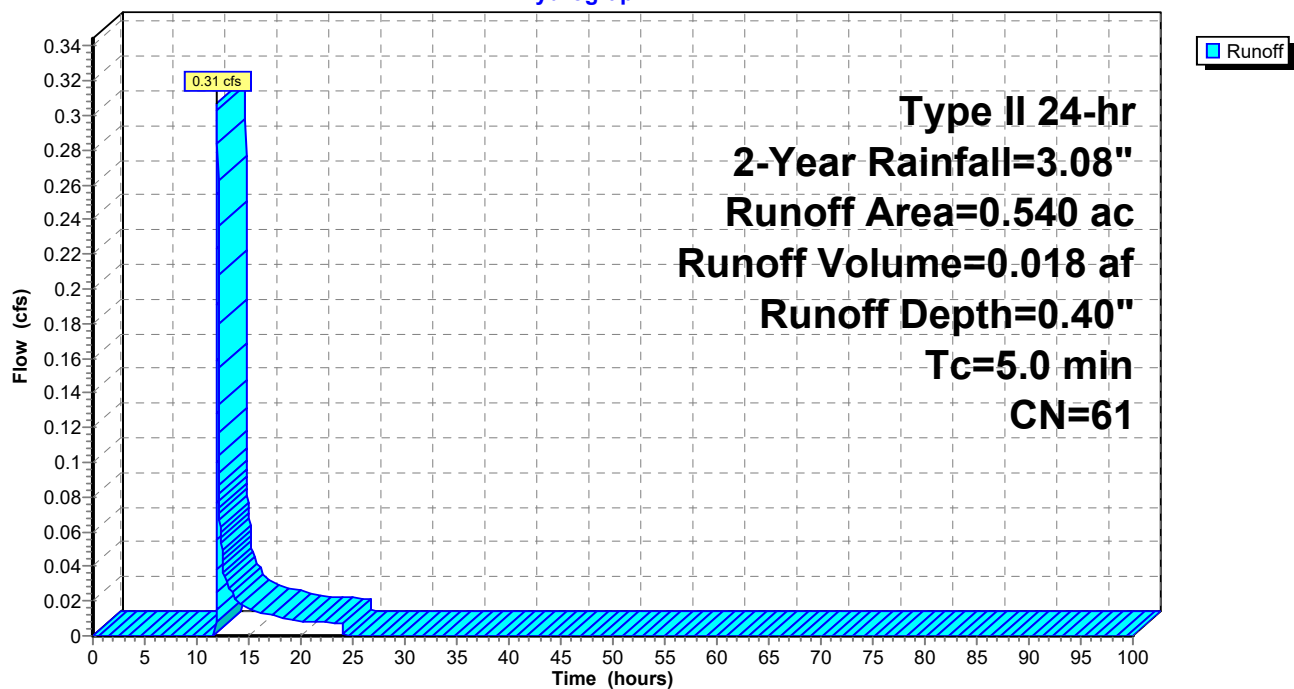
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-Year Rainfall=3.08"

Area (ac)	CN	Description
* 0.540	61	>75% Grass cover, Good, HSG B
0.540		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 7S: Undetained West

Hydrograph



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Type II 24-hr 2-Year Rainfall=3.08"

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Summary for Subcatchment 8S: Undetained North

Runoff = 0.30 cfs @ 11.99 hrs, Volume= 0.017 af, Depth= 0.40"
Routed to Link 13L : Comnined Flow North

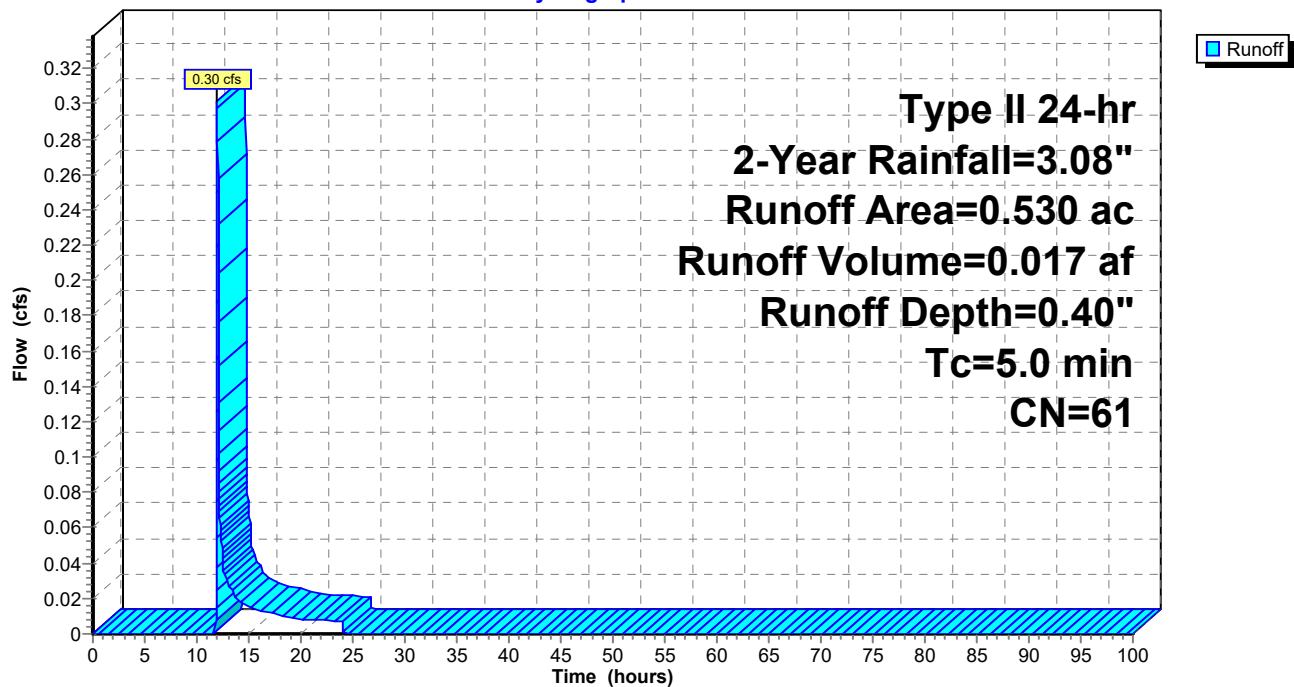
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-Year Rainfall=3.08"

Area (ac)	CN	Description
* 0.530	61	>75% Grass cover, Good, HSG B
0.530		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 8S: Undetained North

Hydrograph



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Type II 24-hr 2-Year Rainfall=3.08"

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Summary for Subcatchment 9S: Undetained Southeast

Runoff = 0.15 cfs @ 11.98 hrs, Volume= 0.008 af, Depth= 0.54"
Routed to Link 12L : Combined Flow South

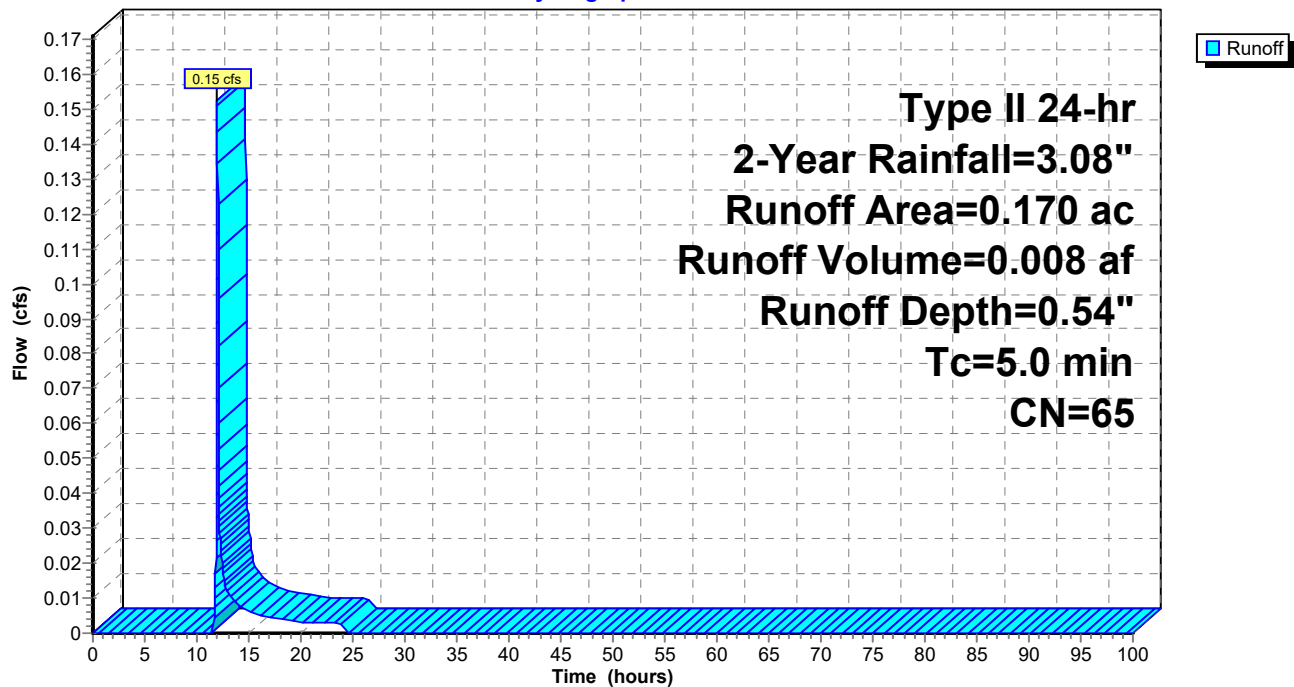
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-Year Rainfall=3.08"

Area (ac)	CN	Description
* 0.150	61	>75% Grass cover, Good, HSG B
* 0.020	98	Pavement
0.170	65	Weighted Average
0.150		88.24% Pervious Area
0.020		11.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 9S: Undetained Southeast

Hydrograph



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Type II 24-hr 2-Year Rainfall=3.08"

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Summary for Subcatchment 10S: Undetained South

Runoff = 0.05 cfs @ 11.99 hrs, Volume= 0.003 af, Depth= 0.40"
Routed to Link 12L : Combined Flow South

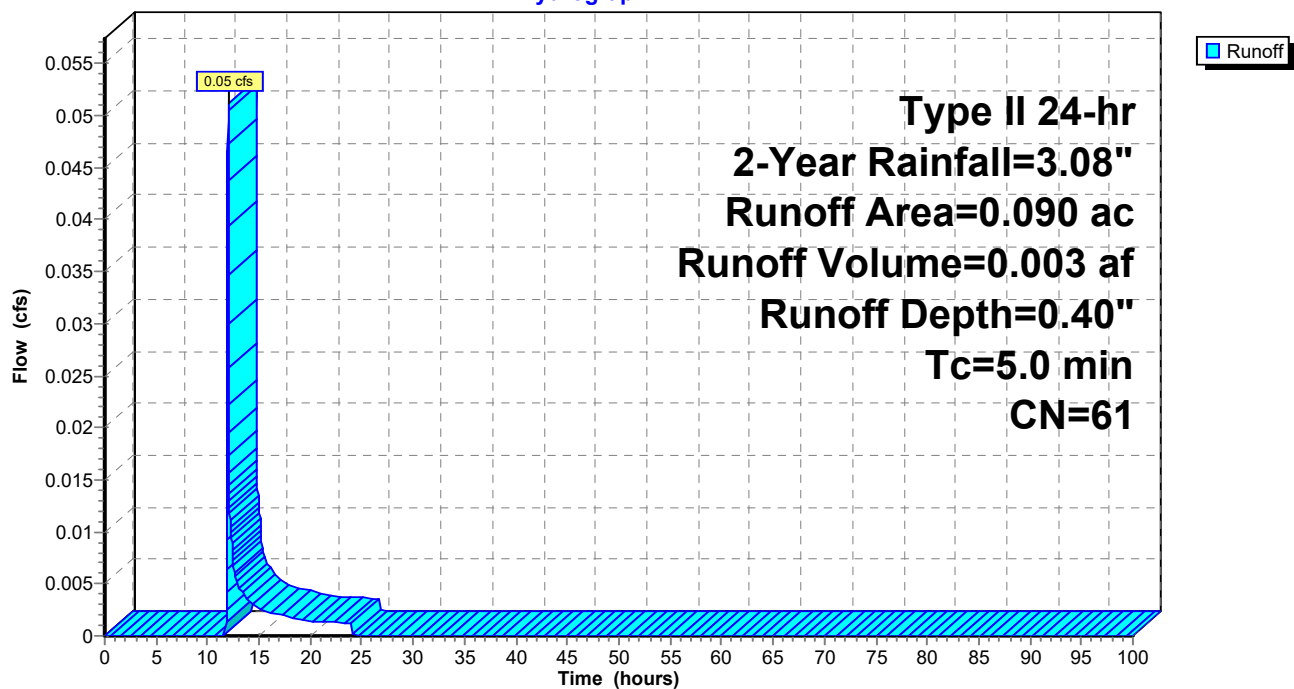
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-Year Rainfall=3.08"

Area (ac)	CN	Description
* 0.090	61	>75% Grass cover, Good, HSG B
0.090		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 10S: Undetained South

Hydrograph



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Type II 24-hr 2-Year Rainfall=3.08"

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Summary for Subcatchment P-N: Proposed North

Runoff = 3.13 cfs @ 11.99 hrs, Volume= 0.161 af, Depth= 1.97"
Routed to Pond 3P : North Basin Orifice

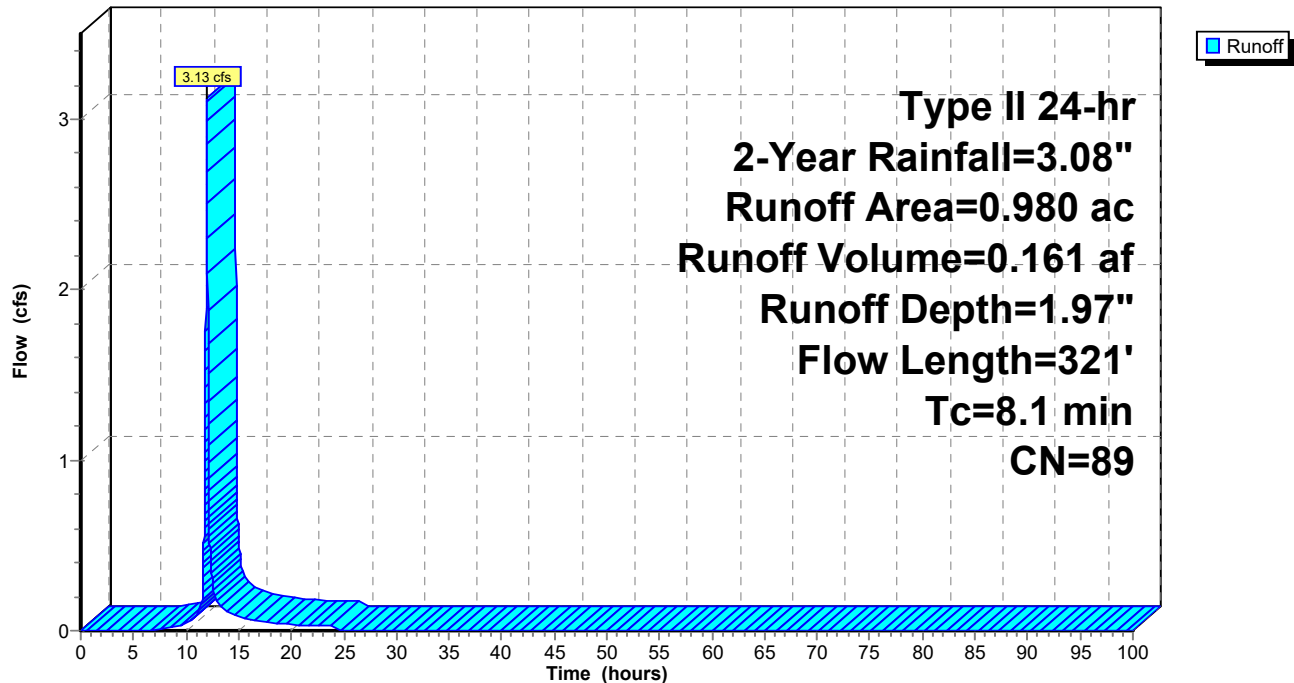
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-Year Rainfall=3.08"

Area (ac)	CN	Description
* 0.740	98	Paved roads w/curbs & sewers, HSG C
0.240	61	>75% Grass cover, Good, HSG B
0.980	89	Weighted Average
0.240		24.49% Pervious Area
0.740		75.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	91	0.0350	0.20		Sheet Flow, SHEET (GRASS) Grass: Short n= 0.150 P2= 3.04"
0.6	230	0.0150	6.45	7.91	Pipe Channel, PIPE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
8.1	321	Total			

Subcatchment P-N: Proposed North

Hydrograph



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Type II 24-hr 2-Year Rainfall=3.08"

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Summary for Subcatchment P-S: Proposed South

Runoff = 0.46 cfs @ 12.05 hrs, Volume= 0.029 af, Depth= 0.71"
Routed to Pond 2P : South Basin Orifice

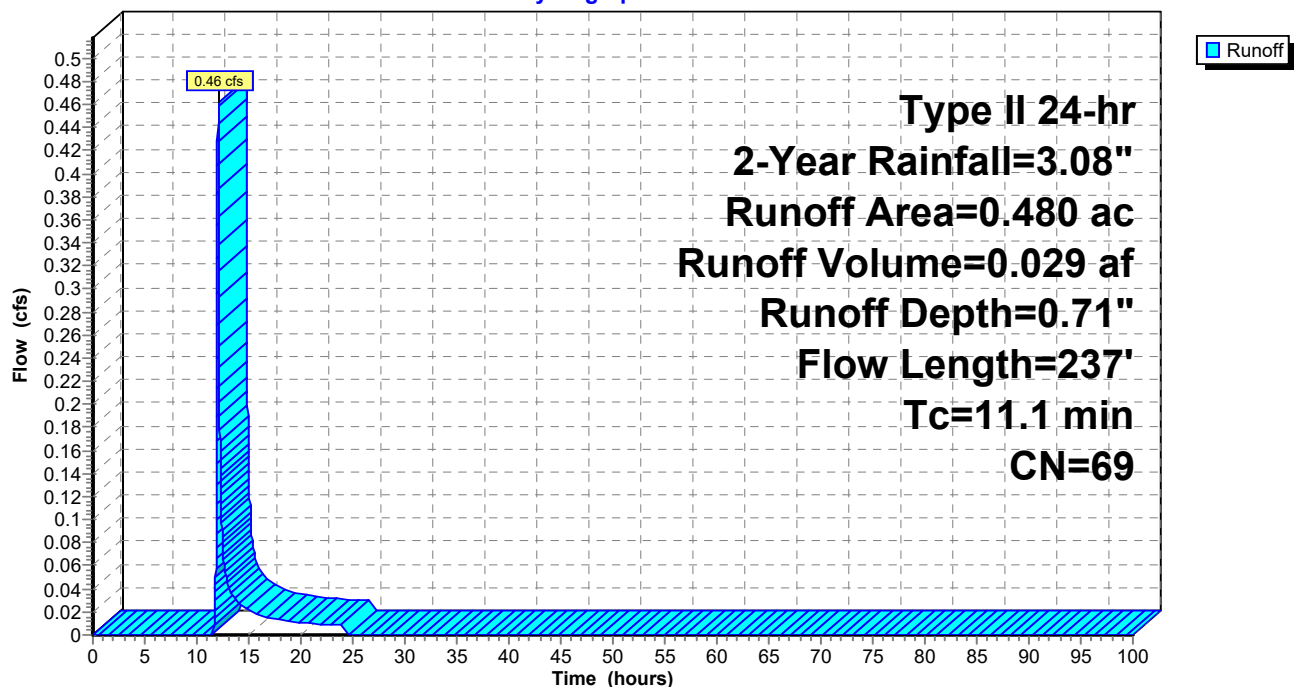
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-Year Rainfall=3.08"

Area (ac)	CN	Description
* 0.110	98	Paved roads w/curbs & sewers, HSG C
0.370	61	>75% Grass cover, Good, HSG B
0.480	69	Weighted Average
0.370		77.08% Pervious Area
0.110		22.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	100	0.0200	0.17		Sheet Flow, SHEET (GRASS) Grass: Short n= 0.150 P2= 3.04"
0.9	112	0.0200	2.12		Shallow Concentrated Flow, SHALLOW (GRASS) Grassed Waterway Kv= 15.0 fps
0.1	25	0.2500	7.50		Shallow Concentrated Flow, SHALLOW (GRASS) Grassed Waterway Kv= 15.0 fps
11.1	237	Total			

Subcatchment P-S: Proposed South

Hydrograph



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Type II 24-hr 2-Year Rainfall=3.08"

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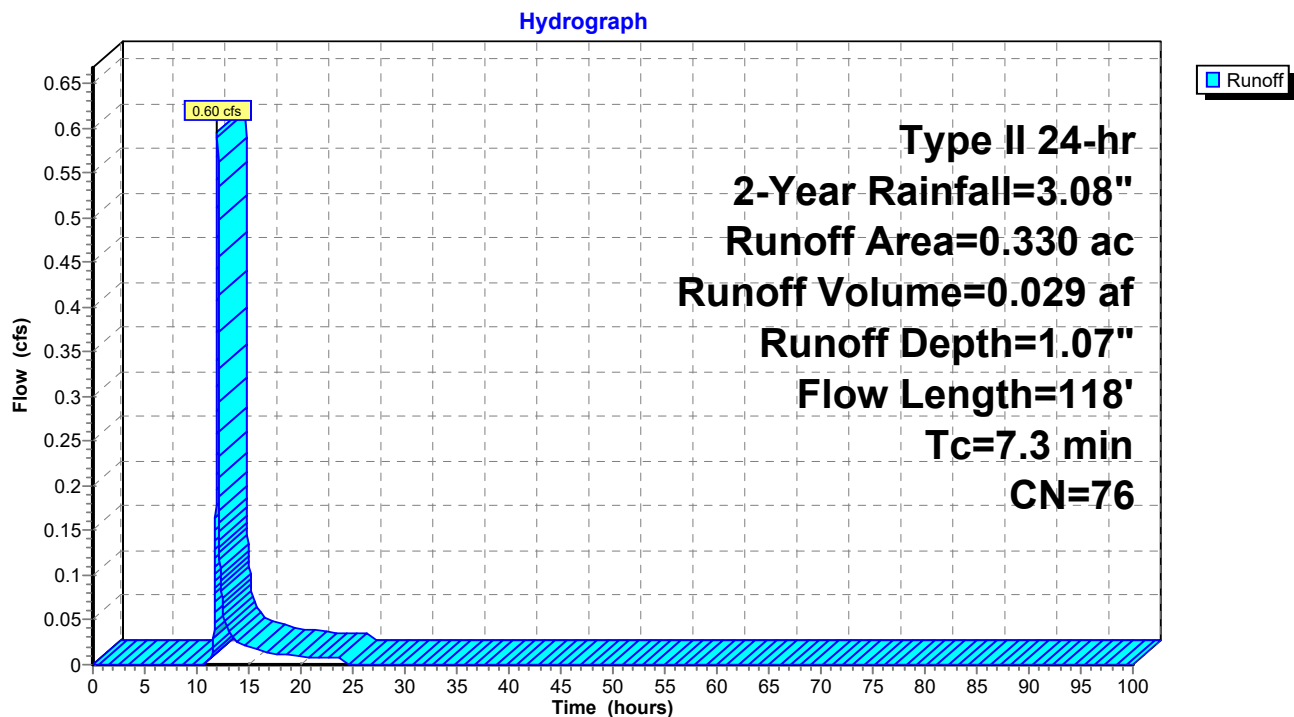
Summary for Subcatchment P-SE: Proposed Drainage

Runoff = 0.60 cfs @ 11.99 hrs, Volume= 0.029 af, Depth= 1.07"
Routed to Pond 1P : SE Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-Year Rainfall=3.08"

Area (ac)	CN	Description
0.130	98	Paved parking, HSG C
0.200	61	>75% Grass cover, Good, HSG B
0.330	76	Weighted Average
0.200		60.61% Pervious Area
0.130		39.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	65	0.0200	0.15		Sheet Flow, Grass: Short n= 0.150 P2= 3.04"
0.2	53	0.0100	5.26	6.46	Pipe Channel, 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
7.3	118	Total			

Subcatchment P-SE: Proposed Drainage

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Type II 24-hr 2-Year Rainfall=3.08"

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Summary for Subcatchment P-W: Proposed West

Runoff = 5.71 cfs @ 11.98 hrs, Volume= 0.276 af, Depth= 1.73"
Routed to Pond 4P : West Basin Orifice

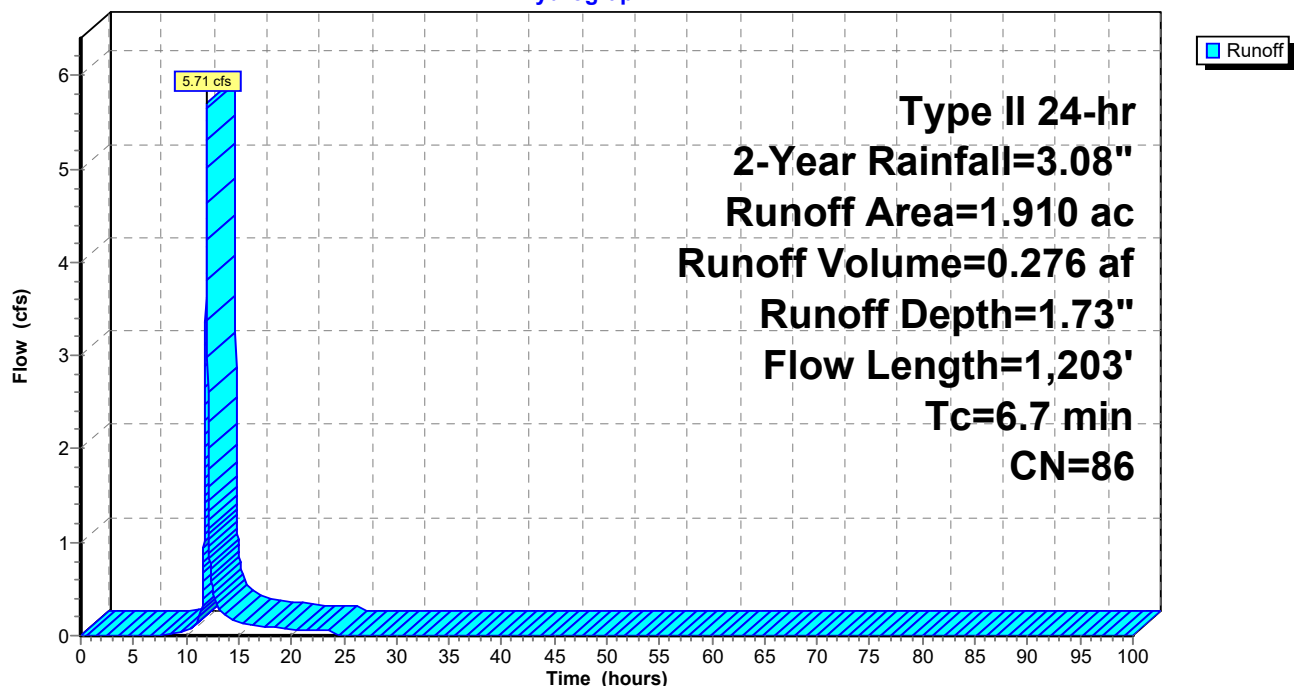
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-Year Rainfall=3.08"

Area (ac)	CN	Description
* 1.290	98	Paved roads w/curbs & sewers, HSG C
0.620	61	>75% Grass cover, Good, HSG B
1.910	86	Weighted Average
0.620		32.46% Pervious Area
1.290		67.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	100	0.0050	0.77		Sheet Flow, SHEET (PAVED) Smooth surfaces n= 0.011 P2= 3.04"
3.6	725	0.0280	3.40		Shallow Concentrated Flow, SHALLOW (PAVED) Paved Kv= 20.3 fps
0.9	378	0.0150	7.28	12.87	Pipe Channel, Storm Sewer 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
6.7	1,203	Total			

Subcatchment P-W: Proposed West

Hydrograph



23-047 Proposed Site Conditions_5-7-24

Type II 24-hr 2-Year Rainfall=3.08"

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Summary for Pond 1P: SE Basin

Inflow Area = 0.330 ac, 39.39% Impervious, Inflow Depth = 1.07" for 2-Year event
 Inflow = 0.60 cfs @ 11.99 hrs, Volume= 0.029 af
 Outflow = 0.03 cfs @ 13.28 hrs, Volume= 0.020 af, Atten= 94%, Lag= 77.3 min
 Primary = 0.03 cfs @ 13.28 hrs, Volume= 0.020 af
 Routed to Pond 2P : South Basin Orifice

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 917.62' @ 13.28 hrs Surf.Area= 1,848 sf Storage= 652 cf

Plug-Flow detention time= 357.5 min calculated for 0.020 af (67% of inflow)
 Center-of-Mass det. time= 239.8 min (1,095.5 - 855.7)

Volume	Invert	Avail.Storage	Storage Description
#1	916.91'	8,715 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
916.91	0	0	0
918.00	2,856	1,557	1,557
919.00	3,551	3,204	4,760
920.00	4,358	3,955	8,715

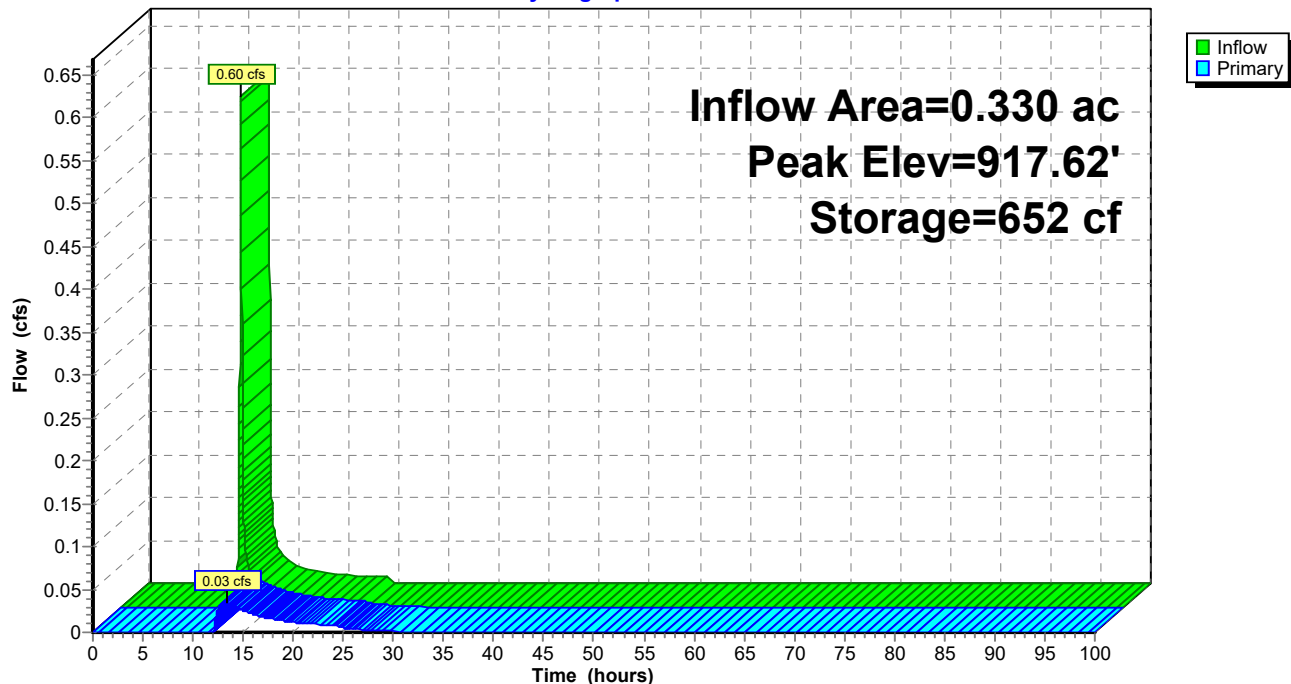
Device	Routing	Invert	Outlet Devices
#1	Primary	916.26'	4.0" Round Culvert X 3.00 L= 30.2' Ke= 0.500 Inlet / Outlet Invert= 916.26' / 915.96' S= 0.0099 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 0.09 sf
#2	Device 1	917.48'	3.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	918.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.45 0.45 0.95 Width (feet) 0.50 0.50 3.00 3.00

Primary OutFlow Max=0.03 cfs @ 13.28 hrs HW=917.62' (Free Discharge)

1=Culvert (Passes 0.03 cfs of 1.02 cfs potential flow)
 2=Orifice/Grate (Orifice Controls 0.03 cfs @ 1.25 fps)
 3=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 1P: SE Basin

Hydrograph



23-047 Proposed Site Conditions_5-7-24

Type II 24-hr 2-Year Rainfall=3.08"

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Summary for Pond 2P: South Basin Orifice

Inflow Area = 0.810 ac, 29.63% Impervious, Inflow Depth = 0.71" for 2-Year event
 Inflow = 0.46 cfs @ 12.05 hrs, Volume= 0.048 af
 Outflow = 0.07 cfs @ 13.55 hrs, Volume= 0.039 af, Atten= 85%, Lag= 90.2 min
 Primary = 0.07 cfs @ 13.55 hrs, Volume= 0.039 af
 Routed to Link 12L : Combined Flow South

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 912.52' @ 13.55 hrs Surf.Area= 1,003 sf Storage= 606 cf

Plug-Flow detention time= 243.6 min calculated for 0.039 af (80% of inflow)
 Center-of-Mass det. time= 129.9 min (1,100.3 - 970.4)

Volume	Invert	Avail.Storage	Storage Description
#1	911.50'	5,431 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
911.50	0	0	0
912.00	682	171	171
913.00	1,303	993	1,163
914.00	2,092	1,698	2,861
915.00	3,048	2,570	5,431

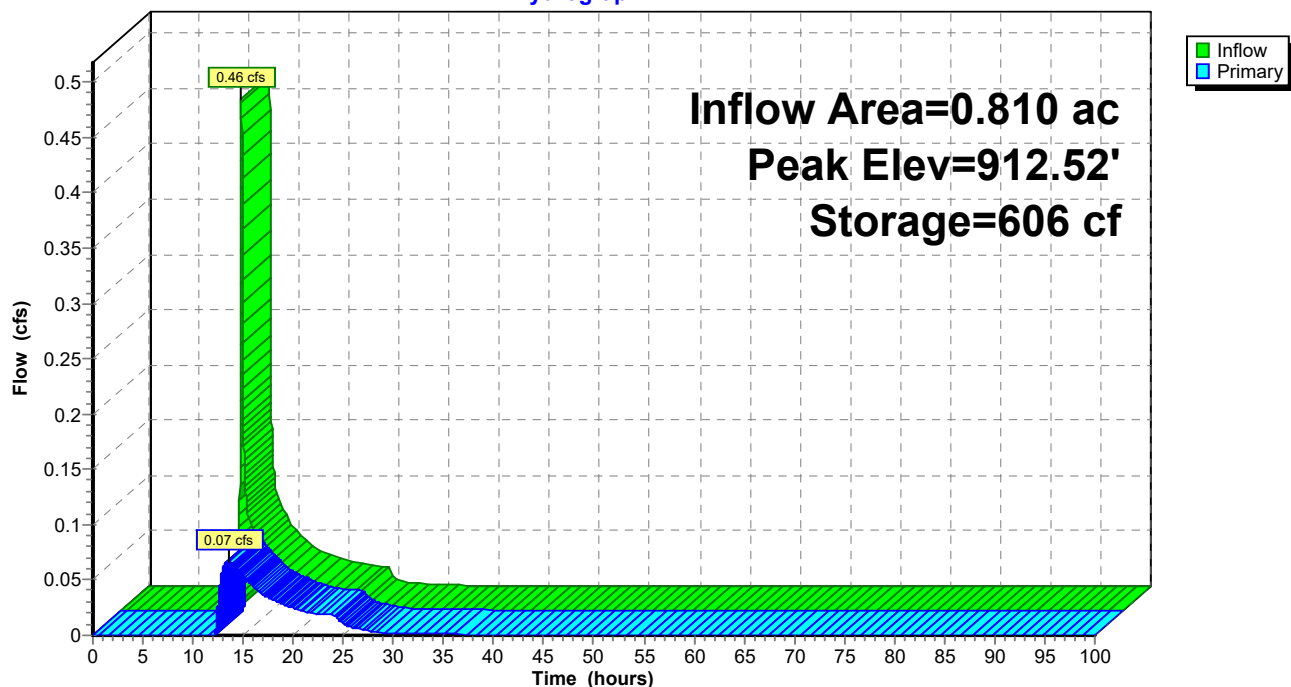
Device	Routing	Invert	Outlet Devices
#1	Primary	911.34'	6.0" Round Culvert L= 68.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 911.34' / 909.31' S= 0.0299 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	912.31'	3.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	913.00'	10.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.07 cfs @ 13.55 hrs HW=912.52' (Free Discharge)

- ↑ **1=Culvert** (Passes 0.07 cfs of 0.91 cfs potential flow)
- ↑ **2=Orifice/Grate** (Orifice Controls 0.07 cfs @ 1.55 fps)
- ↑ **3=Orifice/Grate** (Controls 0.00 cfs)

Pond 2P: South Basin Orifice

Hydrograph



23-047 Proposed Site Conditions_5-7-24

Type II 24-hr 2-Year Rainfall=3.08"

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Summary for Pond 3P: North Basin Orifice

Inflow Area = 0.980 ac, 75.51% Impervious, Inflow Depth = 1.97" for 2-Year event
 Inflow = 3.13 cfs @ 11.99 hrs, Volume= 0.161 af
 Outflow = 0.14 cfs @ 13.35 hrs, Volume= 0.093 af, Atten= 95%, Lag= 81.1 min
 Primary = 0.14 cfs @ 13.35 hrs, Volume= 0.093 af
 Routed to Link 13L : Combined Flow North

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 921.37' @ 13.35 hrs Surf.Area= 3,447 sf Storage= 4,316 cf

Plug-Flow detention time= 368.9 min calculated for 0.093 af (57% of inflow)
 Center-of-Mass det. time= 259.0 min (1,070.5 - 811.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	919.40'	6,149 cf	20.08'W x 171.65'L x 6.75'H Field A 23,269 cf Overall - 7,897 cf Embedded = 15,373 cf x 40.0% Voids
#2A	920.15'	7,897 cf	ADS_StormTech MC-7200 +Cap x 44 Inside #1 Effective Size= 91.2"W x 60.0"H => 26.68 sf x 6.59'L = 175.9 cf Overall Size= 100.0"W x 60.0"H x 6.95'L with 0.36' Overlap 44 Chambers in 2 Rows Cap Storage= 39.5 cf x 2 x 2 rows = 158.0 cf
		14,046 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	918.30'	12.0" Round Culvert L= 104.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 918.30' / 910.25' S= 0.0774 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	920.87'	3.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	924.15'	12.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.14 cfs @ 13.35 hrs HW=921.37' (Free Discharge)

↑ **1=Culvert** (Passes 0.14 cfs of 6.06 cfs potential flow)
 ↑ **2=Orifice/Grate** (Orifice Controls 0.14 cfs @ 2.95 fps)
 ↑ **3=Orifice/Grate** (Controls 0.00 cfs)

23-047 Proposed Site Conditions_5-7-24

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Type II 24-hr 2-Year Rainfall=3.08"

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Pond 3P: North Basin Orifice - Chamber Wizard Field A

Chamber Model = ADS_StormTechMC-7200 +Cap (ADS StormTech®MC-7200 with cap volume)

Effective Size= 91.2"W x 60.0"H => 26.68 sf x 6.59'L = 175.9 cf

Overall Size= 100.0"W x 60.0"H x 6.95'L with 0.36' Overlap

Cap Storage= 39.5 cf x 2 x 2 rows = 158.0 cf

100.0" Wide + 9.0" Spacing = 109.0" C-C Row Spacing

22 Chambers/Row x 6.59' Long +2.73' Cap Length x 2 = 150.48' Row Length +127.0" End Stone x 2 = 171.65' Base Length

2 Rows x 100.0" Wide + 9.0" Spacing x 1 + 16.0" Side Stone x 2 = 20.08' Base Width

9.0" Stone Base + 60.0" Chamber Height + 12.0" Stone Cover = 6.75' Field Height

44 Chambers x 175.9 cf + 39.5 cf Cap Volume x 2 x 2 Rows = 7,896.5 cf Chamber Storage

23,269.3 cf Field - 7,896.5 cf Chambers = 15,372.8 cf Stone x 40.0% Voids = 6,149.1 cf Stone Storage

Chamber Storage + Stone Storage = 14,045.6 cf = 0.322 af

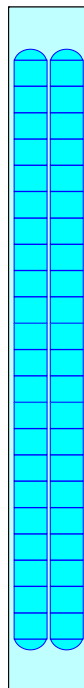
Overall Storage Efficiency = 60.4%

Overall System Size = 171.65' x 20.08' x 6.75'

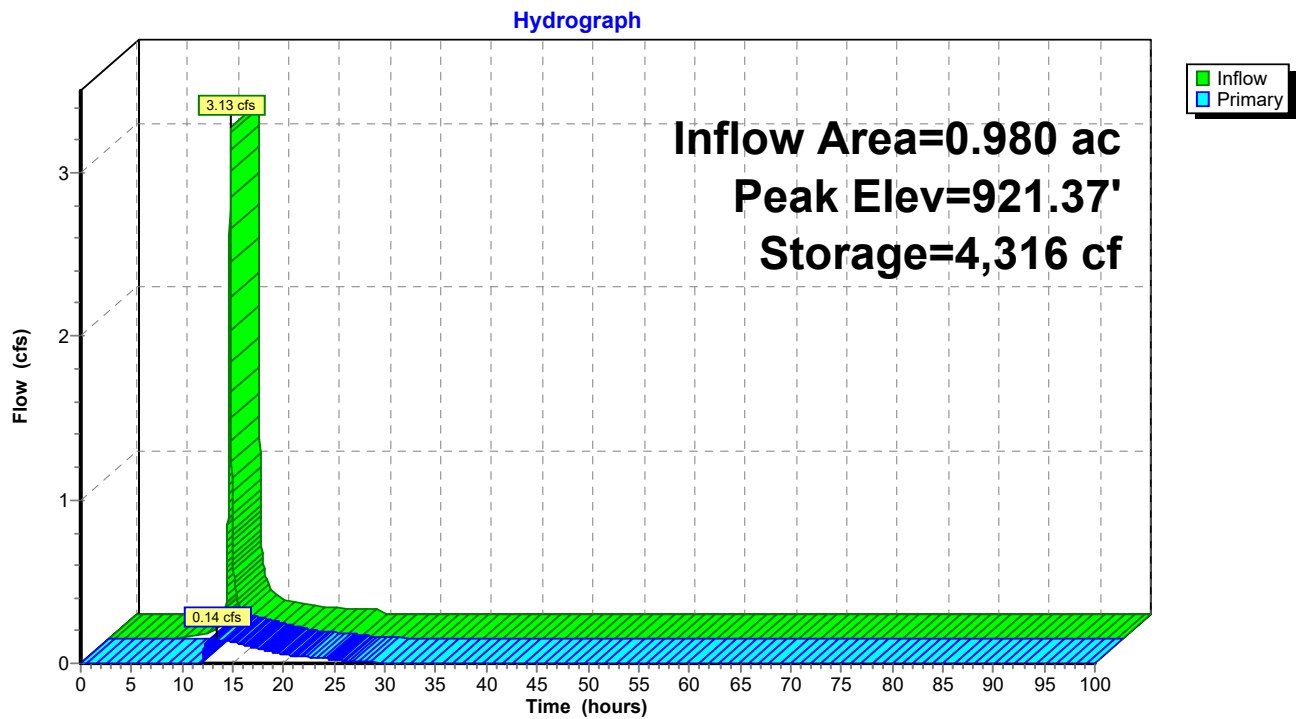
44 Chambers

861.8 cy Field

569.4 cy Stone



Pond 3P: North Basin Orifice



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Type II 24-hr 2-Year Rainfall=3.08"

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Summary for Pond 4P: West Basin Orifice

Inflow Area = 1.910 ac, 67.54% Impervious, Inflow Depth = 1.73" for 2-Year event
 Inflow = 5.71 cfs @ 11.98 hrs, Volume= 0.276 af
 Outflow = 0.25 cfs @ 13.43 hrs, Volume= 0.204 af, Atten= 96%, Lag= 87.0 min
 Primary = 0.25 cfs @ 13.43 hrs, Volume= 0.204 af
 Routed to Pond 5P : Level Spreader

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 910.38' @ 13.43 hrs Surf.Area= 3,771 sf Storage= 7,009 cf

Plug-Flow detention time= 356.3 min calculated for 0.204 af (74% of inflow)
 Center-of-Mass det. time= 260.3 min (1,082.0 - 821.8)

Volume	Invert	Avail.Storage	Storage Description
#1	907.00'	28,862 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
907.00	0	0	0
908.00	1,584	792	792
909.00	2,402	1,993	2,785
910.00	3,364	2,883	5,668
911.00	4,448	3,906	9,574
912.00	5,668	5,058	14,632
913.00	7,027	6,348	20,980
914.00	8,738	7,883	28,862

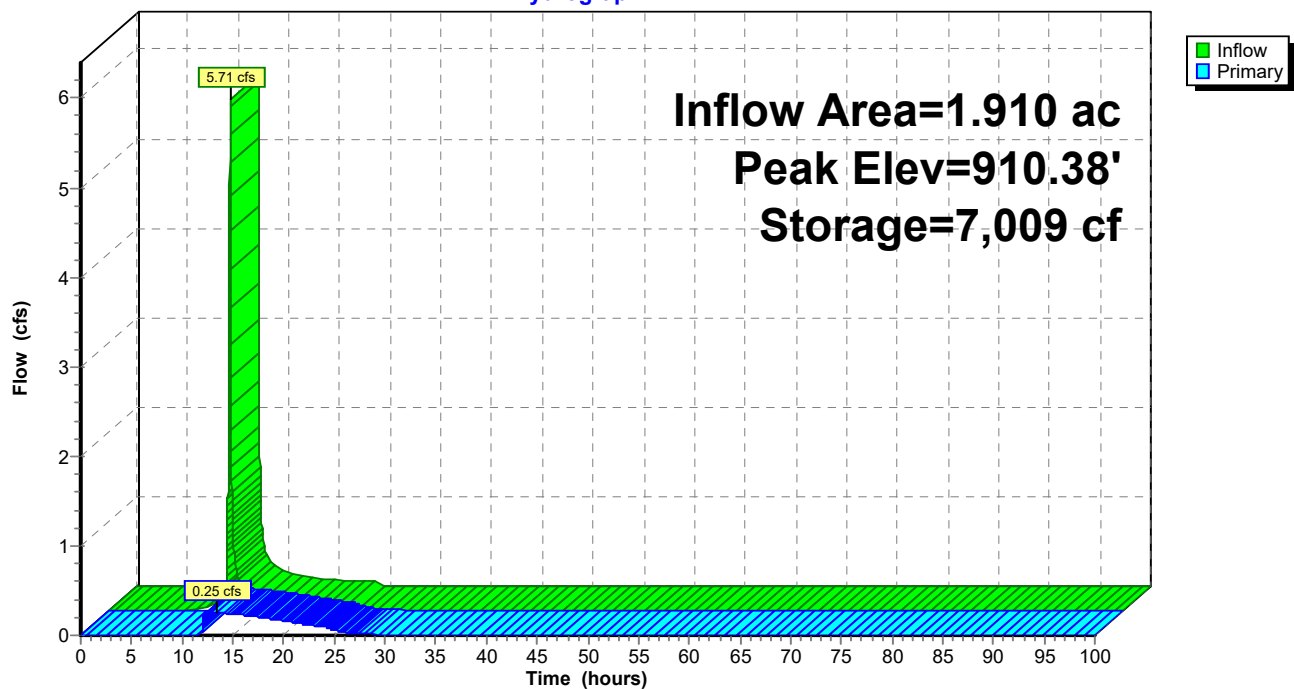
Device	Routing	Invert	Outlet Devices
#1	Primary	908.00'	15.0" Round Culvert L= 32.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 908.00' / 904.00' S= 0.1250 ' S= 0.1250 ' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Device 1	909.14'	3.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	910.50'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.25 1.25 1.75 Width (feet) 1.00 1.00 1.00 1.00

Primary OutFlow Max=0.25 cfs @ 13.43 hrs HW=910.38' (Free Discharge)

- ↑ **1=Culvert** (Passes 0.25 cfs of 7.82 cfs potential flow)
- ↑ **2=Orifice/Grate** (Orifice Controls 0.25 cfs @ 5.07 fps)
- ↑ **3=Custom Weir/Orifice** (Controls 0.00 cfs)

Pond 4P: West Basin Orifice

Hydrograph



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Type II 24-hr 2-Year Rainfall=3.08"

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Summary for Pond 5P: Level Spreader

[79] Warning: Submerged Pond 4P Primary device # 1 OUTLET by 0.02'

Inflow Area = 1.910 ac, 67.54% Impervious, Inflow Depth = 1.28" for 2-Year event
 Inflow = 0.25 cfs @ 13.43 hrs, Volume= 0.204 af
 Outflow = 0.25 cfs @ 13.43 hrs, Volume= 0.204 af, Atten= 0%, Lag= 0.1 min
 Primary = 0.25 cfs @ 13.43 hrs, Volume= 0.204 af
 Routed to Link 11L : Combined Flow West

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Peak Elev= 904.02' @ 13.43 hrs Surf.Area= 88 sf Storage= 1 cf

Plug-Flow detention time= 0.1 min calculated for 0.204 af (100% of inflow)

Center-of-Mass det. time= 0.1 min (1,082.1 - 1,082.0)

Volume	Invert	Avail.Storage	Storage Description
#1	904.00'	1,255 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

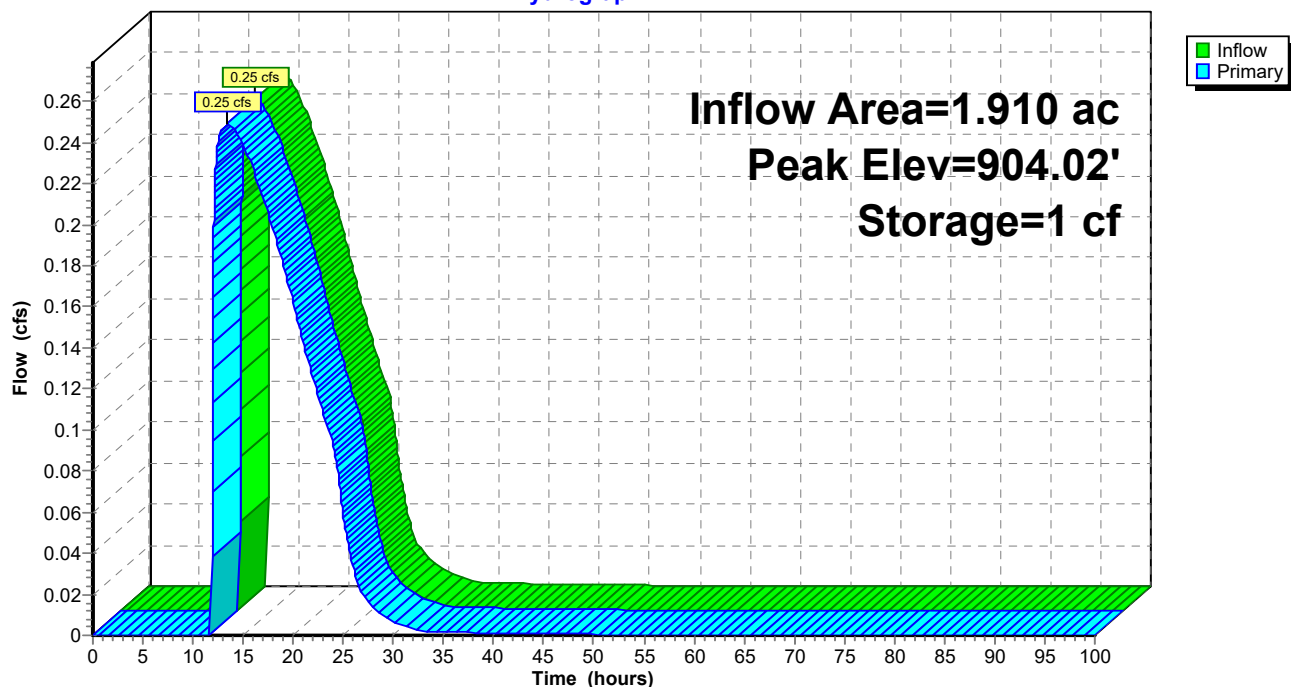
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
904.00	72	0	0
905.00	961	517	517
906.00	515	738	1,255

Device	Routing	Invert	Outlet Devices
#1	Primary	904.00'	30.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=0.24 cfs @ 13.43 hrs HW=904.02' TW=902.00' (Fixed TW Elev= 902.00')↑**1=Sharp-Crested Rectangular Weir**(Weir Controls 0.24 cfs @ 0.44 fps)

Pond 5P: Level Spreader

Hydrograph



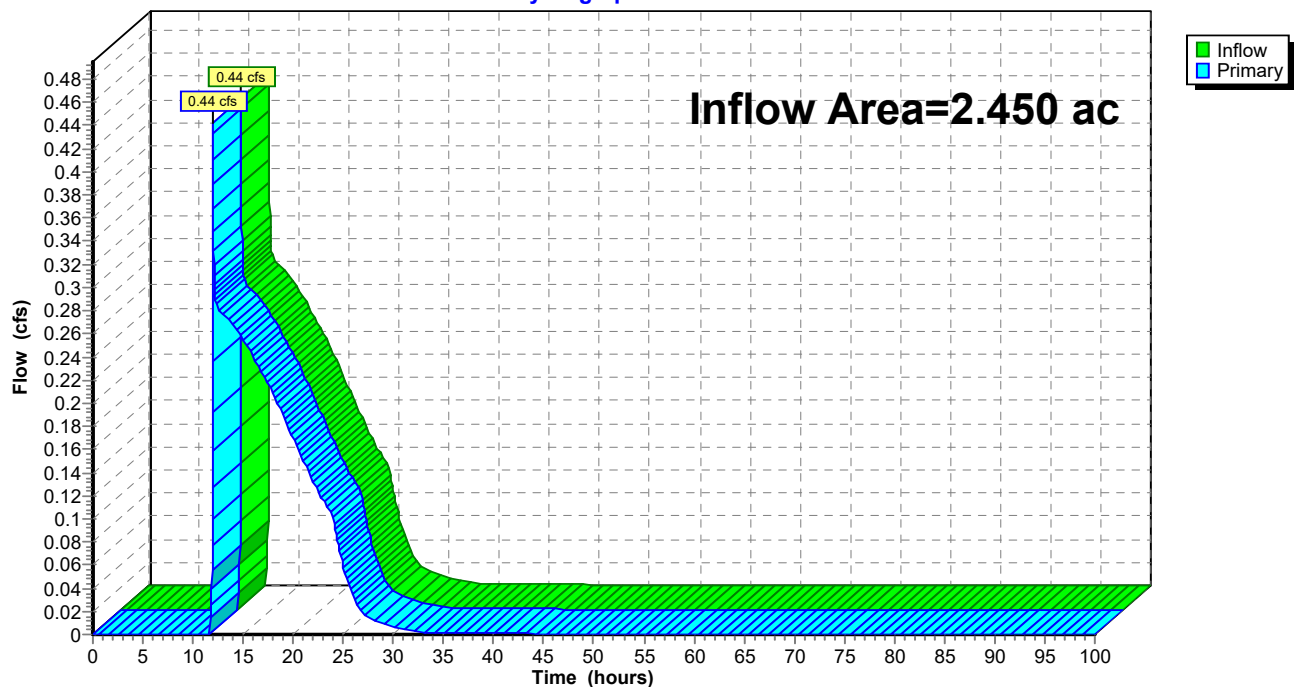
Summary for Link 11L: Combined Flow West

Inflow Area = 2.450 ac, 52.65% Impervious, Inflow Depth = 1.08" for 2-Year event
 Inflow = 0.44 cfs @ 12.00 hrs, Volume= 0.221 af
 Primary = 0.44 cfs @ 12.00 hrs, Volume= 0.221 af, Atten= 0%, Lag= 0.0 min
 Routed to nonexistent node 15L

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Link 11L: Combined Flow West

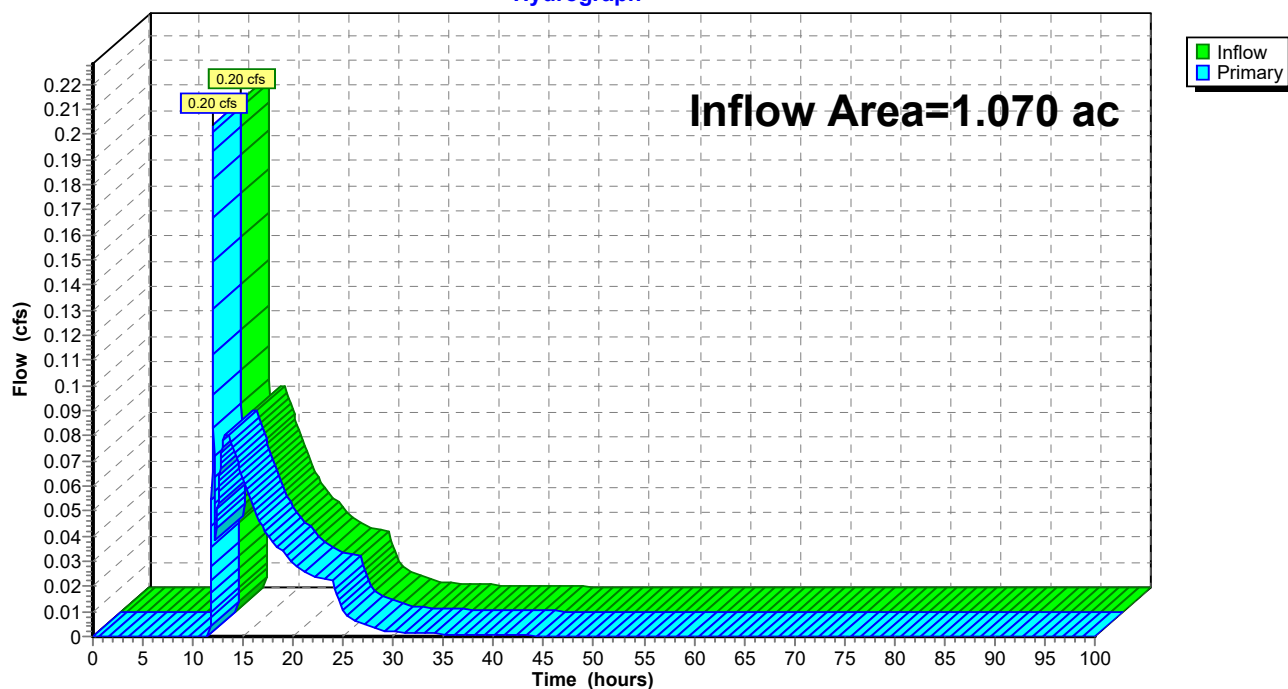
Hydrograph



Summary for Link 12L: Combined Flow South

Inflow Area = 1.070 ac, 24.30% Impervious, Inflow Depth = 0.55" for 2-Year event
Inflow = 0.20 cfs @ 11.98 hrs, Volume= 0.049 af
Primary = 0.20 cfs @ 11.98 hrs, Volume= 0.049 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 15L

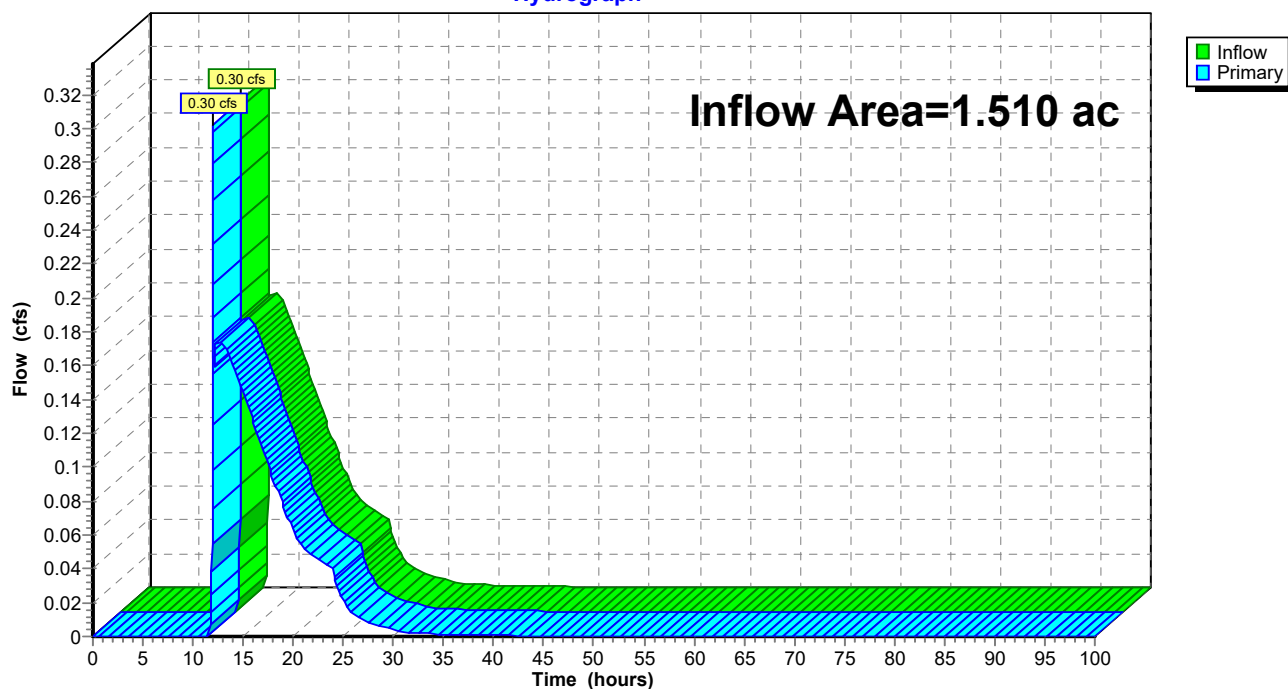
Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Link 12L: Combined Flow South**Hydrograph**

Summary for Link 13L: Comnined Flow North

Inflow Area = 1.510 ac, 49.01% Impervious, Inflow Depth > 0.87" for 2-Year event
Inflow = 0.30 cfs @ 11.99 hrs, Volume= 0.110 af
Primary = 0.30 cfs @ 11.99 hrs, Volume= 0.110 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 15L

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Link 13L: Comnined Flow North**Hydrograph**

23-047 Proposed Site Conditions_5-7-24*Type II 24-hr 5-Year Rainfall=3.81"*

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Time span=0.00-100.00 hrs, dt=0.01 hrs, 10001 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment7S: UndetainedWest	Runoff Area=0.540 ac 0.00% Impervious Runoff Depth=0.72" Tc=5.0 min CN=61 Runoff=0.65 cfs 0.032 af
Subcatchment8S: UndetainedNorth	Runoff Area=0.530 ac 0.00% Impervious Runoff Depth=0.72" Tc=5.0 min CN=61 Runoff=0.64 cfs 0.032 af
Subcatchment9S: UndetainedSoutheast	Runoff Area=0.170 ac 11.76% Impervious Runoff Depth=0.92" Tc=5.0 min CN=65 Runoff=0.28 cfs 0.013 af
Subcatchment10S: UndetainedSouth	Runoff Area=0.090 ac 0.00% Impervious Runoff Depth=0.72" Tc=5.0 min CN=61 Runoff=0.11 cfs 0.005 af
SubcatchmentP-N: Proposed North	Runoff Area=0.980 ac 75.51% Impervious Runoff Depth=2.65" Flow Length=321' Tc=8.1 min CN=89 Runoff=4.14 cfs 0.216 af
SubcatchmentP-S: Proposed South	Runoff Area=0.480 ac 22.92% Impervious Runoff Depth=1.14" Flow Length=237' Tc=11.1 min CN=69 Runoff=0.78 cfs 0.046 af
SubcatchmentP-SE: Proposed Drainage	Runoff Area=0.330 ac 39.39% Impervious Runoff Depth=1.59" Flow Length=118' Tc=7.3 min CN=76 Runoff=0.90 cfs 0.044 af
SubcatchmentP-W: Proposed West	Runoff Area=1.910 ac 67.54% Impervious Runoff Depth=2.37" Flow Length=1,203' Tc=6.7 min CN=86 Runoff=7.75 cfs 0.378 af
Pond 1P: SE Basin	Peak Elev=917.73' Storage=891 cf Inflow=0.90 cfs 0.044 af Outflow=0.09 cfs 0.034 af
Pond 2P: South Basin Orifice	Peak Elev=912.81' Storage=927 cf Inflow=0.83 cfs 0.080 af Outflow=0.14 cfs 0.070 af
Pond 3P: North Basin Orifice	Peak Elev=921.90' Storage=5,706 cf Inflow=4.14 cfs 0.216 af Outflow=0.23 cfs 0.147 af
Pond 4P: West Basin Orifice	Peak Elev=910.81' Storage=8,765 cf Inflow=7.75 cfs 0.378 af Outflow=0.87 cfs 0.306 af
Pond 5P: Level Spreader	Peak Elev=904.04' Storage=4 cf Inflow=0.87 cfs 0.306 af Outflow=0.87 cfs 0.306 af
Link 11L: Combined Flow West	Inflow=0.97 cfs 0.338 af Primary=0.97 cfs 0.338 af
Link 12L: Combined Flow South	Inflow=0.39 cfs 0.089 af Primary=0.39 cfs 0.089 af
Link 13L: Comnined Flow North	Inflow=0.71 cfs 0.179 af Primary=0.71 cfs 0.179 af

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Total Runoff Area = 5.030 ac Runoff Volume = 0.766 af Average Runoff Depth = 1.83"
54.47% Pervious = 2.740 ac 45.53% Impervious = 2.290 ac

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Type II 24-hr 5-Year Rainfall=3.81"

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Summary for Subcatchment 7S: Undetained West

Runoff = 0.65 cfs @ 11.98 hrs, Volume= 0.032 af, Depth= 0.72"
Routed to Link 11L : Combined Flow West

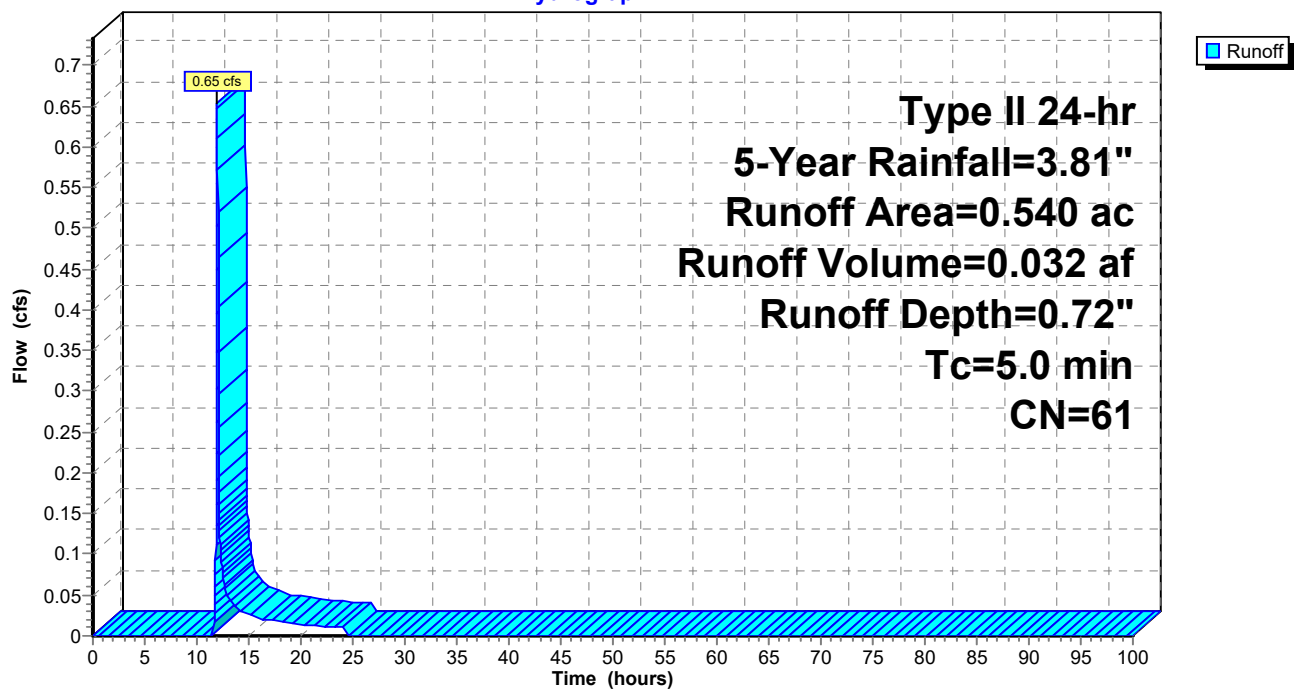
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-Year Rainfall=3.81"

Area (ac)	CN	Description
* 0.540	61	>75% Grass cover, Good, HSG B
0.540		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 7S: Undetained West

Hydrograph



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Type II 24-hr 5-Year Rainfall=3.81"

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Summary for Subcatchment 8S: Undetained North

Runoff = 0.64 cfs @ 11.98 hrs, Volume= 0.032 af, Depth= 0.72"
Routed to Link 13L : Comnined Flow North

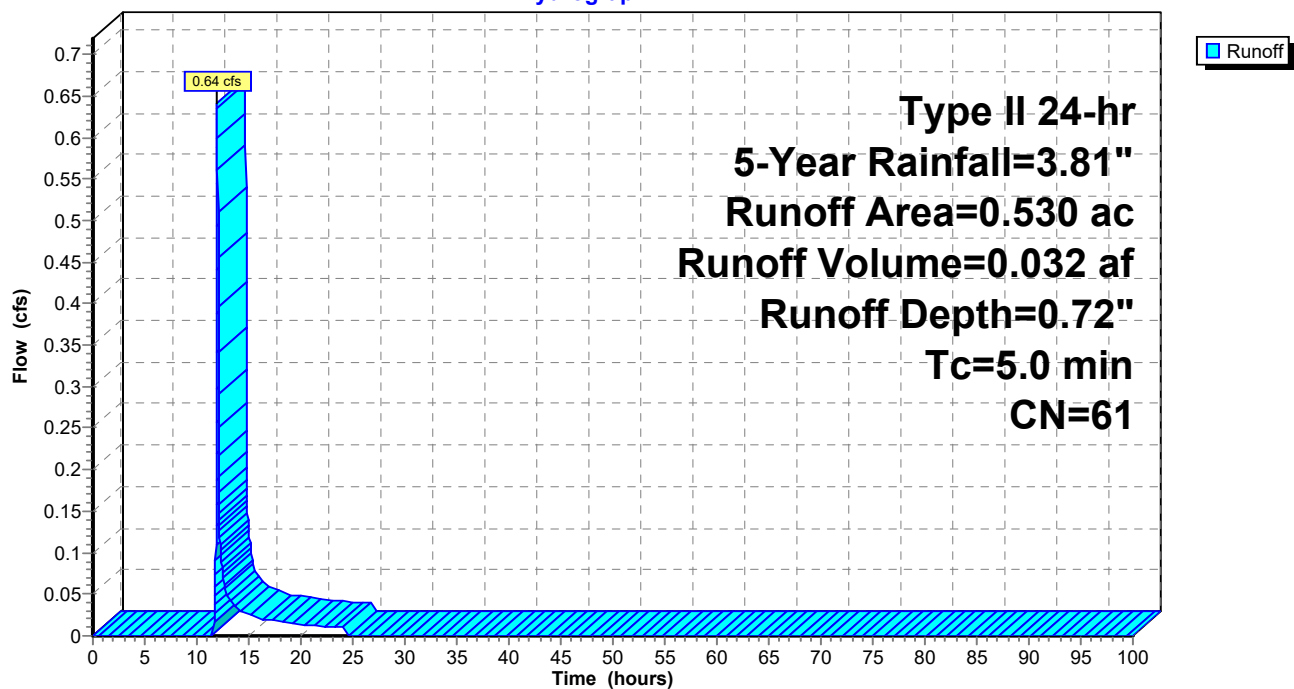
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-Year Rainfall=3.81"

Area (ac)	CN	Description
* 0.530	61	>75% Grass cover, Good, HSG B
0.530		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 8S: Undetained North

Hydrograph



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Type II 24-hr 5-Year Rainfall=3.81"

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Summary for Subcatchment 9S: Undetained Southeast

Runoff = 0.28 cfs @ 11.97 hrs, Volume= 0.013 af, Depth= 0.92"
Routed to Link 12L : Combined Flow South

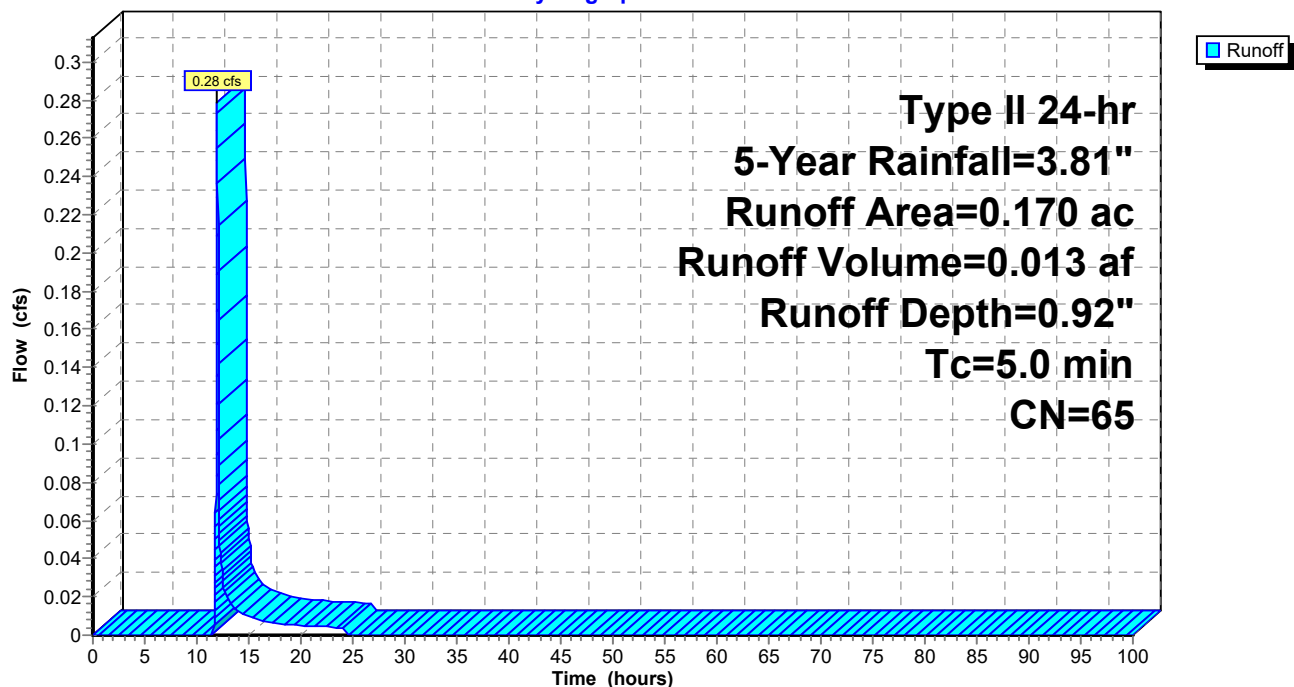
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-Year Rainfall=3.81"

Area (ac)	CN	Description
* 0.150	61	>75% Grass cover, Good, HSG B
* 0.020	98	Pavement
0.170	65	Weighted Average
0.150		88.24% Pervious Area
0.020		11.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 9S: Undetained Southeast

Hydrograph



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Type II 24-hr 5-Year Rainfall=3.81"

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Summary for Subcatchment 10S: Undetained South

Runoff = 0.11 cfs @ 11.98 hrs, Volume= 0.005 af, Depth= 0.72"
Routed to Link 12L : Combined Flow South

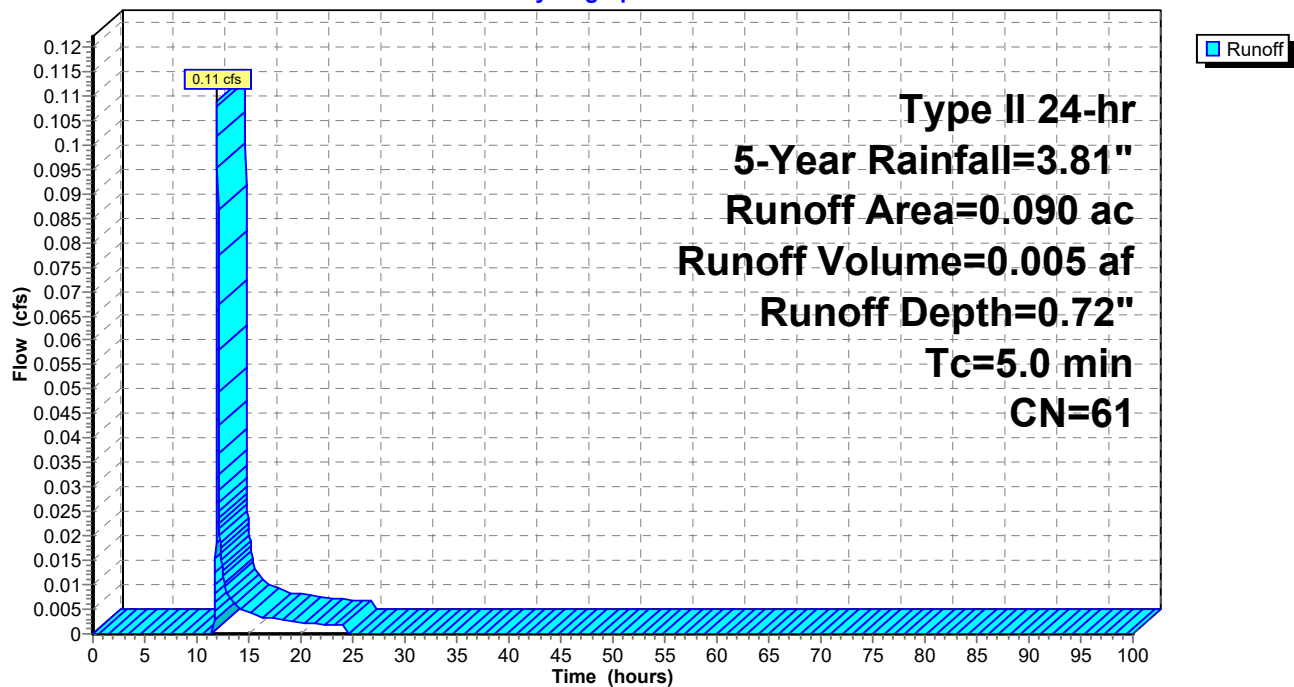
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-Year Rainfall=3.81"

Area (ac)	CN	Description
* 0.090	61	>75% Grass cover, Good, HSG B
0.090		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 10S: Undetained South

Hydrograph



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Type II 24-hr 5-Year Rainfall=3.81"

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Summary for Subcatchment P-N: Proposed North

Runoff = 4.14 cfs @ 11.99 hrs, Volume= 0.216 af, Depth= 2.65"
 Routed to Pond 3P : North Basin Orifice

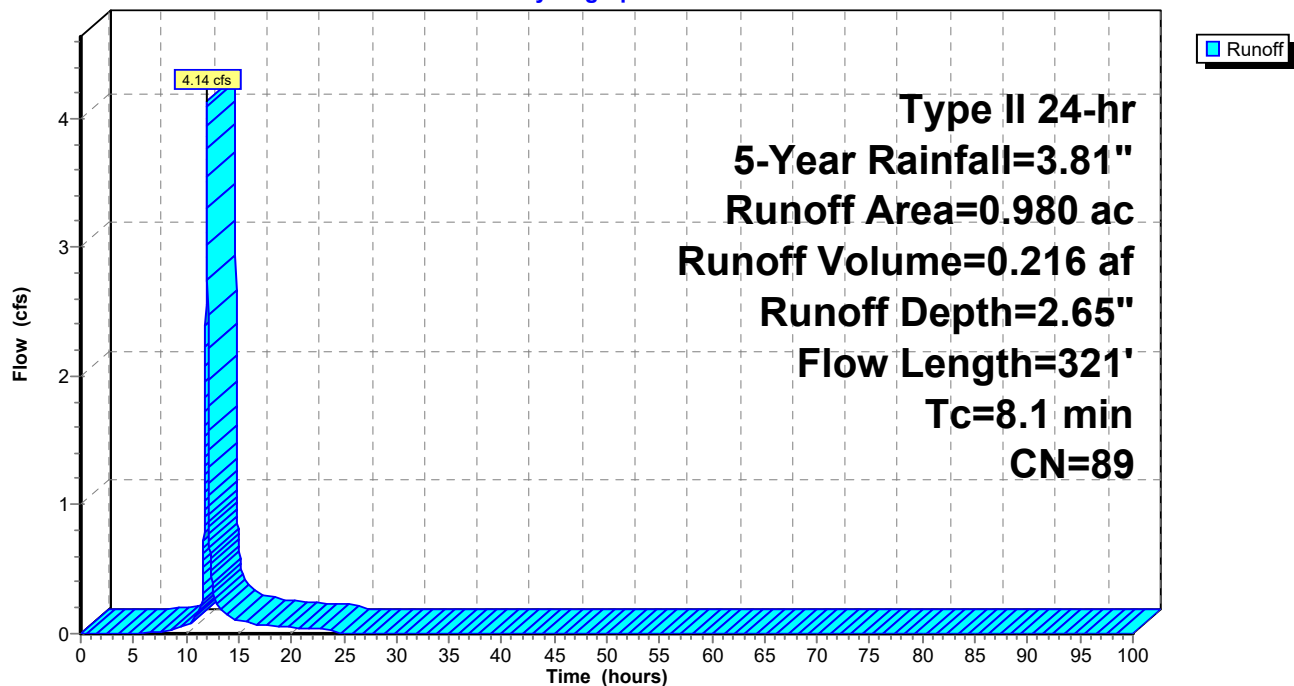
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Type II 24-hr 5-Year Rainfall=3.81"

Area (ac)	CN	Description
* 0.740	98	Paved roads w/curbs & sewers, HSG C
0.240	61	>75% Grass cover, Good, HSG B
0.980	89	Weighted Average
0.240		24.49% Pervious Area
0.740		75.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	91	0.0350	0.20		Sheet Flow, SHEET (GRASS) Grass: Short n= 0.150 P2= 3.04"
0.6	230	0.0150	6.45	7.91	Pipe Channel, PIPE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
8.1	321	Total			

Subcatchment P-N: Proposed North

Hydrograph



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Type II 24-hr 5-Year Rainfall=3.81"

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Summary for Subcatchment P-S: Proposed South

Runoff = 0.78 cfs @ 12.04 hrs, Volume= 0.046 af, Depth= 1.14"
Routed to Pond 2P : South Basin Orifice

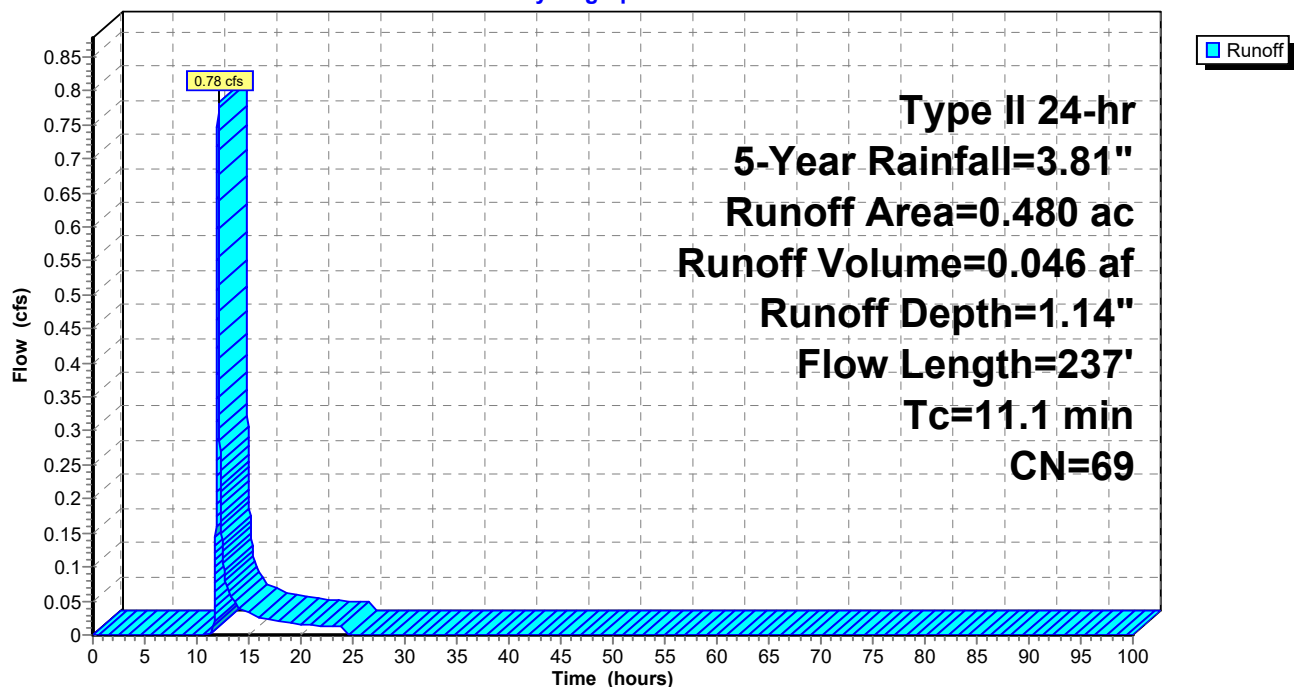
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-Year Rainfall=3.81"

Area (ac)	CN	Description
* 0.110	98	Paved roads w/curbs & sewers, HSG C
0.370	61	>75% Grass cover, Good, HSG B
0.480	69	Weighted Average
0.370		77.08% Pervious Area
0.110		22.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	100	0.0200	0.17		Sheet Flow, SHEET (GRASS) Grass: Short n= 0.150 P2= 3.04"
0.9	112	0.0200	2.12		Shallow Concentrated Flow, SHALLOW (GRASS) Grassed Waterway Kv= 15.0 fps
0.1	25	0.2500	7.50		Shallow Concentrated Flow, SHALLOW (GRASS) Grassed Waterway Kv= 15.0 fps
11.1	237	Total			

Subcatchment P-S: Proposed South

Hydrograph



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Type II 24-hr 5-Year Rainfall=3.81"

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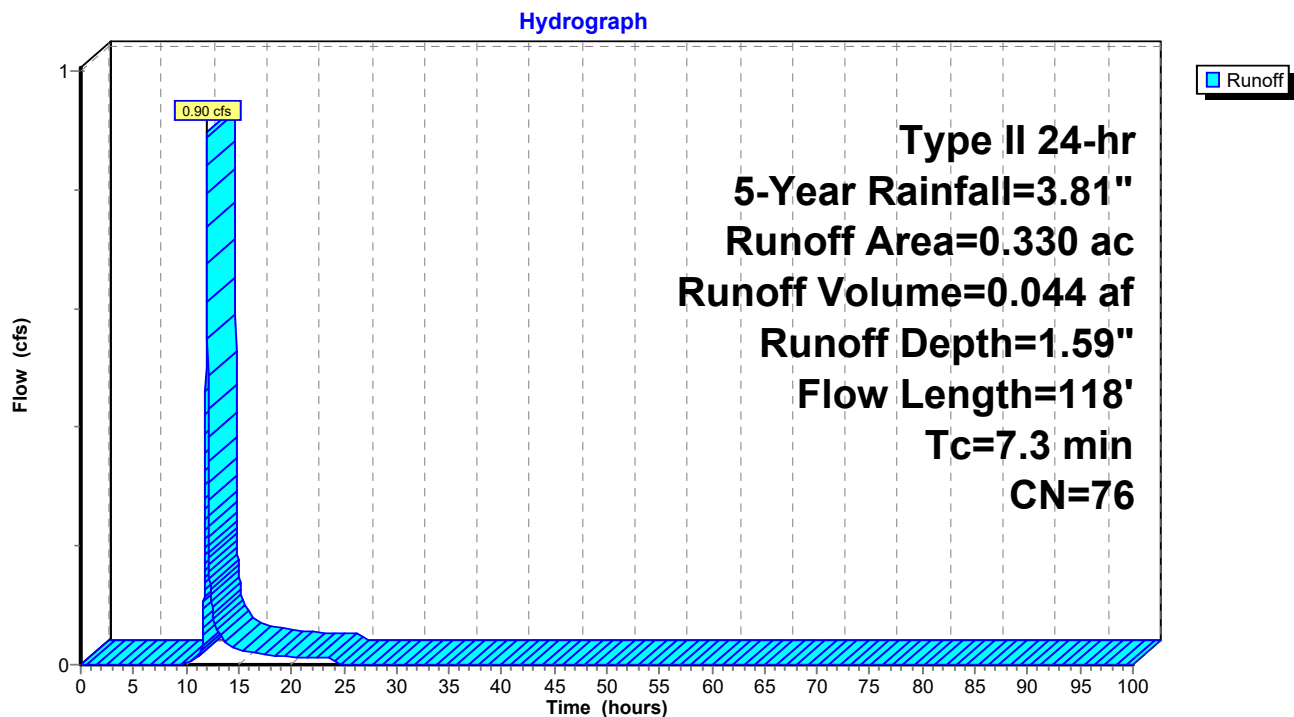
Summary for Subcatchment P-SE: Proposed Drainage

Runoff = 0.90 cfs @ 11.99 hrs, Volume= 0.044 af, Depth= 1.59"
Routed to Pond 1P : SE Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-Year Rainfall=3.81"

Area (ac)	CN	Description
0.130	98	Paved parking, HSG C
0.200	61	>75% Grass cover, Good, HSG B
0.330	76	Weighted Average
0.200		60.61% Pervious Area
0.130		39.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	65	0.0200	0.15		Sheet Flow, Grass: Short n= 0.150 P2= 3.04"
0.2	53	0.0100	5.26	6.46	Pipe Channel, 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
7.3	118	Total			

Subcatchment P-SE: Proposed Drainage

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Type II 24-hr 5-Year Rainfall=3.81"

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Summary for Subcatchment P-W: Proposed West

Runoff = 7.75 cfs @ 11.98 hrs, Volume= 0.378 af, Depth= 2.37"
Routed to Pond 4P : West Basin Orifice

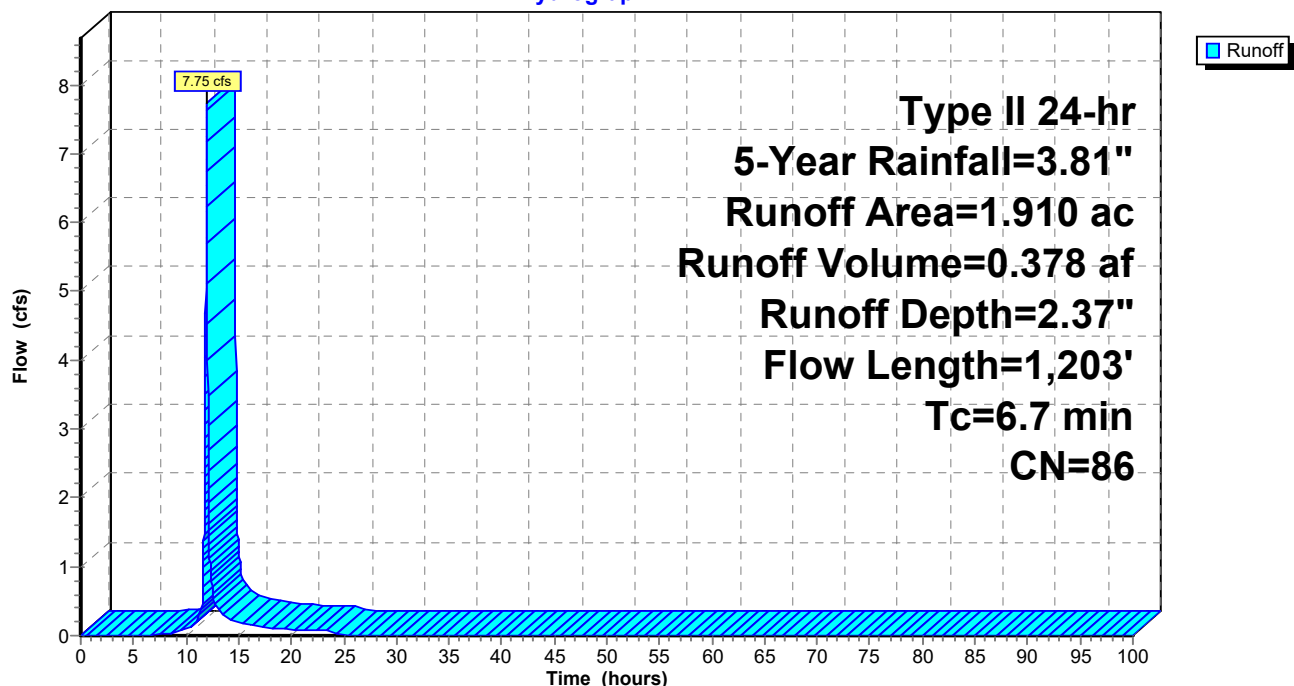
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-Year Rainfall=3.81"

Area (ac)	CN	Description
* 1.290	98	Paved roads w/curbs & sewers, HSG C
0.620	61	>75% Grass cover, Good, HSG B
1.910	86	Weighted Average
0.620		32.46% Pervious Area
1.290		67.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	100	0.0050	0.77		Sheet Flow, SHEET (PAVED) Smooth surfaces n= 0.011 P2= 3.04"
3.6	725	0.0280	3.40		Shallow Concentrated Flow, SHALLOW (PAVED) Paved Kv= 20.3 fps
0.9	378	0.0150	7.28	12.87	Pipe Channel, Storm Sewer 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
6.7	1,203	Total			

Subcatchment P-W: Proposed West

Hydrograph



23-047 Proposed Site Conditions_5-7-24

Type II 24-hr 5-Year Rainfall=3.81"

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Summary for Pond 1P: SE Basin

Inflow Area = 0.330 ac, 39.39% Impervious, Inflow Depth = 1.59" for 5-Year event
 Inflow = 0.90 cfs @ 11.99 hrs, Volume= 0.044 af
 Outflow = 0.09 cfs @ 12.54 hrs, Volume= 0.034 af, Atten= 91%, Lag= 32.8 min
 Primary = 0.09 cfs @ 12.54 hrs, Volume= 0.034 af
 Routed to Pond 2P : South Basin Orifice

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 917.73' @ 12.54 hrs Surf.Area= 2,161 sf Storage= 891 cf

Plug-Flow detention time= 263.7 min calculated for 0.034 af (78% of inflow)
 Center-of-Mass det. time= 171.8 min (1,015.6 - 843.7)

Volume	Invert	Avail.Storage	Storage Description
#1	916.91'	8,715 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
916.91	0	0	0
918.00	2,856	1,557	1,557
919.00	3,551	3,204	4,760
920.00	4,358	3,955	8,715

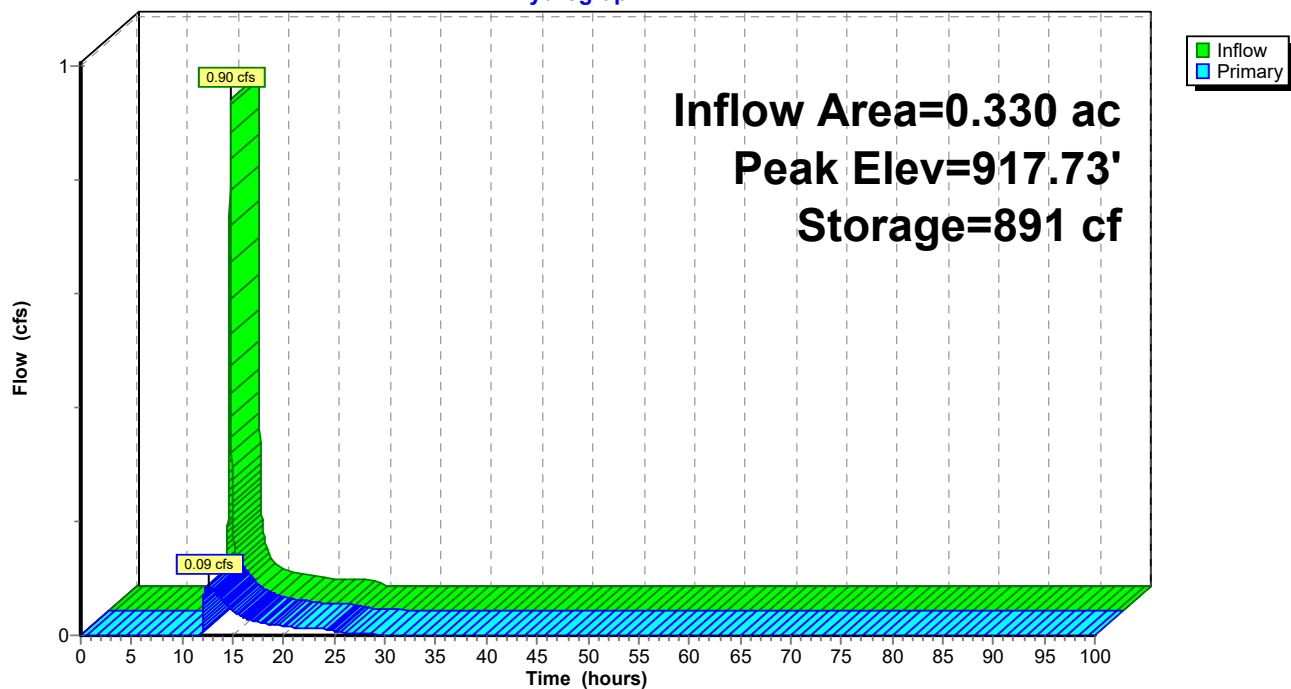
Device	Routing	Invert	Outlet Devices
#1	Primary	916.26'	4.0" Round Culvert X 3.00 L= 30.2' Ke= 0.500 Inlet / Outlet Invert= 916.26' / 915.96' S= 0.0099 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 0.09 sf
#2	Device 1	917.48'	3.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	918.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.45 0.45 0.95 Width (feet) 0.50 0.50 3.00 3.00

Primary OutFlow Max=0.09 cfs @ 12.54 hrs HW=917.73' (Free Discharge)

1=Culvert (Passes 0.09 cfs of 1.07 cfs potential flow)
 2=Orifice/Grate (Orifice Controls 0.09 cfs @ 1.73 fps)
 3=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 1P: SE Basin

Hydrograph



23-047 Proposed Site Conditions_5-7-24

Type II 24-hr 5-Year Rainfall=3.81"

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Summary for Pond 2P: South Basin Orifice

Inflow Area = 0.810 ac, 29.63% Impervious, Inflow Depth = 1.18" for 5-Year event
 Inflow = 0.83 cfs @ 12.05 hrs, Volume= 0.080 af
 Outflow = 0.14 cfs @ 13.06 hrs, Volume= 0.070 af, Atten= 82%, Lag= 60.8 min
 Primary = 0.14 cfs @ 13.06 hrs, Volume= 0.070 af
 Routed to Link 12L : Combined Flow South

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 912.81' @ 13.06 hrs Surf.Area= 1,185 sf Storage= 927 cf

Plug-Flow detention time= 164.6 min calculated for 0.070 af (88% of inflow)
 Center-of-Mass det. time= 90.8 min (1,021.8 - 931.0)

Volume	Invert	Avail.Storage	Storage Description
#1	911.50'	5,431 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
911.50	0	0	0
912.00	682	171	171
913.00	1,303	993	1,163
914.00	2,092	1,698	2,861
915.00	3,048	2,570	5,431

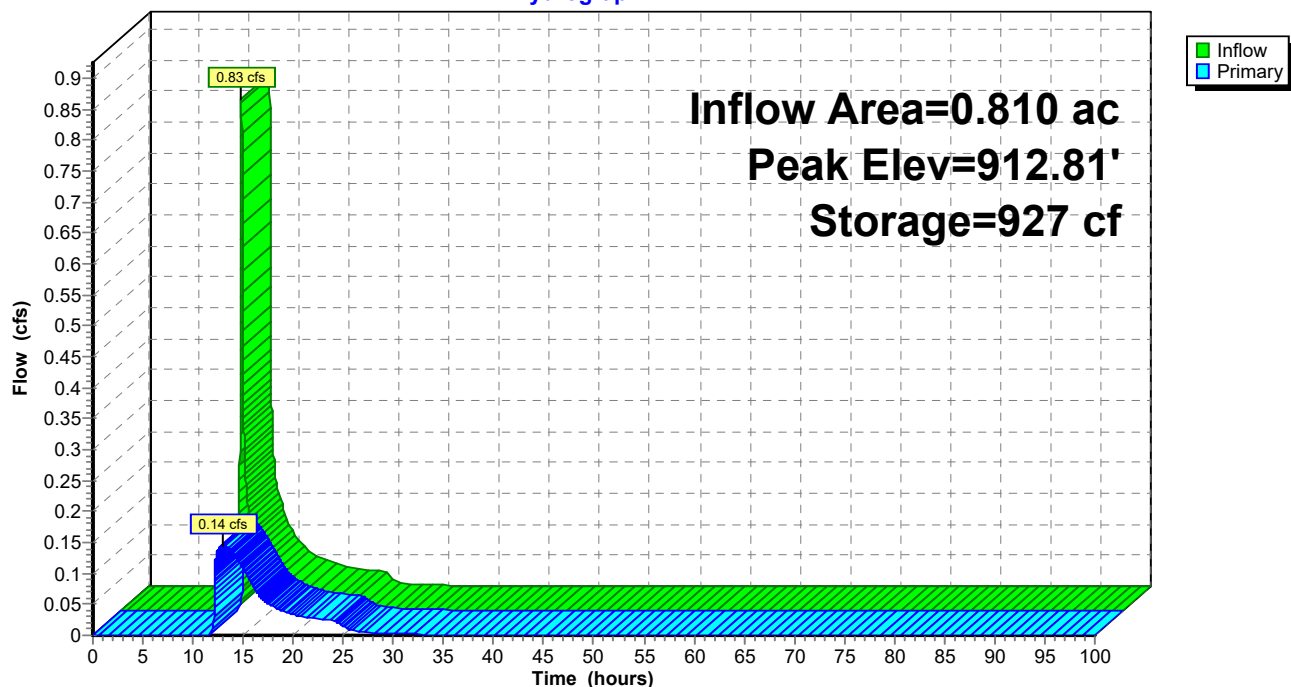
Device	Routing	Invert	Outlet Devices
#1	Primary	911.34'	6.0" Round Culvert L= 68.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 911.34' / 909.31' S= 0.0299 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	912.31'	3.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	913.00'	10.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.14 cfs @ 13.06 hrs HW=912.81' (Free Discharge)

- ↑ **1=Culvert** (Passes 0.14 cfs of 1.04 cfs potential flow)
- ↑ **2=Orifice/Grate** (Orifice Controls 0.14 cfs @ 2.95 fps)
- ↑ **3=Orifice/Grate** (Controls 0.00 cfs)

Pond 2P: South Basin Orifice

Hydrograph



23-047 Proposed Site Conditions_5-7-24

Type II 24-hr 5-Year Rainfall=3.81"

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Summary for Pond 3P: North Basin Orifice

Inflow Area = 0.980 ac, 75.51% Impervious, Inflow Depth = 2.65" for 5-Year event
 Inflow = 4.14 cfs @ 11.99 hrs, Volume= 0.216 af
 Outflow = 0.23 cfs @ 13.02 hrs, Volume= 0.147 af, Atten= 95%, Lag= 61.5 min
 Primary = 0.23 cfs @ 13.02 hrs, Volume= 0.147 af
 Routed to Link 13L : Combined Flow North

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 921.90' @ 13.02 hrs Surf.Area= 3,447 sf Storage= 5,706 cf

Plug-Flow detention time= 343.8 min calculated for 0.147 af (68% of inflow)
 Center-of-Mass det. time= 244.6 min (1,047.7 - 803.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	919.40'	6,149 cf	20.08'W x 171.65'L x 6.75'H Field A 23,269 cf Overall - 7,897 cf Embedded = 15,373 cf x 40.0% Voids
#2A	920.15'	7,897 cf	ADS_StormTech MC-7200 +Cap x 44 Inside #1 Effective Size= 91.2"W x 60.0"H => 26.68 sf x 6.59'L = 175.9 cf Overall Size= 100.0"W x 60.0"H x 6.95'L with 0.36' Overlap 44 Chambers in 2 Rows Cap Storage= 39.5 cf x 2 x 2 rows = 158.0 cf
		14,046 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	918.30'	12.0" Round Culvert L= 104.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 918.30' / 910.25' S= 0.0774 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	920.87'	3.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	924.15'	12.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.23 cfs @ 13.02 hrs HW=921.90' (Free Discharge)

1=Culvert (Passes 0.23 cfs of 6.66 cfs potential flow)
 2=Orifice/Grate (Orifice Controls 0.23 cfs @ 4.59 fps)
 3=Orifice/Grate (Controls 0.00 cfs)

23-047 Proposed Site Conditions_5-7-24

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Type II 24-hr 5-Year Rainfall=3.81"

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Pond 3P: North Basin Orifice - Chamber Wizard Field A

Chamber Model = ADS_StormTechMC-7200 +Cap (ADS StormTech®MC-7200 with cap volume)

Effective Size= 91.2"W x 60.0"H => 26.68 sf x 6.59'L = 175.9 cf

Overall Size= 100.0"W x 60.0"H x 6.95'L with 0.36' Overlap

Cap Storage= 39.5 cf x 2 x 2 rows = 158.0 cf

100.0" Wide + 9.0" Spacing = 109.0" C-C Row Spacing

22 Chambers/Row x 6.59' Long +2.73' Cap Length x 2 = 150.48' Row Length +127.0" End Stone x 2 = 171.65' Base Length

2 Rows x 100.0" Wide + 9.0" Spacing x 1 + 16.0" Side Stone x 2 = 20.08' Base Width

9.0" Stone Base + 60.0" Chamber Height + 12.0" Stone Cover = 6.75' Field Height

44 Chambers x 175.9 cf + 39.5 cf Cap Volume x 2 x 2 Rows = 7,896.5 cf Chamber Storage

23,269.3 cf Field - 7,896.5 cf Chambers = 15,372.8 cf Stone x 40.0% Voids = 6,149.1 cf Stone Storage

Chamber Storage + Stone Storage = 14,045.6 cf = 0.322 af

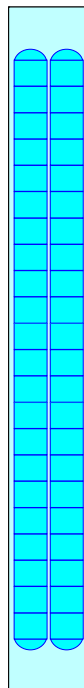
Overall Storage Efficiency = 60.4%

Overall System Size = 171.65' x 20.08' x 6.75'

44 Chambers

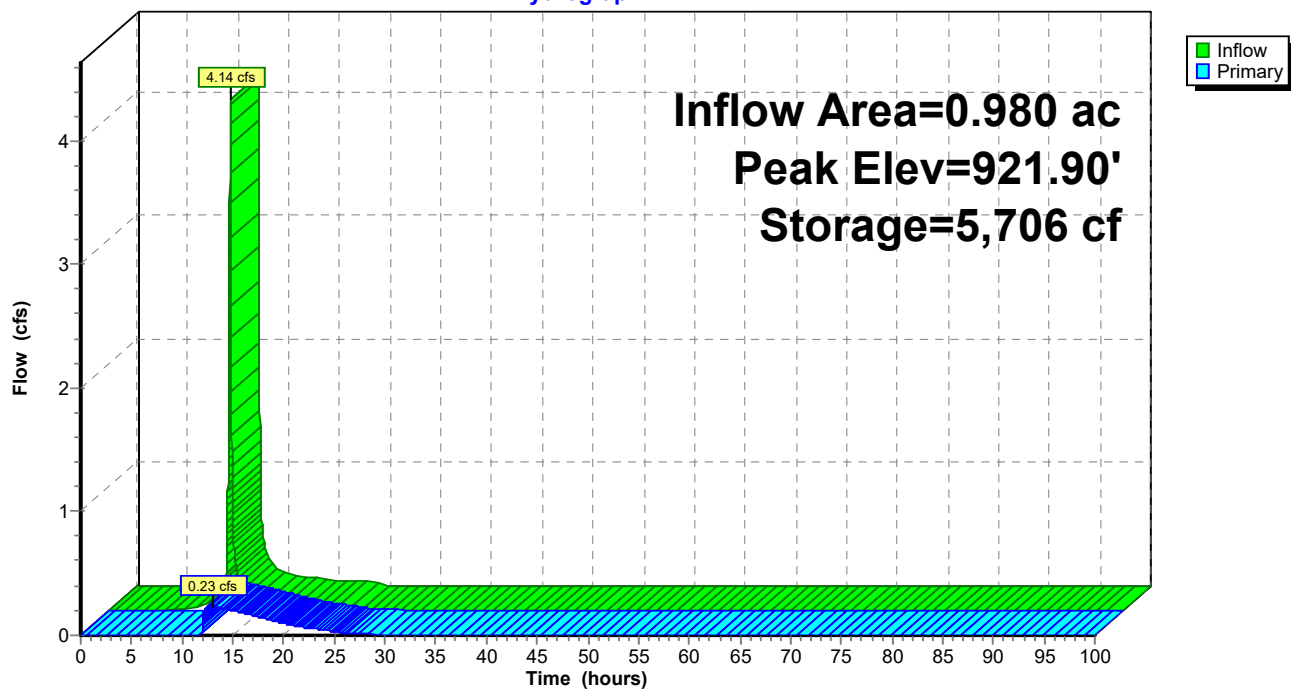
861.8 cy Field

569.4 cy Stone



Pond 3P: North Basin Orifice

Hydrograph



23-047 Proposed Site Conditions_5-7-24

Type II 24-hr 5-Year Rainfall=3.81"

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Summary for Pond 4P: West Basin Orifice

Inflow Area = 1.910 ac, 67.54% Impervious, Inflow Depth = 2.37" for 5-Year event
 Inflow = 7.75 cfs @ 11.98 hrs, Volume= 0.378 af
 Outflow = 0.87 cfs @ 12.36 hrs, Volume= 0.306 af, Atten= 89%, Lag= 22.8 min
 Primary = 0.87 cfs @ 12.36 hrs, Volume= 0.306 af
 Routed to Pond 5P : Level Spreader

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 910.81' @ 12.36 hrs Surf.Area= 4,246 sf Storage= 8,765 cf

Plug-Flow detention time= 310.7 min calculated for 0.306 af (81% of inflow)
 Center-of-Mass det. time= 231.4 min (1,044.1 - 812.7)

Volume	Invert	Avail.Storage	Storage Description
#1	907.00'	28,862 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
907.00	0	0	0
908.00	1,584	792	792
909.00	2,402	1,993	2,785
910.00	3,364	2,883	5,668
911.00	4,448	3,906	9,574
912.00	5,668	5,058	14,632
913.00	7,027	6,348	20,980
914.00	8,738	7,883	28,862

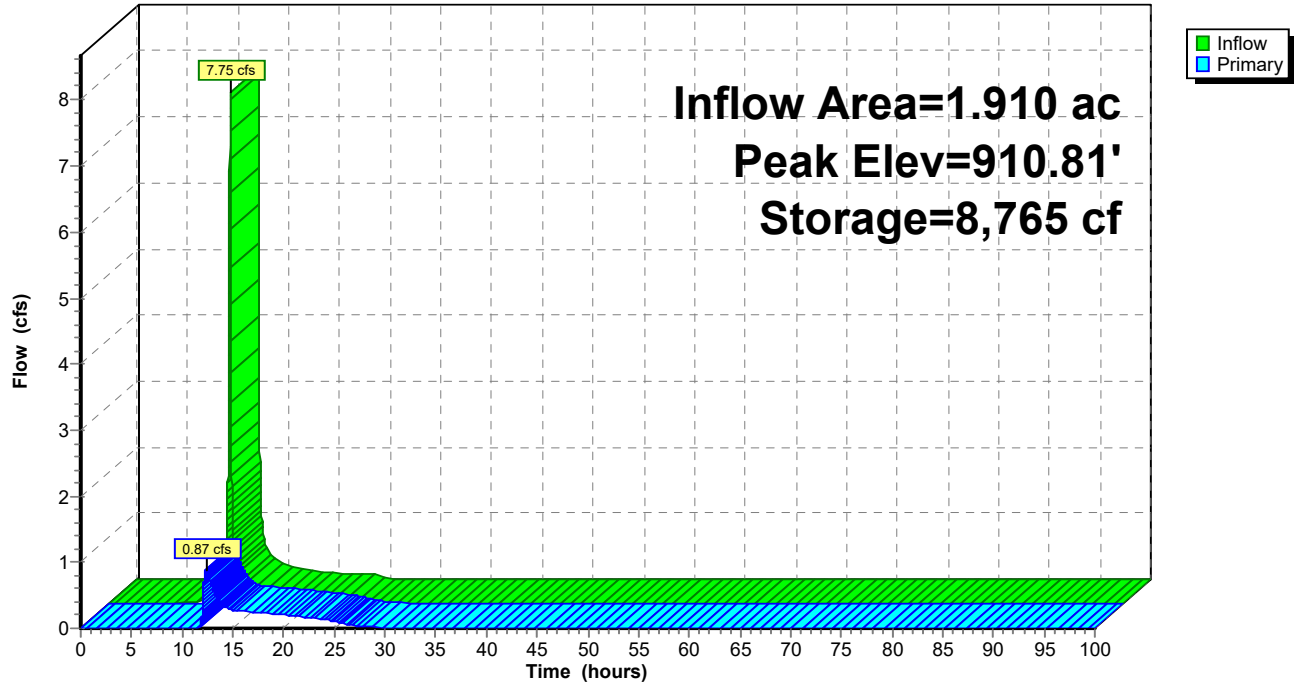
Device	Routing	Invert	Outlet Devices
#1	Primary	908.00'	15.0" Round Culvert L= 32.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 908.00' / 904.00' S= 0.1250 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Device 1	909.14'	3.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	910.50'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.25 1.25 1.75 Width (feet) 1.00 1.00 1.00 1.00

Primary OutFlow Max=0.87 cfs @ 12.36 hrs HW=910.81' (Free Discharge)

- ↑ **1=Culvert** (Passes 0.87 cfs of 8.74 cfs potential flow)
- ↑ **2=Orifice/Grate** (Orifice Controls 0.29 cfs @ 5.99 fps)
- ↑ **3=Custom Weir/Orifice** (Weir Controls 0.58 cfs @ 1.83 fps)

Pond 4P: West Basin Orifice

Hydrograph



23-047 Proposed Site Conditions_5-7-24

Type II 24-hr 5-Year Rainfall=3.81"

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Summary for Pond 5P: Level Spreader

[79] Warning: Submerged Pond 4P Primary device # 1 OUTLET by 0.04'

Inflow Area = 1.910 ac, 67.54% Impervious, Inflow Depth = 1.92" for 5-Year event
 Inflow = 0.87 cfs @ 12.36 hrs, Volume= 0.306 af
 Outflow = 0.87 cfs @ 12.36 hrs, Volume= 0.306 af, Atten= 0%, Lag= 0.1 min
 Primary = 0.87 cfs @ 12.36 hrs, Volume= 0.306 af
 Routed to Link 11L : Combined Flow West

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Peak Elev= 904.04' @ 12.36 hrs Surf.Area= 110 sf Storage= 4 cf

Plug-Flow detention time= 0.1 min calculated for 0.306 af (100% of inflow)

Center-of-Mass det. time= 0.1 min (1,044.2 - 1,044.1)

Volume	Invert	Avail.Storage	Storage Description
#1	904.00'	1,255 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

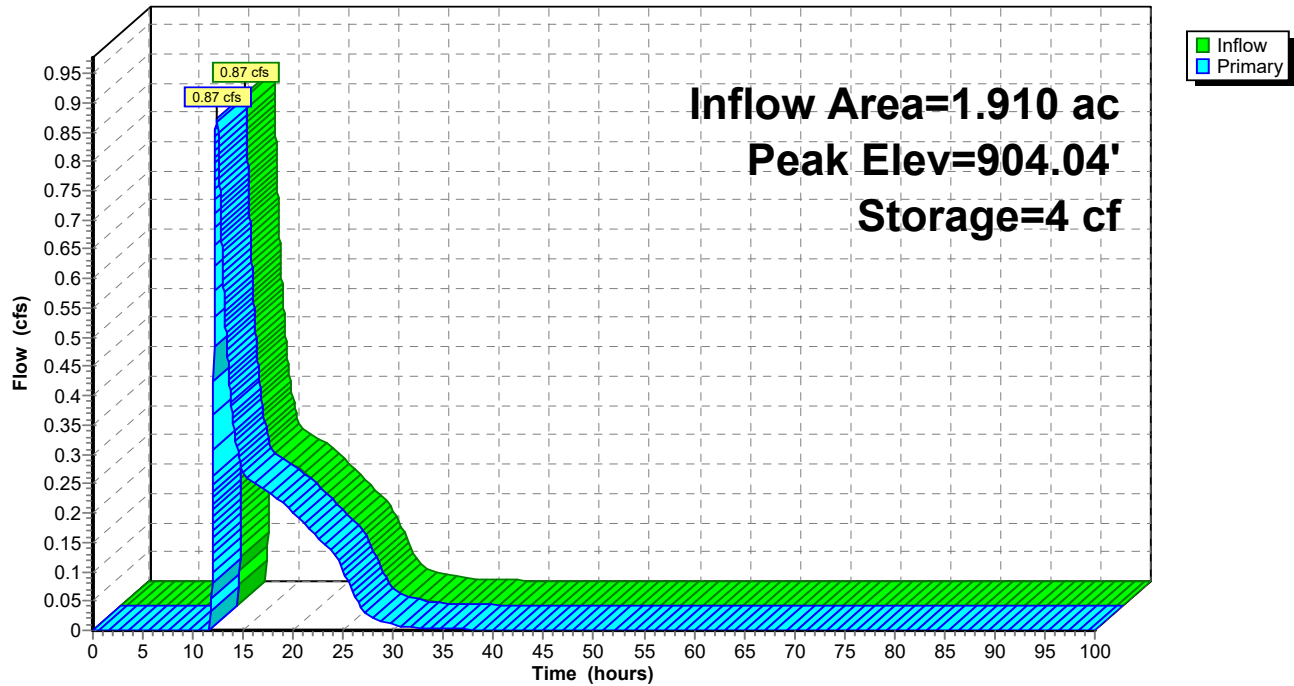
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
904.00	72	0	0
905.00	961	517	517
906.00	515	738	1,255

Device	Routing	Invert	Outlet Devices
#1	Primary	904.00'	30.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=0.86 cfs @ 12.36 hrs HW=904.04' TW=902.00' (Fixed TW Elev= 902.00')↑**1=Sharp-Crested Rectangular Weir**(Weir Controls 0.86 cfs @ 0.68 fps)

Pond 5P: Level Spreader

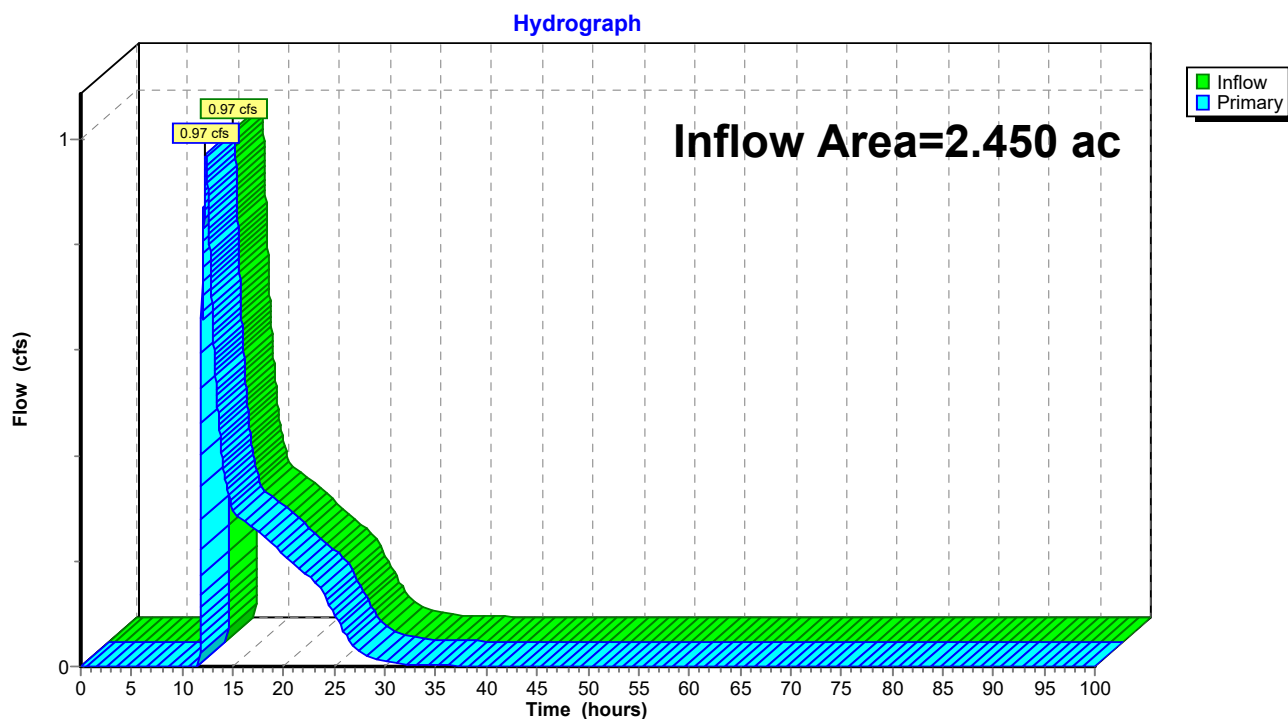
Hydrograph



Summary for Link 11L: Combined Flow West

Inflow Area = 2.450 ac, 52.65% Impervious, Inflow Depth = 1.66" for 5-Year event
Inflow = 0.97 cfs @ 12.33 hrs, Volume= 0.338 af
Primary = 0.97 cfs @ 12.33 hrs, Volume= 0.338 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 15L

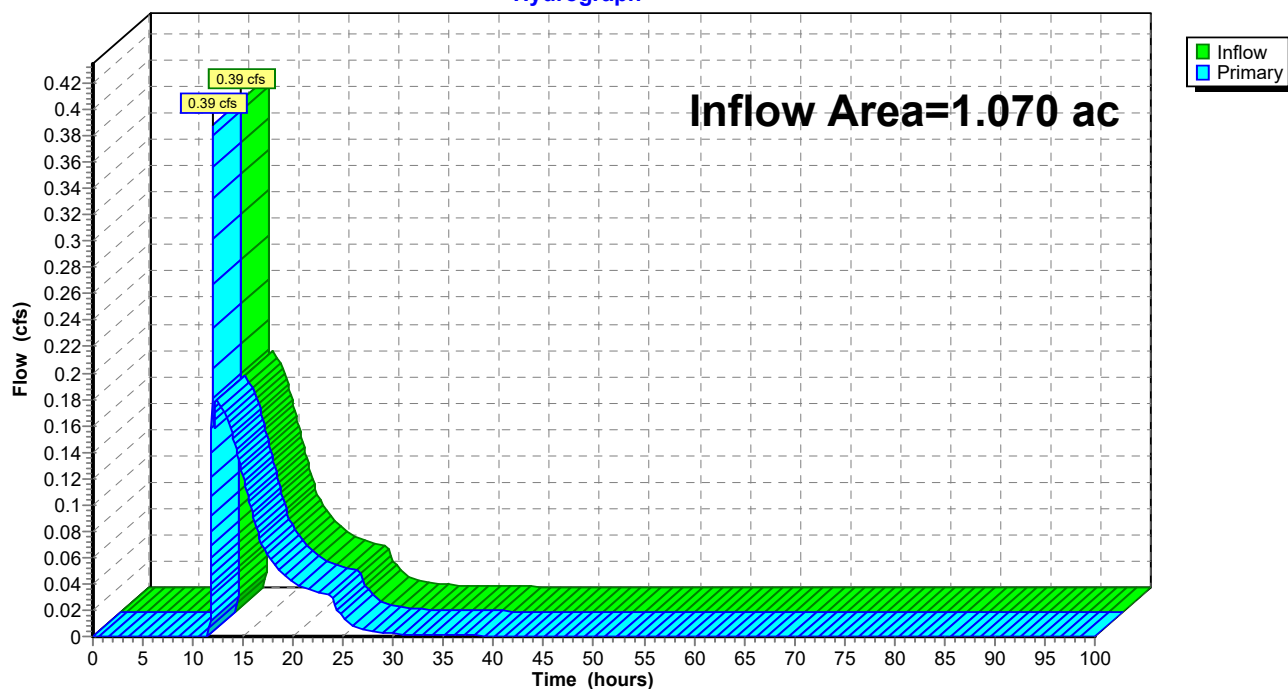
Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Link 11L: Combined Flow West

Summary for Link 12L: Combined Flow South

Inflow Area = 1.070 ac, 24.30% Impervious, Inflow Depth = 1.00" for 5-Year event
Inflow = 0.39 cfs @ 11.97 hrs, Volume= 0.089 af
Primary = 0.39 cfs @ 11.97 hrs, Volume= 0.089 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 15L

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Link 12L: Combined Flow South**Hydrograph**

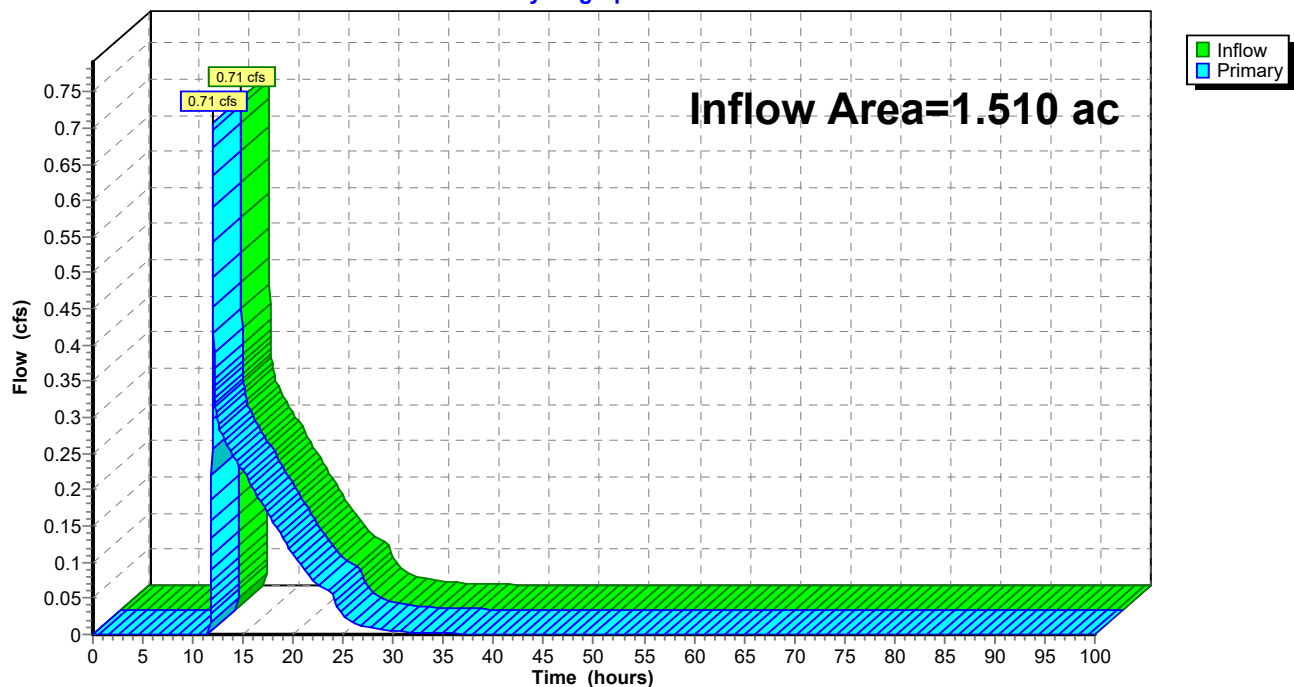
Summary for Link 13L: Comnined Flow North

Inflow Area = 1.510 ac, 49.01% Impervious, Inflow Depth = 1.42" for 5-Year event
 Inflow = 0.71 cfs @ 11.99 hrs, Volume= 0.179 af
 Primary = 0.71 cfs @ 11.99 hrs, Volume= 0.179 af, Atten= 0%, Lag= 0.0 min
 Routed to nonexistent node 15L

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Link 13L: Comnined Flow North

Hydrograph



23-047 Proposed Site Conditions_5-7-24*Type II 24-hr 10-Year Rainfall=4.46"*

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Time span=0.00-100.00 hrs, dt=0.01 hrs, 10001 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment7S: UndetainedWest	Runoff Area=0.540 ac 0.00% Impervious Runoff Depth=1.06" Tc=5.0 min CN=61 Runoff=1.02 cfs 0.048 af
Subcatchment8S: UndetainedNorth	Runoff Area=0.530 ac 0.00% Impervious Runoff Depth=1.06" Tc=5.0 min CN=61 Runoff=1.00 cfs 0.047 af
Subcatchment9S: UndetainedSoutheast	Runoff Area=0.170 ac 11.76% Impervious Runoff Depth=1.31" Tc=5.0 min CN=65 Runoff=0.41 cfs 0.018 af
Subcatchment10S: UndetainedSouth	Runoff Area=0.090 ac 0.00% Impervious Runoff Depth=1.06" Tc=5.0 min CN=61 Runoff=0.17 cfs 0.008 af
SubcatchmentP-N: Proposed North	Runoff Area=0.980 ac 75.51% Impervious Runoff Depth=3.26" Flow Length=321' Tc=8.1 min CN=89 Runoff=5.04 cfs 0.266 af
SubcatchmentP-S: Proposed South	Runoff Area=0.480 ac 22.92% Impervious Runoff Depth=1.57" Flow Length=237' Tc=11.1 min CN=69 Runoff=1.10 cfs 0.063 af
SubcatchmentP-SE: Proposed Drainage	Runoff Area=0.330 ac 39.39% Impervious Runoff Depth=2.10" Flow Length=118' Tc=7.3 min CN=76 Runoff=1.18 cfs 0.058 af
SubcatchmentP-W: Proposed West	Runoff Area=1.910 ac 67.54% Impervious Runoff Depth=2.97" Flow Length=1,203' Tc=6.7 min CN=86 Runoff=9.57 cfs 0.472 af
Pond 1P: SE Basin	Peak Elev=917.86' Storage=1,189 cf Inflow=1.18 cfs 0.058 af Outflow=0.12 cfs 0.048 af
Pond 2P: South Basin Orifice	Peak Elev=913.09' Storage=1,286 cf Inflow=1.19 cfs 0.111 af Outflow=0.23 cfs 0.101 af
Pond 3P: North Basin Orifice	Peak Elev=922.44' Storage=7,066 cf Inflow=5.04 cfs 0.266 af Outflow=0.28 cfs 0.197 af
Pond 4P: West Basin Orifice	Peak Elev=911.16' Storage=10,322 cf Inflow=9.57 cfs 0.472 af Outflow=2.10 cfs 0.400 af
Pond 5P: Level Spreader	Peak Elev=904.08' Storage=8 cf Inflow=2.10 cfs 0.400 af Outflow=2.10 cfs 0.400 af
Link 11L: Combined Flow West	Inflow=2.30 cfs 0.448 af Primary=2.30 cfs 0.448 af
Link 12L: Combined Flow South	Inflow=0.58 cfs 0.128 af Primary=0.58 cfs 0.128 af
Link 13L: Comnined Flow North	Inflow=1.14 cfs 0.244 af Primary=1.14 cfs 0.244 af

23-047 Proposed Site Conditions_5-7-24*Type II 24-hr 10-Year Rainfall=4.46"*

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Total Runoff Area = 5.030 ac Runoff Volume = 0.980 af Average Runoff Depth = 2.34"
54.47% Pervious = 2.740 ac 45.53% Impervious = 2.290 ac

23-047 Proposed Site Conditions_5-7-24

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Type II 24-hr 10-Year Rainfall=4.46"

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Summary for Subcatchment 7S: Undetained West

Runoff = 1.02 cfs @ 11.97 hrs, Volume= 0.048 af, Depth= 1.06"
Routed to Link 11L : Combined Flow West

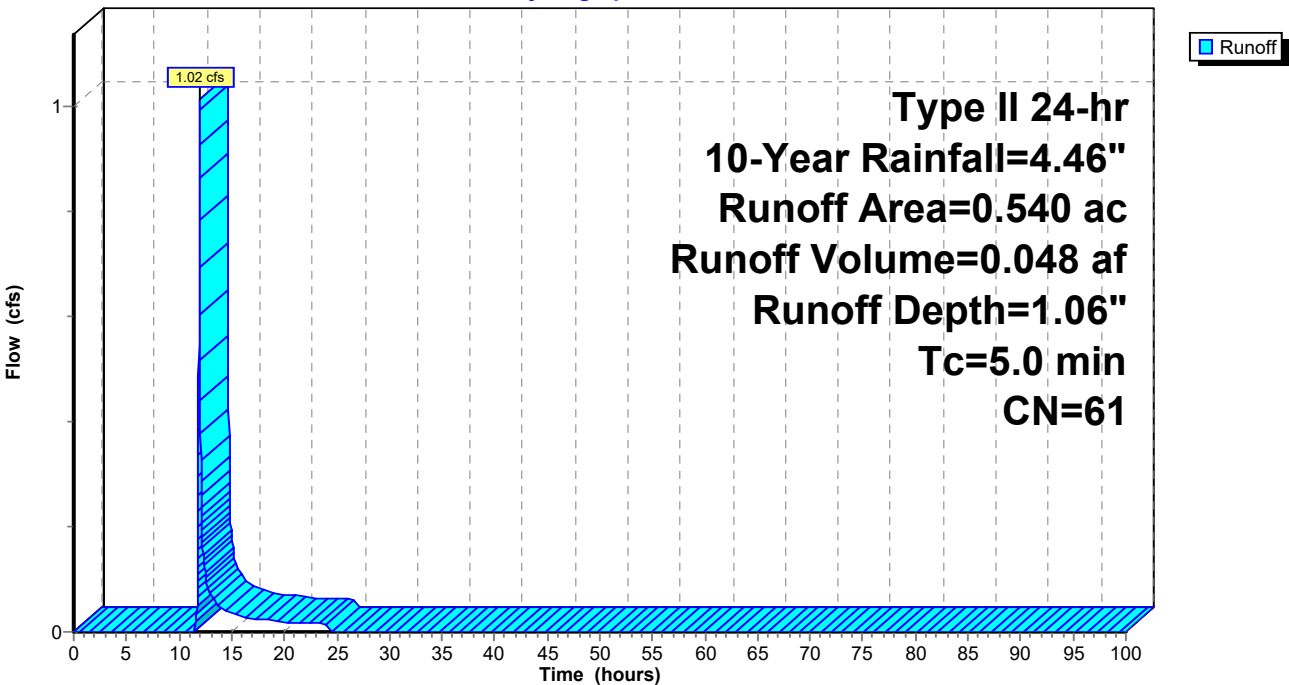
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-Year Rainfall=4.46"

Area (ac)	CN	Description
* 0.540	61	>75% Grass cover, Good, HSG B
0.540		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 7S: Undetained West

Hydrograph



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Type II 24-hr 10-Year Rainfall=4.46"

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Summary for Subcatchment 8S: Undetained North

Runoff = 1.00 cfs @ 11.97 hrs, Volume= 0.047 af, Depth= 1.06"
Routed to Link 13L : Comnined Flow North

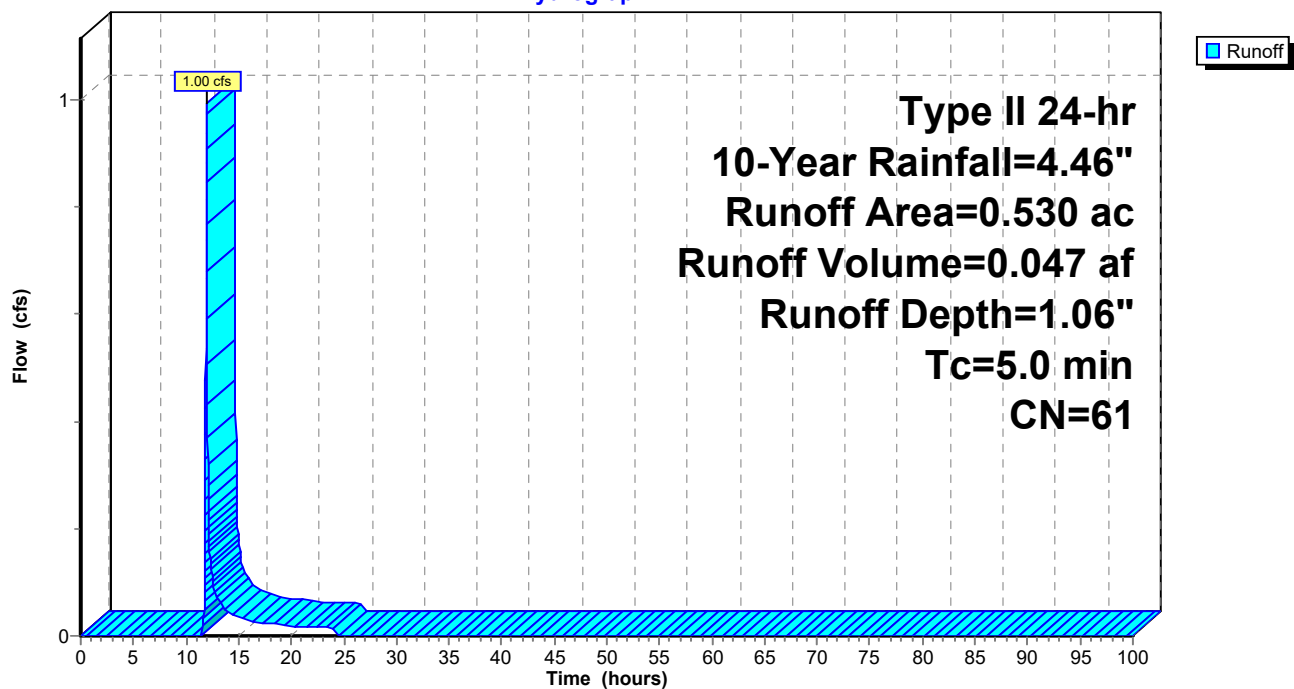
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-Year Rainfall=4.46"

Area (ac)	CN	Description
* 0.530	61	>75% Grass cover, Good, HSG B
0.530		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 8S: Undetained North

Hydrograph



23-047 Proposed Site Conditions_5-7-24

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Type II 24-hr 10-Year Rainfall=4.46"

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Summary for Subcatchment 9S: Undetained Southeast

Runoff = 0.41 cfs @ 11.97 hrs, Volume= 0.018 af, Depth= 1.31"
Routed to Link 12L : Combined Flow South

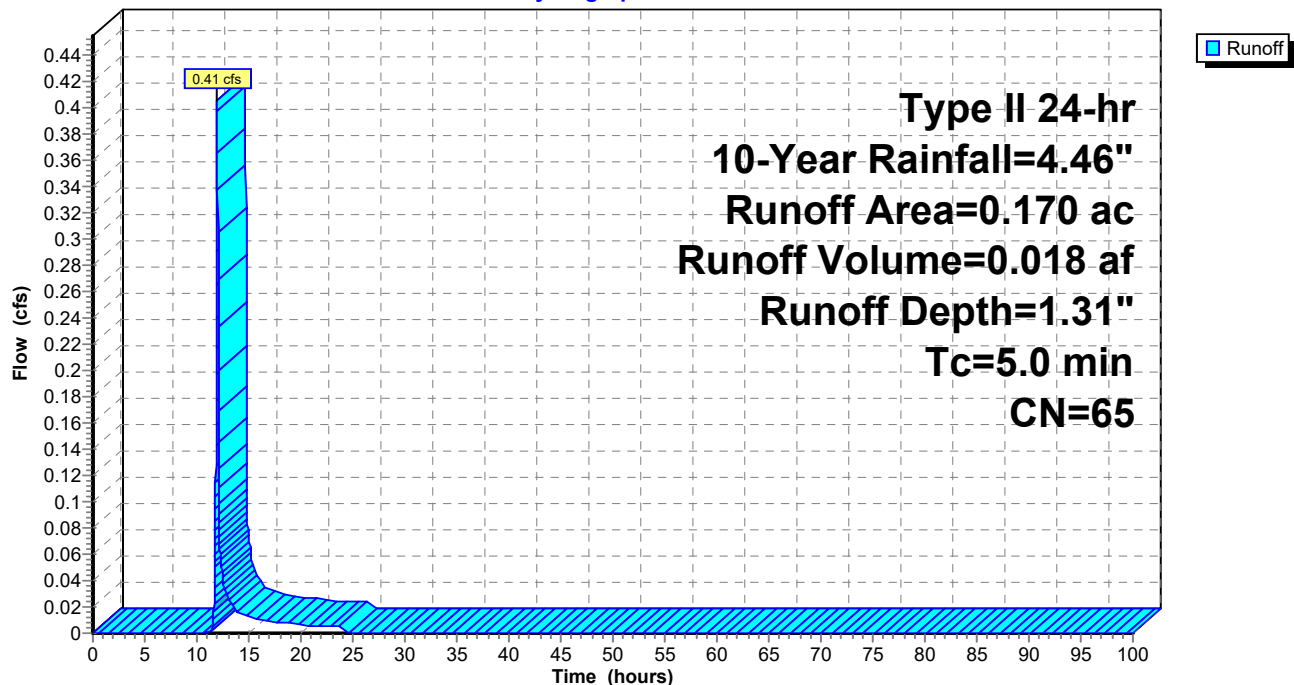
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-Year Rainfall=4.46"

Area (ac)	CN	Description
* 0.150	61	>75% Grass cover, Good, HSG B
* 0.020	98	Pavement
0.170	65	Weighted Average
0.150		88.24% Pervious Area
0.020		11.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 9S: Undetained Southeast

Hydrograph



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Type II 24-hr 10-Year Rainfall=4.46"

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Summary for Subcatchment 10S: Undetained South

Runoff = 0.17 cfs @ 11.97 hrs, Volume= 0.008 af, Depth= 1.06"
Routed to Link 12L : Combined Flow South

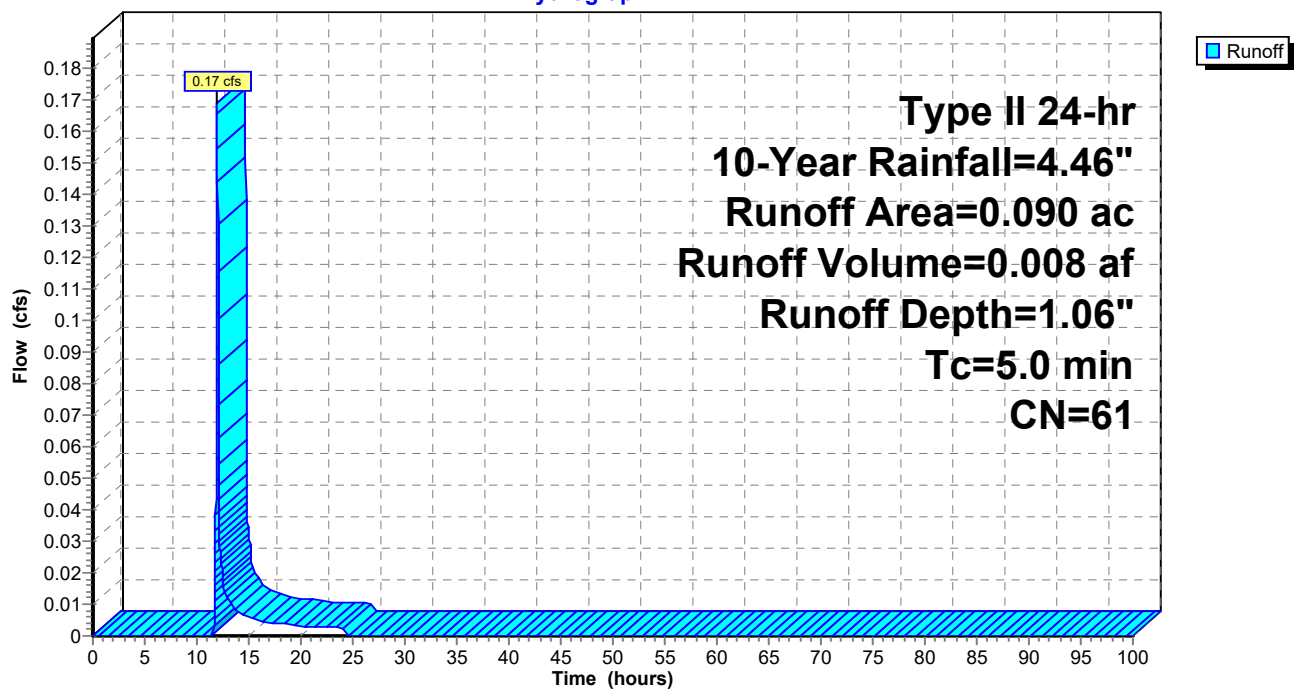
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-Year Rainfall=4.46"

Area (ac)	CN	Description
* 0.090	61	>75% Grass cover, Good, HSG B
0.090		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 10S: Undetained South

Hydrograph



23-047 Proposed Site Conditions_5-7-24

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Type II 24-hr 10-Year Rainfall=4.46"

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Summary for Subcatchment P-N: Proposed North

Runoff = 5.04 cfs @ 11.99 hrs, Volume= 0.266 af, Depth= 3.26"
 Routed to Pond 3P : North Basin Orifice

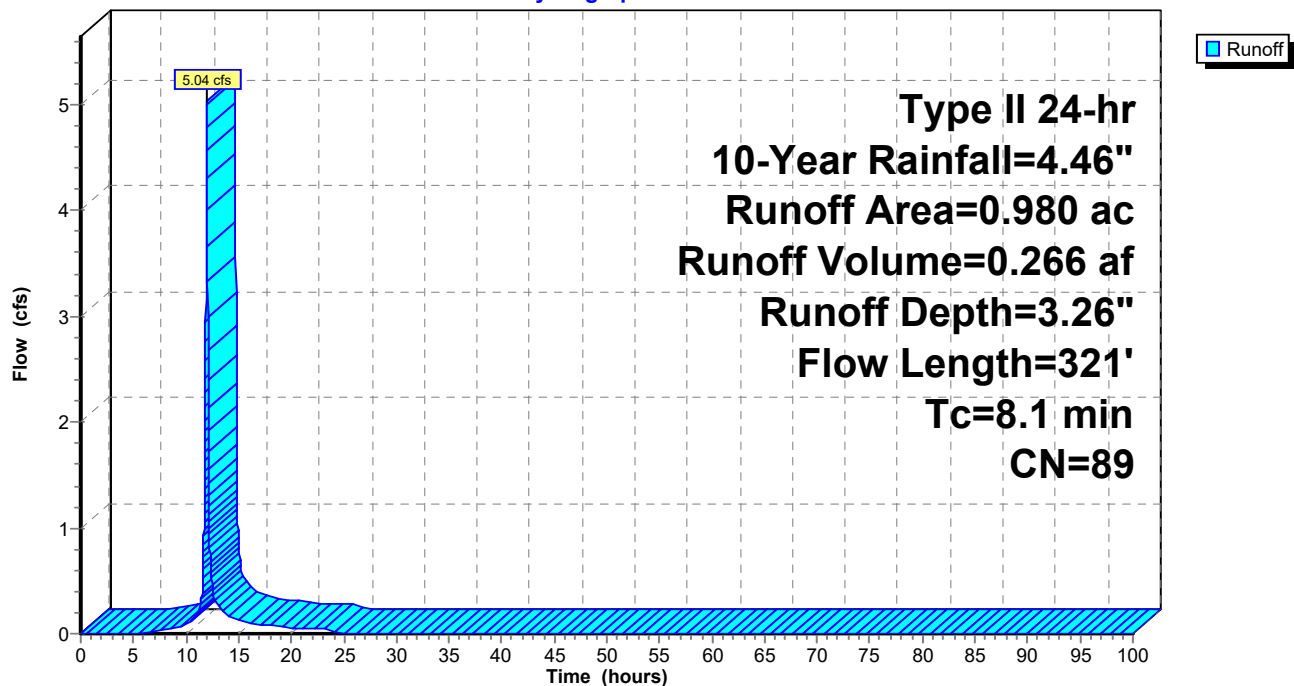
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Type II 24-hr 10-Year Rainfall=4.46"

Area (ac)	CN	Description
* 0.740	98	Paved roads w/curbs & sewers, HSG C
0.240	61	>75% Grass cover, Good, HSG B
0.980	89	Weighted Average
0.240		24.49% Pervious Area
0.740		75.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	91	0.0350	0.20		Sheet Flow, SHEET (GRASS) Grass: Short n= 0.150 P2= 3.04"
0.6	230	0.0150	6.45	7.91	Pipe Channel, PIPE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
8.1	321	Total			

Subcatchment P-N: Proposed North

Hydrograph



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Type II 24-hr 10-Year Rainfall=4.46"

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Summary for Subcatchment P-S: Proposed South

Runoff = 1.10 cfs @ 12.04 hrs, Volume= 0.063 af, Depth= 1.57"
Routed to Pond 2P : South Basin Orifice

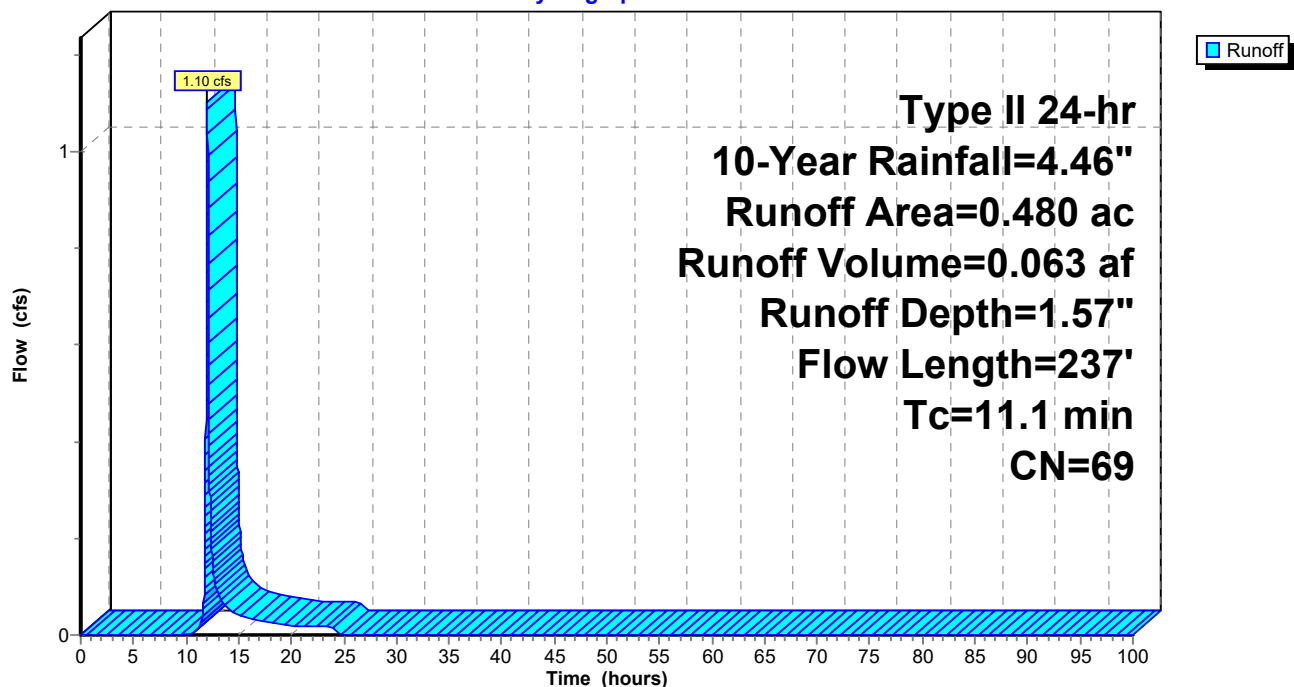
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-Year Rainfall=4.46"

Area (ac)	CN	Description
* 0.110	98	Paved roads w/curbs & sewers, HSG C
0.370	61	>75% Grass cover, Good, HSG B
0.480	69	Weighted Average
0.370		77.08% Pervious Area
0.110		22.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	100	0.0200	0.17		Sheet Flow, SHEET (GRASS) Grass: Short n= 0.150 P2= 3.04"
0.9	112	0.0200	2.12		Shallow Concentrated Flow, SHALLOW (GRASS) Grassed Waterway Kv= 15.0 fps
0.1	25	0.2500	7.50		Shallow Concentrated Flow, SHALLOW (GRASS) Grassed Waterway Kv= 15.0 fps
11.1	237	Total			

Subcatchment P-S: Proposed South

Hydrograph



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Type II 24-hr 10-Year Rainfall=4.46"

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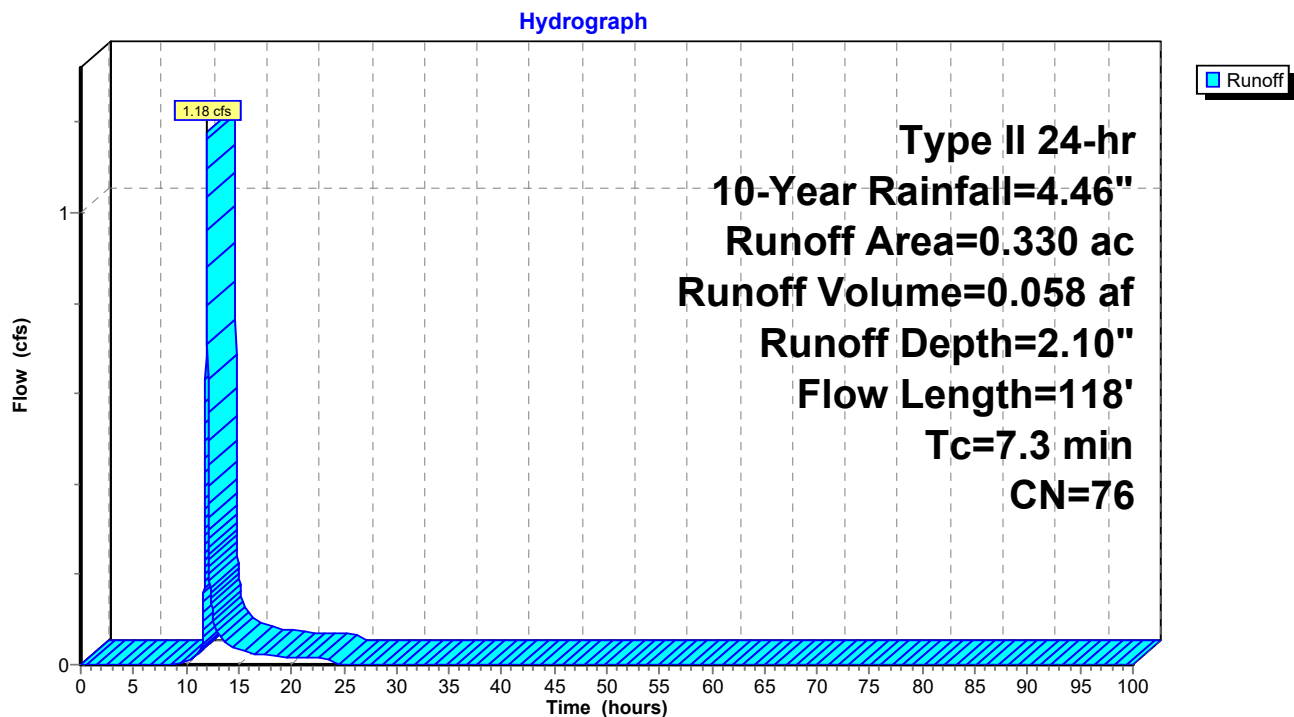
Summary for Subcatchment P-SE: Proposed Drainage

Runoff = 1.18 cfs @ 11.99 hrs, Volume= 0.058 af, Depth= 2.10"
Routed to Pond 1P : SE Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-Year Rainfall=4.46"

Area (ac)	CN	Description
0.130	98	Paved parking, HSG C
0.200	61	>75% Grass cover, Good, HSG B
0.330	76	Weighted Average
0.200		60.61% Pervious Area
0.130		39.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	65	0.0200	0.15		Sheet Flow, Grass: Short n= 0.150 P2= 3.04"
0.2	53	0.0100	5.26	6.46	Pipe Channel, 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
7.3	118	Total			

Subcatchment P-SE: Proposed Drainage

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Type II 24-hr 10-Year Rainfall=4.46"

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Summary for Subcatchment P-W: Proposed West

Runoff = 9.57 cfs @ 11.98 hrs, Volume= 0.472 af, Depth= 2.97"
 Routed to Pond 4P : West Basin Orifice

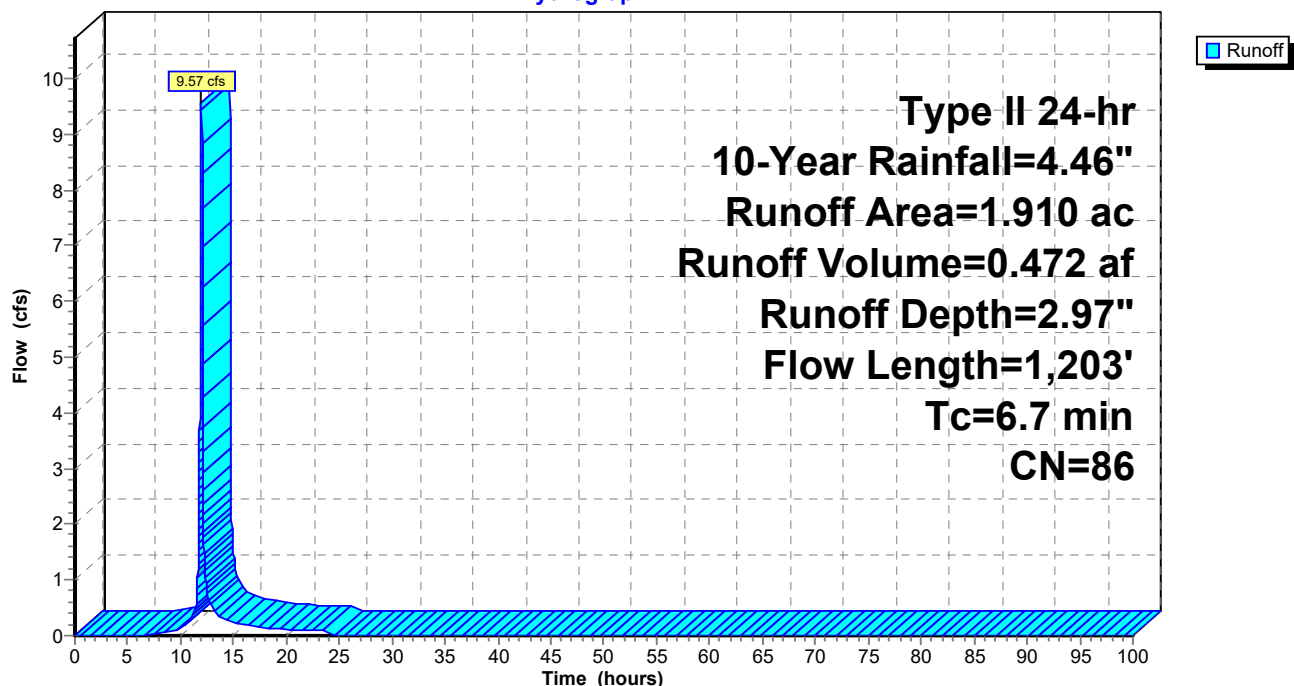
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Type II 24-hr 10-Year Rainfall=4.46"

Area (ac)	CN	Description
* 1.290	98	Paved roads w/curbs & sewers, HSG C
0.620	61	>75% Grass cover, Good, HSG B
1.910	86	Weighted Average
0.620		32.46% Pervious Area
1.290		67.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	100	0.0050	0.77		Sheet Flow, SHEET (PAVED) Smooth surfaces n= 0.011 P2= 3.04"
3.6	725	0.0280	3.40		Shallow Concentrated Flow, SHALLOW (PAVED) Paved Kv= 20.3 fps
0.9	378	0.0150	7.28	12.87	Pipe Channel, Storm Sewer 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
6.7	1,203	Total			

Subcatchment P-W: Proposed West

Hydrograph



23-047 Proposed Site Conditions_5-7-24

Type II 24-hr 10-Year Rainfall=4.46"

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Summary for Pond 1P: SE Basin

Inflow Area = 0.330 ac, 39.39% Impervious, Inflow Depth = 2.10" for 10-Year event
 Inflow = 1.18 cfs @ 11.99 hrs, Volume= 0.058 af
 Outflow = 0.12 cfs @ 12.49 hrs, Volume= 0.048 af, Atten= 90%, Lag= 29.8 min
 Primary = 0.12 cfs @ 12.49 hrs, Volume= 0.048 af
 Routed to Pond 2P : South Basin Orifice

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 917.86' @ 12.49 hrs Surf.Area= 2,497 sf Storage= 1,189 cf

Plug-Flow detention time= 227.6 min calculated for 0.048 af (83% of inflow)
 Center-of-Mass det. time= 151.5 min (987.3 - 835.8)

Volume	Invert	Avail.Storage	Storage Description
#1	916.91'	8,715 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
916.91	0	0	0
918.00	2,856	1,557	1,557
919.00	3,551	3,204	4,760
920.00	4,358	3,955	8,715

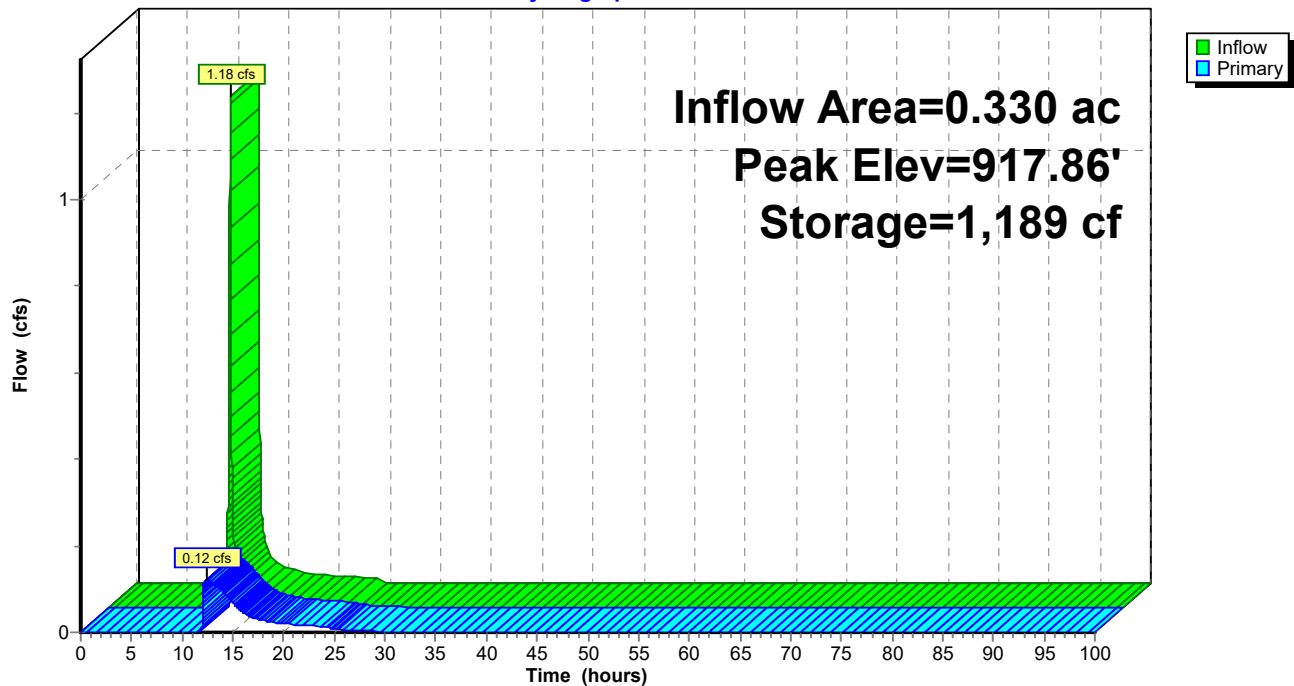
Device	Routing	Invert	Outlet Devices
#1	Primary	916.26'	4.0" Round Culvert X 3.00 L= 30.2' Ke= 0.500 Inlet / Outlet Invert= 916.26' / 915.96' S= 0.0099 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 0.09 sf
#2	Device 1	917.48'	3.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	918.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.45 0.45 0.95 Width (feet) 0.50 0.50 3.00 3.00

Primary OutFlow Max=0.12 cfs @ 12.49 hrs HW=917.86' (Free Discharge)

1=Culvert (Passes 0.12 cfs of 1.11 cfs potential flow)
 2=Orifice/Grate (Orifice Controls 0.12 cfs @ 2.44 fps)
 3=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 1P: SE Basin

Hydrograph



23-047 Proposed Site Conditions_5-7-24

Type II 24-hr 10-Year Rainfall=4.46"

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Summary for Pond 2P: South Basin Orifice

Inflow Area = 0.810 ac, 29.63% Impervious, Inflow Depth = 1.64" for 10-Year event
 Inflow = 1.19 cfs @ 12.04 hrs, Volume= 0.111 af
 Outflow = 0.23 cfs @ 12.72 hrs, Volume= 0.101 af, Atten= 81%, Lag= 40.8 min
 Primary = 0.23 cfs @ 12.72 hrs, Volume= 0.101 af
 Routed to Link 12L : Combined Flow South

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 913.09' @ 12.72 hrs Surf.Area= 1,376 sf Storage= 1,286 cf

Plug-Flow detention time= 138.8 min calculated for 0.101 af (91% of inflow)
 Center-of-Mass det. time= 84.1 min (998.0 - 914.0)

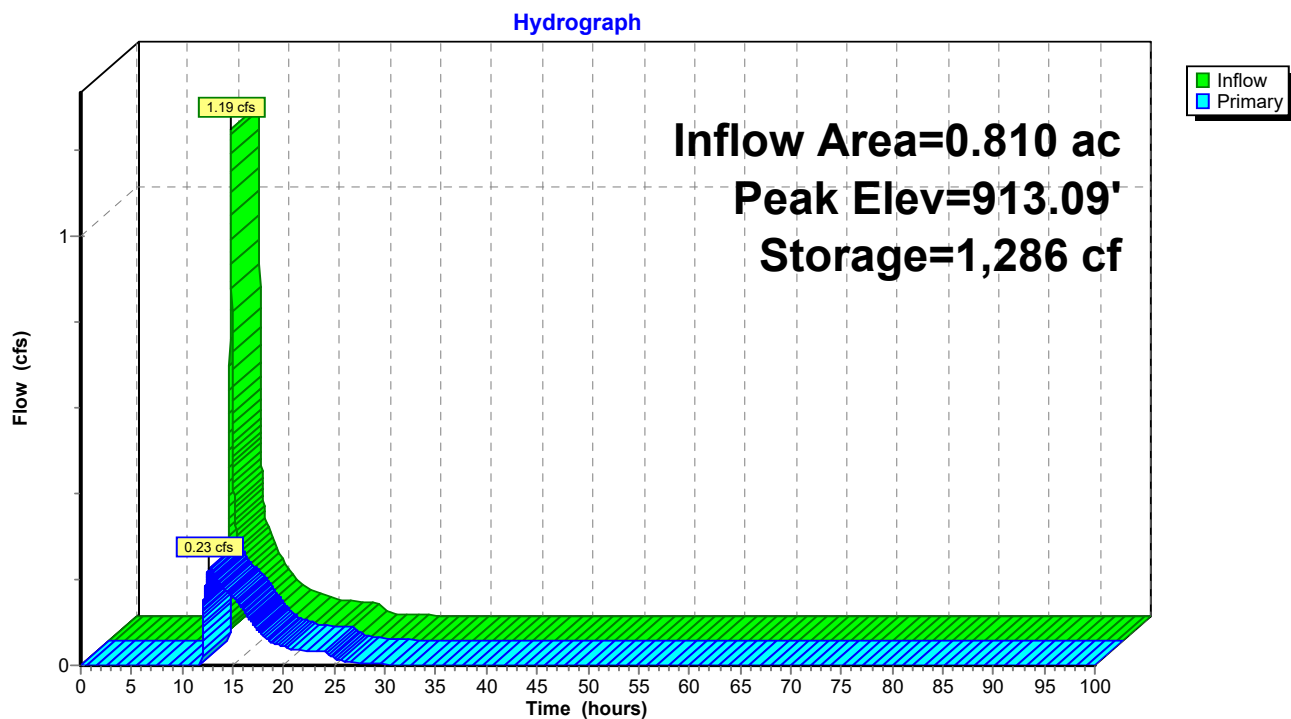
Volume	Invert	Avail.Storage	Storage Description
#1	911.50'	5,431 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
911.50	0	0	0
912.00	682	171	171
913.00	1,303	993	1,163
914.00	2,092	1,698	2,861
915.00	3,048	2,570	5,431

Device	Routing	Invert	Outlet Devices
#1	Primary	911.34'	6.0" Round Culvert L= 68.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 911.34' / 909.31' S= 0.0299 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	912.31'	3.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	913.00'	10.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.23 cfs @ 12.72 hrs HW=913.09' (Free Discharge)

- ↑ **1=Culvert** (Passes 0.23 cfs of 1.09 cfs potential flow)
- ↑ **2=Orifice/Grate** (Orifice Controls 0.19 cfs @ 3.90 fps)
- ↑ **3=Orifice/Grate** (Orifice Controls 0.03 cfs @ 1.03 fps)

Pond 2P: South Basin Orifice



23-047 Proposed Site Conditions_5-7-24

Type II 24-hr 10-Year Rainfall=4.46"

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Summary for Pond 3P: North Basin Orifice

Inflow Area = 0.980 ac, 75.51% Impervious, Inflow Depth = 3.26" for 10-Year event
 Inflow = 5.04 cfs @ 11.99 hrs, Volume= 0.266 af
 Outflow = 0.28 cfs @ 12.95 hrs, Volume= 0.197 af, Atten= 94%, Lag= 57.5 min
 Primary = 0.28 cfs @ 12.95 hrs, Volume= 0.197 af
 Routed to Link 13L : Combined Flow North

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 922.44' @ 12.95 hrs Surf.Area= 3,447 sf Storage= 7,066 cf

Plug-Flow detention time= 345.0 min calculated for 0.197 af (74% of inflow)
 Center-of-Mass det. time= 253.8 min (1,051.1 - 797.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	919.40'	6,149 cf	20.08'W x 171.65'L x 6.75'H Field A 23,269 cf Overall - 7,897 cf Embedded = 15,373 cf x 40.0% Voids
#2A	920.15'	7,897 cf	ADS_StormTech MC-7200 +Cap x 44 Inside #1 Effective Size= 91.2"W x 60.0"H => 26.68 sf x 6.59'L = 175.9 cf Overall Size= 100.0"W x 60.0"H x 6.95'L with 0.36' Overlap 44 Chambers in 2 Rows Cap Storage= 39.5 cf x 2 x 2 rows = 158.0 cf
		14,046 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	918.30'	12.0" Round Culvert L= 104.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 918.30' / 910.25' S= 0.0774 ' / Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	920.87'	3.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	924.15'	12.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.28 cfs @ 12.95 hrs HW=922.44' (Free Discharge)

- 1=Culvert (Passes 0.28 cfs of 7.22 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.28 cfs @ 5.79 fps)
- 3=Orifice/Grate (Controls 0.00 cfs)

23-047 Proposed Site Conditions_5-7-24

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Type II 24-hr 10-Year Rainfall=4.46"

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Pond 3P: North Basin Orifice - Chamber Wizard Field A

Chamber Model = ADS_StormTechMC-7200 +Cap (ADS StormTech®MC-7200 with cap volume)

Effective Size= 91.2"W x 60.0"H => 26.68 sf x 6.59'L = 175.9 cf

Overall Size= 100.0"W x 60.0"H x 6.95'L with 0.36' Overlap

Cap Storage= 39.5 cf x 2 x 2 rows = 158.0 cf

100.0" Wide + 9.0" Spacing = 109.0" C-C Row Spacing

22 Chambers/Row x 6.59' Long +2.73' Cap Length x 2 = 150.48' Row Length +127.0" End Stone x 2 = 171.65' Base Length

2 Rows x 100.0" Wide + 9.0" Spacing x 1 + 16.0" Side Stone x 2 = 20.08' Base Width

9.0" Stone Base + 60.0" Chamber Height + 12.0" Stone Cover = 6.75' Field Height

44 Chambers x 175.9 cf + 39.5 cf Cap Volume x 2 x 2 Rows = 7,896.5 cf Chamber Storage

23,269.3 cf Field - 7,896.5 cf Chambers = 15,372.8 cf Stone x 40.0% Voids = 6,149.1 cf Stone Storage

Chamber Storage + Stone Storage = 14,045.6 cf = 0.322 af

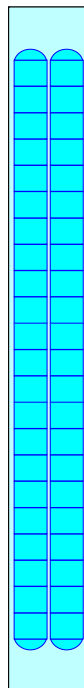
Overall Storage Efficiency = 60.4%

Overall System Size = 171.65' x 20.08' x 6.75'

44 Chambers

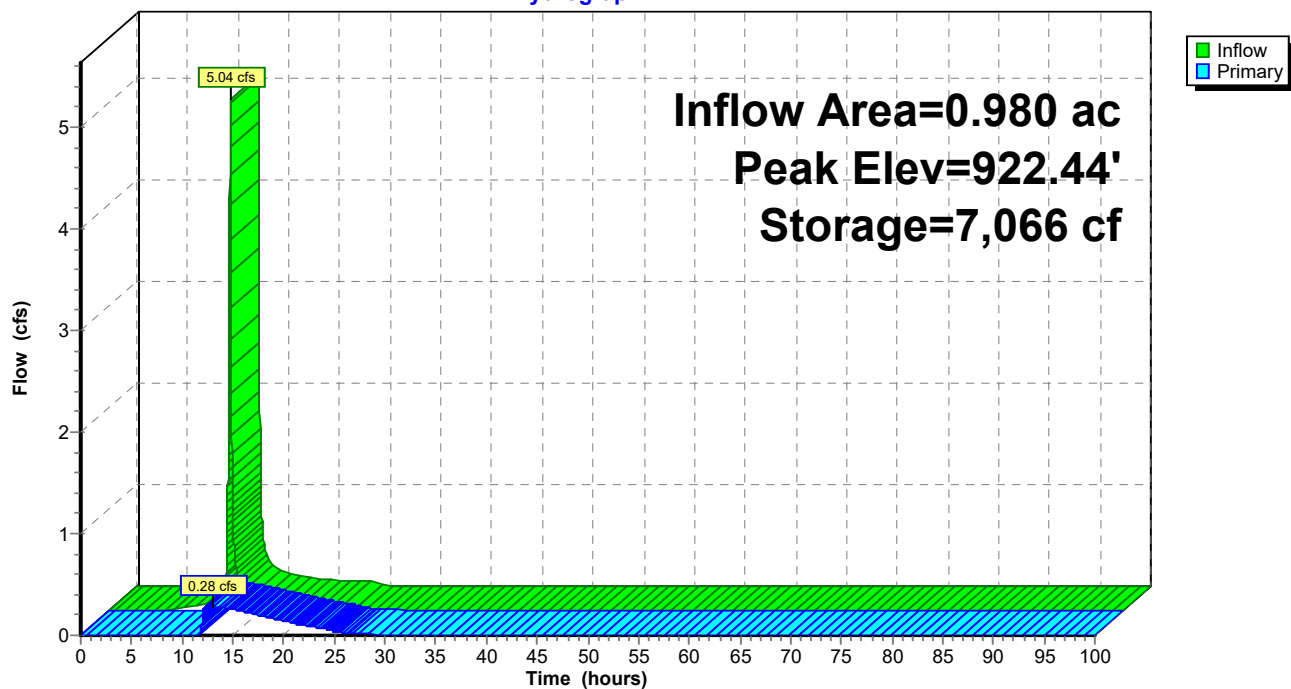
861.8 cy Field

569.4 cy Stone



Pond 3P: North Basin Orifice

Hydrograph



23-047 Proposed Site Conditions_5-7-24

Type II 24-hr 10-Year Rainfall=4.46"

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Summary for Pond 4P: West Basin Orifice

Inflow Area = 1.910 ac, 67.54% Impervious, Inflow Depth = 2.97" for 10-Year event
 Inflow = 9.57 cfs @ 11.98 hrs, Volume= 0.472 af
 Outflow = 2.10 cfs @ 12.14 hrs, Volume= 0.400 af, Atten= 78%, Lag= 9.9 min
 Primary = 2.10 cfs @ 12.14 hrs, Volume= 0.400 af
 Routed to Pond 5P : Level Spreader

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 911.16' @ 12.14 hrs Surf.Area= 4,649 sf Storage= 10,322 cf

Plug-Flow detention time= 269.0 min calculated for 0.400 af (85% of inflow)
 Center-of-Mass det. time= 199.9 min (1,006.4 - 806.4)

Volume	Invert	Avail.Storage	Storage Description
#1	907.00'	28,862 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
907.00	0	0	0
908.00	1,584	792	792
909.00	2,402	1,993	2,785
910.00	3,364	2,883	5,668
911.00	4,448	3,906	9,574
912.00	5,668	5,058	14,632
913.00	7,027	6,348	20,980
914.00	8,738	7,883	28,862

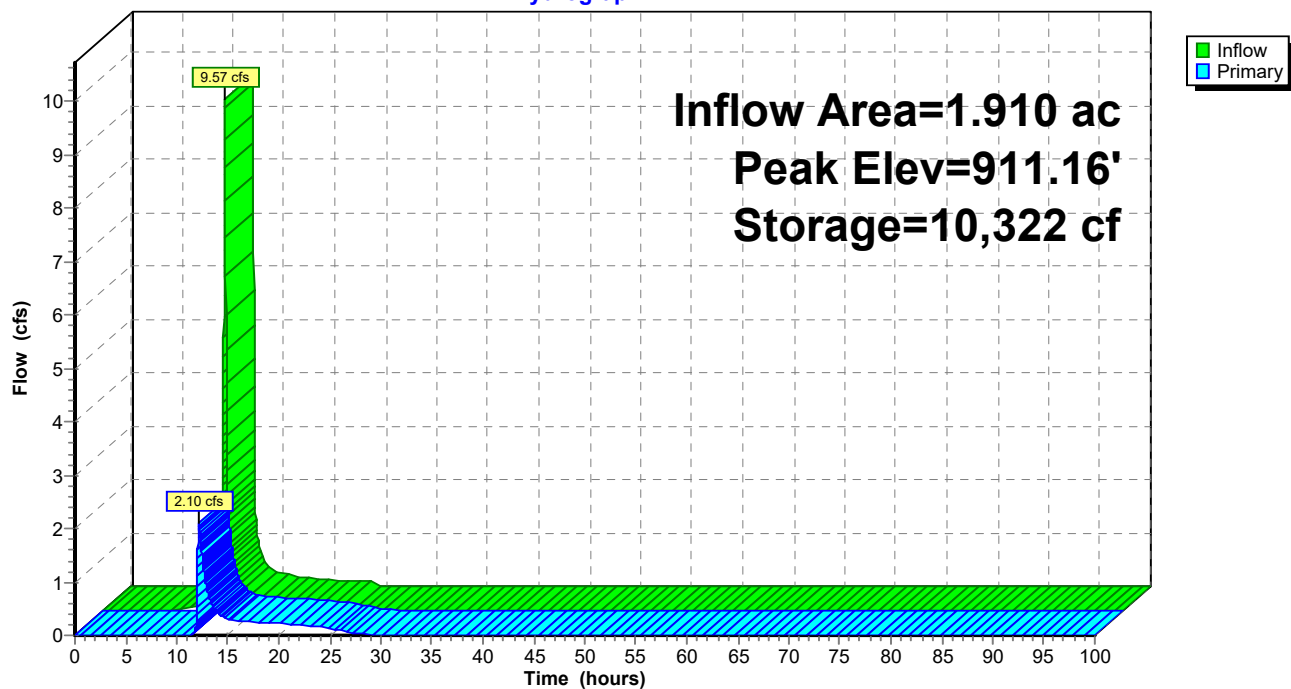
Device	Routing	Invert	Outlet Devices
#1	Primary	908.00'	15.0" Round Culvert L= 32.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 908.00' / 904.00' S= 0.1250 ' S Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Device 1	909.14'	3.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	910.50'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.25 1.25 1.75 Width (feet) 1.00 1.00 1.00 1.00

Primary OutFlow Max=2.10 cfs @ 12.14 hrs HW=911.16' (Free Discharge)

↑ **1=Culvert** (Passes 2.10 cfs of 9.42 cfs potential flow)
 ↑ **2=Orifice/Grate** (Orifice Controls 0.33 cfs @ 6.64 fps)
 ↑ **3=Custom Weir/Orifice** (Weir Controls 1.77 cfs @ 2.67 fps)

Pond 4P: West Basin Orifice

Hydrograph



23-047 Proposed Site Conditions_5-7-24

Type II 24-hr 10-Year Rainfall=4.46"

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Summary for Pond 5P: Level Spreader

[79] Warning: Submerged Pond 4P Primary device # 1 OUTLET by 0.08'

Inflow Area = 1.910 ac, 67.54% Impervious, Inflow Depth = 2.51" for 10-Year event
 Inflow = 2.10 cfs @ 12.14 hrs, Volume= 0.400 af
 Outflow = 2.10 cfs @ 12.15 hrs, Volume= 0.400 af, Atten= 0%, Lag= 0.1 min
 Primary = 2.10 cfs @ 12.15 hrs, Volume= 0.400 af
 Routed to Link 11L : Combined Flow West

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 904.08' @ 12.15 hrs Surf.Area= 140 sf Storage= 8 cf

Plug-Flow detention time= 0.1 min calculated for 0.400 af (100% of inflow)
 Center-of-Mass det. time= 0.1 min (1,006.4 - 1,006.4)

Volume	Invert	Avail.Storage	Storage Description
#1	904.00'	1,255 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

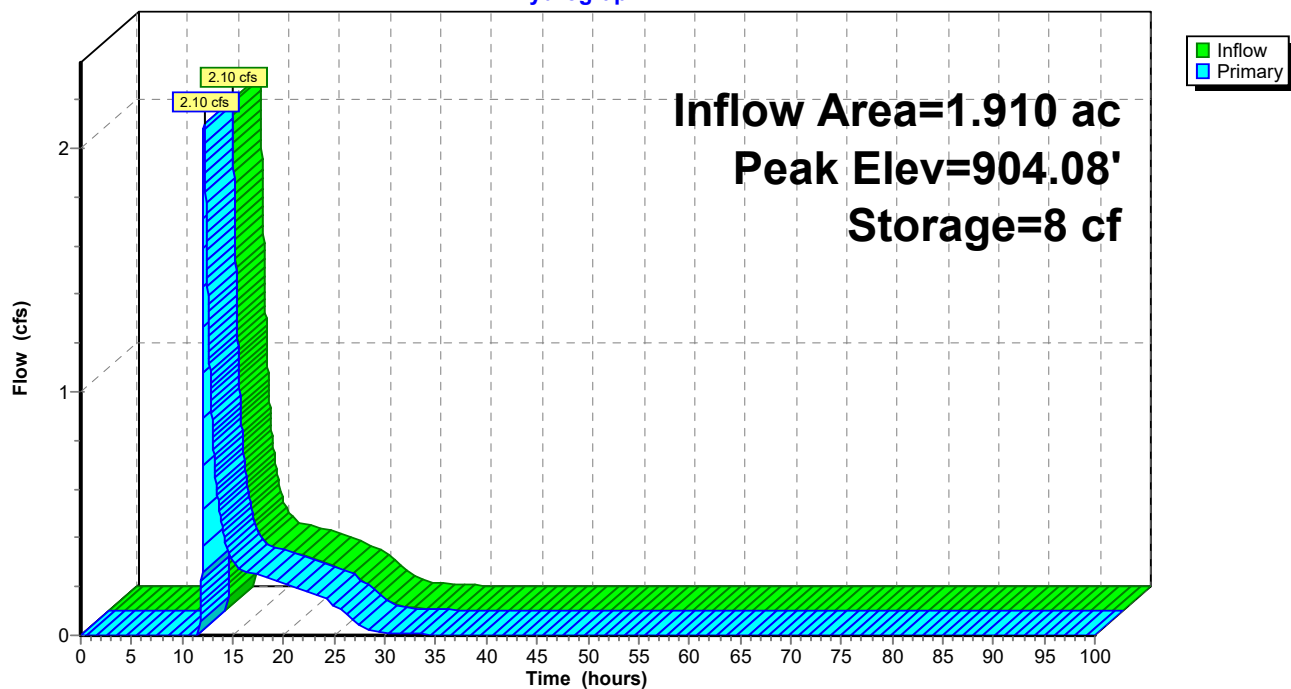
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
904.00	72	0	0
905.00	961	517	517
906.00	515	738	1,255

Device	Routing	Invert	Outlet Devices
#1	Primary	904.00'	30.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=2.09 cfs @ 12.15 hrs HW=904.08' TW=902.00' (Fixed TW Elev= 902.00')
 ↑1=Sharp-Crested Rectangular Weir (Weir Controls 2.09 cfs @ 0.91 fps)

Pond 5P: Level Spreader

Hydrograph

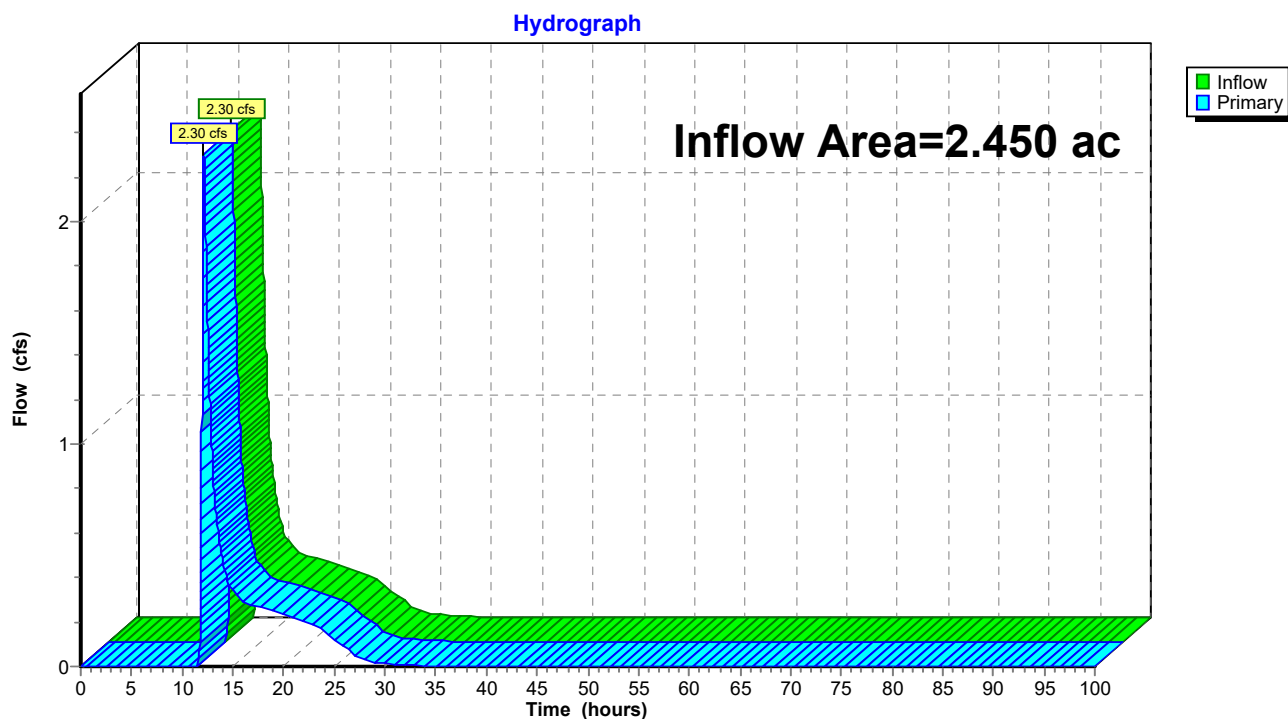


Summary for Link 11L: Combined Flow West

Inflow Area = 2.450 ac, 52.65% Impervious, Inflow Depth = 2.19" for 10-Year event
 Inflow = 2.30 cfs @ 12.13 hrs, Volume= 0.448 af
 Primary = 2.30 cfs @ 12.13 hrs, Volume= 0.448 af, Atten= 0%, Lag= 0.0 min
 Routed to nonexistent node 15L

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

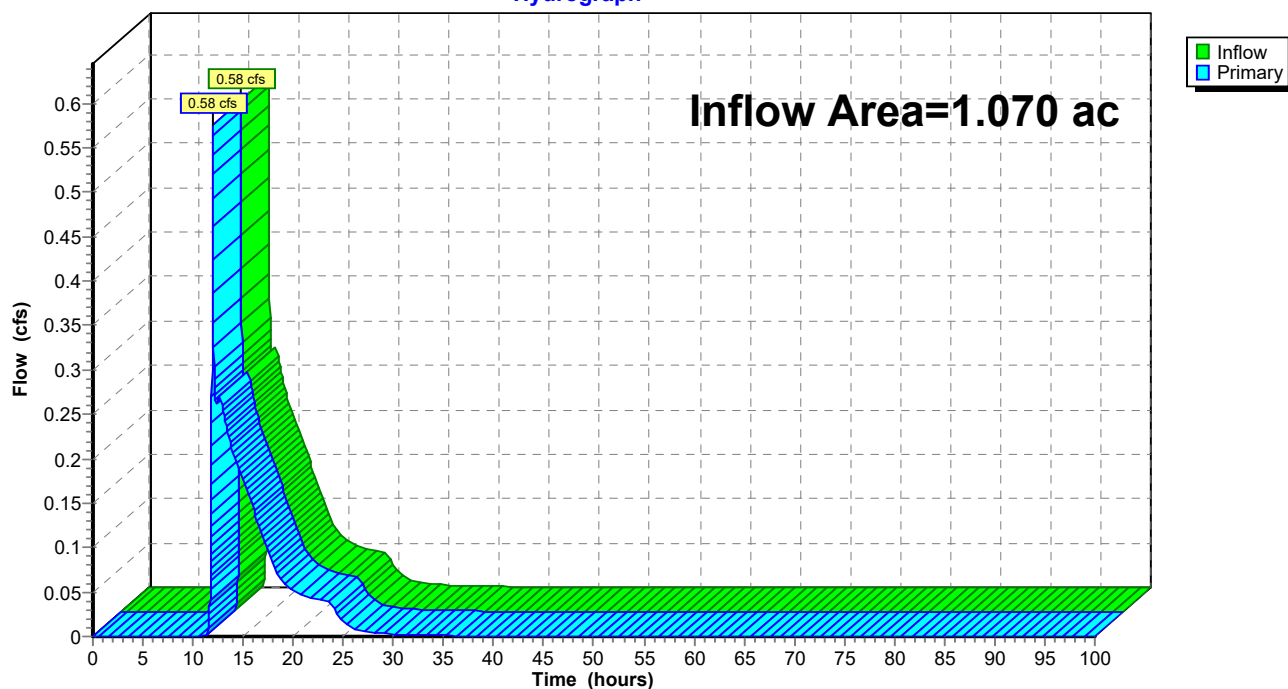
Link 11L: Combined Flow West



Summary for Link 12L: Combined Flow South

Inflow Area = 1.070 ac, 24.30% Impervious, Inflow Depth = 1.43" for 10-Year event
Inflow = 0.58 cfs @ 11.97 hrs, Volume= 0.128 af
Primary = 0.58 cfs @ 11.97 hrs, Volume= 0.128 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 15L

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

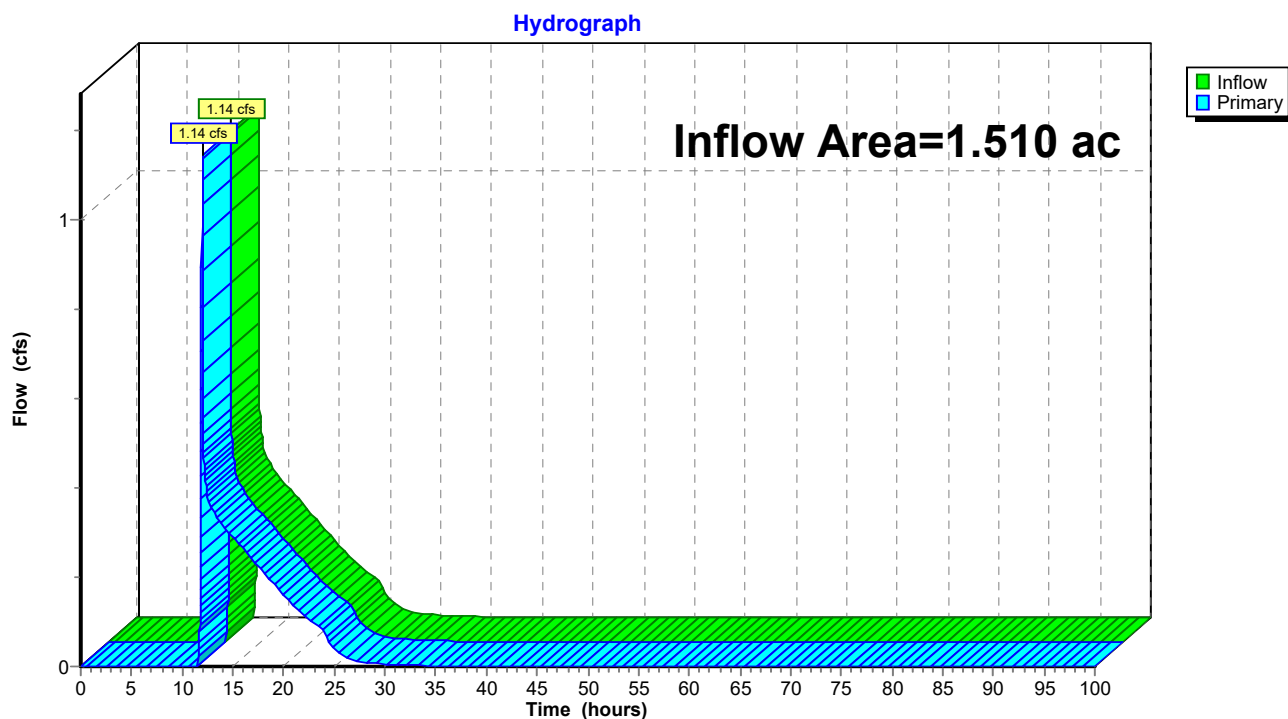
Link 12L: Combined Flow South**Hydrograph**

Summary for Link 13L: Comnined Flow North

Inflow Area = 1.510 ac, 49.01% Impervious, Inflow Depth = 1.94" for 10-Year event
 Inflow = 1.14 cfs @ 11.98 hrs, Volume= 0.244 af
 Primary = 1.14 cfs @ 11.98 hrs, Volume= 0.244 af, Atten= 0%, Lag= 0.0 min
 Routed to nonexistent node 15L

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Link 13L: Comnined Flow North



23-047 Proposed Site Conditions_5-7-24*Type II 24-hr 25-Year Rainfall=5.44"*

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Time span=0.00-100.00 hrs, dt=0.01 hrs, 10001 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment7S: UndetainedWest	Runoff Area=0.540 ac 0.00% Impervious Runoff Depth=1.64" Tc=5.0 min CN=61 Runoff=1.63 cfs 0.074 af
Subcatchment8S: UndetainedNorth	Runoff Area=0.530 ac 0.00% Impervious Runoff Depth=1.64" Tc=5.0 min CN=61 Runoff=1.60 cfs 0.072 af
Subcatchment9S: UndetainedSoutheast	Runoff Area=0.170 ac 11.76% Impervious Runoff Depth=1.95" Tc=5.0 min CN=65 Runoff=0.62 cfs 0.028 af
Subcatchment10S: UndetainedSouth	Runoff Area=0.090 ac 0.00% Impervious Runoff Depth=1.64" Tc=5.0 min CN=61 Runoff=0.27 cfs 0.012 af
SubcatchmentP-N: Proposed North	Runoff Area=0.980 ac 75.51% Impervious Runoff Depth=4.19" Flow Length=321' Tc=8.1 min CN=89 Runoff=6.39 cfs 0.343 af
SubcatchmentP-S: Proposed South	Runoff Area=0.480 ac 22.92% Impervious Runoff Depth=2.28" Flow Length=237' Tc=11.1 min CN=69 Runoff=1.62 cfs 0.091 af
SubcatchmentP-SE: Proposed Drainage	Runoff Area=0.330 ac 39.39% Impervious Runoff Depth=2.90" Flow Length=118' Tc=7.3 min CN=76 Runoff=1.63 cfs 0.080 af
SubcatchmentP-W: Proposed West	Runoff Area=1.910 ac 67.54% Impervious Runoff Depth=3.88" Flow Length=1,203' Tc=6.7 min CN=86 Runoff=12.34 cfs 0.617 af
Pond 1P: SE Basin	Peak Elev=918.05' Storage=1,695 cf Inflow=1.63 cfs 0.080 af Outflow=0.18 cfs 0.070 af
Pond 2P: South Basin Orifice	Peak Elev=913.32' Storage=1,623 cf Inflow=1.75 cfs 0.161 af Outflow=0.60 cfs 0.152 af
Pond 3P: North Basin Orifice	Peak Elev=923.33' Storage=9,204 cf Inflow=6.39 cfs 0.343 af Outflow=0.36 cfs 0.274 af
Pond 4P: West Basin Orifice	Peak Elev=911.64' Storage=12,690 cf Inflow=12.34 cfs 0.617 af Outflow=4.37 cfs 0.546 af
Pond 5P: Level Spreader	Peak Elev=904.13' Storage=16 cf Inflow=4.37 cfs 0.546 af Outflow=4.37 cfs 0.546 af
Link 11L: Combined Flow West	Inflow=4.86 cfs 0.619 af Primary=4.86 cfs 0.619 af
Link 12L: Combined Flow South	Inflow=0.99 cfs 0.192 af Primary=0.99 cfs 0.192 af
Link 13L: Combined Flow North	Inflow=1.82 cfs 0.346 af Primary=1.82 cfs 0.346 af

23-047 Proposed Site Conditions_5-7-24*Type II 24-hr 25-Year Rainfall=5.44"*

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Total Runoff Area = 5.030 ac Runoff Volume = 1.317 af Average Runoff Depth = 3.14"
54.47% Pervious = 2.740 ac 45.53% Impervious = 2.290 ac

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Type II 24-hr 25-Year Rainfall=5.44"

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Summary for Subcatchment 7S: Undetained West

Runoff = 1.63 cfs @ 11.97 hrs, Volume= 0.074 af, Depth= 1.64"
Routed to Link 11L : Combined Flow West

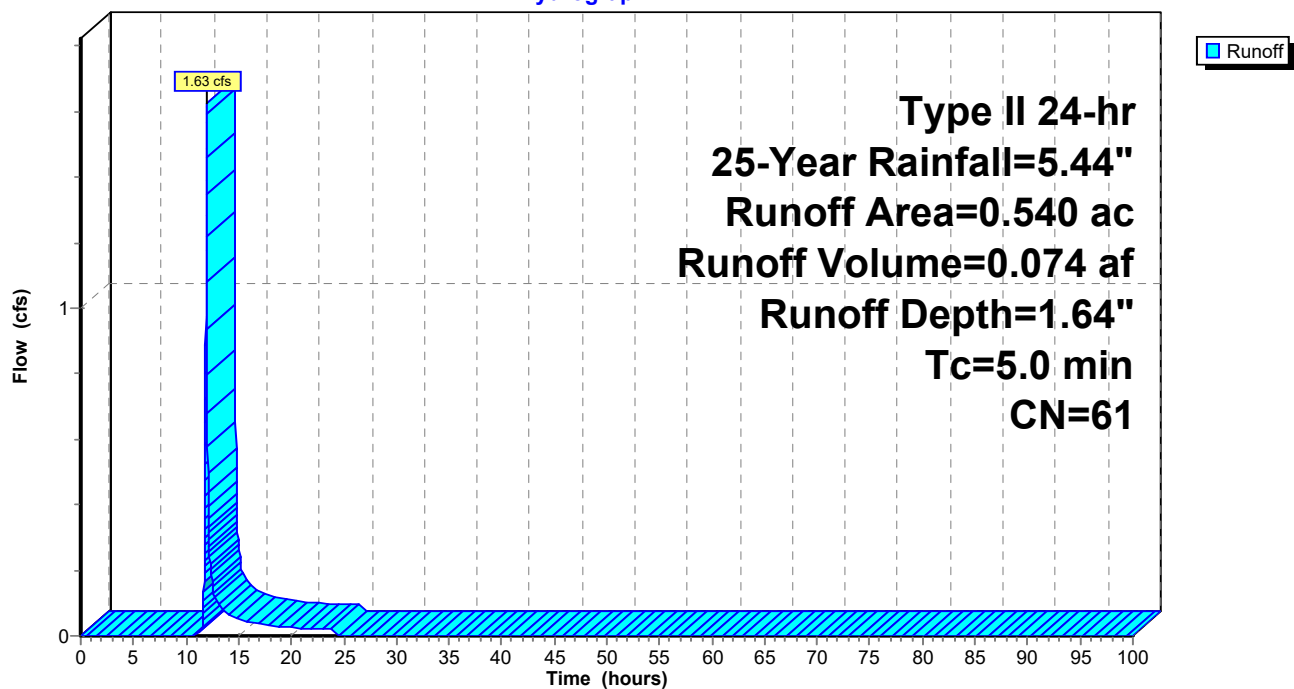
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-Year Rainfall=5.44"

Area (ac)	CN	Description
* 0.540	61	>75% Grass cover, Good, HSG B
0.540		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 7S: Undetained West

Hydrograph



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Type II 24-hr 25-Year Rainfall=5.44"

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Summary for Subcatchment 8S: Undetained North

Runoff = 1.60 cfs @ 11.97 hrs, Volume= 0.072 af, Depth= 1.64"
Routed to Link 13L : Comnined Flow North

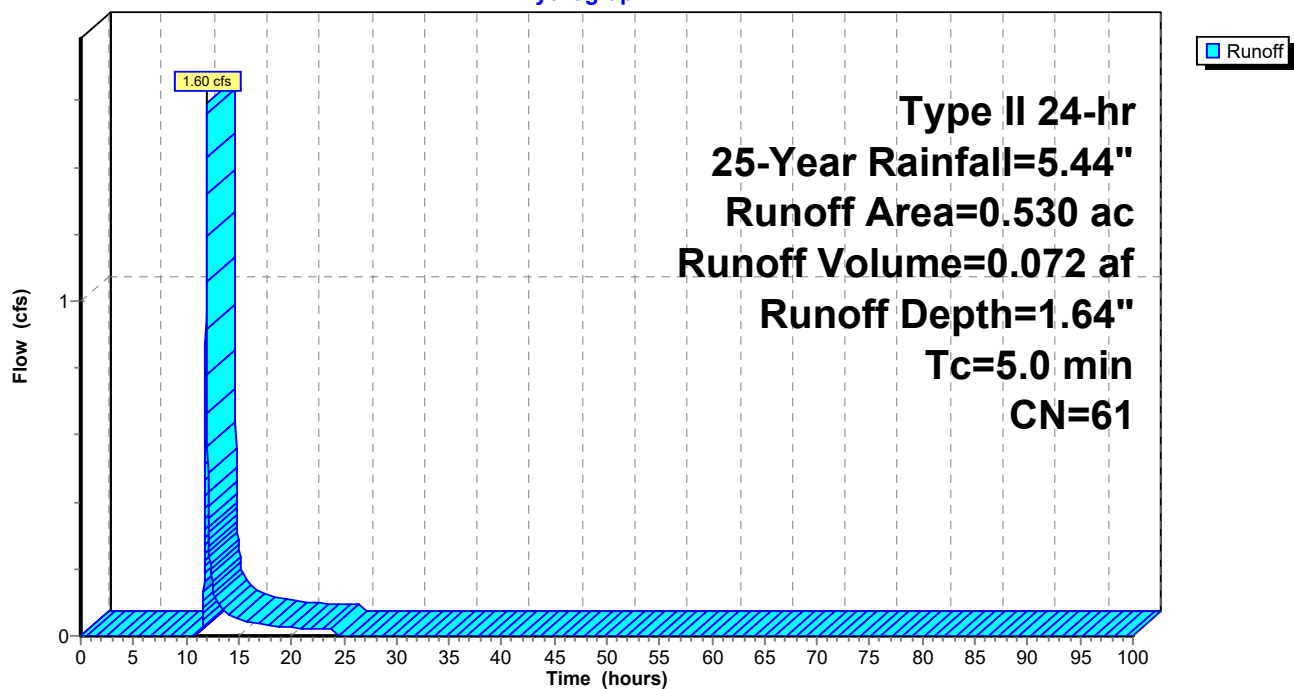
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-Year Rainfall=5.44"

Area (ac)	CN	Description
* 0.530	61	>75% Grass cover, Good, HSG B
0.530		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 8S: Undetained North

Hydrograph



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Type II 24-hr 25-Year Rainfall=5.44"

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Summary for Subcatchment 9S: Undetained Southeast

Runoff = 0.62 cfs @ 11.97 hrs, Volume= 0.028 af, Depth= 1.95"
Routed to Link 12L : Combined Flow South

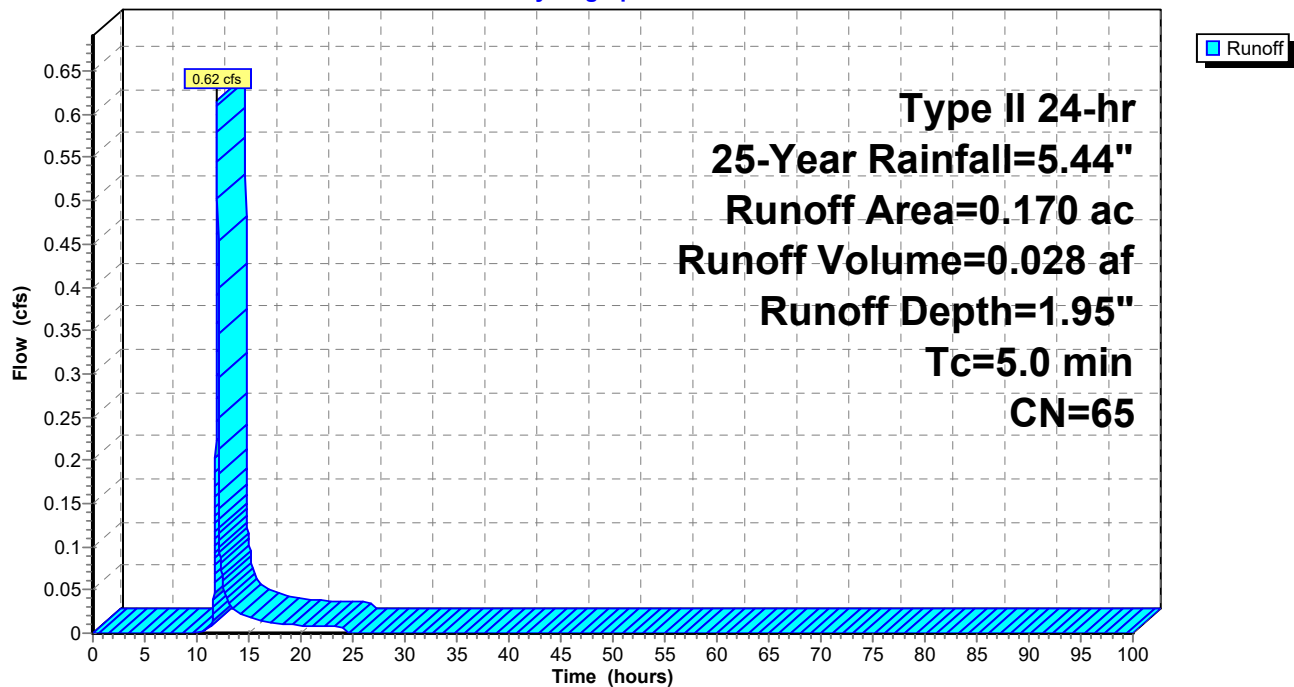
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-Year Rainfall=5.44"

Area (ac)	CN	Description
* 0.150	61	>75% Grass cover, Good, HSG B
* 0.020	98	Pavement
0.170	65	Weighted Average
0.150		88.24% Pervious Area
0.020		11.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 9S: Undetained Southeast

Hydrograph



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Type II 24-hr 25-Year Rainfall=5.44"

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Summary for Subcatchment 10S: Undetained South

Runoff = 0.27 cfs @ 11.97 hrs, Volume= 0.012 af, Depth= 1.64"
Routed to Link 12L : Combined Flow South

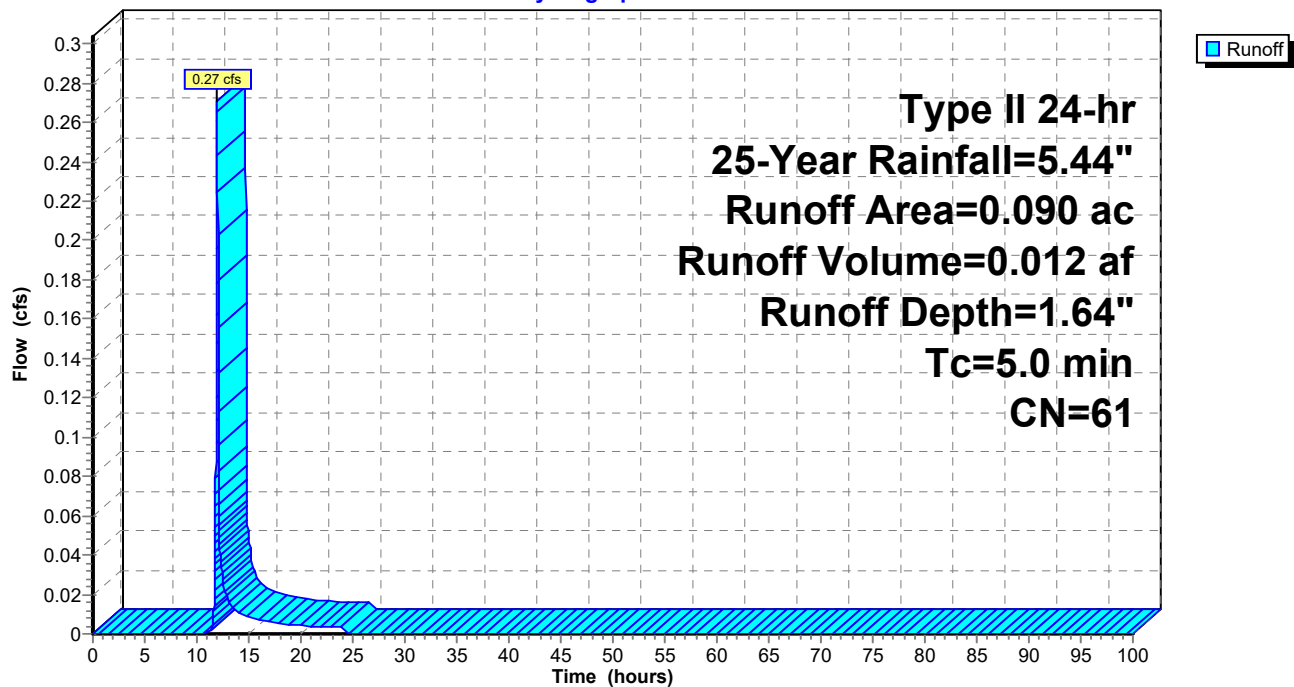
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-Year Rainfall=5.44"

Area (ac)	CN	Description
* 0.090	61	>75% Grass cover, Good, HSG B
0.090		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 10S: Undetained South

Hydrograph



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Type II 24-hr 25-Year Rainfall=5.44"

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Summary for Subcatchment P-N: Proposed North

Runoff = 6.39 cfs @ 11.99 hrs, Volume= 0.343 af, Depth= 4.19"
 Routed to Pond 3P : North Basin Orifice

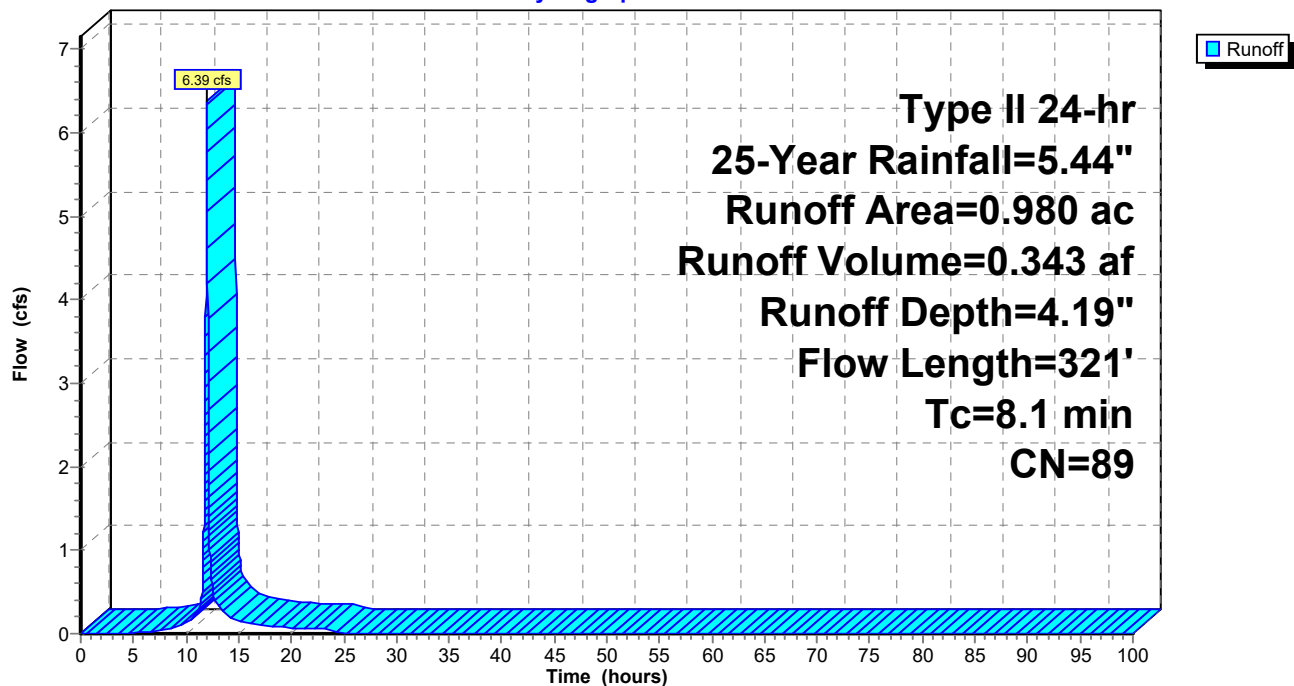
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Type II 24-hr 25-Year Rainfall=5.44"

Area (ac)	CN	Description
* 0.740	98	Paved roads w/curbs & sewers, HSG C
0.240	61	>75% Grass cover, Good, HSG B
0.980	89	Weighted Average
0.240		24.49% Pervious Area
0.740		75.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	91	0.0350	0.20		Sheet Flow, SHEET (GRASS) Grass: Short n= 0.150 P2= 3.04"
0.6	230	0.0150	6.45	7.91	Pipe Channel, PIPE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
8.1	321	Total			

Subcatchment P-N: Proposed North

Hydrograph



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Type II 24-hr 25-Year Rainfall=5.44"

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Summary for Subcatchment P-S: Proposed South

Runoff = 1.62 cfs @ 12.03 hrs, Volume= 0.091 af, Depth= 2.28"
 Routed to Pond 2P : South Basin Orifice

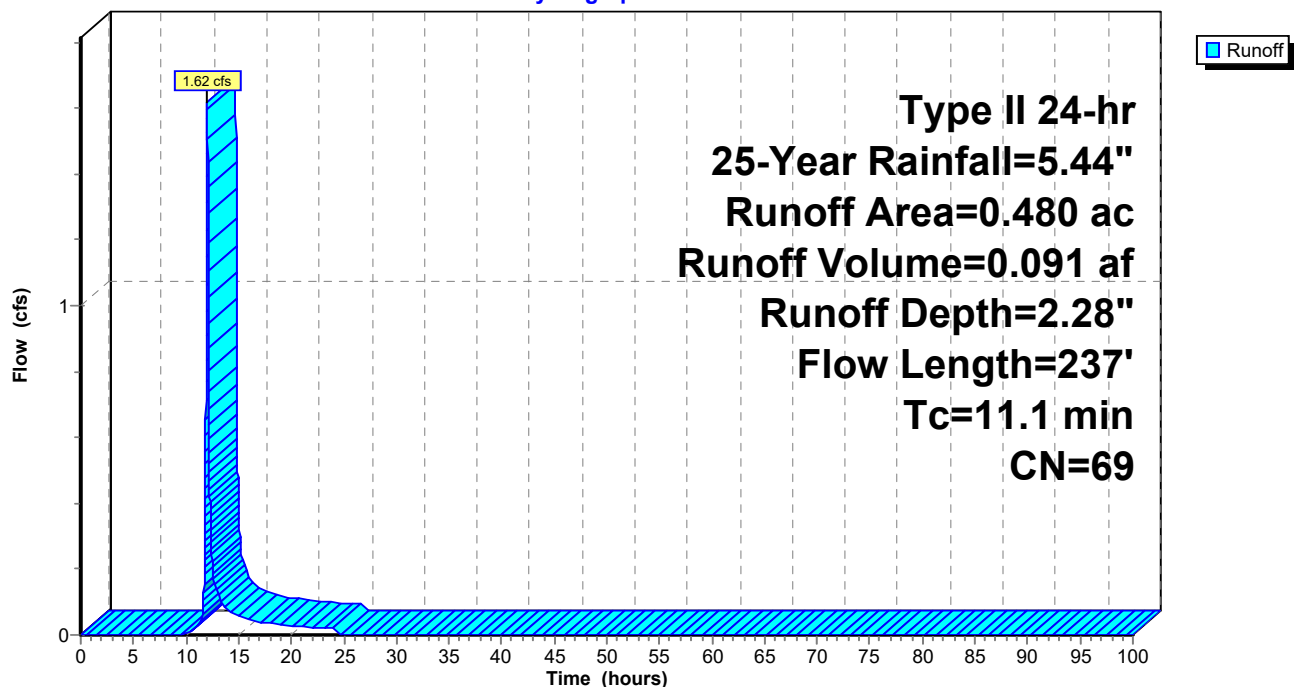
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Type II 24-hr 25-Year Rainfall=5.44"

Area (ac)	CN	Description
* 0.110	98	Paved roads w/curbs & sewers, HSG C
0.370	61	>75% Grass cover, Good, HSG B
0.480	69	Weighted Average
0.370		77.08% Pervious Area
0.110		22.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	100	0.0200	0.17		Sheet Flow, SHEET (GRASS) Grass: Short n= 0.150 P2= 3.04"
0.9	112	0.0200	2.12		Shallow Concentrated Flow, SHALLOW (GRASS) Grassed Waterway Kv= 15.0 fps
0.1	25	0.2500	7.50		Shallow Concentrated Flow, SHALLOW (GRASS) Grassed Waterway Kv= 15.0 fps
11.1	237	Total			

Subcatchment P-S: Proposed South

Hydrograph



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Type II 24-hr 25-Year Rainfall=5.44"

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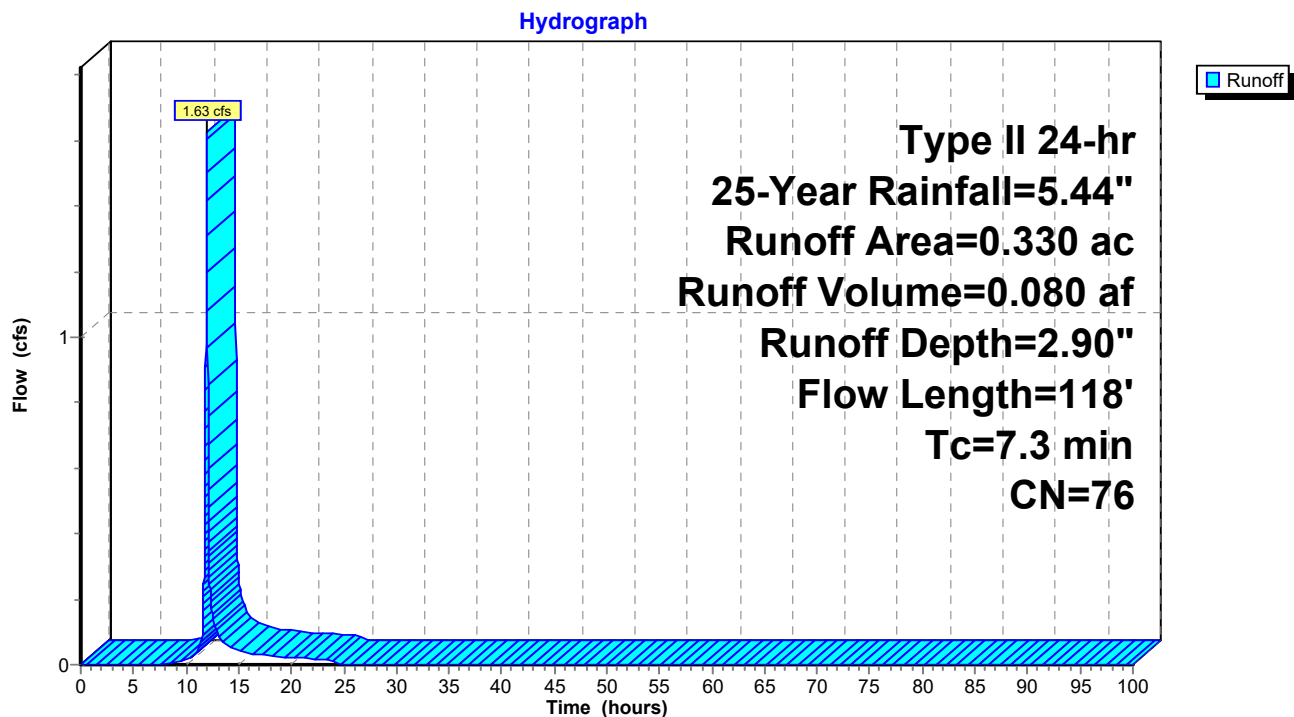
Summary for Subcatchment P-SE: Proposed Drainage

Runoff = 1.63 cfs @ 11.99 hrs, Volume= 0.080 af, Depth= 2.90"
Routed to Pond 1P : SE Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-Year Rainfall=5.44"

Area (ac)	CN	Description
0.130	98	Paved parking, HSG C
0.200	61	>75% Grass cover, Good, HSG B
0.330	76	Weighted Average
0.200		60.61% Pervious Area
0.130		39.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	65	0.0200	0.15		Sheet Flow, Grass: Short n= 0.150 P2= 3.04"
0.2	53	0.0100	5.26	6.46	Pipe Channel, 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
7.3	118	Total			

Subcatchment P-SE: Proposed Drainage

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Type II 24-hr 25-Year Rainfall=5.44"

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Summary for Subcatchment P-W: Proposed West

Runoff = 12.34 cfs @ 11.98 hrs, Volume= 0.617 af, Depth= 3.88"
Routed to Pond 4P : West Basin Orifice

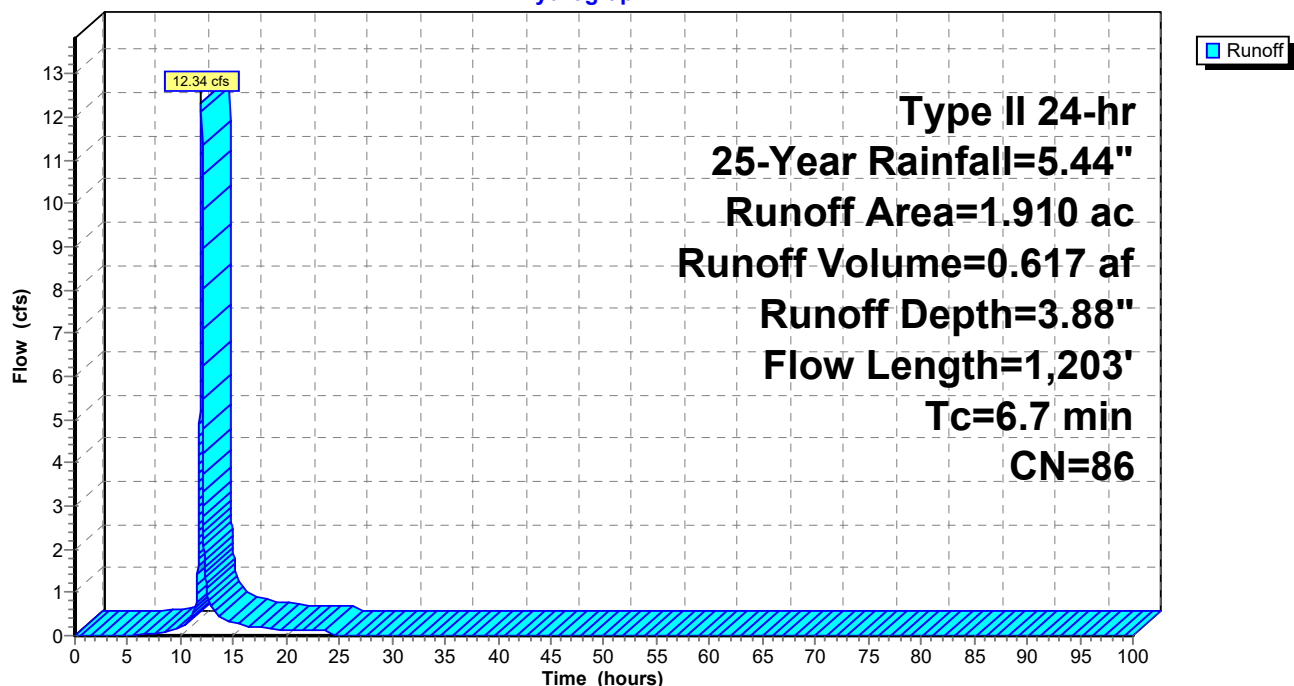
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-Year Rainfall=5.44"

Area (ac)	CN	Description
* 1.290	98	Paved roads w/curbs & sewers, HSG C
0.620	61	>75% Grass cover, Good, HSG B
1.910	86	Weighted Average
0.620		32.46% Pervious Area
1.290		67.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	100	0.0050	0.77		Sheet Flow, SHEET (PAVED) Smooth surfaces n= 0.011 P2= 3.04"
3.6	725	0.0280	3.40		Shallow Concentrated Flow, SHALLOW (PAVED) Paved Kv= 20.3 fps
0.9	378	0.0150	7.28	12.87	Pipe Channel, Storm Sewer 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
6.7	1,203	Total			

Subcatchment P-W: Proposed West

Hydrograph



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Type II 24-hr 25-Year Rainfall=5.44"

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Summary for Pond 1P: SE Basin

Inflow Area = 0.330 ac, 39.39% Impervious, Inflow Depth = 2.90" for 25-Year event
 Inflow = 1.63 cfs @ 11.99 hrs, Volume= 0.080 af
 Outflow = 0.18 cfs @ 12.43 hrs, Volume= 0.070 af, Atten= 89%, Lag= 26.8 min
 Primary = 0.18 cfs @ 12.43 hrs, Volume= 0.070 af
 Routed to Pond 2P : South Basin Orifice

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 918.05' @ 12.43 hrs Surf.Area= 2,890 sf Storage= 1,695 cf

Plug-Flow detention time= 203.8 min calculated for 0.070 af (88% of inflow)
 Center-of-Mass det. time= 144.4 min (970.9 - 826.5)

Volume	Invert	Avail.Storage	Storage Description
#1	916.91'	8,715 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
916.91	0	0	0
918.00	2,856	1,557	1,557
919.00	3,551	3,204	4,760
920.00	4,358	3,955	8,715

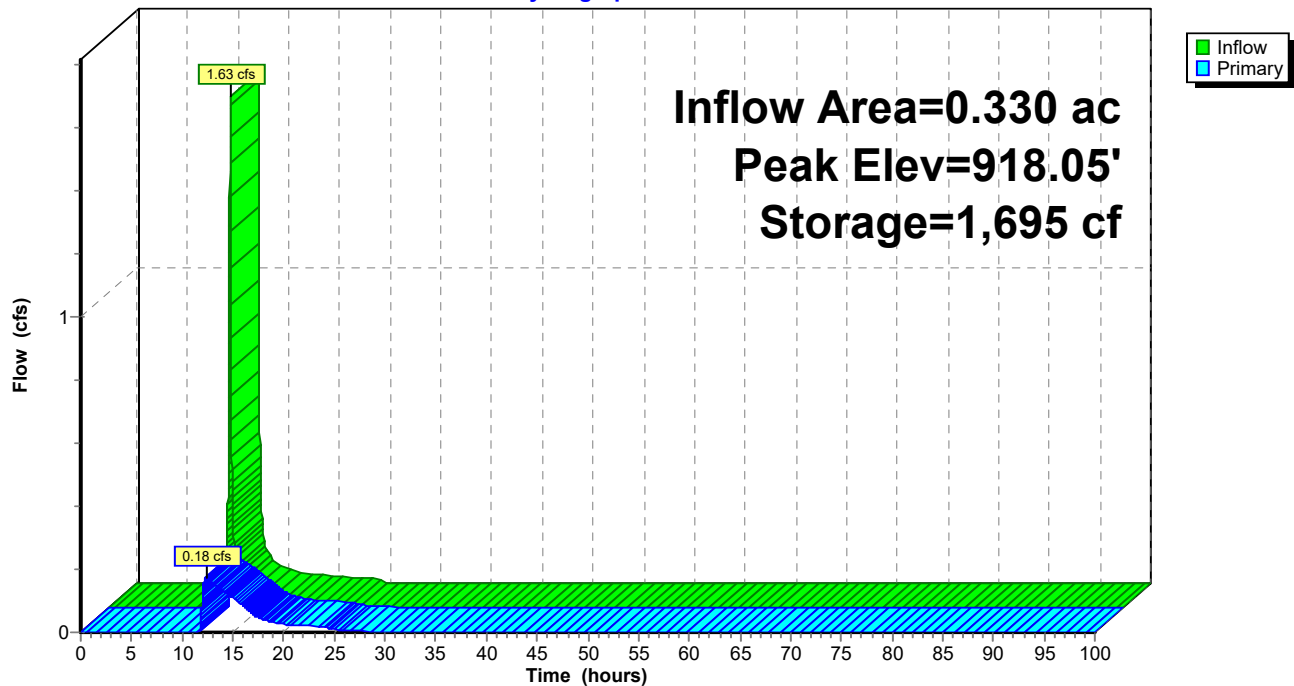
Device	Routing	Invert	Outlet Devices
#1	Primary	916.26'	4.0" Round Culvert X 3.00 L= 30.2' Ke= 0.500 Inlet / Outlet Invert= 916.26' / 915.96' S= 0.0099 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 0.09 sf
#2	Device 1	917.48'	3.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	918.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.45 0.45 0.95 Width (feet) 0.50 0.50 3.00 3.00

Primary OutFlow Max=0.17 cfs @ 12.43 hrs HW=918.05' (Free Discharge)

1=Culvert (Passes 0.17 cfs of 1.18 cfs potential flow)
 2=Orifice/Grate (Orifice Controls 0.16 cfs @ 3.21 fps)
 3=Custom Weir/Orifice (Weir Controls 0.02 cfs @ 0.72 fps)

Pond 1P: SE Basin

Hydrograph



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Type II 24-hr 25-Year Rainfall=5.44"

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Summary for Pond 2P: South Basin Orifice

Inflow Area = 0.810 ac, 29.63% Impervious, Inflow Depth = 2.39" for 25-Year event
 Inflow = 1.75 cfs @ 12.03 hrs, Volume= 0.161 af
 Outflow = 0.60 cfs @ 12.26 hrs, Volume= 0.152 af, Atten= 66%, Lag= 13.4 min
 Primary = 0.60 cfs @ 12.26 hrs, Volume= 0.152 af
 Routed to Link 12L : Combined Flow South

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 913.32' @ 12.26 hrs Surf.Area= 1,557 sf Storage= 1,623 cf

Plug-Flow detention time= 109.5 min calculated for 0.152 af (94% of inflow)
 Center-of-Mass det. time= 70.7 min (971.5 - 900.8)

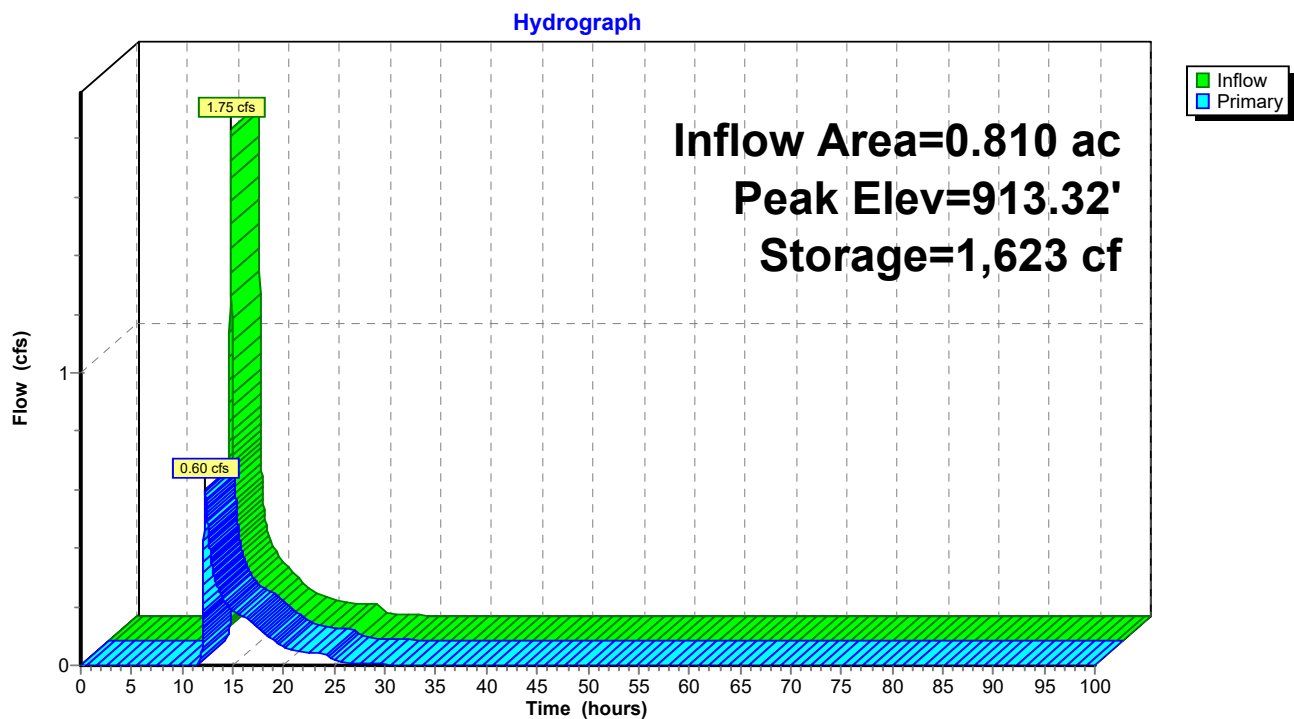
Volume	Invert	Avail.Storage	Storage Description
#1	911.50'	5,431 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
911.50	0	0	0
912.00	682	171	171
913.00	1,303	993	1,163
914.00	2,092	1,698	2,861
915.00	3,048	2,570	5,431

Device	Routing	Invert	Outlet Devices
#1	Primary	911.34'	6.0" Round Culvert L= 68.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 911.34' / 909.31' S= 0.0299 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	912.31'	3.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	913.00'	10.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.60 cfs @ 12.26 hrs HW=913.32' (Free Discharge)

- ↑ **1=Culvert** (Passes 0.60 cfs of 1.13 cfs potential flow)
- ↑ **2=Orifice/Grate** (Orifice Controls 0.22 cfs @ 4.53 fps)
- ↑ **3=Orifice/Grate** (Orifice Controls 0.37 cfs @ 1.93 fps)

Pond 2P: South Basin Orifice



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Type II 24-hr 25-Year Rainfall=5.44"

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Summary for Pond 3P: North Basin Orifice

Inflow Area = 0.980 ac, 75.51% Impervious, Inflow Depth = 4.19" for 25-Year event
 Inflow = 6.39 cfs @ 11.99 hrs, Volume= 0.343 af
 Outflow = 0.36 cfs @ 12.93 hrs, Volume= 0.274 af, Atten= 94%, Lag= 56.0 min
 Primary = 0.36 cfs @ 12.93 hrs, Volume= 0.274 af
 Routed to Link 13L : Combined Flow North

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 923.33' @ 12.93 hrs Surf.Area= 3,447 sf Storage= 9,204 cf

Plug-Flow detention time= 357.3 min calculated for 0.274 af (80% of inflow)
 Center-of-Mass det. time= 277.1 min (1,067.3 - 790.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	919.40'	6,149 cf	20.08'W x 171.65'L x 6.75'H Field A 23,269 cf Overall - 7,897 cf Embedded = 15,373 cf x 40.0% Voids
#2A	920.15'	7,897 cf	ADS_StormTech MC-7200 +Cap x 44 Inside #1 Effective Size= 91.2"W x 60.0"H => 26.68 sf x 6.59'L = 175.9 cf Overall Size= 100.0"W x 60.0"H x 6.95'L with 0.36' Overlap 44 Chambers in 2 Rows Cap Storage= 39.5 cf x 2 x 2 rows = 158.0 cf
		14,046 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	918.30'	12.0" Round Culvert L= 104.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 918.30' / 910.25' S= 0.0774 ' / Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	920.87'	3.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	924.15'	12.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.36 cfs @ 12.93 hrs HW=923.33' (Free Discharge)

1=Culvert (Passes 0.36 cfs of 8.05 cfs potential flow)
 2=Orifice/Grate (Orifice Controls 0.36 cfs @ 7.36 fps)
 3=Orifice/Grate (Controls 0.00 cfs)

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Type II 24-hr 25-Year Rainfall=5.44"

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Pond 3P: North Basin Orifice - Chamber Wizard Field A

Chamber Model = ADS_StormTechMC-7200+Cap (ADS StormTech®MC-7200 with cap volume)

Effective Size= 91.2"W x 60.0"H => 26.68 sf x 6.59'L = 175.9 cf

Overall Size= 100.0"W x 60.0"H x 6.95'L with 0.36' Overlap

Cap Storage= 39.5 cf x 2 x 2 rows = 158.0 cf

100.0" Wide + 9.0" Spacing = 109.0" C-C Row Spacing

22 Chambers/Row x 6.59' Long +2.73' Cap Length x 2 = 150.48' Row Length +127.0" End Stone x 2 = 171.65' Base Length

2 Rows x 100.0" Wide + 9.0" Spacing x 1 + 16.0" Side Stone x 2 = 20.08' Base Width

9.0" Stone Base + 60.0" Chamber Height + 12.0" Stone Cover = 6.75' Field Height

44 Chambers x 175.9 cf + 39.5 cf Cap Volume x 2 x 2 Rows = 7,896.5 cf Chamber Storage

23,269.3 cf Field - 7,896.5 cf Chambers = 15,372.8 cf Stone x 40.0% Voids = 6,149.1 cf Stone Storage

Chamber Storage + Stone Storage = 14,045.6 cf = 0.322 af

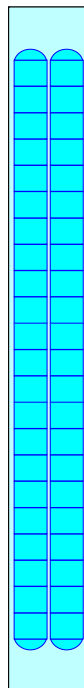
Overall Storage Efficiency = 60.4%

Overall System Size = 171.65' x 20.08' x 6.75'

44 Chambers

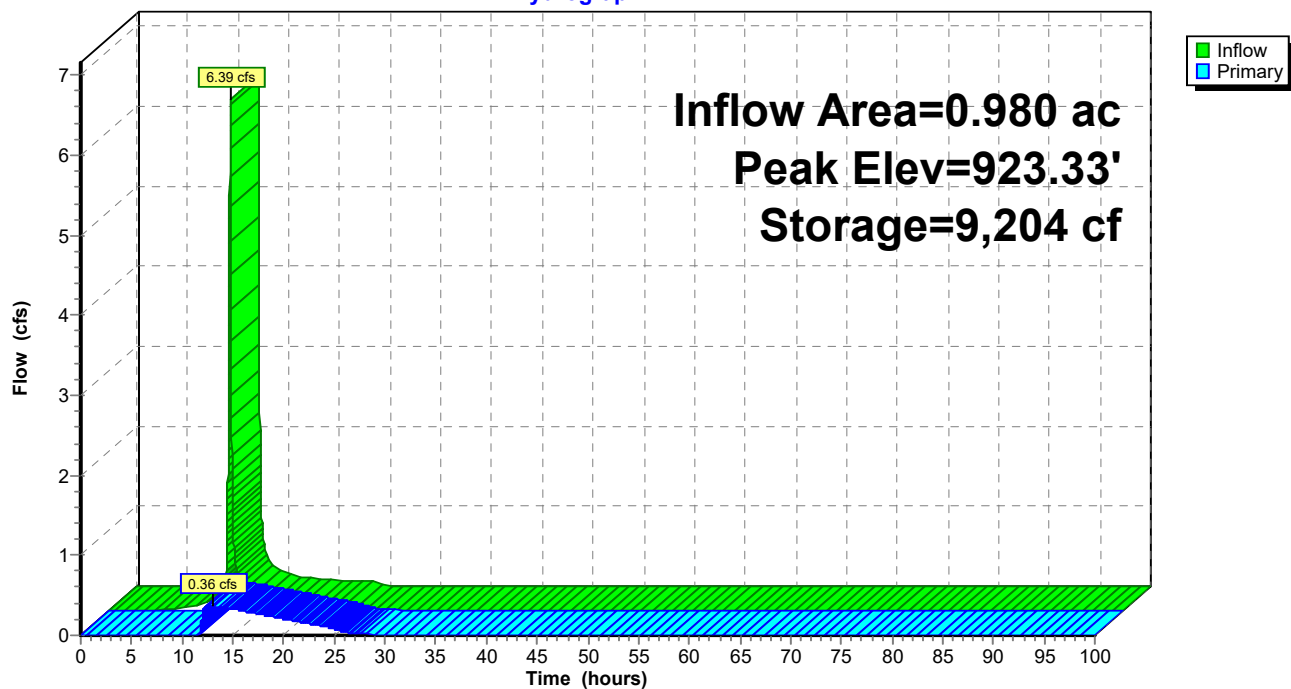
861.8 cy Field

569.4 cy Stone



Pond 3P: North Basin Orifice

Hydrograph



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Type II 24-hr 25-Year Rainfall=5.44"

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Summary for Pond 4P: West Basin Orifice

Inflow Area = 1.910 ac, 67.54% Impervious, Inflow Depth = 3.88" for 25-Year event
 Inflow = 12.34 cfs @ 11.98 hrs, Volume= 0.617 af
 Outflow = 4.37 cfs @ 12.10 hrs, Volume= 0.546 af, Atten= 65%, Lag= 7.2 min
 Primary = 4.37 cfs @ 12.10 hrs, Volume= 0.546 af
 Routed to Pond 5P : Level Spreader

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 911.64' @ 12.10 hrs Surf.Area= 5,233 sf Storage= 12,690 cf

Plug-Flow detention time= 228.2 min calculated for 0.546 af (88% of inflow)
 Center-of-Mass det. time= 170.9 min (969.7 - 798.8)

Volume	Invert	Avail.Storage	Storage Description
#1	907.00'	28,862 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
907.00	0	0	0
908.00	1,584	792	792
909.00	2,402	1,993	2,785
910.00	3,364	2,883	5,668
911.00	4,448	3,906	9,574
912.00	5,668	5,058	14,632
913.00	7,027	6,348	20,980
914.00	8,738	7,883	28,862

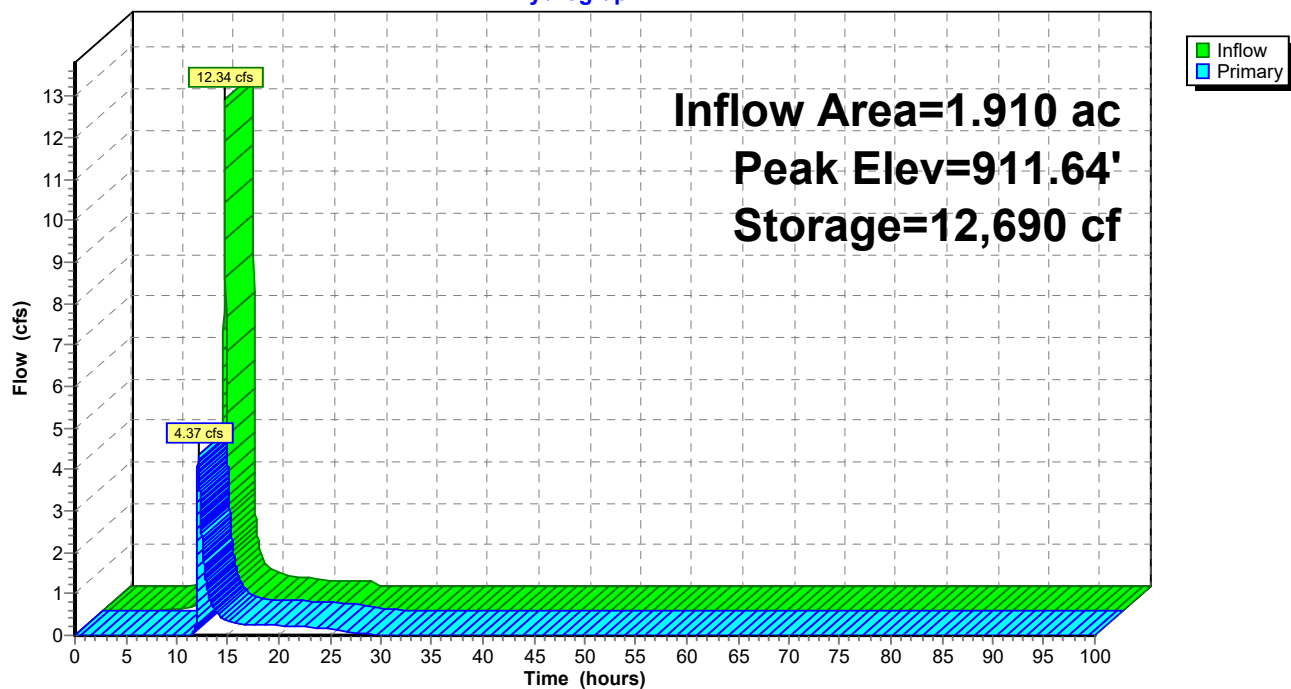
Device	Routing	Invert	Outlet Devices
#1	Primary	908.00'	15.0" Round Culvert L= 32.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 908.00' / 904.00' S= 0.1250 ' S= 0.1250 ' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Device 1	909.14'	3.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	910.50'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.25 1.25 1.75 Width (feet) 1.00 1.00 1.00 1.00

Primary OutFlow Max=4.37 cfs @ 12.10 hrs HW=911.64' (Free Discharge)

↑ **1=Culvert** (Passes 4.37 cfs of 10.27 cfs potential flow)
 ↑ **2=Orifice/Grate** (Orifice Controls 0.36 cfs @ 7.43 fps)
 ↑ **3=Custom Weir/Orifice** (Weir Controls 4.00 cfs @ 3.50 fps)

Pond 4P: West Basin Orifice

Hydrograph



23-047 Proposed Site Conditions_5-7-24

Type II 24-hr 25-Year Rainfall=5.44"

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Summary for Pond 5P: Level Spreader

[79] Warning: Submerged Pond 4P Primary device # 1 OUTLET by 0.13'

Inflow Area = 1.910 ac, 67.54% Impervious, Inflow Depth = 3.43" for 25-Year event
 Inflow = 4.37 cfs @ 12.10 hrs, Volume= 0.546 af
 Outflow = 4.37 cfs @ 12.10 hrs, Volume= 0.546 af, Atten= 0%, Lag= 0.1 min
 Primary = 4.37 cfs @ 12.10 hrs, Volume= 0.546 af
 Routed to Link 11L : Combined Flow West

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Peak Elev= 904.13' @ 12.10 hrs Surf.Area= 184 sf Storage= 16 cf

Plug-Flow detention time= 0.1 min calculated for 0.546 af (100% of inflow)

Center-of-Mass det. time= 0.1 min (969.8 - 969.7)

Volume	Invert	Avail.Storage	Storage Description
#1	904.00'	1,255 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

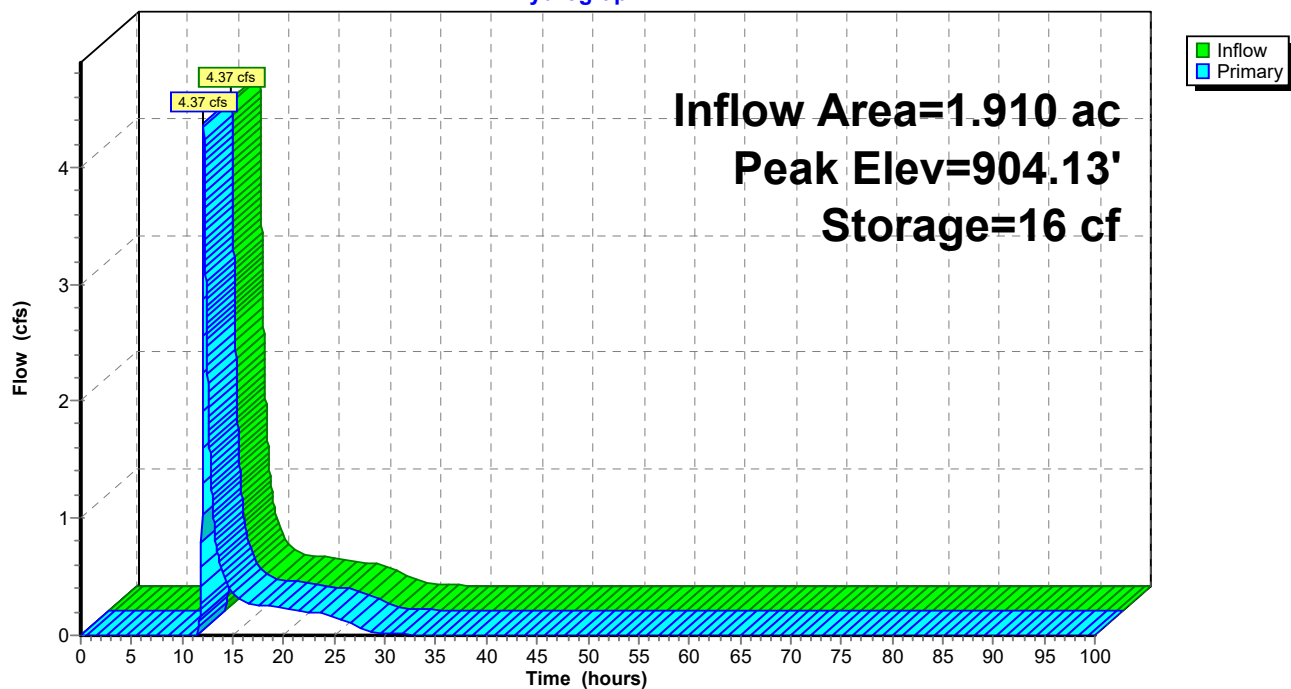
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
904.00	72	0	0
905.00	961	517	517
906.00	515	738	1,255

Device	Routing	Invert	Outlet Devices
#1	Primary	904.00'	30.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=4.36 cfs @ 12.10 hrs HW=904.13' TW=902.00' (Fixed TW Elev= 902.00')↑**1=Sharp-Crested Rectangular Weir**(Weir Controls 4.36 cfs @ 1.16 fps)

Pond 5P: Level Spreader

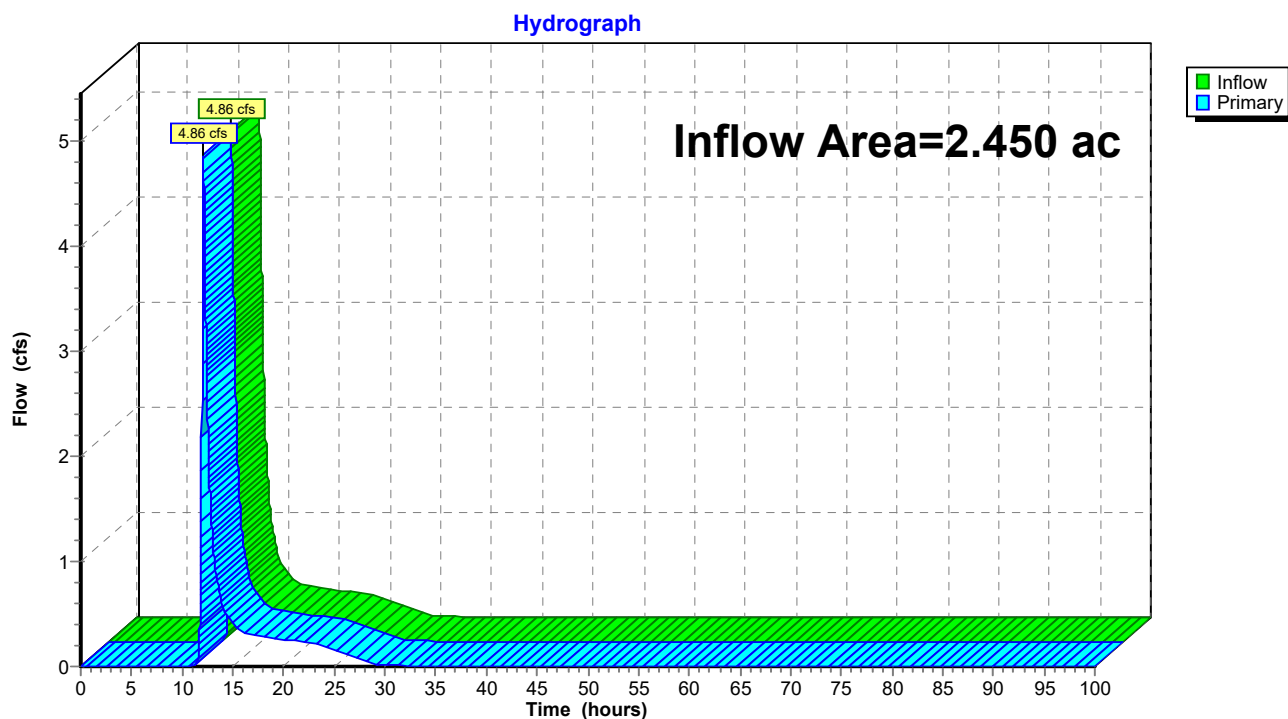
Hydrograph



Summary for Link 11L: Combined Flow West

Inflow Area = 2.450 ac, 52.65% Impervious, Inflow Depth = 3.03" for 25-Year event
Inflow = 4.86 cfs @ 12.06 hrs, Volume= 0.619 af
Primary = 4.86 cfs @ 12.06 hrs, Volume= 0.619 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 15L

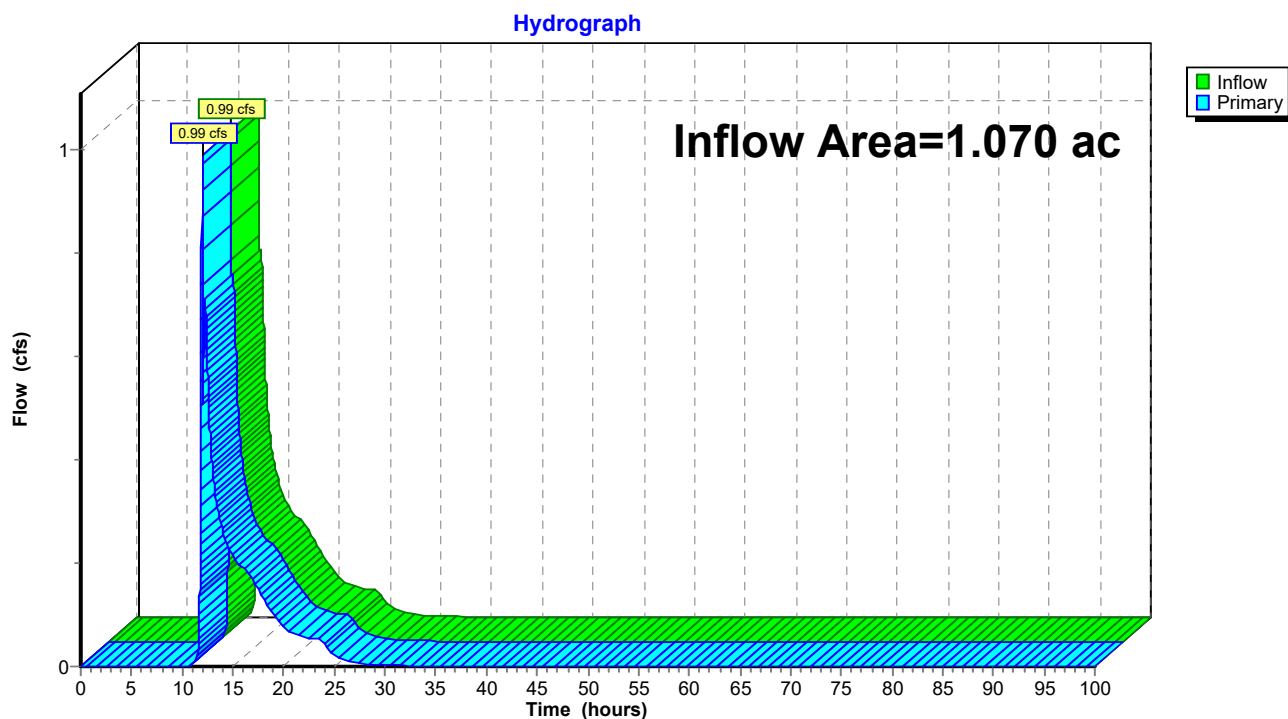
Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Link 11L: Combined Flow West

Summary for Link 12L: Combined Flow South

Inflow Area = 1.070 ac, 24.30% Impervious, Inflow Depth = 2.15" for 25-Year event
Inflow = 0.99 cfs @ 11.97 hrs, Volume= 0.192 af
Primary = 0.99 cfs @ 11.97 hrs, Volume= 0.192 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 15L

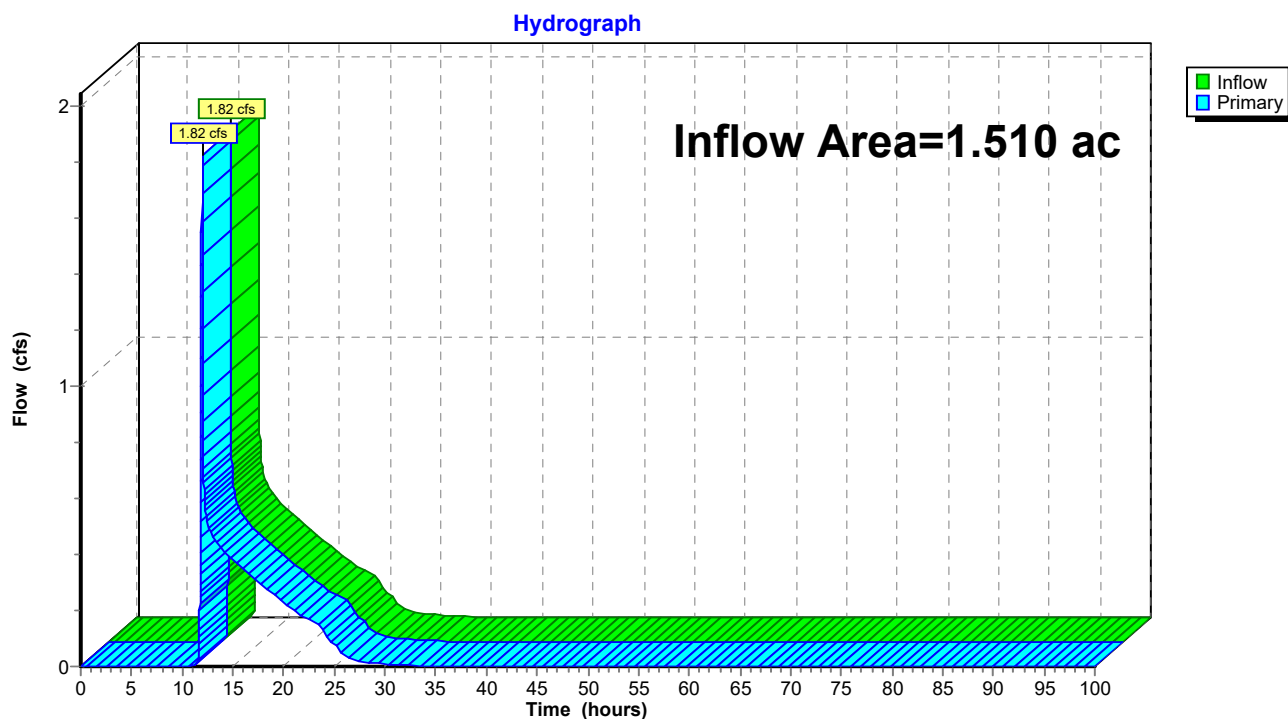
Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Link 12L: Combined Flow South

Summary for Link 13L: Comnined Flow North

Inflow Area = 1.510 ac, 49.01% Impervious, Inflow Depth = 2.75" for 25-Year event
Inflow = 1.82 cfs @ 11.97 hrs, Volume= 0.346 af
Primary = 1.82 cfs @ 11.97 hrs, Volume= 0.346 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 15L

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Link 13L: Comnined Flow North

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Time span=0.00-100.00 hrs, dt=0.01 hrs, 10001 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment7S: UndetainedWest	Runoff Area=0.540 ac 0.00% Impervious Runoff Depth=2.18" Tc=5.0 min CN=61 Runoff=2.19 cfs 0.098 af
Subcatchment8S: UndetainedNorth	Runoff Area=0.530 ac 0.00% Impervious Runoff Depth=2.18" Tc=5.0 min CN=61 Runoff=2.14 cfs 0.096 af
Subcatchment9S: UndetainedSoutheast	Runoff Area=0.170 ac 11.76% Impervious Runoff Depth=2.54" Tc=5.0 min CN=65 Runoff=0.81 cfs 0.036 af
Subcatchment10S: UndetainedSouth	Runoff Area=0.090 ac 0.00% Impervious Runoff Depth=2.18" Tc=5.0 min CN=61 Runoff=0.36 cfs 0.016 af
SubcatchmentP-N: Proposed North	Runoff Area=0.980 ac 75.51% Impervious Runoff Depth=4.99" Flow Length=321' Tc=8.1 min CN=89 Runoff=7.52 cfs 0.407 af
SubcatchmentP-S: Proposed South	Runoff Area=0.480 ac 22.92% Impervious Runoff Depth=2.92" Flow Length=237' Tc=11.1 min CN=69 Runoff=2.08 cfs 0.117 af
SubcatchmentP-SE: Proposed Drainage	Runoff Area=0.330 ac 39.39% Impervious Runoff Depth=3.61" Flow Length=118' Tc=7.3 min CN=76 Runoff=2.01 cfs 0.099 af
SubcatchmentP-W: Proposed West	Runoff Area=1.910 ac 67.54% Impervious Runoff Depth=4.66" Flow Length=1,203' Tc=6.7 min CN=86 Runoff=14.65 cfs 0.741 af
Pond 1P: SE Basin	Peak Elev=918.17' Storage=2,067 cf Inflow=2.01 cfs 0.099 af Outflow=0.30 cfs 0.089 af
Pond 2P: South Basin Orifice	Peak Elev=913.52' Storage=1,939 cf Inflow=2.26 cfs 0.206 af Outflow=1.11 cfs 0.197 af
Pond 3P: North Basin Orifice	Peak Elev=924.17' Storage=11,026 cf Inflow=7.52 cfs 0.407 af Outflow=0.43 cfs 0.339 af
Pond 4P: West Basin Orifice	Peak Elev=911.97' Storage=14,488 cf Inflow=14.65 cfs 0.741 af Outflow=6.25 cfs 0.669 af
Pond 5P: Level Spreader	Peak Elev=904.16' Storage=23 cf Inflow=6.25 cfs 0.669 af Outflow=6.25 cfs 0.669 af
Link 11L: Combined Flow West	Inflow=7.11 cfs 0.768 af Primary=7.11 cfs 0.768 af
Link 12L: Combined Flow South	Inflow=1.33 cfs 0.249 af Primary=1.33 cfs 0.249 af
Link 13L: Combined Flow North	Inflow=2.42 cfs 0.435 af Primary=2.42 cfs 0.435 af

23-047 Proposed Site Conditions_5-7-24*Type II 24-hr 50-Year Rainfall=6.26"*

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Total Runoff Area = 5.030 ac Runoff Volume = 1.611 af Average Runoff Depth = 3.84"
54.47% Pervious = 2.740 ac 45.53% Impervious = 2.290 ac

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Type II 24-hr 50-Year Rainfall=6.26"

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Summary for Subcatchment 7S: Undetained West

Runoff = 2.19 cfs @ 11.97 hrs, Volume= 0.098 af, Depth= 2.18"
Routed to Link 11L : Combined Flow West

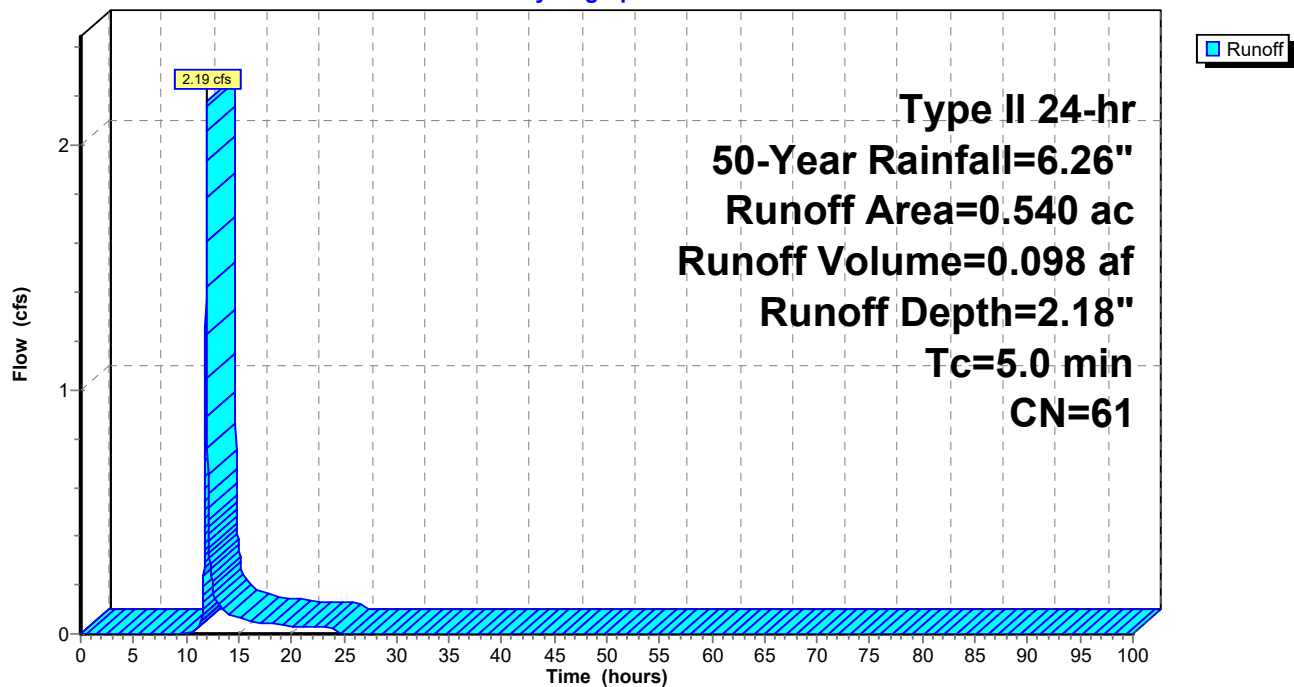
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-Year Rainfall=6.26"

Area (ac)	CN	Description
* 0.540	61	>75% Grass cover, Good, HSG B
0.540		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 7S: Undetained West

Hydrograph



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Type II 24-hr 50-Year Rainfall=6.26"

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Summary for Subcatchment 8S: Undetained North

Runoff = 2.14 cfs @ 11.97 hrs, Volume= 0.096 af, Depth= 2.18"
Routed to Link 13L : Comnined Flow North

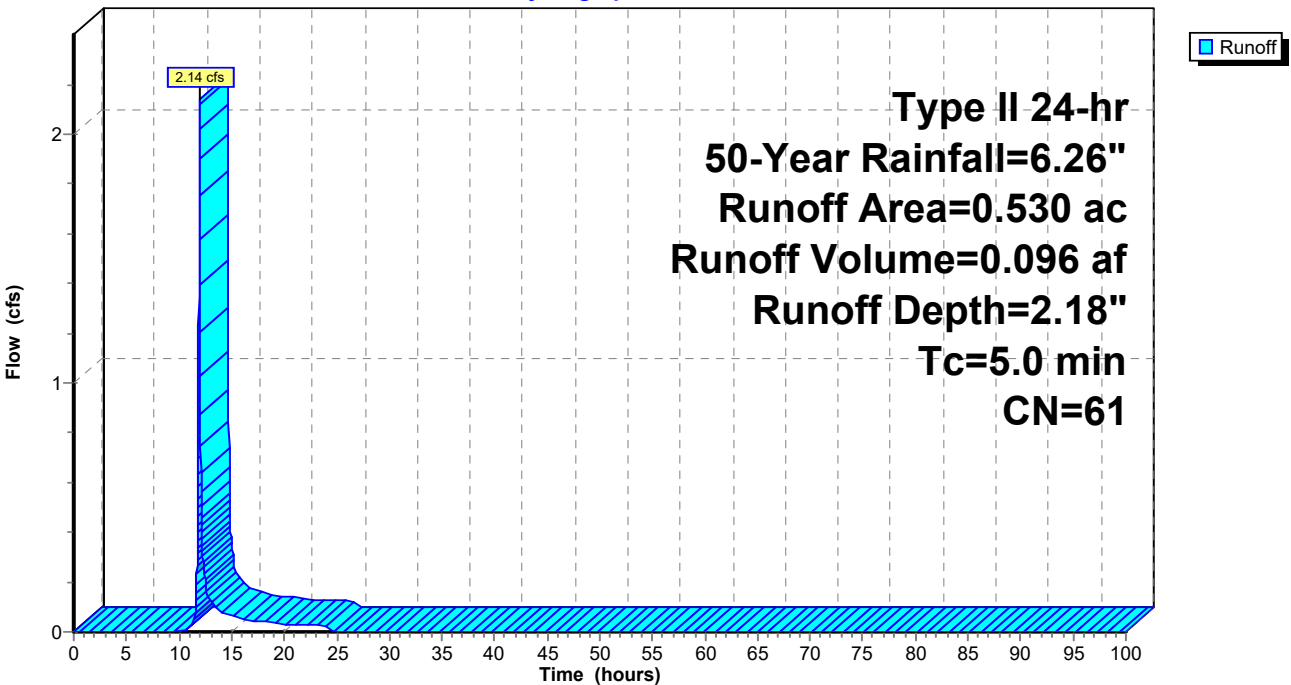
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-Year Rainfall=6.26"

Area (ac)	CN	Description
* 0.530	61	>75% Grass cover, Good, HSG B
0.530		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 8S: Undetained North

Hydrograph



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Type II 24-hr 50-Year Rainfall=6.26"

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Summary for Subcatchment 9S: Undetained Southeast

Runoff = 0.81 cfs @ 11.96 hrs, Volume= 0.036 af, Depth= 2.54"
Routed to Link 12L : Combined Flow South

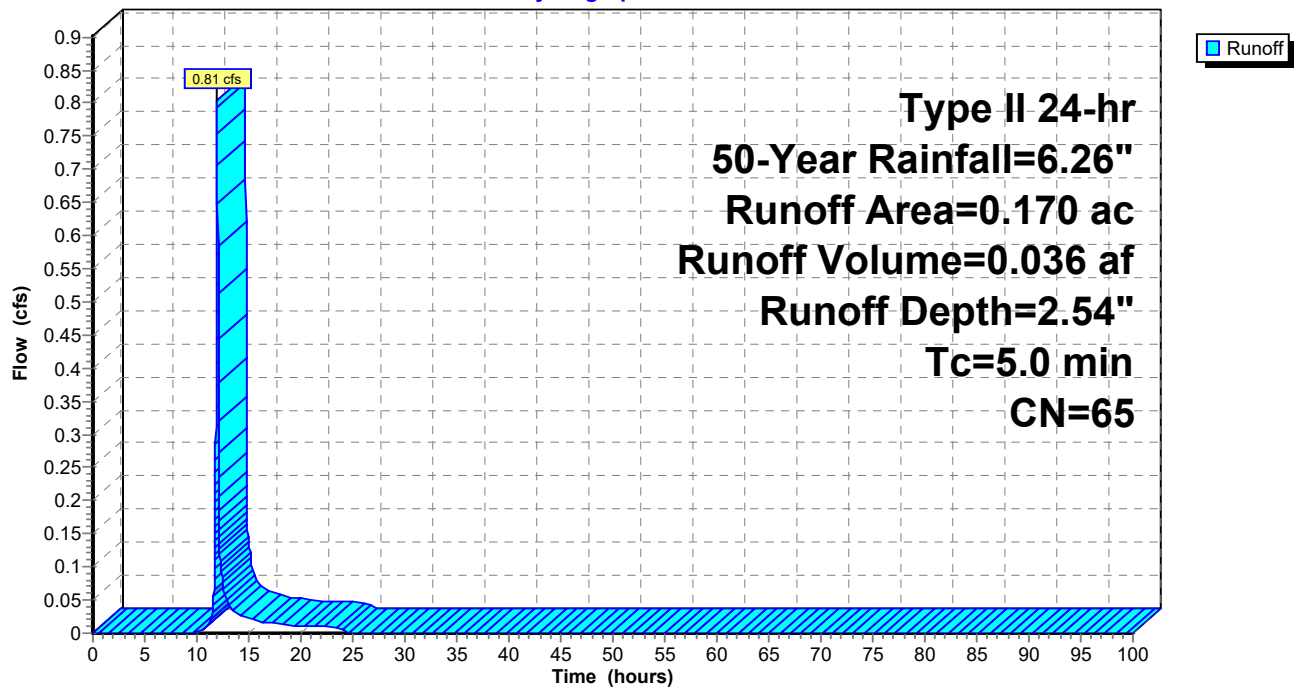
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-Year Rainfall=6.26"

Area (ac)	CN	Description
* 0.150	61	>75% Grass cover, Good, HSG B
* 0.020	98	Pavement
0.170	65	Weighted Average
0.150		88.24% Pervious Area
0.020		11.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 9S: Undetained Southeast

Hydrograph



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Type II 24-hr 50-Year Rainfall=6.26"

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Summary for Subcatchment 10S: Undetained South

Runoff = 0.36 cfs @ 11.97 hrs, Volume= 0.016 af, Depth= 2.18"
Routed to Link 12L : Combined Flow South

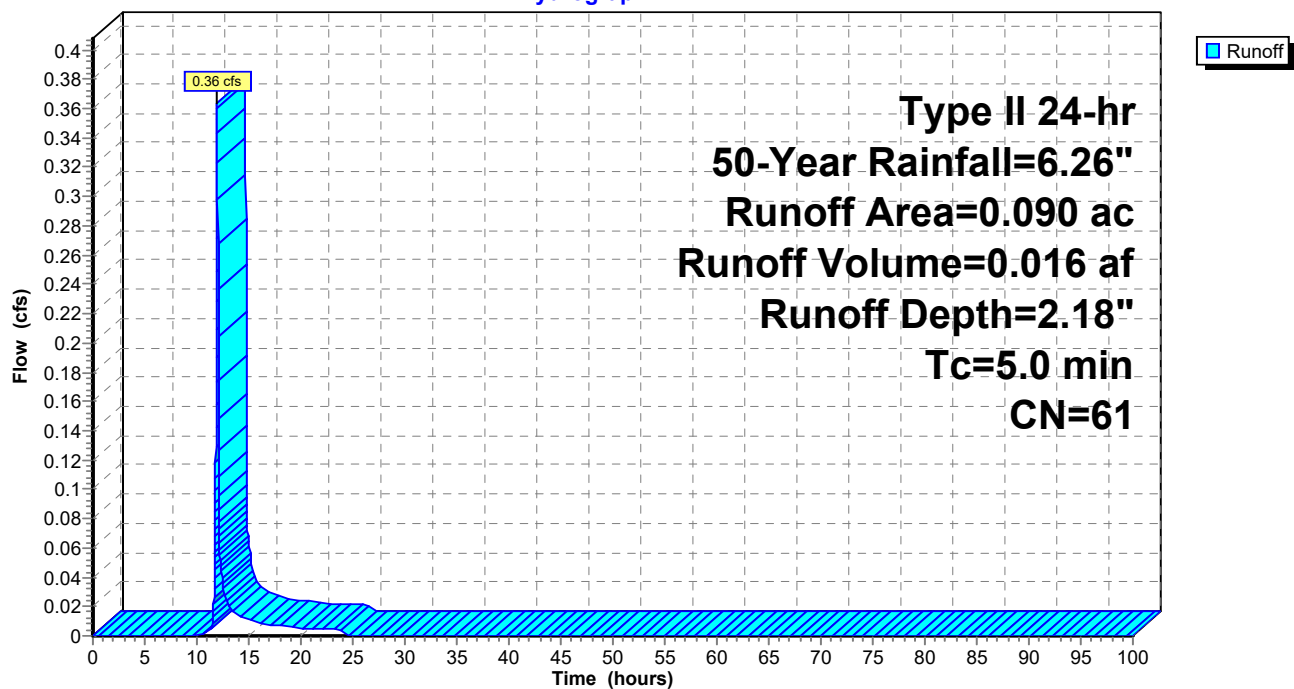
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-Year Rainfall=6.26"

Area (ac)	CN	Description
* 0.090	61	>75% Grass cover, Good, HSG B
0.090		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 10S: Undetained South

Hydrograph



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Type II 24-hr 50-Year Rainfall=6.26"

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Summary for Subcatchment P-N: Proposed North

Runoff = 7.52 cfs @ 11.99 hrs, Volume= 0.407 af, Depth= 4.99"
 Routed to Pond 3P : North Basin Orifice

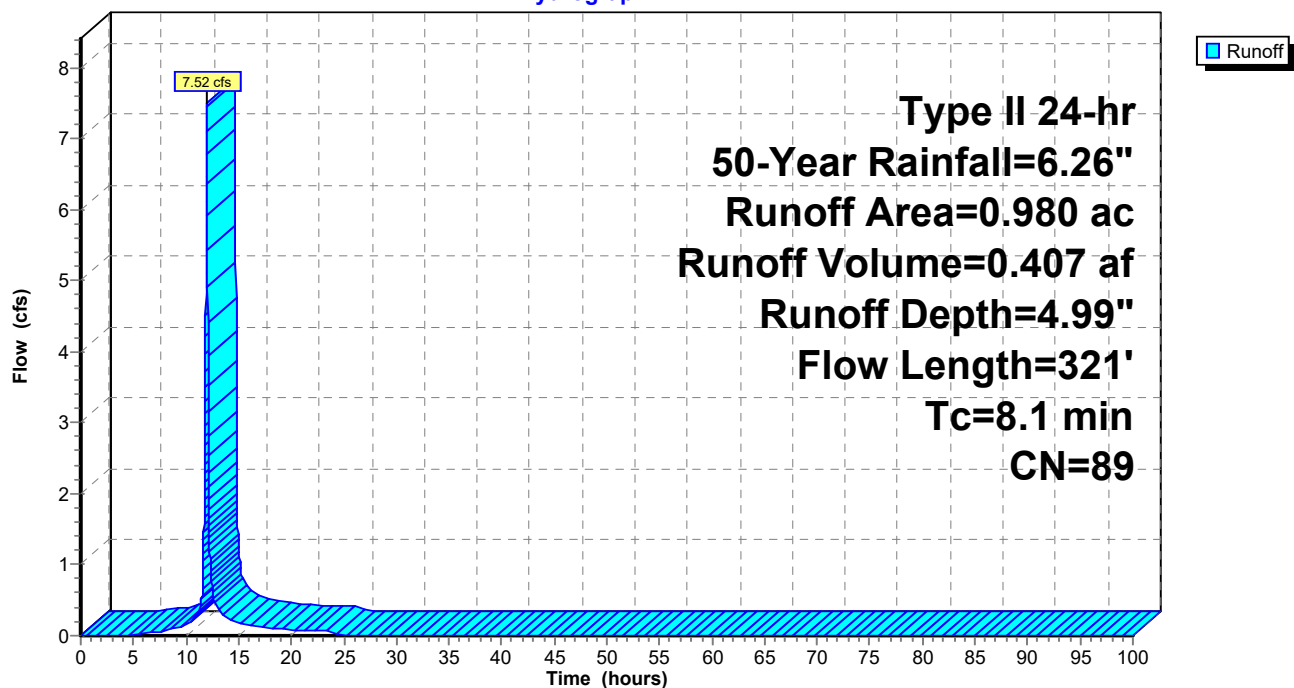
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Type II 24-hr 50-Year Rainfall=6.26"

Area (ac)	CN	Description
* 0.740	98	Paved roads w/curbs & sewers, HSG C
0.240	61	>75% Grass cover, Good, HSG B
0.980	89	Weighted Average
0.240		24.49% Pervious Area
0.740		75.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	91	0.0350	0.20		Sheet Flow, SHEET (GRASS) Grass: Short n= 0.150 P2= 3.04"
0.6	230	0.0150	6.45	7.91	Pipe Channel, PIPE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
8.1	321	Total			

Subcatchment P-N: Proposed North

Hydrograph



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Type II 24-hr 50-Year Rainfall=6.26"

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Summary for Subcatchment P-S: Proposed South

Runoff = 2.08 cfs @ 12.03 hrs, Volume= 0.117 af, Depth= 2.92"
Routed to Pond 2P : South Basin Orifice

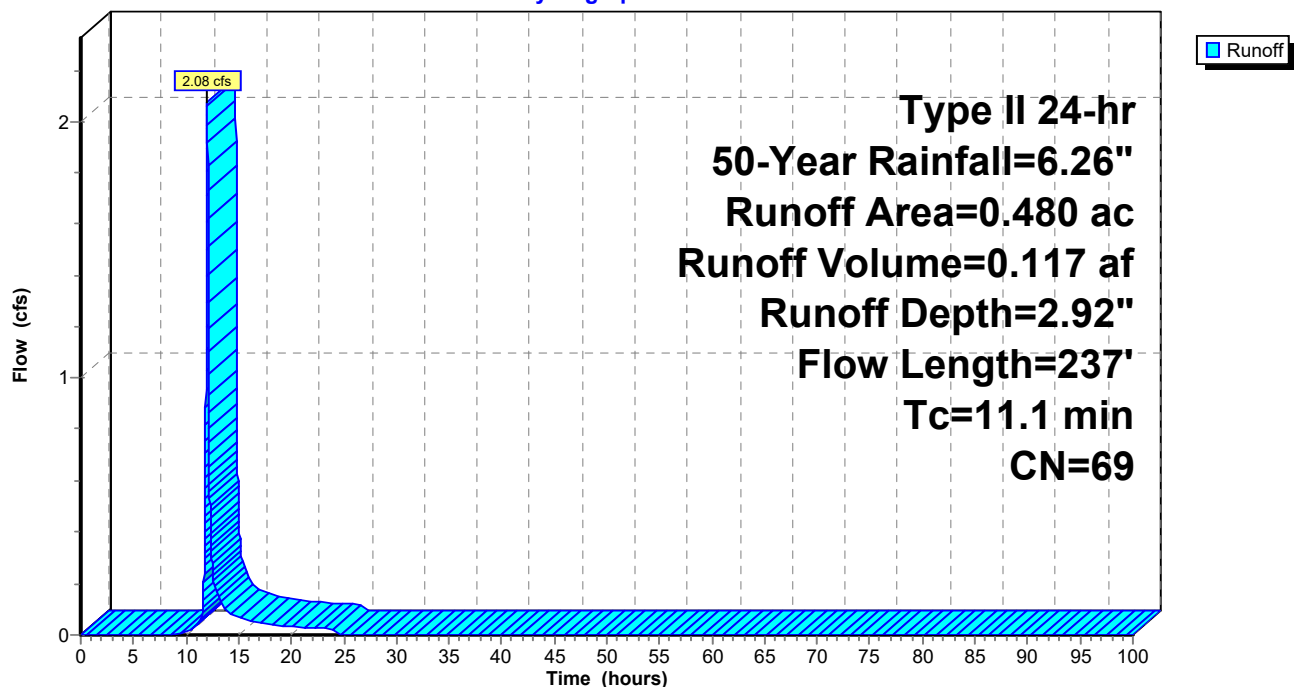
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-Year Rainfall=6.26"

Area (ac)	CN	Description
* 0.110	98	Paved roads w/curbs & sewers, HSG C
0.370	61	>75% Grass cover, Good, HSG B
0.480	69	Weighted Average
0.370		77.08% Pervious Area
0.110		22.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	100	0.0200	0.17		Sheet Flow, SHEET (GRASS) Grass: Short n= 0.150 P2= 3.04"
0.9	112	0.0200	2.12		Shallow Concentrated Flow, SHALLOW (GRASS) Grassed Waterway Kv= 15.0 fps
0.1	25	0.2500	7.50		Shallow Concentrated Flow, SHALLOW (GRASS) Grassed Waterway Kv= 15.0 fps
11.1	237	Total			

Subcatchment P-S: Proposed South

Hydrograph



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Type II 24-hr 50-Year Rainfall=6.26"

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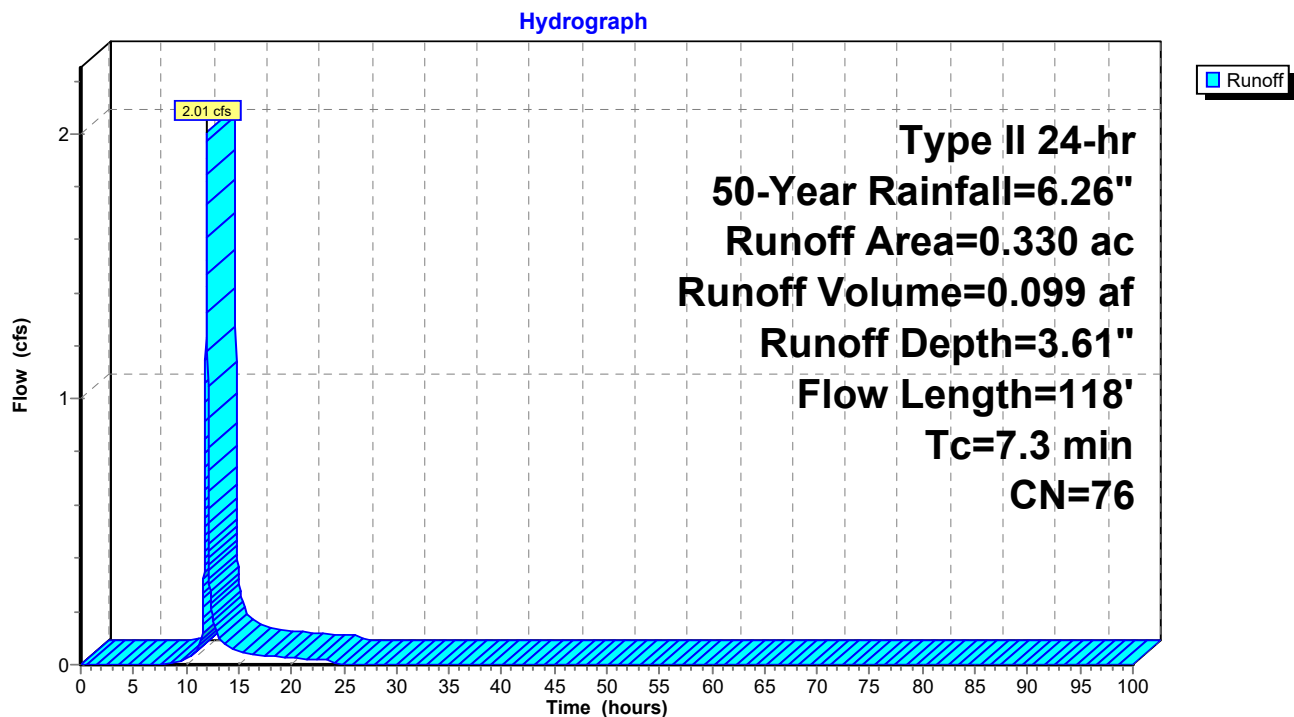
Summary for Subcatchment P-SE: Proposed Drainage

Runoff = 2.01 cfs @ 11.99 hrs, Volume= 0.099 af, Depth= 3.61"
Routed to Pond 1P : SE Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-Year Rainfall=6.26"

Area (ac)	CN	Description
0.130	98	Paved parking, HSG C
0.200	61	>75% Grass cover, Good, HSG B
0.330	76	Weighted Average
0.200		60.61% Pervious Area
0.130		39.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	65	0.0200	0.15		Sheet Flow, Grass: Short n= 0.150 P2= 3.04"
0.2	53	0.0100	5.26	6.46	Pipe Channel, 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
7.3	118	Total			

Subcatchment P-SE: Proposed Drainage

23-047 Proposed Site Conditions_5-7-24

Type II 24-hr 50-Year Rainfall=6.26"

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Summary for Subcatchment P-W: Proposed West

[47] Hint: Peak is 114% of capacity of segment #3

Runoff = 14.65 cfs @ 11.98 hrs, Volume= 0.741 af, Depth= 4.66"
 Routed to Pond 4P : West Basin Orifice

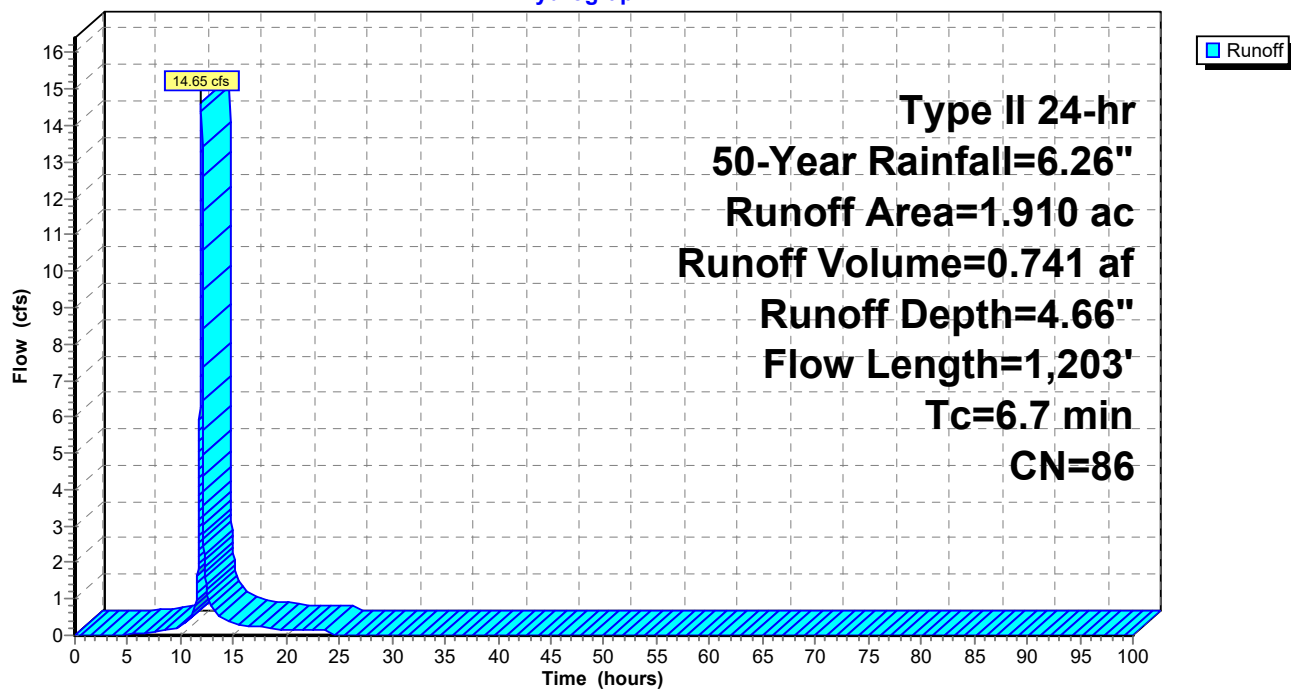
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Type II 24-hr 50-Year Rainfall=6.26"

Area (ac)	CN	Description
* 1.290	98	Paved roads w/curbs & sewers, HSG C
0.620	61	>75% Grass cover, Good, HSG B
1.910	86	Weighted Average
0.620		32.46% Pervious Area
1.290		67.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	100	0.0050	0.77		Sheet Flow, SHEET (PAVED) Smooth surfaces n= 0.011 P2= 3.04"
3.6	725	0.0280	3.40		Shallow Concentrated Flow, SHALLOW (PAVED) Paved Kv= 20.3 fps
0.9	378	0.0150	7.28	12.87	Pipe Channel, Storm Sewer 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
6.7	1,203	Total			

Subcatchment P-W: Proposed West

Hydrograph



23-047 Proposed Site Conditions_5-7-24

Type II 24-hr 50-Year Rainfall=6.26"

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Summary for Pond 1P: SE Basin

Inflow Area = 0.330 ac, 39.39% Impervious, Inflow Depth = 3.61" for 50-Year event
 Inflow = 2.01 cfs @ 11.99 hrs, Volume= 0.099 af
 Outflow = 0.30 cfs @ 12.25 hrs, Volume= 0.089 af, Atten= 85%, Lag= 16.0 min
 Primary = 0.30 cfs @ 12.25 hrs, Volume= 0.089 af
 Routed to Pond 2P : South Basin Orifice

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 918.17' @ 12.25 hrs Surf.Area= 2,978 sf Storage= 2,067 cf

Plug-Flow detention time= 184.4 min calculated for 0.089 af (90% of inflow)
 Center-of-Mass det. time= 134.3 min (954.6 - 820.3)

Volume	Invert	Avail.Storage	Storage Description
#1	916.91'	8,715 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
916.91	0	0	0
918.00	2,856	1,557	1,557
919.00	3,551	3,204	4,760
920.00	4,358	3,955	8,715

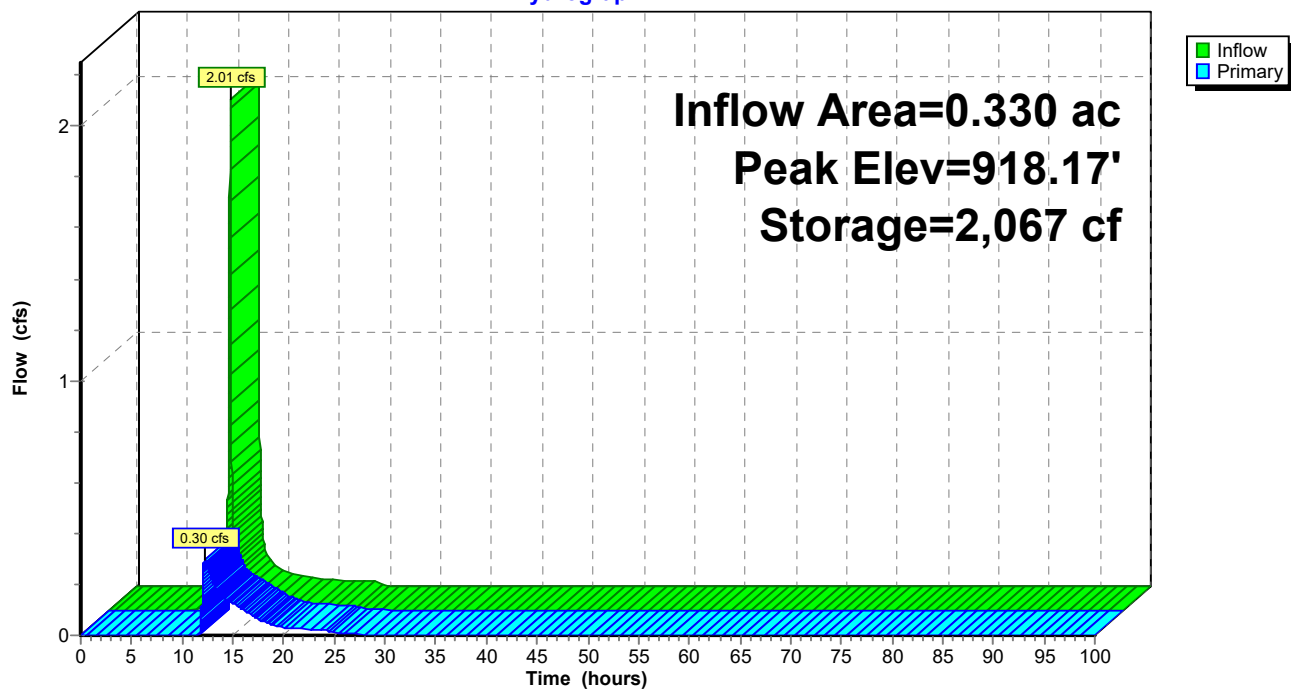
Device	Routing	Invert	Outlet Devices
#1	Primary	916.26'	4.0" Round Culvert X 3.00 L= 30.2' Ke= 0.500 Inlet / Outlet Invert= 916.26' / 915.96' S= 0.0099 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 0.09 sf
#2	Device 1	917.48'	3.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	918.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.45 0.45 0.95 Width (feet) 0.50 0.50 3.00 3.00

Primary OutFlow Max=0.30 cfs @ 12.25 hrs HW=918.17' (Free Discharge)

1=Culvert (Passes 0.30 cfs of 1.22 cfs potential flow)
 2=Orifice/Grate (Orifice Controls 0.18 cfs @ 3.64 fps)
 3=Custom Weir/Orifice (Weir Controls 0.12 cfs @ 1.37 fps)

Pond 1P: SE Basin

Hydrograph



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Type II 24-hr 50-Year Rainfall=6.26"

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Summary for Pond 2P: South Basin Orifice

Inflow Area = 0.810 ac, 29.63% Impervious, Inflow Depth = 3.05" for 50-Year event
 Inflow = 2.26 cfs @ 12.04 hrs, Volume= 0.206 af
 Outflow = 1.11 cfs @ 12.19 hrs, Volume= 0.197 af, Atten= 51%, Lag= 9.0 min
 Primary = 1.11 cfs @ 12.19 hrs, Volume= 0.197 af
 Routed to Link 12L : Combined Flow South

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 913.52' @ 12.19 hrs Surf.Area= 1,710 sf Storage= 1,939 cf

Plug-Flow detention time= 93.0 min calculated for 0.197 af (95% of inflow)
 Center-of-Mass det. time= 61.9 min (951.6 - 889.7)

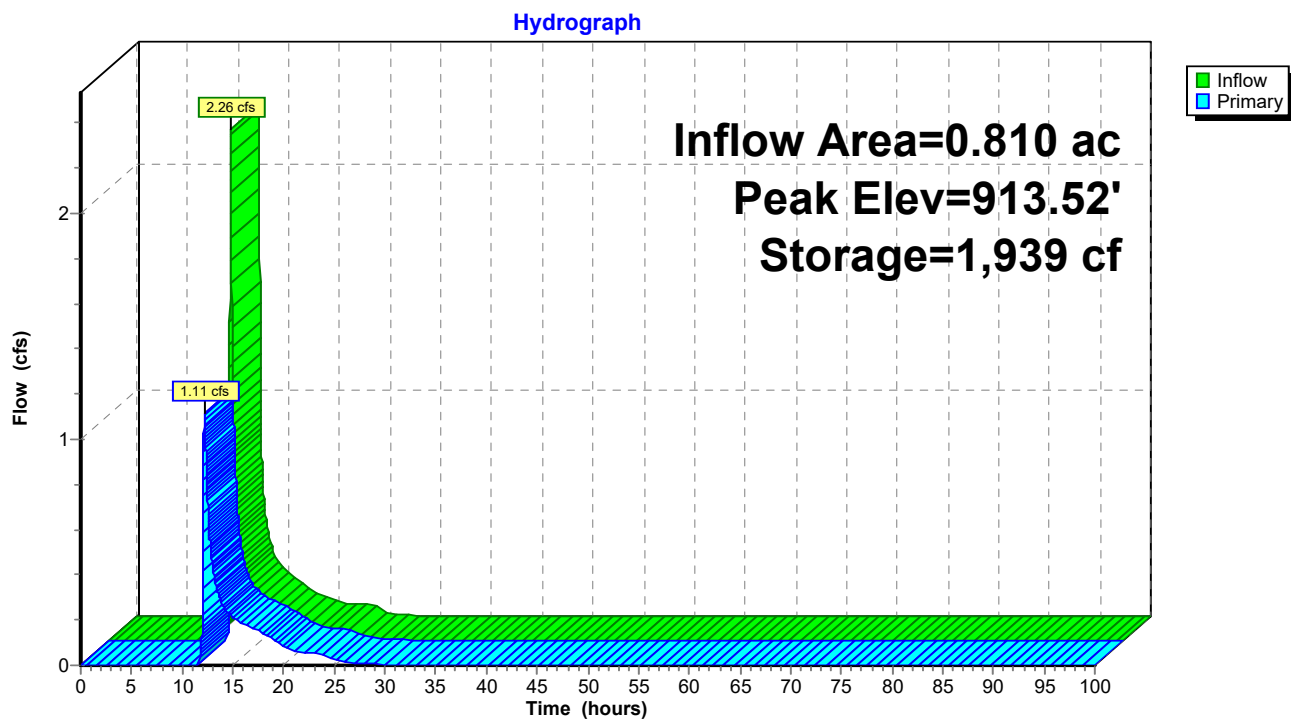
Volume	Invert	Avail.Storage	Storage Description
#1	911.50'	5,431 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
911.50	0	0	0
912.00	682	171	171
913.00	1,303	993	1,163
914.00	2,092	1,698	2,861
915.00	3,048	2,570	5,431

Device	Routing	Invert	Outlet Devices
#1	Primary	911.34'	6.0" Round Culvert L= 68.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 911.34' / 909.31' S= 0.0299 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	912.31'	3.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	913.00'	10.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.11 cfs @ 12.19 hrs HW=913.52' (Free Discharge)

- ↑ **1=Culvert** (Passes 1.11 cfs of 1.16 cfs potential flow)
- ↑ **2=Orifice/Grate** (Orifice Controls 0.25 cfs @ 5.00 fps)
- ↑ **3=Orifice/Grate** (Orifice Controls 0.87 cfs @ 2.44 fps)

Pond 2P: South Basin Orifice



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Type II 24-hr 50-Year Rainfall=6.26"

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Summary for Pond 3P: North Basin Orifice

Inflow Area = 0.980 ac, 75.51% Impervious, Inflow Depth = 4.99" for 50-Year event
 Inflow = 7.52 cfs @ 11.99 hrs, Volume= 0.407 af
 Outflow = 0.43 cfs @ 12.91 hrs, Volume= 0.339 af, Atten= 94%, Lag= 55.2 min
 Primary = 0.43 cfs @ 12.91 hrs, Volume= 0.339 af
 Routed to Link 13L : Combined Flow North

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 924.17' @ 12.91 hrs Surf.Area= 3,447 sf Storage= 11,026 cf

Plug-Flow detention time= 369.5 min calculated for 0.339 af (83% of inflow)
 Center-of-Mass det. time= 296.8 min (1,082.3 - 785.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	919.40'	6,149 cf	20.08'W x 171.65'L x 6.75'H Field A 23,269 cf Overall - 7,897 cf Embedded = 15,373 cf x 40.0% Voids
#2A	920.15'	7,897 cf	ADS_StormTech MC-7200 +Cap x 44 Inside #1 Effective Size= 91.2"W x 60.0"H => 26.68 sf x 6.59'L = 175.9 cf Overall Size= 100.0"W x 60.0"H x 6.95'L with 0.36' Overlap 44 Chambers in 2 Rows Cap Storage= 39.5 cf x 2 x 2 rows = 158.0 cf
		14,046 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	918.30'	12.0" Round Culvert L= 104.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 918.30' / 910.25' S= 0.0774 ' /' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	920.87'	3.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	924.15'	12.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.42 cfs @ 12.91 hrs HW=924.17' (Free Discharge)

1=Culvert (Passes 0.42 cfs of 8.76 cfs potential flow)
 2=Orifice/Grate (Orifice Controls 0.42 cfs @ 8.58 fps)
 3=Orifice/Grate (Orifice Controls 0.00 cfs @ 0.50 fps)

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Type II 24-hr 50-Year Rainfall=6.26"

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Pond 3P: North Basin Orifice - Chamber Wizard Field A

Chamber Model = ADS_StormTechMC-7200 +Cap (ADS StormTech®MC-7200 with cap volume)

Effective Size= 91.2"W x 60.0"H => 26.68 sf x 6.59'L = 175.9 cf

Overall Size= 100.0"W x 60.0"H x 6.95'L with 0.36' Overlap

Cap Storage= 39.5 cf x 2 x 2 rows = 158.0 cf

100.0" Wide + 9.0" Spacing = 109.0" C-C Row Spacing

22 Chambers/Row x 6.59' Long +2.73' Cap Length x 2 = 150.48' Row Length +127.0" End Stone x 2 = 171.65' Base Length

2 Rows x 100.0" Wide + 9.0" Spacing x 1 + 16.0" Side Stone x 2 = 20.08' Base Width

9.0" Stone Base + 60.0" Chamber Height + 12.0" Stone Cover = 6.75' Field Height

44 Chambers x 175.9 cf + 39.5 cf Cap Volume x 2 x 2 Rows = 7,896.5 cf Chamber Storage

23,269.3 cf Field - 7,896.5 cf Chambers = 15,372.8 cf Stone x 40.0% Voids = 6,149.1 cf Stone Storage

Chamber Storage + Stone Storage = 14,045.6 cf = 0.322 af

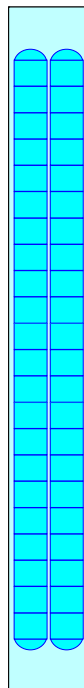
Overall Storage Efficiency = 60.4%

Overall System Size = 171.65' x 20.08' x 6.75'

44 Chambers

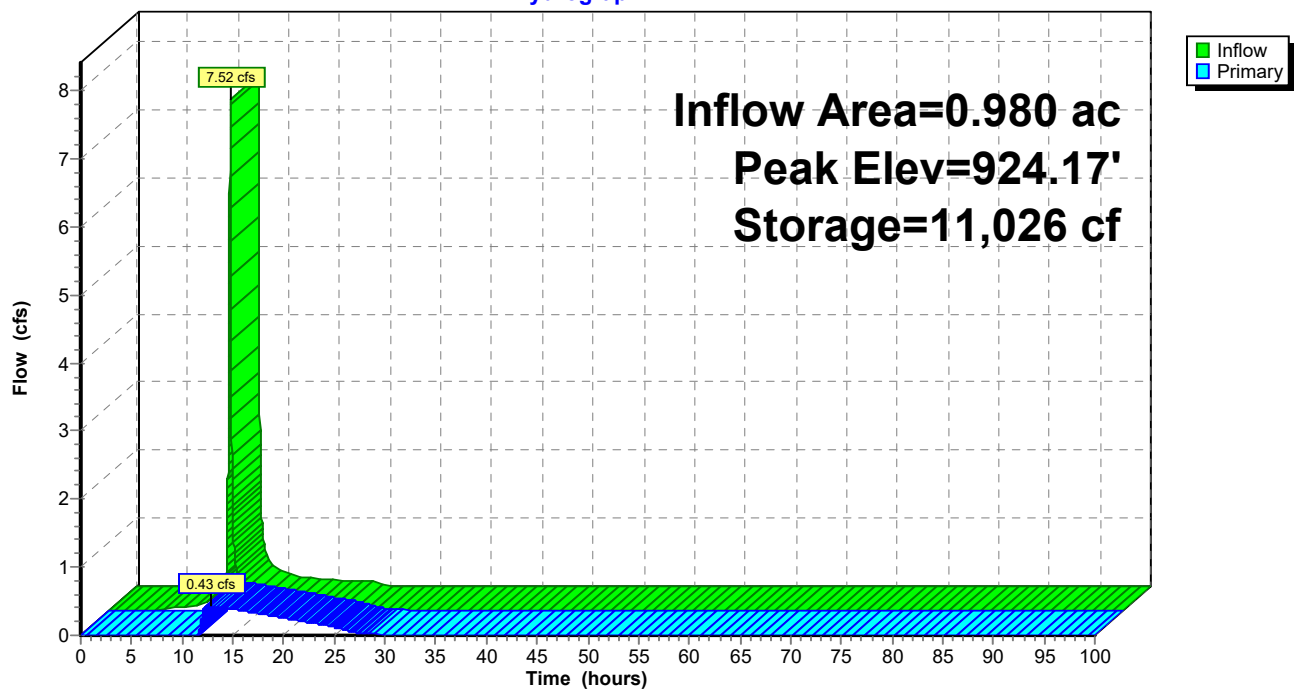
861.8 cy Field

569.4 cy Stone



Pond 3P: North Basin Orifice

Hydrograph



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Type II 24-hr 50-Year Rainfall=6.26"

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Summary for Pond 4P: West Basin Orifice

Inflow Area = 1.910 ac, 67.54% Impervious, Inflow Depth = 4.66" for 50-Year event
 Inflow = 14.65 cfs @ 11.98 hrs, Volume= 0.741 af
 Outflow = 6.25 cfs @ 12.08 hrs, Volume= 0.669 af, Atten= 57%, Lag= 6.3 min
 Primary = 6.25 cfs @ 12.08 hrs, Volume= 0.669 af
 Routed to Pond 5P : Level Spreader

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 911.97' @ 12.08 hrs Surf.Area= 5,637 sf Storage= 14,488 cf

Plug-Flow detention time= 205.2 min calculated for 0.669 af (90% of inflow)
 Center-of-Mass det. time= 155.2 min (948.8 - 793.7)

Volume	Invert	Avail.Storage	Storage Description
#1	907.00'	28,862 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
907.00	0	0	0
908.00	1,584	792	792
909.00	2,402	1,993	2,785
910.00	3,364	2,883	5,668
911.00	4,448	3,906	9,574
912.00	5,668	5,058	14,632
913.00	7,027	6,348	20,980
914.00	8,738	7,883	28,862

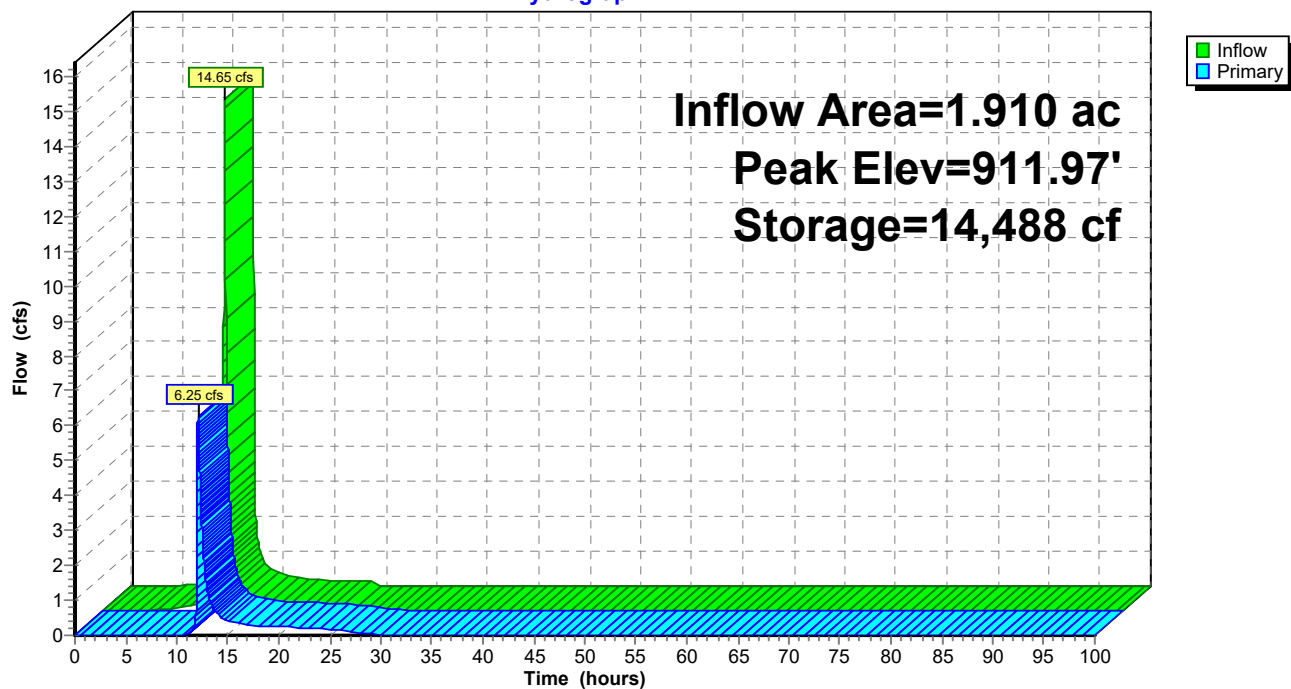
Device	Routing	Invert	Outlet Devices
#1	Primary	908.00'	15.0" Round Culvert L= 32.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 908.00' / 904.00' S= 0.1250 ' S= 0.1250 ' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Device 1	909.14'	3.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	910.50'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.25 1.25 1.75 Width (feet) 1.00 1.00 1.00 1.00

Primary OutFlow Max=6.25 cfs @ 12.08 hrs HW=911.97' (Free Discharge)

↑ **1=Culvert** (Passes 6.25 cfs of 10.81 cfs potential flow)
 ↑ **2=Orifice/Grate** (Orifice Controls 0.39 cfs @ 7.92 fps)
 ↑ **3=Custom Weir/Orifice** (Weir Controls 5.86 cfs @ 3.98 fps)

Pond 4P: West Basin Orifice

Hydrograph



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Type II 24-hr 50-Year Rainfall=6.26"

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Summary for Pond 5P: Level Spreader

[79] Warning: Submerged Pond 4P Primary device # 1 OUTLET by 0.16'

Inflow Area = 1.910 ac, 67.54% Impervious, Inflow Depth = 4.21" for 50-Year event
 Inflow = 6.25 cfs @ 12.08 hrs, Volume= 0.669 af
 Outflow = 6.25 cfs @ 12.08 hrs, Volume= 0.669 af, Atten= 0%, Lag= 0.1 min
 Primary = 6.25 cfs @ 12.08 hrs, Volume= 0.669 af
 Routed to Link 11L : Combined Flow West

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Peak Elev= 904.16' @ 12.08 hrs Surf.Area= 214 sf Storage= 23 cf

Plug-Flow detention time= 0.1 min calculated for 0.669 af (100% of inflow)

Center-of-Mass det. time= 0.1 min (948.9 - 948.8)

Volume	Invert	Avail.Storage	Storage Description
#1	904.00'	1,255 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

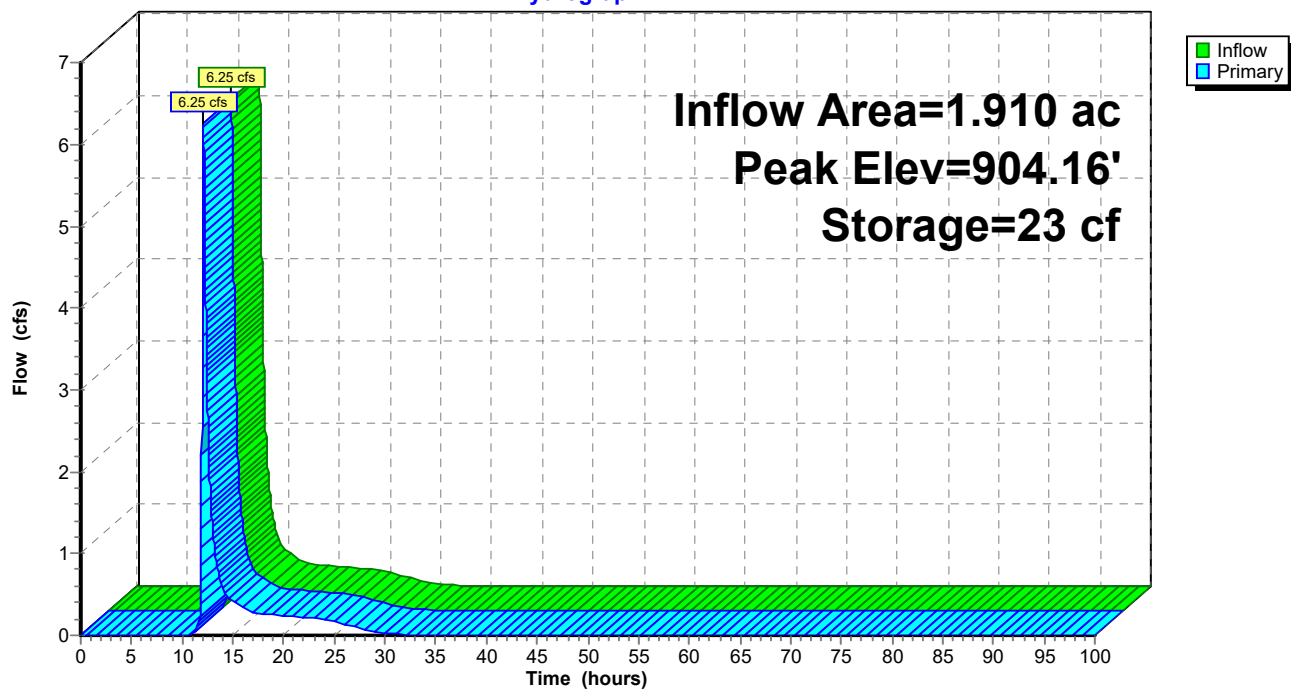
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
904.00	72	0	0
905.00	961	517	517
906.00	515	738	1,255

Device	Routing	Invert	Outlet Devices
#1	Primary	904.00'	30.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=6.25 cfs @ 12.08 hrs HW=904.16' TW=902.00' (Fixed TW Elev= 902.00')↑**1=Sharp-Crested Rectangular Weir**(Weir Controls 6.25 cfs @ 1.31 fps)

Pond 5P: Level Spreader

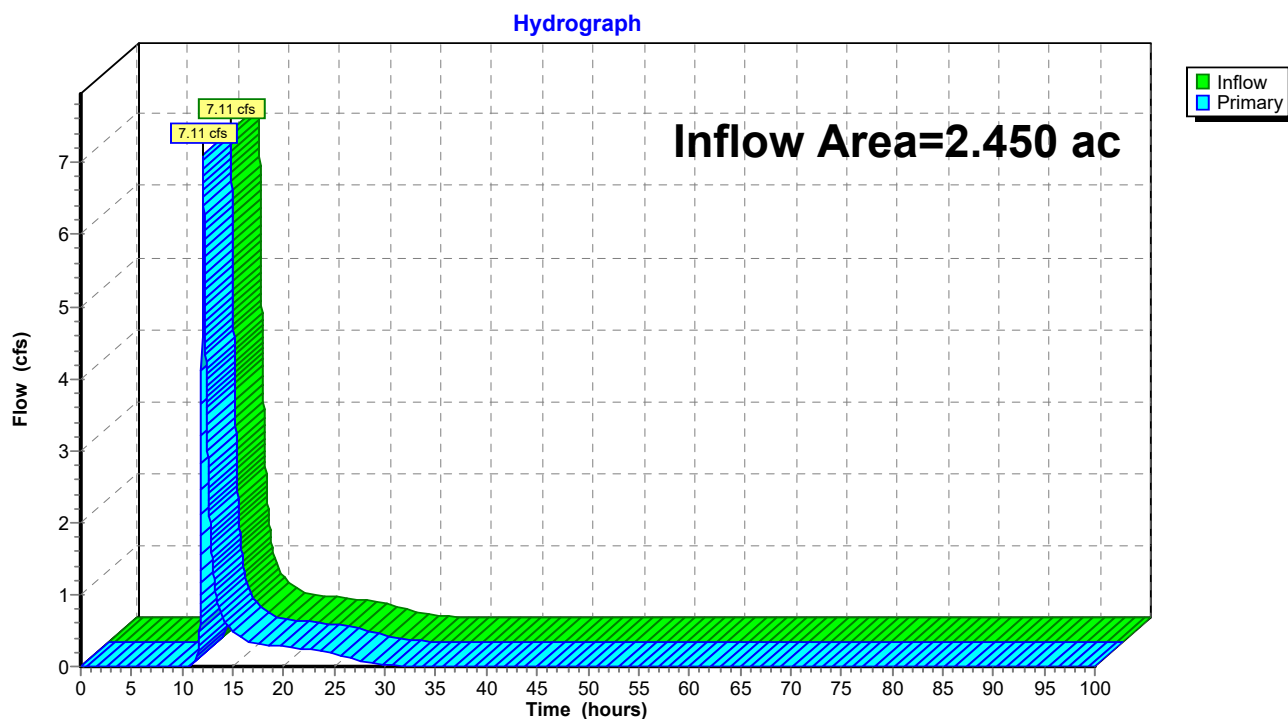
Hydrograph



Summary for Link 11L: Combined Flow West

Inflow Area = 2.450 ac, 52.65% Impervious, Inflow Depth = 3.76" for 50-Year event
Inflow = 7.11 cfs @ 12.04 hrs, Volume= 0.768 af
Primary = 7.11 cfs @ 12.04 hrs, Volume= 0.768 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 15L

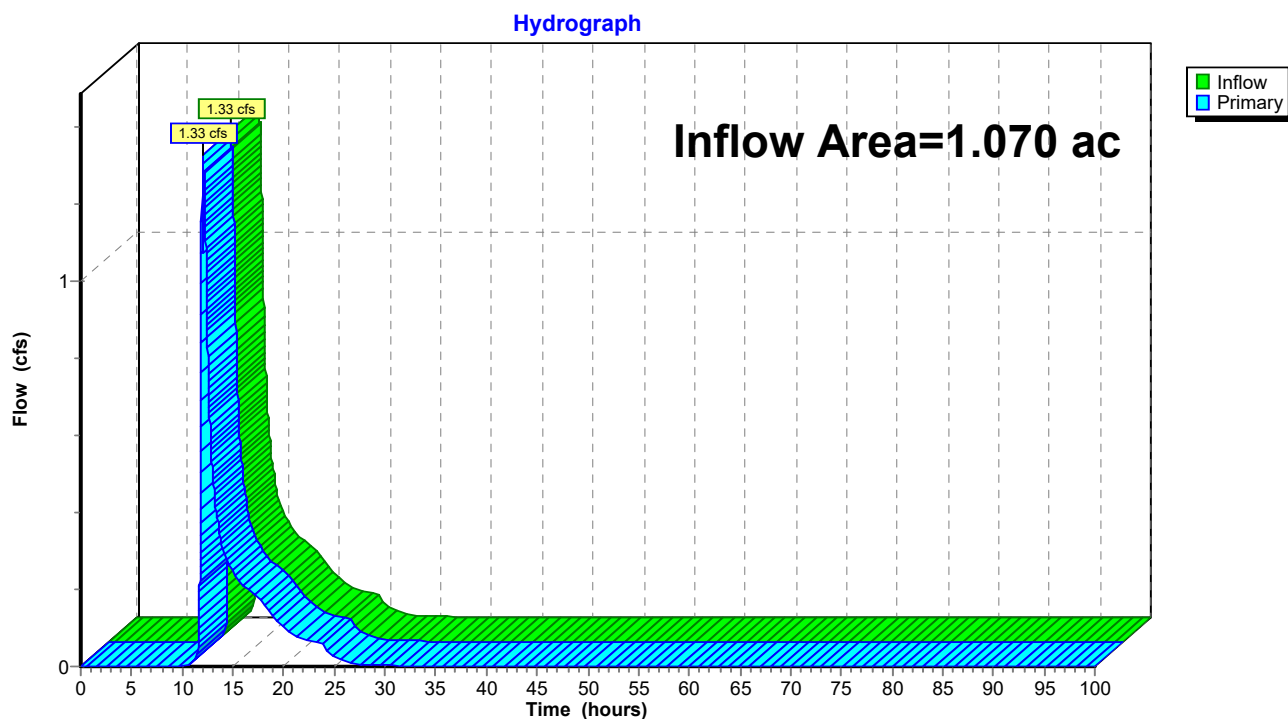
Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Link 11L: Combined Flow West

Summary for Link 12L: Combined Flow South

Inflow Area = 1.070 ac, 24.30% Impervious, Inflow Depth = 2.79" for 50-Year event
Inflow = 1.33 cfs @ 11.97 hrs, Volume= 0.249 af
Primary = 1.33 cfs @ 11.97 hrs, Volume= 0.249 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 15L

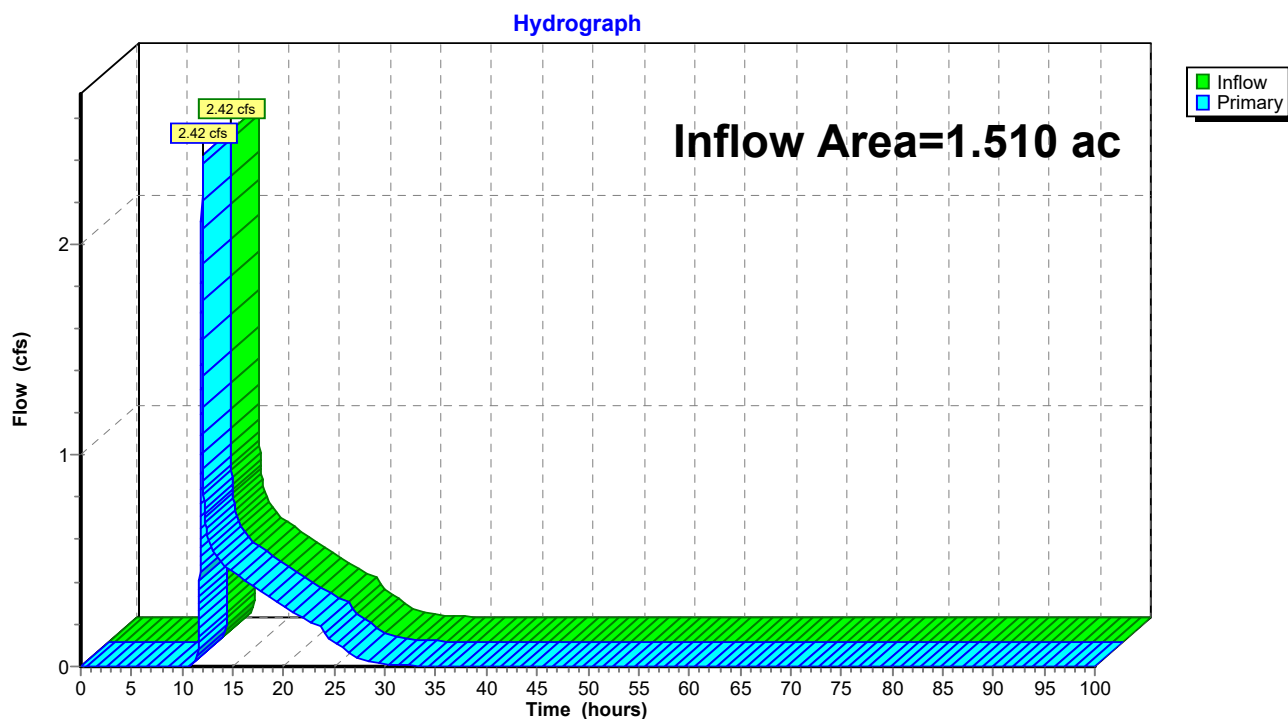
Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Link 12L: Combined Flow South

Summary for Link 13L: Comnined Flow North

Inflow Area = 1.510 ac, 49.01% Impervious, Inflow Depth = 3.46" for 50-Year event
Inflow = 2.42 cfs @ 11.97 hrs, Volume= 0.435 af
Primary = 2.42 cfs @ 11.97 hrs, Volume= 0.435 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 15L

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Link 13L: Comnined Flow North

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Time span=0.00-100.00 hrs, dt=0.01 hrs, 10001 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment7S: UndetainedWest	Runoff Area=0.540 ac 0.00% Impervious Runoff Depth=2.79" Tc=5.0 min CN=61 Runoff=2.80 cfs 0.125 af
Subcatchment8S: UndetainedNorth	Runoff Area=0.530 ac 0.00% Impervious Runoff Depth=2.79" Tc=5.0 min CN=61 Runoff=2.75 cfs 0.123 af
Subcatchment9S: UndetainedSoutheast	Runoff Area=0.170 ac 11.76% Impervious Runoff Depth=3.20" Tc=5.0 min CN=65 Runoff=1.01 cfs 0.045 af
Subcatchment10S: UndetainedSouth	Runoff Area=0.090 ac 0.00% Impervious Runoff Depth=2.79" Tc=5.0 min CN=61 Runoff=0.47 cfs 0.021 af
SubcatchmentP-N: Proposed North	Runoff Area=0.980 ac 75.51% Impervious Runoff Depth=5.83" Flow Length=321' Tc=8.1 min CN=89 Runoff=8.69 cfs 0.476 af
SubcatchmentP-S: Proposed South	Runoff Area=0.480 ac 22.92% Impervious Runoff Depth=3.61" Flow Length=237' Tc=11.1 min CN=69 Runoff=2.57 cfs 0.145 af
SubcatchmentP-SE: Proposed Drainage	Runoff Area=0.330 ac 39.39% Impervious Runoff Depth=4.36" Flow Length=118' Tc=7.3 min CN=76 Runoff=2.41 cfs 0.120 af
SubcatchmentP-W: Proposed West	Runoff Area=1.910 ac 67.54% Impervious Runoff Depth=5.48" Flow Length=1,203' Tc=6.7 min CN=86 Runoff=17.07 cfs 0.872 af
Pond 1P: SE Basin	Peak Elev=918.30' Storage=2,457 cf Inflow=2.41 cfs 0.120 af Outflow=0.47 cfs 0.110 af
Pond 2P: South Basin Orifice	Peak Elev=913.81' Storage=2,475 cf Inflow=2.90 cfs 0.255 af Outflow=1.20 cfs 0.245 af
Pond 3P: North Basin Orifice	Peak Elev=924.65' Storage=11,911 cf Inflow=8.69 cfs 0.476 af Outflow=1.38 cfs 0.407 af
Pond 4P: West Basin Orifice	Peak Elev=912.27' Storage=16,219 cf Inflow=17.07 cfs 0.872 af Outflow=8.11 cfs 0.801 af
Pond 5P: Level Spreader	Peak Elev=904.19' Storage=30 cf Inflow=8.11 cfs 0.801 af Outflow=8.11 cfs 0.801 af
Link 11L: Combined Flow West	Inflow=9.42 cfs 0.926 af Primary=9.42 cfs 0.926 af
Link 12L: Combined Flow South	Inflow=1.85 cfs 0.311 af Primary=1.85 cfs 0.311 af
Link 13L: Comnined Flow North	Inflow=3.07 cfs 0.530 af Primary=3.07 cfs 0.530 af

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Total Runoff Area = 5.030 ac Runoff Volume = 1.928 af Average Runoff Depth = 4.60"
54.47% Pervious = 2.740 ac 45.53% Impervious = 2.290 ac

Summary for Subcatchment 7S: Undetained West

Runoff = 2.80 cfs @ 11.97 hrs, Volume= 0.125 af, Depth= 2.79"
Routed to Link 11L : Combined Flow West

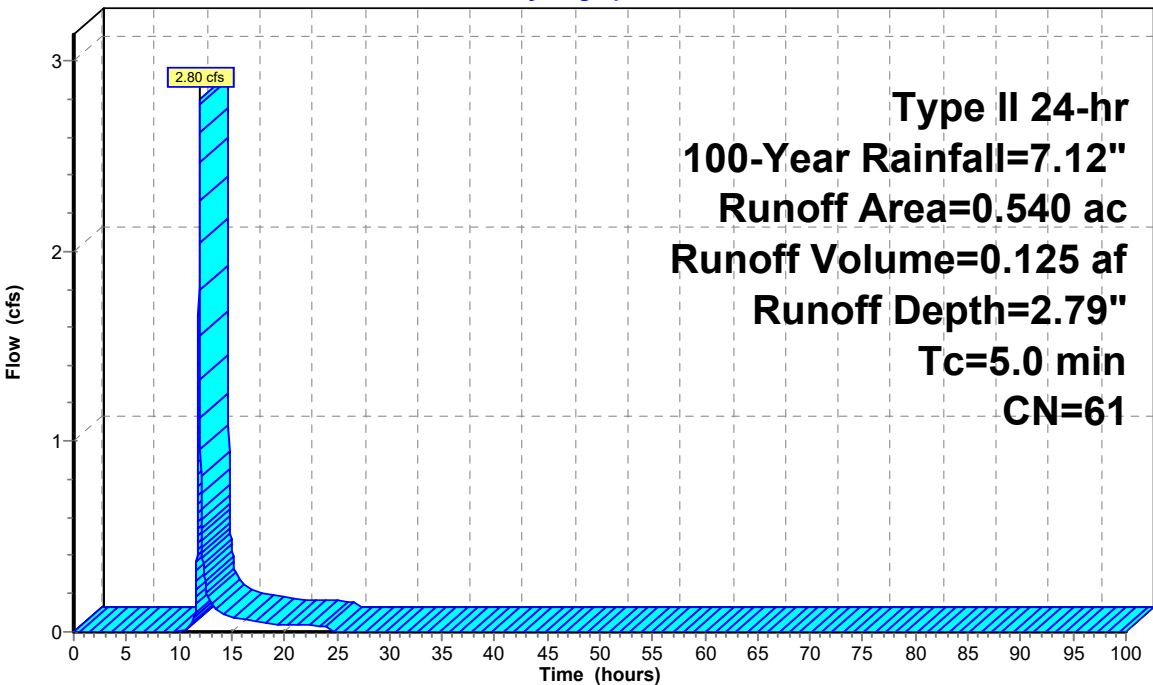
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=7.12"

Area (ac)	CN	Description
* 0.540	61	>75% Grass cover, Good, HSG B
0.540		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 7S: Undetained West

Hydrograph



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Type II 24-hr 100-Year Rainfall=7.12"

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Summary for Subcatchment 8S: Undetained North

Runoff = 2.75 cfs @ 11.97 hrs, Volume= 0.123 af, Depth= 2.79"
Routed to Link 13L : Comnined Flow North

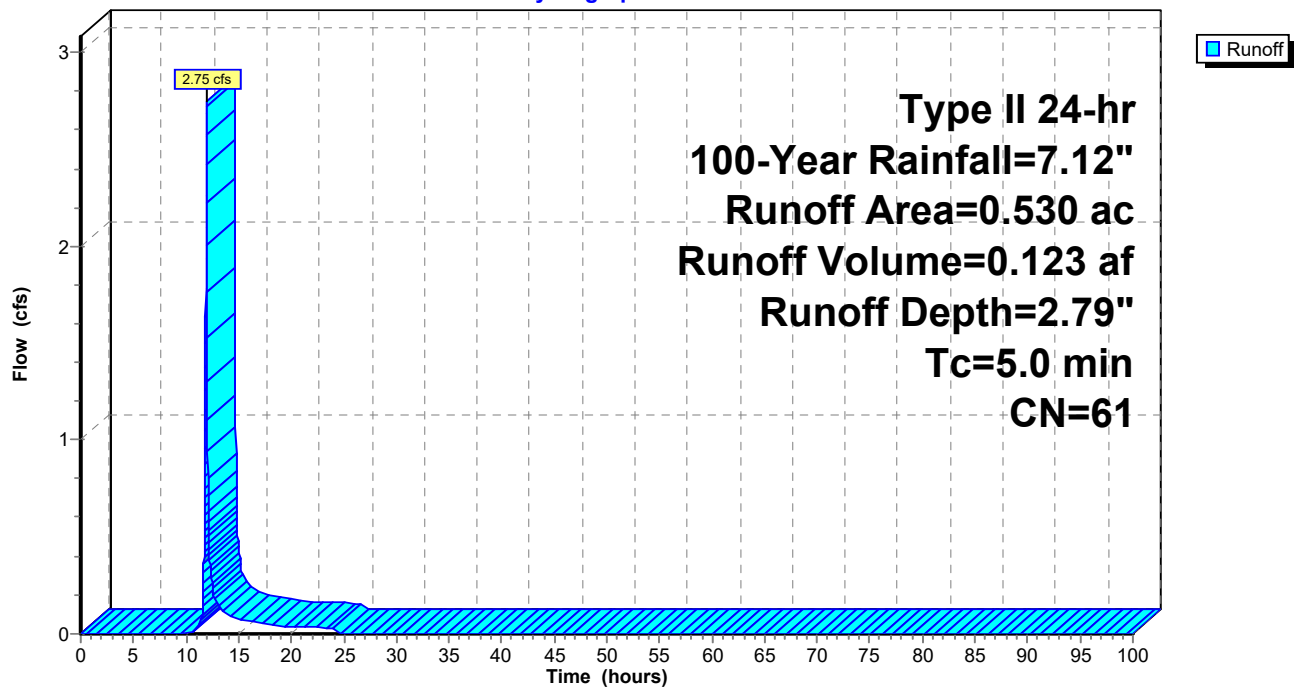
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=7.12"

Area (ac)	CN	Description
* 0.530	61	>75% Grass cover, Good, HSG B
0.530		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 8S: Undetained North

Hydrograph



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Type II 24-hr 100-Year Rainfall=7.12"

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Summary for Subcatchment 9S: Undetained Southeast

Runoff = 1.01 cfs @ 11.96 hrs, Volume= 0.045 af, Depth= 3.20"
Routed to Link 12L : Combined Flow South

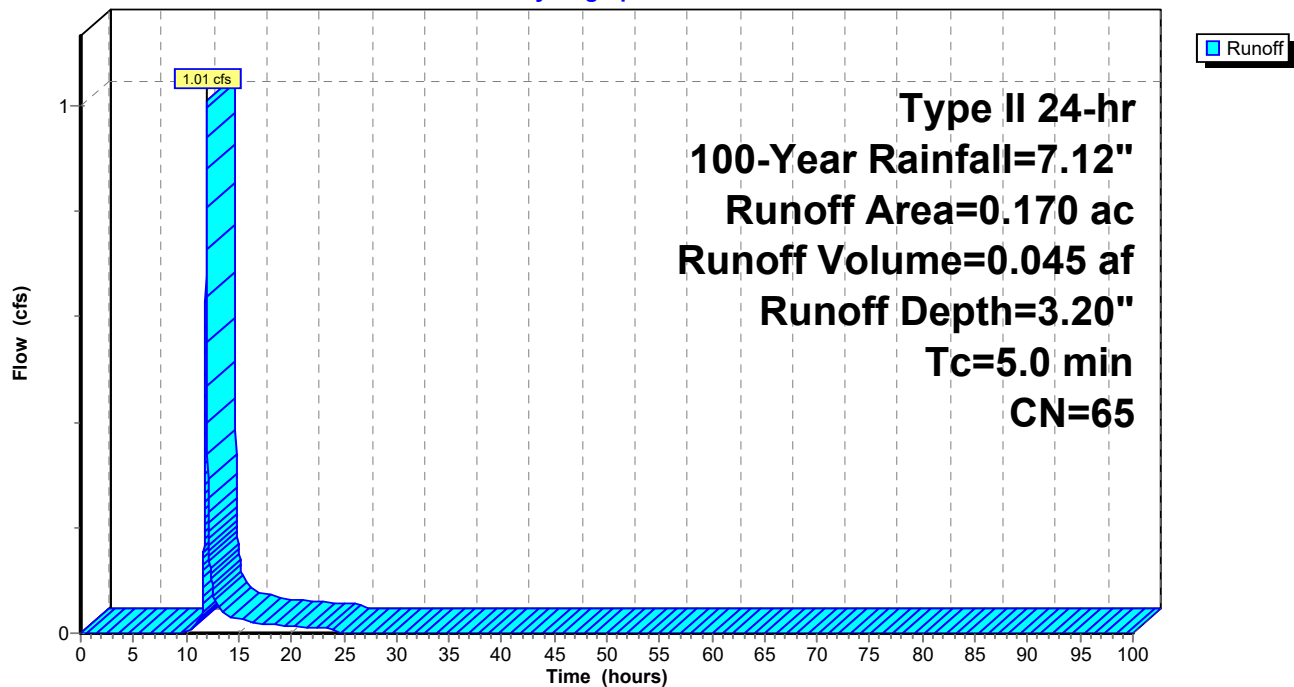
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=7.12"

Area (ac)	CN	Description
* 0.150	61	>75% Grass cover, Good, HSG B
* 0.020	98	Pavement
0.170	65	Weighted Average
0.150		88.24% Pervious Area
0.020		11.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 9S: Undetained Southeast

Hydrograph



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Type II 24-hr 100-Year Rainfall=7.12"

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Summary for Subcatchment 10S: Undetained South

Runoff = 0.47 cfs @ 11.97 hrs, Volume= 0.021 af, Depth= 2.79"
Routed to Link 12L : Combined Flow South

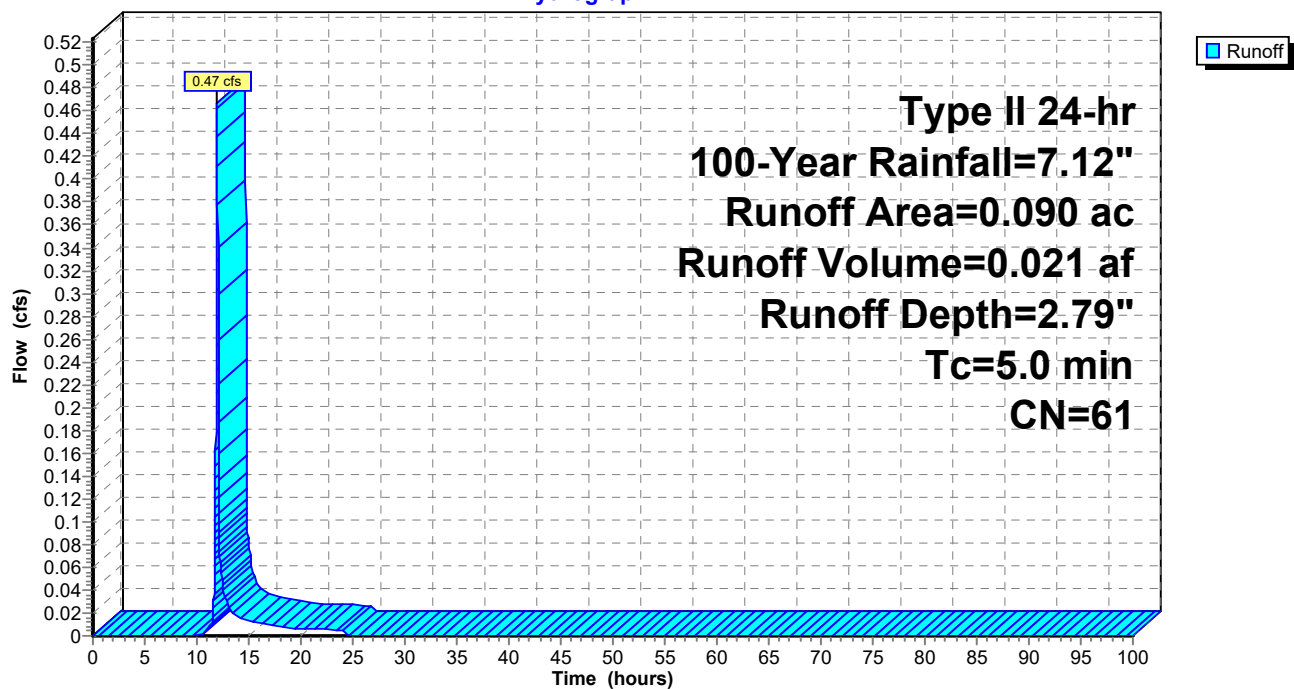
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=7.12"

Area (ac)	CN	Description
* 0.090	61	>75% Grass cover, Good, HSG B
0.090		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 10S: Undetained South

Hydrograph



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Type II 24-hr 100-Year Rainfall=7.12"

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Summary for Subcatchment P-N: Proposed North

[47] Hint: Peak is 110% of capacity of segment #2

Runoff = 8.69 cfs @ 11.99 hrs, Volume= 0.476 af, Depth= 5.83"
 Routed to Pond 3P : North Basin Orifice

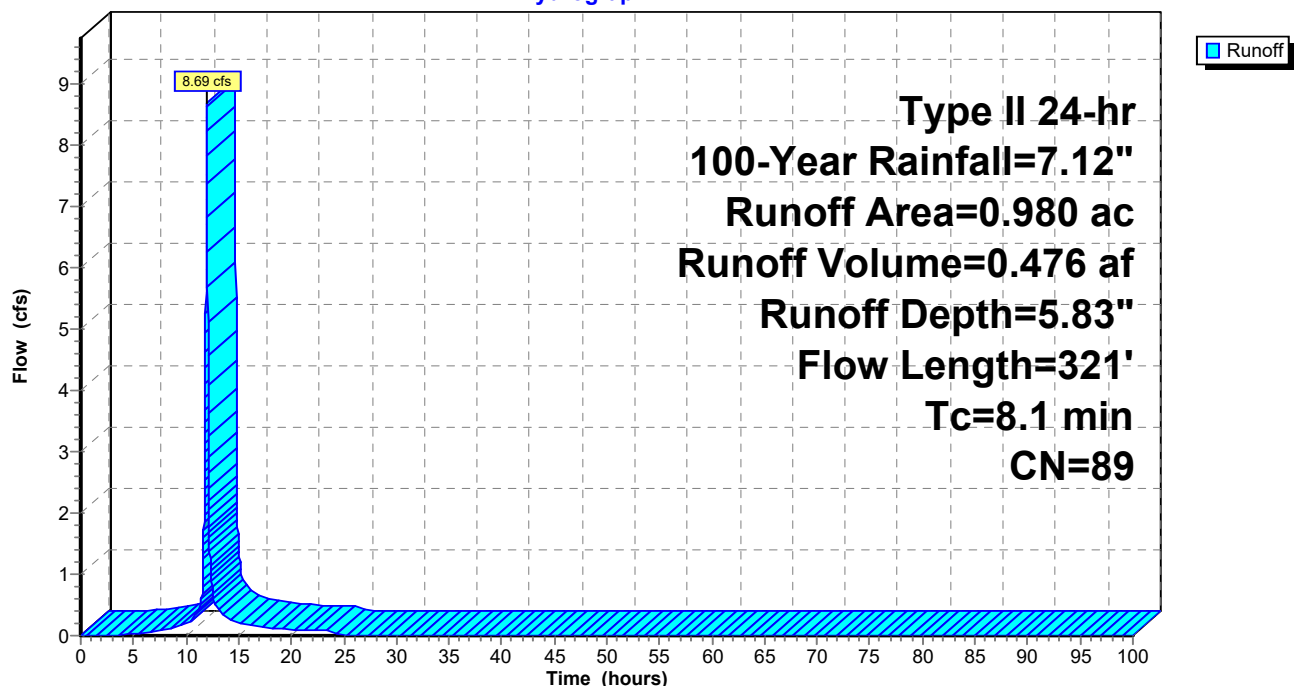
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Type II 24-hr 100-Year Rainfall=7.12"

Area (ac)	CN	Description
* 0.740	98	Paved roads w/curbs & sewers, HSG C
0.240	61	>75% Grass cover, Good, HSG B
0.980	89	Weighted Average
0.240		24.49% Pervious Area
0.740		75.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	91	0.0350	0.20		Sheet Flow, SHEET (GRASS) Grass: Short n= 0.150 P2= 3.04"
0.6	230	0.0150	6.45	7.91	Pipe Channel, PIPE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
8.1	321	Total			

Subcatchment P-N: Proposed North

Hydrograph



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Type II 24-hr 100-Year Rainfall=7.12"

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Summary for Subcatchment P-S: Proposed South

Runoff = 2.57 cfs @ 12.03 hrs, Volume= 0.145 af, Depth= 3.61"
 Routed to Pond 2P : South Basin Orifice

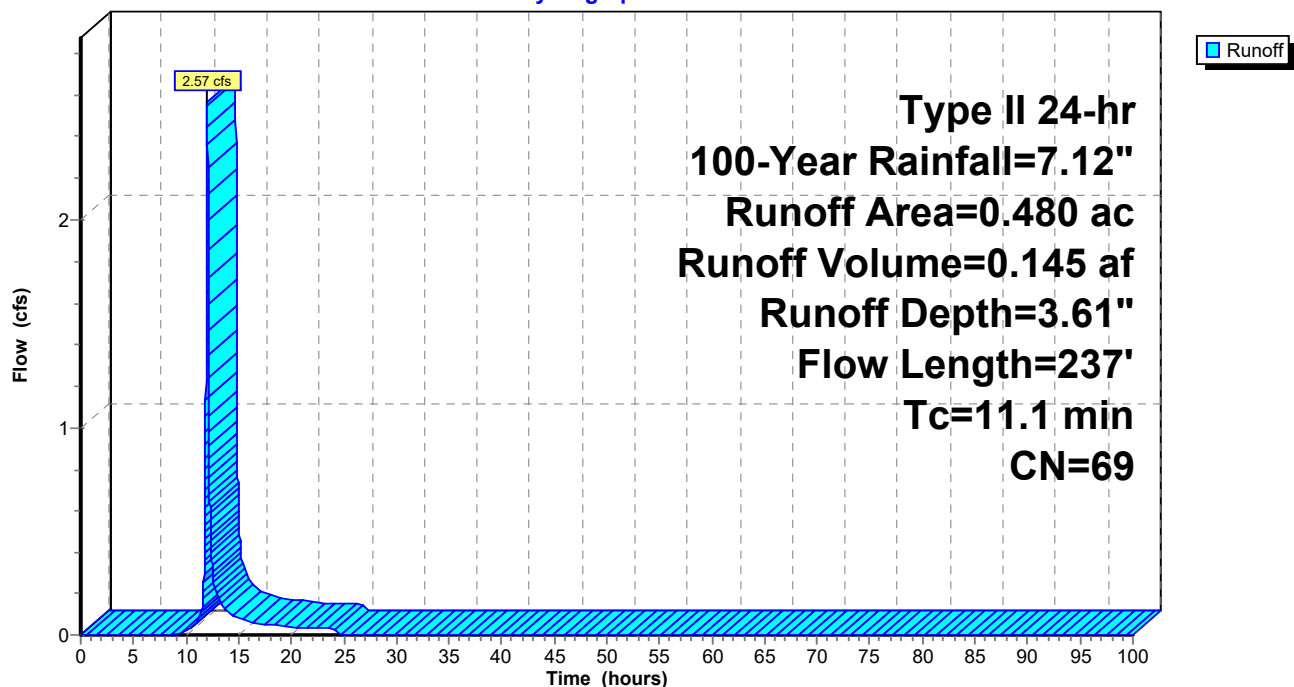
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Type II 24-hr 100-Year Rainfall=7.12"

Area (ac)	CN	Description
* 0.110	98	Paved roads w/curbs & sewers, HSG C
0.370	61	>75% Grass cover, Good, HSG B
0.480	69	Weighted Average
0.370		77.08% Pervious Area
0.110		22.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	100	0.0200	0.17		Sheet Flow, SHEET (GRASS) Grass: Short n= 0.150 P2= 3.04"
0.9	112	0.0200	2.12		Shallow Concentrated Flow, SHALLOW (GRASS) Grassed Waterway Kv= 15.0 fps
0.1	25	0.2500	7.50		Shallow Concentrated Flow, SHALLOW (GRASS) Grassed Waterway Kv= 15.0 fps
11.1	237	Total			

Subcatchment P-S: Proposed South

Hydrograph



23-047 Proposed Site Conditions_5-7-24

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Type II 24-hr 100-Year Rainfall=7.12"

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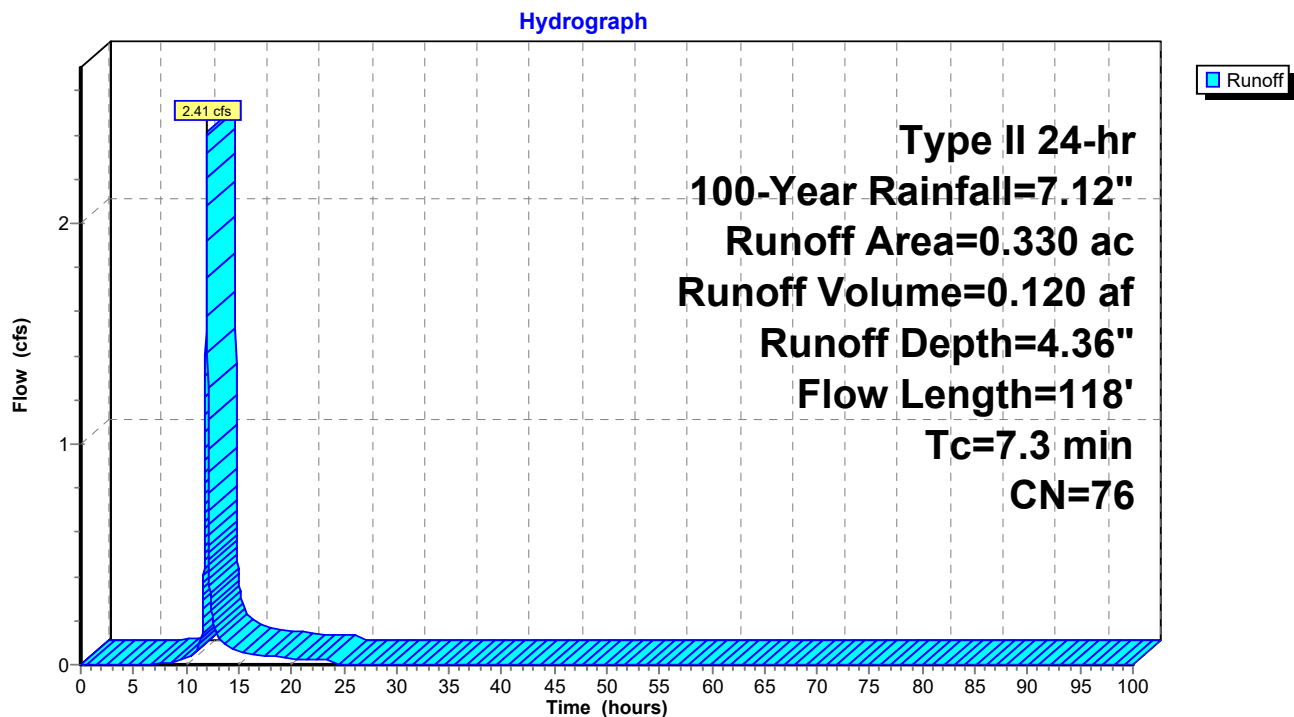
Summary for Subcatchment P-SE: Proposed Drainage

Runoff = 2.41 cfs @ 11.99 hrs, Volume= 0.120 af, Depth= 4.36"
Routed to Pond 1P : SE Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=7.12"

Area (ac)	CN	Description
0.130	98	Paved parking, HSG C
0.200	61	>75% Grass cover, Good, HSG B
0.330	76	Weighted Average
0.200		60.61% Pervious Area
0.130		39.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	65	0.0200	0.15		Sheet Flow, Grass: Short n= 0.150 P2= 3.04"
0.2	53	0.0100	5.26	6.46	Pipe Channel, 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
7.3	118	Total			

Subcatchment P-SE: Proposed Drainage

23-047 Proposed Site Conditions_5-7-24

Type II 24-hr 100-Year Rainfall=7.12"

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Summary for Subcatchment P-W: Proposed West

[47] Hint: Peak is 133% of capacity of segment #3

Runoff = 17.07 cfs @ 11.98 hrs, Volume= 0.872 af, Depth= 5.48"
 Routed to Pond 4P : West Basin Orifice

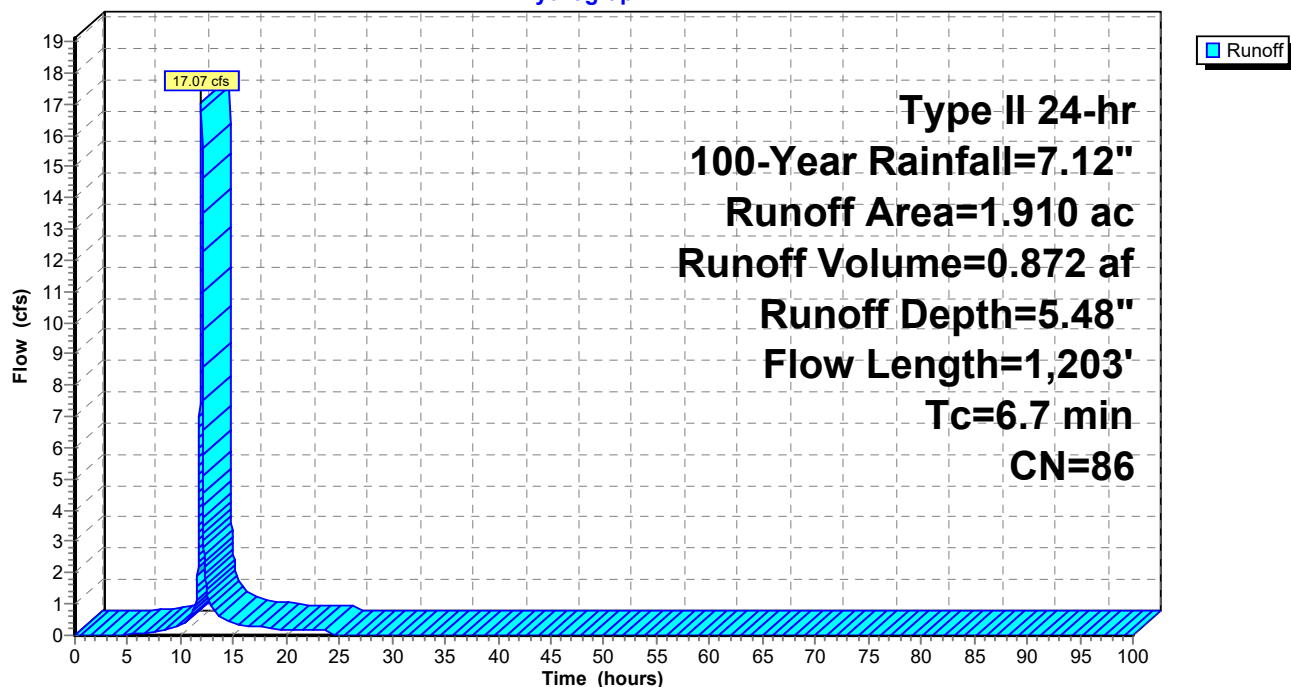
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Type II 24-hr 100-Year Rainfall=7.12"

Area (ac)	CN	Description
* 1.290	98	Paved roads w/curbs & sewers, HSG C
0.620	61	>75% Grass cover, Good, HSG B
1.910	86	Weighted Average
0.620		32.46% Pervious Area
1.290		67.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	100	0.0050	0.77		Sheet Flow, SHEET (PAVED) Smooth surfaces n= 0.011 P2= 3.04"
3.6	725	0.0280	3.40		Shallow Concentrated Flow, SHALLOW (PAVED) Paved Kv= 20.3 fps
0.9	378	0.0150	7.28	12.87	Pipe Channel, Storm Sewer 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
6.7	1,203	Total			

Subcatchment P-W: Proposed West

Hydrograph



23-047 Proposed Site Conditions_5-7-24

Type II 24-hr 100-Year Rainfall=7.12"

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Summary for Pond 1P: SE Basin

Inflow Area = 0.330 ac, 39.39% Impervious, Inflow Depth = 4.36" for 100-Year event
 Inflow = 2.41 cfs @ 11.99 hrs, Volume= 0.120 af
 Outflow = 0.47 cfs @ 12.18 hrs, Volume= 0.110 af, Atten= 80%, Lag= 11.7 min
 Primary = 0.47 cfs @ 12.18 hrs, Volume= 0.110 af
 Routed to Pond 2P : South Basin Orifice

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 918.30' @ 12.18 hrs Surf.Area= 3,067 sf Storage= 2,457 cf

Plug-Flow detention time= 167.7 min calculated for 0.110 af (92% of inflow)
 Center-of-Mass det. time= 124.3 min (939.2 - 814.8)

Volume	Invert	Avail.Storage	Storage Description
#1	916.91'	8,715 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
916.91	0	0	0
918.00	2,856	1,557	1,557
919.00	3,551	3,204	4,760
920.00	4,358	3,955	8,715

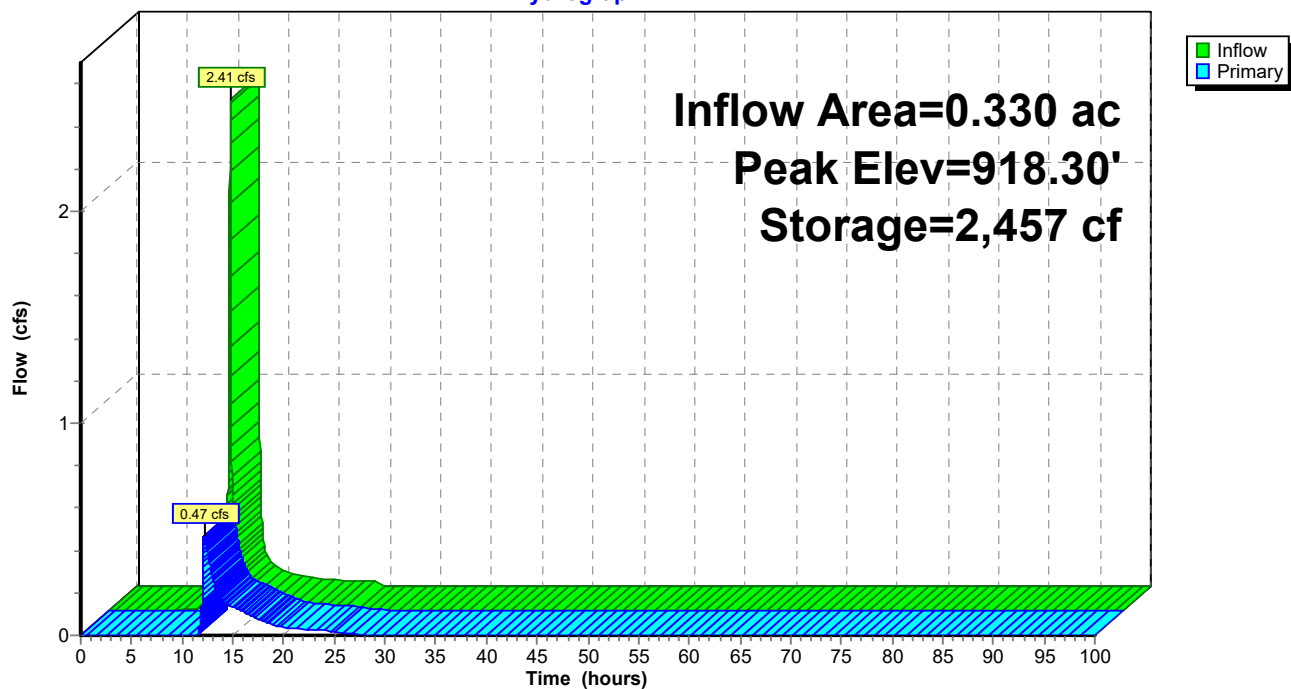
Device	Routing	Invert	Outlet Devices
#1	Primary	916.26'	4.0" Round Culvert X 3.00 L= 30.2' Ke= 0.500 Inlet / Outlet Invert= 916.26' / 915.96' S= 0.0099 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 0.09 sf
#2	Device 1	917.48'	3.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	918.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.45 0.45 0.95 Width (feet) 0.50 0.50 3.00 3.00

Primary OutFlow Max=0.47 cfs @ 12.18 hrs HW=918.30' (Free Discharge)

1=Culvert (Passes 0.47 cfs of 1.26 cfs potential flow)
 2=Orifice/Grate (Orifice Controls 0.20 cfs @ 4.03 fps)
 3=Custom Weir/Orifice (Weir Controls 0.27 cfs @ 1.81 fps)

Pond 1P: SE Basin

Hydrograph



23-047 Proposed Site Conditions_5-7-24

Type II 24-hr 100-Year Rainfall=7.12"

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Summary for Pond 2P: South Basin Orifice

Inflow Area = 0.810 ac, 29.63% Impervious, Inflow Depth = 3.77" for 100-Year event
 Inflow = 2.90 cfs @ 12.04 hrs, Volume= 0.255 af
 Outflow = 1.20 cfs @ 12.24 hrs, Volume= 0.245 af, Atten= 59%, Lag= 11.8 min
 Primary = 1.20 cfs @ 12.24 hrs, Volume= 0.245 af
 Routed to Link 12L : Combined Flow South

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 913.81' @ 12.24 hrs Surf.Area= 1,941 sf Storage= 2,475 cf

Plug-Flow detention time= 82.4 min calculated for 0.245 af (96% of inflow)
 Center-of-Mass det. time= 56.4 min (935.8 - 879.4)

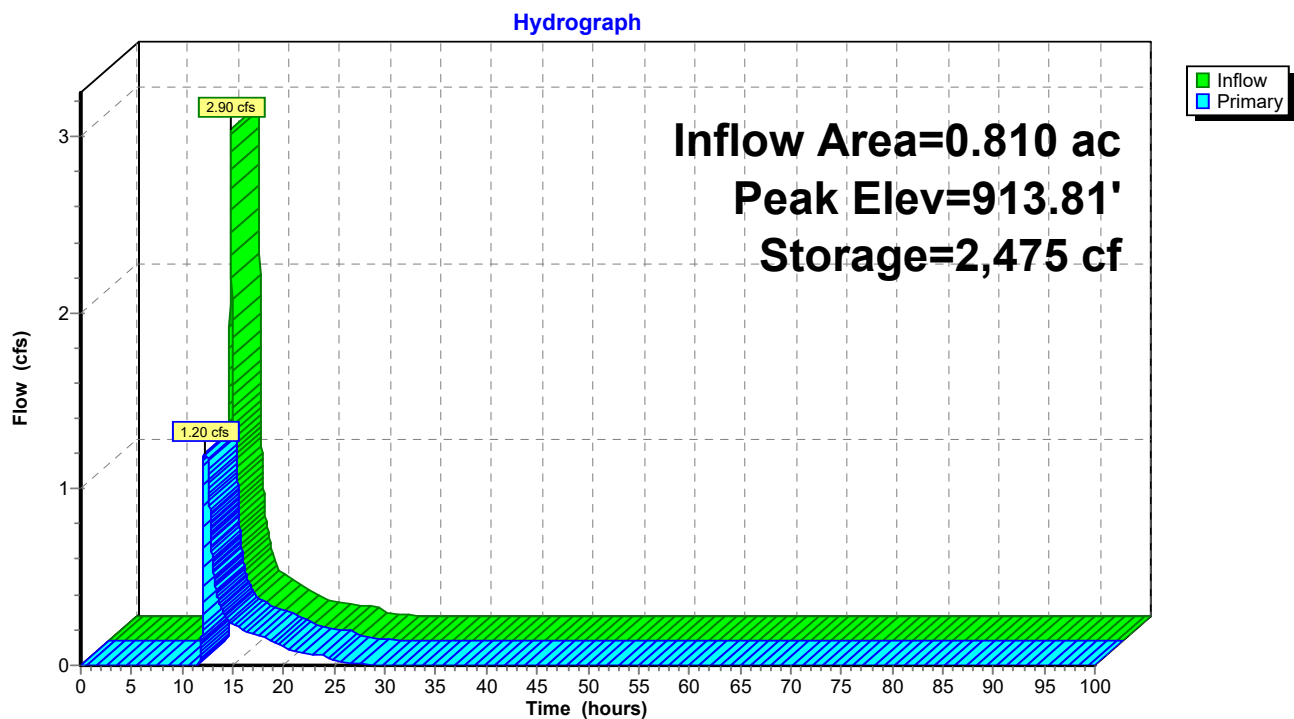
Volume	Invert	Avail.Storage	Storage Description
#1	911.50'	5,431 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
911.50	0	0	0
912.00	682	171	171
913.00	1,303	993	1,163
914.00	2,092	1,698	2,861
915.00	3,048	2,570	5,431

Device	Routing	Invert	Outlet Devices
#1	Primary	911.34'	6.0" Round Culvert L= 68.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 911.34' / 909.31' S= 0.0299 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	912.31'	3.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	913.00'	10.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.20 cfs @ 12.24 hrs HW=913.81' (Free Discharge)

- ↑ **1=Culvert** (Barrel Controls 1.20 cfs @ 6.12 fps)
- ↑ **2=Orifice/Grate** (Passes < 0.28 cfs potential flow)
- ↑ **3=Orifice/Grate** (Passes < 1.66 cfs potential flow)

Pond 2P: South Basin Orifice



23-047 Proposed Site Conditions_5-7-24

Type II 24-hr 100-Year Rainfall=7.12"

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Summary for Pond 3P: North Basin Orifice

Inflow Area = 0.980 ac, 75.51% Impervious, Inflow Depth = 5.83" for 100-Year event
 Inflow = 8.69 cfs @ 11.99 hrs, Volume= 0.476 af
 Outflow = 1.38 cfs @ 12.24 hrs, Volume= 0.407 af, Atten= 84%, Lag= 15.0 min
 Primary = 1.38 cfs @ 12.24 hrs, Volume= 0.407 af
 Routed to Link 13L : Combined Flow North

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 924.65' @ 12.24 hrs Surf.Area= 3,447 sf Storage= 11,911 cf

Plug-Flow detention time= 338.7 min calculated for 0.407 af (86% of inflow)
 Center-of-Mass det. time= 273.1 min (1,054.3 - 781.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	919.40'	6,149 cf	20.08'W x 171.65'L x 6.75'H Field A 23,269 cf Overall - 7,897 cf Embedded = 15,373 cf x 40.0% Voids
#2A	920.15'	7,897 cf	ADS_StormTech MC-7200 +Cap x 44 Inside #1 Effective Size= 91.2"W x 60.0"H => 26.68 sf x 6.59'L = 175.9 cf Overall Size= 100.0"W x 60.0"H x 6.95'L with 0.36' Overlap 44 Chambers in 2 Rows Cap Storage= 39.5 cf x 2 x 2 rows = 158.0 cf
		14,046 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	918.30'	12.0" Round Culvert L= 104.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 918.30' / 910.25' S= 0.0774 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	920.87'	3.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	924.15'	12.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.38 cfs @ 12.24 hrs HW=924.64' (Free Discharge)

↑ **1=Culvert** (Passes 1.38 cfs of 9.14 cfs potential flow)
 ↑ **2=Orifice/Grate** (Orifice Controls 0.45 cfs @ 9.20 fps)
 ↑ **3=Orifice/Grate** (Orifice Controls 0.93 cfs @ 2.40 fps)

23-047 Proposed Site Conditions_5-7-24

Type II 24-hr 100-Year Rainfall=7.12"

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Pond 3P: North Basin Orifice - Chamber Wizard Field A

Chamber Model = ADS_StormTechMC-7200 +Cap (ADS StormTech®MC-7200 with cap volume)

Effective Size= 91.2"W x 60.0"H => 26.68 sf x 6.59'L = 175.9 cf

Overall Size= 100.0"W x 60.0"H x 6.95'L with 0.36' Overlap

Cap Storage= 39.5 cf x 2 x 2 rows = 158.0 cf

100.0" Wide + 9.0" Spacing = 109.0" C-C Row Spacing

22 Chambers/Row x 6.59' Long +2.73' Cap Length x 2 = 150.48' Row Length +127.0" End Stone x 2 = 171.65' Base Length

2 Rows x 100.0" Wide + 9.0" Spacing x 1 + 16.0" Side Stone x 2 = 20.08' Base Width

9.0" Stone Base + 60.0" Chamber Height + 12.0" Stone Cover = 6.75' Field Height

44 Chambers x 175.9 cf + 39.5 cf Cap Volume x 2 x 2 Rows = 7,896.5 cf Chamber Storage

23,269.3 cf Field - 7,896.5 cf Chambers = 15,372.8 cf Stone x 40.0% Voids = 6,149.1 cf Stone Storage

Chamber Storage + Stone Storage = 14,045.6 cf = 0.322 af

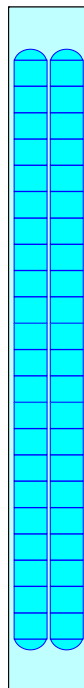
Overall Storage Efficiency = 60.4%

Overall System Size = 171.65' x 20.08' x 6.75'

44 Chambers

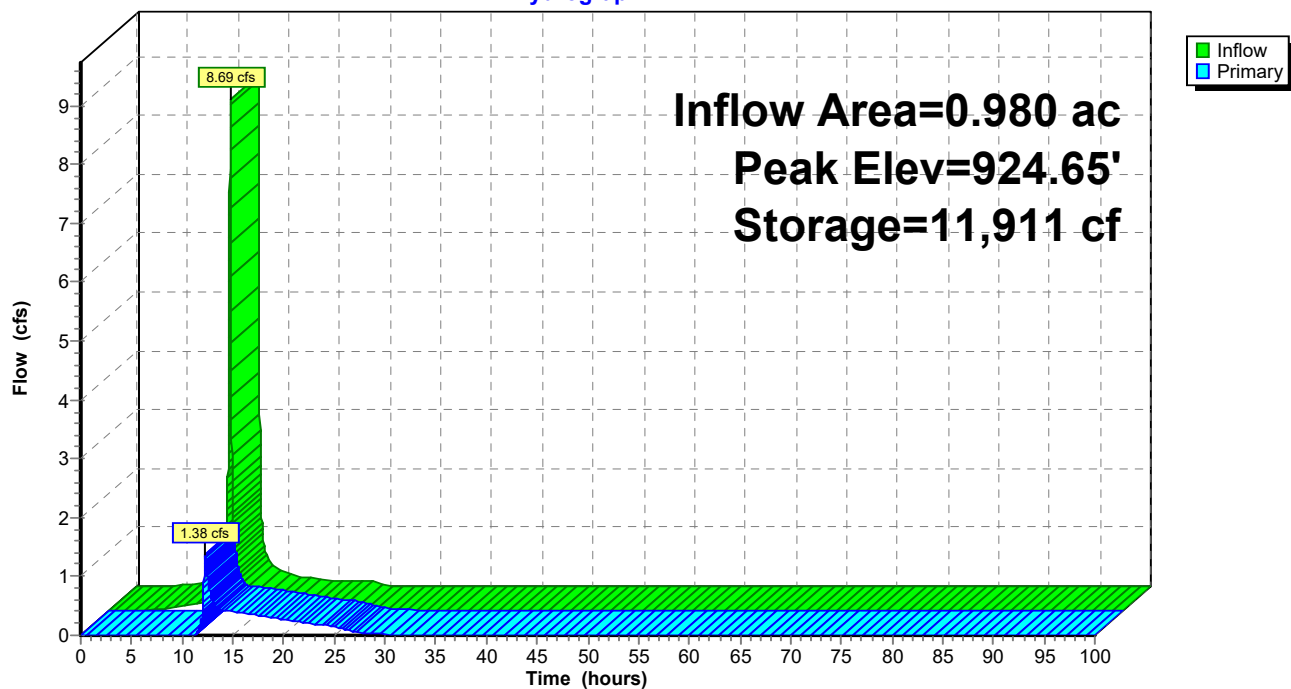
861.8 cy Field

569.4 cy Stone



Pond 3P: North Basin Orifice

Hydrograph



23-047 Proposed Site Conditions_5-7-24

Type II 24-hr 100-Year Rainfall=7.12"

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Summary for Pond 4P: West Basin Orifice

[95] Warning: Outlet Device #3 rise exceeded

Inflow Area = 1.910 ac, 67.54% Impervious, Inflow Depth = 5.48" for 100-Year event
 Inflow = 17.07 cfs @ 11.98 hrs, Volume= 0.872 af
 Outflow = 8.11 cfs @ 12.07 hrs, Volume= 0.801 af, Atten= 52%, Lag= 5.8 min
 Primary = 8.11 cfs @ 12.07 hrs, Volume= 0.801 af
 Routed to Pond 5P : Level Spreader

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 912.27' @ 12.07 hrs Surf.Area= 6,037 sf Storage= 16,219 cf

Plug-Flow detention time= 186.7 min calculated for 0.800 af (92% of inflow)
 Center-of-Mass det. time= 142.9 min (932.0 - 789.1)

Volume	Invert	Avail.Storage	Storage Description
#1	907.00'	28,862 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
907.00	0	0	0
908.00	1,584	792	792
909.00	2,402	1,993	2,785
910.00	3,364	2,883	5,668
911.00	4,448	3,906	9,574
912.00	5,668	5,058	14,632
913.00	7,027	6,348	20,980
914.00	8,738	7,883	28,862

Device	Routing	Invert	Outlet Devices
#1	Primary	908.00'	15.0" Round Culvert L= 32.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 908.00' / 904.00' S= 0.1250 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Device 1	909.14'	3.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	910.50'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.25 1.25 1.75 Width (feet) 1.00 1.00 1.00 1.00

Primary OutFlow Max=8.11 cfs @ 12.07 hrs HW=912.27' (Free Discharge)

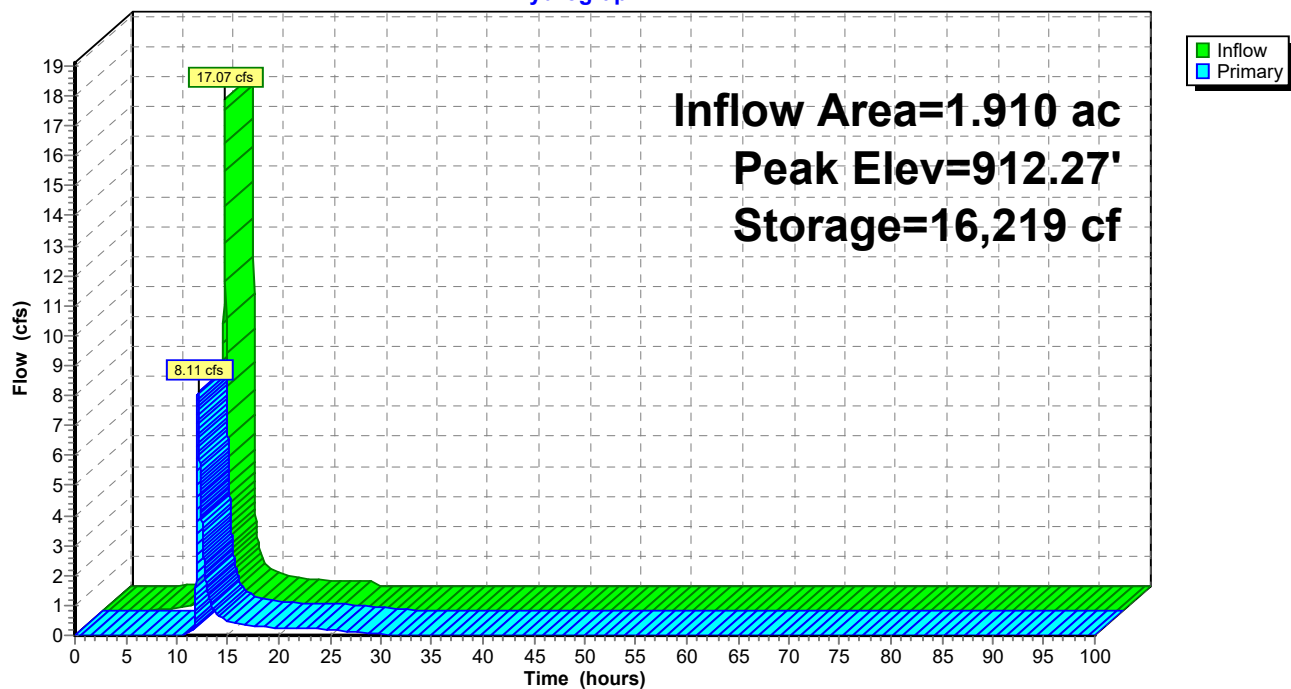
1=Culvert (Passes 8.11 cfs of 11.28 cfs potential flow)

2=Orifice/Grate (Orifice Controls 0.41 cfs @ 8.35 fps)

3=Custom Weir/Orifice (Orifice Controls 7.70 cfs @ 4.40 fps)

Pond 4P: West Basin Orifice

Hydrograph



23-047 Proposed Site Conditions_5-7-24

Type II 24-hr 100-Year Rainfall=7.12"

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Summary for Pond 5P: Level Spreader

[79] Warning: Submerged Pond 4P Primary device # 1 OUTLET by 0.19'

Inflow Area = 1.910 ac, 67.54% Impervious, Inflow Depth = 5.03" for 100-Year event
 Inflow = 8.11 cfs @ 12.07 hrs, Volume= 0.801 af
 Outflow = 8.11 cfs @ 12.08 hrs, Volume= 0.801 af, Atten= 0%, Lag= 0.1 min
 Primary = 8.11 cfs @ 12.08 hrs, Volume= 0.801 af
 Routed to Link 11L : Combined Flow West

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
 Peak Elev= 904.19' @ 12.08 hrs Surf.Area= 241 sf Storage= 30 cf

Plug-Flow detention time= 0.1 min calculated for 0.801 af (100% of inflow)
 Center-of-Mass det. time= 0.1 min (932.1 - 932.0)

Volume	Invert	Avail.Storage	Storage Description
#1	904.00'	1,255 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

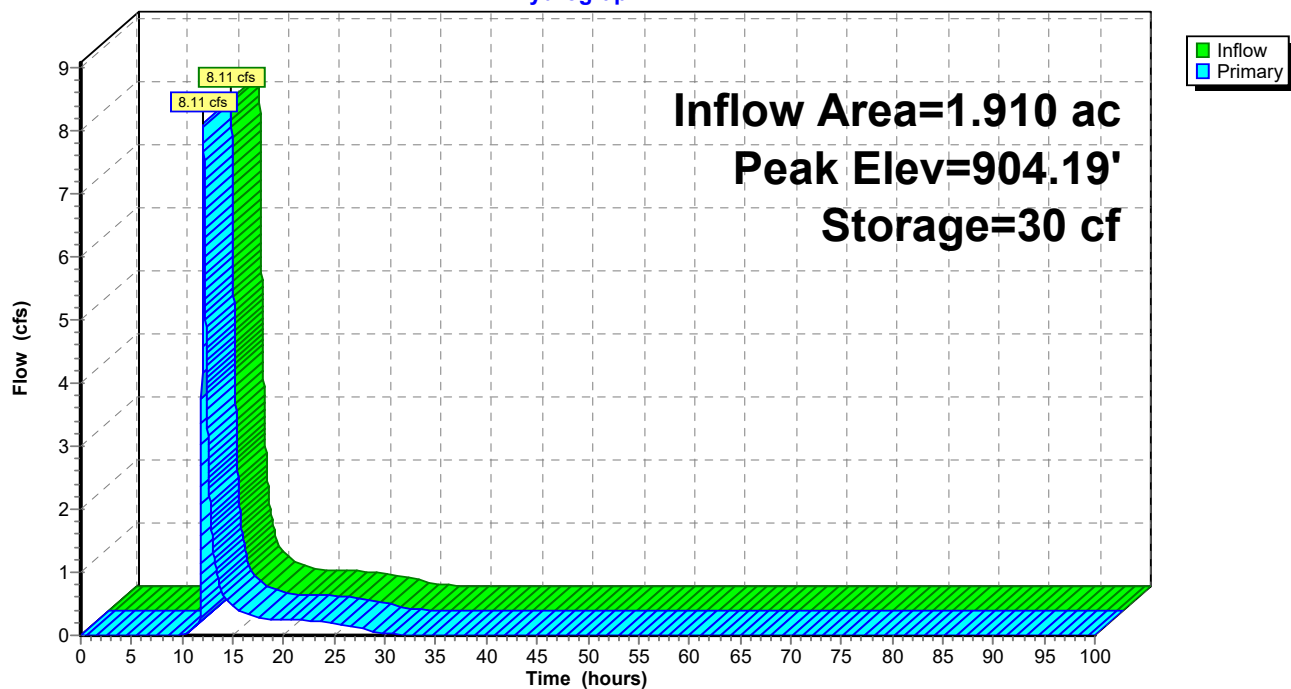
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
904.00	72	0	0
905.00	961	517	517
906.00	515	738	1,255

Device	Routing	Invert	Outlet Devices
#1	Primary	904.00'	30.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=8.10 cfs @ 12.08 hrs HW=904.19' TW=902.00' (Fixed TW Elev= 902.00')
 ↑1=Sharp-Crested Rectangular Weir (Weir Controls 8.10 cfs @ 1.42 fps)

Pond 5P: Level Spreader

Hydrograph

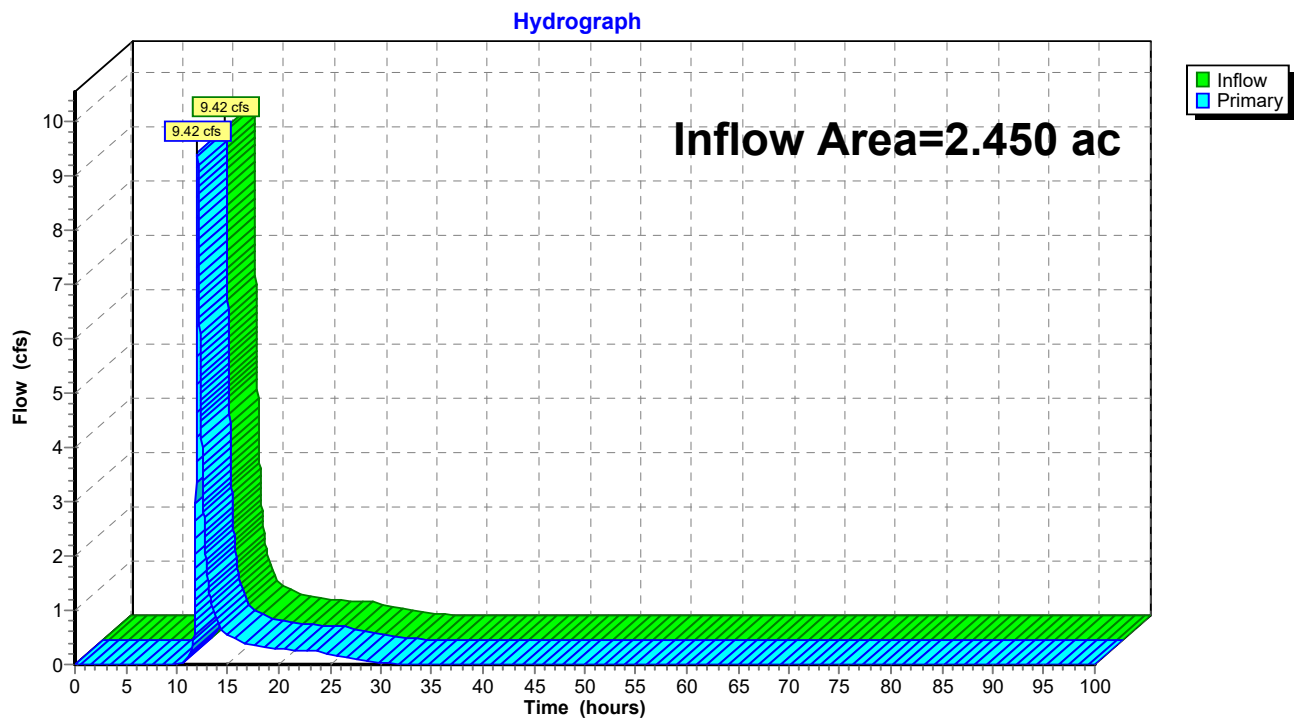


Summary for Link 11L: Combined Flow West

Inflow Area = 2.450 ac, 52.65% Impervious, Inflow Depth = 4.54" for 100-Year event
 Inflow = 9.42 cfs @ 12.03 hrs, Volume= 0.926 af
 Primary = 9.42 cfs @ 12.03 hrs, Volume= 0.926 af, Atten= 0%, Lag= 0.0 min
 Routed to nonexistent node 15L

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Link 11L: Combined Flow West

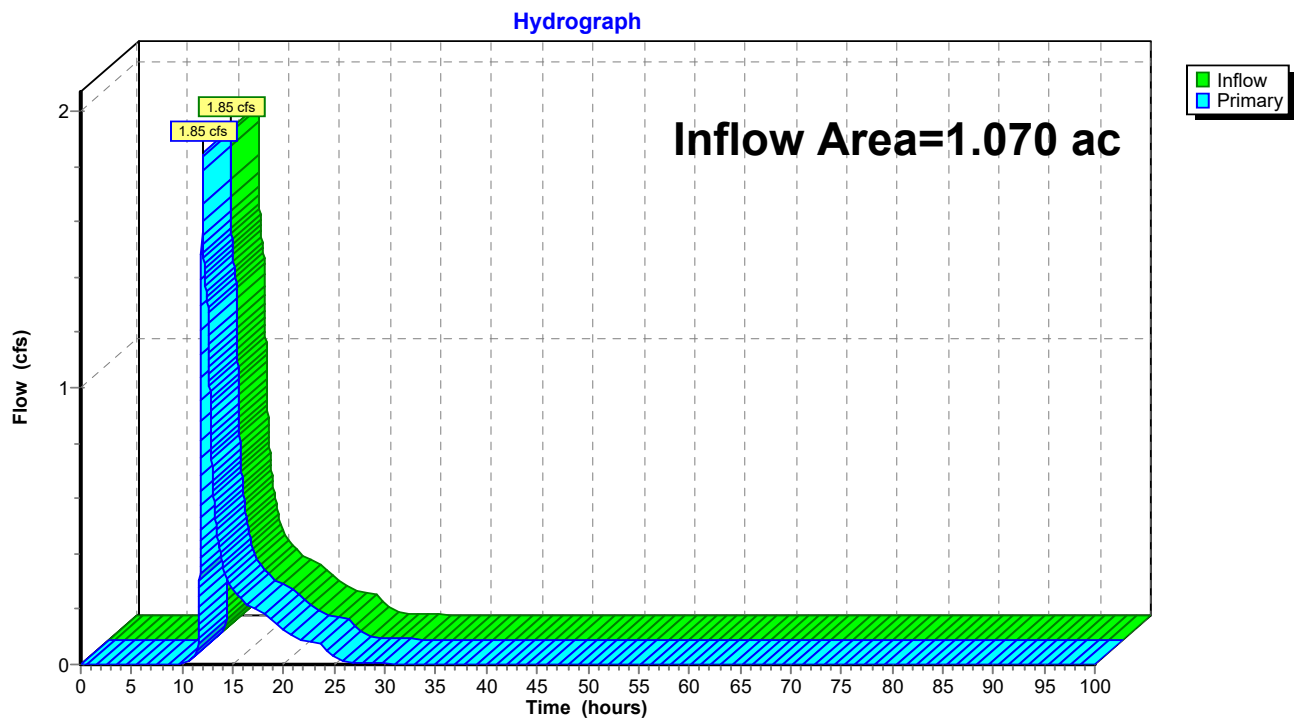


Summary for Link 12L: Combined Flow South

Inflow Area = 1.070 ac, 24.30% Impervious, Inflow Depth = 3.49" for 100-Year event
 Inflow = 1.85 cfs @ 12.01 hrs, Volume= 0.311 af
 Primary = 1.85 cfs @ 12.01 hrs, Volume= 0.311 af, Atten= 0%, Lag= 0.0 min
 Routed to nonexistent node 15L

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

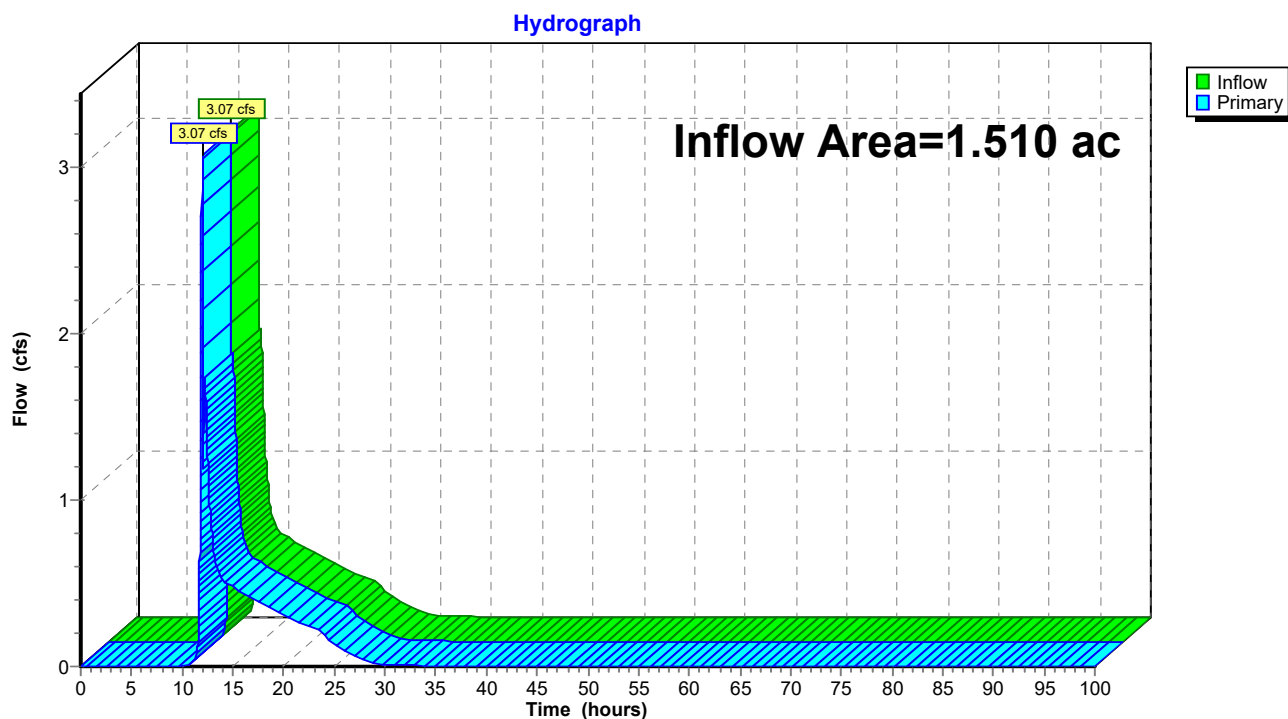
Link 12L: Combined Flow South



Summary for Link 13L: Comnined Flow North

Inflow Area = 1.510 ac, 49.01% Impervious, Inflow Depth = 4.21" for 100-Year event
Inflow = 3.07 cfs @ 11.97 hrs, Volume= 0.530 af
Primary = 3.07 cfs @ 11.97 hrs, Volume= 0.530 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 15L

Primary outflow = Inflow, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Link 13L: Comnined Flow North

Appendix G: Water Quality Calculations

Water recharge volume requirements have been met for the underground and all above ground detention areas. Therefore water quality is not needed. See Appendix H for recharge volume calculations.

The Rev is being met on this site, therefore the WQv is also considered to be met per ISWMM 3.01-2 pg 3.

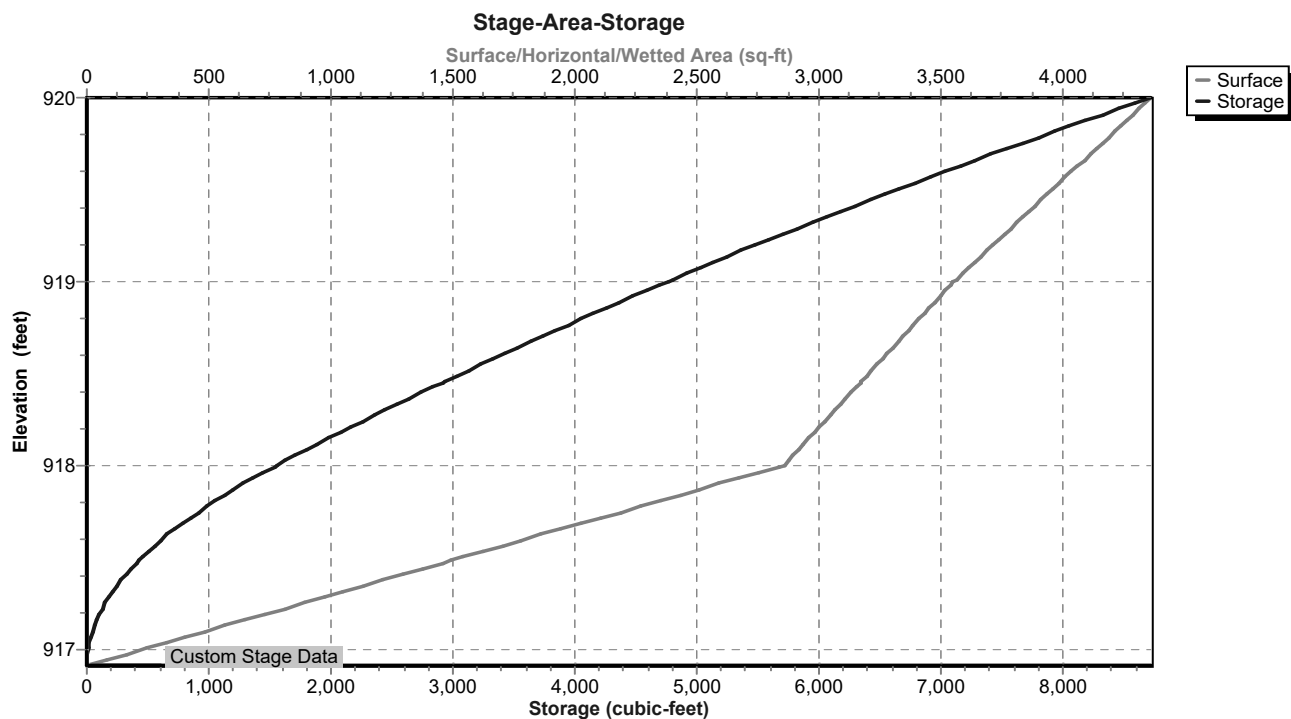
Appendix H: Water Quality, Recharge Calculations

Recharge Volume (Rev)											
Rev = 0.95 x A x D /12						(Equation 3.01-2-1)					
0.95 = Runoff Coefficient											
A = Impervious surface area (sf)											
D = Recharge Depth (in)											
Design Data											
See Example Table 3.01-2-1A											
BMP	Treatment Area	Impervious Area	Site Impervious	Recharge Depth	Rev to BMP	Upstream Rev	Total Rev to BMP	Rev Retained	Rev Retaine	Rev Bypass	Downstream BMP
	(ac)	(sf)	(%)	(in)	(cf)	(cf)	(cf)	(cf)	(%)	(cf)	
North	0.98	32,234	75.51%	1	2,552	0	2,552	2,552	100	0	
South	0.48	4,792	22.92%	1	379	0	379	379	100	0	
Southeast	0.33	5,663	39.40%	1	448	0	448	448	100	0	
West	1.91	56,192	67.54%	1	4,449	0	4,449	4,449	100	0	
Total	3.70	98,881	61.35%								

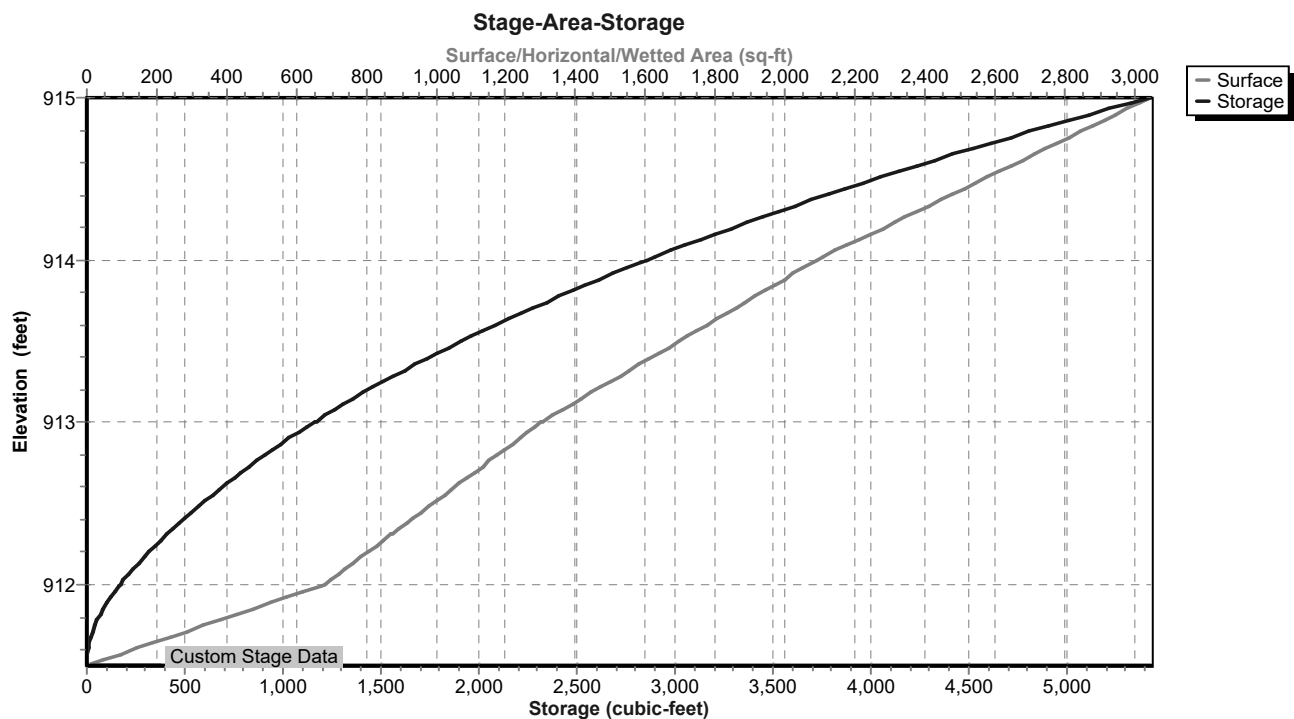
23-047 Recharge Calculations				
North Detention				
Recharge needed	2552	Stone Storage		1378.80
Stone Cover	12"	Storage Area needed		1173.20
Void Ratio	0.4	Height of Outlet		0.46
Stone Area (sf)	3447	Elevation of Outlet		920.87
Storage Area (sf)	2509			
South Detention				
Recharge needed	379	Contour	912	913
		Area (cuft)	114	976
Elevation of Outlet	912.31			
Southeast Detention				
Recharge needed	448	Contour	917	918
		Area (cuft)	0	952
Elevation of Outlet	917.48			
West Detention				
Recharge needed	4449	Contour	909	910
		Area (cuft)	3986	7350
Elevation of Outlet	909.14			

Appendix I: Stage Storage Table

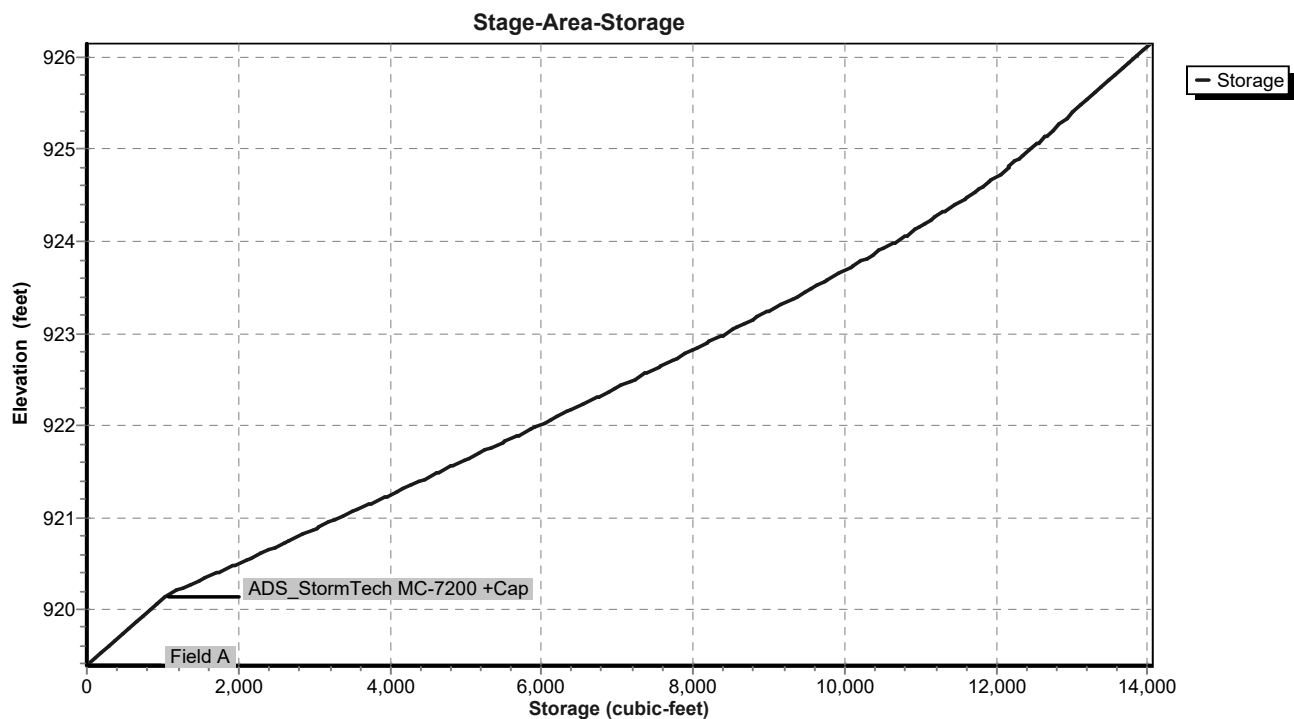
Pond 1P: SE Basin



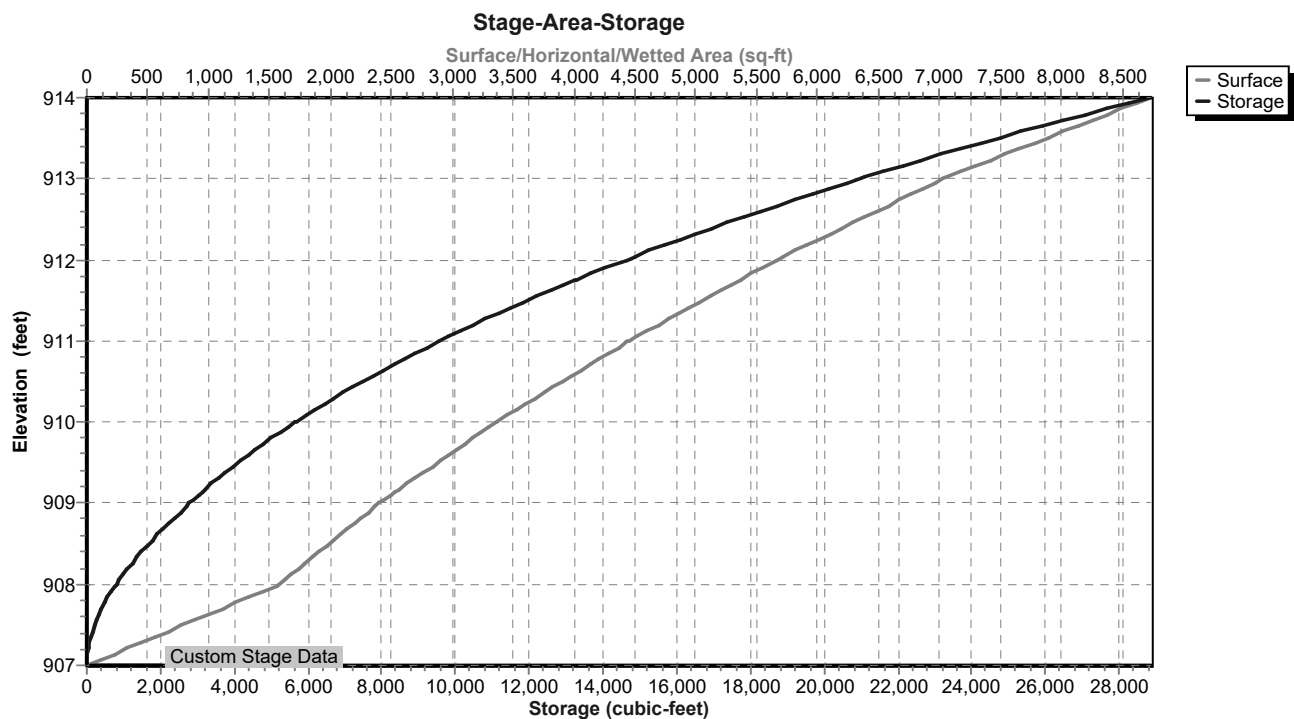
Pond 2P: South Basin Orifice



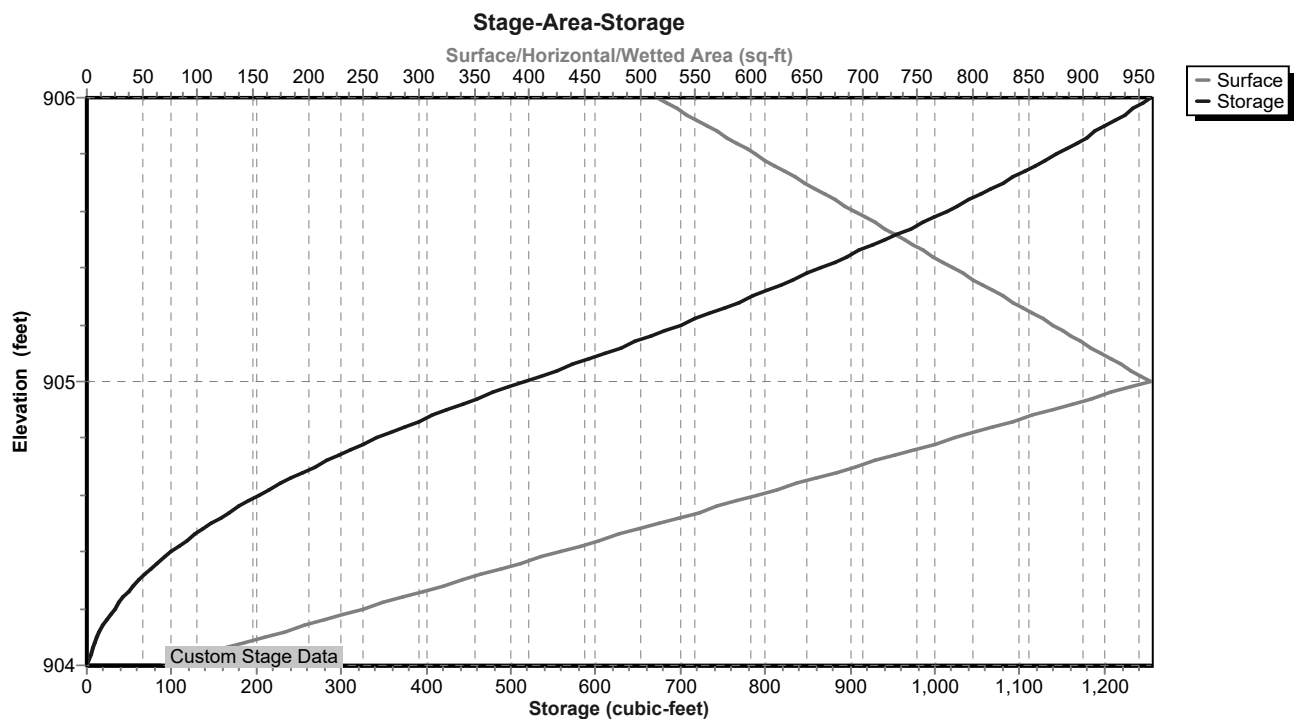
Pond 3P: North Basin Orifice



Pond 4P: West Basin Orifice



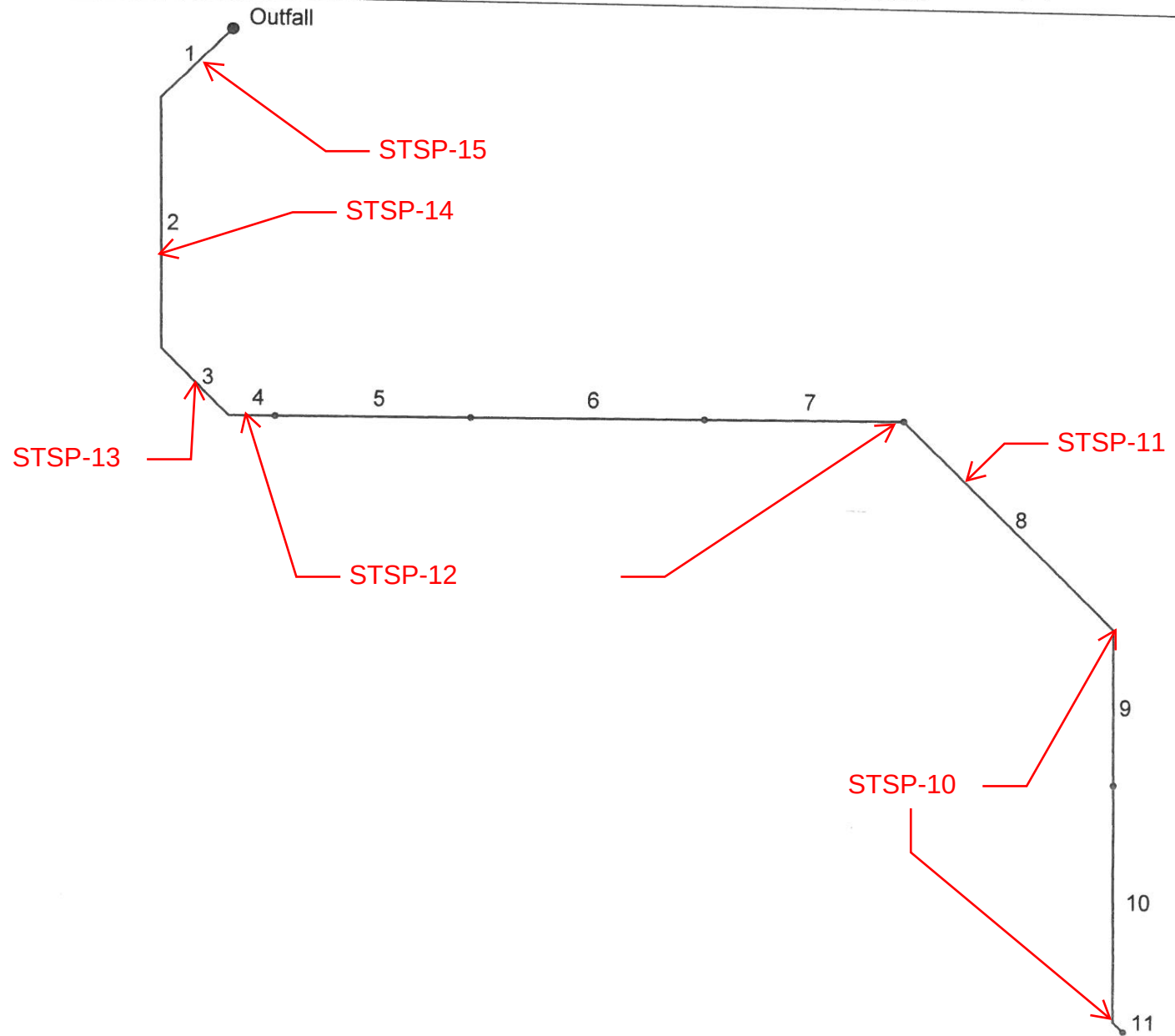
Pond 5P: Level Spreader



Appendix J: Storm Sewer Calculations

Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan

542



Project File: 23-047-RD.stm

Number of lines: 11

Date: 2/29/2024

Storm Sewers v2023.00

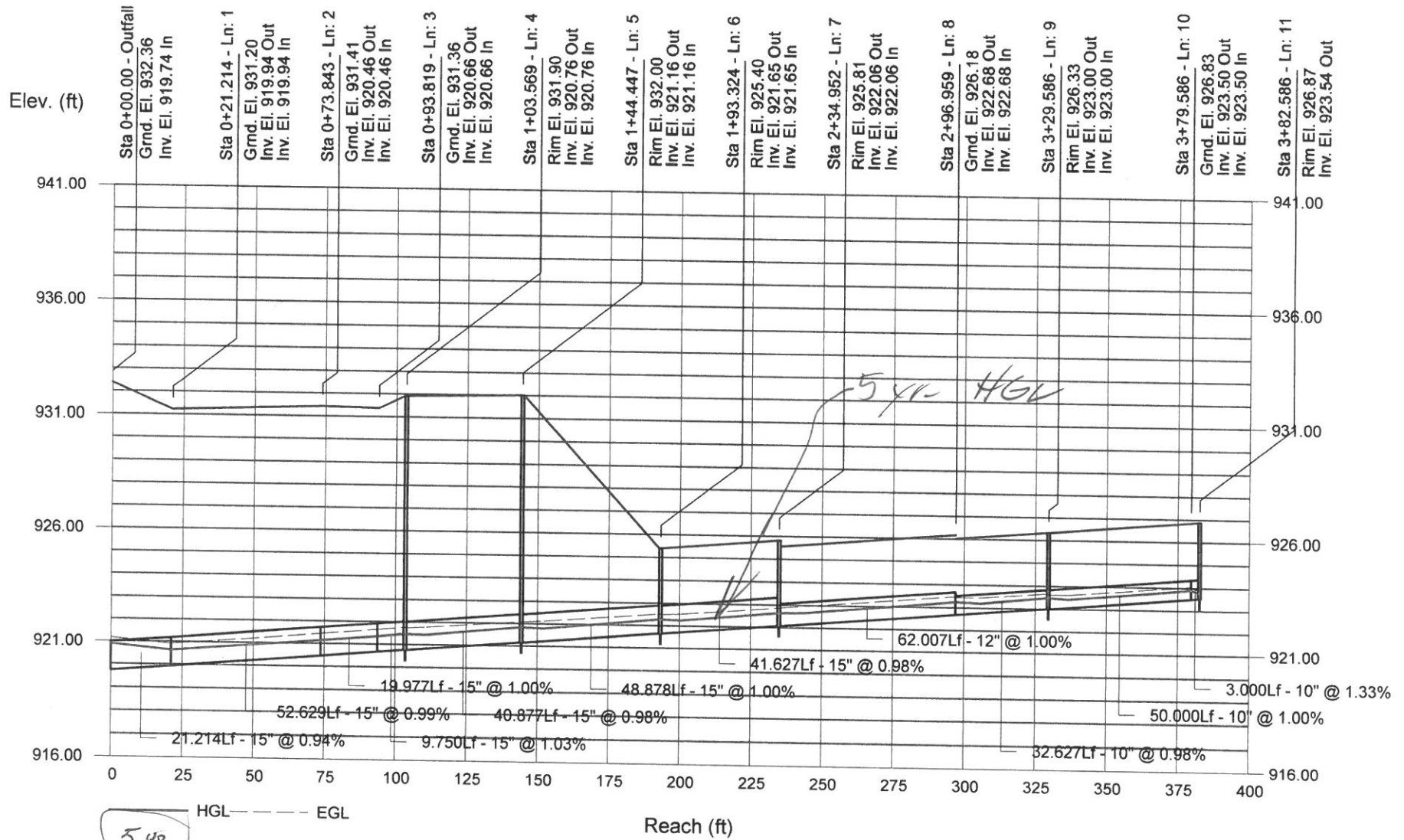
Storm Sewer Tabulation

5yr

Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (l) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	21.214	0.00	0.52	0.98	0.00	0.51	5.0	7.9	5.8	2.95	6.27	3.37	15	0.94	919.74	919.94	920.90	920.63	932.36	931.20	
2	1	52.629	0.00	0.52	0.98	0.00	0.51	5.0	7.6	5.9	3.01	6.42	4.30	15	0.99	919.94	920.46	920.63	921.16	931.20	931.41	
3	2	19.977	0.00	0.52	0.98	0.00	0.51	5.0	7.5	5.9	3.03	6.46	4.30	15	1.00	920.46	920.66	921.16	921.36	931.20	931.41	
4	3	9.750	0.06	0.52	0.98	0.06	0.51	5.0	7.4	6.0	3.04	6.54	4.30	15	1.03	920.66	920.76	921.36	921.46	931.41	931.36	
5	4	40.877	0.06	0.46	0.98	0.06	0.45	5.0	7.1	6.1	2.73	6.39	4.00	15	0.98	920.76	921.16	921.46	921.82	931.36	931.90	
6	5	48.878	0.06	0.40	0.98	0.06	0.39	5.0	6.7	6.2	2.43	6.47	3.83	15	0.98	920.76	921.16	921.46	921.82	931.90	932.00	
7	6	41.627	0.06	0.34	0.98	0.06	0.33	5.0	6.3	6.3	2.11	6.41	3.63	15	1.00	921.16	921.65	921.82	922.27	932.00	0.00	
8	7	62.007	0.10	0.28	0.98	0.10	0.27	5.0	5.9	6.5	1.79	3.56	3.84	12	1.00	922.06	922.68	922.64	922.27	0.00	0.00	
9	8	32.627	0.06	0.18	0.98	0.06	0.18	5.0	5.6	6.6	1.17	2.17	3.26	10	0.98	922.68	923.00	923.25	923.48	0.00	0.00	
10	9	50.000	0.06	0.12	0.98	0.06	0.12	5.0	5.1	6.9	0.81	2.19	2.82	10	1.00	922.68	923.00	923.25	923.48	0.00	0.00	
11	10	3.000	0.06	0.06	0.98	0.06	0.06	5.0	5.0	6.9	0.41	2.53	2.07	10	1.33	923.00	923.50	923.48	923.90	0.00	0.00	
Project File: 23-047-RD.stm																Number of lines: 11				Run Date: 2/29/2024		
NOTES: Intensity = 35.47 / (Inlet time + 5.30) ^ 0.70; Return period = Yrs. 5 ; c = cir e = ellip b = box																						

Storm Sewer Profile

Proj. file: 23-047-RD.stm

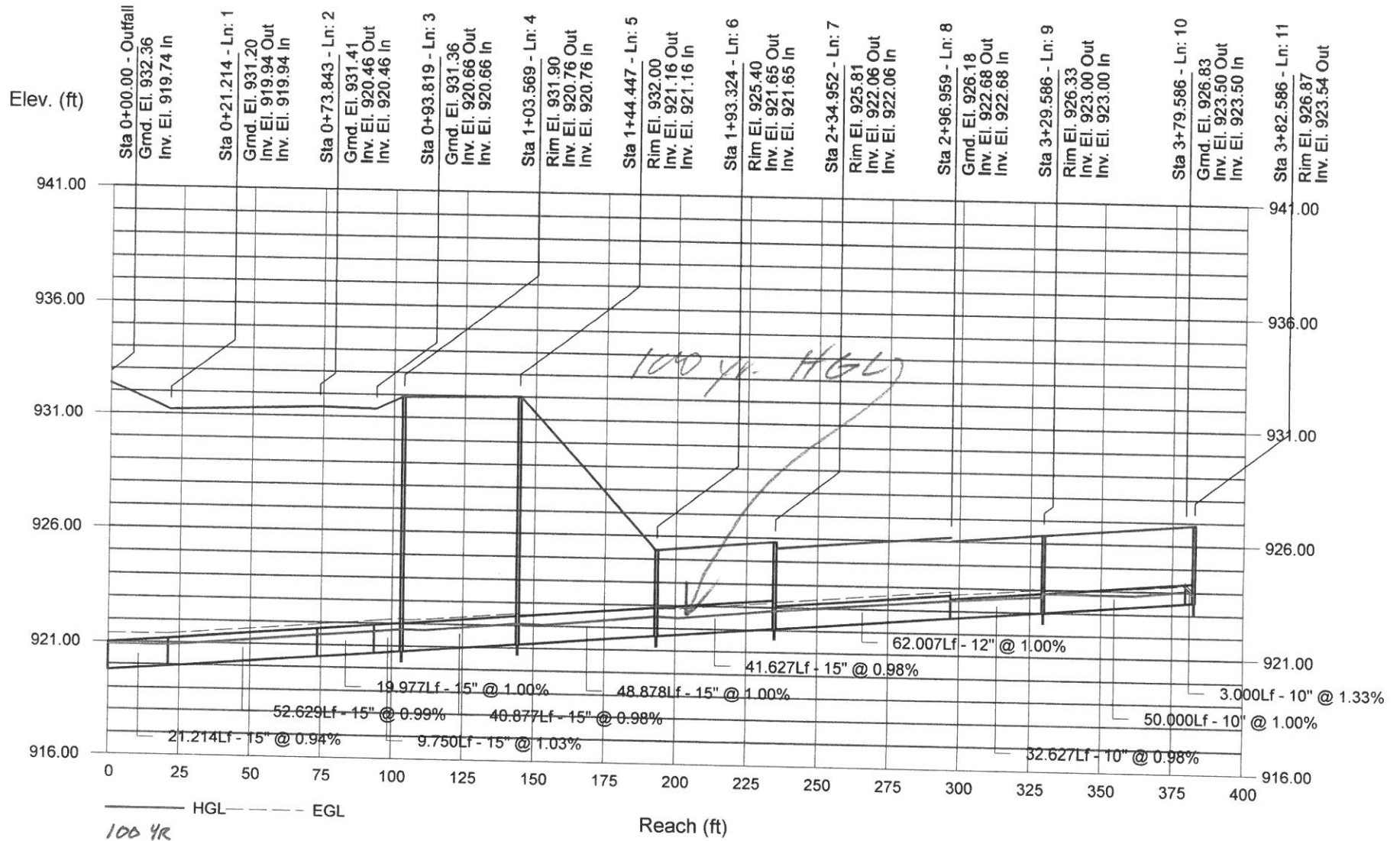


Storm Sewer Tabulation 100 x 1

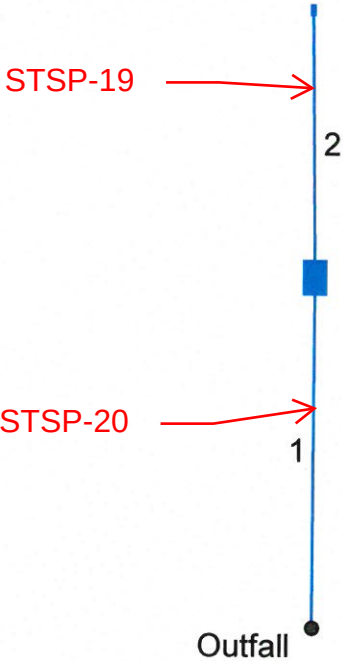
Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (l)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	21.214	0.00	0.52	0.98	0.00	0.51	5.0	6.6	11.1	5.65	6.27	5.17	15	0.94	919.74	919.94	920.90	920.90	932.36	931.20	
2	1	52.629	0.00	0.52	0.98	0.00	0.51	5.0	6.4	11.2	5.72	6.42	5.63	15	0.99	919.94	920.46	920.90	921.43	931.20	931.41	
3	2	19.977	0.00	0.52	0.98	0.00	0.51	5.0	6.4	11.3	5.74	6.46	5.63	15	1.00	920.46	920.66	921.43	921.63	931.41	931.36	
4	3	9.750	0.06	0.52	0.98	0.06	0.51	5.0	6.3	11.3	5.76	6.54	5.63	15	1.03	920.66	920.76	921.63	921.73	931.36	931.90	
5	4	40.877	0.06	0.46	0.98	0.06	0.45	5.0	6.2	11.4	5.15	6.39	5.18	15	0.98	920.76	921.16	921.73	922.08	931.90	932.00	
6	5	48.878	0.06	0.40	0.98	0.06	0.39	5.0	6.0	11.6	4.54	6.47	4.86	15	1.00	921.16	921.65	922.08	922.51	932.00	0.00	
7	6	41.627	0.06	0.34	0.98	0.06	0.33	5.0	5.7	11.8	3.92	6.41	4.53	15	0.98	921.65	922.06	922.51	922.86	0.00	0.00	
8	7	62.007	0.10	0.28	0.98	0.10	0.27	5.0	5.5	12.0	3.28	3.56	4.95	12	1.00	922.06	922.68	922.86	923.45	0.00	0.00	
9	8	32.627	0.06	0.18	0.98	0.06	0.18	5.0	5.3	12.1	2.13	2.17	4.22	10	0.98	922.68	923.00	923.45	923.69	0.00	0.00	
10	9	50.000	0.06	0.12	0.98	0.06	0.12	5.0	5.0	12.4	1.45	2.19	3.27	10	1.00	923.00	923.50	923.84	924.04	0.00	0.00	
11	10	3.000	0.06	0.06	0.98	0.06	0.06	5.0	5.0	12.4	0.73	2.53	2.26	10	1.33	923.50	923.54	924.21	923.92	0.00	0.00	
Project File: 23-047-RD.stm																Number of lines: 11				Run Date: 2/29/2024		
NOTES:Intensity = 45.52 / (Inlet time + 3.30) ^ 0.62; Return period =Yrs. 100 ; c = cir e = ellip b = box																						

Storm Sewer Profile

Proj. file: 23-047-RD.stm



Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



Project File: 23-047-SE.stm	Number of lines: 2	Date: 3/5/2024
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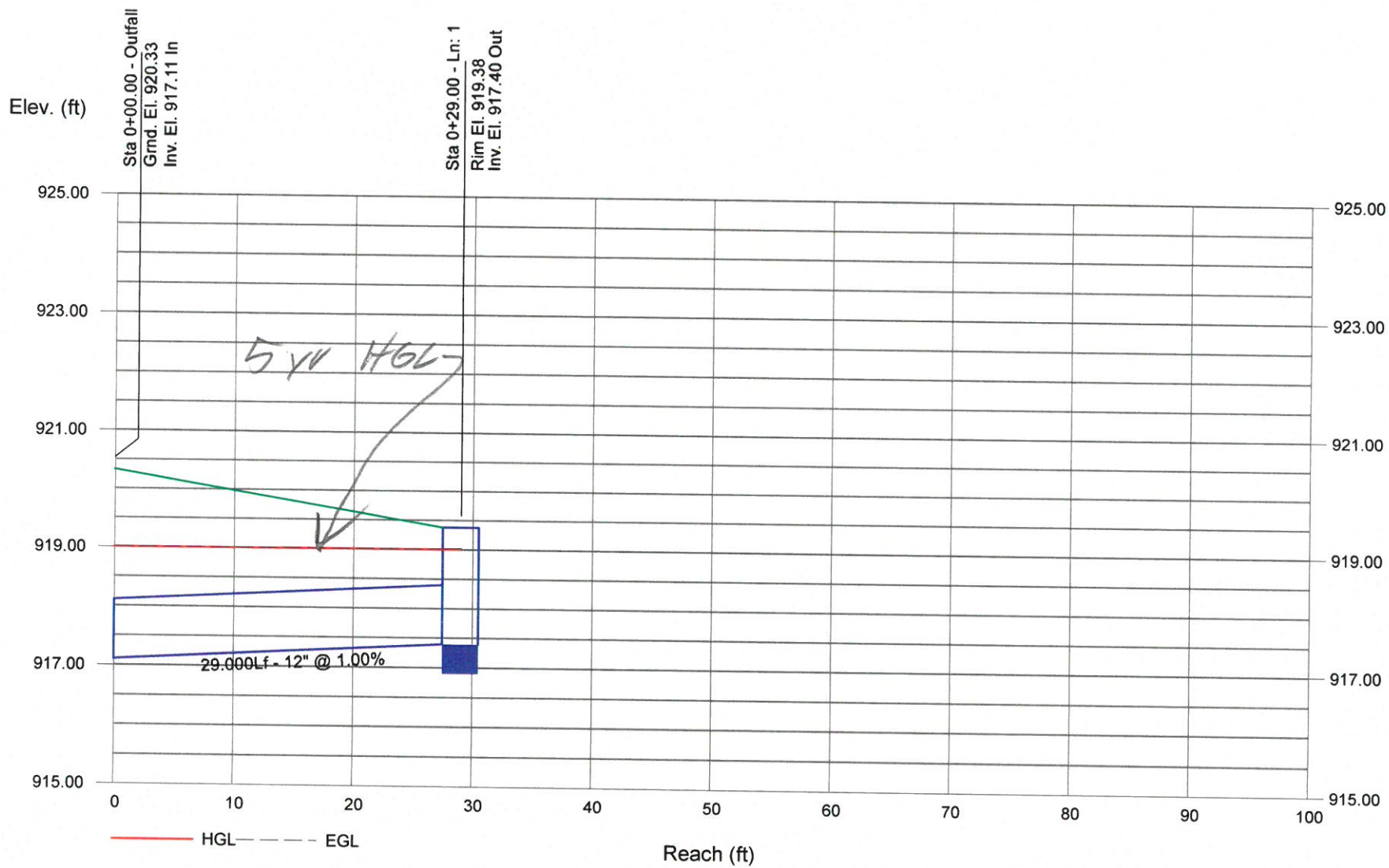
Storm Sewer Tabulation

5 yr.

Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (l) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1 2	End 1	29.000 22.000	0.00 0.09	0.09 0.09	0.00 0.98	0.00 0.09	0.09 0.09	5.0 5.0	5.5 5.0	6.7 6.9	0.59 0.61	3.56 2.01	0.75 0.78	12 12	1.00 1.00	917.11 917.55	917.40 917.77	919.00 919.01	919.01 919.03	920.33 919.38	919.38 919.25	
Project File: 23-047-SE.stm																Number of lines: 2		Run Date: 3/5/2024				
NOTES: Intensity = 35.47 / (Inlet time + 5.30) ^ 0.70; Return period = Yrs. 5 ; c = cir e = ellip b = box																						

Storm Sewer Profile *5yr*

Proj. file: 23-047-SE.stm

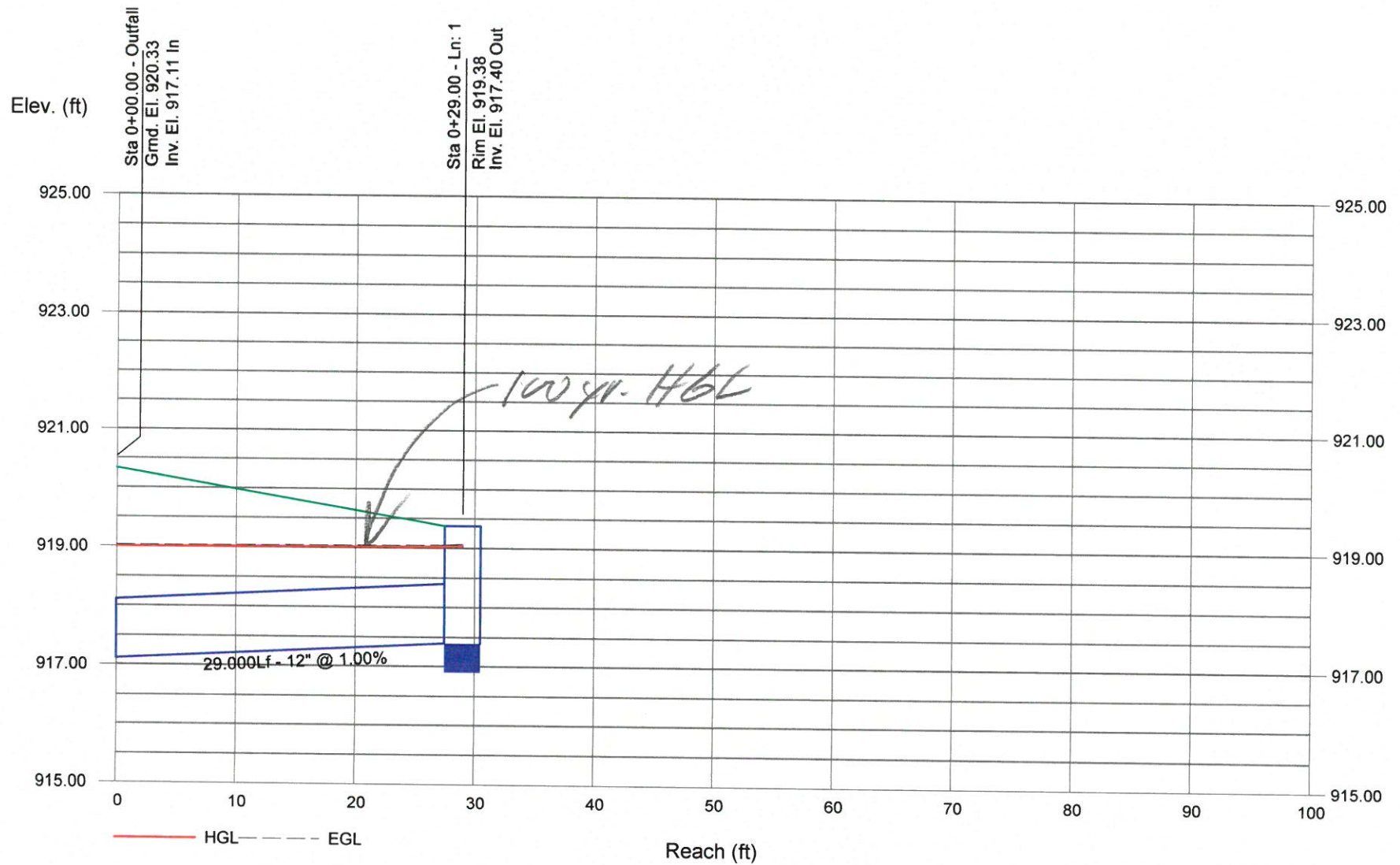


Storm Sewer Tabulation 10041

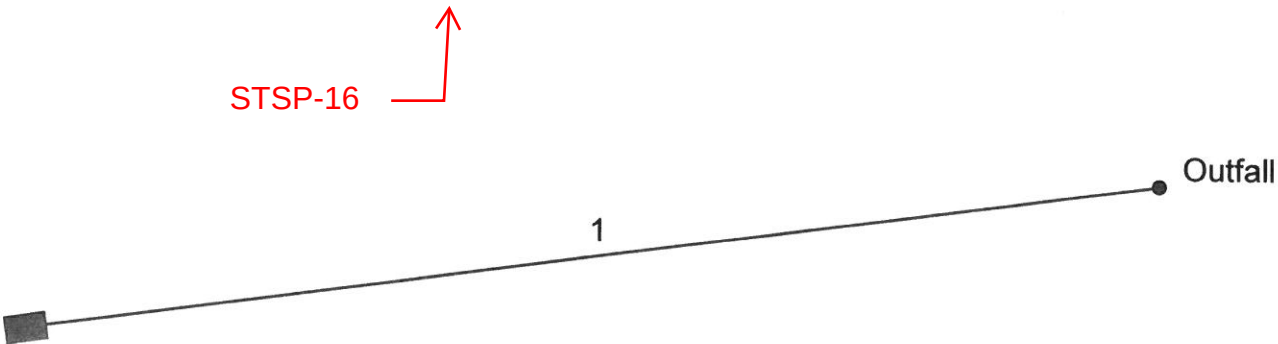
Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (l) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	29.000	0.00	0.09	0.00	0.00	0.09	5.0	5.3	12.2	1.07	3.56	1.36	12	1.00	917.11	917.40	919.00	919.03	920.33	919.38	
2	1	22.000	0.09	0.09	0.98	0.09	0.09	5.0	5.0	12.4	1.09	2.01	1.39	12	1.00	917.55	917.77	919.04	919.11	919.38	919.25	
Project File: 23-047-SE.stm																Number of lines: 2				Run Date: 3/5/2024		
NOTES: Intensity = 45.52 / (Inlet time + 3.30) ^ 0.62; Return period =Yrs. 100 ; c = cir e = ellip b = box																						

Storm Sewer Profile

Proj. file: 23-047-SE.stm



Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



Storm Sewer Tabulation

Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (l)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	81.000	0.17	0.17	0.98	0.17	0.17	5.0	5.0	6.9	1.15	6.17	2.40	12	3.00	922.96	925.39	923.96	925.84	931.20	929.40	

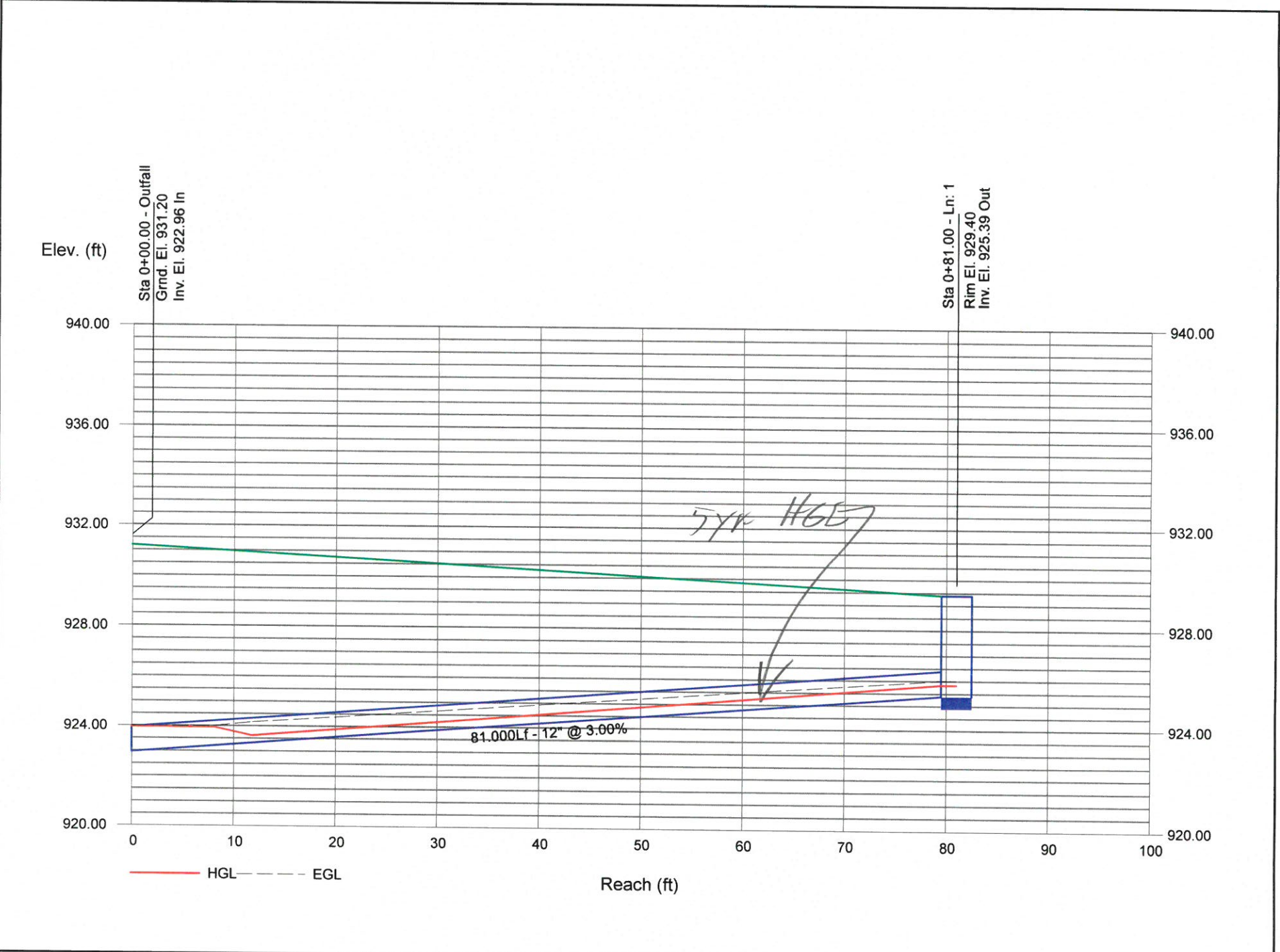
Project File: 23-047-NW.stm

Number of lines: 1

Run Date: 3/5/2024

NOTES: Intensity = 35.47 / (Inlet time + 5.30) ^ 0.70; Return period = Yrs. 5 ; c = cir e = ellip b = box

Storm Sewer Profile

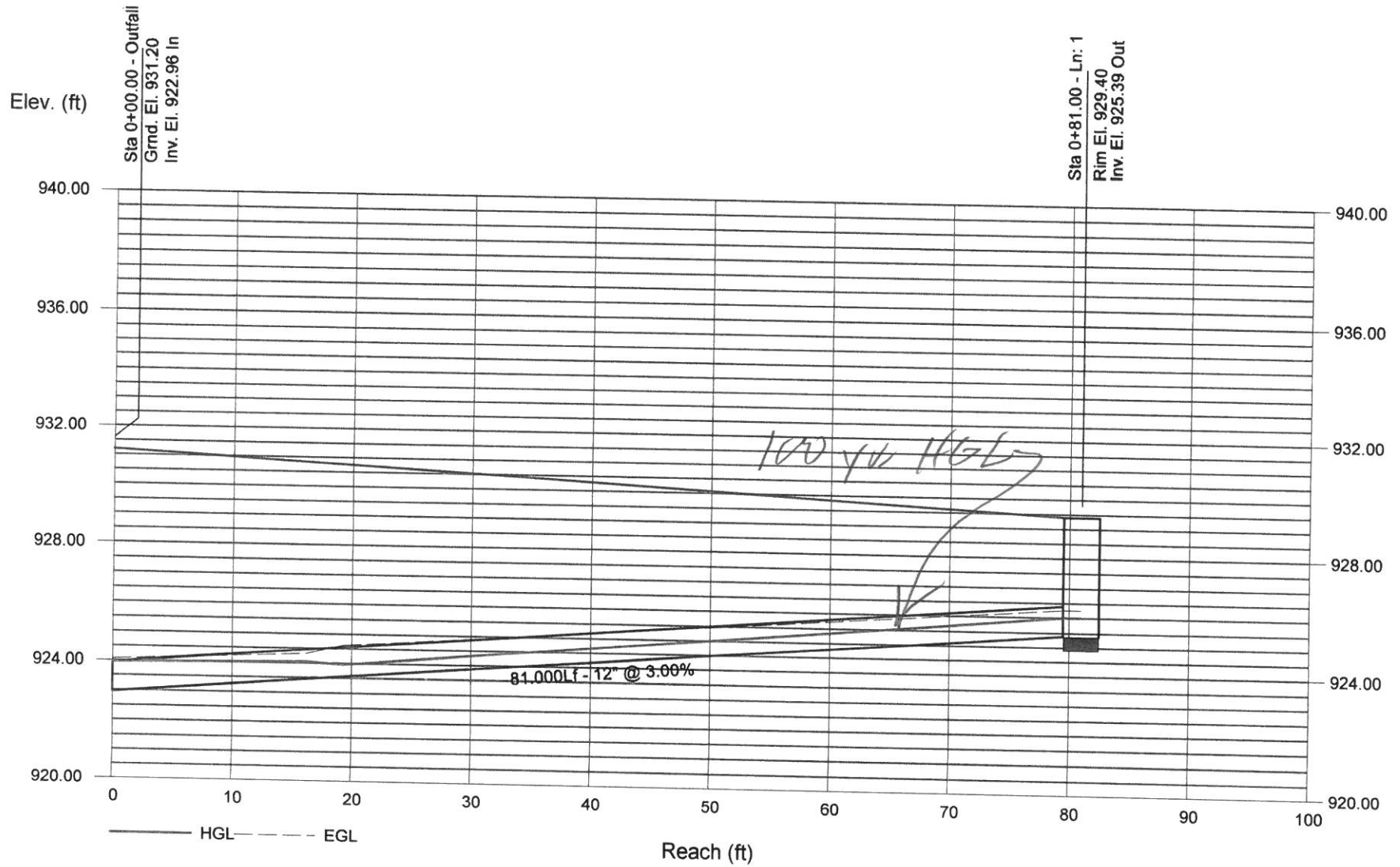


Storm Sewer Tabulation *100%*

Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (I) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr (ac)	Total (ac)		Incr (min)	Total (min)	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	81.000	0.17	0.17	0.98	0.17	0.17	5.0	5.0	12.4	2.06	6.17	3.36	12	3.00	922.96	925.39	923.96	926.00	931.20	929.40	
Project File: 23-047-NW.stm																Number of lines: 1				Run Date: 3/5/2024		
NOTES:Intensity = 45.52 / (Inlet time + 3.30) ^ 0.62; Return period =Yrs. 100 ; c = cir e = ellip b = box																						

Storm Sewer Profile

Proj. file: 23-047-NW.stm



Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan

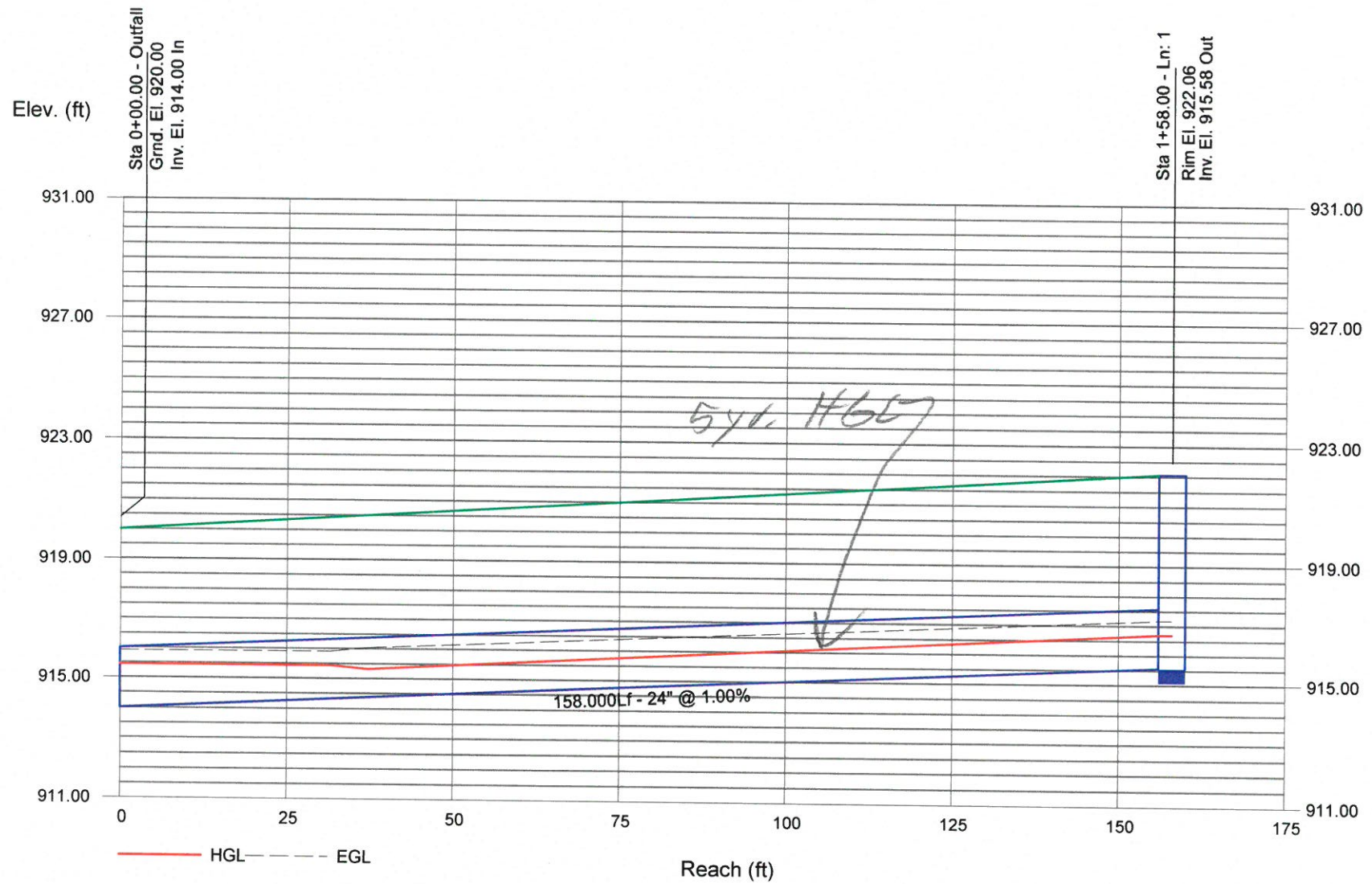


Storm Sewer Tabulation *546*

Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (l) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	158.000	0.66	1.52	0.98	0.65	1.49	5.0	5.4	6.7	10.00	22.62	4.78	24	1.00	914.00	915.58	915.45	916.71	920.00	922.06	
2	1	85.000	0.86	0.86	0.98	0.84	0.84	5.0	5.0	6.9	5.82	10.50	5.23	18	1.00	915.83	916.68	916.71	917.61	922.06	920.68	
Project File: 23-047-S.stm																Number of lines: 2				Run Date: 3/5/2024		
NOTES: Intensity = 35.47 / (Inlet time + 5.30) ^ 0.70; Return period =Yrs. 5 ; c = cir e = ellip b = box																						

Storm Sewer Profile

Proj. file: 23-047-S.stm

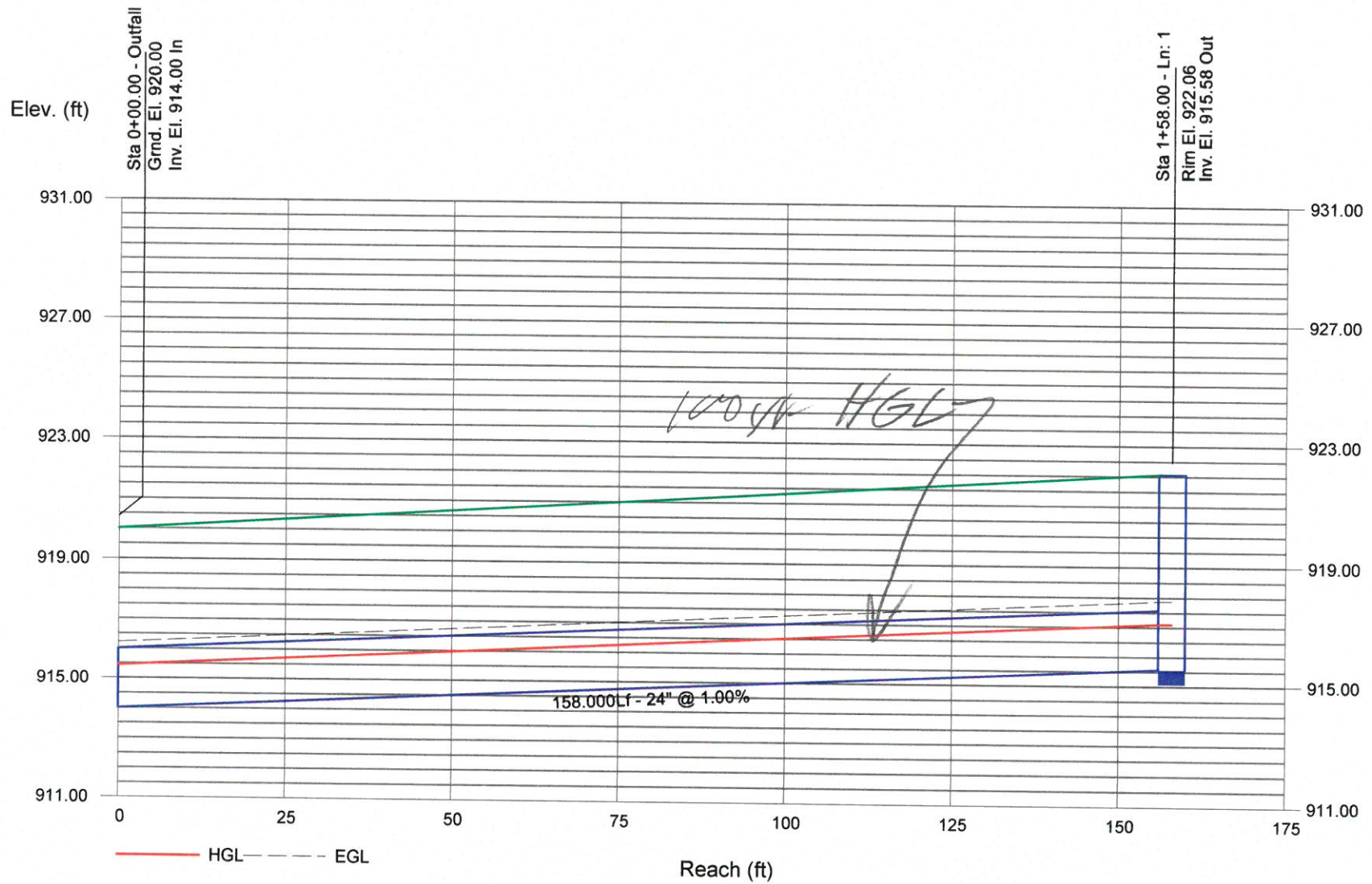


Storm Sewer Tabulation *100 yr.*

Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (l) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr (ac)	Total (ac)		Incr (min)	Total (min)	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	158.000	0.66	1.52	0.98	0.65	1.49	5.0	5.2	12.2	18.13	22.62	7.23	24	1.00	914.00	915.58	915.45	917.11	920.00	922.06	
2	1	85.000	0.86	0.86	0.98	0.84	0.84	5.0	5.0	12.4	10.44	10.50	6.58	18	1.00	915.83	916.68	917.11	917.92	922.06	920.68	
Project File: 23-047-S.stm																Number of lines: 2				Run Date: 3/5/2024		
NOTES: Intensity = 45.52 / (Inlet time + 3.30) ^ 0.62; Return period =Yrs. 100 ; c = cir e = ellip b = box																						

Storm Sewer Profile

Proj. file: 23-047-S.stm



Appendix K: Site Plans



MEMORANDUM

Date: April 23, 2024
To: Clapsaddle-Garber Associates, Inc.
From: Justin Ernst, PE
Trey Rouse
Subject: Site Plan: The Windsor Apartments (63rd Street and University Avenue)
4th Comment Letter

General Comments

1. All permits related to the project will be held and released concurrently at the approval of the following:
 - a. Approval of signs and utility from Safe Building.
Acknowledged.
 - b. Revision of site plan application in accordance with the comment letter and all corresponding comments from each City Department.
Acknowledged.
 - c. Professional Signatures on Final Site Plan including Licensed Surveyor (Chapter 170.10)
Acknowledged.
 - d. City Council approval of site plan.
Acknowledged.

Storm Water General Comments

1. Please document how the Rev calculated in Appendix H is infiltrated within the above-ground basins. For example, the Rev West is calculated as 860 CF. The storage volume at elevation 914.00 is 774 CF according to the model output but the 3" orifice is set at 913.56. How does this basin infiltrate the total Rev? Similarly, please document that the available storage at elevation 920.16 within the underground chambers is equal to or greater than the Rev North in Appendix H.
Rv volume calculations are provided in the storm report.
2. The WQv North in Appendix G should be 5,796 CF and the WQv West should be 3,164 CF. Please correct.
The Rv is being met on this site, therefore the WQv is also considered to be met per ISWMM 3.01-2 pg 3.
3. Provide specifications for the proposed hydrodynamic separator.
This has been removed from the plans.
4. How is the WQv North forced to go through the isolator row? According to the plan sheets, it looks like the inlet pipes to both chambers have the same invert elevation.
The Rv is being met on this site, therefore the WQv is also considered to be met per ISWMM 3.01-2 pg 3.
5. Label proposed contours on Post Development Drainage Map.
Contours are labeled.
6. Provide seeding/planting information in the proposed undetained areas to justify a CN of 61.
Per Table C3-S5-2 of the ISWMM, HSG Type B in Good Condition has a CN value of 61. These areas will be sodded and shall be in good condition. Refer to Landscape Plan for planting information. CN calcs are provided in appendices.

7. Route the SE Basin outflow through the S Basin within the model and update WSELs/release rates accordingly.

SE basin now flows west to S basin and model has been updated.

8. Provide the release rates for water
9. Include a soil management plan in the report.

All release rates are tabulated within the report.

The Web Soil Survey Report is included.

Storm Water Plan Sheet Comments

10. Add bioretention cell components (aggregate layer depth, amended soil depth, amended soil specs, etc.) to the plans.
11. Label emergency overflow elevations and dimensions within the plans.
12. Ensure the 100-yr WSELs in the plans match the stormwater report.
13. Adjust the backslope of the West Basin embankment to 4:1 or flatter.
14. Add rip rap at the FES within the level spreader downstream of the West Basin.
15. Per grading plan, the southeast basin's emergency overflow appears directed to 63rd Street.
16. Place TRM on bottom and outflow sides on the level spreader.
17. Show details of the outlet onto 64th Street. (ie. FES, etc.)

WQv is not required. No Bioretention on site.

Emergency overflows are dimensioned on plans.

Data matched plans

Backslopes are not required to be 4:1. These slopes are 3:1 due to the limited space to fit the basin.

All outlets and inlets now have riprap

That is correct.

RE: Erosion Control Plan.

This has been removed from the plans. Outlet is now directed west.

Stormwater Other Comments

18. Adjust western water basin design to accommodate a walkway per 3/27/24 email and map or provide explanation for any alternative design. A walkway connection along the southern section of the pond is the highest priority.
19. Revise stormwater agreement to remove easement portions being dedicated to the city.

A walkway is now implemented at the Wester Basin.

Police Comments

1. No further comments.

Fire Comments

1. No further comments.

Des Moines Water Works Comments

1. No further comments.

Urbandale Windsor Heights Sanitary District Comments

1. No further comments.

Des Moines Metropolitan Wastewater Reclamation Authority Comments

1. No comments received.

Building Comments

1. No further comments.

Engineering Comments

1. Complete Stormwater Maintenance Agreement and submit per instructions. Final agreement once final property ownership is determined.
Acknowledged.
2. Provided trail easement to be filed once site plan is approved.
Acknowledged. Will provide when Site Plan is approved.
3. Provide DOT approval of driveway.
Acknowledged. Will provide when received.
4. Finalize easements once final property ownership is determined.
Acknowledged.

Planning Comments

Parkland Dedication:

1. Fulfill Parkland Dedication requirement determined by City Council as either a physical dedication or monetary value substitute as determined by Section 172.15 of the Zoning Code.
 - a. Will be considered a condition of approval.
2. Remove dead or diseased trees in parkland dedication area prior to dedication as per the April 1st City Council Parkland Dedication discussion.
3. Place native plantings in the parkland dedication area and establish those plantings before dedication as per the April 1st City Council Parkland Dedication discussion.

Bike Parking:

4. Indoor Long-Term Bike Parking and Car parking in garage don't work with the current design as people won't be able to get out of their cars. Please Address.

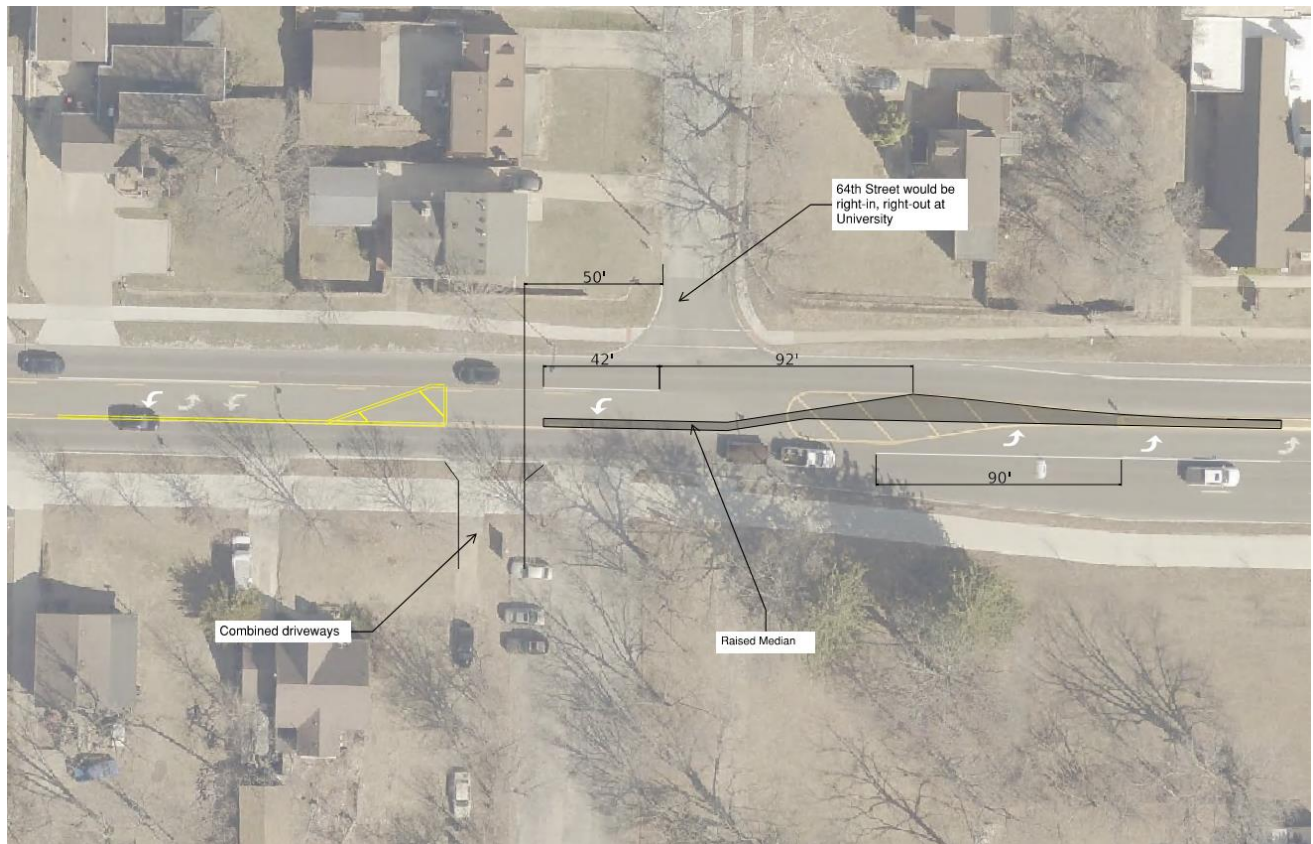
Landscaping Comments

Photometric Plan:

1. Show foot candle data at building entrances and pathways to said entrances from the parking lot and other public spaces.

Traffic General Comments

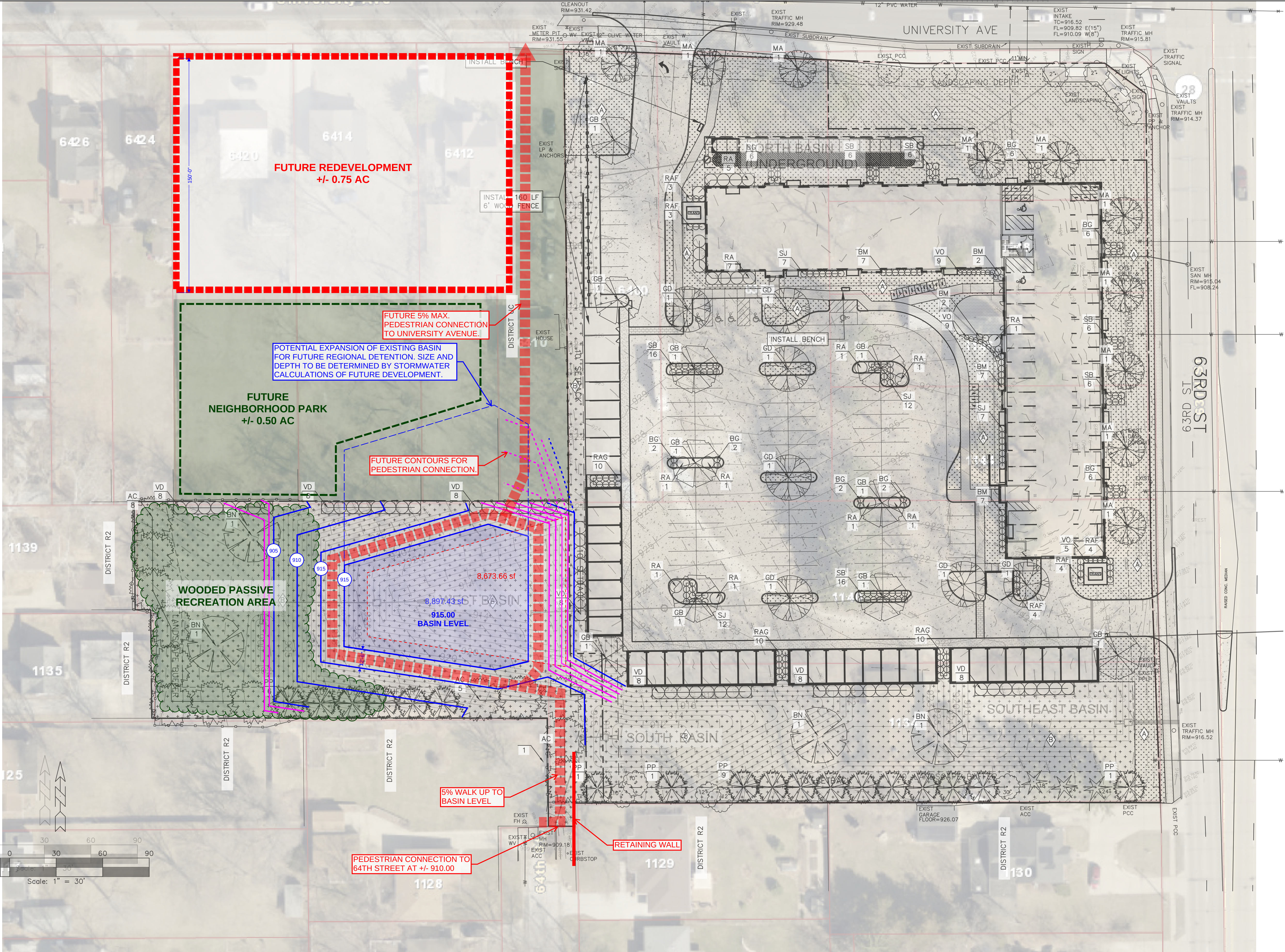
1. University Avenue Access (page 9)
 - a. As shown on the 4/15/24 site plan, the proposed driveway aligned with 64th Street on University is within the functional area of the intersection of 63rd/University. Queues are anticipated to block this driveway in the peak hours. Per the report, the delay for residents leaving the apartment is LOS F. Creating a westbound left turn lane on University for the apartments will limit the ability to extend the eastbound left turn lane at 63rd street which is already a heavy movement.
 - i. It is encouraged that the developer work with adjacent property owners to move the full access driveway further west away from the intersection of 63rd Street.
 - ii. One idea for the driveway moved further west follows:



- iii. If the above is not an option, the developer should make the driveway right-in, right-out only by placing a median across the intersection with 64th Street.

Traffic Other Comments

2. If Council chooses to allow the full access, City Administration recommends it be a temporary full access and a condition on the site plan approval. A temporary full-access shall be allowed on to University Ave as shown in the site plan. Said access shall be limited to a duration of five years from the date an occupancy certificate is issued for any structure built, after which time the city council must review the access to determine if the temporary full-access may continue or otherwise terminated and converted to a right-in-right-out only access. Temporary full access may also be terminated prior to five years as directed by the Council if they so determine said access has contributed to additional traffic conflicts or if roadway improvements are determined necessary. When temporary full-access is terminated, any action needed to discourage use as a full-access shall be a cost of the developer.





Real People. Real Solutions.

430 E Grand Avenue
Suite 101
Des Moines, IA 50309

Ph: (515) 259-9190
Fax: (515) 233-4430
Bolton-Menk.com

MEMORANDUM

Date: April 5, 2024
To: Adam Plagge
City Administrator
City of Windsor Heights, IA
From: Jennifer McCoy, PE, PTOE
Subject: The Windsor Apartments Traffic Letter Review
Windsor Heights, IA

Introduction

The Traffic Letter for the Caliber Apartments at Hwy 28/63rd and University Avenue dated March 2024 was reviewed to determine how this development impacts the traveling public. Overall, the trip generation assumptions and calculations seem reasonable. The location of the full access driveway is the biggest point of discussion and decision.

Trip Generation

The study assumed that construction of a 103 unit, 4-story apartment building on the south side of University Avenue at Hwy 28/63rd Street. ITE Land Use Code 221 was used for the apartments. This approach seems clear and reasonable.

Trip Distribution and Assignments

There are two proposed accesses into this development: full access on University Avenue aligned with 64th Street and a right-in/right-out access on 63rd Street, 350 feet south of University Avenue. 41% of the trips are traveling to the west, 59% to the east, 45% to the south and 55% to the north during the pm peak. This results in 12 westbound left turns entering the site and 10 northbound turns leaving the site in the PM peak at the University access.

Calculations and Warrants

No right turn lanes are warranted. A westbound left turn lane into the site driveway is warranted on University Avenue for the Windsor Apartments Driveway.

Driveway Access

The driveway on Hwy 28/63rd Street will be restricted to right-in, right-out per conversations with the Iowa DOT. Hwy 28/63rd Street is under their jurisdiction to determine access requirements.

The Windsor Apartment driveway on University Avenue is shown aligned with 64th Street on the north and is shown as full access on the site plan submitted by the developer in March 2024. This driveway is located 300 feet west of Hwy 28/63rd Street.

When considering the location and amount of access for The Windsor Apartment driveway, three things should be considered:

- SUDAS or City Code driveway spacing requirements
- Available Sight Distance
- Driveway location to Intersection Influence Area for the Hwy 28/63rd Street intersection

SUDAS Spacing

A review of the City Code shows that specific driveway spacing requirements are not provided, therefore, the Statewide Urban Design and Specifications (SUDAS) Road Design Manual was reviewed as a resource for preferred driveway spacing. Per the Iowa DOT the functional classification for University Avenue is a Minor Arterial. SUDAS Chapter 5 provides access location and spacing guidance for distances between driveways and intersecting streets. The minimum distance in SUDAS for a full access driveway from a city street is 170' for an arterial roadway like University Avenue. SUDAS also suggests that driveways be aligned in commercial areas.

The proposed full-access driveway on University Avenue is 300' from Hwy 28/63rd Street.

This DOES meet the SUDAS driveway spacing for a full access driveway.

Sight Distance

There are two types of sight distance calculations that are performed when determining if the driveway is proposed in a safe location: Stopping Sight Distance and Intersection Sight Distance.

1) Stopping Sight Distance

Stopping Sight Distance is the distance needed for a driver on University Avenue to see a driver pulling into and out of the driveway to have enough time to react. It's the distance needed for the driver on University Avenue to see the car, react to the car, and have enough time to stop.

This calculation was provided by the developer's engineer as part of the Traffic Letter. This distance was calculated as 310 feet and there is 300 feet provided.

The required stopping sight distance has NOT been met.

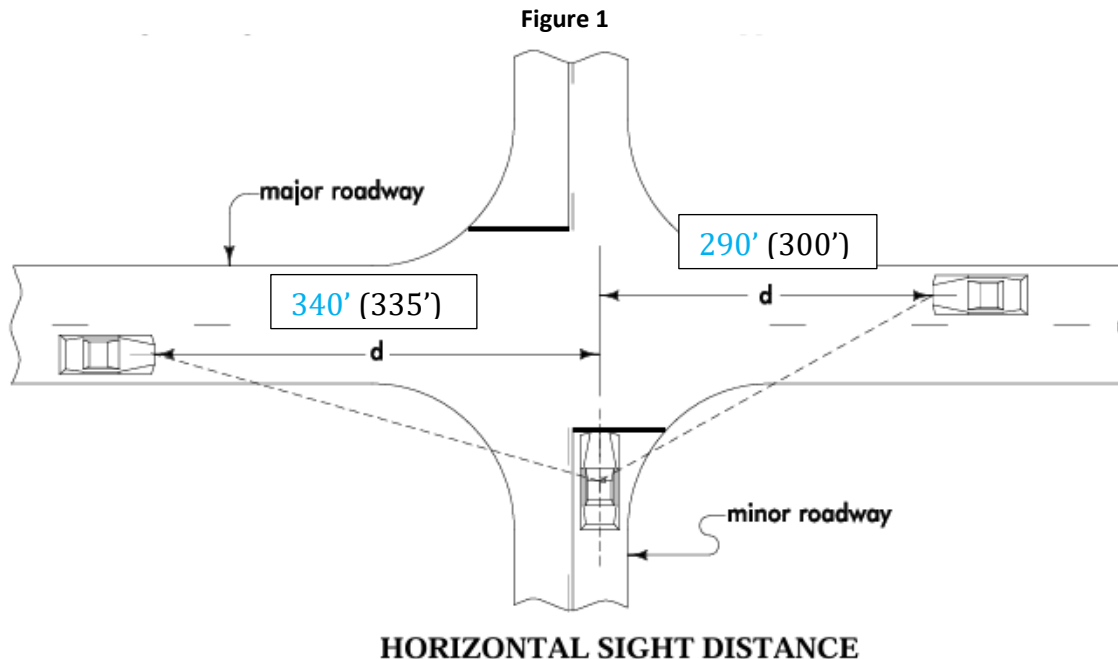
2) Intersection Sight Distance

Exiting Driveway Traffic

Per the Iowa DOT, an intersection sight distance study is performed to determine if adequate sight distance, from a design perspective, exists for a driver negotiating an existing intersection.

Horizontal sight distance (d) is the leg of the sight triangle that is along the major roadway. The sight triangle is the right triangle designated by the stopped driver's eye, the middle of the intersection, and the approaching vehicle. An adequate sight distance is achieved when no part of the sight triangle is obstructed from the view of the stopped driver.

According to the Traffic Letter submitted, the measured horizontal site distance is approximately 340' to the west. According to Chapter 5L-4 in the Iowa SUDAS Design Manual table 5L-4.03, the desirable sight distance for the proposed access is 335' from left turn stop and 290' from right turn stop and crossing maneuver for a 30 MPH roadway. The Traffic Letter stated that, according to SUDAS there should be adequate sight distance for exiting vehicles at the proposed location. See available sight distance in blue text vs. required sight distance in black in **Figure 1** below.



Entering Driveway Traffic

The Iowa Department of Transportation Design Manual – Chapter 6D-1 Sight Distance was also used to calculate the horizontal intersection sight distance required for an intersection. The intersection site distance along a major road is calculated to be 352.8 feet for westbound left turning traffic per the Traffic Letter. There are 340 feet available.

In summary, the required sight distance IS MET for traffic leaving the driveway, however, left turning traffic entering the driveway does NOT have the required amount of sight distance.

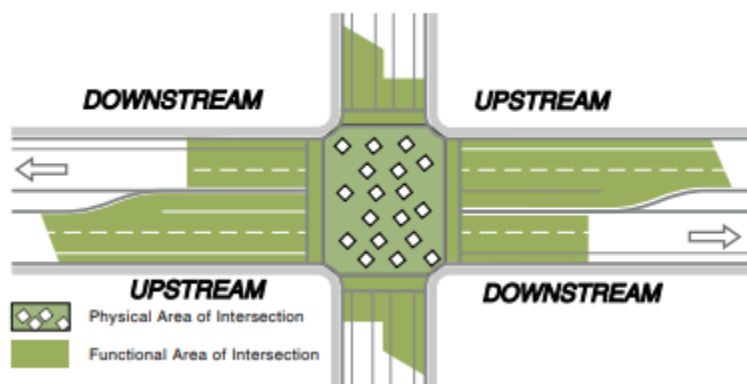
Intersection Influence Area

The American Association of State Highway and Transportation Officials (AASHTO) states, “Ideally, driveways should not be located within the functional area of an intersection or in the influence area of an adjacent driveway. The functional area extends both upstream and downstream from the physical intersection area and includes the longitudinal limits of auxiliary lanes.” See **Figure 2** for illustration of the functional area of an intersection.

Limiting the number of driveways in the functional area of an intersection improves the safety of the roadway by reducing the number of decisions motorists must make while traveling through an intersection and improves safety in the vicinity of an intersection. The functional area of an intersection varies by roadway speed and the type of control at the intersection. For example, the upstream functional area for a signalized intersection with approach speeds of 30 mph is 395 feet.

The proposed driveway into the site is located at 300 feet and IS NOT outside of the functional area of the Hwy 28/63rd Street intersection.

Figure 2

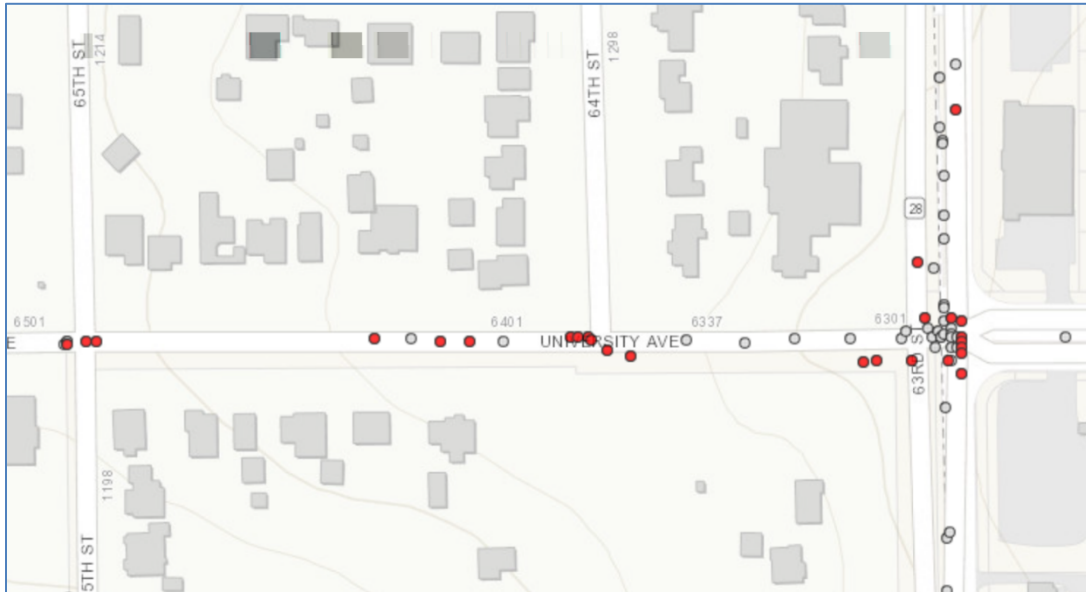


From FHWA's *Access Management in the Vicinity of Intersections*

Crash History at 64th Street

A review of the Iowa DOT Crash Analysis Tool (ICAT) for January 2022 to February 2024, shows a clustering of crashes at the existing intersection of 64th Street. Six crashes were reported in two years. Five of them were rear-end, two resulted in minor injuries. Rear-end crashes tend to occur in congested conditions. **Figure 3** presents a screen shot from the ICAT tool for crashes on University Avenue from Jan 2022 to Feb 2024.

Figure 3



Driveway Options

In the Traffic Letter, the driveway on University Avenue is recommended to be aligned with 64th Street as there are limited options for full access into the site from University Avenue. The Traffic Letter suggested that this will help to limit the number of conflict points in the functional area of the intersection. The Letter also states that a westbound left turn lane is warranted and should be provided for the apartment's driveway on University Avenue.

Today this eastbound left turn traffic at Hwy 28/63rd Street spills back out of its turn pocket at peak traffic times. The eastbound queue at Hwy 28/63rd Street is 495 feet without the apartments and is 505 feet in the PM peak with the apartments, therefore, traffic would block the vehicles exiting the apartment driveway in the PM Peak hour.

Creating a westbound left turn at 64th Street limits the ability for the eastbound left turn lane at Hwy 28/63rd Street to ever be extended. To fit in a westbound left turn lane at a driveway aligned with 64th Street, this turn lane would need to be back-to-back with the existing eastbound left turn at Hwy28/63rd Street.

Table 1 provides a summary of the sight distance and intersection influence areas for required vs. actual distances available for the proposed full access University Avenue driveway aligned with 64th Street.

Table 1 – Distance Summary

	Exiting Traffic Sight Distance		Entering Traffic Sight Distance	Influence Area
	Left	Right		
Required	335'	290'	353'	395'
Actual	340'	300'	340'	300'

As stated, previously, when considering the location and amount of access for The Windsor Apartment driveway, three things should be considered:

- SUDAS or City Code driveway spacing requirements
- Available Sight Distance
- Driveway location to Intersection Influence Area for the Hwy 28/63rd Street intersection

SUDAS driveway spacing requirements are met.

Table 1 shows that the sight distances are met or close to being met with the driveway aligned at 64th Street, however, the driveway is located within the influence area of the intersection.

It is recommended that the full access driveway be moved further west for the following reasons:

- To provide greater distance for sight visibility for turning traffic
- To improve safety by locating the driveway further away from the Hwy 28/63rd Street intersection influence area.

This would require that 64th Street be changed to right-in, right-out with the placement of a median on University Avenue. The apartment driveway would have to be combined with the residential access to the west as well.

An alternative to moving the driveway further west as stated above, is to leave it aligned with 64th Street and extend the median across 64th Street, to create a right-in, right-out for both the apartments driveway and 64th Street. This would also address the sight visibility concerns and improve safety. Per FHWA's *Access Management in the Vicinity of Intersections* manual, "it is desirable to minimize the number of conflict points created with existing and future driveways since more conflict points increase the risk of a crash occurring. For example, a crash due to crossing maneuvers (created by motorists turning across the roadway or making left turns) can lead to more severe crashes than merging or diverging conflicts because of the angle and speed differentials between the vehicles."

Caliber Development – Windsor Heights

Prepared by:

Kimberley L. Rouse Engineering

Prepared for:

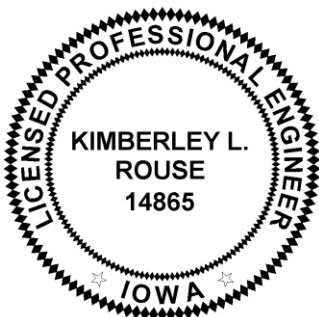
Windsor 63, LLC

Submitted to:

City of Windsor Heights

Iowa Department of Transportation

March 2024

	I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.
	Date: _____
	_____ KIMBERLEY L. ROUSE, P.E.
	License No. 14865
	My renewal date is December 31, 2024
	Pages or sheets covered by this seal: _____ _____

Introduction

This letter discusses the traffic generation resulting from the construction of the proposed Caliber Development. The proposed development is located in the southwest corner of the intersection of University Avenue and 63rd Street (Hwy 28). Currently there are two proposed entrances into the site. One is off of 63rd Street (Hwy 28), and the other is off of University Avenue and is aligned with 64th Street to the north. **Figure 1** shows the proposed site location.

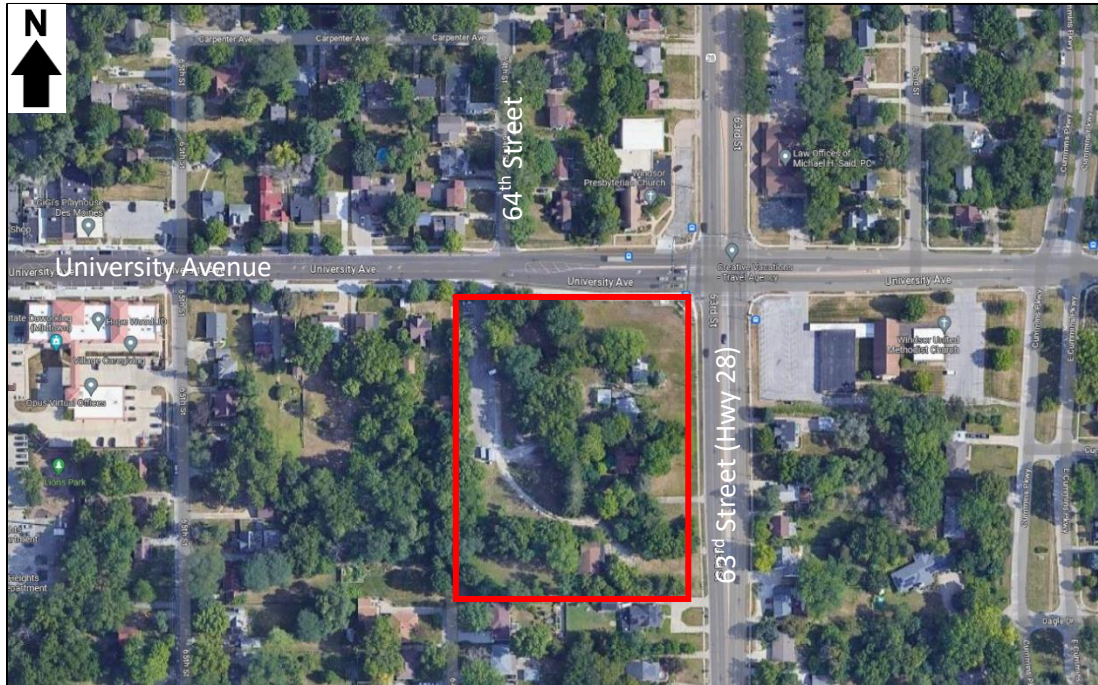


Figure 1 – Proposed Site Location

Existing Conditions

The site is south of University Avenue approximately 0.5 miles north of Interstate 235. The posted speed limit is 35 mph on 63rd Street (Hwy 28) and 30 mph on University Avenue at the proposed site. 63rd Street is a 4-lane roadway with a left-turn lane at University Avenue. University Avenue is a 3-lane roadway adjacent to the site with left-turn lanes at the 63rd Street (Hwy 28) intersection. University Avenue transitions to a 3-lane roadway to the east of 63rd Street (Hwy 28).

Trip Generation

The proposed development on the site is a 103 unit, 4 story apartment building. Trip generation rates recommended in the *Institute of Transportation Engineers' (ITE) Trip Generation, 11th Edition*, were used to develop estimates of trips to and from the site based on the proposed land use. **Table 1** shows the daily, AM peak hour, and PM peak hour trip generation for the proposed Caliber Development.

Table 1 – Trip Generation

Trip Generaion							
Land Use Code	Use	Total SF/Units/	Factor	Percent	Entering	Percent	Exit
			Daily				
221	Apartments	103.00	4.54	50%	234	50%	234
			AM				
221	Apartments	103.00	0.37	23%	9	77%	29
			PM				
221	Apartments	103.00	0.39	61%	25	39%	16

Trip Distribution and Assignments

Currently there are two proposed entrances into the site. One is aligned with 64th Street to the north and is proposed to be a full access. The other entrance is approximately 350 feet south of University Avenue on 63rd Street (Hwy 28) and is currently being proposed to be a right-in/right-out. Traffic counts for the intersection of University Avenue and 63rd Street (Hwy 28) were taken from the Iowa Department of Transportation (IDOT) website for the years 2004-2016. Updated traffic counts were also taken from the traffic letter submitted to the IDOT in March of 2021 for the site. A growth rate of 0.5%/year was assumed for the counts in the traffic letter when growing the traffic counts to 2023 projected volumes. **Figures 2 and 3** show the 2023 projected volumes for the intersection of University Ave and 63rd Street (Hwy 28) during the AM and PM peak hours.

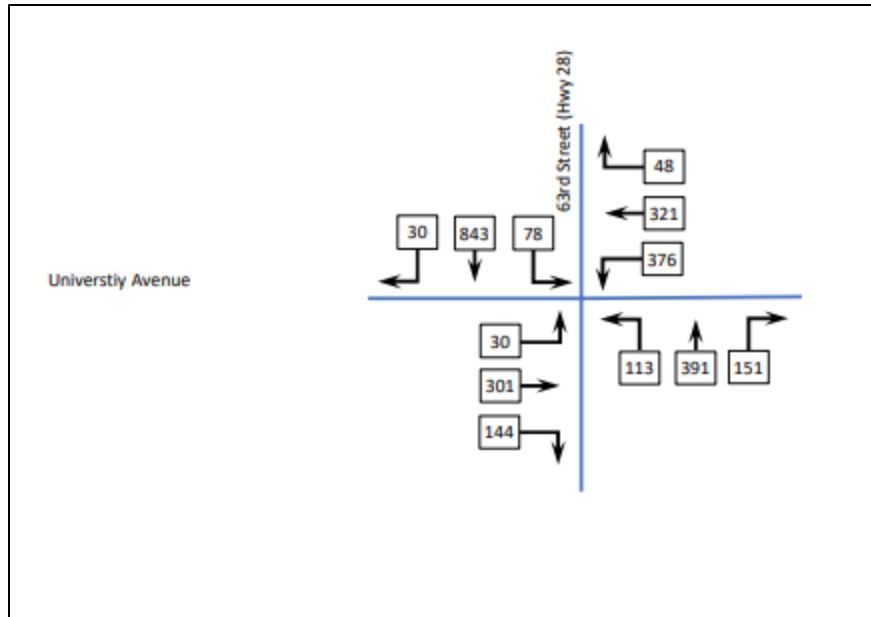


Figure 2 – Projected Traffic Volumes 2023 AM Peak

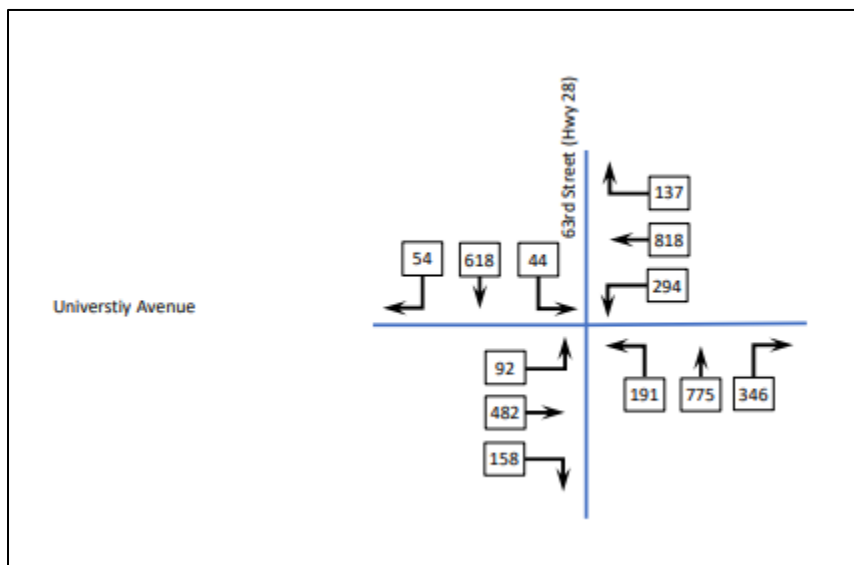


Figure 3 – Projected Traffic Volumes 2023 PM Peak

Using the existing AADT split of traffic on University Avenue it was assumed that 41% of the trips generated will travel to the west and 59% to the east, 45% to the south and 55% to the north during the PM Peak. Because it is the worst-case scenario, **Figure 4** shows the trips generated by the site during the PM peak. **Figure 5** shows the trips generated for the site plus background traffic.

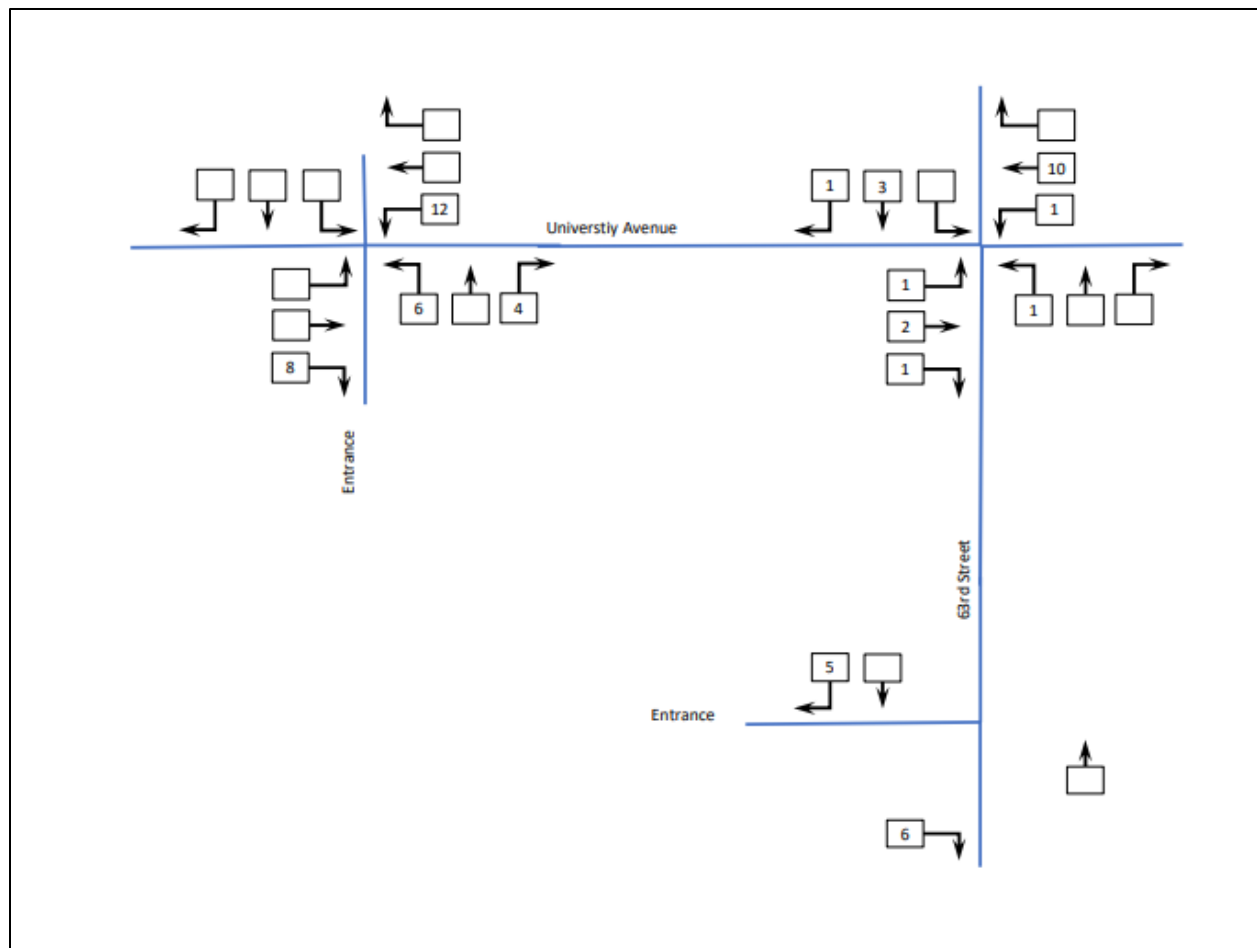


Figure 4 – PM Peak Trips Generated by the Proposed Development

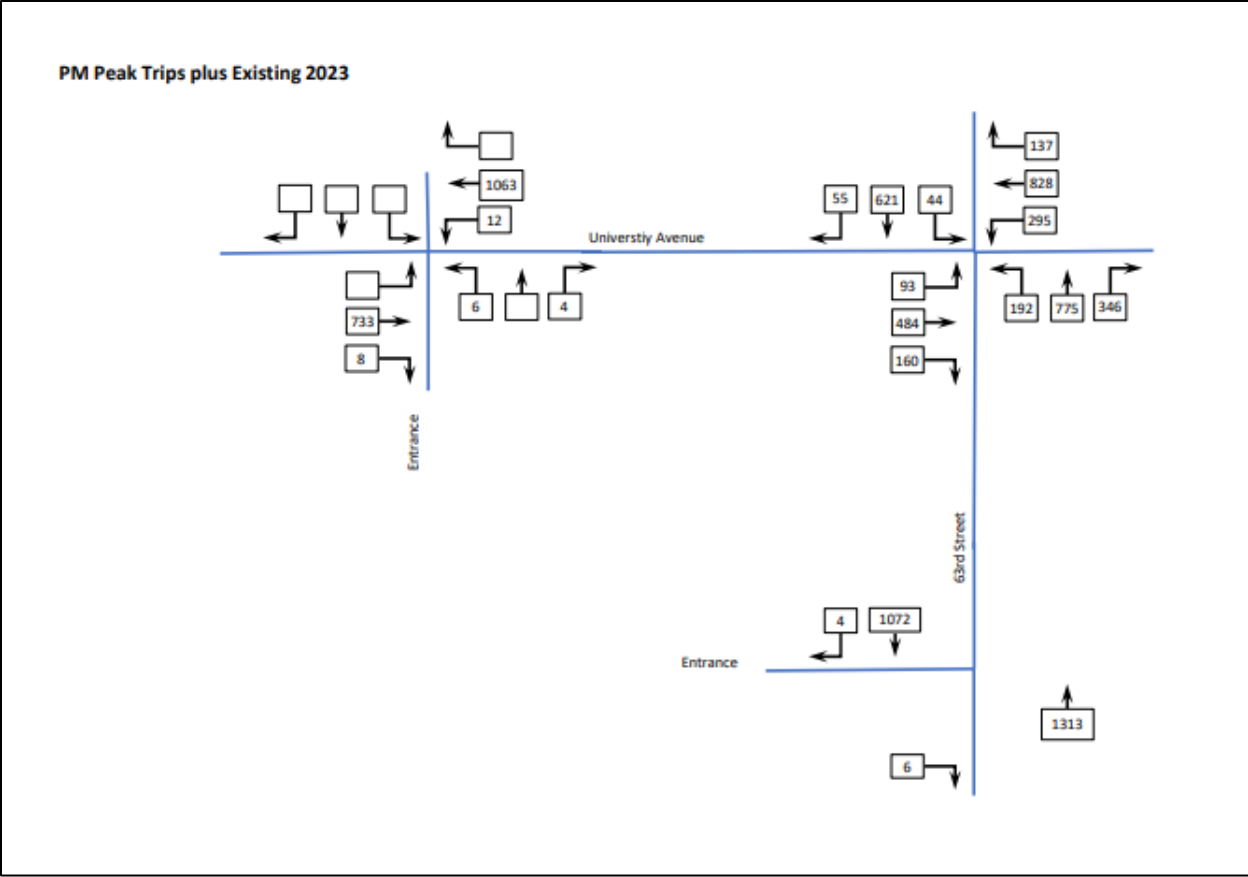


Figure 5 – PM Peak Proposed Site Trips Plus 2023 Traffic (right-in/right-out)

Intersection Analysis

An AM and PM peak traffic analysis was completed using *Synchro and Simtraffic, Version 8*, software and the Highway Capacity Manual 2010 methodology for the intersection of University Avenue and 63rd Street (Hwy 28) for level of service (LOS). The two entrances into the site were also evaluated.

Level of service at intersections is primarily a function of peak hour turning movement volumes, intersection lane configuration, and traffic control. For intersection analysis, the Highway Capacity Manual (HCM) defines LOS in terms of the average control delay at the intersection in seconds per vehicle. The results of an HCM analysis are typically presented in the form of a letter grade (A-F) that provides a qualitative estimate of the operational efficiency or effectiveness of the corridor. Much like an academic report card, LOS A represents the best range of operating conditions (i.e., motorists experiencing little delay or congestion) and LOS F represents the worst (i.e., extreme delay or severe congestion). **Table 2** shows the LOS for both the intersection and the entrances from the Synchro output.

Table 2 – Level of Service

Intersection	Overall	East Bound	West Bound	North Bound	South Bound
Existing PM Peak					
University Avenue and 63rd Street (Hwy 28)	E/57.3 s	D/48.7 s	E/67.6 s	E/60.8 s	D/41.6 s
95% Queue in feet		498	807	545	300
PM Peak with Development (right-in/right-out)					
University Avenue and 63rd Street (Hwy 28)	E/58.4 s	D/49.3 s	E/70.6 s	E/60.9 s	D/42.0 s
95% Queue in feet		502	821	545	302
University Avenue and 64th Street/Entrance	A	A	A	F	
95% Queue in feet			25		
63rd Street (Hwy 28) and Entrance	A	A		A	A

Turn Lane Warrants

“NCHRP Report 745: Left-Turn Accommodations at Unsignalized Intersections” was used to evaluate the need for left turning bays at the entrances on University Avenue. The PM peak was evaluated because it

was the worst-case scenario for the entrances for left-turns. **Table 3 and Figure 6** show that a left-turn lane would likely be warranted at the entrance on University Avenue.

Table 3 – Recommended Left Turn Warrants for Urban and Suburban Arterials

Left-Turn Lane Peak-Hour Volume (veh/hr)	Three-Leg Intersection, Major Urban and Suburban Arterial Volume (veh/hr/ln) That Warrants a Left-Turn Lane	Four-Leg Intersection, Major Urban and Suburban Arterial Volume (veh/hr/ln) That Warrants a Left-Turn Lane
5	450	50
10	300	50
15	250	50
20	200	50
25	200	50
30	150	50
35	150	50
40	150	50
45	150	< 50
50 or More	100	< 50

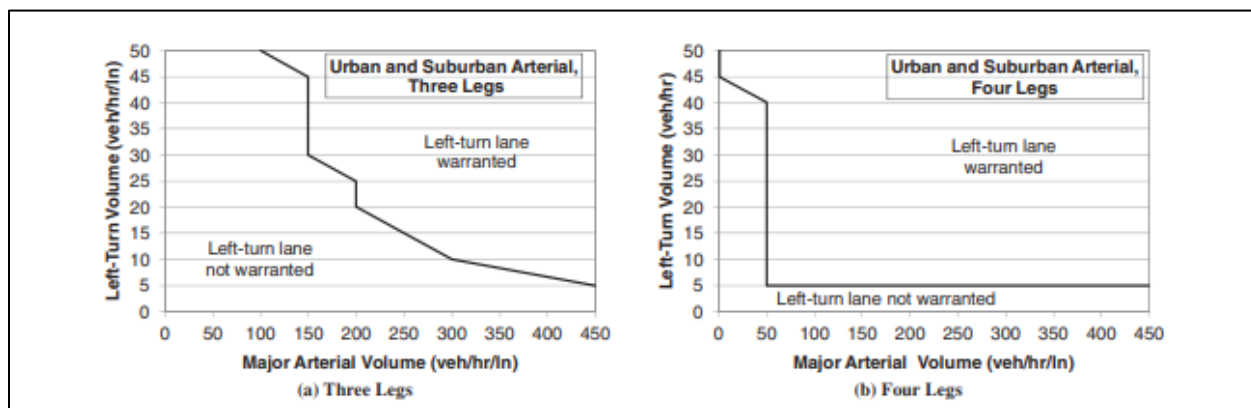


Figure 6 – Recommended Left Turn Warrants for Urban and Suburban Arterials

“NCHRP Report 457: Evaluating Intersection Improvements: An Engineering Study Guide”, figure 2-6 was used to evaluate the need for right turning bays at the two entrances into the site. Only the PM peak was evaluated for turn lanes because it was the worst-case scenario for the right turning traffic. **Figures 7 and 8** show that right-turn lanes are likely not warranted at either entrance into the site.

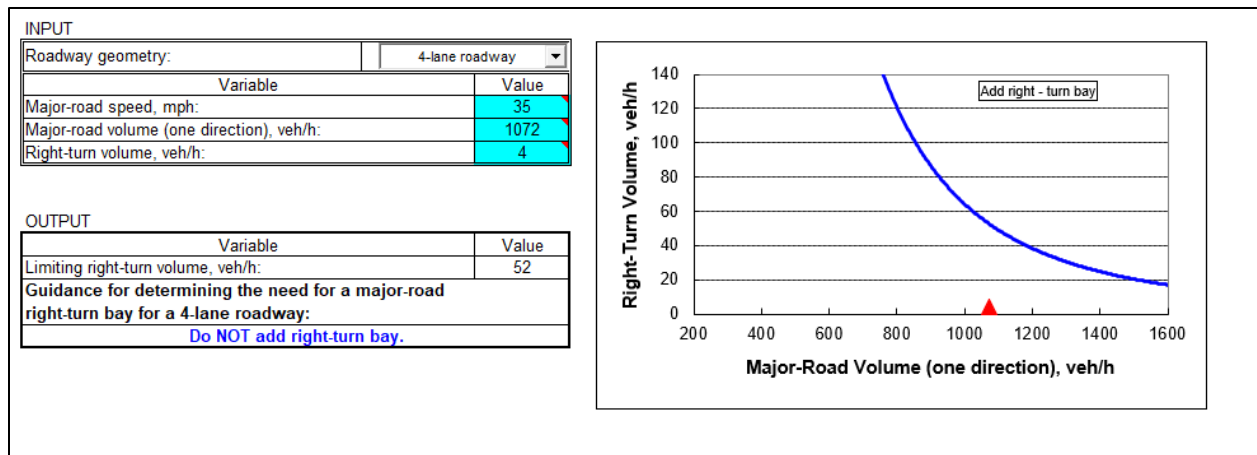


Figure 7 – Guideline for Determining the Need for a Major Road Right Turn Bay – 63rd Street Entrance

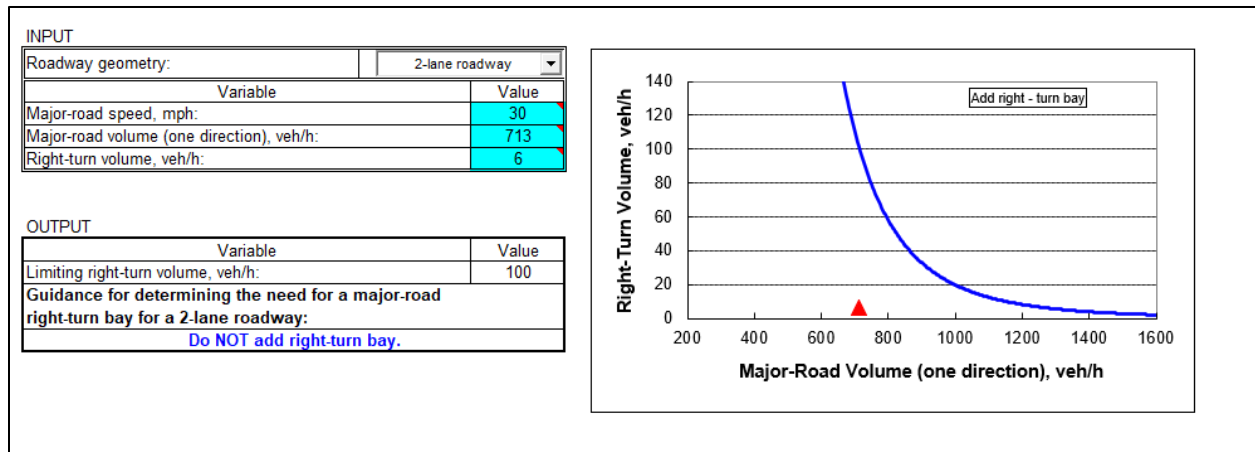


Figure 8 – Guideline for Determining the Need for a Major Road Right Turn Bay – University Ave Entrance

University Avenue Access

The entrance into the site on University Avenue is proposed to be aligned with 64th Street to the north. The measured site distance is approximately 340' to the west. According to Chapter 5L-4 in the Iowa SUDAS Design Manual table 5L-4.03, the desirable sight distance for the proposed access is 335' from left turn stop and 290' from right turn stop and crossing maneuver. According to SUDAS there should be adequate sight distance for entering and exiting vehicles at the proposed location.

The Iowa Department of Transportation Design Manual – Chapter 6D-1 Sight Distance was also used to calculate the horizontal intersection sight distance required for an intersection. The criteria taken into consideration for the calculation is the time gap and the design speed. The time gap variable represents the time a stopped driver will accept to accelerate and complete the turning maneuver. For passenger cars the assumed value is 8.0 seconds for a left turn, 7.0 seconds for a right turn and 7.0 seconds for a crossing maneuver. The intersection sight distance along a major road is calculated to be 352.8 feet for westbound left turning traffic. For vehicles exiting the site the calculated sight distance is 308.7 feet.

Limiting the number of driveways in the functional area of an intersection improves the safety of the roadway. The functional area, according to the American Association of State Highway and Transportation Officials' (AASHTO) A Policy on Geometric Design of Highways and Streets defines the upstream functional area of an intersection as a variable distance, influenced by: 1) distance traveled during perception-reaction time, 2) deceleration distance while the driver maneuvers to a stop, and 3) the amount of queuing at the intersection. The functional area of an intersection varies by roadway speed and the type of control at the intersection. For example, the upstream functional area for a signalized intersection with approach speeds of 30 mph is 395 feet. The proposed driveway into the site does fall within the functional area of the 63rd Street intersection.

There are limited options for full access into the site from University Avenue, it is recommended that the entrance is aligned with 64th Street to the north as is currently being proposed. This will help to limit the number of conflict points in the functional area. A left-turn lane would likely be warranted at this entrance.

Conclusion

After the review of the trips generated by the proposed Caliber development it was determined that the apartment complex will have little impact on University Avenue, 63rd Street (Hwy 28) or the intersection of University Avenue and 63rd Street (Hwy 28) as it pertains to added traffic volume.

Right-turn lanes will likely not be warranted for the site. A left-turn lane will likely be warranted at the entrance on University Avenue.

RESOLUTION 2024-40

A RESOLUTION APPROVING THE SITE PLAN FOR THE WINDSOR AT 1148 63RD STREET

WHEREAS, on May 22, 2024, upon proper publication of notice, the Planning and Zoning Commission held a public hearing, notice of which was given to property owners within 200 feet; and

WHEREAS, the Planning & Zoning Commission has reviewed this request during its regular meeting on May 22, 2024, and forwarded to City Council with a recommendation of approval with the Traffic condition that the full access driveway be allowed on University Avenue, as long as it is aligned with 64th Street and that moving this driveway to the west isn't possible, on a temporary/review basis. This temporary full access will be allowed for 3 years after the receipt of the certificate of occupancy (received within 6 months after opening) and will be determined to be reviewed if within that 3 years there are more total accidents than what has previously happened in the last 3 years (6 total accidents) at which time City Council may require the developer to turn that access into a right-in/right-out access if deemed necessary for public safety; and,

WHEREAS, the City Engineer has reviewed the Site Plan and recommends approval with the noted conditions; and

NOW THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF WINDSOR HEIGHTS, IOWA, that the Site Plan for Casey's General Store located at 6961 University Avenue is hereby approved subject to the following conditions:

1. All of the following conditions will be met, reviewed by the city department assigned, and deemed complete before approval of the site plan and before any development can take place.

General Comments

1. All permits related to the project will be held and released concurrently at the approval of the following:
 - a. Approval of signs and utility from Safe Building.
 - b. Revision of site plan application in accordance with the comment letter and all corresponding comments from each City Department.
 - c. Professional Signatures on Final Site Plan including Licensed Surveyor (Chapter 170.10)
 - d. City Council approval of site plan.

Storm Water General Comments

1. The Rev calculation for the West Detention in Appendix H uses cumulative storage numbers that do not match the stage-storage curve for the West Basin within the model output. Please resolve the discrepancy.

2. The WQv standard is required by the Windsor Heights City Code. Please adjust the detention facilities to meet this standard.
3. Include a soil management plan in the report. Provide details for topsoil preservation and respread in the report and include notes in the plans (See 11. Topsoil Requirements in the Windsor Heights Storm Water Standards).

Storm Water Plan Sheet Comments

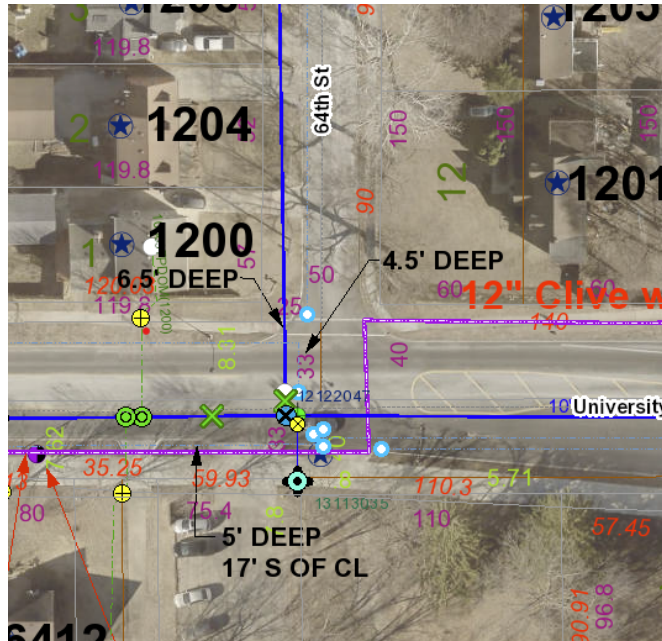
4. Add bioretention cell components (aggregate layer depth, amended soil depth, amended soil specs, etc.) to the plans if that is how the WQv standard will be met.
5. The emergency overflow of the West Basin is the entire south, north and west sides. What is the plan to protect that? Right now it just shows turf.
6. Ensure the 100-yr WSELs in the plans match the stormwater report. For example, see the Southeast Basin numbers.
7. Show details of the outlet onto 64th Street. (ie. FES, etc.). Plans show pipe run STSP-7.

Stormwater Other Comments

8. Adjust western water basin design to accommodate a walkway per 3/27/24 email and map or provide explanation for any alternative design. A walkway connection along the southern section of the pond is the highest priority.
9. Storm water agreement to match final signed site plan.

Des Moines Water Works Comments

1. The existing hydrant near the proposed entrance will need to be removed & a new hydrant assembly installed...instead of installing a 90 bend to head east, install tapping & sleeve & valve lay straight south to proposed location. The actual 12" Clive main location will need to be verified. The hydrant lead will need a minimum of 10' separation from the existing 12" 90 Bend. Note should be added for the contractor installing new hydrant assembly to protect & avoid existing thrust block on the 90-degree bend.
2. Hydrants and valves are to have a minimum separation of 10' from trees shrubs.



Engineering Comments

1. Complete Stormwater Maintenance Agreement and submit per instructions. Final agreement once final property ownership is determined Complete Stormwater Maintenance Agreement and submit per instructions. Final agreement once final property ownership is determined. Presuming dedication of the western detention basin to the city, the maintenance agreement shall stipulate the developer maintain the detention basin, per the approved site plan, within the parkland dedication area in perpetuity.
2. Provided trail easement to be filed once site plan is approved.
3. Provide DOT approval of driveway.
4. Finalize easements once final property ownership is determined.
5. RECP to be minimum of Type 2, note on plans.
6. TRM to be minimum of Type 2, note on plans.

Planning Comments

Parkland Dedication:

1. Fulfill Parkland Dedication requirement determined by City Council as either a physical dedication or monetary value substitute as determined by Section 172.15 of the Zoning Code.
 - a. Will be considered a condition of approval.
2. Remove any dead or diseased trees in parkland dedication area, per the direction of City Staff, prior to dedication as per the April 1st, 2024 City Council Parkland Dedication discussion.
3. Place native plantings in the parkland dedication area and establish those plantings before dedication as per the April 1st City Council Parkland Dedication discussion.

Bike Parking:

4. Indoor Long-Term Bike Parking and Car parking in garage don't work with the current design as people won't be able to get out of their cars. Please address.

Landscaping Comments

Photometric Plan:

1. Show foot candle data at building entrances and pathways to said entrances from the parking lot and other public spaces.

Traffic General Comments

1. University Avenue Access (page 9)
 - a. As shown on the 4/15/24 site plan, the proposed driveway aligned with 64th Street on University is within the functional area of the intersection of 63rd/University. Queues are anticipated and have been observed to block this driveway in the peak hours. Per the report, the delay for residents leaving the apartment is LOS F. Creating a westbound left turn lane on University for the apartments will limit the ability to extend the eastbound left turn lane at 63rd street which is already a heavy movement.
 - i. It is encouraged that the developer work with adjacent property owners to move the full access driveway further west away from the intersection of 63rd Street. Note: Both city staff and/or the developer have reached out in person, letter, and phone to the owner of 6412 University Avenue to discuss options and received no response from the property owner.
 - ii. One idea for the driveway moved further west follows:



- iii. If the above is not an option, the developer should make the driveway right-in, right-out only by placing a median across the intersection with 64th Street.

PASSED AND APPROVED this 3rd day of June, 2024.

MIKE JONES, MAYOR

ADAM STRAIT, CITY CLERK



**STAFF REPORT
CITY COUNCIL**

June 3, 2024

TO: CITY COUNCIL

FROM:

SUBJECT: Consideration of Resolution No. 2024-39 -A Resolution Approving Development Agreement with Windsor Millang, L.L.C., the Windsor, L.L.C. and Jensfam, LLC, Authorizing Annual Appropriation Tax Increment Payments and Pledging Certain Tax Increment Revenues to the Payment of the Agreement

GENERAL INFORMATION

ATTACHMENTS

1. Resolution No. 2024-39 - Resolution Approving Development Agreement with Millang Properties, L.L.C., the Windsor, L.L.C. and Jensfam, LLC, Authorizing

RESOLUTION NO.2024 -39

Resolution Approving Development Agreement with Windsor Millang, L.L.C., the Windsor, L.L.C. and Jensfam, LLC, Authorizing Annual Appropriation Tax Increment Payments and Pledging Certain Tax Increment Revenues to the Payment of the Agreement

WHEREAS, the City of Windsor Heights, Iowa (the "City"), pursuant to and in strict compliance with all laws applicable to the City, and in particular the provisions of Chapter 403 of the Code of Iowa, has adopted an Urban Renewal Plan for the Windsor Heights Consolidated Urban Renewal Area (the "Urban Renewal Area"); and

WHEREAS, this City Council has adopted an ordinance providing for the division of taxes levied on taxable property in the Urban Renewal Area pursuant to Section 403.19 of the Code of Iowa and establishing the fund referred to in Subsection 2 of Section 403.19 of the Code of Iowa (the "Urban Renewal Tax Revenue Fund"), which fund and the portion of taxes referred to in that subsection may be irrevocably pledged by the City for the payment of the principal of and interest on indebtedness incurred under the authority of Section 403.9 of the Code of Iowa to finance or refinance in whole or in part projects in the Urban Renewal Area; and

WHEREAS, an agreement (the "Agreement"), between the City and Windsor Millang, L.L.C., the Windsor, L.L.C. and Jensfam, LLC (collectively, the "Developers") has been prepared, pursuant to which the Developers would undertake the construction of a new apartment building in the Urban Renewal Area (the "Project"); and

WHEREAS, under the Agreement, the City would provide annual appropriation tax increment payments to the Developer in a total amount not exceeding \$903,535; and

WHEREAS, this City Council, pursuant to Section 403.9 of the Code of Iowa, has published notice, has held a public hearing on the Agreement on June 3, 2024, and has otherwise complied with statutory requirements for the approval of the Agreement; and

WHEREAS, Chapter 15A of the Code of Iowa ("Chapter 15A") declares that economic development is a public purpose for which a City may provide grants, loans, tax incentives, guarantees and other financial assistance to or for the benefit of private persons; and

WHEREAS, Chapter 15A requires that before public funds are used for grants, loans, tax incentives or other financial assistance, a City Council must determine that a public purpose will reasonably be accomplished by the spending or use of those funds; and

WHEREAS, Chapter 15A requires that in determining whether funds should be spent, a City Council must consider any or all of a series of factors;

NOW, THEREFORE, It Is Resolved by the City Council of the City of Windsor Heights, Iowa, as follows:

Section 1. Pursuant to the factors listed in Chapter 15A, the City Council hereby finds that:

(a) The Project will add diversity and generate new opportunities for the Windsor Heights and Iowa economies; and

(b) The Project will generate public gains and benefits, particularly in the creation of new jobs, income, and housing opportunities, which are warranted in comparison to the amount of the proposed property tax incentives; and

Section 2. The City Council further finds that a public purpose will reasonably be accomplished by entering into the Agreement and providing the incremental property tax payments to the Developer as provided for therein.

Section 3. The Agreement is hereby approved, and the Mayor and City Clerk are hereby authorized and directed to execute and deliver the Agreement on behalf of the City, in substantially the form and content in which the Agreement has been presented to this City Council. Such officers are also authorized to make such changes, modifications, additions or deletions as they, with the advice of bond counsel, may believe to be necessary, and to take such actions as may be necessary to carry out the provisions of the Agreement.

Section 4. All payments by the City under the Agreement shall be subject to annual appropriation by the City Council, in the manner set out in the Agreement. As provided and required by Chapter 403 of the Code of Iowa, the City's obligations under the Agreement shall be payable solely from a subfund (the "Windsor Millang, L.L.C., the Windsor, L.L.C. and Jensfam, LLC Subfund") which is hereby established, into which shall be paid that portion of the income and proceeds of the Urban Renewal Tax Revenue Fund attributable to property taxes derived from the property as described as follows:

The South 73.60 feet of Lot Three (3) in HOPKINS PLACE, an Official Plat; and the North ½ of Lot Twenty-three (23) and all of Lot Twenty-four (24) in HOPKINS PLACE, an Official Plat; all now included in and forming a part of the City of Windsor Heights, Polk County, Iowa

AND

Lot Twenty-two (22) (except the South 15 feet) and the South ½ of Lot Twenty-three (23) in HOPKINS-WOEHLER PLACE, an Official Plat now included in and forming a part of the City of Windsor Heights, Polk County, Iowa

AND

The East 265.4 feet of Lot Eleven (11); and Lot Twelve (12) (except the West 155 feet thereof); and the West 17.5 feet of the South 15 feet of Lot Twenty-two (22),

all in HOPKINS-WOEHLER PLACE, an Official Plat, now included in and forming a part of the City of Windsor Heights, Polk County, Iowa

AND

Lot Four (4) in HOPKINS PLACE, an Official Plat, now included in and forming a part of the City of Windsor Heights, Polk County, Iowa

AND

Lot Five (5), except the West 15 feet thereof, in HOPKINS-WOEHLER PLACE, an Official Plat, now included in and forming a part of the City of Windsor Heights, Polk County, Iowa

AND

The North 60 feet of Lot Two (2) and the South 60 feet of the North 120 feet of Lots Two (2) and Three (3) in HOPKINS PLACE, an Official Plat, now included in and forming a part of the City of Windsor Heights, Polk County, Iowa

AND

EXCEPT those parts acquired by the State of Iowa, City of Des Moines and the City of Windsor Heights by Condemnation recorded in Book 7465 Page 428 in the Office of the Recorder of Polk County, Iowa.

Section 5. The City hereby pledges to the payment of the Agreement the Windsor Millang, L.L.C., the Windsor, L.L.C. and Jensfam, LLC Subfund and the taxes referred to in Subsection 2 of Section 403.19 of the Code of Iowa to be paid into such Subfund, provided, however, that no payment will be made under the Agreement unless and until monies from the Windsor Millang, L.L.C., the Windsor, L.L.C. and Jensfam, LLC Subfund are appropriated for such purpose by the City Council.

Section 6. After its adoption, a copy of this resolution shall be filed in the office of the County Auditor of Polk County to evidence the continuing pledging of the Windsor Millang, L.L.C., the Windsor, L.L.C. and Jensfam, LLC Subfund and the portion of taxes to be paid into such Subfund and, pursuant to the direction of Section 403.19 of the Code of Iowa, the County Auditor shall allocate the taxes in accordance therewith and in accordance with the tax allocation ordinance referred to in the preamble hereof.

Section 7. All resolutions or parts thereof in conflict herewith are hereby repealed.

Passed and approved June 3, 2024.

Mayor

Attest:

City Clerk



Mobile Grinding

Date 5/30/2024

Customer Jason Roberts | City of Windsor Heights | 1145 66th St, Ste 1 | Windsor Heights, IA 50324

Property City of Windsor Heights | 1303 64th St | Windsor Heights, IA 50324

Sales Rep Jennifer Anderson

Sales Rep Phone No. (515) 360-0620

Mobile Grinding

Grinding of piles at specified site: Debris is to consist only of natural wood products (no pallets, grass, dirt, metal objects or garbage) - Any damage caused to the grinder by unnatural materials will be the customers responsibility.

Includes delivery of excavator & grinder to the site.

Mobile Grinding Price:	\$8,975.00
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Subtotal	\$8,975.00
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Estimated Tax	\$0.00
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Total	\$8,975.00
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Terms & Conditions



Wright Outdoor Solutions (WOS) takes great pride in taking care of your property. We look at doing business with you as a partnership where there are certain responsibilities for both WOS and our Clients. Approval of the proposal is considered acceptance of the terms and conditions noted below. Please read and follow the terms and conditions outlined. If you have any questions, do not hesitate to call.

- 1. Estimates** - Estimates are valid for 30 days from the original date of proposal and are based on current material availability and pricing. If materials increase in cost by more than 10% or are unavailable at the time of work, a substitution will be offered of equal value.
- 2. Down Payment** - Projects with landscape or holiday décor require a 40% down payment to order materials, authorize work and secure a spot on the installation schedule.
- 3. Change Orders** - Additional materials and/or labor charges may apply as a result of unforeseen site conditions or at the request of the Client. Prior to obtaining additional materials or completing the work, the Client will be notified and a change order (CO) defining the scope of the additional services/materials will be provided. The CO scope of work will not continue until authorization is given. If authorization is not received within 24 hours of the CO being sent, project work may be delayed.
- 4. Hard Surface Agreement** - WOS requests permission to access the existing hardscape surfaces (driveways, sidewalks, patio's, etc) for staging and transporting materials for the duration of the project. We have no knowledge of the strength of your driveway and will not be held liable for damages that may occur. Limiting access may result in additional installation charges, if necessary. The equipment used could include, but is not limited to Aerial lifts, Bucket Truck, Track Lift and others that weigh in excess of 60,000 lbs.
- 5. Turf Agreement** - WOS will attempt to minimize all disturbances to the Client's lawn. However, we do require the use of vehicles and specialized equipment to perform services safely. WOS shall not be liable for damages to landscaping, sod and plant material in the execution of work (i.e. ruts in yard). Repairs are not included in the scope of work, unless specified on the proposal.
- 6. Public Utilities** - When digging, WOS is required by law to contact Iowa One Call to locate all public utilities (phone, gas, electric, etc.).
- 7. Private Utilities** - Client is responsible for locating all private utilities at their cost (irrigation systems, septic systems, geo-thermal lines, pet containment fences, outdoor lighting, private gas, electrical lines, and any other such utility) on site. WOS will not be held responsible for unmarked or mismarked private utilities. Client is responsible for any damage or injury caused by private utilities not installed to code (i.e. proper depth, approved materials, etc).
- 8. Irrigation** - If existing irrigation heads and lines must be relocated for completion of the project and WOS has not been contracted to do the relocation, scheduling and associated costs are the sole responsibility of the Client and must be completed prior the start of work by WOS.
- 9. Property Surveys** - Any required property surveys will be at the cost of the Client and are not included in this bid.
- 10. Subcontractors** - WOS may employ subcontractors for portions of the project at its discretion.
- 11. Schedule** - WOS will work to complete the project as scheduled. Weather, material availability and changes to the scope of the project may require revisions to the schedule. If WOS is unable to provide scheduled service due to unmarked private utilities, inhibited site access, failure to remove personal items (including furniture or structures in the project area), or if pets are located within the project area and inhibit completion of a scheduled service, a trip fee will be charged.
- 12. Client Rescheduling** - If Client has a special event or will be away from job location and would like to reschedule services, it is the responsibility of the Client to contact WOS for schedule changes. Landscape design projects require a 7-day minimum notice or could result in major delay of project and/or additional charges. All other services require a 48 hour minimum notice or could result in delay of project and/or additional charges.
- 13. Cancellation** - Unless otherwise stated in your contract, a 7-day written notice is requested to cancel any service. If any work has already been completed, Client is responsible for the full cost of labor and materials installed. Special order items that have already been purchased by WOS cannot be canceled regardless of written notice and will be charged to the client.
- 14. Warranty** - Details regarding our plant and hardscape material warranties can be found on our website.



**STAFF REPORT
CITY COUNCIL**
June 3, 2024

TO: CITY COUNCIL

FROM:

SUBJECT: Consideration of Payment to JC Midwest Services For Storm Cleanup Services

GENERAL INFORMATION

ATTACHMENTS

1. Quote QU0229 (1)
2. PW Staff Report - Pay Request for JCMS



QUOTE

City Of Windsor Heights Iowa

Date
May 30, 2024

Quote Number
QU-0229

Reference
Storm Clean Up 5-21-24

JC Midwest Services
LLC
PO Box 472
EARLHAM IA 50072
UNITED STATES

Description	Quantity	Unit Price	Amount USD
Skid Loaders X 2 With Grapples 5/22-24 8 am - 4:30 pm 5/23/24 8 am - 4:30 pm 5/29/24 8 am - 4:30 pm 5/30/24 8 am - 4:30 pm	32.00	300.00	9,600.00
Dump Trucks X 2 / 20 Ton Capacity 5/22-24 8 am - 4:30 pm 5/23/24 8 am - 4:30 pm 5/29/24 8 am - 4:30 pm 5/30/24 8 am - 4:30 pm	32.00	300.00	9,600.00
88 Loads			
Subtotal			19,200.00
TOTAL TAX			0.00
TOTAL USD			19,200.00

Terms



DEPARTMENT OF PUBLIC WORKS
1145 66TH Street, Suite 1
Windsor Heights, IA 50324

TO: CITY COUNCIL
CC: Adam Plagge
FROM: Jason Roberts, Public Works Director
DATE: 30 May 2024
SUBJECT: Pay Request for JC Midwest Services in regards to storm debris clean-up from May 21th, 2024

GENERAL INFORMATION:

In response to the wind storm event that took place on May 21, 2024, Public Works secured the help of a private contractor to assist in the debris clean-up that we as the City gladly offered to our residents. Public Works felt the need to utilize the services of an outside contractor due to volume of debris and acted in accordance with the emergency provisions of the purchase policy of the City. JC Midwest Service's quote for assistance came at an hourly rate, inclusive of equipment and operators, was compared to others as information was available and was determined to be of fair market value. A citywide clean up would have taken PW Staff 4-6 weeks to complete what PW Staff and JC Midwest Services Staff completed in approximately a week. Combined, as of end of day Thursday, we have had 394 man hours and 192 truck loads in four and a half full days of clean-up. Not to mention the opportunity and time lost in completing other services provided by the Public Works Department. We are grateful for the opportunity to have worked with JC Midwest Services, it has been a great benefit not only to the Public Works Department but to the City of Windsor Heights and our residents. Staff recommends payment of the attached invoice and notes an additional 8-10 hours may be billed to the city for additional work Friday, weather dependent.

ATTACHMENTS:

Invoice of Services from JC Midwest Services



**STAFF REPORT
CITY COUNCIL**

June 3, 2024

TO: CITY COUNCIL

FROM:

SUBJECT: Consideration of the 3rd Reading of Ordinance 2024-04 - An Ordinance Amending the Code of Ordinances for the City of Windsor Heights, Iowa, by Amending Chapter 185, Governing Floodplain Management; and to Adopt and Publish

GENERAL INFORMATION

ATTACHMENTS

1. 24.04 Floodplain Management Chapter 185

ORDINANCE NO. 2024-04

AN ORDINANCE AMENDING THE CODE OF ORDINANCES FOR THE CITY OF WINDSOR HEIGHTS, IOWA, BY AMENDING CHAPTER 185, GOVERNING FLOODPLAIN MANAGEMENT

WHEREAS, the City of Windsor Heights seeks to protect and preserve the rights, privileges and property of the City of Windsor Heights and its residents and to preserve and improve the peace, safety, health, welfare, and comfort and convenience of its residents by minimizing those flood losses; and

WHEREAS, the City Council deems it necessary to adopt this ordinance to protect property values, the local economy and the quality of life for its residents by minimizing flood losses; and

WHEREAS, the City Council of the City of Windsor Heights do hereby find and declare that the revisions to the floodplain management ordinance are necessary and will promote the health, safety, general welfare and aesthetics of the community.

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF WINDSOR HEIGHTS, POLK COUNTY, IOWA:

SECTION 1. Purpose. The purpose of this ordinance is to amend Chapter 185 of the Windsor Heights Code of Ordinances to preserve and improve the peace, safety, health, welfare, and comfort and convenience of its residents by minimizing those flood losses.

SECTION 2. Amended. Chapter 185 of the Windsor Heights Code of Ordinances, Sidewalk Regulations, is amended and replaced with the attached Exhibit A.

SECTION 3. Repealer. All ordinances or parts of ordinances in conflict with the provisions of this ordinance are hereby repealed.

SECTION 4. Severability. If any section, provision or part of this ordinance shall be adjudged invalid or unconstitutional, such adjudication shall not affect the validity of the ordinance as a whole or any section, provision or part thereof not adjudged invalid or unconstitutional.

SECTION 5. Effective Date. This ordinance shall be effective after the final passage, approval and publication as provided by law.

Passed and Approved this 3rd day of June 2024.

1st Reading: May 6, 2024

2nd Reading: May 20, 2024

3rd Reading: June 3, 2024

Publish Date:

ATTEST:

(SEAL)

Mike Jones, Mayor

Adam Strait, City Clerk

EXHIBIT A

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FLOODPLAIN MANAGEMENT ORDINANCE

185.01 - Definitions

Unless specifically defined below, words or phrases used in this Ordinance shall be interpreted so as to give them the meaning they have in common usage and to give this Ordinance its most reasonable application.

APPURTENANT STRUCTURE - A structure which is on the same parcel of the property as the principal structure to be insured and the use of which is incidental to the use of the principal structure.

BASE FLOOD - The flood having one (1) percent chance of being equaled or exceeded in any given year. (Also commonly referred to as the "100-year flood").

BASE FLOOD ELEVATION (BFE) - The elevation floodwaters would reach at a particular site during the occurrence of a base flood event.

BASEMENT - Any enclosed area of a building which has its floor or lowest level below ground level (subgrade) on all sides. Also see "lowest floor."

DEVELOPMENT - Any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation, drilling operations or storage of equipment or materials. "Development" does not include "minor projects" or "routine maintenance of existing buildings and facilities" as defined in this section. It also does not include gardening, plowing, and similar practices that do not involve filling or grading.

ENCLOSED AREA BELOW LOWEST FLOOR - The floor of the lowest enclosed area in a building when all the following criteria are met:

- A. The enclosed area is designed to flood to equalize hydrostatic pressure during flood events with walls or openings that satisfy the provisions of 185.07(2)(D)(1) of this Ordinance, and
- B. The enclosed area is unfinished (not carpeted, drywalled, etc.) and used solely for low damage potential uses such as building access, parking or storage, and
- C. Machinery and service facilities (e.g., hot water heater, furnace, electrical service) contained in the enclosed area are located at least two (2) feet above the base flood elevation, and
- D. The enclosed area is not a "basement" as defined in this section.

EXISTING CONSTRUCTION - Any structure for which the "start of construction" commenced before the effective date of the first floodplain management regulations adopted by the community.

EXISTING FACTORY-BUILT HOME PARK OR SUBDIVISION - A factory-built home park or subdivision for which the construction of facilities for servicing the lots on which the factory-built homes are to be affixed (including at a minimum, the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads) is completed before the effective date of the first floodplain management regulations adopted by the community.

EXPANSION OF EXISTING FACTORY-BUILT HOME PARK OR SUBDIVISION - The preparation of additional sites by the construction of facilities for servicing the lots on which the factory-built homes are to be affixed (including at a minimum, the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads).

FACTORY-BUILT HOME - Any structure, designed for residential use which is wholly or in substantial part, made, fabricated, formed or assembled in manufacturing facilities for installation or assembly and installation, on a building site. For the purpose of this Ordinance factory-built homes include mobile homes, manufactured homes, and modular homes; and also include "recreational vehicles" which are placed on a site for greater than 180 consecutive days and not fully licensed for and ready for highway use.

FACTORY-BUILT HOME PARK OR SUBDIVISION - A parcel or contiguous parcels of land divided into two or more factory-built home lots for sale or lease.

FIVE HUNDRED (500) YEAR FLOOD - A flood, the magnitude of which has a two-tenths (0.2) percent chance of being equaled or exceeded in any given year or which, on average, will be equaled or exceeded at least once every five hundred (500) years.

FLOOD - A general and temporary condition of partial or complete inundation of normally dry land areas resulting from the overflow of streams or rivers or from the unusual and rapid runoff of surface waters from any source.

FLOOD INSURANCE RATE MAP (FIRM) - The official map prepared as part of (but published separately from) the Flood Insurance Study which delineates both the flood hazard areas and the risk premium zones applicable to the community.

FLOOD INSURANCE STUDY (FIS) - A report published by FEMA for a community issued along with the community's Flood Insurance Rate Map(s). The study contains such background data as the base flood discharge and water surface elevations that were used to prepare the FIRM.

FLOODPLAIN - Any land area susceptible to being inundated by water as a result of a flood.

FLOODPLAIN MANAGEMENT - An overall program of corrective and preventive measures for reducing flood damages and promoting the wise use of floodplains, including but not limited to emergency preparedness plans, flood control works, floodproofing and floodplain management regulations.

FLOODPROOFING - Any combination of structural and nonstructural additions, changes, or adjustments to structures, including utility and sanitary facilities, which will reduce or eliminate flood damage to such structures.

FLOODWAY - The channel of a river or stream and those portions of the floodplains adjoining the channel, which are reasonably required to carry and discharge flood waters or flood flows so that confinement of flood flows to the floodway area will not cumulatively increase the water surface elevation of the base flood by more than one (1) foot.

FLOODWAY FRINGE - Those portions of the Special Flood Hazard Area outside the floodway.

HIGHEST ADJACENT GRADE - The highest natural elevation of the ground surface prior to construction next to the proposed walls of a structure.

HISTORIC STRUCTURE - Any structure that is:

- A. Listed individually in the National Register of Historic Places, maintained by the Department of Interior, or preliminarily determined by the Secretary of the Interior as meeting the requirements for individual listing of the National Register;
- B. Certified or preliminarily determined by the Secretary of the Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined by the Secretary to qualify as a registered historic district;
- C. Individually listed on a state inventory of historic places in states with historic preservation programs which have been approved by the Secretary of the Interior; or,
- D. Individually listed on a local inventory of historic places in communities with historic preservation programs that have been certified by either i) an approved state program as determined by the Secretary of the Interior or ii) directly by the Secretary of the Interior in states without approved programs.

LOWEST FLOOR - The floor of the lowest enclosed area in a building including a basement except when the criteria listed in the definition of Enclosed Area below Lowest Floor are met.

MAXIMUM DAMAGE POTENTIAL DEVELOPMENT - Hospitals and like institutions; buildings or building complexes containing documents, data, or instruments of great public value; buildings or building

complexes containing materials dangerous to the public or fuel storage facilities; power installations needed in emergency or other buildings or building complexes similar in nature or use.

MINOR PROJECTS - Small development activities (except for filling, grading and excavating) valued at less than \$500.

NEW CONSTRUCTION - (new buildings, factory-built home parks) - Those structures or development for which the start of construction commenced on or after the effective date of the first floodplain management regulations adopted by the community.

NEW FACTORY-BUILT HOME PARK OR SUBDIVISION - A factory-built home park or subdivision for which the construction of facilities for servicing the lots on which the factory-built homes are to be affixed (including at a minimum, the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads) is completed on or after the effective date of the effective date of the first floodplain management regulations adopted by the community.

RECREATIONAL VEHICLE - A vehicle which is:

- A. Built on a single chassis;
- B. Four hundred (400) square feet or less when measured at the largest horizontal projection;
- C. Designed to be self-propelled or permanently towable by a light duty truck; and
- D. Designed primarily not for use as a permanent dwelling but as a temporary living quarters for recreational, camping, travel, or seasonal use.

ROUTINE MAINTENANCE OF EXISTING BUILDINGS AND FACILITIES - Repairs necessary to keep a structure in a safe and habitable condition that do not trigger a building permit, provided they are not associated with a general improvement of the structure or repair of a damaged structure. Such repairs include:

- A. Normal maintenance of structures such as re-roofing, replacing roofing tiles and replacing siding;
- B. Exterior and interior painting, papering, tiling, carpeting, cabinets, counter tops and similar finish work;
- C. Basement sealing;
- D. Repairing or replacing damaged or broken window panes;
- E. Repairing plumbing systems, electrical systems, heating or air conditioning systems and repairing wells or septic systems.

SPECIAL FLOOD HAZARD AREA (SFHA) - The land within a community subject to the "base flood". This land is identified on the community's Flood Insurance Rate Map as Zone A, A1-30, AE, AH, AO, AR, and/or A99.

START OF CONSTRUCTION - Includes substantial improvement, and means the date the development permit was issued, provided the actual start of construction, repair, reconstruction, rehabilitation, addition, placement, or other improvement, was within 180 days of the permit date. The actual start means either the first placement or permanent construction of a structure on a site, such as pouring of a slab or footings, the installation of pile, the construction of columns, or any work beyond the stage of excavation; or the placement of a factory-built home on a foundation. Permanent construction does not include land preparation, such as clearing, grading and filling; nor does it include the installation of streets and/or walkways; nor does it include excavation for a basement, footings, piers, or foundations or the erection of temporary forms; nor does it include the installation on the property of accessory buildings such as garages or sheds not occupied as dwelling units or not part of the main structure. For a substantial improvement, the actual start of construction means the first alteration of any wall, ceiling, floor, or other structural part of the building, whether or not that alteration affects the external dimensions of the building.

STRUCTURE - Anything constructed or erected on the ground or attached to the ground, including, but not limited to, buildings, factories, sheds, cabins, factory-built homes, storage tanks, grain storage facilities and/or other similar uses.

SUBSTANTIAL DAMAGE - Damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damage condition would equal or exceed fifty (50) percent of the market value of the structure before the damage occurred. Volunteer labor and donated materials shall be included in the estimated cost of repair. Substantial damage also means flood-related damages sustained by a structure on two separate occasions during a 10-year period for which the cost of repairs at the time of such flood event, on the average, equals or exceeds 25 percent of the market value of the structure before the damage occurred. Volunteer labor and donated materials shall be included in the estimated cost of repair.)

SUBSTANTIAL IMPROVEMENT - Any improvement to a structure which satisfies either of the following criteria:

- A. Any repair, reconstruction or improvement of a structure taking place during a 10-year period, the cumulative cost of which, equals or exceeds fifty (50) percent of the market value of the structure either (i) before the "start of construction" of the first improvement of the structure, or (ii) if the structure has been "substantially damaged" and is being restored, before the damage occurred.)

The term does not, however, include any project for improvement of a structure to correct existing violations of state or local health, sanitary, or safety code specifications which have been identified by the local code enforcement official and which are the minimum necessary to assure safe living conditions. The term also does not include any alteration of an "historic structure", provided the alteration will not preclude the structure's designation as an "historic structure".

- B. Any addition which increases the original floor area of a building by 25 percent or more. All additions constructed after the effective date of the first floodplain management regulations adopted by the community shall be added to any proposed addition in determining whether the total increase in original floor space would exceed 25 percent.

VARIANCE - A grant of relief by a community from the terms of the floodplain management regulations.

VIOLATION - The failure of a structure or other development to be fully compliant with the community's floodplain management regulations.

185.02 - Statutory Authority, Findings of Fact and Purpose

1. The Legislature of the State of Iowa has in Chapter 414, Code of Iowa, as amended, delegated the power to cities to enact zoning regulations to secure safety from flood and to promote health and the general welfare.
2. Findings of Fact
 - A. The flood hazard areas of the City of Windsor Heights are subject to periodic inundation which can result in loss of life and property, health and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures for flood protection and relief, and impairment of the tax base all of which adversely affect the public health, safety and general welfare of the community.
 - B. These flood losses, hazards, and related adverse effects are caused by: (i) The occupancy of flood hazard areas by uses vulnerable to flood damages which create hazardous conditions as a result of being inadequately elevated or otherwise protected from flooding and (ii) the cumulative effect of obstructions on the floodplain causing increases in flood heights and velocities.
 - C. This ordinance relies upon engineering methodology for analyzing flood hazards which is consistent with the standards established by the Department of Natural Resources.
3. Statement of Purpose

It is the purpose of this Ordinance to protect and preserve the rights, privileges and property of the City of Windsor Heights and its residents and to preserve and improve the peace, safety, health, welfare, and comfort and convenience of its residents by minimizing those flood losses described in 185.02(2)(A) of this Ordinance with provisions designed to:

 - A. Reserve sufficient floodplain area for the conveyance of flood flows so that flood heights and velocities will not be increased substantially.

- B. Restrict or prohibit uses which are dangerous to health, safety or property in times of flood or which cause excessive increases in flood heights or velocities.
- C. Require that uses vulnerable to floods, including public facilities which serve such uses, be protected against flood damage at the time of initial construction or substantial improvement.
- D. Protect individuals from buying lands which may not be suited for intended purposes because of flood hazard.
- E. Assure that eligibility is maintained for property owners in the community to purchase flood insurance through the National Flood Insurance Program.

185.03 - General Provisions

1. Lands to Which Ordinance Apply

The provisions of this Ordinance shall apply to all lands within the jurisdiction of the City of Windsor Heights shown on the Official Floodplain Zoning Map as being within the boundaries of the Floodway, Floodway Fringe, and General Floodplain (Overlay) Districts, as established in Section 185.05.

2. Establishment of Official Floodplain Zoning Map

The Flood Insurance Rate Map (FIRM) for Polk County and Incorporated Areas, City of Windsor Heights, Panels 19153C0326F, 0327F, and 0329F, dated February 1, 2019, which were prepared as part of the Flood Insurance Study for Polk County, is (are) hereby adopted by reference and declared to be the Official Floodplain Zoning Map. The flood profiles and all explanatory material contained with the Flood Insurance Study are also declared to be a part of this ordinance.

3. Rules for Interpretation of District Boundaries

The boundaries of the zoning district areas shall be determined by scaling distances on the Official Floodplain Zoning Map. When an interpretation is needed as to the exact location of a boundary, the Building Official shall make the necessary interpretation. The Board of Adjustment shall hear and decide appeals when it is alleged that there is an error in any requirement, decision, or determination made by the Building Official in the enforcement or administration of this Ordinance.

4. Compliance

No structure or land shall hereafter be used and no structure shall be located, extended, converted or structurally altered without full compliance with the terms of this Ordinance and other applicable regulations which apply to uses within the jurisdiction of this Ordinance.

5. Abrogation and Greater Restrictions

It is not intended by this Ordinance to repeal, abrogate or impair any existing easements, covenants, or deed restrictions. However, where this Ordinance imposes greater restrictions, the provision of this Ordinance shall prevail. All other ordinances inconsistent with this Ordinance are hereby repealed to the extent of the inconsistency only.

6. Interpretation

In their interpretation and application, the provisions of this Ordinance shall be held to be minimum requirements and shall be liberally construed in favor of the governing body and shall not be deemed a limitation or repeal of any other powers granted by State statutes.

7. Warning and Disclaimer of Liability

The standards required by this Ordinance are considered reasonable for regulatory purposes. This Ordinance does not imply that areas outside the designated Floodplain (Overlay) District areas will be free from flooding or flood damages. This Ordinance shall not create liability on the part of the City of Windsor Heights or any officer or employee thereof for any flood damages that result from reliance on this Ordinance or any administrative decision lawfully made there under.

8. Severability

If any section, clause, provision or portion of this Ordinance is adjudged unconstitutional or invalid by a court of competent jurisdiction, the remainder of this Ordinance shall not be affected thereby.

185.04 - Administration

1. Appointment, Duties and Responsibilities of Local Official

- A. The Building Official is hereby appointed to implement and administer the provisions of this Ordinance and will herein be referred to as the Administrator.
- B. Duties and responsibilities of the Administrator shall include, but not necessarily be limited to the following:
 - 1) Review all floodplain development permit applications to assure that the provisions of this Ordinance will be satisfied.
 - 2) Review floodplain development applications to assure that all necessary permits have been obtained from federal, state and local governmental agencies including approval when required from the Department of Natural Resources for floodplain construction.
 - 3) Record and maintain a record of (i) the elevation (in relation to North American Vertical Datum 1988) of the lowest floor (including basement) of all new or substantially improved structures or (ii) the elevation to which new or substantially improved structures have been floodproofed.
 - 4) Notify adjacent communities/counties and the Department of Natural Resources prior to any proposed alteration or relocation of a watercourse and submit evidence of such notifications to the Federal Emergency Management Agency.
 - 5) Keep a record of all permits, appeals and such other transactions and correspondence pertaining to the administration of this Ordinance.
 - 6) Submit to the Federal Insurance Administrator an annual report concerning the community's participation, utilizing the annual report form supplied by the Federal Insurance Administrator.
 - 7) Notify the Federal Insurance Administrator of any annexations or modifications to the community's boundaries.
 - 8) Review subdivision proposals to ensure such proposals are consistent with the purpose of this ordinance and advise the Board of Adjustment, Planning and Zoning and City Council of potential conflict.
 - 9) Maintain the accuracy of the community's Flood Insurance Rate Maps when;
 - a. Development placed within the Floodway (Overlay) District results in any of the following:
 - (i) An increase in the Base Flood Elevations, or
 - (ii) Alteration to the floodway boundary
 - b. Development placed in Zones A, AE, AH, and A1-30 that does not include a designated floodway that will cause a rise of more than one foot in the base elevation; or
 - c. Development relocates or alters the channel.

Within 6 months of the completion of the development, the applicant shall submit to FEMA all scientific and technical data necessary for a Letter of Map Revision.

- 10) Perform site inspections to ensure compliance with the standards of this Ordinance.
- 11) Forward all requests for Variances to the Board of Adjustment for consideration. Ensure all requests include the information ordinarily submitted with applications as well as any additional information deemed necessary to the Board of Adjustment.

2. Floodplain Development Permit

- A. Permit Required - A Floodplain Development Permit issued by the Administrator shall be secured prior to any floodplain development (any man-made change to improved and unimproved real estate, including but not limited to buildings or other structures, mining, filling, grading, paving, storage of materials or equipment, excavation or drilling operations), including the placement of factory-built homes.
- B. Application for Permit - Application shall be made on forms furnished by the Administrator and shall include the following:
 - 1) Description of the work to be covered by the permit for which application is to be made.
 - 2) Description of the land on which the proposed work is to be done (i.e., lot, block, track, street address or similar description) that will readily identify and locate the work to be done.
 - 3) Location and dimensions of all structures and additions
 - 4) Indication of the use or occupancy for which the proposed work is intended.
 - 5) Elevation of the base flood.

- 6) Elevation (in relation to North American Vertical Datum 1988) of the lowest floor (including basement) of structures or of the level to which a structure is to be floodproofed.
 - 7) For structures being improved or rebuilt, the estimated cost of improvements and market value of the structure prior to the improvements.
 - 8) Such other information as the Administrator deems reasonably necessary (e.g., drawings or a site plan) for the purpose of this Ordinance.
- C. Action on Permit Application - The Administrator shall, within a reasonable time, make a determination as to whether the proposed floodplain development meets the applicable standards of this Ordinance and shall approve or disapprove the application. For disapprovals, the applicant shall be informed, in writing, of the specific reasons therefore. The Administrator shall not issue permits for variances except as directed by the Board of Adjustment.
- D. Construction and Use to be as Provided in Application and Plans - Floodplain Development Permits based on the basis of approved plans and applications authorize only the use, arrangement, and construction set forth in such approved plans and applications and no other use, arrangement or construction. Any use, arrangement, or construction at variance with that authorized shall be deemed a violation of this Ordinance. The applicant shall be required to submit certification by a professional engineer or land surveyor, as appropriate, registered in the State of Iowa, that the finished fill, structure floor elevations, floodproofing, or other flood protection measures were accomplished in compliance with the provisions of this Ordinance, prior to the use or occupancy of any structure.

185.05 - Establishment of Zoning (Overlay) Districts

The floodplain areas within the jurisdiction of this ordinance are hereby divided into the following districts:

1. Floodway (Overlay) District (FW) - those areas identified as Floodway on the Official Floodplain Zoning Map;
2. Floodway Fringe (Overlay) District (FF) - those areas identified as Zone AE on the Official Floodplain Zoning Map but excluding those areas identified as Floodway, and;
3. General Floodplain (Overlay) District (GF) - those areas identified as Zone A on the Official Floodplain Zoning Map.

The boundaries shall be as shown on the Official Floodplain Zoning Map. Within these districts, all uses not allowed as Permitted Uses are prohibited unless a variance to the terms of this ordinance is granted after due consideration by the Board of Adjustment.

185.06 - Floodway (Overlay) District (FW)

1. Permitted Uses

All development within the Floodway District shall be permitted to the extent that they are not prohibited by any other ordinance (or underlying zoning district) and provided they meet applicable performance standards of the Floodway District.

2. Performance Standards

All Floodway District uses allowed as a Permitted Use shall meet the following standards.

- A. No development shall be permitted in the Floodway District that would result in any increase in the base flood elevation. Consideration of the effects of any development on flood levels shall be based upon the assumption that an equal degree of development would be allowed for similarly situated lands.
- B. All development within the Floodway District shall:
 - 1) Be consistent with the need to minimize flood damage.
 - 2) Use construction methods and practices that will minimize flood damage.
 - 3) Use construction materials and utility equipment that are resistant to flood damage.
- C. No development shall affect the capacity or conveyance of the channel or floodway of any tributary to the main stream, drainage ditch or any other drainage facility or system.
- D. Structures, buildings, recreational vehicles, and sanitary and utility systems, if permitted, shall meet the applicable performance standards of the Floodway Fringe District and shall be constructed or aligned to present the minimum possible resistance to flood flows.
- E. Structures, if permitted, shall have a low flood damage potential and shall not be for human habitation.

- F. Storage of materials or equipment that are buoyant, flammable, explosive or injurious to human, animal or plant life is prohibited. Storage of other material may be allowed if readily removable from the Floodway District within the time available after flood warning.
- G. Watercourse alterations or relocations (channel changes and modifications) must be designed to maintain the flood carrying capacity within the altered or relocated portion. In addition, such alterations or relocations must be approved by the Department of Natural Resources.
- H. Any fill allowed in the floodway must be shown to have some beneficial purpose and shall be limited to the minimum amount necessary.
- I. Pipeline river or stream crossings shall be buried in the streambed and banks or otherwise sufficiently protected to prevent rupture due to channel degradation and meandering or due to the action of flood flows.

185.07 - Floodway Fringe (Overlay) District FF

1. Permitted Uses

All development within the Floodway Fringe District shall be permitted to the extent that they are not prohibited by any other ordinance (or underlying zoning district) and provided they meet applicable performance standards of the Floodway Fringe District.

2. Performance Standards

All development must be consistent with the need to minimize flood damage and meet the following applicable performance standards. Until a regulatory floodway is designated, no development may increase the Base Flood Elevation more than one (1) foot. The applicant will be responsible for providing the Department of Natural Resources with sufficient technical information to make such determination.

A. All development shall:

- 1) Be designed and adequately anchored to prevent flotation, collapse or lateral movement.
- 2) Use construction methods and practices that will minimize flood damage.
- 3) Use construction materials and utility equipment that are resistant to flood damage.

- B. Residential structures - All new or substantially improved residential structures shall have the lowest floor, including basement, elevated a minimum of two (2) feet above the base flood elevation. Construction shall be upon compacted fill which shall, at all points, be no lower than 2.0 ft. above the base flood elevation and extend at such elevation at least 18 feet beyond the limits of any structure erected thereon. Alternate methods of elevating (such as piers or extended foundations) may be allowed, subject to favorable consideration by the Board of Adjustment, where existing topography, street grades, or other factors preclude elevating by fill. In such cases, the methods used must be adequate to support the structure as well as withstand the various forces and hazards associated with flooding.

All new residential structures located in areas that would become isolated due to flooding of surrounding ground shall be provided with a means of access that will be passable by wheeled vehicles during the base flood. However, this criterion shall not apply where the Administrator determines there is sufficient flood warning time for the protection of life and property. When estimating flood warning time, consideration shall be given to the criteria listed in 567-75.2(3), Iowa Administrative Code.

- C. Non-residential structures - All new or substantially improved non-residential structures shall have the lowest floor (including basement) elevated a minimum of two (2) feet above the base flood elevation, or together with attendant utility and sanitary systems, be floodproofed to such a level. When floodproofing is utilized, a professional engineer registered in the State of Iowa shall certify that the floodproofing methods used are adequate to withstand the flood depths, pressures, velocities, impact and uplift forces and other factors associated with the base flood; and that the structure, below the base flood elevation is watertight with walls substantially impermeable to the passage of water. A record of the certification indicating the specific elevation (in relation to North American Vertical Datum 1988) to which any structures are floodproofed shall be maintained by the Administrator.

- D. All new and substantially improved structures

- 1) Fully enclosed areas below the “lowest floor” (not including basements) that are subject to flooding shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters. Designs for meeting this requirement must either be certified by a registered professional engineer or meet or exceed the following minimum criteria:
 - a. A minimum of two (2) openings, with positioning on at least two (2) walls, having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding shall be provided.
 - b. The bottom of all openings shall be no higher than one foot above grade.
 - c. Openings may be equipped with screens, louvers, valves, or other coverings or devices provided they permit the automatic entry and exit of floodwaters.

Such areas shall be used solely for parking of vehicles, building access and low damage potential storage. Where the distance between the floor and ceiling of the fully enclosed area below the “lowest floor” is five (5) feet or more, the applicant shall be required to sign and record with the Polk County Recorder a Non-Conversion Agreement that ensures the lower enclosed area remains compliant with the criteria outlined in Section 185.07(2)(D)(1).

- 2) New and substantially improved structures must be designed (or modified) and adequately anchored to prevent flotation, collapse, or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy.
- 3) New and substantially improved structures shall be constructed with electric meter, electrical service panel box, hot water heater, heating, air conditioning, ventilation equipment (including ductwork), and other similar machinery and equipment elevated (or in the case on non-residential structures, optionally floodproofed to) a minimum of two (2) feet above the base flood elevation.
- 4) New and substantially improved structures shall be constructed with plumbing, gas lines, water/gas meters and other similar service utilities either elevated (or in the case of non-residential structures, optionally floodproofed to) a minimum of two (2) feet above the base flood elevation or designed to be watertight and withstand inundation to such a level.

E. Factory-built homes

- 1) All new and substantially improved factory-built homes, including those placed in existing factory-built home parks or subdivisions, shall be elevated on a permanent foundation such that the lowest floor of the structure is a minimum of two (2) feet above the base flood elevation.
- 2) All new and substantially improved factory-built homes, including those placed in existing factory-built home parks or subdivisions, shall be anchored to resist flotation, collapse, or lateral movement. Anchorage systems may include, but are not limited to, use of over-the-top or frame ties to ground anchors as required by the State Building Code.

F. Utility and Sanitary Systems

- 1) On-site wastewater disposal and water supply systems shall be located or designed to avoid impairment to the system or contamination from the system during flooding.
- 2) All new and replacement sanitary sewage systems shall be designed to minimize or eliminate infiltration of flood waters into the system as well as the discharge of effluent into flood waters. Wastewater treatment facilities (other than on-site systems) shall be provided with a level of flood protection equal to or greater than two (2) feet above the base flood elevation.
- 3) New or replacement water supply systems shall be designed to minimize or eliminate infiltration of flood waters into the system. Water supply treatment facilities (other than on-site systems) shall be provided with a level of protection equal to or greater than two (2) feet above the base flood elevation.
- 4) Utilities such as gas or electrical systems shall be located and constructed to minimize or eliminate flood damage to the system and the risk associated with such flood damaged or impaired systems.

- G. Storage of materials and equipment** that are flammable, explosive or injurious to human, animal or plant life is prohibited unless elevated a minimum of two (2) feet above the base flood elevation. Other material and equipment must either be similarly elevated or (i) not be subject to major flood damage

and be anchored to prevent movement due to flood waters or (ii) be readily removable from the area within the time available after flood warning.

- H. Flood control structural works such as levees, flood walls, etc. shall provide, at a minimum, protection from the base flood with a minimum of 3 ft. of design freeboard and shall provide for adequate interior drainage. In addition, the Department of Natural Resources shall approve structural flood control works.
- I. Watercourse alterations or relocations must be designed to maintain the flood carrying capacity within the altered or relocated portion. In addition, the Department of Natural Resources must approve such alterations or relocations.
- J. Subdivisions (including factory-built home parks and subdivisions) shall be consistent with the need to minimize flood damages and shall have adequate drainage provided to reduce exposure to flood damage. Development associated with subdivision proposals (including the installation of public utilities) shall meet the applicable performance standards of this Ordinance. Subdivision proposals intended for residential use shall provide all lots with a means of access which will be passable by wheeled vehicles during the base flood. Proposals for subdivisions greater than five (5) acres or fifty (50) lots (whichever is less) shall include base flood elevation data for those areas located within the Floodway Fringe (Overlay) District.
- K. Accessory Structures to Residential Uses
 - 1) Detached garages, sheds, and similar structures that are incidental to a residential use are exempt from the base flood elevation requirements where the following criteria are satisfied:
 - a. The structure shall be designed to have low flood damage potential. Its size shall not exceed 600 sq. ft. in size. Those portions of the structure located less than 1 foot above the base flood elevation must be constructed of flood-resistant materials.
 - b. The structure shall be used solely for low flood damage potential purposes such as vehicle parking and limited storage. The structure shall not be used for human habitation.
 - c. The structure shall be constructed and placed on the building site so as to offer minimum resistance to the flow of floodwaters.
 - d. The structure shall be firmly anchored to prevent flotation, collapse, and lateral movement which may result in damage to other structures.
 - e. The structure's service facilities such as electrical and heating equipment shall be elevated or floodproofed to at least one foot above the base flood elevation.
 - f. The structure's walls shall include openings that satisfy the provisions of Section 185.07(2)(D)(1) of this Ordinance.
 - 2) Exemption from the base flood elevation requirements for such a structure may result in increased premium rates for flood insurance coverage of the structure and its contents.
- L. Recreational Vehicles
 - 1) Recreational vehicles are exempt from the requirements of 185.07(2)(E) of this Ordinance regarding anchoring and elevation of factory-built homes when the following criteria are satisfied:
 - a. The recreational vehicle shall be located on the site for less than 180 consecutive days, and,
 - b. The recreational vehicle must be fully licensed and ready for highway use. A recreational vehicle is ready for highway use if it is on its wheels or jacking system and is attached to the site only by quick disconnect type utilities and security devices and has no permanently attached additions.
 - 2) Recreational vehicles that are located on the site for more than 180 consecutive days or are not ready for highway use must satisfy requirements of 185.07(2)(E) of this Ordinance regarding anchoring and elevation of factory-built homes.
- M. Pipeline river and stream crossings shall be buried in the streambed and banks, or otherwise sufficiently protected to prevent rupture due to channel degradation and meandering.
- N. Maximum Damage Potential Development - All new or substantially improved maximum damage potential development shall have the lowest floor (including basement) elevated a minimum of two (2) feet above the elevation of the 500-year flood, or together with attendant utility and sanitary systems, be floodproofed to such a level. When floodproofing is utilized, a professional engineer registered in the State of Iowa shall certify that the floodproofing methods used are adequate to withstand the flood depths, pressures, velocities, impact and uplift forces and other factors associated with the 0.2% annual chance flood; and that the structure, below the 0.2% annual chance flood elevation is watertight

with walls substantially impermeable to the passage of water. A record of the certification indicating the specific elevation (in relation to North American Vertical Datum 1988) to which any structures are floodproofed shall be maintained by the Administrator. Where 0.2% chance flood elevation data has not been provided in the Flood Insurance Study, the Iowa Department of Natural Resources shall be contacted to compute such data. The applicant will be responsible for providing the Department of Natural Resources with sufficient technical information to make such determinations.

185.08 - General Floodplain (Overlay) District (GF)

1. Permitted Uses

- A. All development within the General Floodplain District shall be permitted to the extent that they are not prohibited by any other ordinance (or underlying zoning district) and provided they meet the applicable performance standards of the General Floodplain District.
- B. Any development which involves placement of structures, factory-built homes, fill or other obstructions, storage of materials or equipment, excavation or alteration of a watercourse shall be reviewed by the Department of Natural Resources to determine (i) whether the land involved is either wholly or partly within the floodway or floodway fringe and (ii) the base flood elevation. The applicant shall be responsible for providing the Department of Natural Resources with sufficient technical information to make the determination.
- C. Review by the Iowa Department of Natural Resources is not required for the proposed construction of new or replacement bridges or culverts where:
 - 1) The bridge or culvert is located on a stream that drains less than two (2) square miles, and
 - 2) The bridge or culvert is not associated with a channel modification that constitutes a channel change as specified in 567-71.2(2), Iowa Administrative Code.

2. Performance Standards

- A. All development, or portions thereof, to be located in the floodway as determined by the Department of Natural Resources shall meet the applicable provisions and standards of the Floodway (Overlay) District, Section 185.06.
- B. All development, or portions thereof, to be located in the floodway fringe as determined by the Department of Natural Resources shall meet the applicable provisions and standards of the Floodway Fringe (Overlay) District, Section 185.07.

185.09 - Reserved

185.10 - Appointment and Duties of Board of Adjustment

1. Appointment and Duties of Board of Adjustment - A Board of Adjustment is hereby established which shall hear and decide (i) appeals and (ii) requests for variances to the provisions of this ordinance, and shall take any other action which is required of the Board.
2. Appeals - Where it is alleged there is any error in any order, requirement, decision, or determination made by an administrative official in the enforcement of this ordinance, the aggrieved party may appeal such action. The notice of appeal shall be filed with the Board of Adjustment and with the official from whom the appeal is taken and shall set forth the specific reason for the appeal. The official from whom the appeal is taken shall transmit to the Board of Adjustment all the documents constituting the record upon which the action appealed from was taken.
3. Variance - The Board of Adjustment may authorize upon request in specific cases such variances from the terms of this Ordinance that will not be contrary to the public interest where, owing to special conditions, a literal enforcement of the provisions of this Ordinance will result in unnecessary hardship. Variances granted must meet the following applicable standards:
 - A. Variances shall only be granted upon: (i) a showing of good and sufficient cause, (ii) a determination that failure to grant the variance would result in exceptional hardship to the applicant, and (iii) a determination that the granting of the variance will not result in increased flood heights, additional threats to public safety, extraordinary public expense, create nuisances, cause fraud on or victimization of the public or conflict with existing local codes or ordinances.
 - B. Variances shall not be issued within any designated floodway if any increase in flood levels during the base flood would result. Consideration of the effects of any development on flood levels shall be based

upon the assumption that an equal degree of development would be allowed for similarly situated lands.

- C. Variances shall only be granted upon a determination that the variance is the minimum necessary, considering the flood hazard, to afford relief.
- D. In cases where the variance involves a lower level of flood protection for structures than what is ordinarily required by this Ordinance, the applicant shall be notified in writing over the signature of the Administrator that: (i) the issuance of a variance will result in increased premium rates for flood insurance up to amounts as high as \$25 for \$100 of insurance coverage and (ii) such construction increases risks to life and property.
- E. All variances granted shall have the concurrence or approval of the Department of Natural Resources.

4. Hearings and Decisions of the Board of Adjustment

- A. Hearings. Upon the filing with the Board of Adjustment of an Appeal or a request for a Variance, the Board shall hold a public hearing. The Board shall fix a reasonable time for the hearing and give public notice thereof, as well as due notice to parties in interest. At the hearing, any party may appear in person or by agent or attorney and present written or oral evidence. The Board may require the appellant or applicant to provide such information as is reasonably deemed necessary and may request the technical assistance and/or evaluation of a professional engineer or other expert person or agency, including the Department of Natural Resources.
- B. Decisions. The Board shall arrive at a decision on an Appeal or Variance within a reasonable time. In passing upon an Appeal, the Board may, so long as such action is in conformity with the provisions of this ordinance, reverse or affirm, wholly or in part, or modify the order, requirement, decision, or determination appealed from, and it shall make its decision, in writing, setting forth the findings of fact and the reasons for its decision. In granting a Variance, the Board shall consider such factors as contained in this section and all other relevant sections of this ordinance and may prescribe such conditions as contained in Section 185.10(4)(B)(2).

- 1) Factors Upon Which the Decision of the Board of Adjustment Shall be Based. In passing upon applications for Variances, the Board shall consider all relevant factors specified in other sections of this Ordinance and:
 - a. The danger to life and property due to increased flood heights or velocities caused by encroachments.
 - b. The danger that materials may be swept on to other land or downstream to the injury of others.
 - c. The proposed water supply and sanitation systems and the ability of these systems to prevent disease, contamination and unsanitary conditions.
 - d. The susceptibility of the proposed facility and its contents to flood damage and the effect of such damage on the individual owner.
 - e. The importance of the services provided by the proposed facility to the City.
 - f. The requirements of the facility for a floodplain location.
 - g. The availability of alternative locations not subject to flooding for the proposed use.
 - h. The compatibility of the proposed use with existing development and development anticipated in the foreseeable future.
 - i. The relationship of the proposed use to the comprehensive plan and floodplain management program for the area.
 - j. The safety of access to the property in times of flood for ordinary and emergency vehicles.
 - k. The expected heights, velocity, duration, rate of rise and sediment transport of the flood water expected at the site.
 - l. The cost of providing governmental services during and after flood conditions, including maintenance and repair of public utilities (sewer, gas, electrical and water systems), facilities, streets and bridges.
 - m. Such other factors which are relevant to the purpose of this Ordinance.
- 2) Conditions Attached to Variances - Upon consideration of the factors listed above, the Board of Adjustment may attach such conditions to the granting of variances as it deems necessary to further the purpose of this Ordinance. Such conditions may include, but not necessarily be limited to:
 - a. Modification of waste disposal and water supply facilities.

- b. Limitation of periods of use and operation.
 - c. Imposition of operational controls, sureties, and deed restrictions.
 - d. Requirements for construction of channel modifications, dikes, levees, and other protective measures, provided such are approved by the Department of Natural Resources and are deemed the only practical alternative to achieving the purpose of this Ordinance.
 - e. Floodproofing measures shall be designed consistent with the flood protection elevation for the particular area, flood velocities, duration, rate of rise, hydrostatic and hydrodynamic forces, and other factors associated with the regulatory flood. The Board of Adjustment shall require that the applicant submit a plan or document certified by a registered professional engineer that the floodproofing measures are consistent with the regulatory flood protection elevation and associated flood factors for the particular area.
5. Appeals to the Court - Any person or persons, jointly or severally, aggrieved by any decision of the Board of Adjustment may present to a court of record a petition, duly verified, setting forth that such decision is illegal, in whole or in part, specifying the grounds of the illegality. Such petition shall be presented to the court within thirty days after the filing of the decision in the office of the Board.

185.11 - Nonconforming Uses

1. A structure or the use of a structure or premises which was lawful before the passage or amendment of this Ordinance, but which is not in conformity with the provisions of this Ordinance, may be continued subject to the following conditions:
 - A. If such use is discontinued for six (6) consecutive months, any future use of the building premises shall conform to this Ordinance.
 - B. Uses or adjuncts thereof that are or become nuisances shall not be entitled to continue as nonconforming uses.
 - C. If any nonconforming use or structure experiences Substantial Damage by any means, including flood, it shall not be reconstructed if the cost is more than fifty (50) percent of the market value of the structure before the damage occurred, unless it is reconstructed in conformity with the provisions of this Ordinance. This limitation does not include the cost of any alteration to comply with existing state or local health, sanitary, building or safety codes or regulations or the cost of any alteration of a structure listed on the National Register of Historic Places, provided that the alteration shall not preclude its continued designation.
2. Except as provided in Section 185.11(1)(B), any use which has been permitted as a Variance shall be considered a conforming use.

185.12 - Penalties for Violation

Violations of the provisions of this Ordinance or failure to comply with any of the requirements (including violations of conditions and safeguards established in connection with grants of Variances) shall constitute a misdemeanor. Any person who violates this Ordinance or fails to comply with any of its requirements shall upon conviction thereof be fined not more than \$500.00 (five hundred dollars) or imprisoned for not more than 30 (thirty) days. Each day such violation continues shall be considered a separate offense. Nothing herein contained prevent the City of Windsor Heights from taking such other lawful action as is necessary to prevent or remedy violation.

185.13 - Amendments

The regulations and standards set forth in this Ordinance may from time to time be amended, supplemented, changed, or repealed. No amendment, supplement, change, or modification shall be undertaken without prior approval of the Department of Natural Resources.

ADOPTED AND PASSED by the City Council of the
City of this

_____ day
of _____, 20 ____ .

Seal of City

Mayor

Attest:

City Clerk

Public Hearing
Date: _____

Publication Date: _____

Effective Date: _____

Note: All Ordinances must be properly certified.



**STAFF REPORT
CITY COUNCIL**
June 3, 2024

TO: CITY COUNCIL

FROM:

SUBJECT: Mayor, Council Reports and Committee Updates, and Administration Reports

GENERAL INFORMATION

ATTACHMENTS

None